CENTRALCITY 2035

Volume 3B
WILLAMETTE RIVER CENTRAL REACH NATURAL RESOURCES INVENTORY

Proposed Draft
June 20, 2016

Bureau of Planning and Sustainability
Innovation. Collaboration. Practical Solutions.
City of Portland, Oregon
Charlie Hales, Mayor • Susan Anderson, Director

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Maps, Tables and Figures

Maps for each Inventory Site, included in section 3c:

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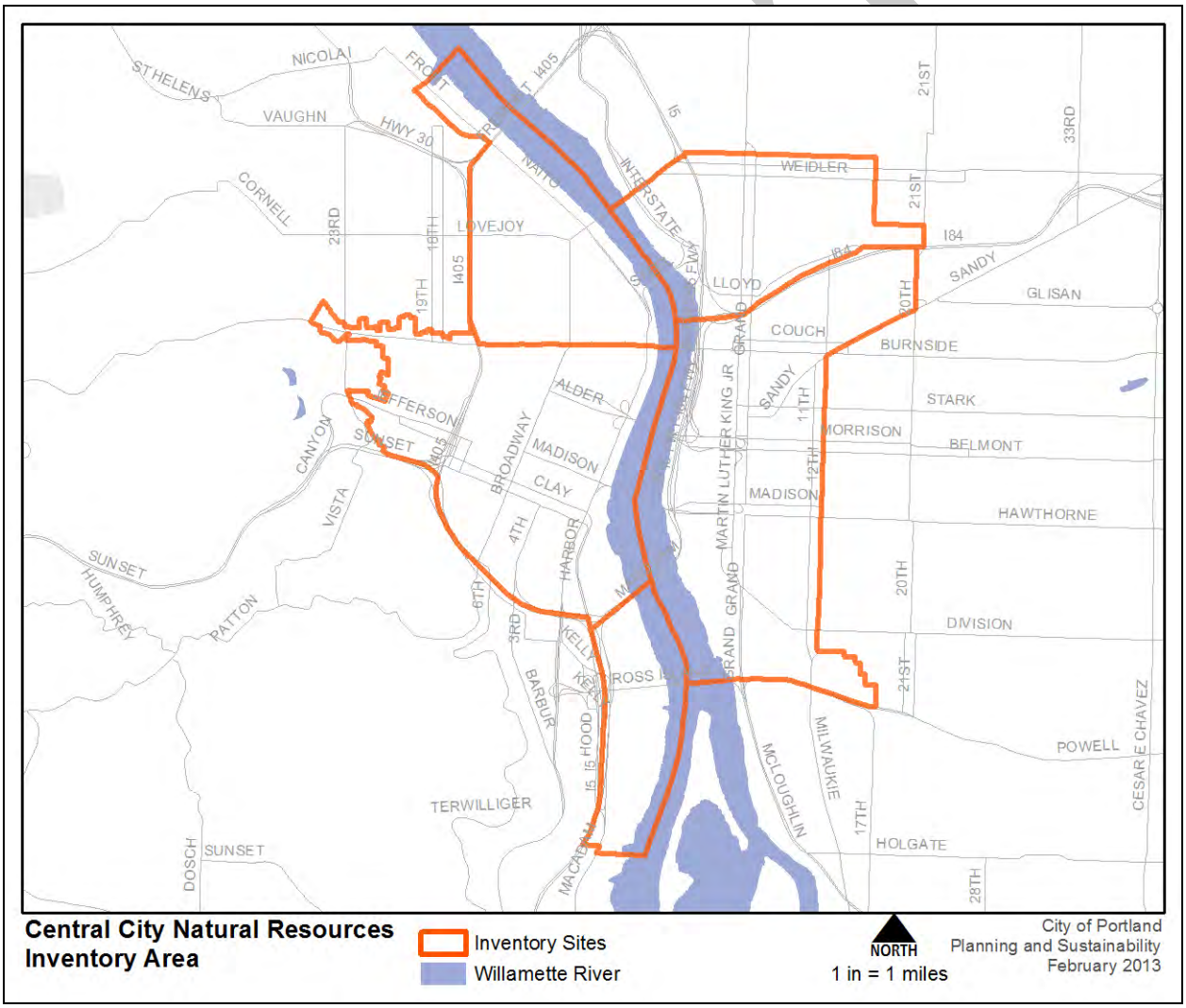
EXECUTIVE SUMMARY

Background and Process

As part of the River Plan / Central Reach and Central City 2035 (CC2035) projects, the City is updating the existing environmental information and management tools to protect and enhance natural resources. This update is needed to aide in meeting watershed health goals and advancing the City's compliance with local, regional, state and federal regulations. The first step is to produce an inventory of existing natural resources.

The Central City Natural Resources Inventory (CCNRI) describes the existing natural resources (e.g., vegetation, floodplain) in the CC2035 planning area, and evaluates the functions and values they provide (e.g., flood storage, microclimate and shade).



The inventory approach is based on the science and methodology that Metro used to produce a regional inventory of riparian corridors and wildlife habitat. Metro's inventory was adopted as part of Title 13, Nature in Neighborhoods.

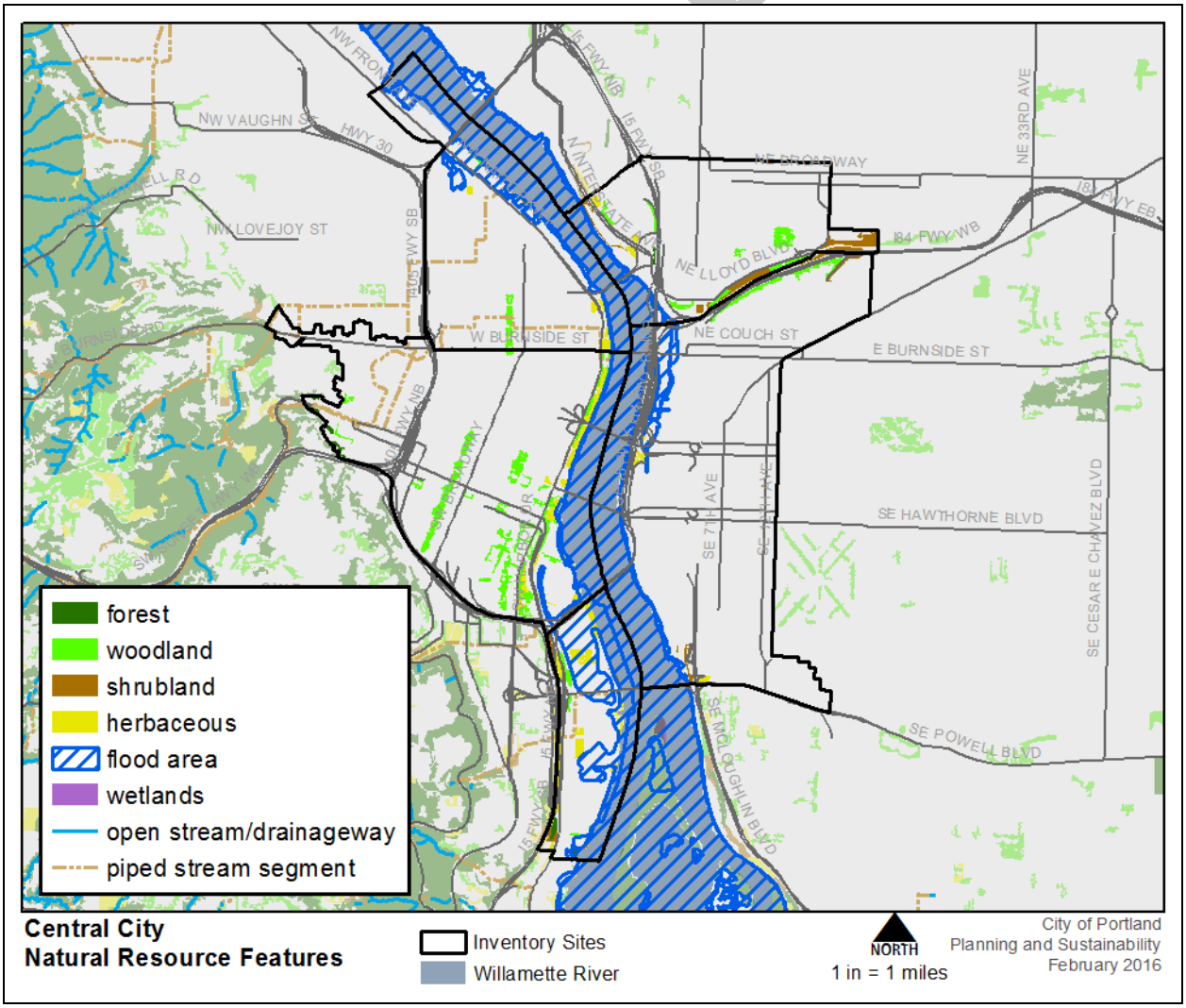
The City has refined the regional inventory to include recent scientific information about resources in Portland. The City's inventory methodology is documented in the *Natural Resources Inventory Update, Riparian Corridors and Wildlife Habitat Project Report*, which was adopted by City Council in October 2012. The *Project Report* is available online:
www.portlandoregon.gov/bps/article/421364

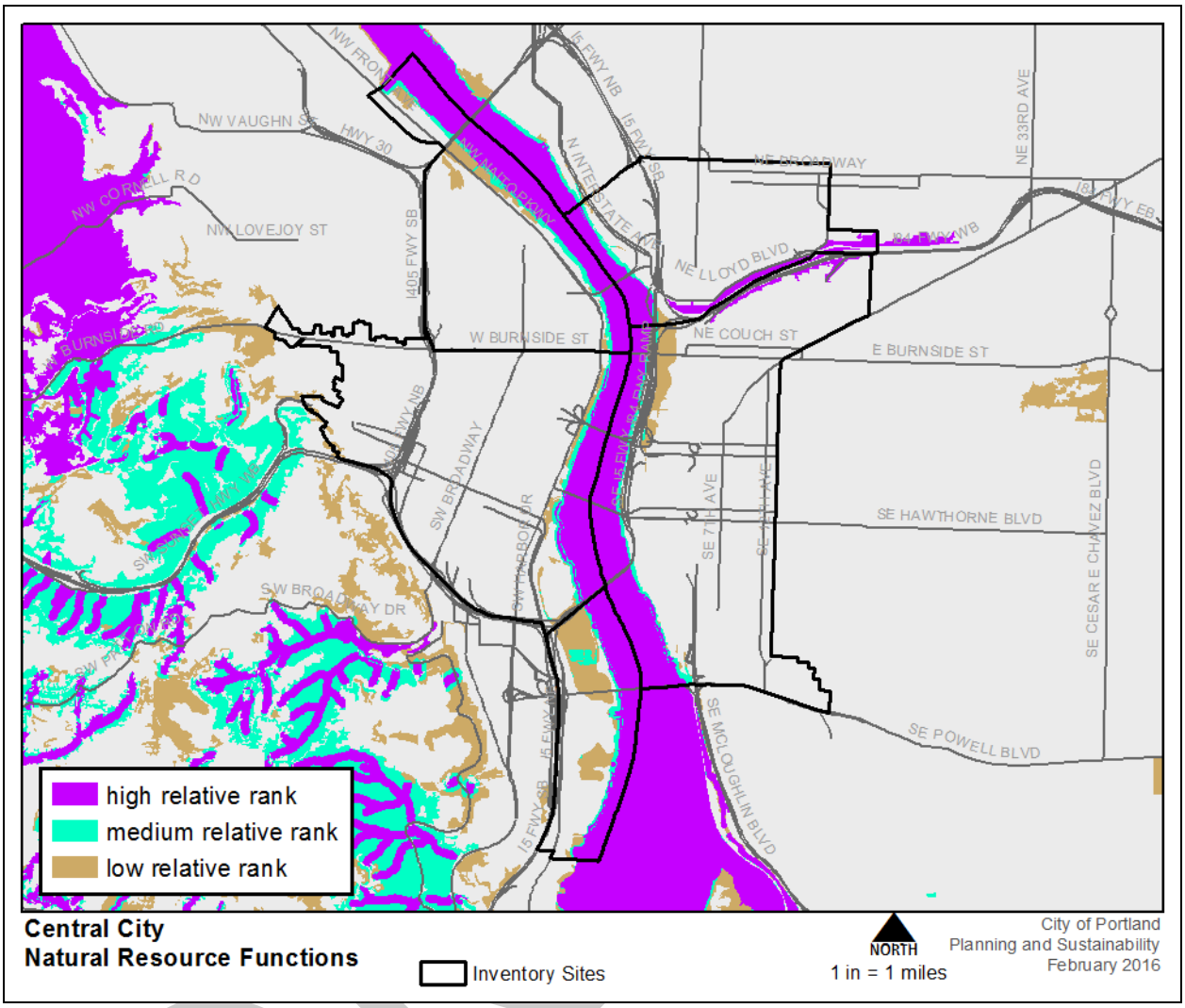
The CCNRI is a technical document and does not propose any new programs or regulations. The CCNRI will inform discussion through CC2035 regarding environmental policies, priorities and regulations.

Results

The CCNRI contains narrative descriptions of the natural resource features and functions in the CC2035 planning area. In addition to the narratives, two GIS models are used to display the functions provided by the features and produce ranks of high, medium and low that depict the relative amount of functions provided by any given feature. For example, a large stand of trees located adjacent to the river provides numerous functions, such as shading the in-water habitat, and contributing leaf litter, structure and nutrients to the river. In a situation like this, the trees would receive a high relative rank for riparian corridor functions.

The following two maps show the features and the results of the geographic information system (GIS) modeling for the CC2035 planning area.





Below is a brief summary of the inventory results.

The Willamette River

The Lower Willamette River flows through the CC2035 planning area, providing the primary migration corridor for Endangered Species Act (ESA) listed Chinook, coho, and chum salmon, and steelhead and bull trout, to the Columbia River. These fish depend on clean, cool water and shallow areas for resting and feeding during migration. There are numerous small pockets of shallow water habitat along the Willamette's Central Reach.

The Willamette River is part of the Pacific Flyway and is utilized by more than 200 resident and migratory bird species. Shorebirds and waterfowl use shallow water areas and exposed sand and mud. Waterfowl and gulls use the vegetated shoreline along the river. Peregrine falcon nest on Willamette River bridges and perch on pilings and buildings.

The Willamette River receives a high relative rank for riparian corridor functions and wildlife habitat and it is designated a *Special Habitat Area* for ESA-listed fishes.

River Banks

The features and quality of the Willamette's river banks are directly tied to the river itself. These riparian corridors provide the transition between the river, stream banks and upland areas.

Vegetation on the banks, even in a narrow strip, is important to watershed health. Native plant species generally provide a broader suite of benefits – such as varied wildlife food sources and effective slope stabilization – than non-native plants. However, plants of all types, including invasive species, provide functions such as water storage, nutrient cycling and cover and nesting opportunities for wildlife. Vegetated river banks receive a high or medium relative rank for riparian corridor functions.

The river banks in the Central Reach are impacted by development, fill and hardening. Hardened, non-vegetated river banks do not provide a suite of riparian corridor functions like vegetated river banks do. However, because of the direct impact and important relationship between all river banks and in-water habitat, hardened, non-vegetated river banks are still identified in the inventory as a feature. They receive a low relative rank.

Flood Area

Most of the flood area in the Central Reach is comprised of the Willamette River itself and the river banks. Open water and vegetated flood areas provide a host of important functions, including water storage, nutrient cycling, microclimate and channel migration. In some locations, the flood area extends over the banks and into developed lands. The developed flood area provides for water storage during large storm events like the flood in early 1996.

The vegetated flood area receives a high or medium relative rank for riparian corridor functions, while the developed flood area receives a low relative rank to acknowledge only the flood storage capacity it provides.

Trees and Landscape Vegetation

For purposes of the CCNRI mapping and modeling, only patches of trees that are at least one-half acre in size are assigned a relative rank for wildlife habitat. In the Central City there are no patches of tree canopy that large. However, smaller landscaped areas and individual street trees, while not receiving a rank in the inventory, do provide functions including cleaning and cooling the air and water, capturing greenhouse gases, capturing and uptaking stormwater, reducing energy demand and providing wildlife habitat.

Across the entire planning area, neo-tropical migratory songbirds utilize landscape trees and shrubs for foraging and resting as they pass through during migration. Resident and migratory songbirds, raptors and hummingbirds use mature tree canopy along the North and South Park blocks, other street trees, patches of vegetation and landscaped areas.

Along I-84 is a steep, vegetated ravine called Sullivan's Gulch. A mix of tall native trees, including Big Leaf Maple, and non-native (primarily invasive) understory, including Himalayan Blackberry, provide habitat for multiple species. Migratory and resident birds, including red-tailed hawks, Bewick's wren, song sparrow and spotted towhee, nest in Sullivan's Gulch. White crowned sparrow and Anna's hummingbird were observed during a Spring 2011 site visit. The slope is prone to landslides and wild fire. Sullivan's Gulch is designated a *Special Habitat Area* and receives a high relative rank as a unique feature in the Central City.

CHAPTER 1. INTRODUCTION

Report Purpose, Organization and Uses

The purpose of this inventory report is to provide useful, current and accessible information on the location of existing natural resource features and their functions for Portland's Central City. The report includes descriptions and maps of the current relative condition of riparian corridors and wildlife habitat located within the Willamette River Central Reach, river banks, flood plains and upland features.

The report is organized into chapters that provide a context for inventory work, describe the inventory methodology and present an inventory of natural resources for the Central City. The following is a brief summary of the material contained in each chapter of this document:

Chapter 1: Introduction – This chapter provides background information and describes the regulatory context for the inventory.

Chapter 2: Project Approach and Methodology Overview – This chapter provides an overview of the citywide inventory project approach and the methodology used to identify and evaluate riparian corridor functions and wildlife habitat attributes. There is also a section describing additional work done specifically for the Central City inventory report.

Chapter 3: Central City Natural Resources Inventory – Includes a general overview of the Willamette River basin in Portland. The overview describes general land uses, transportation, commerce and existing natural resources. Following the overview is a summary of the Willamette River in the Central City, also known as the Willamette River Central Reach. This summary includes hydrology, bathymetry, bank conditions, and fish and wildlife species using the river. A description of natural resources for each inventory site is presented. Descriptions include the presence, type and extent of existing waterways, flood areas, wetlands, vegetation, and fish and wildlife habitats and species. Alterations and disturbances, such as flood control and invasive species, are also discussed. For each inventory site, an evaluation of current riparian corridor functions and wildlife habitat is included, followed by a series of maps, aerial photographs, water-related features, vegetation features, riparian corridor relative ranks, wildlife habitat relative ranks and combined riparian/wildlife habitat relative ranks.

Relation to Central City 2035

Central City 2035 is a comprehensive, multi-objective plan for the Central City and the Willamette River waterfront. It will update and replace the 1987 Willamette Greenway Plan, zoning code and design guidelines, which serve as Portland's compliance with State Planning Goal 15: Willamette River Greenway and the 1988 Central City Plan. The 1987 Willamette Greenway Plan is currently being updated through the River Plan. The River Plan is a comprehensive, multi-objective plan for the Willamette River waterfront and adjacent lands. The River Plan is being carried out in phases, each focusing on a different reach of the Willamette River. The second phase of the River Plan is called the Central Reach. The Central Reach phase of the River Plan is being carried in conjunction with the City's update of the Central City Plan.

Over the past 25 years, planning for natural resources along the Willamette River has occurred through the following citywide initiatives:

Willamette Greenway Plan – The Willamette Greenway Plan was first adopted in 1979 to fulfill the requirements of Statewide Planning Goal 15: Willamette River Greenway. The plan was adopted in 1987. The purpose of Goal 15 is "to protect, conserve, enhance and maintain the natural, scenic, historical, agricultural, economic and recreational qualities of lands along the Willamette River as the Willamette River Greenway." The Central City Natural Resources Inventory (CCNRI) is an update of a

portion of the Willamette River Wildlife Habitat Inventory that supported the Willamette Greenway Plan.

River Renaissance Vision and River Renaissance Strategy – In March 2001, the Portland City Council adopted the River Renaissance Vision by resolution. The Vision articulates a set of goals and aspirations for a revitalized river. It includes five mutually supportive and interrelated themes that proclaim Portland's aspirations to:

- Ensure a clean and healthy river for fish, wildlife, and people
- Maintain and enhance the city's prosperous working harbor
- Embrace the river and its banks as Portland's front yard
- Create vibrant waterfront districts and neighborhoods
- Promote partnerships, leadership and education

In December 2004, the Portland City Council adopted the River Renaissance Strategy by resolution. The Strategy is intended to lead the City toward the future outlined in the River Renaissance Vision. The Strategy serves as the City's blueprint for river-related activities and investments by establishing policy guidance, progress measures and an action agenda.

The River Concept – The River Concept was adopted by the Portland City Council in April 2006 as a guiding document for the River Plan. The Concepts synthesizes river-related planning over the last decade. The guidance for the Central Reach includes:

Pearl District – The riverfront will play a renewed role in the future of downtown and the Pearl District. North of Waterfront Park, redevelopment of the Centennial Mill riverfront will offer a new public space that completes the Central City waterfront park system. This revitalized area will serve as the Pearl and Northwest Districts' waterfront connection. Sustainable development practices will provide stormwater management and energy-efficient design.

Central Eastside – The Central Eastside will continue to support light industry while developing into a center for new urban industries that create jobs and provide products and services to the region. Capitalizing on the district's proximity to the river, cultural and recreational uses will add vitality to the area. Sustainable practices, including green streets and ecoroofs, will be incorporated into new development.

South Waterfront – South Waterfront will grow into a vibrant Central City neighborhood that derives its character and identity from its relationship to the river and Ross Island. It will feature science and technology-sector jobs, diverse housing options, mixed-use buildings that include retail, restaurants and internal open spaces, and a waterfront designed to support fish and wildlife and provide people with a natural retreat from the urban environment.

Portland Watershed Management Plan – The Portland Watershed Management Plan was adopted by the Portland City Council in March 2006. The Plan describes the approach that will be used to evaluate conditions in Portland's urban watersheds and recommends projects to improve watershed health. The overarching themes of the Plan are to achieve improved watershed health through: (1) protection and enhancement of remaining natural resources, (2) low-impact development, (3) installation of innovative stormwater infrastructure, (4) modern and effective approaches to City repair and maintenance of existing infrastructure, and (5) an integrated City response to local, state and federal environmental requirements.

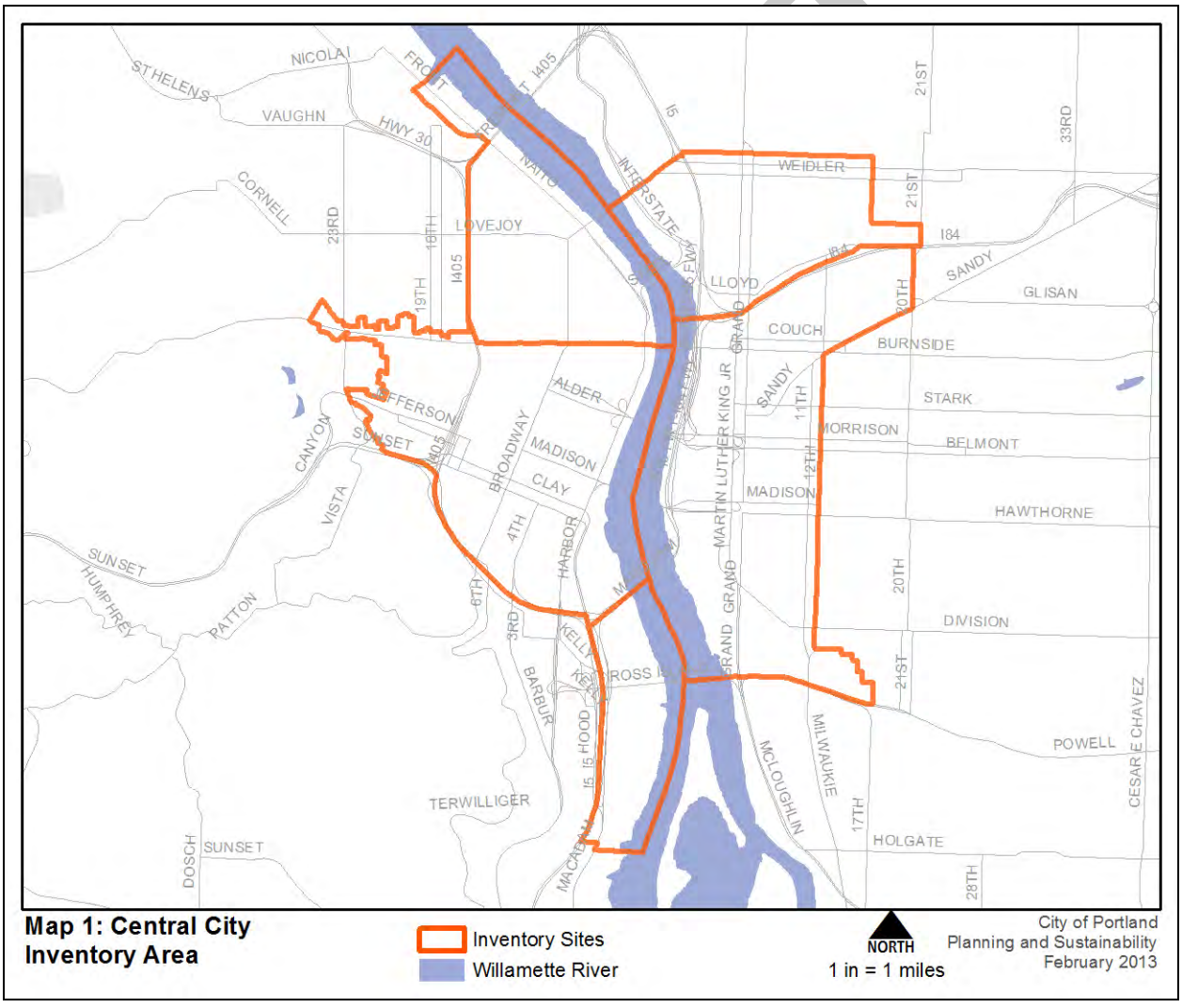
The inventory is intended to inform and support a broad array of City and community activities relating to the Central City 2035 planning area. Such activities include long-range planning, implementing and updating City programs to manage natural resources, identifying priority areas for restoration, enhancement, and public acquisition, designing development and redevelopment projects, and meeting regional, state and federal regulatory requirements.

Over the long term, this inventory can help the City achieve its River Renaissance Vision for clean and healthy rivers, and meet its watershed health goals. The inventory will inform the development of

regulatory and non-regulatory tools through Central City 2035 and The River Plan. The City also intends to submit this inventory to Metro as part of the City's compliance with the Title 13, Nature in Neighborhoods program.

Inventory Area

The Central City inventory area extends from south of the Ross Island Bridge to the Broadway Bridge and is characterized primarily by commercial/mixed-use development on the west side of the Willamette and industrial uses on the east side of the river. The inventory includes the Willamette River, other natural resource features and developed lands adjacent to the natural resource features. The area encompasses, and is larger than, the area currently contained within the City's Willamette Greenway Overlay Zones, and is generally coincident with the boundaries of the Central City 2035 planning boundary (Map 1).



Background

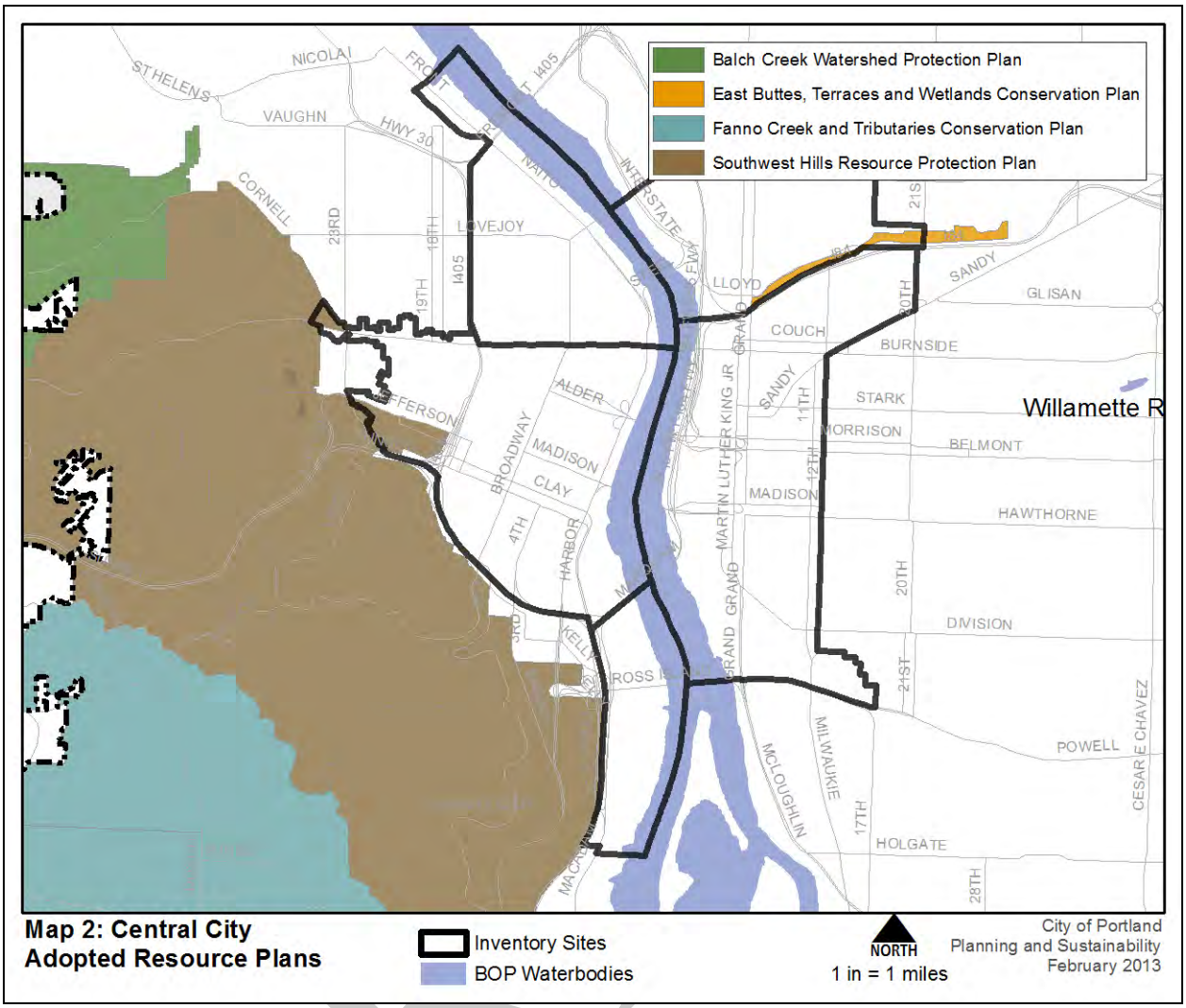
More than 30 years ago, the City began developing natural resource inventories to support natural resources planning and management decisions. The first Willamette River inventory was completed in 1975 for the Lower Willamette River Management Plan. The inventory provided generalized information about relative wildlife habitat values. It was the first of 10 inventories the City completed for different areas in Portland to meet state land-use planning goals.

The second Willamette River inventory was adopted by the City in 1986. It provided more detailed information about specific habitat sites along the river, including information about existing conditions and potential restoration options. A Wildlife Habitat Assessment (WHA) methodology was used to document and rank existing conditions and identify potential opportunities for habitat improvement. The inventory was divided into 24 segments or zones along the Willamette River in Portland. Each zone included anywhere from two to 14 habitat sites, depending on the complexity of the zone. Highly ranked habitat sites were identified as Rank I, with lesser value habitat sites identified as Rank II, III, IV or V.

Both the 1975 and the 1986 Willamette River inventories were developed for the City's Willamette Greenway program. The Greenway program was established primarily to meet requirements of the Oregon State Land Use Goal 15: Willamette River Greenway. The program includes policies, design guidelines, overlay zone maps and regulations to meet multiple objectives along the Willamette River.

Between 1991 and 2002, the City adopted several other natural resource inventories as part of a program to comply with of the Oregon State Land Use Goal 5. The following inventories address resources within, or adjacent to, the Central City Planning Area (Map 2):

- Balch Creek Watershed Protection Plan (1991)
- East Buttes, Terraces and Wetlands Conservation Plan (1993)
- Fanno Creek and Tributaries Conservation Plan (1993)
- Southwest Hills Resource Protection Plan (1992)



Resource values identified in the existing inventories were determined based on a number of factors, including quality, quantity, diversity, interspersion and uniqueness. These inventories informed required Economic, Social, Environmental and Energy (ESEE) Analyses and the application of environmental overlay zones (maps and regulations) to protect important resources in these areas.

This Central City inventory represents additional honing of a recently developed citywide natural resource inventory to focus on conditions in the Central City and Willamette River Central Reach. Portland's citywide inventory information refines Metro's inventory of regionally significant fish and wildlife habitat. Metro adopted the regional inventory in September 2005 as part of the Title 13, Nature in Neighborhoods program. The citywide inventory reflects more current and higher resolution data, as well as information from additional scientific literature.

The information presented in this report updates the existing inventories based on current natural resource data, recent field assessments and resource evaluations. The work is also consistent with, and advances the goals outlined in, the Portland Watershed Management Plan and the Framework for Integrated Watershed Management, both of which were adopted by the City Council in 2005. These documents establish key ecological principles, restoration priorities and recommended strategies to protect and restore watershed health. Portland's watershed goals and objectives are provided in Appendix A.

Regulatory Context

Many federal, state, regional and local regulations and policies relate and are applicable to natural resources found in the Central City inventory area. Policies and regulations relating most directly to the development of the inventory are certain Oregon State Land Use Goals and portions of the Metro Urban Growth Management Functional Plan. These requirements are summarized below; Appendix B provides additional information about key state and federal natural resources regulations and policies.

State Land Use Planning Program

Comprehensive land use planning was mandated by the 1973 Oregon Legislature, primarily in response to population growth pressures on valuable farm and forest land. Since 1975, cities and counties in Oregon have been required to comply with Statewide Planning Goals. Today there are 19 goals that Oregon cities and counties must comply with through the adoption and maintenance of local comprehensive plans. Portland adopted its first comprehensive plan in 1981 to satisfy the requirements of the state planning program.

Multiple state planning goals apply to the inventory area; however only those goals most directly relating to the natural resource inventory, Goals 5, 6, 7 and 15, are addressed in this section. Other goals, including Goal 9: Economy of the State, and Goal 12: Transportation, will be addressed in separate documents that will be developed later in the program update process.

- **Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces** – Goal 5 addresses many types of resources. It establishes a process in which resources are inventoried and evaluated for significance. If a resource or site is found to be significant, the local government must evaluate the consequences of three policy choices: protecting the resource, allowing proposed uses that conflict with the resources, or establishing a balance between protecting and allowing uses that conflict with the resources. The local government must then adopt a program based on the results of this evaluation.

- **Goal 6: Air, Water and Land Resources Quality** – This goal requires local comprehensive plans and implementation measures to be consistent with state and federal regulations on matters such as stream quality and groundwater pollution. Goal 6 provides guidelines for local jurisdictions, including buffering and separating those land uses which create impacts on air, water and other resources. Further, plans should consider the carrying capacity of the air, land and water resources within the planning area.

- **Goal 7: Areas Subject to Natural Hazards** – Goal 7 deals with development in places subject to natural hazards such as flooding, landslides or wildfire. It requires that jurisdictions apply "appropriate safeguards" (e.g., flood plain zoning) when planning for development.

- **Goal 15: Willamette River Greenwa**y – Goal 15 sets forth procedures for protecting the diverse qualities of the 300 miles of land along the Willamette River. Multiple uses and functions are to be conserved, enhanced and maintained, including significant habitat and economic and recreational uses.

To address Goals 5 and 7, cities and counties must use inventories to inform development of their local compliance programs. Goal 5 requires local jurisdictions to develop their own resource inventories, while Goal 7 refers to land hazard inventories developed by federal and state agencies to be used for implementing policy. (Goal 6 does not require an inventory, but does require local programs to be consistent with adopted state and federal clean water and clean air laws.) Goal 5 requires the following resources to be identified in the city and county inventories:

- Riparian corridors, including water and riparian areas and fish habitat
- Wetlands
- Wildlife habitat
- Federal Wild and Scenic Rivers
- State Scenic Waterways
- Groundwater resources
- Approved Oregon recreation trails
- Natural areas
- Wilderness areas
- Mineral and aggregate resources
- Energy sources
- Cultural areas
- Historic resources
- Open space
- Scenic views and sites

Goal 15 requires some similar types of resources be inventoried:

- Fish and wildlife habitats
- Hydrological conditions
- Ecologically fragile areas
- Significant natural and scenic areas and vegetative cover
- Areas of annual flooding and flood plains
- All current public recreation sites, including public access points to the river and hunting and fishing areas
- Recreational needs as set forth in Goal 8
- Historical and archaeological sites
- All current aggregate excavation and processing sites, and all known extractable aggregate sources

Additional resources that are unique to Goal 15 also need to be inventoried:

- Land currently committed to industrial, commercial and residential uses
- The ownership of property, including riparian rights
- Other uses of land and water in or near the Greenway
- Acquisition areas, which includes identifying areas suitable for protection or preservation through public acquisition of lands or an interest in land

The Goal 5 Administrative Rule requires local governments to follow a three-step planning process, and complete an inventory as the first step. The inventory includes an analysis of the location, quantity, quality and significance of the resources identified. If a resource is not determined to be significant, it may be excluded from further consideration. The remaining resources are then subject to a "conflicting use" analysis (also known as the Economic, Social, Environmental and Energy Analysis), with the final step being development of a resource management program for significant resources.

The Goal 15: Willamette River Greenway inventory is used to determine which lands are suitable or necessary for inclusion within the greenway boundary, and to develop the greenway management plan and acquisition program. There is no determination of significance, and no conflicting use analysis. However, jurisdictions are instructed to consider competing or conflicting uses when determining the best use of a public resource (e.g., the Willamette River).

Cities and counties may choose to meet the requirements of Goal 15 instead of Goal 5 for areas within the Willamette River Greenway. The City of Portland addressed these inventory requirements while developing the Willamette River Greenway and Environmental Overlay Zoning programs that now apply to some of the natural resources that are addressed by this inventory. The inventory for the Central City Planning Area focuses on riparian corridors and wildlife habitat areas. It also contains general information pertaining to water quality, natural hazards including landslide and wildlife hazard areas and flood areas, hydrological conditions, ecologically fragile areas, significant natural areas and vegetative

cover. Thus, this inventory may be used to inform and support updates to the City's programs relating to portions of Goals 5, 6, 7 and 15.

Central City 2035 is a comprehensive, multi-objective plan for the Central City and the Willamette River waterfront. It will update and replace the 1987 Willamette Greenway Plan, zoning code and design guidelines, which serve as Portland's compliance with State Planning Goal 15: Willamette River Greenway and the 1988 Central City Plan. The 1987 Willamette Greenway Plan is currently being updated through the River Plan. The River Plan is a comprehensive, multi-objective plan for the Willamette River waterfront and adjacent lands. The River Plan is being carried out in phases, each focusing on a different reach of the Willamette River. The second phase of the River Plan is called the Central Reach. The Central Reach phase of the River Plan is being carried in conjunction with the City's update of the Central City Plan.

Metro's Urban Growth Management Functional Plan and Titles 3 and 13

The 1973 Legislature granted expanded powers for the Columbia Region Association of Governments (now called Metro) to "coordinate regional planning in metropolitan areas" and to "establish a representative regional planning agency to prepare and administer a regional plan." During the 1990s, Metro worked with local jurisdictions to develop Regional Urban Growth Goals and Objectives (RUGGOs) and the Urban Growth Management Functional Plan.

The Urban Growth Management Functional Plan provides a regional approach to growth management by tailoring several key statewide land use goals to meet regional population growth expectations. This approach recognizes the interrelationship between housing, employment, clean air and water, natural resource protection, and transportation networks across jurisdictional boundaries. Metro developed the plan with input from the 24 cities and three counties within the Urban Growth Boundary at that time. The Urban Growth Boundary is one tool used to protect farms and forests from urban sprawl and promote efficient use of lands within the boundary. Uses of land within an Urban Growth Boundary support and are supported by urban services such as road, water and sewer systems.

Nine titles in the Urban Growth Management Functional Plan are derived from or relate to statewide planning goals and the rest are procedural. Title 3 and Title 13 pertain most directly to natural resources and the inventory information contained in this report.

Title 3 is derived from portions of Oregon State Land Use Goals 6 and 7, and establishes regional requirements relating to water quality, erosion control and flood hazard management. In September 2002, the City of Portland completed the Title 3 Water Quality Compliance Report. The report explains how the City complies with Title 3 requirements through the existing Environmental Overlay Zoning program and newer regulations established by the Willamette River Title 3 Water Quality Compliance Project (adopted by the City Council in August 2002). Metro found the City in substantial compliance with Title 3 in December 2002.

Title 13, adopted by the Metro Council in September 2005, establishes the Nature in Neighborhoods program. The purpose of the program is to protect, conserve, and restore important riparian corridors and wildlife habitat areas in the region, and also serves as a supplement to Title 3 requirements relating to water quality, flood hazard and erosion control. Title 13 establishes provisions intended to prevent impacts or ensure mitigation of unavoidable impacts on identified Habitat Conservation Areas within the region. Habitat Conservation Areas are comprised of regionally significant riparian corridors and wildlife habitat identified in Metro's inventory, including substantial portions of Hayden Island. Title 13 also establishes specific planning requirements for West Hayden Island, namely the development of a district plan.

In January 2007, the Oregon Department of Land Conservation and Development acknowledged the new Title 13 program, finding it in compliance with Goals 5 and 6. This acknowledgement establishes new Goal 5 and 6 requirements for cities and counties in the Metro area, which had until January 2009 to show that their local programs meet the requirements of the regional program. In November 2009 and June 2011, Metro granted the City of Portland extensions to meet Title 13 requirements.

The extension was granted to provide the City with time to complete or make progress on key projects that would update Portland's environmental policy direction and regulations. These projects include area-specific plans such as Airport Futures, River Plan/North Reach, the West Hayden Island plan, as well as citywide projects such as the updated citywide Natural Resources Inventory, Portland Plan and the Citywide Tree Policy Review and Regulatory Improvement Project.

In October 2012, the Portland City Council adopted the citywide Natural Resources Inventory methodology and maps as part of the factual basis to inform the City's Comprehensive Plan update. In November 2012, the City Council approved the City's *Request for Metro Determination of Substantial Compliance with Title 13* for submittal to Metro. In December 2012, Metro staff determined that the City is in substantial compliance with Title 13 and the Metro Council accepted this determination in February 2013. The City and Metro entered into a voluntary Intergovernmental Agreement (IGA) that states the City's intent to complete a number of planning projects that will involve the development of area-specific inventory updates and evaluation of environmental program refinements based on the inventory findings and other new information. The River Plan North, Central and South reaches as well as West Hayden Island plan are referenced in the IGA.

Metro identified many of the natural resource areas addressed in this inventory in the regional Title 13 inventory. Metro documented these areas as providing important riparian functions and wildlife habitat attributes during development of Titles 3 and 13. As noted above, this updated inventory is intended to replace the regional inventory for the inventory study area and will, among other uses, inform City program updates affecting the management of natural resources within the Central Reach.

CHAPTER 2. PROJECT APPROACH AND METHODOLOGY OVERVIEW

The inventory presented in this report was produced by integrating information from several sources. Some of the information presented later in this report was taken directly from Portland's new (draft) citywide inventory of riparian corridors and wildlife habitat. Other key information was produced specifically for the Central City Planning Area, including the delineation of inventory sites and field observations. The following chapter describes the key information that makes up this inventory and how the information was developed.

Background and Relationship to Metro's Regional Inventory

The Bureau of Planning and Sustainability (BPS), in consultation with other City bureaus and other technical experts, has recently produced substantial new inventory information for riparian corridors and wildlife habitat in Portland. Products include new natural resources descriptions, geographic information system (GIS) natural resource data and models, maps, and a report documenting the project approach (Appendix F: City of Portland Natural Resource Inventory Update: Project Report).

BPS used Metro's inventory of regionally significant riparian corridors and wildlife habitat as a starting point for citywide inventory development. The new citywide inventory incorporates and builds on the extensive research, analysis, technical review and public scrutiny that went into the development of Metro's regional inventory. Metro's inventory was reviewed by the Independent Multidisciplinary Science Team (a group of leading scientists in the Pacific Northwest) and other local experts. Public workshops were held and a public hearing was conducted before the Metro Council. The Metro Council endorsed the Regional Natural Resources Inventory in December 2001, and directed Metro staff to develop a regional program to protect, conserve and restore regionally significant riparian corridors and wildlife habitat. The Metro Council adopted the inventory as part of the Title 13, Nature in Neighborhoods program in September 2005. The development of Metro's inventory is documented in the Technical Report for Fish and Wildlife (Metro, 2005), Riparian Corridor and Wildlife Habitat Inventories (Metro, 2005) and Addendum and Update to Metro's Riparian Corridor and Wildlife Habitat Inventories (Metro, 2005).

In 2007, The Oregon Department of Land Conservation and Development acknowledged Title 13 as in compliance with Oregon State Land Use Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces, and Goal 6: Air, Water and Land Resources Quality. As such, Title 13 establishes new regional requirements that Metro area cities and counties must meet to achieve compliance with specified elements of Oregon Land Use Planning Goals 5 and 6.

Both the City's and Metro's inventories reflect fundamental information from Metro's extensive review of scientific literature pertaining to riparian corridors and wildlife habitat. The scientific foundation upon which both inventories are based can be summarized as follows:

> Riparian corridors are comprised of rivers and streams, drainageways, riparian vegetation and off-channel areas, including wetlands, side channels and floodplains. Riparian corridors usually contain a complex mix of vegetation consisting of trees or woody vegetation, shrubs and herbaceous plants. Portland's urban riparian corridors may also include riprap or other types of bank hardening, invasive species and development. Riparian corridors provide the transition between the stream banks and upland areas.
>
> The predominance of riparian corridor functions occurs within 100 to 300 feet of a water body, but some functions, such as the microclimate effect associated with forest vegetation, can occur up to 780 feet from a water body. Functions provided by natural resources located in riparian corridors include:

- **Microclimate and shade** – Open water bodies, wetlands, flood areas, and surrounding trees and woody vegetation are associated with localized air cooling, soil moisture and increased humidity.

- **Bank function and control of sediments, nutrients and pollutants** – River, stream, drainageway channels and flood areas have a direct relationship to bank functions and the conveyance of sediments, nutrients and pollutants. Trees, vegetation, roots and leaf litter intercept precipitation; hold soils, banks and steep slopes in place; slow surface water runoff; take up nutrients; and filter sediments and pollutants found in surface water. Structures, such as pilings, can also help stabilize banks and contain contaminants.

- **Stream flow moderation and flood storage** – Waterways and floodplains provide for conveyance and storage of stream flows and floodwaters in channel and above and below the ground surface; trees and vegetation intercept precipitation and promote infiltration which tempers stream flow fluctuations or "flashiness" that often occurs in urban waterways.

- **Organic inputs, nutrient cycling and food web** – Water bodies, wetlands, flood areas and nearby vegetation provide food (e.g., plants, leaves, twigs, insects) for aquatic and terrestrial species and are part of an ongoing chemical, physical and biological nutrient cycling system.

- **Large wood and channel dynamics** – Rivers, streams, drainageways, riparian wetlands, flood areas and large trees and woody vegetation contribute to natural changes in location and configuration of the waterway channel over time.

- **Wildlife movement corridors** – Rivers, streams, drainageways, wetlands, floodplains and vegetated corridors along waterways allow wildlife to migrate and disperse among different habitat areas and provide access to water.

Wildlife habitats provide food, cover, and roosting and nesting sites for a broad array of birds, mammals, reptiles and amphibians. The terrestrial habitat features that provide these functions include forests, woodland, shrubland, grassland and meadows, wetlands, rocky slopes and uplands, buttes and other topographic features. (For the purposes of this inventory, rivers, streams and drainageways are included in the riparian corridor.) The following wildlife habitat attributes are indicators of habitat function and habitat fragmentation due to urbanization:

- **Habitat patch size** – Larger habitat patches generally provide more food, cover, dispersal and nesting/denning opportunities for multiple wildlife species.

- **Interior habitat area** – Larger, rounder-shaped habitat patches experience less "edge effect" (disturbance from urban land uses such as noise/light/vibration, predation and invasive species) and provide more interior habitat area, a requirement for some sensitive wildlife species, than narrow patches.

- **Connectivity between habitat patches** (including distance and edge effect) – Patches located closer together allow for species dispersal and migration, and provide additional access to food, cover, nesting sites and reproduction opportunities.

- **Connectivity/proximity to water** – Access to water is vital to wildlife survival.

- **Special Habitat Areas** – The inventory recognizes specific habitat types or features that provide important functions for wildlife, including habitats and species at risk, rare or declining habitat types such as native oak assemblages, critical habitat for threatened or endangered species, and urban structures such as bridges that are utilized by Peregrine Falcons for nesting.

Within the city, natural resources generally reflect the impacts of urbanization; however, the resources still provide critical riparian and wildlife habitat functions. For example, vegetated areas in riparian corridors and upland habitats are often comprised of a mix of native, non-native and invasive plants. Native plant species generally provide a broader suite of benefits, such as varied wildlife food sources and effective slope stabilization. However, plants of all types, including non-native species, provide important watershed functions such as water storage, nutrient cycling and cover and nesting opportunities for wildlife. Other examples of the effects of urbanization include rivers and streams with constrained or altered channels, wetlands with soil contamination and developed flood plains. In each of these cases, the resource has experienced some degradation but still provides important functions such as water conveyance and storage, and fish and wildlife habitat.

City's Inventory Methodology

Below is a summary of the steps BPS took to produce the new citywide inventory of riparian corridors and wildlife habitat (also see figure 1). More detail regarding the inventory approach and methodology, including citations, can be found in Appendix F: City of Portland Natural Resource Inventory Update: Project Report. BPS staff completed these five actions:

1. Compiled GIS data and mapped key natural resource features, including rivers, streams, drainageways, wetlands, flood areas, vegetation and topography
2. Developed criteria and GIS models to rank and map the relative functional value of existing natural resources
3. Designated Special Habitat Areas and Updated Regional Species Lists
4. Produced Combined Relative Ranks and Maps
5. Addressed Resource Significance

The following is a detailed explanation of each action:

1. Compiled GIS data and mapped key natural resource features, including rivers, streams, drainageways, wetlands, flood areas, vegetation and topography.

The natural resource feature data are the primary inputs to the GIS inventory models for riparian corridors and wildlife habitat. BPS improved the regional natural resource feature GIS data by:

- Remapping more than 160 miles of stream/drainageway centerlines and adding 100 stream/drainageway miles to the maps.
- Mapping smaller vegetation units (1/2 acre minimum), and classifying forest, woodland, shrubland and herbaceous vegetation over a wider area (using the National Vegetation Classification System as shown below). Vegetation mapping does not include land that is sparsely vegetated.[1]
    - Forest: Trees with their crowns overlapping, generally forming 60-100 percent of cover.
    - Woodland: Open stands of trees with crowns not usually touching, generally forming 25-60 percent of cover. Tree cover may be less than 25 percent in cases where it exceeds shrubland and herbaceous vegetation.
    - Shrubland: Shrubs generally greater than 0.5 meters tall with individuals or clumps overlapping to not touching, generally forming more than 25 percent of cover with trees generally less than 25 percent of cover. Shrub cover may be less than 25 percent where it exceeds forest, woodland, and herbaceous vegetation. Vegetation dominated by woody vines (e.g., blackberry) is generally included in this class.
    - Herbaceous: Herbs (graminoids, forbs, ferns and shrubs less than 0.5 meters tall) dominant, generally forming at least 25 percent of cover. Herbaceous cover may be less than 25 percent where it exceeds forest, woodland and shrubland vegetation.
- Verifying the existing wetland data using state and city permits and site visits; modifying some wetland boundaries where there was sufficient data.
- Updating the City's flood area data for use in the inventory, including incorporation of the 2004 and 2010 FEMA 100-year floodplain.
- Using Light Detection and Ranging (LiDAR), a method for precisely measuring the elevation of the Earth's surface, and objects on the surface (trees, buildings, etc.).

[1] Sparse vegetation is defined as areas with a predominance of boulders, gravel, cobble, talus, consolidated rock and/or soil with unconsolidated, low-structure vegetation.

2. **Developed criteria and GIS models to rank and map the relative functional value of existing natural resources**.

Like Metro, the City produced GIS models to assess the relative functional value of riparian corridors and wildlife habitat. The riparian corridor and wildlife habitat GIS models assign relative ranks of high, medium, low or no rank to natural resource features. The relative ranks are produced using a consistent and replicable scoring method based on the number and types of functions provided by specific natural resource features in the city. The ranks are not tied to a reference or baseline condition, but allow comparison of the relative condition of natural resources within the region or city.

Science-based model criteria were developed to score, assign relative ranks and map the natural resources that provide the specific riparian functions and wildlife habitat attributes listed above. The City's model criteria focus on the presence, type and extent of specific natural resource features. Additional descriptive information on natural resources and disturbances (e.g., development, contamination and invasive species) are provided in the inventory site narratives.

The City's inventory models apply the same general sets of evaluation criteria that Metro developed. However, BPS refined some of the regional criteria to reflect additional detail, more recent data and studies, and local conditions. For example, the City's wildlife habitat model was refined to assign a higher value to somewhat smaller habitat patches than Metro's model. Shifts in the patch size scoring thresholds were based on additional scientific studies and recent wildlife studies conducted in Portland's natural areas.

The City worked closely with Metro and technical experts to ensure that refinements to the regional inventory would be consistent with Metro's work and would support the City's watershed health goals. For more detail on the inventory refinement, see Appendix F: City of Portland Natural Resource Inventory Update: Project Report.

Riparian Corridor Model

The riparian corridor GIS model assigns primary and secondary scores to natural resources for six riparian functions. The scores reflect the types of landscape features present and the proximity of those features to a river, stream or wetland. Primary scores are applied to features that provide the most direct and substantial contribution to a particular riparian function. Secondary scores are assigned to features that provide lesser, but still important, contribution to riparian functions. The scientific literature indicates that the preponderance of riparian functions, such as nutrient cycling, occurs within 30 to 100 meters (approximately 100 to 300 feet) of a water body. The microclimate effect associated with forest vegetation can occur up to several hundred feet from a water body. The model criteria are not sensitive to the species of vegetation present or whether vegetation is native or non-native. However, the model criteria do assign different riparian functional values to cultivated, heavily manicured and managed landscapes versus semi-natural and natural vegetation.

Table 1 presents the riparian corridor GIS model criteria. The criteria reflect some refinements to the criteria Metro used to map riparian corridors across the region. The criteria refinements are explained in Appendix F: City of Portland Natural Resource Inventory Update: Project Report.

For example, Metro assigned a medium or high rank to all river banks and land within 50 feet of rivers and streams to recognize the direct and important impact of those areas on the river. This methodology was reviewed by independent experts and adopted as part of Title 13, Nature in Neighborhoods. The City refined the regional inventory to further recognize the variability of riverbank conditions in Portland. The refinement resulted in a lesser level of function being assigned to hardened, non-vegetated banks along specific segments of the Willamette and Columbia rivers. Initially, this refinement was made to recognize the impact of extensive river bank hardening associated with Portland Harbor marine terminal facilities in the Willamette River North Reach. In the North Reach land within 50 feet of the river, where the river bank is hardened and not vegetated, is assigned a low relative rank, recognizing a lower level of function but continuing to highlight the importance of the banks and adjacent land to overall riparian function.

Through this Central City Natural Resource Inventory, the Willamette River North Reach refinement is proposed to apply to non-vegetated, hardened banks of the Central Reach. This particular refinement is also being proposed for application in the Columbia River surrounding Hayden Island, which include Terminal 6 and East Hayden Island. The model continues to assign a medium or high aggregated relative riparian rank to vegetated, non-hardened river banks.

Table 1: Riparian Corridor GIS Model Criteria

Riparian Function	Landscape Feature	Features Assigned a Primary Score	Footnotes	Features Assigned a Secondary Score	Footnotes
Microclimate and Shade	Water bodies	River, stream/drainageway or wetland	2, 5		
	Vegetation	Forest vegetation within the flood area (except within a drainage district)	3, 4	Woodland vegetation within the flood area (except within a drainage district)	3, 4
		Forest vegetation that is outside the flood area and contiguous to and within 100 feet of a river, stream/drainageway or wetland	1, 2	Forest vegetation that is outside the flood area, contiguous to primary vegetation and between 100 feet and 780 feet of a river, stream/drainageway or wetland	1, 2
				Woodland vegetation that is outside the flood area and contiguous to and within 100 feet of a river, stream/drainageway or wetland	1, 2
				Shrubland vegetation that is contiguous to and within 50 feet of a stream/drainageway or wetland	1, 2
Stream Flow Moderation and Water Storage	Water bodies	River, stream/drainageway or wetland	2, 5		
	Flood area	Vegetation within the flood area (except within a drainage district)	3, 4	Non-vegetated land within the flood area (except within a drainage district)	3, 4
	Vegetation			Woodland or shrubland vegetation that is outside the flood area and within 300 feet of a river, stream/drainageway or wetland	1, 2
				Forest vegetation that is contiguous to primary forest vegetation or starts within 300 feet of a river, stream/drainageway or wetland and is within 780 feet of a river, stream/drainageway or wetland	1, 2
				Herbaceous vegetation that is outside the flood area and within 100 feet of a river, stream/drainageway or wetland	1, 2
				Where the slope is at least 25%: herbaceous vegetation that is outside the flood area, that starts within 100 feet and is within 200 feet of a river, stream/drainageway or wetland	1, 2

Riparian Function	Landscape Feature	Features Assigned a Primary Score	Footnotes	Features Assigned a Secondary Score	Footnotes
Bank Function, and Sediment, Pollution and Nutrient Control	Water bodies	River, stream/drainageway or wetland (except Willamette River North and Central Reach)	2, 5	Willamette River North and Central Reach	Water bodies
	Land	Land within 50 feet of a river, stream/drainageway or wetland except land within 50 feet of a hardened, non-vegetated river bank in the Willamette River North and Central Reaches and the Columbia River within the Hayden Island NRI study area	1, 2, 7	Land within 50 feet of a hardened, non-vegetated river bank in the Willamette River North and Central Reaches and the Columbia River within the Hayden Island NRI study area	7
	Vegetation	Forest, woodland or shrubland vegetation within the flood area (except within a drainage district)	3, 4	Herbaceous vegetation within the flood area (except within a drainage district)	3, 4
		Forest and natural/semi-natural woodland or shrubland vegetation outside a flood area, between 50 feet and 100 feet of a river	1, 6, 8	Herbaceous or cultivated woodland or shrubland vegetation outside the flood area and between 50 feet and 100 feet of a river	1, 6, 8
		Forest, woodland or shrubland vegetation outside a flood area, between 50 feet and 100 feet of a stream/drainageway or wetland	1, 2	Herbaceous vegetation outside the flood area and between 50 feet and 100 feet of a stream/drainageway or wetland	1, 2
		Where the slope is at least 25%: forest and natural/semi-natural woodland or shrubland vegetation that is outside the flood area and between 100 feet and 200 feet of a river	1, 6, 8		
		Where the slope is at least 25%: forest, woodland or shrubland vegetation that is outside the flood area and between 100 feet and 200 feet of a stream/drainageway or wetland	1, 2	Where the slope is at least 25%: forest, woodland or shrubland vegetation that is outside the flood area, contiguous with primary vegetation and more than 200 feet of a river, stream/drainageway or wetland, but does not extend beyond the area with at least 25% slope.	1, 2
				Where the slope is at least 25%: herbaceous vegetation that is outside the flood area, contiguous to vegetation within 100 feet and between 100 feet and 200 feet of a river, stream/drainageway or wetland	1, 2

Riparian Function	Landscape Feature	Features Assigned a Primary Score	Footnotes	Features Assigned a Secondary Score	Footnotes
Large Wood and Channel Dynamics	Water bodies	River (including Willamette and Columbia River beaches) or stream/drainageway	2, 5		
	Land	Land within 50 feet of a river, stream or wetland, except land within 50 feet of a river in the Willamette River North and Central Reaches and the Columbia River within the Hayden Island NRI study area	1, 4		
	Vegetation	Forest vegetation within 50 feet of a river in the Willamette River North Reach and Columbia River surrounding Hayden Island		Woodland, shrubland, herbaceous or non-vegetated land within 50 feet of the river within the Willamette River North Reach and Columbia River surrounding Hayden Island	
		Forest vegetation within the flood area (except within a drainage district)	3, 4	Woodland, shrubland or herbaceous vegetation within a flood area (except within a drainage district)	3, 4
		Forest vegetation that is outside the flood area, contiguous to and within 150 feet of a river or stream/drainageway (except within a drainage district)	1, 3, 4	Where the slope is at least 25%: forest vegetation that is outside the flood area, contiguous with primary forest vegetation and between 150 feet and 260 feet of a river or stream/drainageway (except within a drainage district)	1, 3, 4
				Within a drainage district, forest vegetation that is contiguous to and within 150 feet of stream/drainageway	1, 4
		Forest that is contiguous to and within 150 feet of a wetland that is located completely or partially within the flood area or 150 feet of a river or stream (except within a drainage district)	1, 2, 3, 4	Where the slope is at least 25%: forest vegetation that is contiguous with primary forest vegetation and is between 150 feet and 260 feet of a wetland, where the wetland is located completely or partially in a flood area or within 150 feet of a river or stream/drainageway (except within a drainage district)	1, 2, 3, 4
	Water bodies	Wetland located completely or partially within the flood area or within 150 feet of a river or stream/drainageway (except within a drainage district)	1, 2, 3, 4		

Riparian Function	Landscape Feature	Features Assigned a Primary Score	Footnotes	Features Assigned a Secondary Score	Footnotes
Organic Inputs, Food Web and Nutrient Cycling	Water bodies	River, stream/drainageway or wetland	2, 5		
	Vegetation	Forest and natural/semi-natural woodland or shrubland vegetation within the flood area (except within a drainage district)	3, 4, 8	Cultivated woodland and shrubland vegetation within a flood area (except within a drainage district)	3, 6, 8
		Forest and natural/semi-natural woodland or shrubland vegetation that is outside the flood area and within 100 feet of a river	1, 2, 6	Forest and natural/semi-natural woodland or shrubland vegetation that is outside the flood area, contiguous to primary or secondary vegetation and within 170 feet of a river	1, 2, 6
				Cultivated woodland or shrubland vegetation that is outside the flood area and within 100 feet of a river	1, 2, 6, 8
		Forest, woodland or shrubland vegetation that is outside the flood area and within 100 feet of a stream/drainageway or wetland	1, 2	Forest, woodland or shrubland vegetation that is contiguous to primary vegetation and within 170 feet of a stream/drainageway or wetland	1, 2
Riparian Wildlife Movement Corridor	Water bodies	River, stream/drainageway or wetland	2, 5		
	Vegetation	Vegetation that is contiguous to and within 100 feet of a river, stream/drainageway or wetland	1, 2	Vegetation that is contiguous to primary vegetation and within 300 feet of a river, stream/drainageway or wetland	1, 2

Footnotes:

1. Rivers, streams/drainageways and wetlands are primary features for riparian functions under evaluation. The model produces functional rankings for such features if open water area has been mapped. Map notations will indicate relative riparian function levels associated with streams or drainageways where only centerline data are available.
2. All search distances are measured from either a) the edge of the mapped water body or b) the stream/drainageway centerline.
3. "Wetland" refers to all mapped regional wetlands fully or partially within 1/4 mile of a river or stream/drainageway, unless otherwise specified.
4. "Flood area" is comprised of the combined FEMA 100-year floodplain (2004/2010) and the 1996 flood inundation area as initially adjusted, and to reflect recent permitted activities affecting site elevation.
5. Portland-area drainage districts: Peninsula Drainage District #1, Peninsula Drainage District #2 and Multnomah County Drainage District #1.
6. Hardened, non-vegetated banks are defined as seawalls, pilings and non-vegetated riprap and adjacent land within 50 feet of the North or Central Reach of the Willamette River.
7. Natural/semi-natural vegetation has a composition or structure that is self-maintaining, can include native and non-native species, or is managed as a natural area or restoration/enhancement project. Cultivated vegetation is consistent with traditional landscaping and is highly manicured and regularly managed and maintained. Cultivated vegetation is often dominated by turf grasses and ornamental shrubs and trees and may be managed using a combination of mowing, pruning, fertilizers and pesticides. Residential yards, common areas, golf courses, parks and right-of-ways are typically considered cultivated.

The primary and secondary scores for each function are combined to produce aggregated relative riparian corridor rankings of high, medium or low. The formula is similar to those that Metro used for the regional inventory and also reflects the distribution of primary scores assigned to features in the city (Table 2).

Table 2: Riparian Corridor Aggregated Relative Ranking Formula

Riparian Corridor Relative Rank	Ranking Formula	
	Primary Functions	Secondary Functions
High	4-6	0-6
Medium	1-3	0-6
Low	0	1-6

Features that receive any score, whether primary or secondary, provide significant riparian corridor functions. Features that receive at least one secondary score and no primary scores receive a low relative rank. Features that receive one or more primary scores receive a medium or high relative rank. The number of secondary scores does not affect medium and high ranks.

Typically, the riparian corridor model assigns aggregated relative ranks to natural resource features as follows:

- **High** – Rivers, streams, drainageways and wetlands; forest or woodland vegetation within a flood area or in close proximity to a water body; and woody vegetation on steep slopes
- **Medium** – Shrubland and herbaceous vegetation within a flood area or in close proximity to a water body
- **Low** – Vegetation outside the flood area and further from a water body; developed flood areas; and hardened, non-vegetated banks of the Willamette River North Reach and South Reach and Columbia River surrounding Hayden Island[2]

Within the city, natural resources generally reflect the impacts of urbanization; however, the resources still provide critical riparian functions. For example, vegetated areas in riparian corridors are often comprised of a mix of native, non-native and invasive plants. Native plant species generally provide a broader suite of benefits, such as more effective slope stabilization. However, non-native plants still provide important watershed functions such as water storage, nutrient cycling, erosion control and organic inputs. Other examples of the effects of urbanization include constrained or altered river and stream channels, contaminated wetlands and soil, and developed floodplains. In each of these cases, the resource has experienced some degradation but still provides important functions such as water conveyance and storage.

Wildlife Habitat Model

The wildlife habitat GIS model assigns scores to mapped habitat patches based on their size, shape and connectivity to other patches or water bodies as shown in Table 3 below. For purposes of the inventory model, habitat patches are defined as areas of forest vegetation and wetland that are at least 2 acres in size, plus adjacent woodland vegetation.[3] The model does not assign scores to habitat areas smaller than 2 acres, or to shrubland or grassland habitats or woodland that is not associated with a 2 acre forest/wetland patch. However, these habitats may be designated Special Habitat Areas if the habitats meet specific criteria (described in Step 3 below). Additional detail regarding the wildlife habitat methodology can be found in Appendix F: City of Portland Natural Resource Inventory Update: Project Report.

[2] Hardened, non-vegetated river banks include seawalls, pilings and non-vegetated riprap.

[3] Woodland vegetation that is contiguous to a forest/wetland patch that is greater than 2 acres in size is evaluated for wildlife habitat. Woodland vegetation independent of a forest/wetland patch is not evaluated by the wildlife habitat model.

Table 3: Wildlife Habitat GIS Model Criteria		
High Value (3 points)	**Medium Value (2 points)**	**Low Value (1 point)**
Habitat Patch Size[1]		
Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is 585 acres or larger.	Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is at least 30 acres and smaller than 585 acres.	Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is at least 2 acres and smaller than 30 acres.
Interior Habitat Area[2]		
Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the interior area of the forest vegetation and/or wetland patch area is 500 acres or larger.	Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the interior area of the forest vegetation and/or wetland patch area is at least 15 acres and smaller than 500 acres.	Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the interior area of the forest vegetation and/or wetland patch area is at least 2 acres and smaller than 15 acres.
Proximity to Other Patches[3]		
Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is at least 2 acres, and the patch proximity index value is 100 or more.	Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is at least 2 acres, and the patch proximity index value is at least 30 and less than 100.	Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is at least 2 acres and the patch proximity index value is less than 30.
Proximity to Water[4]		
Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is at least 2 acres, and where at least 75% of the patch area is within 300 feet of a river, stream/drainageway or wetland.	Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is at least 2 acres, and where at least 25% and less than 75% of the patch area is within 300 feet of a river, stream/drainageway or wetland.	Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is at least 2 acres, and less than 25% of the patch area is within 300 feet of a river, stream/drainageway or wetland.

Footnotes:

1. A "habitat patch" is defined as an area of contiguous forest and/or wetland greater than 2 acres in size, plus any woodland vegetation adjacent and contiguous to the core forest/wetland area.
2. "Interior area" is defined as the area within the forest and/or wetland portion of a habitat patch that is situated at least 200 feet from the edge of that portion of the patch.
3. Proximity to water relative value thresholds were determined by identifying "natural breaks" in the distribution of the values using the Jenk's Natural Breaks method, which determines the best arrangement of values into a specified number of classes by comparing and minimizing the sum of the squared differences of values from the means of potential classes.
4. Proximity to other patches is calculated using the Fragstats 3.3 proximity index (PROX). The specified search radius is ¼ mile. The proximity index is a dimensionless measure of the relative size and distance of all patches whose edges are within the specified search radius of each vegetation patch. For more information on Fragstats and the proximity index, refer to http://www.umass.edu/landeco/research/fragstats/fragstats.html.

Features that receive scores for one or more attributes provide significant wildlife habitat functions. Individual scores for each attribute are combined to produce an aggregated relative ranking of high, medium or low for each wildlife habitat patch. As with the riparian corridor model, the formula used to generate the aggregated wildlife habitat rank is similar to those Metro used for the regional inventory (see Table 4).

Table 4: Wildlife Habitat Aggregated Relative Ranking Formula	
Wildlife Habitat Relative Rank	Ranking Formula
High	9 or more points
Medium	4-8 points
Low	1-3 points

Natural resource features that receive points for one or more of these attributes provide important wildlife habitat functions. Typically, the wildlife habitat model assigns aggregated relative ranks to natural resource features as follows:

- **High** – Large forest and wetland areas such as Forest Park, Smith and Bybee Wetlands, and Tryon Creek State Natural Area.
- **Medium** – Moderate-sized forest and wetland areas such as those at Kelley Point Park, Oaks Bottom Wildlife Refuge and Powell Butte.
- **Low** – Numerous smaller forest and wetland areas throughout the city.

Within the city, natural resources generally reflect the impacts of urbanization; however, the resources still provide critical wildlife habitat functions. For example, vegetated areas in upland habitats are often comprised of a mix of native, non-native and invasive plants. Native plant species generally provide a broader suite of benefits, such as varied wildlife food sources. However, non-native plants still provide important watershed functions such as cover and nesting opportunities for wildlife. Other examples of the effects of urbanization include rivers and streams with constrained or altered channels, wetlands with soil contamination and developed floodplains. In each of these cases, the resource has experienced some degradation but still provides important functions such as fish and wildlife habitat.

3. Designated Special Habitat Areas and Updated Regional Species Lists.

As part of the regional Title 13 inventory, Metro designated Habitats of Concern for areas with documented sensitive/threatened fish or wildlife species, sensitive/unique plant populations, wetlands, native oak, bottomland hardwood forests, riverine islands, river deltas, migratory stopover habitat, connectivity corridors, upland meadow and other unique natural or built structures or resources (such as bridges that provide habitat for Peregrine Falcons).

Portland began with Metro's Title 13 inventory of designated Habitats of Concern, which are referred to in the city as Special Habitat Areas (SHAs), and expanded the documentation, refined the mapping, and honed the eligibility criteria explanations. The City has also added and removed SHA designations for certain areas based on additional analysis.

Like the Title 13 Habitats of Concern, SHAs are mapped more generally than the landscape feature data used in the riparian and wildlife GIS models. The SHA boundaries may extend beyond the specific landscape features to capture seasonal variations in conditions (e.g., water levels) or a feature containing one or more habitat points, such as nesting areas on a bridge. Boundaries are determined on a case-by-case basis rather than through the use of model criteria. The rationale for the boundary is described in the natural resource descriptions for each inventory site.

The City has updated the SHA criteria to include National Oceanic and Atmospheric Administration (NOAA) designated Critical Habitat for anadromous salmonids. Within this inventory study area the Willamette River is designated as Critical Habitat for multiple fish species. The City has also designated certain urban structures as SHAs, including chimney roosting sites for Vaux's Swifts and several bridges on the Willamette and Columbia rivers that provide nesting sites for Peregrine Falcons. A full list of SHA criteria is available in Appendix C.

Like Metro Title 13 Habitats of Concern, SHAs receive a high relative rank for wildlife habitat, which supersedes medium or low ranks assigned by the Wildlife Habitat Model.

The citywide inventory also includes up-to-date plant and wildlife species lists. The list does not include all the plant and wildlife species found in the city, focusing instead on "special status" species. Special status species include fish, wildlife and plant species that are officially listed under the Endangered Species Act by the NOAA Fisheries or the U.S. Fish and Wildlife Service, and species receiving specific designations from:

- Oregon Natural Heritage Information Center ranked or listed species
- Oregon Watershed Enhancement Board priority species
- Partners In Flight focal species
- National Audubon Society and American Bird Conservancy Watch List species
- Northwest Power and Conservation Council Willamette and Columbia Subbasin Plans focal species

Special status species are identified by these entities for a variety of reasons. For example, the species may be:

- Experiencing local, regional, state or national population declines.
- Endemic to Oregon.
- Vulnerable to local extirpation.
- A focal or indicator species (a species that encompasses structural and functional needs of broader ecological communities).
- A keystone species (a species that physically alters environments and whose absence is detrimental to ecosystem function).

The City uses this information to track species trends at different scales and to provide context for evaluating management options and prioritizing local habitat protection and enhancement efforts. Information about special status species is included in the natural resource descriptions for each inventory site.

The City also maintains a list of at-risk wildlife species. The at-risk species list is a subset of the full special status species list, and includes only those species that are:

1. Listed by USFWS or NOAA Fisheries as:
    a. LE: Listed Endangered
    b. LT: Listed Threatened
    c. PE: Proposed Endangered
    d. PT: Proposed Threatened
    e. SoC: Species of Concern
2. C: CandidateListed by ODFW as:
    a. LE: Listed Endangered
    b. LT: Listed Threatened
    c. SC: Critical
    d. SV: Vulnerable
3. Received an Oregon Biodiversity Information Center rank or list 1, 2 or 3.

Peregrine Falcon

Courtesy: Bob Sallinger

These at-risk species are the most vulnerable of the special status species. The at-risk species list, not the full sensitive species list, is used to designate SHA based on the (S) criteria. The full special status species list and the list of at-risk species are included in Appendix D.

4. **Produced Combined Relative Ranks and Maps.**

Once the GIS models produce the aggregated riparian corridor and wildlife habitat ranks and Special Habitat Areas are designated, a single combined relative rank for riparian corridor/wildlife habitat areas is produced. Where ranked riparian corridors and wildlife habitat areas overlap, and if the two aggregated relative ranks differ, the higher of the two ranks becomes the overall combined rank for that resource area. For example, a feature that ranks medium for riparian corridor functions and low for wildlife attributes, would receive a medium combined relative rank.

As noted in previous sections, it is important to keep in mind that natural resource features can rank high based on the specific inventory criteria and also be impacted by land management activities, invasive plants or animals, or contamination as discussed in the natural resource description for each inventory site.

The City can produce different inventory maps displaying the GIS model results for individual riparian and wildlife habitat functions and attributes, the Special Habitat Areas, the aggregated riparian corridor and wildlife habitat relative ranks, and the combined riparian corridor/wildlife habitat relative ranks. Maps of the aggregated riparian corridor and wildlife habitat ranks and combined riparian/wildlife habitat relative ranks are presented in this report for each inventory site.

5. **Addressed Resource Significance.**

To comply with the Oregon State Land Use Goal 5 rule, local jurisdictions must assess inventoried natural resources to determine if the resources are "significant" based on location and quantity and quality. Resources that have been deemed significant must then be evaluated to determine if and how those resources should be protected by the local jurisdiction.

Metro determined the significance of inventoried natural resources by evaluating both ecological significance and regional significance. Metro determined the ecological significance of inventoried regional riparian corridors and wildlife habitat based on the scientific literature. For riparian corridors, Metro determined that all natural resources receiving scores for riparian functions are ecologically and regionally significant. For wildlife habitat, Metro determined that all ranked habitats are ecologically significant, and all but the lowest ranked wildlife habitats are regionally significant. Metro noted that these low ranked wildlife habitat areas could provide locally significant habitat and recommended that cities and counties consider these areas when developing local protection programs. When developing inventories for area-specific planning projects, such as West Hayden Island Plan, the City considers the existing natural resource features and functions in the context of the planning area, the city as a whole, and the region. The City also considers relevant information beyond the immediate region, such as fish and wildlife species that migrate over long distances and pass through Portland.

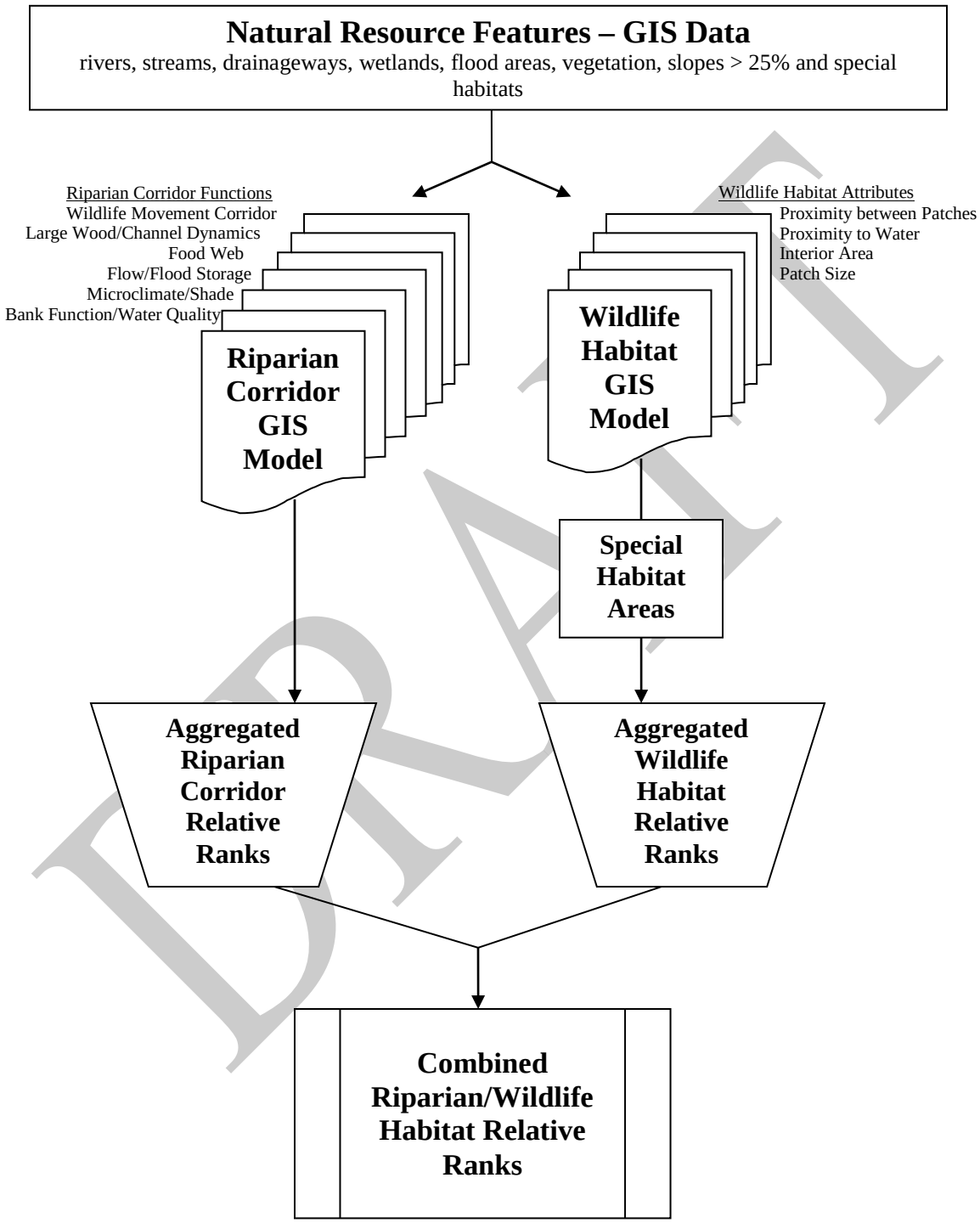
The Oregon Department of Land Conservation and Development acknowledged Metro's regional inventory and associated Title 13, Nature in Neighborhoods program as in compliance with the Goal 5 rule in January 2007.

The City's inventory is based on the science and approach Metro used to develop the adopted inventory of regional riparian corridors and wildlife habitat. The City's inventory also reflects updates and refinements to the regional inventory, incorporates more recent scientific literature, and relates more closely to existing relative quality and functions of Portland's natural resources. These improvements have increased the accuracy and level of detail of the City's inventory information.

Following Metro's approach for determining resource significance, all natural resources receiving riparian corridor or wildlife habitat scores and ranks in the City's inventory would be deemed

ecologically and locally significant. Official determination(s) of significance will take place at the time of adoption by the Portland City Council.

Figure 1: Natural Resources Inventory GIS Model Flow Diagram

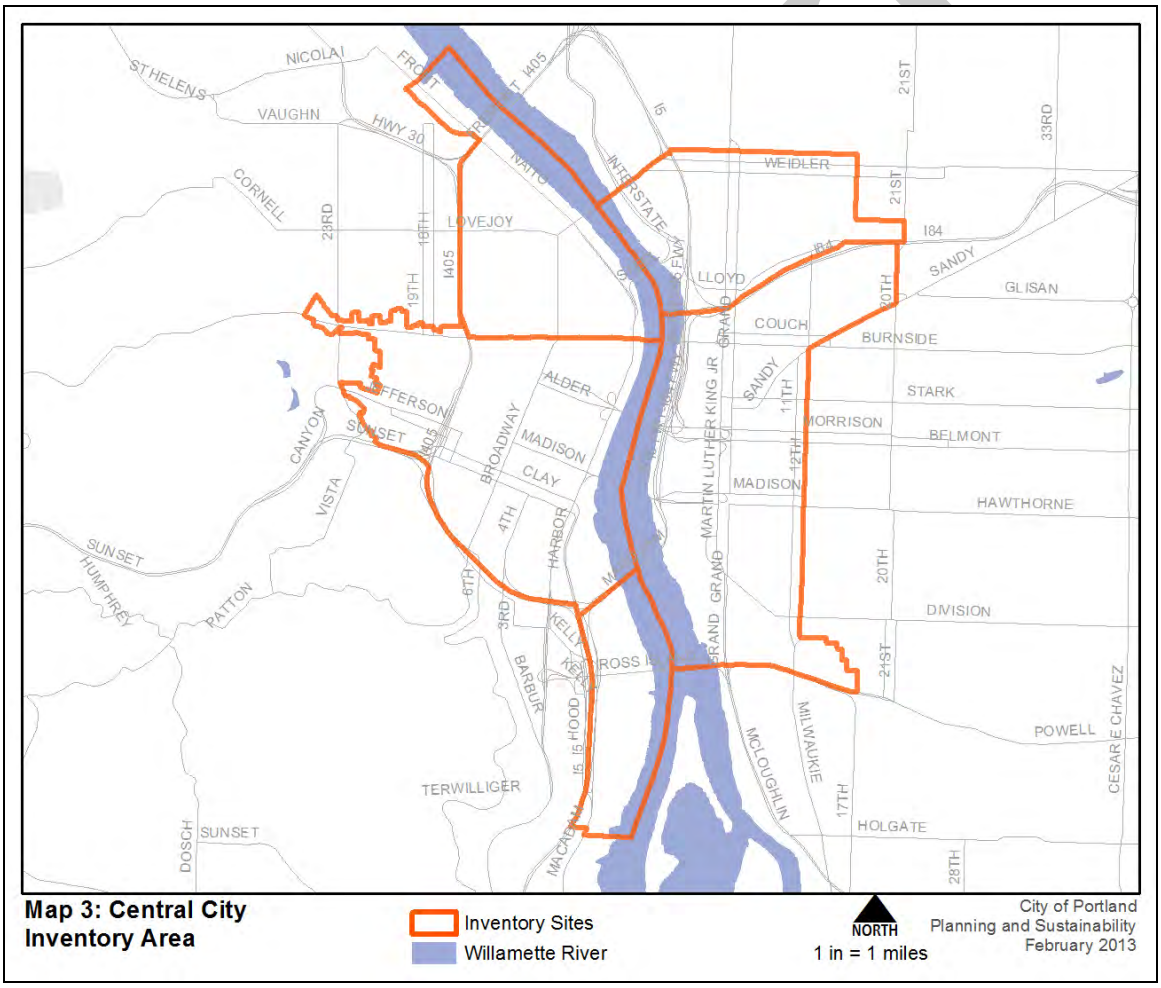


Work Conducted for the Central City Natural Resources Inventory

The Central City Natural Resources Inventory presented in this report reflects the citywide inventory work discussed in the previous section, and additional work conducted specifically for the inventory study area, as described below.

Delineation of Inventory Sites

The City has delineated five inventory sites for the Central City Natural Resources Inventory (Map 3). Consistent with more recent City inventories, the inventory sites are contiguous to each other and include not only natural resource features but the surrounding land uses as well. For the Central City, the inventory sites use the same boundaries as the Central City 2035 quadrants.



Specifically, the inventory site boundaries are intended to:

- Capture similar and contiguous landscape features (natural and human-made) in the same inventory site.
- Abut one another (no gaps between inventory sites).
- Address areas included in Metro's inventory of regionally significant riparian corridors and wildlife habitat.

The term “inventory site” or “site” is used, rather than “resource site” or “habitat site” which has been used in previous City inventories. The terms have been updated for clarity given that the current inventory sites contain and address natural resource areas and surrounding land uses including developed areas.

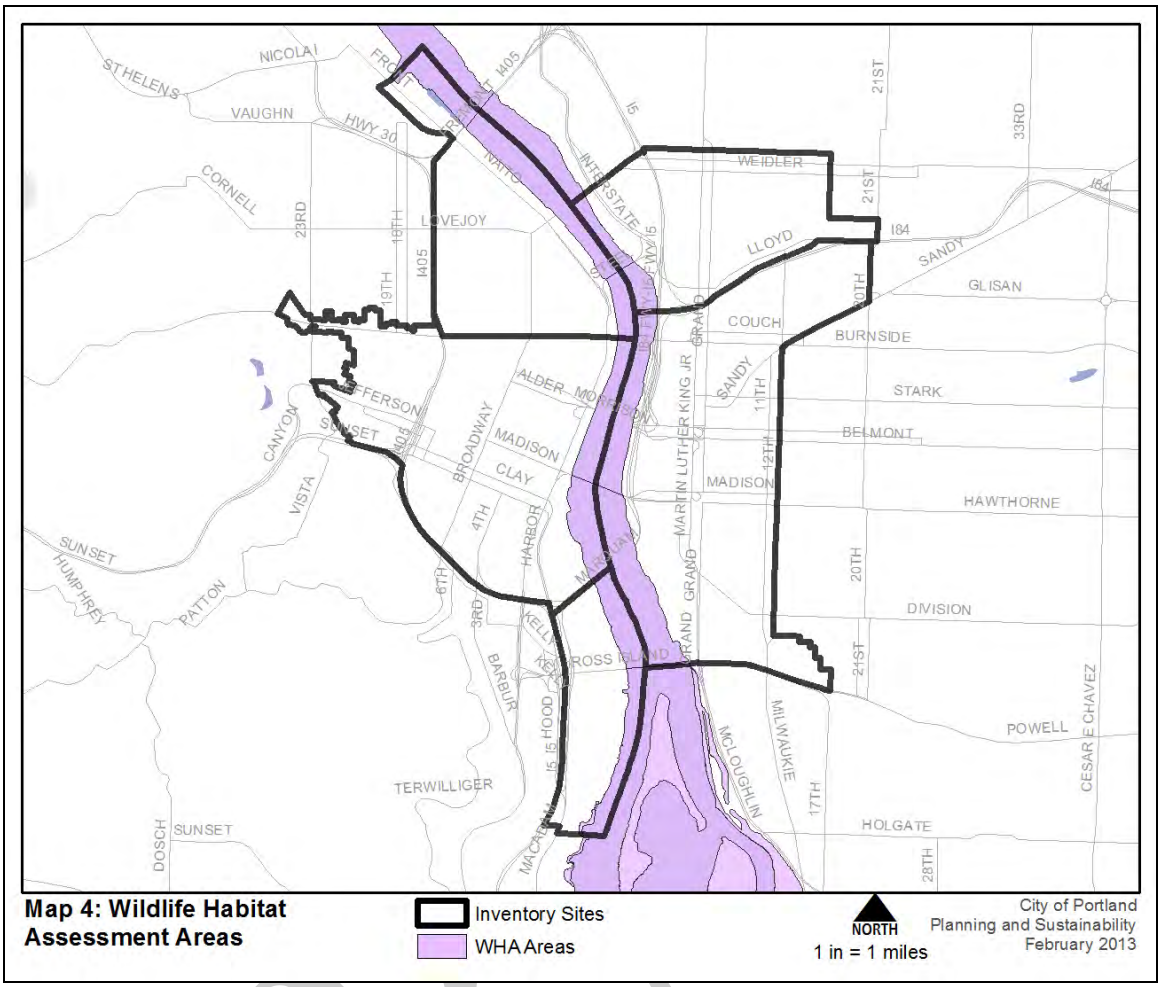
Incorporating Information from the Draft Lower Willamette Inventory: Natural Resources (Adolfson Associates, Inc. 2000, Updated by City Staff, 2003)

The City contracted with Adolfson Associates, Inc. to produce habitat inventory information for the Willamette Corridor. An initial draft Willamette River Inventory: Natural Resources report was produced in 2000. The report identified 24 habitat sites throughout the study area – 15 terrestrial and nine aquatic (Willamette River) sites. Site boundaries were generally concurrent with the natural resources themselves and did not encompass surrounding developed areas.

The study involved extensive field visits conducted on land and by boat on the Willamette River itself. Wildlife Habitat Assessments (WHAs) were performed for each site. These assessments involved evaluating the presence and availability of water, food and cover for wildlife. Observations regarding water quality, riparian vegetation, wildlife use and habitat connectivity were recorded, as well as disturbance impacts and connection with other natural areas. Unique or rare occurrences of plant and animals were also noted. A Riverine Habitat Assessment methodology, adapted from the WHA, was developed to assess the riverine habitat of the Willamette River. Habitat sites received a numeric score, which provided a relative rank compared to other sites within the Willamette River Inventory study area. The Lower Willamette Inventory: Natural Resources report contained habitat descriptions, including observational data collected using the WHA, and the numeric score for each site.

In 2003, the City updated the draft Lower Willamette Inventory: Natural Resources report to reflect input from City bureaus and key stakeholders, including information about recent development that altered the presence and condition of natural resources. Site boundaries were modified slightly, but the habitat descriptions and WHA scores were not updated. Terrestrial sites are shown in Map 4.

The data and information from the updated Lower Willamette Inventory: Natural Resources (2003) were never formally adopted but are still relevant and are now being incorporated into the inventory site descriptions presented later in this report. The numeric scores were not used to develop the relative rankings because they do not address the full array of riparian functions evaluated in this inventory, and they were not developed for all identified resources in the inventory.



Supplemental Site Visits

The purpose of the site visits is for staff to become familiar with the environs within the study area; to revisit information contained in the previous natural resource and wildlife inventories; and to document plant and wildlife species observations. The City developed a strategy to gather data regarding the presence/absence of wildlife species and the vegetation composition within the study area to:

1. Inform designation of Special Habitat Areas
2. Confirm and supplement the GIS data and mapping
3. Provide sufficient detail to inform future management discussions

Site visits notes, wildlife species observations and photographs are found in Appendix E.

Technical and Public Review

Through the CC2035 planning process, the CCNRI has been distributed to technical experts and the public for review and comment. Technical experts that have reviewed the document included staff from Oregon Department of Fish and Wildlife, Metro, NOAA Fisheries, native tribes, Portland State University and Audubon Society of Portland.

Property owners with resources identified on any portion of their site are contacted and given a chance to review the draft document and request a site visit.

Technical comments and public input, including results from site visits, are incorporated into the document as appropriate.

CHAPTER 3. Central City Natural Resources Inventory

Introduction

Chapter 3 begins with a general description of the Willamette River Basin, then focuses in on the Lower Willamette River that flows through Portland and further into the Central City planning area. Following these descriptions are chapter sections for each of the inventory sites in the Central City. The inventory site sections include detailed descriptions of the natural resource features and functions within that site.

Section 3.a: The Willamette River Basin

Regionally situated in the Lower Columbia River Basin, the Willamette River Basin is an 11,500 square mile watershed located between the Cascade Mountains to the east and the Coast Range to the west. The 187-mile long Willamette River flows north through 128 jurisdictions including Eugene, Corvallis, Salem and Portland as well as eight counties: Lane, Linn, Benton, Marion, Polk, Yamhill, Clackamas and Multnomah. Nearly 70 percent of Oregon's population lives in the Willamette River Basin. The basin contains a broad range of land uses including forestry, agriculture and urban.

Figure 2: Willamette River Basin

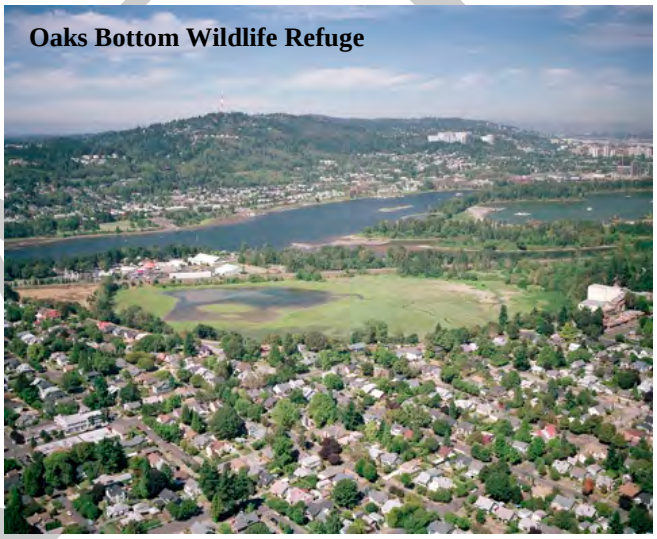
The basin occupies roughly 12 percent of Oregon's land and plays an important role in the ecology of the region. The basin extends from mountains, approximately 10,000 feet in elevation, to the Columbia River, which is just 10 feet above sea level. The Willamette Basin's 12 tributary sub-basins are diverse in terms of elevation, hydrology and landscape character. The Willamette Basin helps to disperse aquatic and avian species among rivers and streams, upland forests, valleys, floodplains and to and from the Columbia River and the Pacific Ocean. It is part of the Pacific Flyway for migratory birds, and is a key component of the extensive network of spawning streams for anadromous salmon and steelhead.

The Lower Willamette River is a tidal freshwater system with water levels that are influenced by a complex and dynamic set of factors, most notably discharge, Pacific Ocean tides and Columbia River flow conditions. Willamette River flows are governed by seasonally variable rainfall patterns, snowmelt in the Willamette Valley's Coast and Cascade mountain ranges, and the operation of dams on many of the major tributaries. Diurnal tidal fluctuations in the lower Willamette are typically on the order of 2 feet per day, but can range from 0 to 8 feet depending on the influence of flow conditions in the Willamette and Columbia Rivers. The Pacific Ocean's tidal prism runs up the Columbia River estuary and into the Willamette River, where it exerts force against downstream flows and influences water surface elevation up to Willamette Falls near Oregon City at RM 27.

The flows in the Willamette River are highest between December and February, with a 40-year monthly average between 50,000 and 70,000 cubic feet per second (cfs). The maximum flow over the period of record is 420,000 cfs and it occurred on February 9, 1996, during what was nearly a 100-year flood event. Columbia River water levels rise in mid-spring due to spring freshets that occur in the Columbia system east of the Cascades. This results in a higher river stage in the Willamette. Under certain conditions, Willamette river flows reverse as rising tides back water up into the Lower Willamette.

It is important to note that flow patterns in both the Willamette and Columbia basins have been dramatically altered over time, largely due to dam and reservoir operations. Following floods in 1943 and 1945, the U.S. Army Corps of Engineers constructed 13 reservoirs, 11 of which have flood control functions. Operation of the reservoirs reduces winter peak flows in the Willamette River by as much as 30 to 50 percent, and augments summer flows to approximately double historical low-flow levels. The reservoirs also provide water for irrigation, navigation, recreation, power generation, public water supply, pollution abatement and anadromous fish propagation. These are important social, economic, and environmental benefits; however, the disruption of the river's flow regime has reduced the periodic flooding that sustains the functions of side channels, sloughs, flood plain areas, wetlands and riparian vegetation. Seasonal flooding and fluctuating currents are known to play an important role in shaping the aquatic environment by distributing nutrients and sediment to maintain gravel bars, deep channel pools, in-channel wood and other characteristics that create diverse aquatic habitats.

The Willamette River provides important habitat for fish and other aquatic and terrestrial species. Beach, near-shore shallow water areas, undercut banks, and large woody debris provide refugia habitat for salmonids that are listed as threatened species under the Endangered Species Act, and feeding areas for shorebirds and other wildlife (ODFW, 2005).



Oaks Bottom Wildlife Refuge

The Willamette River supports a diverse assemblage of fishes. Farr and Ward (1993) identified 39 different fish species occurring within the study area. Species include resident fish, seasonal migrants, and opportunistic migrants representing 17 different families. Resident fish include both warmwater and coldwater species. Seasonal migrants include salmon, steelhead, sturgeon and shad. Opportunistic migrants include white sturgeon and starry flounder. Fish assemblages within the Lower Willamette River are in a state of flux and have been for most of this century. Factors contributing to this constant state of change include the introduction of, and colonization by, hatchery fishes; altered flow regimes; removal of riparian bottomland forests; filling and diking within the flood plain; non-indigenous species; water quality degradation; urban development; and a wide range of fisheries management practices. Numerous non-indigenous species were introduced into the river system in the period between 1890 and 1910. Soon after, overall fish abundance and diversity decreased to historically low levels during the 1940s due to high pollution levels (Farr and Ward, 1993). Many of the introduced species tolerate warmer, more polluted water, and have thrived better in the mainstem and large tributaries — sometimes to the detriment of salmonids.

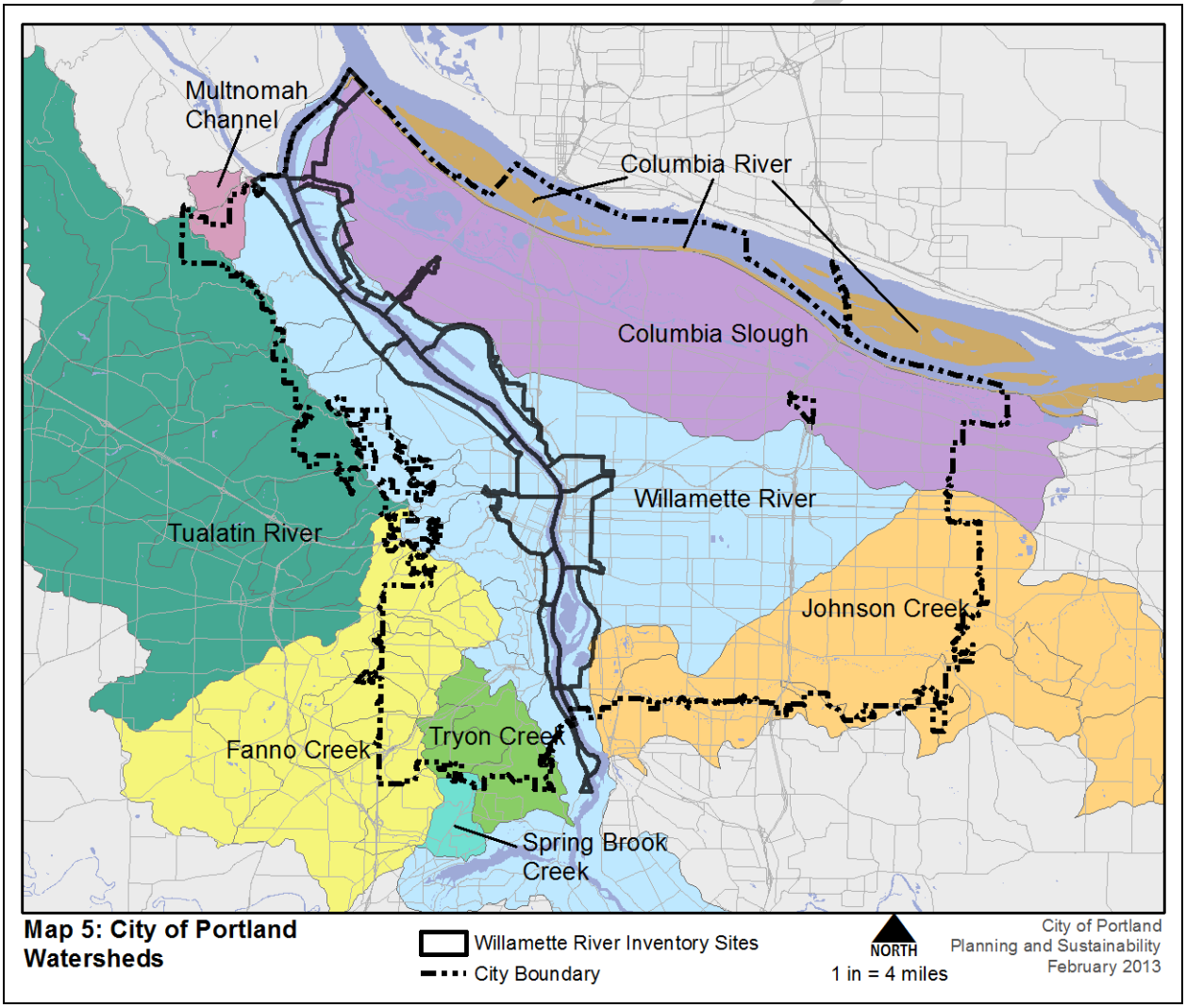
The lower Willamette River is designated critical habitat for several evolutionarily significant units (ESUs) of anadromous salmonids listed as threatened under the federal Endangered Species Act (ESA). These include: upper Willamette River Chinook salmon and steelhead trout, and lower Columbia River Chinook salmon and steelhead trout. In addition, the lower Willamette River is proposed to be included in the designation of critical habitat for coho salmon this year, and is key migratory habitat for Pacific lamprey, a federal species of concern (Chilcote, 1999). Critical habitat designated for most Columbia River ESUs includes the lower Willamette River up to Willamette Falls because it serves the Columbia River as a tributary stream and provides rearing and refuge habitat to its migrating salmon and trout populations. (http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Maps/upload/chumcr-2.pdf)

Recent studies have looked at salmonid and salmonid predator use of the Willamette River in Portland. Ward *et al.* (1994) found that juvenile salmonids use near-shore habitats in Portland. In particular, most salmonids were caught, through vertical gill netting, in waters 18 feet or less in depth. Friesen et al. (2004) conducted comprehensive fish sampling within Willamette River in Portland and found that

beaches appeared to be an important habitat for younger salmonids, particularly Chinook salmon. Beaches were also preferred by radio-tagged coho salmon. Friesen et. al. (2004) found that densities of large predators were consistently highest at sampling sites dominated by rocky habitats (both natural and riprap) and pilings, and radio-tagged predators are prevalent at sites with riprap in summer and autumn. Radio-tagged coho salmon, and to a lesser extent Chinook salmon, are less prevalent at sites with riprap.

The Willamette River is also part of the Pacific Flyway. Nearshore mudflats, shoals and beaches provide habitat for migratory shorebirds: least sandpipers, solitary sandpipers and semi-palmated plovers.

Section 3.b: The Lower Willamette River



The 27 miles of river between Willamette Falls and the Columbia River are often referred to as the Lower Willamette River. This portion of the basin connects directly with the regional ecosystem that includes Sauvie Island, Ridgefield and Shillapoo Wildlife Areas, Vancouver Lake, Tualatin Mountains, Burlington and Oaks Bottom, the Smith and Bybee Wetlands preserve, Sandy River and estuarine islands in the Columbia River. The Lower Willamette River corridor provides connectivity for north/south and east/west wildlife movement. For example, the river connects to Forest Park and further west to the Tualatin Mountains and Coast Range. These large, forested areas provide a major wildlife migration corridor for deer and elk, and are a source of species recruitment. The Lower Willamette River corridor provides important wintering habitat for waterfowl and raptors, and breeding habitat for Neotropical

migratory songbirds. To the east, the Willamette River corridor connects to the East Buttes in the Johnson Creek watershed and the Sandy River delta via the Columbia Slough and the Columbia Gorge. A seven-mile escarpment runs along the east side of the river within the city, providing important native oak habitat and wildlife habitat connectivity. Local neighborhoods contain tree canopy and vegetation that help manage stormwater by intercepting rain and filtering pollutants from overland flow. Neighborhood vegetation can also provide important wildlife habitat areas and corridors. Map 5 shows Portland's watersheds and the boundary of the Willamette River Inventory Sites.

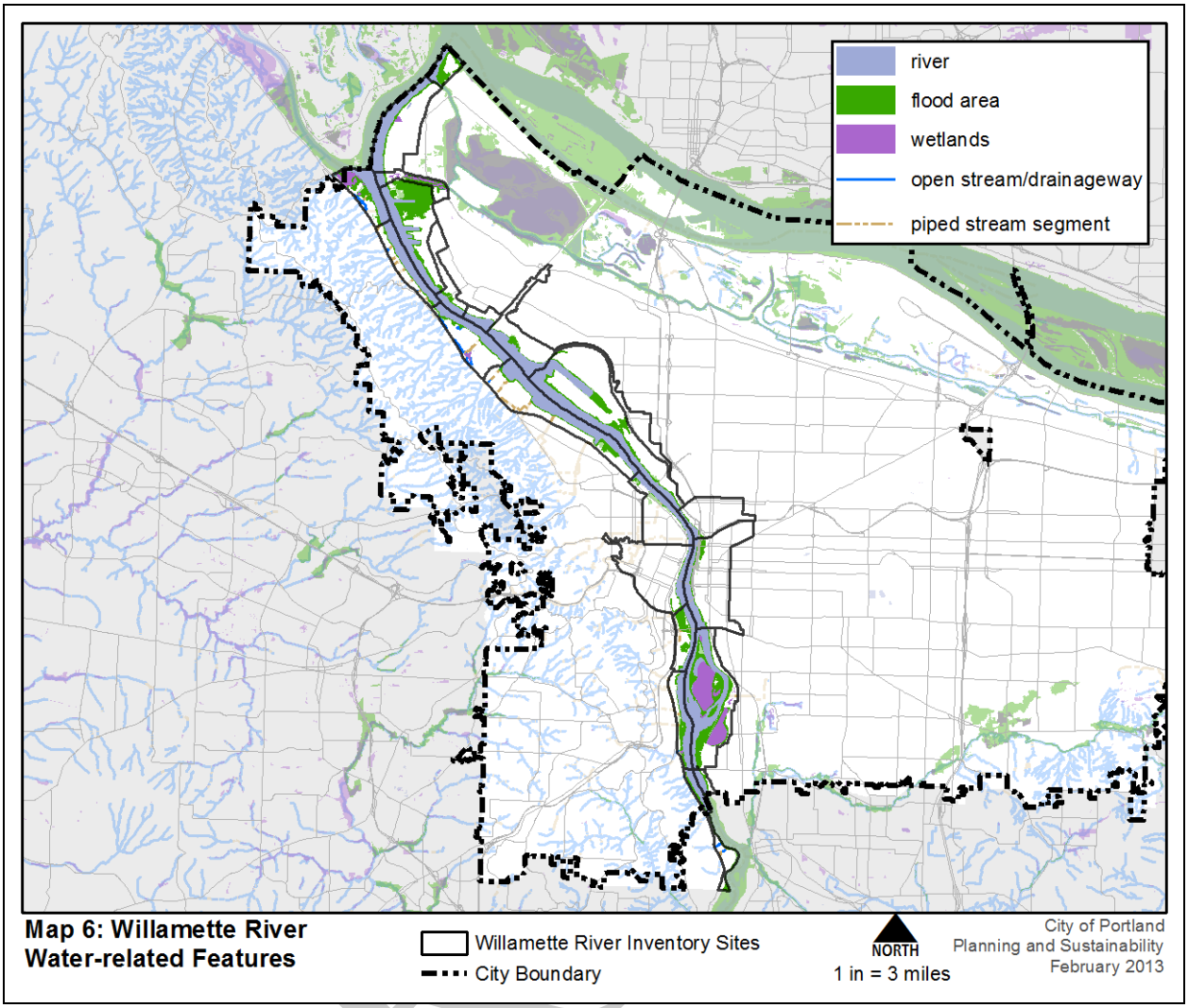
The Lower Willamette River is a tidal freshwater system, and its flow and water levels are influenced by a complex and dynamic set of factors, including tides, seasonally-variable rainfall patterns, snowmelt in the Willamette Valley's Coast and Cascade mountain ranges, as well as by a number of dams on many of the major tributaries. The diurnal tidal fluctuations in the lower Willamette are typically on the order of 2 feet per day, but can range from 0 to 8 feet depending on the influence of flow conditions in both the Willamette and Columbia rivers. Tidal flows are transmitted from the Columbia River estuary to the Willamette River by way of the Columbia River, and the tidal influence extends up to Willamette Falls near Oregon City at RM 27.

The Lower Willamette River does not meet water quality standards for bacteria, mercury, dioxin, temperature and various other toxics and heavy metals (see Table 5). Total maximum daily loads (TMDLs) for bacteria and temperature as well as a phased TMDL for mercury were established in 2006. Oregon Water Quality Index values from 2001 to 2010 for the Lower Willamette River in Portland have been fair and the trend is steady. High in-stream temperatures in the Lower Willamette River during the summer months are of concern to migrating anadromous salmonids. Tributary streams can have mitigating influence on the water temperature in the Willamette River by providing cool water refugia. However, many tributaries to the river do not meet standards for temperature and other pollutants, including bacteria, and toxics are also of concern.

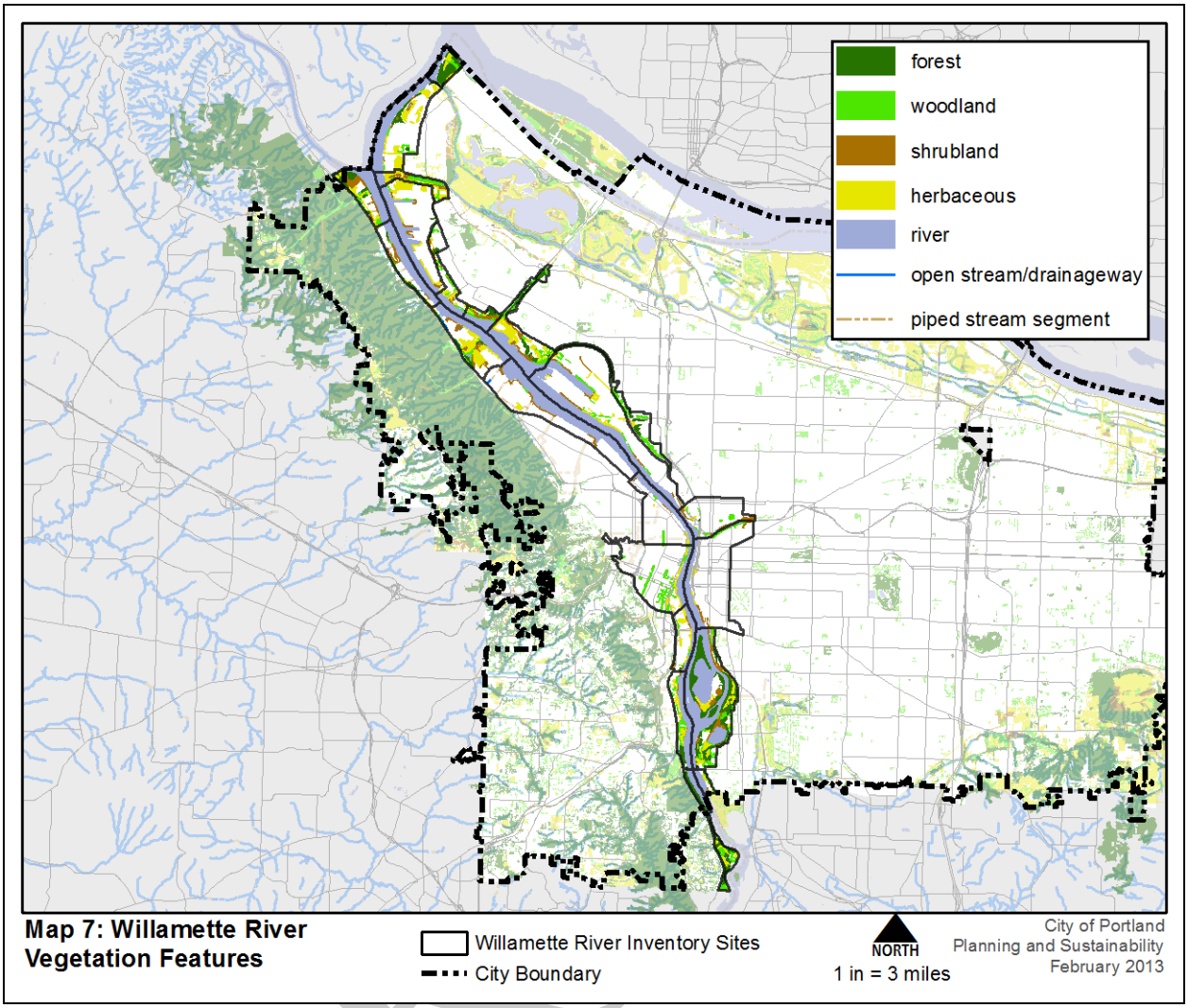
Table 5: Water Quality (303(d)) Listings in the Lower Willamette River and Tributaries

Pollutant	Season	Year River was Listed for this Pollutant	Risk Factors
Pesticides and Toxics (DDT/DDE, Dieldrin, Aldrin, Pentachlorophenol, PCB, PAH)	Year-round	1998, 2002	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
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

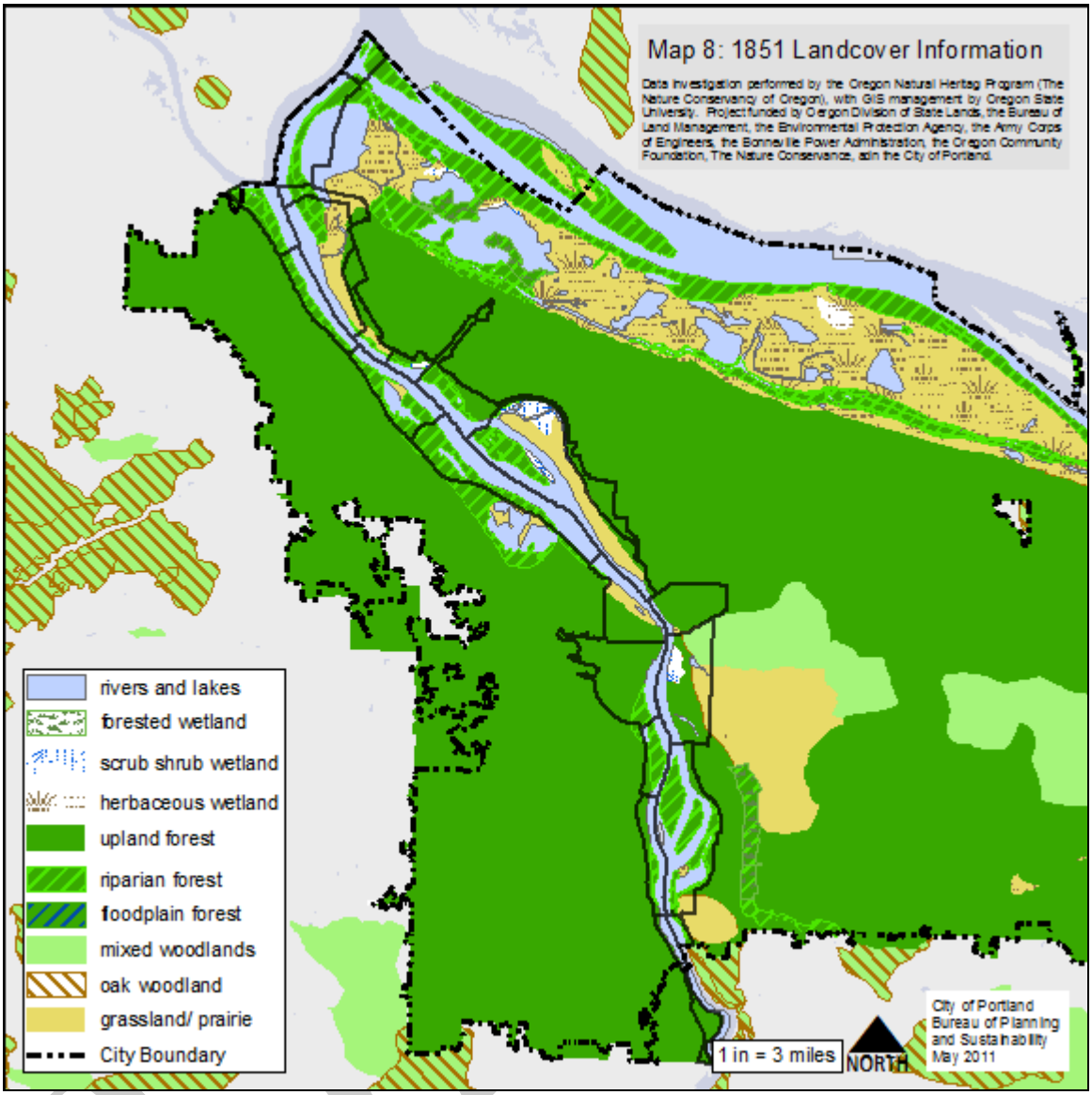
The entire Portland Willamette River inventory study area (North, Central and South reaches combined) includes 19 miles of the Lower Willamette River from Elk Rock Island northward through Portland to its confluence with the Columbia River. Of this, 17 miles are within city limits**.** Many of the smaller tributary streams originate in Forest Park and the West Hills, and are piped through the study area. Map 6 shows water-related features located in the River Plan study area and Map 7 shows vegetation features.



The Willamette River channel within Portland is generally wide, although in the southern portions of the city and urbanizing pockets of Multnomah County, the river is constrained by historic basalt flows. Historically, the Willamette River in the Portland area was comprised of an extensive, interconnected system of active channels, open slack waters, emergent wetlands, riparian forests, mid-channel islands and adjacent upland forests. Prior to European settlement of the Willamette Valley, the river was used primarily by Native Americans for travel, trade, fishing and gathering of plant materials. Permanent and seasonal villages existed on both sides of the river to facilitate these uses, and many of these traditional uses are carried on today by local Native Americans.



Vegetation in bottomland and wetland forests was dominated by black cottonwood, Oregon ash and willow, and associated native understory assemblages of shrubs, grasses and herbs. Denser, mixed-conifer forests of Douglas fir, big leaf maple, western red cedar, western hemlock, grand fir and red alder dominated the west hills and some parts of the east terrace. Foothill savannas of Oregon white oak, Pacific madrone, red alder and big leaf maple were found on the eastern side of the river.



Today, the Willamette River in Portland provides for many uses, including shipping; industrial and commercial enterprises; residential uses; subsistence, commercial, and recreational fishing; other types of recreation; and fish and wildlife habitat. The Lower Willamette River channel has been substantially altered in Portland. The river bottom is occasionally dredged to improve navigation and allow large barges and ships to access Portland terminals. The Willamette River federal navigation channel extends from the mouth of the Willamette River upstream 11.5 miles to the Broadway Bridge in Portland. The width of the channel varies between 600 and 1,900 feet and the maintained depth is 40 feet. The Portland District U.S. Army Corps of Engineers maintains this federal navigation channel. The channel was last dredged in 1997. Maintenance dredging has been suspended until legal and technical issues are resolved regarding dredging within the boundaries of the Portland Harbor Superfund site, as well as how dredging impacts critical habitat for many stocks of Federally-protected endangered aquatic species. Portions of the channel are now less than 40 feet deep, which can pose a hazard to large cargo ships navigating through the Harbor.

Eleven bridges cross the Willamette River in Portland. The Sellwood, Marquam, Ross Island, Hawthorne, Morrison, Steel, Broadway, Fremont and St. Johns bridges are designed to accommodate automobile and

truck traffic. Just south of the St. Johns Bridge, a railroad bridge crosses the Willamette. Several of the bridges provide habitat. For example, the St. Johns, Railroad, Fremont and Marquam bridges provide nesting opportunities for Peregrine falcons.

Substantial stretches of the river's banks have been hardened with riprap, seawalls and docks. Pilings, piers and other human-made structures extend out from the bank into the channel. Numerous structures related to marine cargo facilities are located along the river within the city. Shipping activities are common in the North Reach and a portion of the Central Reach of the Willamette River, with large vessels docking at berths between the Broadway Bridge at RM 11.5 and the mouth where it converges with the Columbia River.

In Portland, the Willamette River's historic floodplain and lowlands were located between the lower Tualatin Mountains/Southwest Hills on the west and the remnant oak bluffs above the Swan Island corridor on the east. Over the last 150 years, many floodplain areas, bottomland forests and wetlands were filled or drained, and developed. There are remnant corridors and pockets of riparian forest, wetlands and upland vegetation. Few large, connected and intact habitats remain in the flood plain in Portland, as multiple jurisdictions and private landowners manage it to meet various objectives. Below are maps from the Willamette River Atlas (City of Portland, 2001) that depict the historic (circa 1888) and current Willamette River.

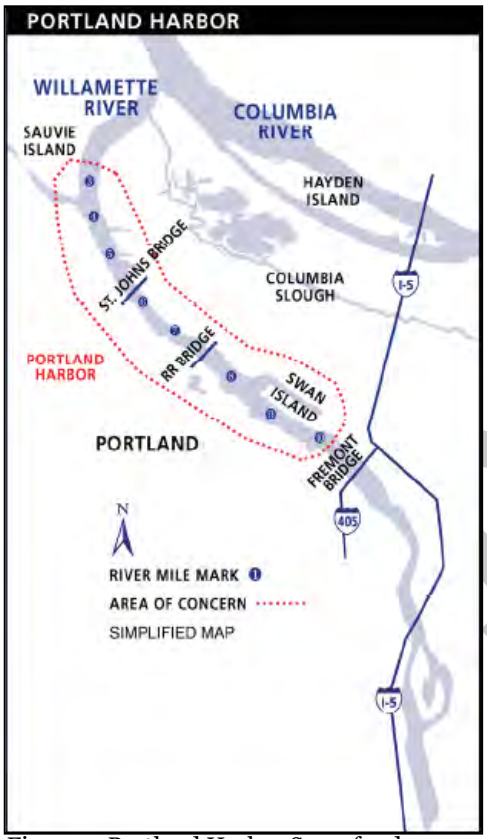


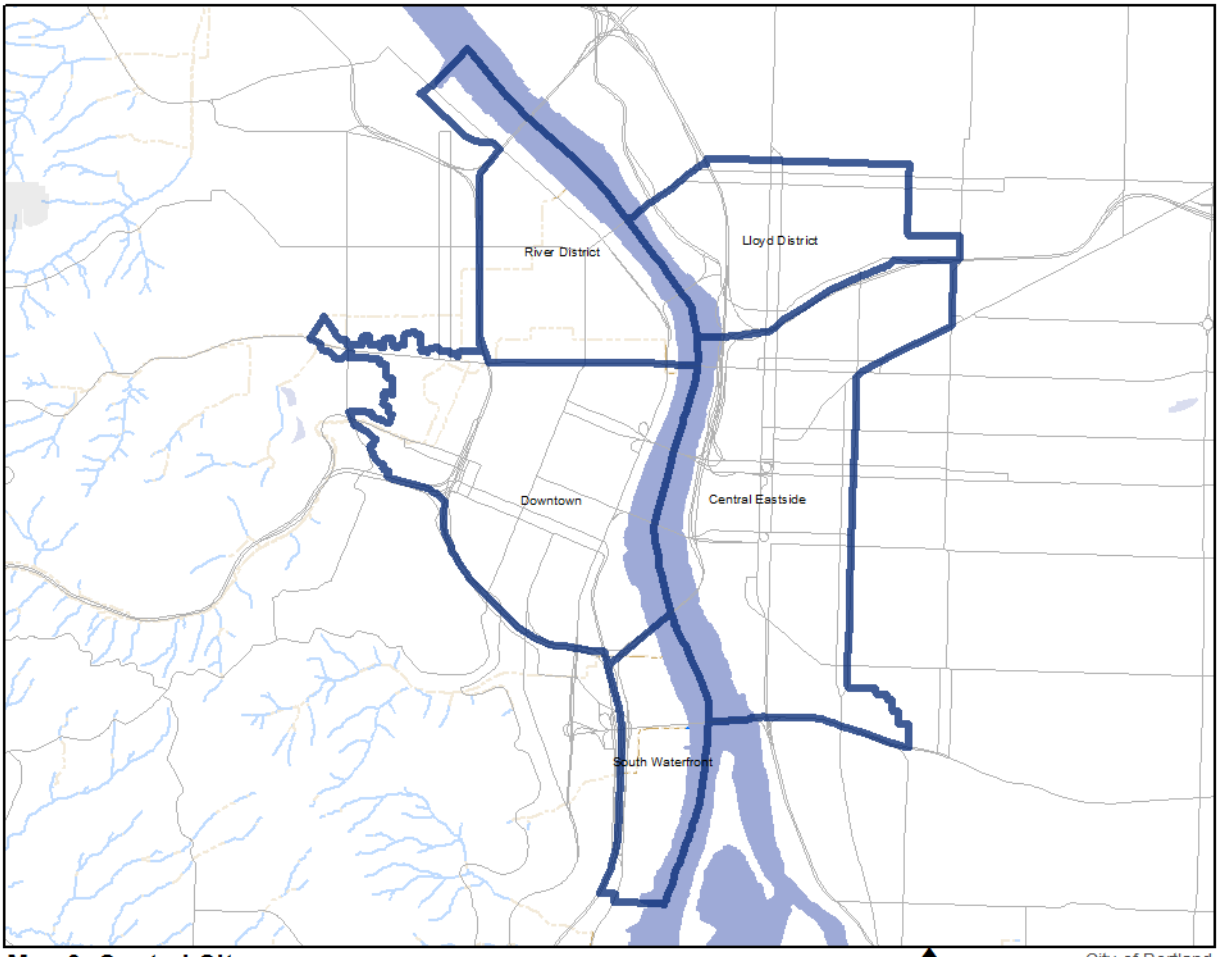
Figure 3: Portland Harbor Superfund

The Portland Harbor, which includes the Willamette River from roughly the Fremont Bridge downstream to river mile 2 near the tip of Sauvie Island, has been listed on the National Priorities List, or as a "Superfund" (Figure 2). Sediments in the river are contaminated with various toxic compounds, including metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), chlorinated pesticides and dioxin. Levels of these pollutants in the river appear to be highest near contaminated upland sites adjacent to the river. One of the main ways in which people come in contact with these toxic compounds is by consuming fish caught in the Willamette. In June 2004, the Oregon Department of Human Services issued a fish advisory related to high PCB levels found in fish caught from the Willamette River in Portland Harbor. The advisory recommends that children and pregnant or nursing women should not consume fish from the Willamette. For more information about the Portland Harbor Superfund, see the Department of Environmental Quality's website: www.deq.state.or.us/lq/cu/nwr/PortlandHarbor/index.htm.

The City of Portland's combined sewer overflow reduction program, and Clean Water Act program implemented by the Oregon Department of Environmental Quality, have been credited with most of the water quality improvements in the Lower Willamette River. Further cleanup mandated through the EPA Superfund process is expected to improve conditions in the lower river in the near future.

Despite changes to the Willamette River's physical, chemical and biological habitats, there remain processes that continue to shape and maintain watershed functions. Within Portland, significant riparian and wildlife habitat resources still exist at Kelley Point Park, Harborton Wetlands, South Rivergate Corridor, Ross Island, the Oaks Bottom Wildlife Refuge, numerous smaller tributaries, wetlands, active flood plain and other vegetated areas along the Willamette corridor, and the Willamette River itself. These areas provide flood storage, water cooling and sediment filtering, and fish and wildlife habitat. These areas also provide important wildlife connectivity corridors along the river and to other significant resources within Portland and the region.

Section 3.c: The Central City



Map 9: Central City Inventory Sites

Overview

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 Central City Planning Area is largely developed, and includes Portland's downtown core, industrial and commercial land, and various other land uses. The banks of the Lower Willamette River have been altered over time; approximately 85 percent of the river banks in the Central City are armored with seawalls, pilings, rock/fill or riprap (Table 6). In the Central City, the flood area has been largely filled and developed. The existing flood area is generally confined to the Willamette River itself; however, there are a few locations of developed flood area. The largest flood area is in South

Waterfront, which is partially developed. Throughout the reach, wharves and piers extend into the river channel, and bulkheads and riprap armor the riverbank. Active dredging has produced a uniform channel with little diversity.

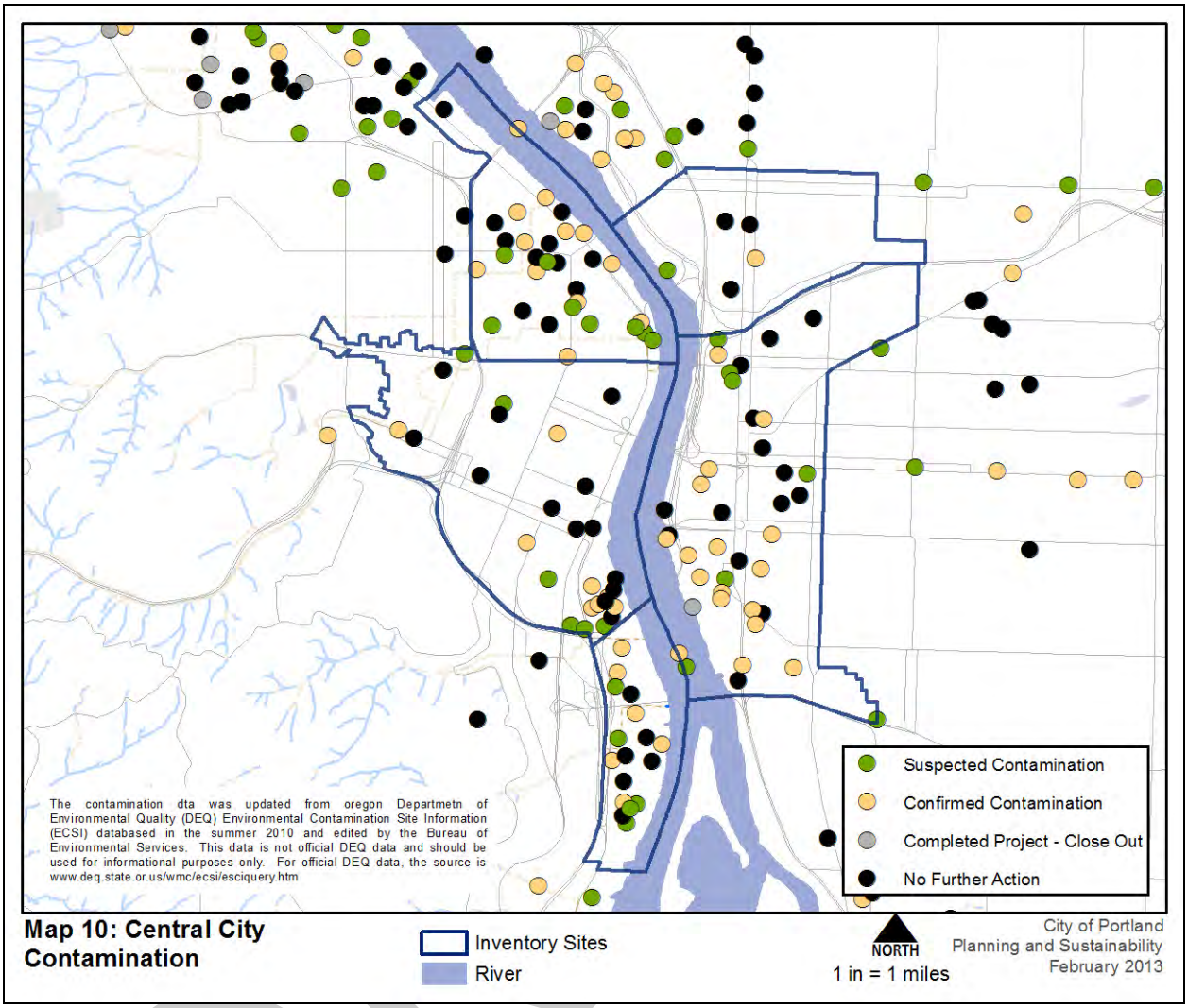
Table 6: Central City Willamette River Bank Treatments

Bank Treatment	Linear Feet
Beach	1,131
Bioengineered	4,140
Non-Vegetated Riprap	1,689
Vegetated Riprap	15,922
Pilings	2,265
Seawall	6,095
Unclassified Fill	5,118
Total	**36,360**

The Willamette River and considerable portions of the land in the Central City are contaminated with toxic compounds. More than 40 Environmental Cleanup Sites have been identified by the Department of Environmental Quality (Map 10). The types of contamination include polychlorinated biphenyls (PCBs), DDT, polycyclic aromatic hydrocarbons (PAHs), and heavy metals, such as mercury. Some contaminants are bound to soil particles, while others can dissolve in water. The level of risk to humans and wildlife varies depending on the type of contaminant as well as exposure. The inventory site descriptions provide an overview of contaminated areas, types of contaminants, risk and status of clean-up activities. For more information, see the Department of Environmental Quality's website: www.deq.state.or.us/lq/ECSI/ecsi.htm.

Currently, the Lower Willamette River does not meet water quality standards for bacteria, mercury, dioxin and temperature. Oregon Water Quality Index values from 1986 to 1995 for the Lower Willamette Basin in Portland range from fair to very poor. Cool water is one of the necessities of many aquatic species, including salmonids. Tributary streams can influence water temperature in portions of the Willamette by providing cool water. However, many tributaries to the Lower Willamette do not meet standards for temperature and other pollutants, such as sediment and heavy metals.

Due to the documented presence of mercury, PCBs, dioxins and pesticides in Lower Willamette River fish, there is a fish advisory for the mainstem of the river. The advisory recommends that people, especially pregnant or breastfeeding women, limit or avoid consuming fatty fish such as carp, bass and catfish. There is no restriction on the consumption of salmon or steelhead. The Lower Willamette River in Portland is deemed unsafe for swimming when sewers overflow into the mainstem during large storm events. The City has worked to curtail overflows over the past decade, and has completed a multi-million dollar sewer pipe retrofit and upgrade project that will capture 94 percent of sewer runoff and transport it to treatment facilities.



Even with the alterations and impacts, the Central City still contains important natural resources, including 4 miles and 408 acres of the Willamette River channel, river banks and flood area. The Willamette River provides significant habitat for Chinook and coho salmon, rainbow/steelhead trout, Pacific Lamprey, beaver, river otter, red-legged frog, western pond turtle and bats. The Willamette River in the Central City is part of the Pacific Flyway and is used by numerous bird species; some are year-round residents, while others pass through the city during spring and fall migrations. Over 210 species regularly occur in Portland, many of which are resident or migratory in the Central City. Iconic species, such as great blue heron, osprey, Peregrine falcon and bald eagle are commonly sighted in the Central City.

Approximately 8 percent of the Central City is vegetated**.** Vegetated areas at least ½ acre include roughly 6 acres of herbaceous, 8 acres of shrubland, 18 acres of woodland and less than 1 acre of forest vegetation. The rest is comprised of smaller, fragmented patches of trees, landscaped areas and non-managed vegetation. Impervious surfaces (e.g., roads, buildings, parking lots) make up 55 percent of the study area.

Vegetated areas in riparian corridors and upland habitats are often comprised of a mix of native, non-native and invasive plants. Native plant species generally provide a broader suite of benefits, such as varied wildlife food sources and effective slope stabilization. However, plants of all types, including non-native and even invasive plant species, provide important watershed functions such as water storage,

nutrient cycling and cover and nesting opportunities for wildlife. Riparian vegetation roots stabilize river banks and trap sediments. Trees and shrubs that overhang the water provide shade that can create localized areas of cooler water. Vegetation along the river provides food sources and perching, nesting and resting areas for resident and migratory birds. The riparian area, and the Willamette River itself, creates a wildlife movement corridor between larger nearby resource areas to the south, including Elk Rock Island, Ross Island and Oaks Bottom, and resource areas directly to the north such as Swan Island Lagoon, Waud Bluff and Doane Lake.

Other effects of urbanization include rivers and streams with constrained or altered channels, wetlands with soil contamination and the developed flood plain. In each of these cases, the resource has experienced some degradation but still provides important functions such as water conveyance and storage, and fish and wildlife habitat.

Elements of the built environment influence resource features and functions of the Willamette River and riparian area. For example, street trees, ecoroofs and other vegetated landscaping intercept rainwater and reduce runoff, provide shade, cool and filter the air, and provide habitat for birds, small mammals (e.g., squirrels) and pollinators.

Table 7 and Map 11 provide a summary of natural resource features found in the Central City.

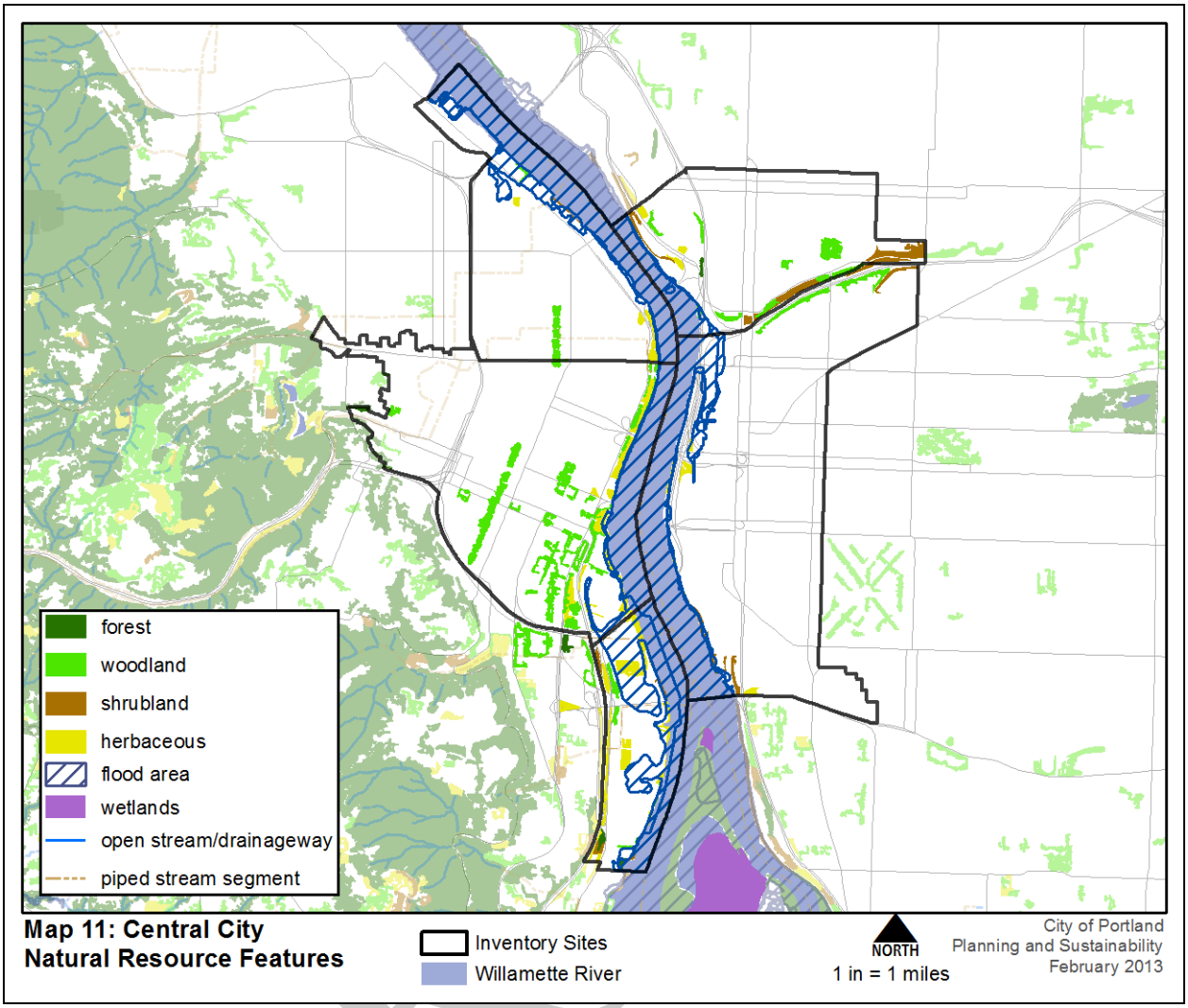
Table 7: Summary of Natural Resource Features in the Central City

	Study Area (miles/acres)
River (miles/acres)	4/408
Stream/Drainageway (miles)	0
Wetlands (acres)	0
Flood Area (acres)*	
Vegetated (acres)	23
Non-vegetated (acres)	126
Open Water** (acres)	406
Vegetated Areas >= ½ acre (acres)+	
Forest (acres)	<1
Woodland (acres)	18
Shrubland (acres)	14
Herbaceous (acres)	7
Impervious Surfaces (acres)	1,507

* 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.



Below is additional information about fish and wildlife use in the Central City Planning Area as a whole.

Fish and Wildlife Use

The Willamette River is the primary migration corridor for both fish and wildlife. The water, river banks, riparian vegetation and upland vegetation in the Central City serve important functions for fish and wildlife.

Anadromous Fish Species

Several fish species that use the Willamette River Central Reach have been listed under the Endangered Species Act. Although most of the rearing and migratory habitats have been heavily developed in this reach, many of these fish continue to use the Central Reach as they migrate from their natal tributary streams to the Pacific Ocean and back to spawn and die. The area identified as Critical Habitat for ESA-listed fishes includes designated rivers and streams up to the ordinary high water mark (OHWM). The OHWM for the Willamette River is determined by the U.S. Army Corps of Engineers. The Central Reach OHWM is elevation 20ft (NAVD88). The National Oceanographic and Atmospheric Administration (NOAA) has designated the Willamette River within the Central Reach as Critical Habitat for the following species (NOAA/NRMF, 2005):

Chinook Salmon
- Lower Columbia River Chinook – listed Threatened
- Upper Columbia River spring Chinook – listed Endangered
- Upper Willamette River Chinook – listed Threatened

Chum Salmon
- Columbia River Chum – listed Threatened

Coho Salmon
- Lower Columbia River (the Lower Willamette River is included in this ESU; critical habitat maps have not been finalized) – listed Threatened

Steelhead Trout
- Lower Columbia River Steelhead – listed Threatened
- Middle Columbia River Steelhead – listed Threatened
- Upper Columbia River Steelhead – listed Threatened
- Upper Willamette River Steelhead – listed Threatened

Bull Trout
- Columbia Basin Bull Trout (Lower Willamette is a Recovery Unit of habitat) – listed Threatened

White sturgeon are distributed throughout the Lower Willamette River, including within the Central Reach. White sturgeon are not current listed at the state or federal level; however ODFW published a Conservation Plan for white sturgeon because of decreases in their population (ODFW, 2011).

Seasonal migrating anadromous fish occur within the Central Reach for short periods and usually occur at predictable seasonal peaks:
- Juvenile salmon and steelhead out-migration generally occurs between March and June.
- Spring Chinook out-migration peaks in April.
- Fall Chinook, steelhead, and Coho out-migration peaks in May and June.
- White sturgeon generally move from the Columbia River estuary into the Willamette River in the spring and summer.

Pacific Lamprey are also found in the Central Reach. The Willamette River is one of the most important production areas for Pacific Lamprey in the entire Columbia River Basin (ODFW, 2002). The sand and small-sized gravel substrate in the Lower Willamette River is used by lamprey ammocetes for rearing and migration out to the sea; as well as by adult migration upstream to spawning grounds.

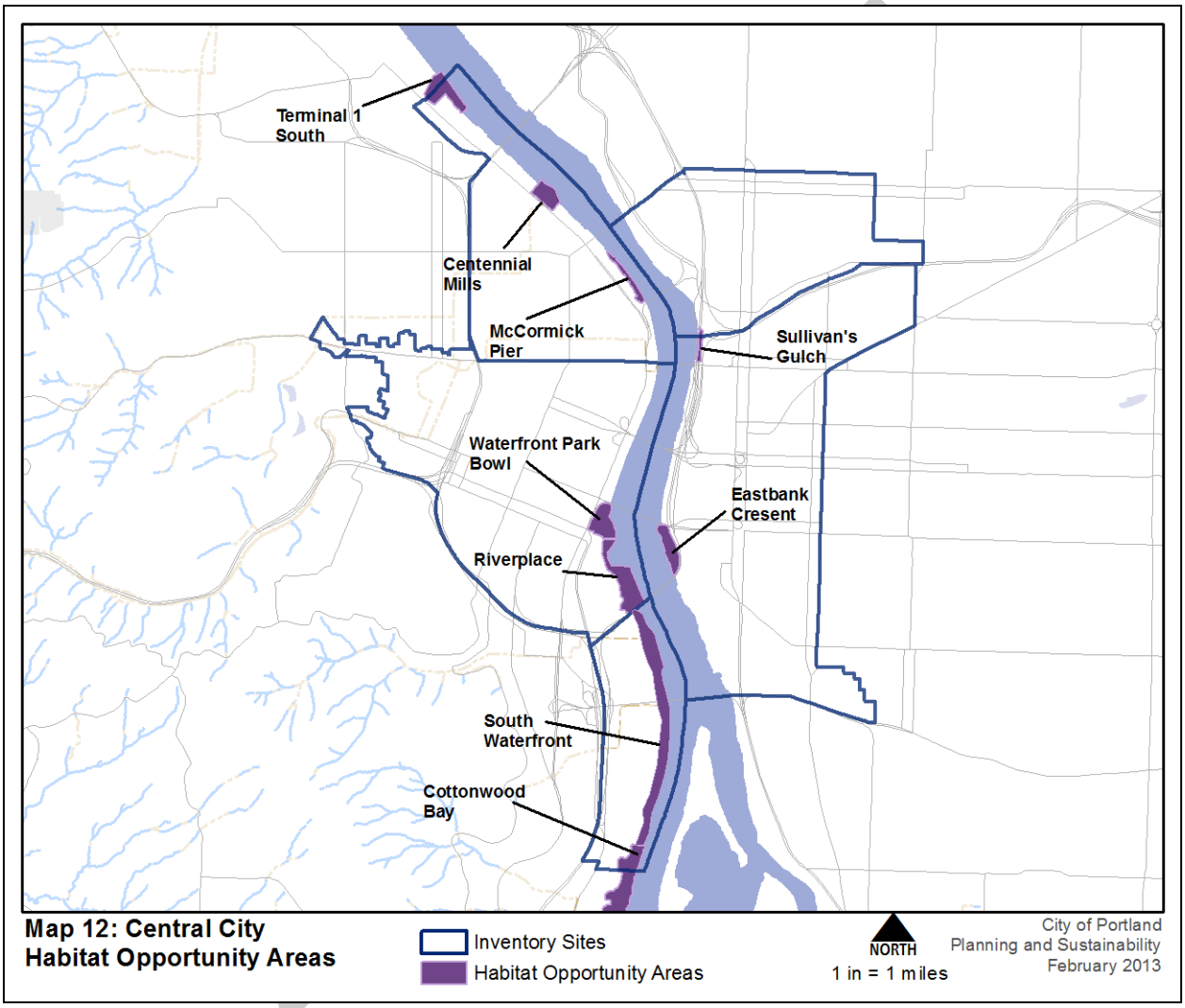
All of these anadromous fish enter the Lower Willamette River system to forage on the annual shad run and to spawn downstream of Willamette Falls. Meyers et al. (1998) identified habitat modification, dams and hatchery management as factors for salmonid decline in the Willamette River basin. Immediately downstream from the South Reach, urban development, river bank armoring, river dredging and filling within the flood plain have substantially altered habitat availability and habitat quality for salmonid fishes. These impacts affect fish as they travel through the South Reach.

Habitat connectivity along the shoreline is crucial to the salmon's survival. As both juveniles and adults move along the shoreline, they seek refugia habitat that provides opportunities to feed, rest and hide from predators. Refugia habitat, in this context, includes shallow water areas, defined as –21.0 feet to +9.5 feet (NAVD88 vertical datum) of the OHWM, with sandy substrates and overhanging vegetation that provide food, resting and recharging opportunities for juvenile salmonids. Shallow water areas also provide important habitat for shorebirds and waterfowl.

The distance between shallow-water refugia is important to the health and survival of salmonids. Long periods of sustained swimming between refugia deplete energy reserves. Fish with low energy resources

migrating between refugia are more vulnerable to predation, as their flight response diminishes with a reduction in stamina. The more "rest stops" a fish has, the more likely they will complete their migrations in good health. Therefore, salmonid productivity and survival is expected to be greater in locations with the shortest distance between refugia, where the fish can rest, feed and rebuild their energy supplies. (C.L. Groot, 1995; M.B. Foreman, 1990; R.C. Eaton, 1991; Sauter, 2001; Sedell, 1990).

Existing important shallow water areas in the (Map 12) Central Reach include: Terminal 1 South, Centennial Mills, McCormick Pier, Hawthorne Bowl, Riverplace, Eastbank Crescent, South Waterfront and Cottonwood Bay. These areas offer an opportunity to improve fish and wildlife habitat. Additional information about these shallow water habitat is provided in the inventory site descriptions.



Terminal 1 South – Terminal 1 South is an approximately 3.5 acre alcove off the mainstem of the Willamette River. The banks are comprised of pilings and docks on the western and northwestern sides of the alcove, and riprap and unclassified fill on the southern shore. The exposed banks on the southern shore are steeply sloped. The banks are sparsely vegetated, primarily with Himalayan blackberry, with a few small trees interspersed. The shallow water areas contain primarily muddy sand.

Centennial Mills – The Centennial Mills site, including the adjacent Mounted Police Unit barn, is approximately 4.3 acres in size. Tanner Creek is piped beneath the site and discharges along the

banks. The banks are comprised of pilings and the overwater mill structure along the downstream half, and vegetated riprap along the upstream half of the site. The bank is vegetated with a mix of Himalayan blackberry and a few small maples and cottonwoods. Landward of the top of bank, in front of the horse barn, there is a small area of maintained grass. Shallow water habitat along the bank from the Broadway Bridge to the Fremont Bridge is large relative to other shallow water areas in the Willamette River Central Reach. The sediments along this stretch are sand and muddy sand.

McCormick Pier – McCormick Pier includes roughly 1,100 feet of bank that are comprised of vegetated riprap and 300-400 feet of sandy beach shoreline. Although the sandy beach is small, it is a rare feature within the Willamette River Central Reach. The riprap in the downstream portion is lightly vegetated with Himalayan blackberry, with isolated small trees and shrubs also present. The bank is mostly steepened along its length, although portions of the lower toe of the slope and the sandy beach area are more gradually sloped. There is a limited thin strip of shallow water along this site, expanding slightly in the area near the beach. On a site visit in spring 2011, an Osprey was observed perched on an in-water structure at the pier. A second was observed soaring over the river.

Sullivan's Gulch – Sullivan's Gulch is located along I-84 between NE 21st Avenue and the Willamette River. The gulch is very steep and is vegetated with woodland to the east and west and a large patch of Himalayan blackberry in the middle. Sullivan's Gulch meets the Willamette River underneath the I-5/I-84 interchange. The river banks here are largely riprap and unclassified fill with no vegetation due to shading by the ramps. A few small stretches of shallow water exist here. The sediments at this site are sand and hard ground.

Waterfront Park Bowl – Waterfront Park Bowl is a slight embayment with gradually sloping banks down to the river. The banks below ordinary high water are non-vegetated riprap; above the riprap is maintained lawn. A concrete overlook and the Hawthorne Bridge demark the upstream and downstream edges of the embayment, respectively. There is narrow area of shallow water at the downstream end near the seawall, which widens at the upstream end. Sediments at the site are predominantly muddy sand.

Riverplace – Riverplace is a slight embayment just south of Waterfront Park Bowl and is developed with a marina, docks and a restaurant. The concave banks are mostly non-vegetated and vegetated riprap. A few trees grow along the top of bank. Buildings and sidewalks are present just beyond the top of bank. The strip of shallow water is wider in this site than at most other sites within the Willamette River Central Reach. Only Eastbank Crescent has a wider area of shallow water. The sediment in the embayment is sandy mud and sand.

Eastbank Crescent – Eastbank Crescent is comprised of an 11,000 foot-long, steeply-sloped bank with unclassified fill along its length. A bench of shallow water off the banks widens downstream as the thalweg switches from the east to the west bank. This represents the widest stretch of shallow water in the Willamette River Central Reach. The bank is dominated by Himalayan blackberry. One large tree and a few shrubs are also present. The sediment is gravelly sand and sand, with a small amount of hard ground at the downstream end near the Hawthorne Bridge.

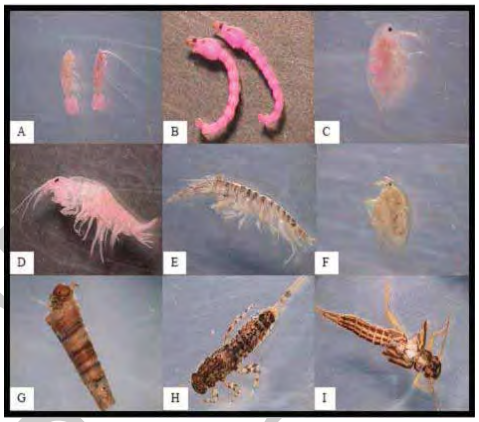
South Waterfront – South Waterfront stretches over 5,000 feet along the eastern river bank. The banks are a highly-varied mix of unclassified fill – concrete, piers and pilings, ramps and riprap. Recently, some bioengineered banks with root wads were installed in front of the new development. Root wads provide bank stabilization and in-water structure for aquatic species. There is a row of trees along the banks at the Landing at Macadam and at other points along the bank, but this area is otherwise sparsely vegetated and the vegetation is dominated by Himalayan blackberry. A thin strip of shallow water in the southern half widens in the northern half as the thalweg transitions to the eastern side of the river. Much of the river bottom is hard ground with patches of gravelly sand, sandy mud, muddy sand and sand.

Cottonwood Bay – Cottonwood Bay spans from the Willamette River Central Reach into South Reach. Cottonwood Bay is one of the larger natural resources areas in the Central/South Reach and provides many riparian corridor and wildlife habitat functions. The larger northern embayment is

approximately 1.2 acres in size and the southern embayment is approximately 0.6 acres. The banks are primarily non-vegetated and vegetated riprap with an abandoned concrete boat ramp in the northern embayment. There is a grove of large cottonwoods along the innermost banks of the two embayments. The water within the embayment is shallow, and the bottom is hard ground within the northern embayment and sand in the southern embayment.

Macroinvertebrates

Macroinvertebrates (aquatic insects), zooplankton and phytoplankton are significant food sources for fish and other aquatic species. The invertebrate community in the Lower Willamette is relatively homogenous, consisting primarily of oligochaetes, cladocerans, amphipods and chironomids (Friesen et. al., 2005). The highest species diversity and taxa richness tends to be found at beaches. High densities of invertebrates usually exist at riprapped banks, but the species diversity and richness varies greatly. Seawalls tend to have the lowest species densities, diversity and richness, likely caused by the lack of interstitial spaces or other complex microhabitats. Figure 3 is representative of taxa found in the Lower Willamette River: (A) copepods (Calanoida), (B) chironomids (Diptera), (C) *Daphnia* spp. (Cladocera), (D) *Eogammarus* spp. (Amphipoda), (E) *Corophium* spp. (Amphipoda), (F) *Bosmina* spp. (Cladocera), (G) caddisfly (Trichoptera), (H) mayfly (Ephemoptera) and (I) stonefly (Plecoptera).



Source: The Xerces Society

Birds

The Central City, including the Willamette River, is part of the Pacific Flyway and is used by numerous bird species during spring and fall migrations. Over 210 species regularly occur in Portland, many of which are resident or migratory in the Central City.

Current bird habitat in the Central City planning area includes:

- Mature canopy of the North and South Park blocks, street trees, patches of vegetation and landscaped areas used by resident and migratory raptors and hummingbirds.
- Trees and shrubs used by Neotropical migrant songbirds for foraging and resting as they pass through the area on migration.
- Beaches and open water, used by great blue heron, double-crested cormorant and waterfowl.
- Vegetated shoreline along the river, used by waterfowl and gulls.
- Built features such as bridges, pilings and buildings, used by peregrine falcon and cliff swallows.

Larger patches of native and non-native vegetation along Sullivan's Gulch and in Holiday Park provide nesting sites for red-tailed hawks and other resident species such as Bewick's Wren and Spotted Towhee. There are nesting sites near beaches in the planning area which are used by bald eagles and osprey. Bridges in the Central City play a vital role in the recovery of the peregrine falcon; once listed as a Federal Endangered Species, and recently delisted by the State of Oregon, Portland bridges provide successful nest sites and year-round habitat for these peregrine falcons. Five percent of Oregon's known nesting population are Portland birds.

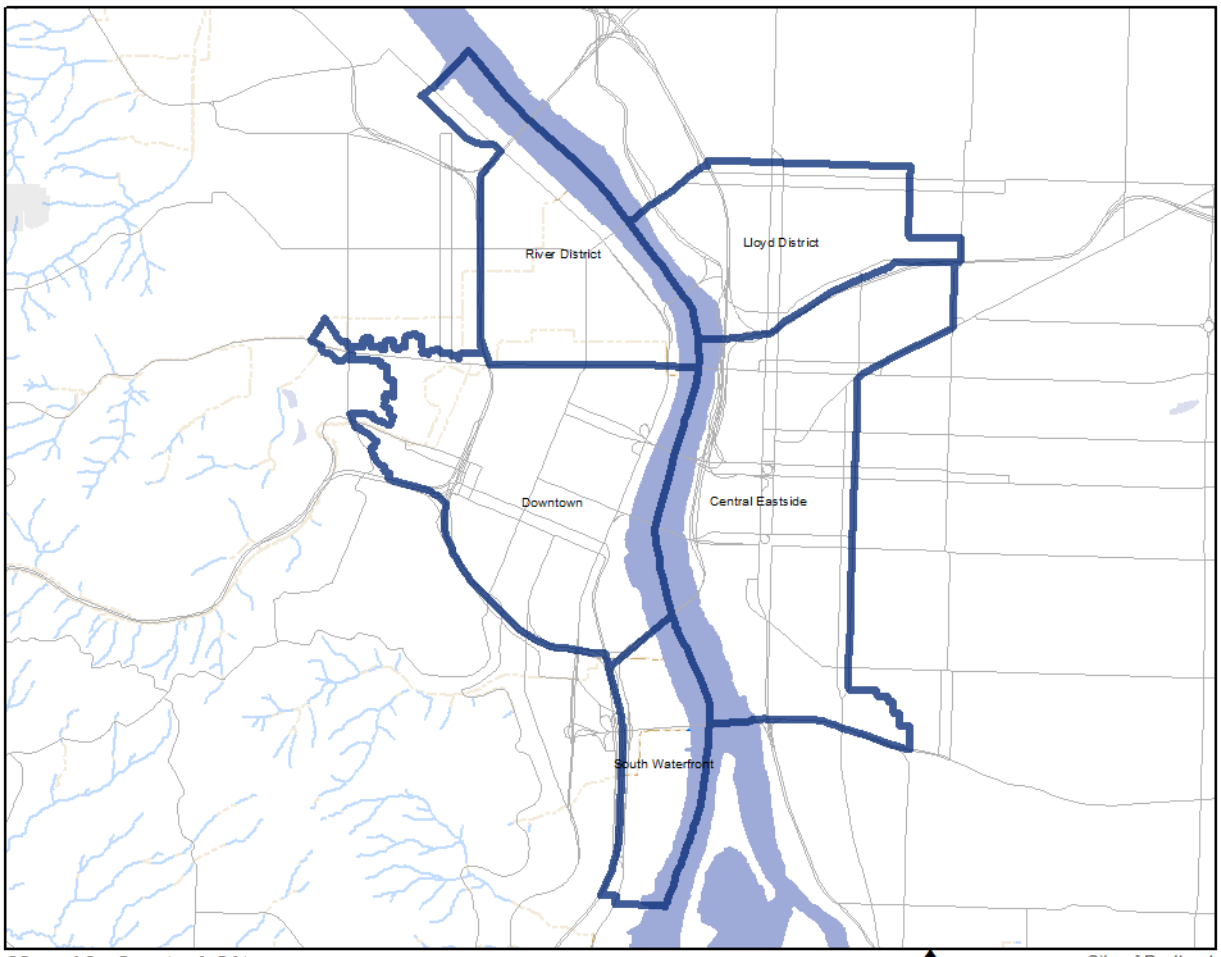
Birds observed during 2011 site visits in the Central City included: American crow, American robin, Anna's hummingbird, bushtit, Cooper's hawk, European starling, house finch, house sparrow, peregrine falcon, osprey, scrub jay, red-tailed hawk, song sparrow, rock pigeon (dove), white-crowned sparrow and yellow-rumped warbler.

Section 3.d: Central City Inventory Sites

There are five inventory sites in the Central City Planning Area (Map 13), which include portions of the Willamette River channel, banks, and riparian and upland areas:

- 3.d.i: Inventory Site WR14 – Lloyd District
- 3.d.ii: Inventory Site WR15 – River District
- 3.d.iii: Inventory Site WR16 – Downtown District
- 3.d.iv: Inventory Site WR17 – Central Eastside
- 3.d.v: Inventory Site WR18 – South Waterfront

The inventory sites support a variety of land uses, primarily commercial, industrial, residential and recreational use.



Map 13: Central City Inventory Sites

The following report sections provide information for each inventory site. Each site section starts with a summary of site characteristics (Table 8) and is followed by a description and evaluation of natural resources.

Table 8: Explanation of Inventory Site Summary Information

Characteristic	Explanation
Watershed:	The name of the watershed(s) in which the resource site is located.
Neighborhood:	The name of the neighborhood(s) in which the resource site is located.
Legal Description:	USGS quadrangle maps and quarter section maps.
River Mile:	Willamette River river mile, beginning at the confluence with the Columbia River.
Site Size:	Size estimates include land features, streams and drainageways, wetland and river.
Previous Inventory:	City-adopted natural resource inventories in which the site or portions of the site were addressed.
Zoning:	Zone designations within the site, including overlays (e.g., height, design, open space, scenic, greenway and environmental).
Existing Land Use:	Primary land uses currently within the site.
General Resource Description:	Brief description of the site, its geographic location, natural resources and other key features.
Resource Features:	Specific natural resource features found within the site (e.g., stream, drainageway, wetland, flood area, vegetation, beach, steep slopes and open water). Features may be in relatively good or poor/degraded condition.
Resource Functions:	Riparian and wildlife habitat resource functions relate directly to the resource features found within the site; these are the functions that may be performed by the resources present.
Special Habitat Area:	Special Habitat Areas (SHAs) are designated where natural resources have been documented to include critical, rare or declining habitat types, or critical habitats for special status species.
Special Status Species:	Special status species are wildlife (including fish) or plant species known or reasonably expected to occur within or use the site and that have been officially listed by the NOAA Fisheries or the U.S. Fish and Wildlife Service (Candidate, Threatened, Endangered, Species of Concern), or the Oregon Department of Fish and Wildlife (Threatened, Endangered, State Sensitive, State Strategy), or ranked by Oregon Natural Heritage Information Center (Ranked or Listed Species), Oregon Watershed Enhancement Board (Priority Species), Partners In Flight (Focal Species), the National Audubon Society & American Bird Conservancy (Watch List), and the Northwest Power and Conservation Council Willamette and Columbia Subbasin Plans (Focal Species). Special status species lists for Portland can be found in Appendix D.
Hazards:	Indicates whether any portion of the site is within City-designated Wildfire Hazard Zone, Landslide Hazard Zone or the Flood Area (FEMA 100-year flood plain and/or adjusted 1996 flood inundation area).
Contamination:	Indicates whether any portion of the site is contaminated per the Oregon Department of Environmental Quality, Environmental Cleanup Site Information (ECSI) database.

Following the inventory site summary, the following information is provided:

Site Description

The site description is a brief, general description of site boundaries, current and historic land uses, development characteristics, natural resource features, and other issues, such as known contamination, mitigation sites, revegetation projects and natural hazards, if applicable. This section is intended to provide important context for the following descriptions and evaluations of the natural resources on the site.

Natural Resource Description

The natural resource description provides an account of the types and condition of natural resources present within the site, including information on water bodies, wetlands, water quality, plant assemblages, habitat types and wildlife species found within the site. Natural resource functions are addressed, as are factors that may affect the overall function of these resources. Such factors include invasive species, development-related disturbances, impervious surfaces and contamination.

The natural resource descriptions, in conjunction with the natural resource evaluations, are intended to provide a general understanding of the presence, functions and relative value or quality of the natural resources. The descriptions are based in part on research and site visits completed by City staff between 2010 and 2011. Other information sources used to develop these descriptions include: Department of Environmental Quality information on contaminated sites; City data on natural resources and landslide and wildfire hazard areas; and various other documents.

Natural Resource Evaluation

This section presents and describes key natural resource functions and values that currently exist in each inventory site. The resource evaluations are presented in three sub-sections: (1) riparian areas, (2) wildlife habitat, and (3) combined riparian and wildlife habitat areas. The methodology used to produce the relative rankings, including the process listed below, is summarized in the previous chapter and a more detailed description is found in Appendix G – Natural Resource Inventory Update: Project Report.

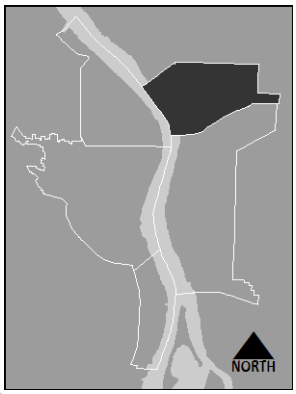
The natural resource evaluation process includes:

1. Mapping key resource features associated with riparian corridors and wildlife habitat.
2. Applying science-based criteria using GIS models to assess functions and attributes and generate initial relative ranks for natural resource features in the site.
3. Incorporating Special Habitat Areas.
4. Combining Relative Rankings.

It is important to emphasize that the relative rankings denote the current conditions and the relative functional quality of natural resources in a given site. The relative quality of existing natural resources in the study area ranges from relatively functional to highly degraded. This information is intended to inform, but not dictate, how these areas could be managed. For example, understanding the relative quality of existing resources can inform planning efforts, design of development projects, and priority-setting for natural resource protection or restoration.

It should also be noted that all ranked resources provide important watershed values and functions that should be taken into consideration when making management decisions to protect, restore or disturb these areas.

Section 3.d.i: Inventory Site WR14 - Lloyd District

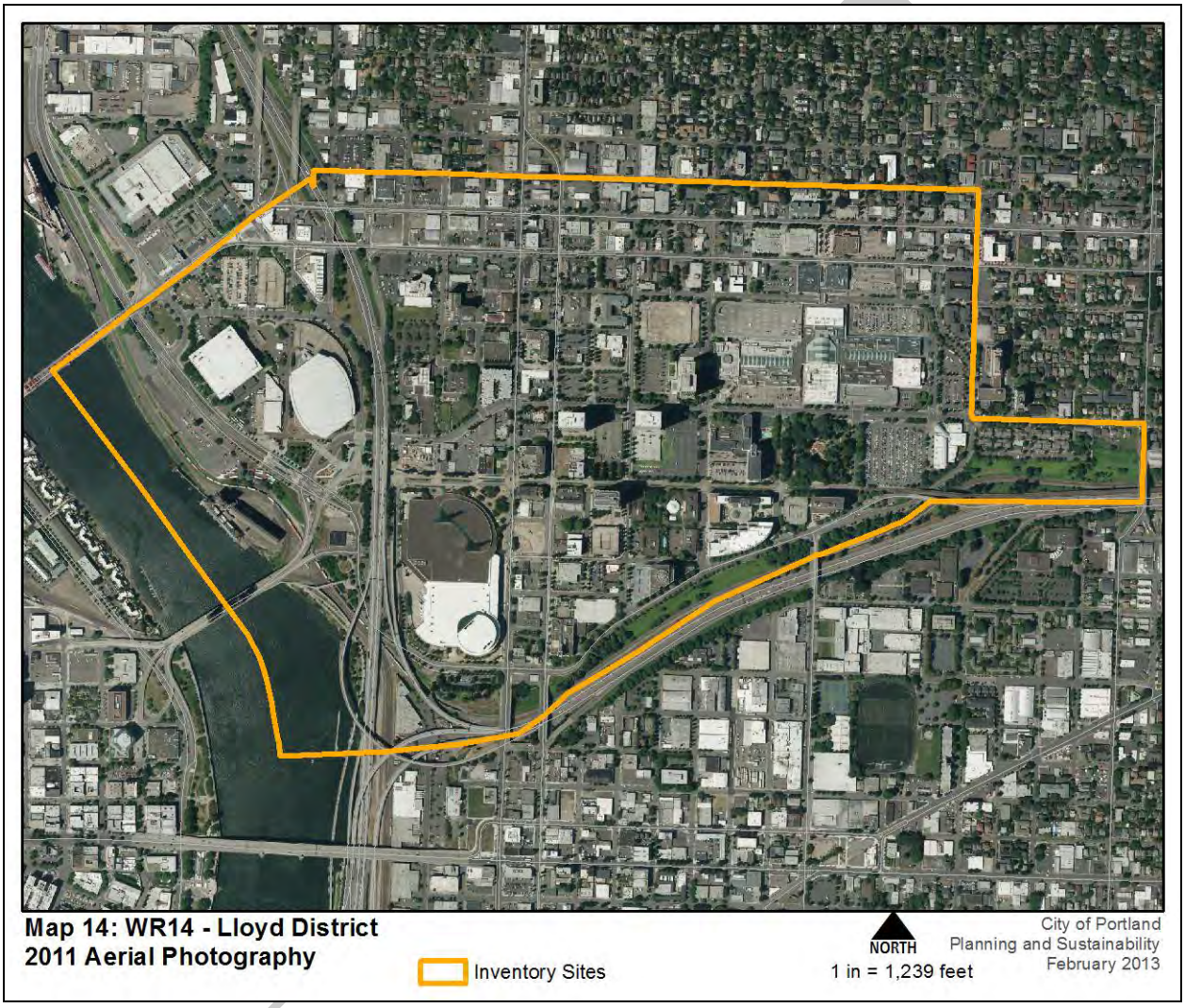


Summary Information

Watershed:	Willamette River Watershed
Neighborhood:	Lloyd, Sullivan's Gulch, Irvington, Eliot
USGS Quadrangle and Quarter Section Maps:	1N1E34, 1N1E35, 1S1e03, and 2929-30, 3030-31, 3130
River Mile:	11.3 – 12.7
Site Size:	423 acres (land and water)
Previous Inventory:	Lower Willamette River Wildlife Habitat Inventory, March 1986
Zoning:	Central Commercial (CX) Central Employment (EX) Central Multi-dwelling Residential (RX) General Industrial 1 (IG1) High Density Multi-dwelling Residential (RH) Open Space (OS) Design overlay (d) River General overlay (g) Scenic overlay(s)
Existing Land Use:	Commercial, residential, industrial, parks and open space, railroad, freeway
General Description:	This mostly commercial site extends between the Broadway Bridge to the north and the Burnside Bridge to the south. Along the Willamette River, there is a public walkway surrounded by herbaceous and shrubland vegetation. There are railroad lines and several freeways with access ramps within this site.
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 Sullivan's Gulch: (U) – unique feature
Special Status Species:	Fish: Lower Columbia River Chinook salmon, Columbia River chum salmon, lower Columbia River steelhead trout, Pacific lamprey
Natural Hazards:	Flood area, wildfire, landslide
Contamination:	Yes

Site Description

This 423 acre site is located from the Willamette River centerline eastward to NE 21st Avenue and between Broadway Bridge to the north and I-84 to the south. The site is bordered by industrial, residential and commercial uses, and a major freeway runs through much of the site. As a result of development, most of the connections between the few remaining pockets of forested upland habitat and the river bank have been removed. The shoreline is defined by banks of vegetated and non-vegetated riprap, unclassified fill, rock, seawall and bioengineered bank treatment. There is a public walkway along the river, running from the Steel Bridge to the Hawthorne Bridge. Map 14 shows the aerial view of the Lloyd District inventory site.



The site contains 241 acres (57 percent) impervious surface coverage, including 20 miles of road. Of the vegetated areas over ½ acre in size, there is are approximately 14 acres of forest and woodland vegetation, 14 acres of shrubland and 2 acres of herbaceous vegetation. There are 37 acres of flood area on this site (City of Portland, 2002), most of which is open water; the on-land portion is developed for industrial or transportation uses.

Table 9: Summary of Natural Resource Features in WR14 - Lloyd District	
	Study Area (miles/acres)
River (miles/acres)	0.6/31
Stream/Drainageway (miles)	0
Wetlands (acres)	0
Flood Area (acres)*	
Vegetated (acres)	2
Non-vegetated (acres)	4
Open Water** (acres)	31
Vegetated Areas >= ½ acre (acres)+	
Forest (acres)	<1
Woodland (acres)	13
Shrubland (acres)	14
Herbaceous (acres)	2
Impervious Surfaces (acres)	241

* 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 Willamette River in the Portland area was comprised of an extensive, interconnected system of active channels, open slack waters, emergent wetlands, riparian forests and adjacent upland forests. Today, the Lloyd District is a largely-developed landscape. The predominant existing natural resources are the Willamette River, including the flood area, and vegetation along the banks. Elements of the built environment also provide natural resource functions, including street trees, ecoroofs and vegetated landscaping.

The natural resources description is divided into sections that focus on habitat types:

- Open Water and Flood Area
- River Banks and Riparian Vegetation
- Steep Slopes

<u>Open Water</u>
Below is a summary of the Lower Willamette River in inventory site WR14. Additional information about the water quality, hydrology, and fish and wildlife use of the Willamette River is provided in Section 3.c: The Central City.

Inventory site WR14 includes 31 acres of the Lower Willamette River. The river is the primary habitat linkage providing connectivity to upstream and downstream aquatic habitats. This linkage is critical for supporting salmonids, 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 bull 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 watershed. Seasonal migrants use habitat within the inventory site for only short periods and usually occur at 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 sturgeons 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 the Willamette Falls and the Columbia River confluence describe an abundant population of white sturgeon with multiple age classes present.

There is currently relatively little scientific literature characterizing Pacific lamprey rearing and outmigration in the Lower Willamette River. However, the freshwater juvenile rearing stage of Pacific lamprey is known to last between 4-7 years, and juvenile Pacific lamprey have repeatedly been found burrowing in Lower Willamette River sediments.

Resident fish assemblages within this reach include both native and non-native species that both support and prey upon native salmonids. These species include natives 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.

Inventory site WR14 is part of the Pacific Flyway and is utilized by 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 man-made structures for perching, resting and foraging. Shallow water areas and exposed sand and mud are used by shorebirds and waterfowl. Upland trees and shrubs are used by Neotropical migratory songbirds.

The Willamette River in the inventory site does not meet water quality standards for bacteria, mercury, dioxin, temperature, and various other toxics and heavy metals (see Table 10).TMDLs for bacteria and temperature as well as a phased TMDL for mercury were established in 2006. Oregon Water Quality Index values from 2001 to 2010 for the Lower Willamette River in Portland have been fair 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)	Year-round	1998, 2002	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
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

Due to the presence of mercury, PCBs, dioxins and mainly legacy pesticides (DDT, dieldrin) in Willamette River fish tissue, a fish advisory for the mainstem recommends that people, especially pregnant or breastfeeding women, limit or avoid consuming fatty fish such as carp, bass and catfish. There is no restriction on the consumption of salmon or steelhead. The Lower Willamette River in Portland is deemed

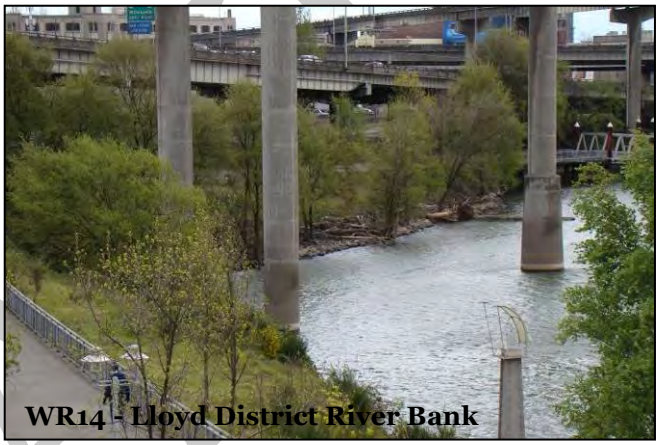
unsafe for swimming during and immediately after sewer overflows as a result of larger storm events. However, in 2011, the City completed a large infrastructure project to address combined sewer overflows. The result is that combined sewer overflows should be very infrequent (about one every three years) during the summer recreating season.

In the inventory site, the flood area is generally confined to the Willamette River itself; but the flood area extends on to developed land south of the I-84 and I-5 interchange, riverward of NW Front Ave. The developed floodplain provides the function of water storage during events like the 1996 flood.

River Banks and Riparian Vegetation

This inventory site was historically industrialized, resulting in a highly modified river channel, bank and nearshore areas. Wharves and piers extending out from the channel and bulkheads and riprap revetments armor the riverbank.

There is little riparian vegetation except a 1,030-foot-long, narrow strip of woodland vegetation south of the Steel Bridge. There is some low-structure vegetation south of the Broadway Bridge. Riparian vegetation in the inventory site is a mix of native, non-native and invasive plants, including cottonwood, Oregon Ash, Himalayan blackberry and Scot's broom. Native plant species generally provide a broader suite of benefits, such as varied wildlife food sources and effective slope stabilization. However, all plants, including non-native and invasive species, provide important watershed functions such as water storage, nutrient cycling, and cover and nesting opportunities for wildlife.



WR14 - Lloyd District River Bank

Due to extensive development, armored river banks and limited remnant riparian vegetation, wildlife use is limited in this site. During a spring 2011 site visit, species observed using river banks and riparian vegetation in inventory site WR14 included: yellow-rumped warbler, osprey, mallards and geese.

Sullivan's Gulch and Steep Slopes

Along I-84 is a steeply-sloped, largely vegetated corridor, known as Sullivan's Gulch. Sullivan's Gulch begins outside of the inventory site, near NE 21st Avenue, and continues west to the Willamette River. Between the Lloyd Blvd/I-84 onramp and NE 12th Avenue, vegetation is comprised of black cottonwoods to the east, indicating the presence of surface or subsurface water, and big leaf maple to the west. The understory is a mix of hawthorn, English holly, Pacific dogwood, ivy, clematis, Himalayan blackberry and some Scott's broom. Between NE 12th Avenue and NE Grand Avenue the vegetation includes big leaf maple, cherry, one Oregon white oak, hawthorn, butterfly bush, English holly and English ivy. The middle of this stretch of the gulch is void of large trees and dominated by Himalayan blackberry. Between NE Grand Ave and the river, the vegetation includes some large trees, including one Oregon white oak, and an understory of Himalayan blackberry or turf grass. There is standing water under the I-84/I-5 onramp.

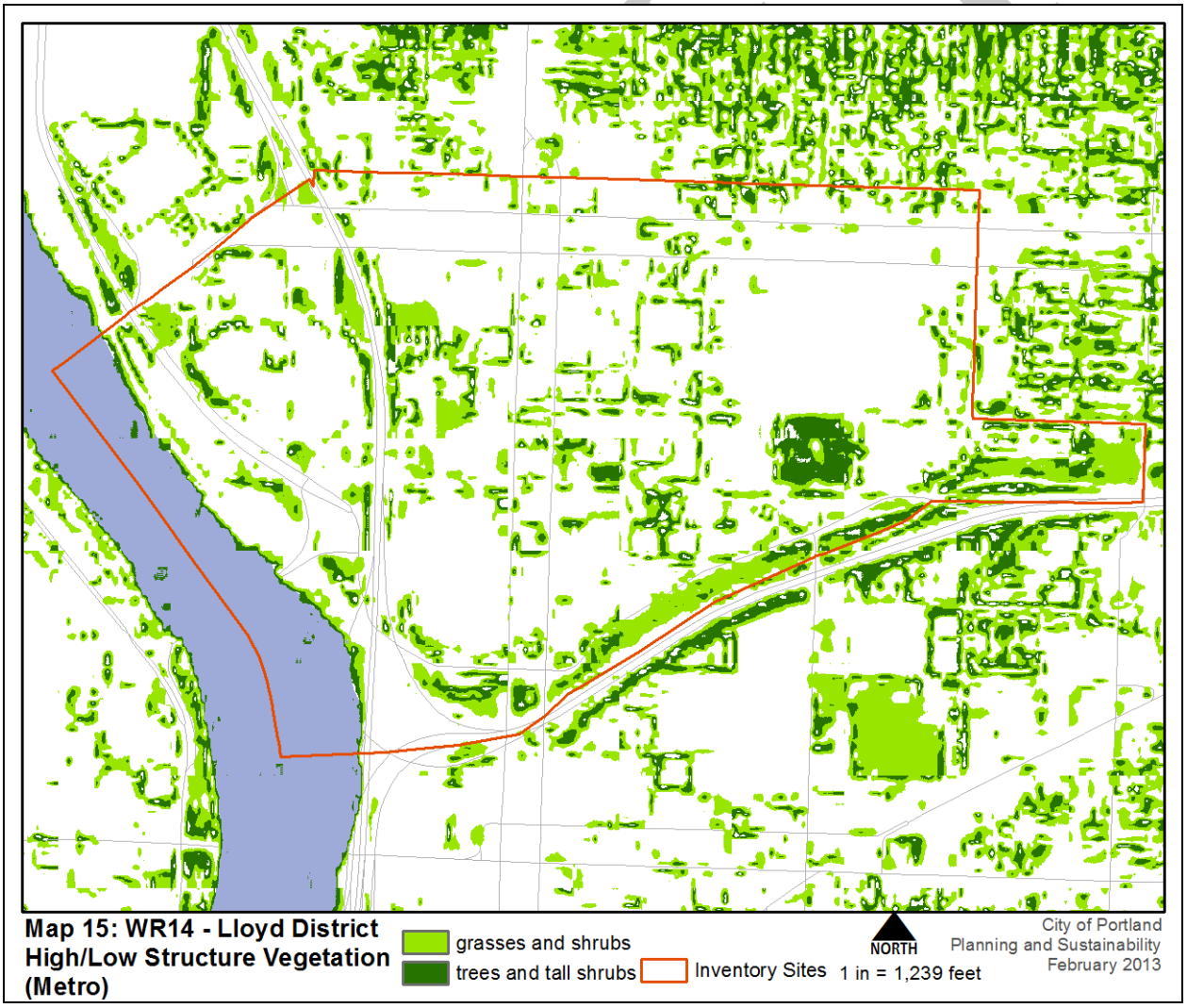
Sullivan's Gulch

During a spring 2011 site visit, birds observed using Sullivan's Gulch included: song sparrow, Western scrub jay, American robin, bushtit, crow, Anna's hummingbird, white-crowned sparrow and yellow-rumped warbler. In the standing water under the I-84/I-5 onramp, two mallards were observed.

Steep slopes in Portland are relatively prone to wildfire and landslides. Although Sullivan's Gulch has not burned recently, north of the inventory site is Waud Bluff which experienced fires in 2001 and 2003. The primary sources of fuel were non-native plant species such Himalayan blackberry. Native species, including Oregon oak, Douglas fir, Oregon grape, snowberry, Gilia capitata (globe gilia) and Penstemon ovatus (broad leaved penstemon), are more fire-resistant plants.

Landscape Vegetation and Street Trees

For purposes of the Natural Resources Inventory mapping and modeling, only vegetation patches at least ½ acre in size are captured. However, smaller landscaped areas and individual street trees also provide functions, including cleaning and cooling the air and water, capturing greenhouse gases, capturing and uptaking stormwater, reducing energy demand and providing wildlife habitat (Map 15: High/Low Structure Vegetation). Along with the parks located throughout the site, the southern half of the site contains a significant amount of landscape vegetation and street trees.



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 11). 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 G: 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 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. High and medium relative functional ranks are assigned to vegetated, non-hardened river banks or flood areas. Low relative ranks are generally assigned to non-vegetated flood areas and hardened, non-vegetated river banks.

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 WR14 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:

- 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

- Sullivan's Gulch upland habitat along I-84 that is also subject to potential landslides and wildfire is designated SHA because it meets the following criteria:

(U) – Unique feature

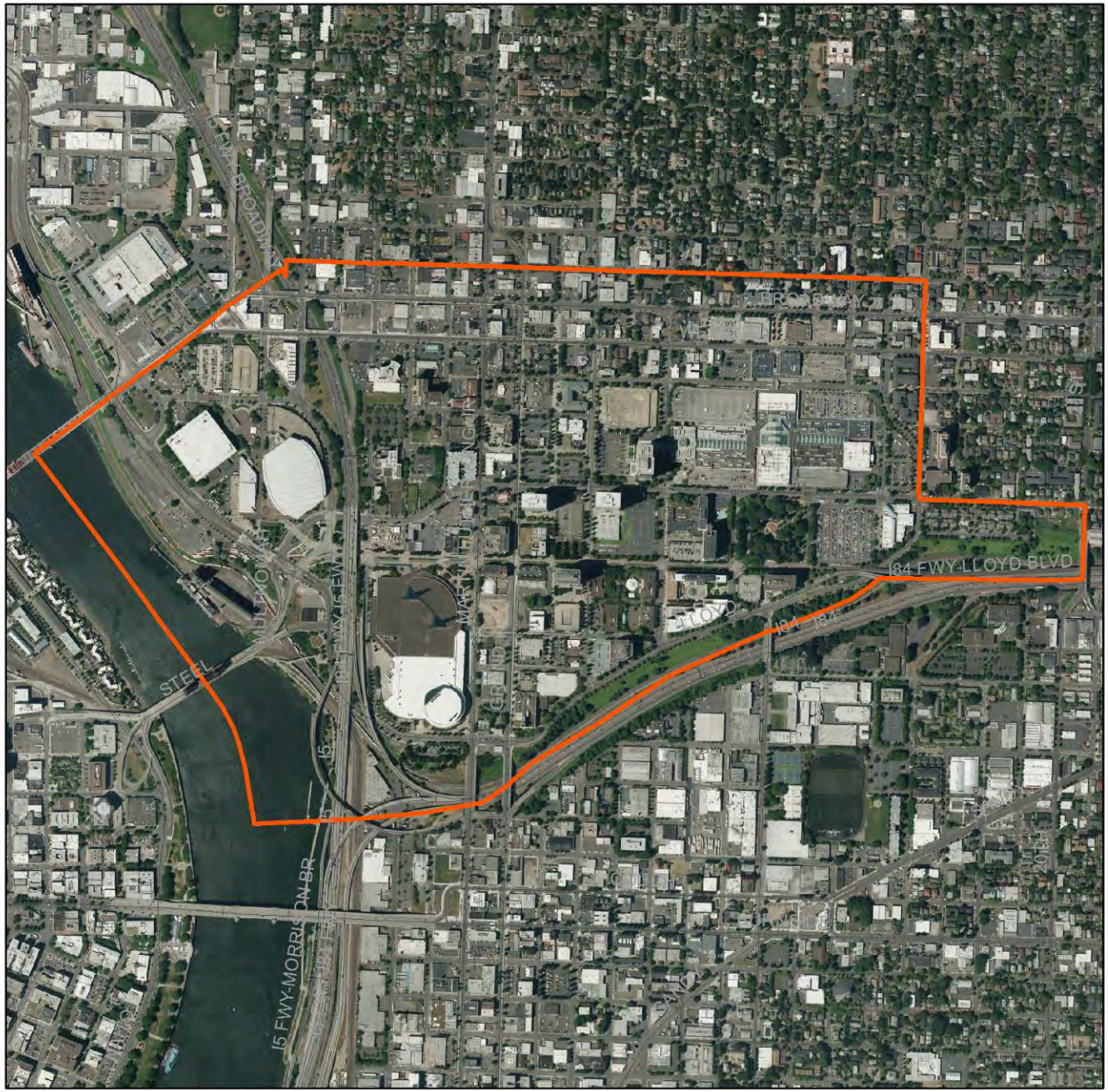
Combined Relative Riparian/Wildlife Habitat Ranking

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 11: Summary of Ranked Resources in WR14 - Lloyd District

Total Inventory Site = 423				
	High	**Medium**	**Low**	**Total**
Riparian Resources*				
acres	33	7	3	43
percent total inventory site area	8	2	1	11
Wildlife Habitat				
Wildlife Habitat*				
acres	0	0	0	0
percent total inventory site area	0	0	0	0
Special Habitat Areas**				
acres	50			
percent total inventory site area	12			
Wildlife Habitat - adjusted by Special Habitat Areas***				
acres	50	0	0	50
percent total inventory site area	12	0	0	12
Combined Total***				
acres	51	7	3	61
percent total inventory site area	12	2	1	15

* 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.



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WR14 - Lloyd District

Map 1: 2011 Aerial Photography

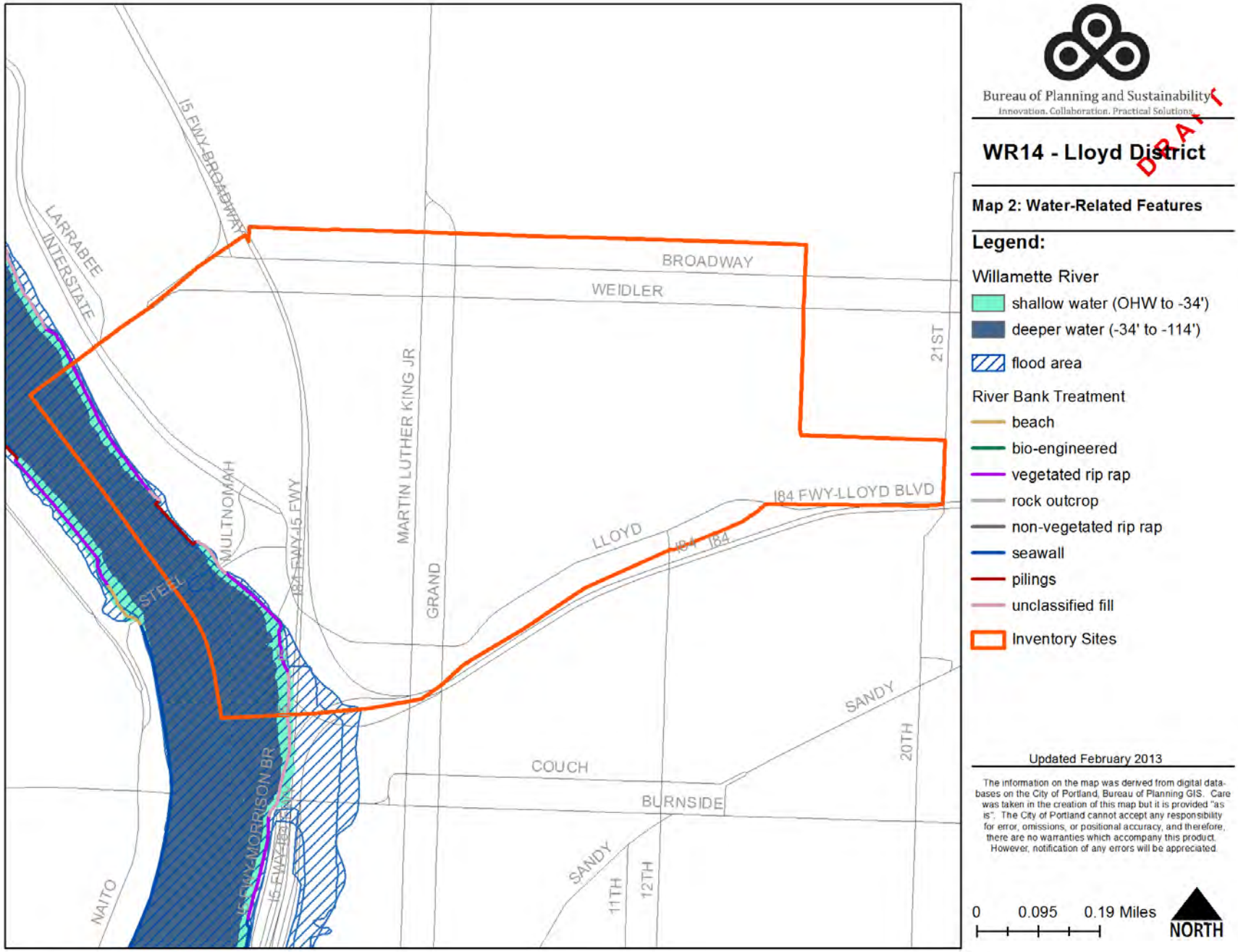
Legend:

Inventory Sites

Updated February 2013

0 0.095 0.19 Miles

NORTH


I5 FWY-BROADWAY
LARRABEE
INTERSTATE
BROADWAY
WEIDLER
21ST
MARTIN LUTHER KING JR
GRAND
MULTNOMAH
I84 FWY-I5 FWY
I84 FWY-LLOYD BLVD
LLOYD
I84
I84
STEEL
I5 FWY-MORRISON BR
I5 FWY-EB
NAITO
SANDY
20TH
COUCH
BURNSIDE
SANDY
11TH
12TH
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WR14 - Lloyd District
Map 2: Water-Related Features
Legend:
Willamette River
shallow water (OHW to -34')
deeper water (-34' to -114')
flood area
River Bank Treatment
beach
bio-engineered
vegetated rip rap
rock outcrop
non-vegetated rip rap
seawall
pilings
unclassified fill
Inventory Sites
Updated February 2013
The information on the map was derived from digital databases on the City of Portland, Bureau of Planning GIS. Care was taken in the creation of this map but it is provided "as is". The City of Portland cannot accept any responsibility for error, omissions, or positional accuracy, and therefore, there are no warranties which accompany this product. However, notification of any errors will be appreciated.
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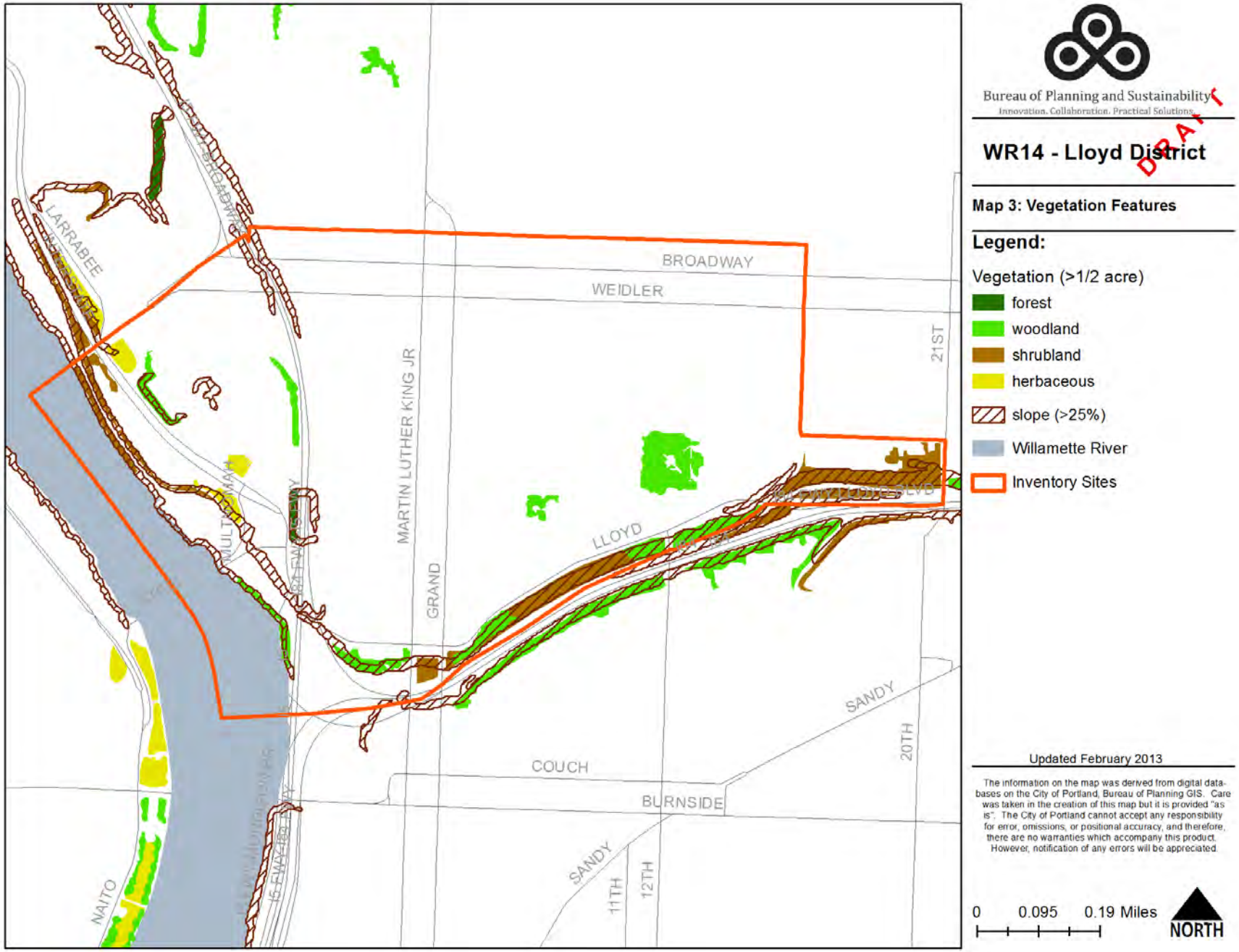
0.095
0.19 Miles
NORTH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WR14 - Lloyd District
Map 3: Vegetation Features
Legend:
Vegetation (>1/2 acre)
forest
woodland
shrubland
herbaceous
slope (>25%)
Willamette River
Inventory Sites
BROADWAY
WEIDLER
LARRABEE
MARTIN LUTHER KING JR
GRAND
21ST
LLOYD
MULTNOMAH
COUCH
BURNSIDE
SANDY
20TH
12TH
11TH
NAITO
Updated February 2013
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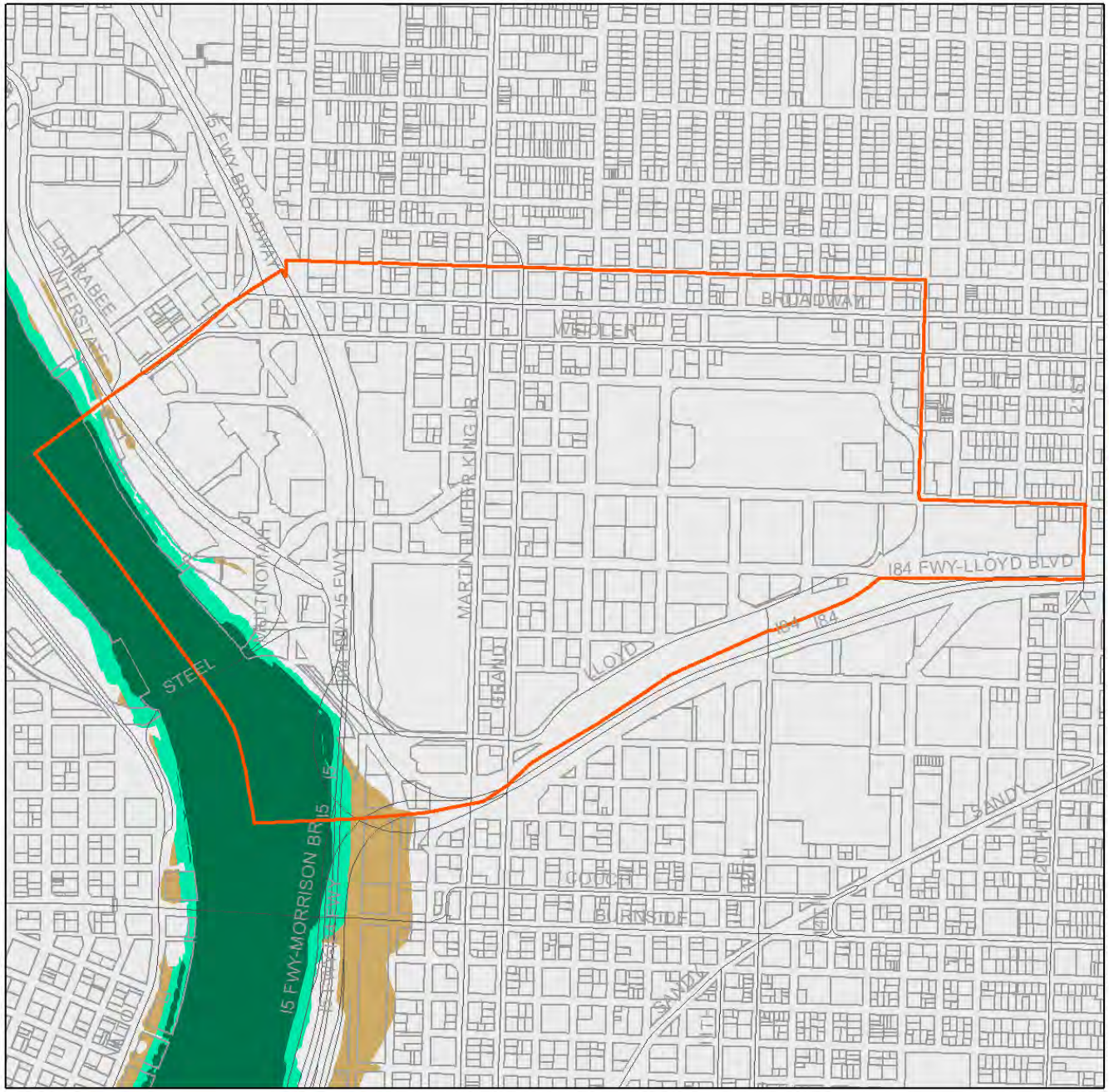
NORTH



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City of Portland, Oregon

WR14 - Lloyd District

Map 4: Riparian Corridors Resources

Legend

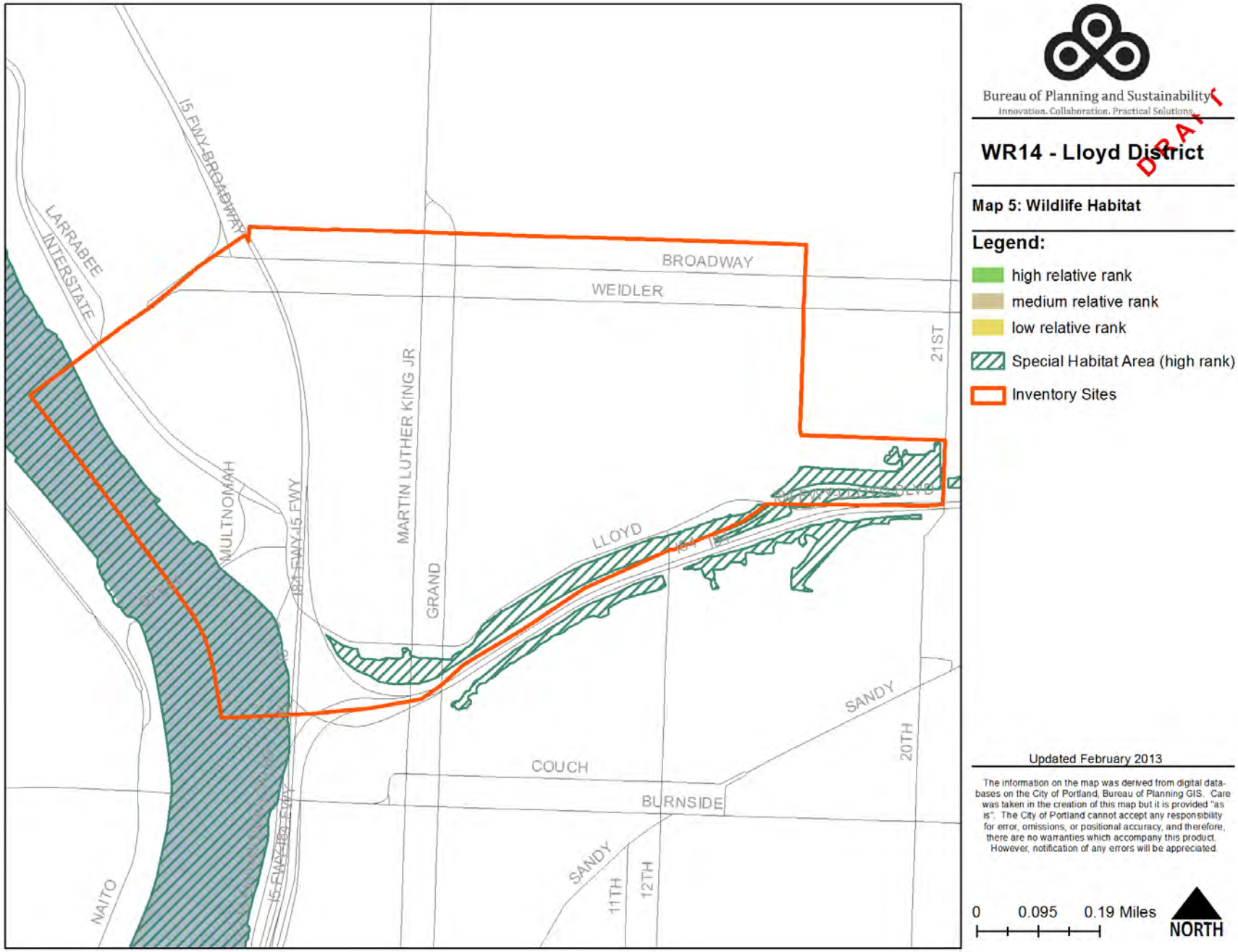
- high relative rank
- medium relative rank
- low releative rank
- Inventory Sites

DRAFT

Updated February 2016

0 0.095 0.19 Miles

NORTH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WR14 - Lloyd District
Map 5: Wildlife Habitat
Legend:
high relative rank
medium relative rank
low relative rank
Special Habitat Area (high rank)
Inventory Sites
I5 FWY-BROADWAY
LARRABEE
INTERSTATE
BROADWAY
WEIDLER
21ST
MARTIN LUTHER KING JR
GRAND
MULTNOMAH
I84 FWY-I5 FWY
LLOYD
SANDY
20TH
COUCH
BURNSIDE
SANDY
11TH
12TH
NAITO
I5 FWY-I84 FWY
Updated February 2013
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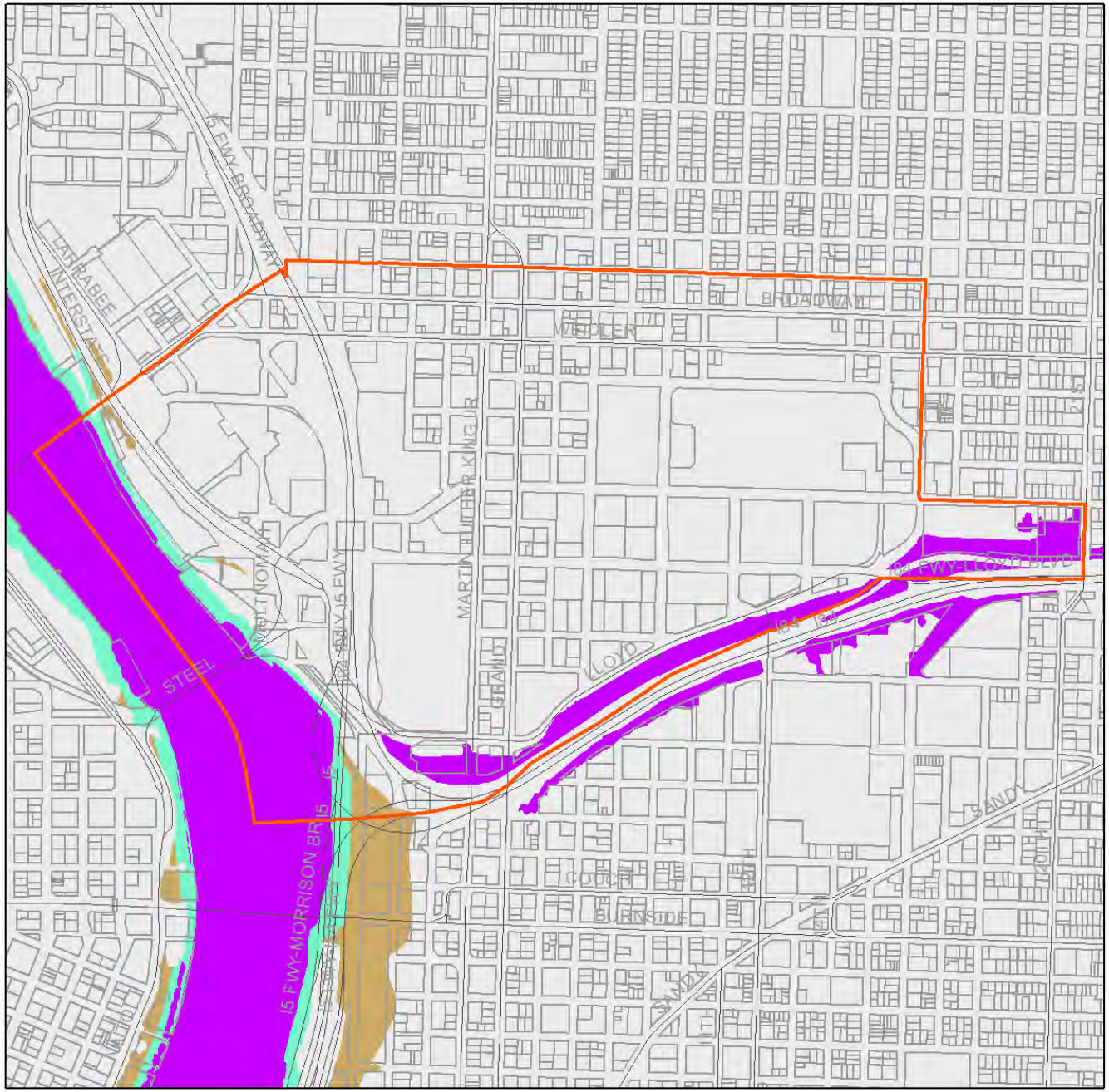
0 0.095 0.19 Miles
NORTH



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WR14 - Lloyd District

Map 6: Combined Riparian/Wildlife Relative Ranks

Legend

- high relative rank
- medium relative rank
- low relative rank
- Inventory Sites

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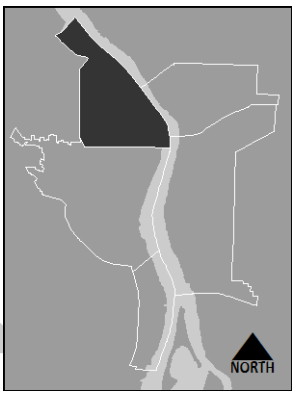
Updated February 2016

0 0.095 0.19 Miles

NORTH

Section 3.d.ii: Inventory Site WR15 - River District

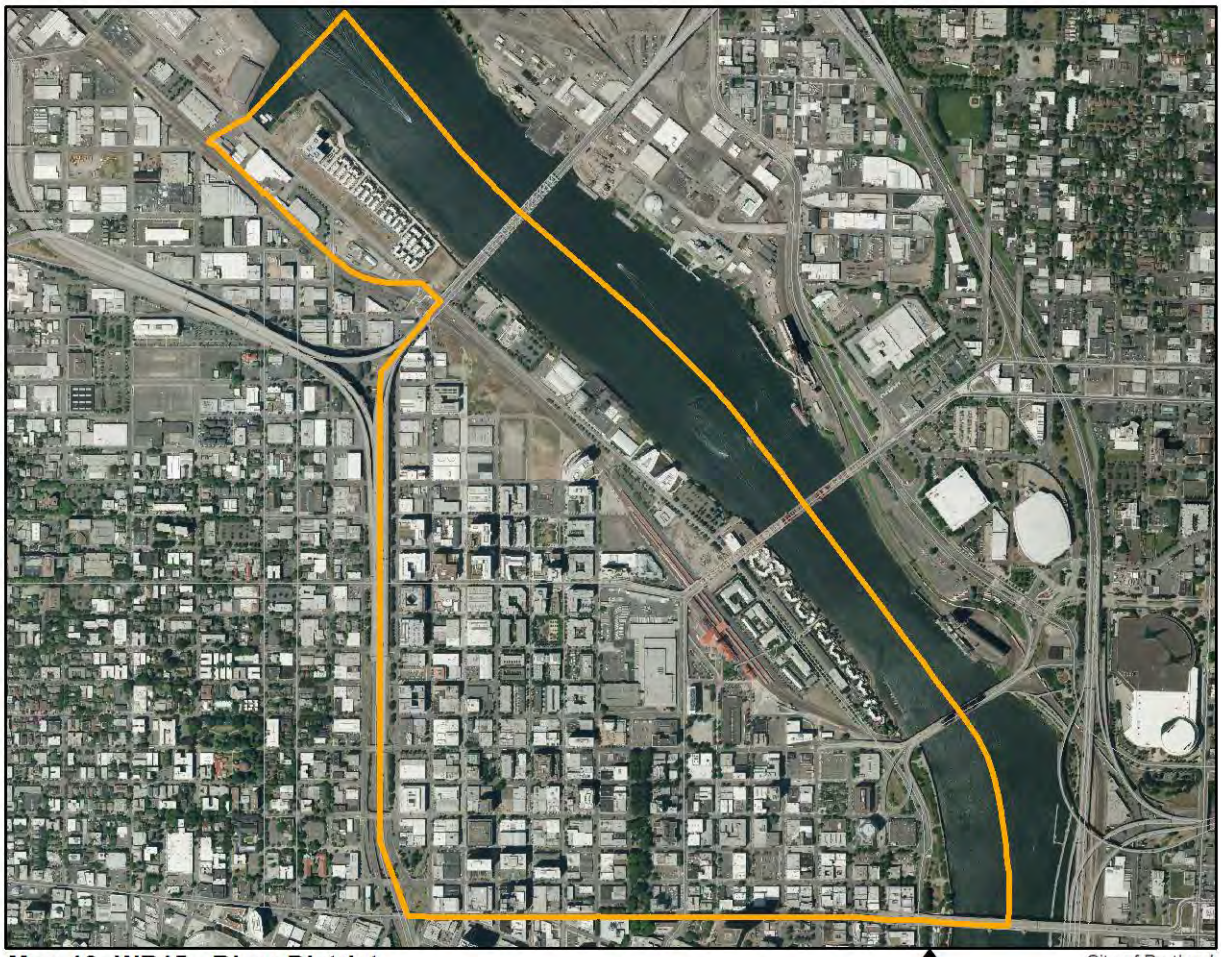


Summary Information

Watershed:	Willamette River Watershed
Neighborhood:	Northwest District, Pearl, Old Town/Chinatown
USGS Quadrangle and Quarter Section Maps:	1N1E28D, 1N1E27C, 1N1E33A, 1N1E33B, 1N1E34A, 1N1E34B, 1N1E34C, 1N1E34D
River Mile:	10.5 – 12.3
Site Size:	675 acres (land and water)
Previous Inventory:	Lower Willamette River Wildlife Habitat Inventory, March 1986
Zoning:	Central Employment (EX) Central Multi-dwelling Residential (RX) Central Commercial (CX) Heavy Industrial (HI) Open Space(OS)
Existing Land Use:	Commercial, residential, industrial, parks and open space, railroad, freeway
General Description:	This site is a mix of primarily residential and commercial uses. Along the Willamette River, there are newly-developed, multi-family residential, condominiums with some surrounding vegetation. The North Park Blocks are located in the southern portion of the site. There are rail lines and four bridges within the site.
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; 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
Special Status Species:	Fish: Lower Columbia River Chinook salmon, Columbia River chum salmon, lower Columbia River steelhead trout, Pacific lamprey
Natural Hazards:	Flood area, wildfire, landslide
Contamination:	Yes

Site Description

This 489-acre site is located from the Willamette River centerline westward, between the Balch Creek outfall on the north, I-405 on the west and the Burnside Bridge on the south. The site developed primarily with commercial and residential uses. As a result of development, most of the connections between the few remaining pockets of forested upland habitat and the river bank have been eliminated. The shoreline is defined by banks of vegetated and non-vegetated riprap, unclassified fill and seawall. Map 16 shows the aerial view of the River District inventory site.



The site contains 280 acres (41 percent) impervious surface coverage, including 23 miles of road. Of the vegetated areas at least ½ acre in size, there are approximately 5 acres of forest and woodland vegetation, 1 acre of shrubland and 4 acres of herbaceous vegetation. There are 136 acres of flood area on this site (City of Portland, 2002), most of which is the Willamette River (105 acres). The remaining flood area on land is largely developed.

Table 12: Summary of Natural Resource Features in WR15 - River District	
	Study Area (miles/acres)
River (miles/acres)	2/107
Stream/Drainageway (miles)	0
Wetlands (acres)	0
Flood Area (acres)*	
Vegetated (acres)	2
Non-vegetated (acres)	30
Open Water** (acres)	105
Vegetated Areas >= ½ acre (acres)+	
Forest (acres)	0
Woodland (acres)	5
Shrubland (acres)	1
Herbaceous (acres)	4
Impervious Surfaces (acres)	280

* 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 Willamette River in the Portland area was comprised of an extensive, interconnected system of active channels, open slack waters, emergent wetlands, riparian forests and adjacent upland forests. Today, the River District is a largely-developed landscape. The predominant existing natural resources are the Willamette River, including the flood area and vegetation along the banks. Elements of the built environment also provide natural resource functions, including street trees, ecoroofs and vegetated landscaping.

The natural resources description is divided into sections that focus on habitat types:

- Open Water and Flood Area
- River Banks and Riparian Vegetation
- North Park Blocks
- Landscape Vegetation and Street Trees

<u>Open Water</u>
Below is a summary of the Lower Willamette River in inventory site WR15. Additional information about the water quality, hydrology, and fish and wildlife use of the Willamette River is provided in Section 3.c: The Central City.

Inventory site WR15 includes 107 acres of the Lower Willamette River. The river is the primary habitat linkage providing connectivity to upstream and downstream aquatic habitats. This linkage is critical for supporting salmonids, migrating birds and other species.

Active dredging has produced a uniform channel with little diversity. Although limited to very small pockets, nearshore, undeveloped shallow water habitats still exist in several areas along the river bank. Shallow water areas provide habitat for migrating fishes, including federally-listed salmonids.

The Willamette River is the primary migration corridor for ESA-listed Chinook, coho, and chum salmon, as well as steelhead and bull 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 watershed. Seasonal migrants use habitat within the inventory site for only short periods, and usually occur at 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.

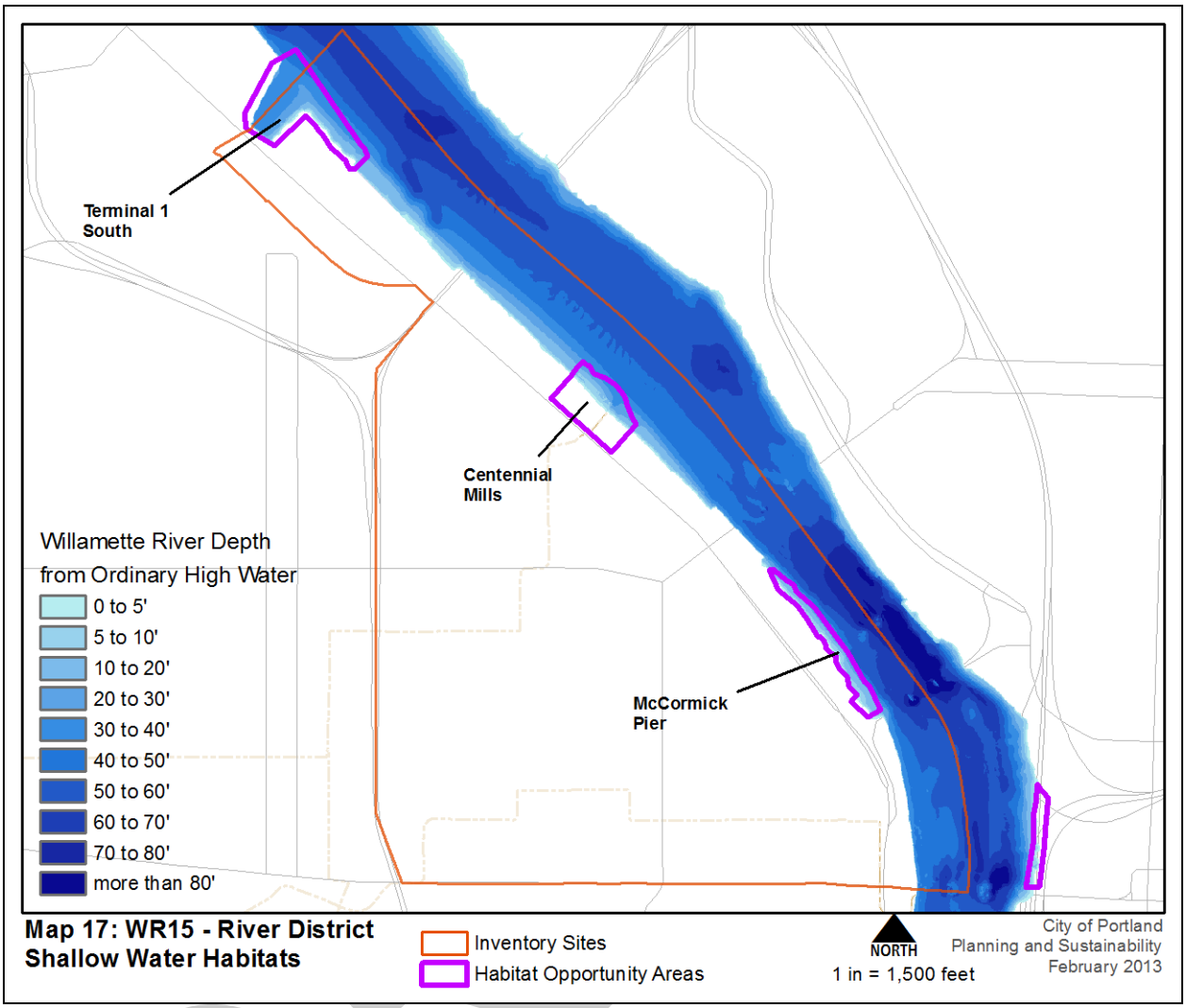
Columbia eulachon pass through the lower Columbia and Willamette Rivers as opportunistic migrants as well. Adults return to their natal river every winter; however, their out-migration timing is not as well documented.

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 the Willamette Falls and the Columbia River confluence describe an abundant population of white sturgeon with multiple age classes present.

There is currently relatively little scientific literature characterizing Pacific lamprey rearing and out-migration in the Lower Willamette River. However, the freshwater juvenile rearing stage of Pacific lamprey is known to last between four and seven years, and juvenile Pacific lamprey have repeatedly been found burrowing in Lower Willamette River sediments.

Resident fish assemblages within this reach include both native and non-native species that both support, and prey upon, native salmonids. These species include natives 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.

There are three notable shallow water habitats in site WR15: (1) Terminal 1 South, (2) Centennial Mills and (3) McCormick Pier (Map 17).



Map 17: WR15 - River District Shallow Water Habitats

The Terminal 1 South, located in the northwestern portion of the site, is a small, shallow water area associated with confluence of Balch Creek. River depths range from approximately -10 feet to -38 feet below ordinary high water (NAVD88 vertical datum). The substrate is primarily muddy sand.

The Centennial Mills site, including the adjacent Mounted Police Unit barn, is approximately 4.3 acres in size. Tanner Creek, once an open stream that flowed from the forested hills to Couch Lake, is now piped beneath the site and discharges along the banks. As a result of the Tanner Creek Stream Diversion Project, stormwater and overflow sewage were separated from the pipe and a series of stormwater treatment facilities constructed upstream. The result of removing sewage and treating surface runoff improved the water quality discharging to the Willamette River at Centennial Mills. The Tanner Creek Water Quality Characterization (City of Portland, 2011) found that current water quality of the discharge is supportive of aquatic species. The sediments along this stretch are sand and muddy sand.

Centennial Mill Bank

McCormick Pier includes roughly 300 to 400 feet of sandy beach shoreline. Although the sandy beach is small, it is a rare feature within the Willamette River Central Reach. There is a limited thin strip of shallow water along this site that expands slightly in the area near the beach. On a site visit in spring 2011, an osprey was observed perched on an in-water structure at the pier. A second was observed soaring over the river.


McCormick Pier Bank

Inventory site WR15 is part of the Pacific Flyway and is used by 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 man-made structures for perching, resting and foraging. Shallow water areas and exposed sand and mud are used by shorebirds and waterfowl. Upland trees and shrubs are used by Neotropical migratory songbirds.

The Lower Willamette River does not meet water quality standards for bacteria, mercury, dioxin, temperature, and various other toxics and heavy metals (see Table 13). TMDLs for bacteria and temperature, as well as a phased TMDL for mercury, were established in 2006. Oregon Water Quality Index values from 2001 to 2010 for the Lower Willamette River in Portland have been fair and the trend is steady.

Table 13: 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)	Year-round	1998, 2002	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
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

Due to the presence of mercury, PCBs, dioxins and mainly legacy pesticides (DDT, dieldrin) in Willamette River fish tissue, a fish advisory for the mainstem recommends that people, especially pregnant or breastfeeding women, limit or avoid consuming fatty fish such as carp, bass and catfish. There is no restriction on the consumption of salmon or steelhead. The Lower Willamette River in Portland is deemed unsafe for swimming during and immediately after sewer overflows as a result of larger storm events. However, since 2011, such overflows are exceedingly rare (about one every three years) during the summer recreating season.

In the inventory site, the flood area is generally confined to the Willamette River itself, but the flood area extends onto developed and vacant lands between the Fremont and Broadway bridges. The developed flood plain provides the function of water storage during events like the 1996 flood.

River Banks and Riparian Vegetation

This site was historically industrialized, resulting in a highly modified river channel, bank and nearshore areas. Wharves and piers extending out from the channel and bulkheads and riprap revetments armor the riverbank.

There is little riparian vegetation except in landscaped areas around development. There are some riparian trees just south of the Fremont Bridge, near the Tanner Creek outfall. There are some low-structure vegetation and a few trees south of the Steel Bridge in the northern portion of Willamette Park.

Riparian vegetation in the inventory site is a mix of native, non-native and invasive plants, including cottonwood, Oregon Ash, Himalayan blackberry and Scott's broom. Native plant species generally provide a broader suite of benefits, such as varied wildlife food sources and effective slope stabilization. However, all plants, including non-native and invasive species, provide important watershed functions, such as water storage, nutrient cycling and cover and nesting opportunities for wildlife.

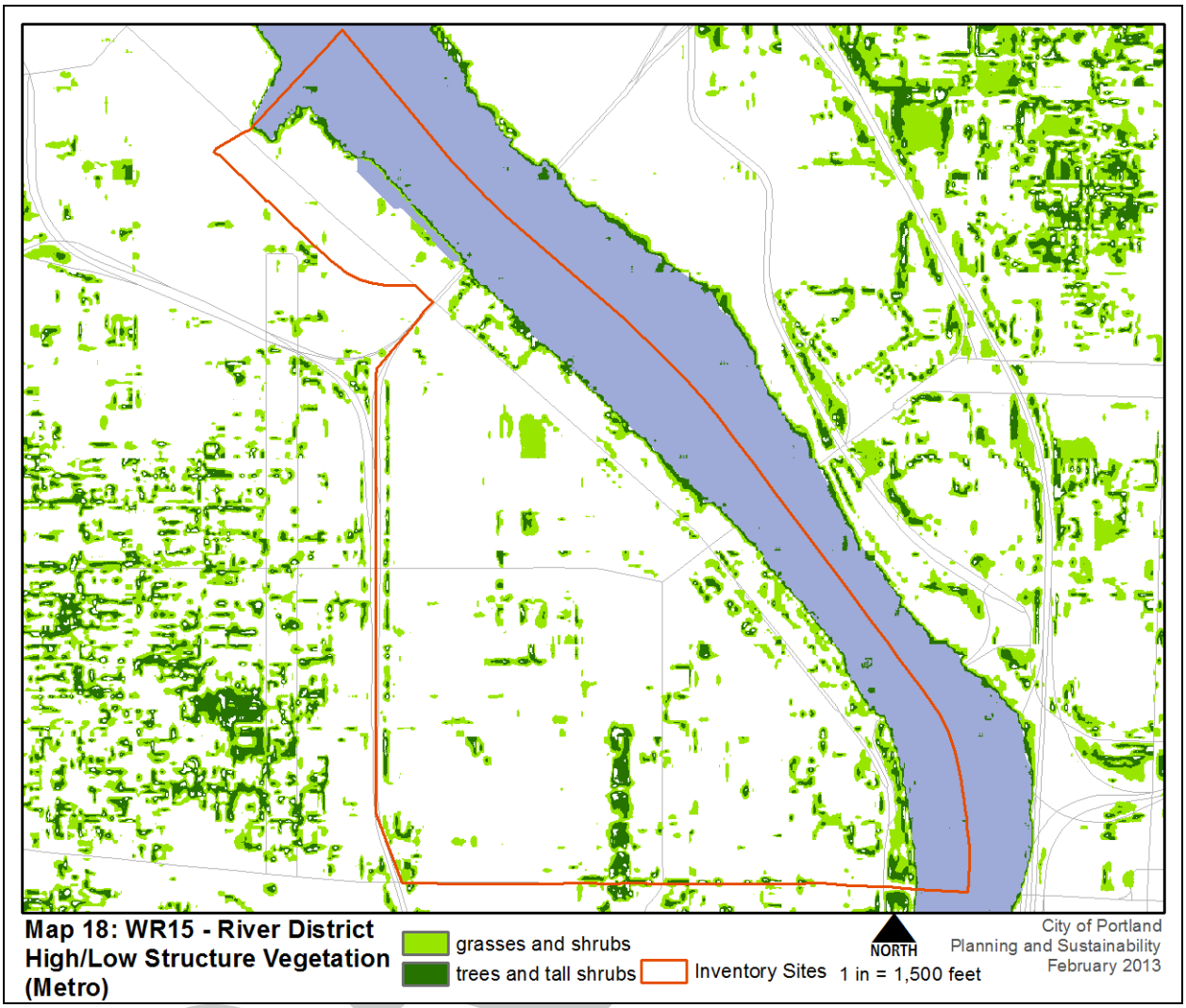
Due to extensive development, armored river banks and limited remnant riparian vegetation, wildlife use is limited in this site. During a spring 2011 site visit, a nesting osprey was observed on a dolphin in the Willamette River (photo).

North Park Blocks

The North Park Blocks are located between Burnside Street and NW Glisan Street along NW 9th Avenue and NW Park Avenue. The park contains stands of large trees and the understory is primarily turf grass. The park is entirely surrounded by commercial and residential development and it is located far from the west hills or the Willamette River; therefore, the North Park Blocks do not provide connectivity between other habitat areas. However, Portland is on the Pacific Flyway for migratory birds, and the North Park Blocks likely provide habitat for resident birds and for migratory birds during spring and fall migration periods.

Landscape Vegetation and Street Trees

For purposes of the Natural Resources Inventory mapping and modeling, only vegetation patches at least ½ acre in size are captured. However, smaller landscaped areas and individual street trees also provide functions, including cleaning and cooling the air and water, capturing greenhouse gases, capturing and uptaking stormwater, reducing energy demand and providing wildlife habitat (Map 18: High/Low Structure Vegetation). Most of the tree canopy within the inventory site is found within the North Park Blocks.


Map 18: WR15 - River District
High/Low Structure Vegetation
(Metro)
grasses and shrubs
trees and tall shrubs
Inventory Sites
NORTH
1 in = 1,500 feet
City of Portland
Planning and Sustainability
February 2013

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 14). 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: Project Approach and Methodology Overview and Appendix G: 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 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. High and medium relative functional ranks are assigned to vegetated, non-hardened river banks or flood areas. Low relative ranks are generally assigned to non-vegetated flood area and hardened, non-vegetated river banks.

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 WR15 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:

- 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

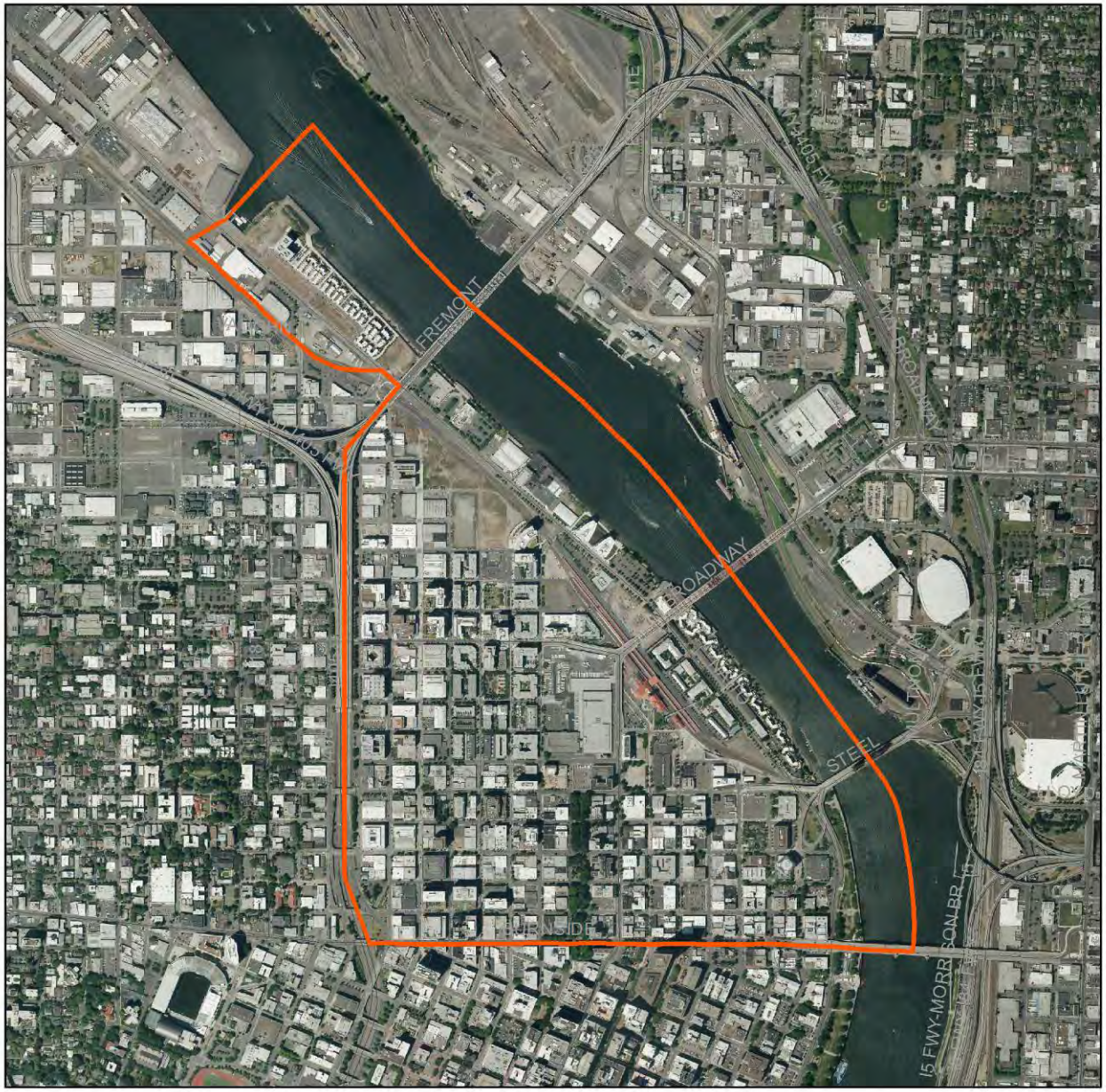
Combined Relative Riparian/Wildlife Habitat Ranking

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 14: Summary of Ranked Resources in WR15 - River District

Total Inventory Site = 489				
	High	**Medium**	**Low**	**Total**
Riparian Resources*				
acres	109	17	21	148
percent total inventory site area	22	4	4	30
Wildlife Habitat				
Wildlife Habitat*				
acres	0	0	0	0
percent total inventory site area	0	0	0	0
Special Habitat Areas**				
acres	104			
percent total inventory site area	21			
Wildlife Habitat - adjusted by Special Habitat Areas***				
acres	104	0	0	104
percent total inventory site area	21	0	0	21
Combined Total***				
acres	109	19	21	148
percent total inventory site area	22	4	4	30

* 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.



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WR15 - River District

Map 1: 2011 Aerial Photography

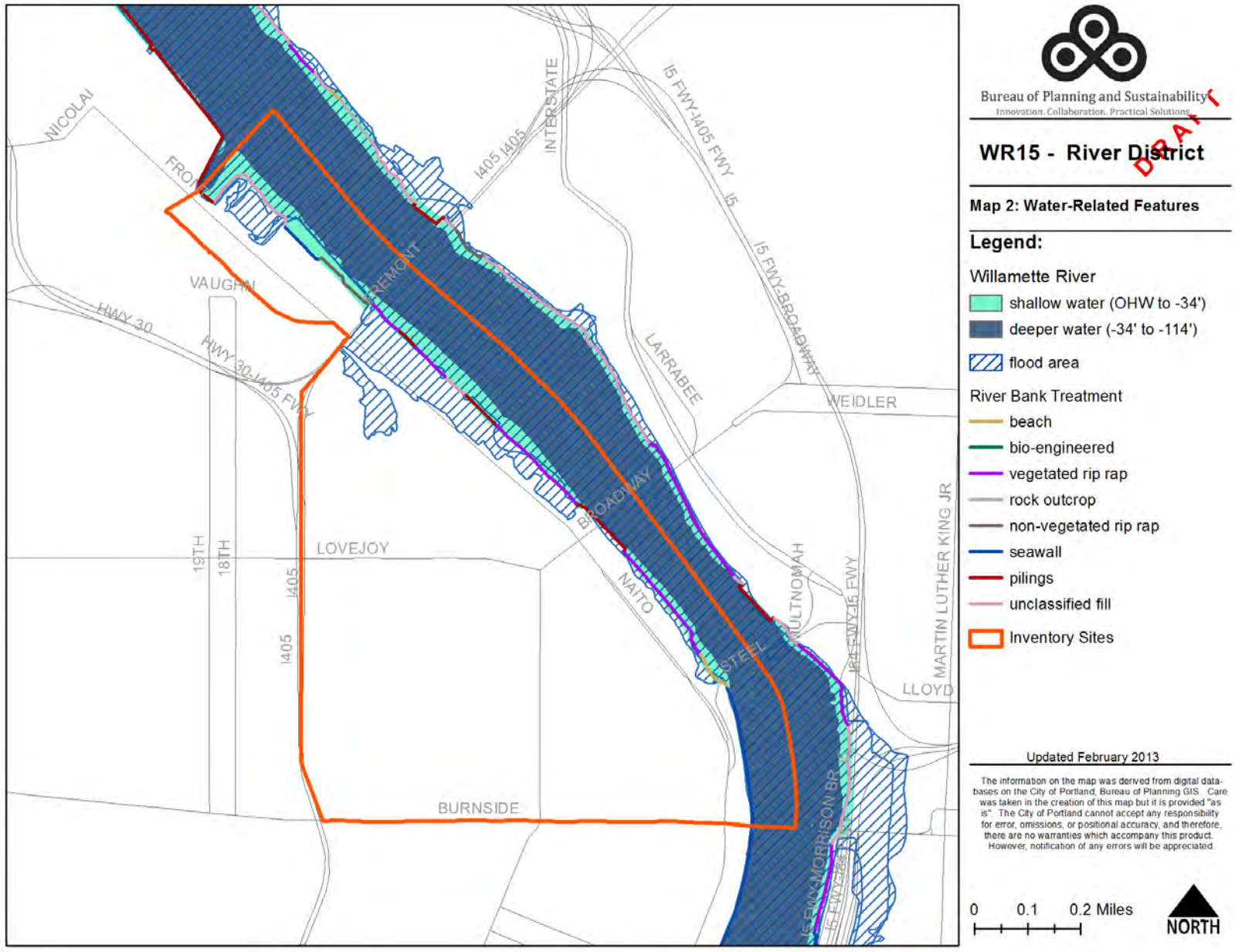
Legend:

Inventory Sites

Updated February 2013

0 0.1 0.2 Miles

NORTH


NICOLAI
FRONT
VAUGHN
HWY 30
HWY 30-I405 FWY
I405 I405
INTERSTATE
I5 FWY-I405 FWY
I5
I5 FWY-BROADWAY
FREMONT
LARRABEE
WEIDLER
BROADWAY
MARTIN LUTHER KING JR
19TH
18TH
LOVEJOY
I405
I405
NAITO
STEEL
MULTNOMAH
I5 FWY
I5 FWY
LLOYD
BURNSIDE
I5 FWY-MORRISON BR
I5 FWY
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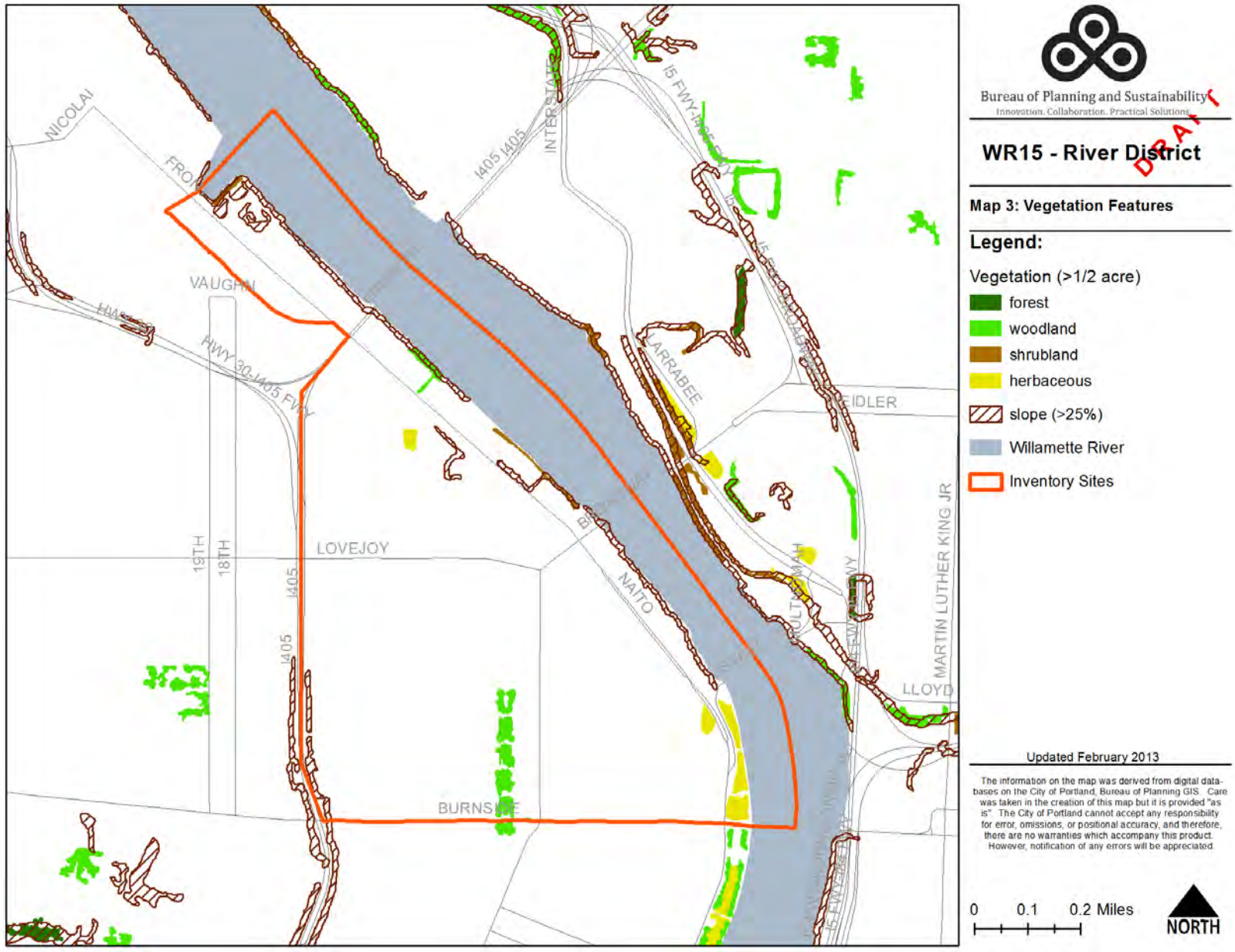
WR15 - River District
Map 2: Water-Related Features
Legend:
Willamette River
shallow water (OHW to -34')
deeper water (-34' to -114')
flood area
River Bank Treatment
beach
bio-engineered
vegetated rip rap
rock outcrop
non-vegetated rip rap
seawall
pilings
unclassified fill
Inventory Sites
Updated February 2013
The information on the map was derived from digital databases on the City of Portland, Bureau of Planning GIS. Care was taken in the creation of this map but it is provided "as is". The City of Portland cannot accept any responsibility for error, omissions, or positional accuracy, and therefore, there are no warranties which accompany this product. However, notification of any errors will be appreciated.
0 0.1 0.2 Miles
NORTH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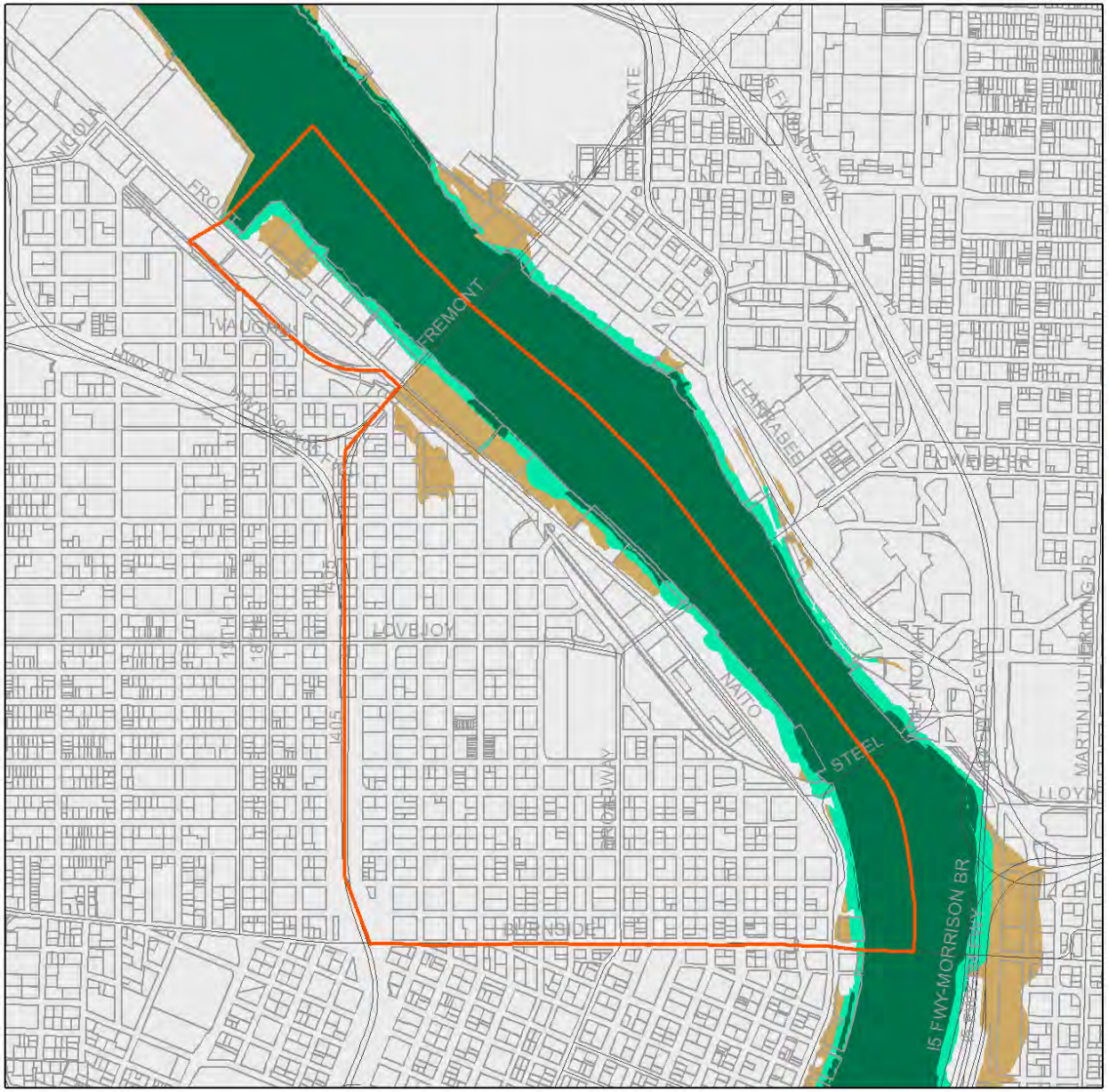
WR15 - River District
Map 3: Vegetation Features
Legend:
Vegetation (>1/2 acre)
forest
woodland
shrubland
herbaceous
slope (>25%)
Willamette River
Inventory Sites
Updated February 2013
The information on the map was derived from digital data-bases on the City of Portland, Bureau of Planning GIS. Care was taken in the creation of this map but it is provided "as is". The City of Portland cannot accept any responsibility for error, omissions, or positional accuracy, and therefore, there are no warranties which accompany this product. However, notification of any errors will be appreciated.
0 0.1 0.2 Miles
NORTH
NICOLAI
VAUGHN
HWY 30-I405 FWY
LOVEJOY
19TH
18TH
I405
LARRABEE
GLISAN
NAITO
MARTIN LUTHER KING JR
LLOYD
BURNSIDE



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WR15 - River District

Map 4: Riparian Corridors Resources

Legend

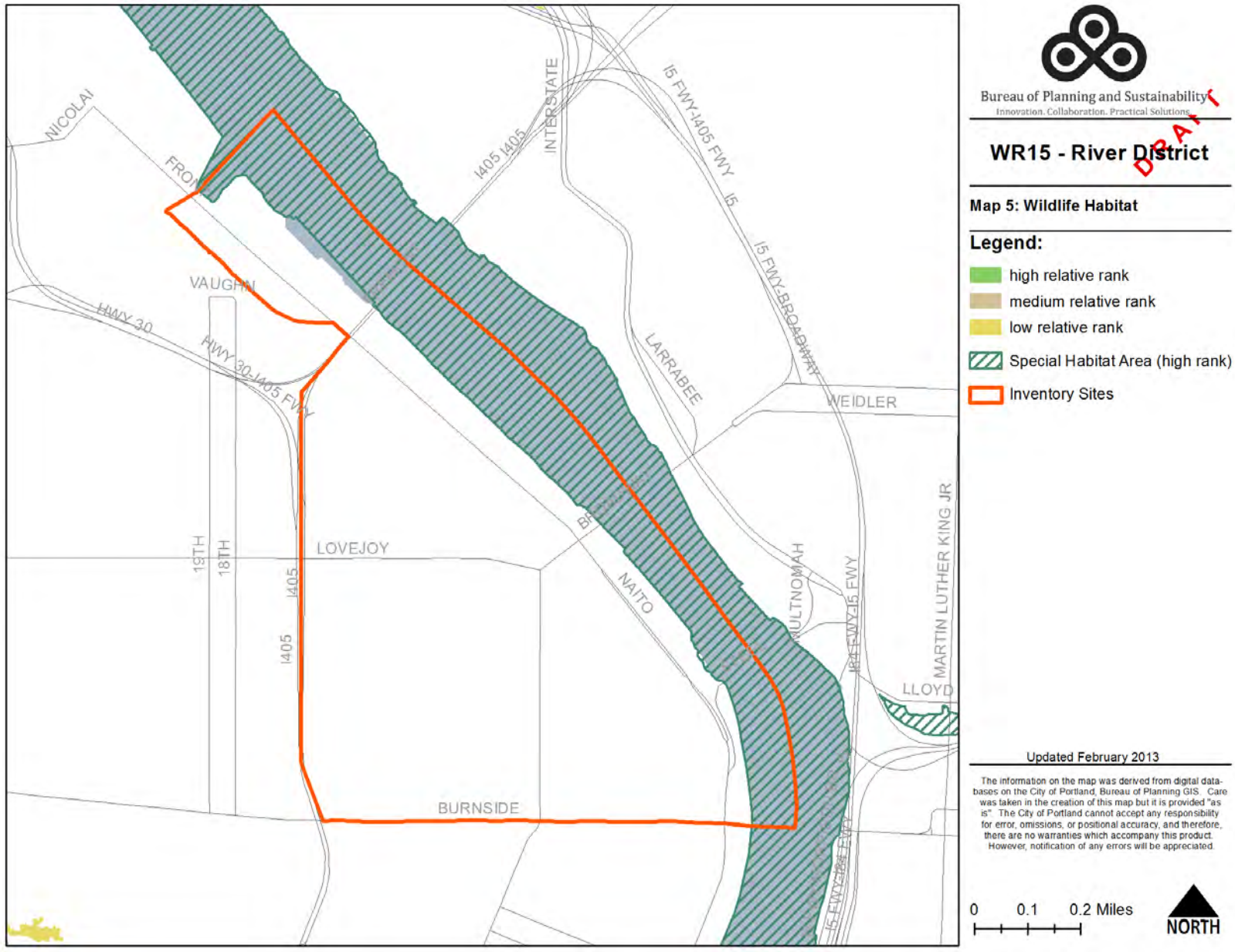
- high relative rank
- medium relative rank
- low releative rank
- Inventory Sites

DRAFT

Updated February 2016

0 0.1 0.2 Miles

NORTH


NICOLAI
FRONT
VAUGHN
HWY 30
HWY 30-I405 FWY
INTERSTATE
I405 I405
I5 FWY-I405 FWY
I5
I5 FWY-BROADWAY
LARRABEE
WEIDLER
19TH
18TH
LOVEJOY
I405
I405
NAITO
MULTNOMAH
I5 FWY
MARTIN LUTHER KING JR
LLOYD
BURNSIDE
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DRAFT
WR15 - River District
Map 5: Wildlife Habitat
Legend:
high relative rank
medium relative rank
low relative rank
Special Habitat Area (high rank)
Inventory Sites
Updated February 2013
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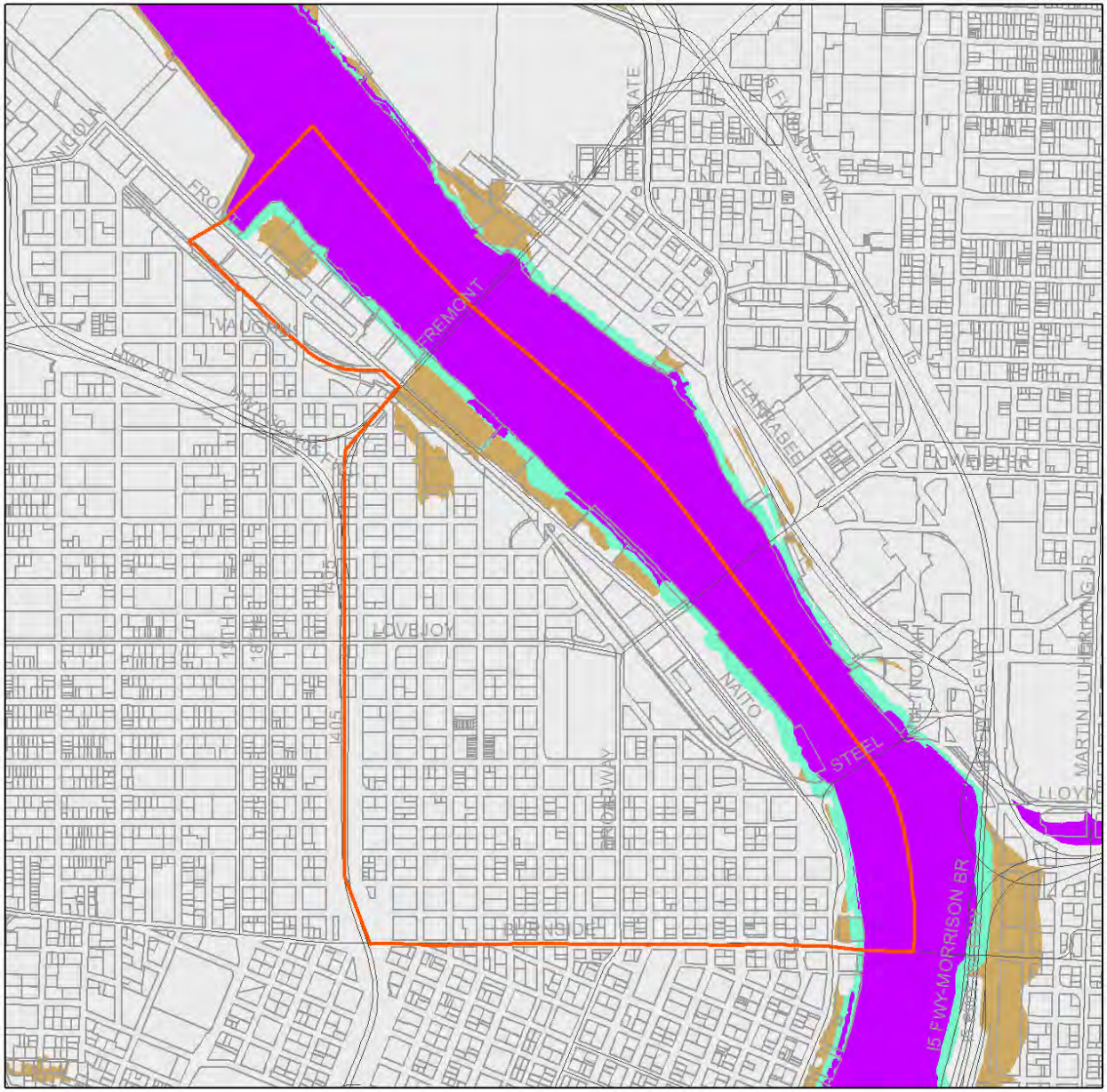
0 0.1 0.2 Miles
NORTH



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City of Portland, Oregon

WR15 - River District

Map 6: Combined Riparian/Wildlife Relative Ranks

Legend

- high relative rank
- medium relative rank
- low relative rank
- Inventory Sites

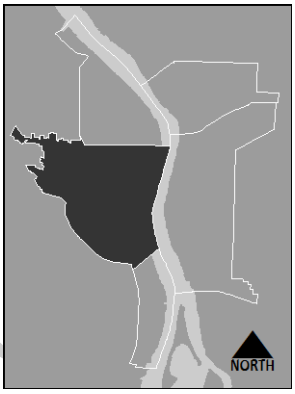
DRAFT

Updated February 2016

0 0.1 0.2 Miles

NORTH

Section 3.d.iii: Inventory Site WR16 - Downtown District



Summary Information

Watershed:	Willamette River Watershed
Neighborhood:	Downtown, Goose Hollow, Old Town/ Chinatown
USGS Quadrangle and Quarter Section Maps:	1N1E33c, 1N1E33d, 1N1E34c, 1N1E34d, 1S1E03a, 1S1E03b, 1S1E03c, 1S1E03d, 1S1E04a, 1S1E04b, 1S1E04d, 1S1E10b
River Mile:	12.3 – 13.4
Site Size:	778 acres (land and water)
Previous Inventory:	Lower Willamette River Wildlife Habitat Inventory, March 1986
Zoning:	Central Commercial (CX) Central Multi-dwelling Residential (RX) High Density Multi-dwelling Residential (RH) Central Employment (EX) Open Space (OS)
Existing Land Use:	Downtown commercial, residential, parks and open space, university, freeway
General Description:	This site is a mix of primarily commercial, residential and open space uses. The Willamette River frontage is occupied by public parks and a marina. The South Park Blocks are located in the central to southern portion of the site. The I-405 loop extends around the southern edge of the site and exits through the north end of the site. There are four bridges in the site: Burnside, Morrison, Hawthorne and Marquam. The foot of the West Hills extends down to the western edge of the site.
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, pollution control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; 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
Special Status Species:	Fish: Lower Columbia River Chinook salmon, Columbia River chum salmon, lower Columbia River steelhead trout, Pacific lamprey
Natural Hazards:	Flood area, landslide
Contamination:	Yes

Site Description

This 812-acre site is located between the Burnside Bridge to the north, I-405 on the south and the foot of the West Hills on the west. The site is developed primarily with commercial, residential and open space uses. The shoreline extends from Waterfront Park to Riverplace Marina**.** Map 19 shows the aerial view of the Downtown District inventory site. As a result of development, most of the connections between the forested upland habitat of the West Hills and the river have been eliminated. The South Park Blocks offer limited wildlife habitat as do landscape and street trees.

The site contains 407 acres (52 percent) of impervious surface coverage, including 45 miles of road. Of the vegetated areas over ½ acre in size, there are approximately 43 acres of forest and woodland vegetation and 17 acres of herbaceous vegetation. There are 87 acres of flood area on this site (City of Portland, 2002), most of which is the Willamette River (76 acres). The remaining flood area on land is largely developed.

Table 15: Summary of Natural Resource Features in WR16 - Downtown District	
	Study Area (mile/acres)
River (miles/acres)	1/76
Stream/Drainageway (miles)	0
Wetlands (acres)	0
Flood Area (acres)*	
Vegetated (acres)	4
Non-vegetated (acres)	8
Open Water** (acres)	76
Vegetated Areas >= ½ acre (acres)+	
Forest (acres)	3
Woodland (acres)	40
Shrubland (acres)	0
Herbaceous (acres)	17
Impervious Surfaces (acres)	407

* 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 Willamette River in the Portland area was comprised of an extensive, interconnected system of active channels, open slack waters, emergent wetlands, riparian forests and adjacent upland forests. Today, the Downtown District is a largely developed landscape. The predominant existing natural resource is the Willamette River, including the flood area and vegetation along the banks. Elements of the built environment also provide limited natural resource functions, including street trees, ecoroofs and vegetated landscaping.

The natural resources description is divided into sections that focus on habitat types:

- Open Water and Flood Area
- River Banks and Riparian Vegetation
- South Park Blocks
- Landscape Vegetation and Street Trees

<u>Open Water</u>
Below is a summary of the Lower Willamette River in inventory site WR16. Additional information about the water quality, hydrology, and fish and wildlife use of the Willamette River is provided in Section 3.c: The Central City.

Inventory site WR16 includes 75 acres of the Lower Willamette River. The river is the primary habitat linkage providing connectivity to upstream and downstream aquatic habitats. This linkage is critical for supporting salmonids, migrating birds and other species.

Historic dredging and bank hardening has produced a uniform channel with little diversity. Near-shore, shallow water habitats still exist along the river bank in the southern portion of the site. Shallow water areas provide habitat for migrating fishes, including federally-listed salmonids.

The Willamette River is the primary migration corridor for ESA-listed Chinook, coho and chum salmon, as well as steelhead and bull 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 watershed. Seasonal migrants use habitat within the inventory site for only short periods and usually occur at 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.

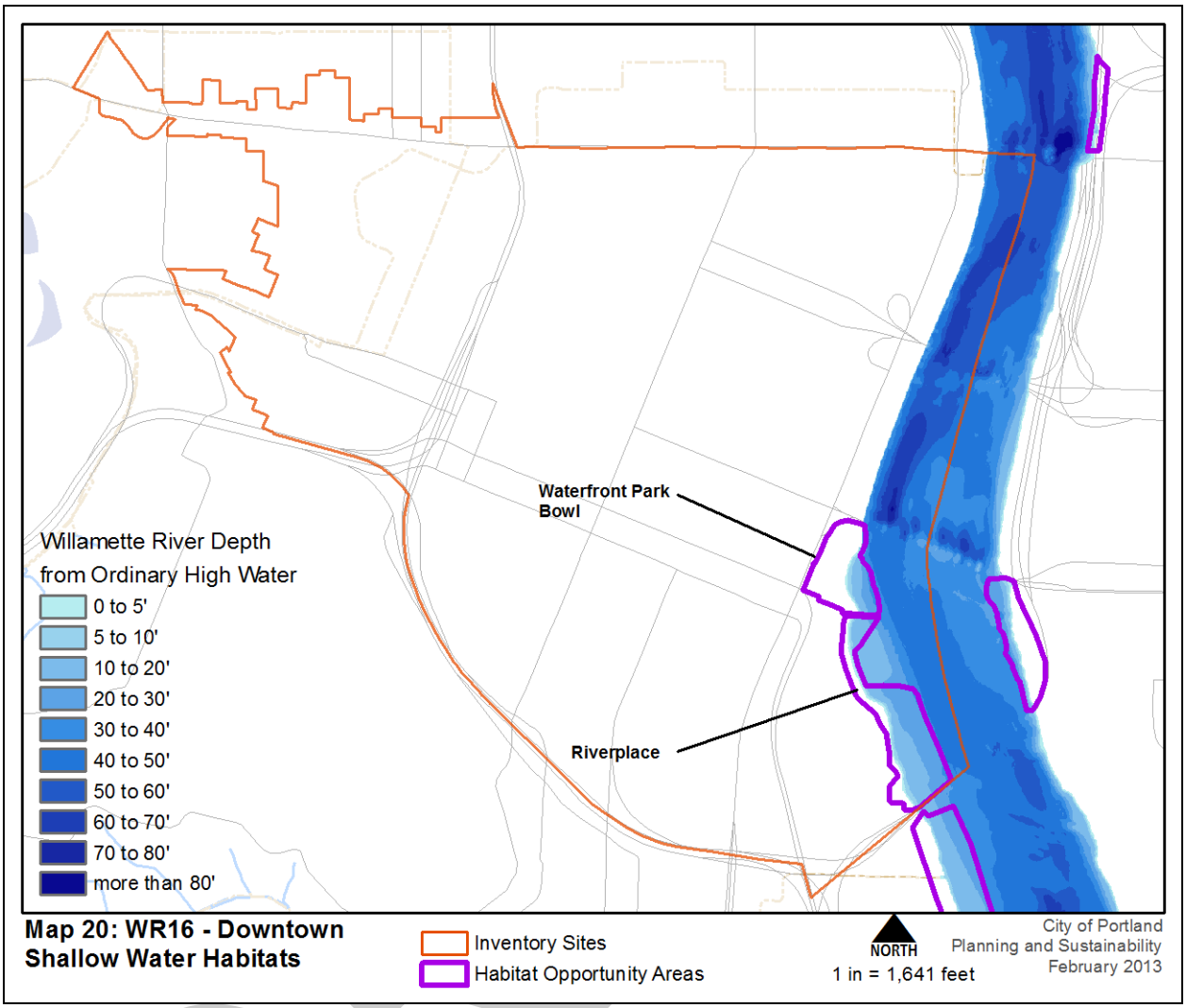
Columbia eulachon pass through the lower Columbia and Willamette Rivers as opportunistic migrants as well. Adults return to their natal river every winter; however, their out-migration timing is not as well documented.

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 the Willamette Falls and the Columbia River confluence describe an abundant population of white sturgeon with multiple age classes present.

There is currently relatively little scientific literature characterizing Pacific lamprey rearing and out-migration in the Lower Willamette River. However, the freshwater juvenile rearing stage of Pacific lamprey is known to last between four and seven years, and juvenile Pacific lamprey have repeatedly been found burrowing in Lower Willamette River sediments.

Resident fish assemblages within this reach include both native and non-native species that both support and prey upon native salmonids. These species include natives 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.

There are two notable shallow water habitats in site WR16: (1) Willamette Park Bowl and (2) Riverplace (Map 20).



Map 20: WR16 - Downtown Shallow Water Habitats

The Waterfront Park Bowl is a slight embayment with gradually sloping banks down to the river. The banks below ordinary high water are gravel and sand, which provide habitat for macroinvertebrates and shorebirds, and maintained lawn above the riprap. Below the riprap and gravel is a muddy/sandy beach. A concrete overlook and the Hawthorne Bridge demark the downstream edge of the embayment. The upstream edge is comprised of non-vegetated riprap. A narrow area of shallow water exists at the downstream end near the seawall, and widens at the upstream end. Sediments at the site are predominantly muddy sand.

Riverplace is a slight embayment just south of Waterfront Park Bowl and is developed with a marina, docks and a restaurant. The concave banks are mostly non-vegetated and vegetated riprap. A few trees grow along the top of the bank. Vegetation is a mix of native plant species, including Douglas spirea, red osier dogwood, salal and Oregon grape, and non-native species. Buildings and sidewalks are present just beyond the top of bank. Wildlife observed using the riparian area includes house sparrow, stellar jay, blue heron and pigeon. The strip of shallow water is wider in this site than at most other sites within the Willamette River Central Reach. Only Eastbank Crescent has a wider area of shallow water. The sediment in the embayment is sandy mud and sand.


Riverplace

Inventory site WR16 is part of the Pacific Flyway and is used by over 200 resident and migratory bird species, including iconic species such as great blue heron, osprey, peregrine falcon and bald eagle. Wildlife use the open water habitat for foraging and as a migratory corridor. Avian species also use man-made structures for perching, resting and foraging. Shallow water areas and exposed sand and mud are used by shorebirds and waterfowl. Vegetation on the banks, including trees and shrubs, are used by Neotropical migratory songbirds.

The Lower Willamette River does not meet water quality standards for bacteria, mercury, dioxin, temperature, and various other toxics and heavy metals (see Table 16). TMDLs for bacteria and temperature, as well as a phased TMDL for mercury, were established in 2006. Oregon Water Quality Index values from 2001 to 2010 for the Lower Willamette River in Portland have been fair and the trend is steady.

Table 16: 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)	Year-round	1998, 2002	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
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

Due to the presence of mercury, PCBs, dioxins and mainly legacy pesticides (DDT, dieldrin) in Willamette River fish tissue, a fish advisory for the mainstem recommends that people, especially pregnant or breastfeeding women, limit or avoid consuming fatty fish such as carp, bass and catfish. There is no restriction on the consumption of salmon or steelhead. The Lower Willamette River in Portland is deemed unsafe for swimming during and immediately after sewer overflows as a result of larger storm events. However, since 2011, such overflows are exceedingly rare (about one every three years) during the summer recreating season.


Waterfront Park

In the inventory site, the flood area is generally confined to the Willamette River itself, but the flood area extends under the Marquam Bridge and further south. The developed flood plain provides the function of water storage during events like the 1996 flood.

River Banks and Riparian Vegetation

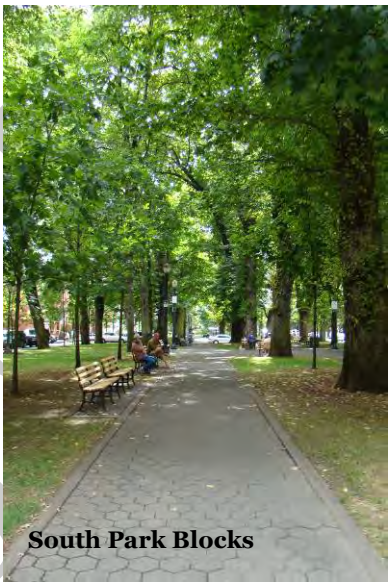
The majority of the river bank in this inventory site is a seawall along Waterfront Park. The seawall prevents bank erosion but provides few other natural resource functions. Above the seawall, the park is vegetated with turf grass and large trees. South of the Waterfront Park Bowl, the bank is non-vegetated riprap, with landscape trees above the riprap. This riparian vegetation is comprised of a mix of native, non-native and invasive plants, including cottonwood, Oregon Ash, Himalayan blackberry and Scott's broom. Native plant species generally provide a broader suite of benefits, such as varied

wildlife food sources and effective slope stabilization. However, all plants, including non-native and invasive species, provide important watershed functions, such as water storage and infiltration, organic materials, nutrient cycling, and cover and perching/nesting opportunities for wildlife.

Due to extensive development, seawall and limited remnant riparian vegetation, wildlife use is limited in this site.

South Park Blocks

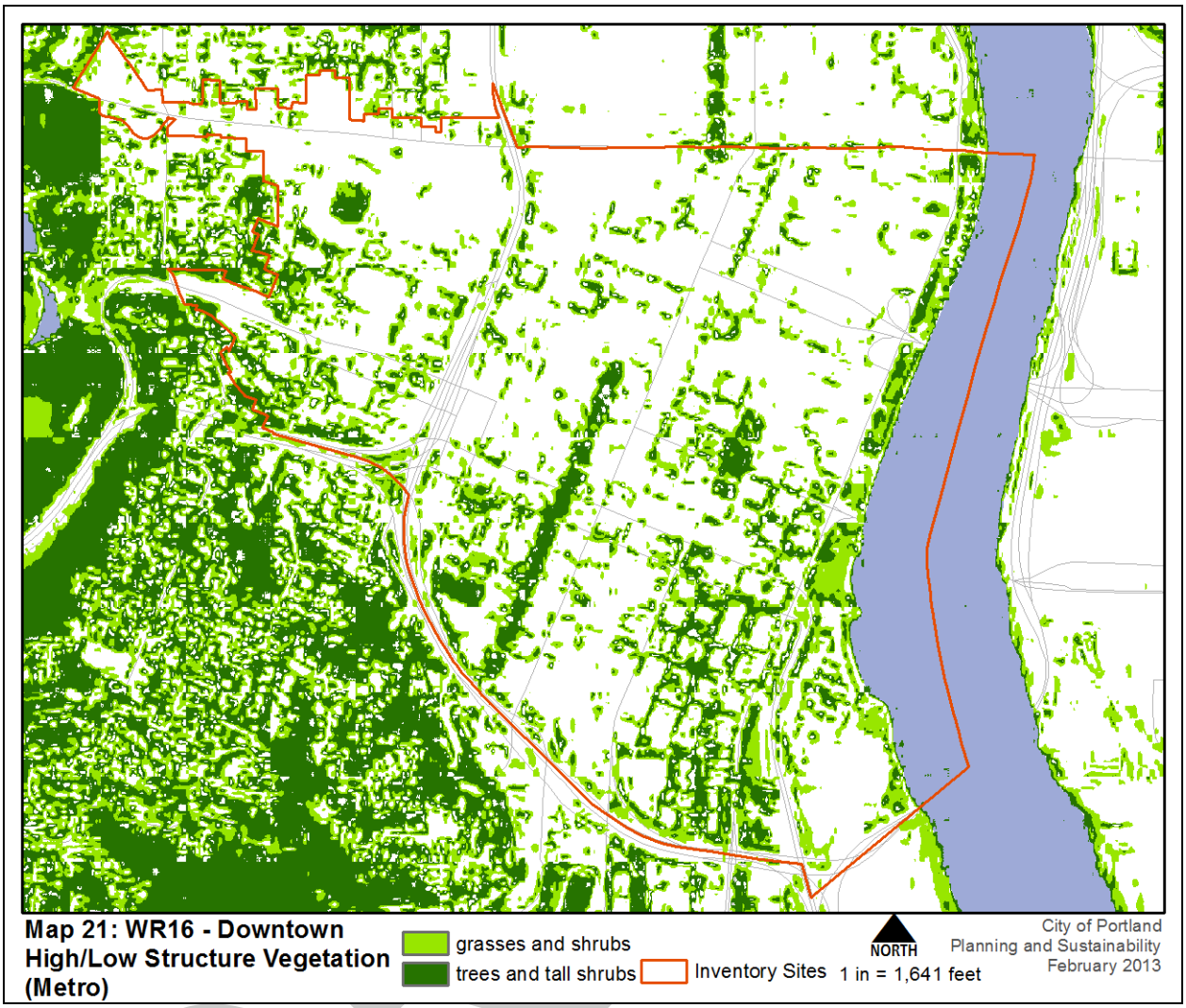
The South Park Blocks are located between I-405 and SW Salmon Street along SW 9th Avenue and SW Park Avenue. The park contains stands of large trees and the understory is primarily turf grass. The park is entirely surrounded by commercial and residential development and it is located far from the west hills or the Willamette River; therefore, the South Park Blocks do not provide connectivity between other habitat areas. However, Portland is on the Pacific Flyway for migratory birds, and the South Park Blocks likely provide habitat for resident birds and for migrating birds during the spring and fall migration periods.



South Park Blocks

Landscape Vegetation and Street Trees

For purposes of the Natural Resources Inventory mapping and modeling, vegetation patches at least ½ acre in size are captured. However, smaller landscaped areas and individual street trees also provide functions, including cleaning and cooling the air and water, capturing greenhouse gases, capturing and uptaking stormwater, reducing energy demand and providing wildlife habitat (Map 21: High/Low Structure Vegetation). The Downtown District has more tree canopy than much of the rest of the Central City planning area, particularly in Waterfront Park, the South Park Blocks and along streets.


Map 21: WR16 - Downtown
High/Low Structure Vegetation
(Metro)
grasses and shrubs
trees and tall shrubs
Inventory Sites
NORTH
1 in = 1,641 feet
City of Portland
Planning and Sustainability
February 2013

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: Project Approach and Methodology Overview of this report and Appendix G: 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 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. High and medium relative functional ranks are assigned to vegetated, non-hardened river banks or flood areas. Low relative ranks are generally assigned to non-vegetated flood area and hardened, non-vegetated river banks.

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 WR16 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:

- 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

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 WR16 - Downtown District

Total Inventory Site = 812				
	High	**Medium**	**Low**	**Total**
Riparian Resources*				
acres	80	13	13	106
percent total inventory site area	9	2	2	13
Wildlife Habitat				
Wildlife Habitat*				
acres	0	0	3	<1
percent total inventory site area	0	0	<1	<1
Special Habitat Areas**				
acres	75			
percent total inventory site area	9			
Wildlife Habitat - adjusted by Special Habitat Areas * **				
acres	75	0	3	79
percent total inventory site area	9	0	<1	10
Combined Total***				
acres	80	13	16	109
percent total inventory site area	10	2	2	14

* 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.

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WR16 - Downtown

Map 1: 2011 Aerial Photography

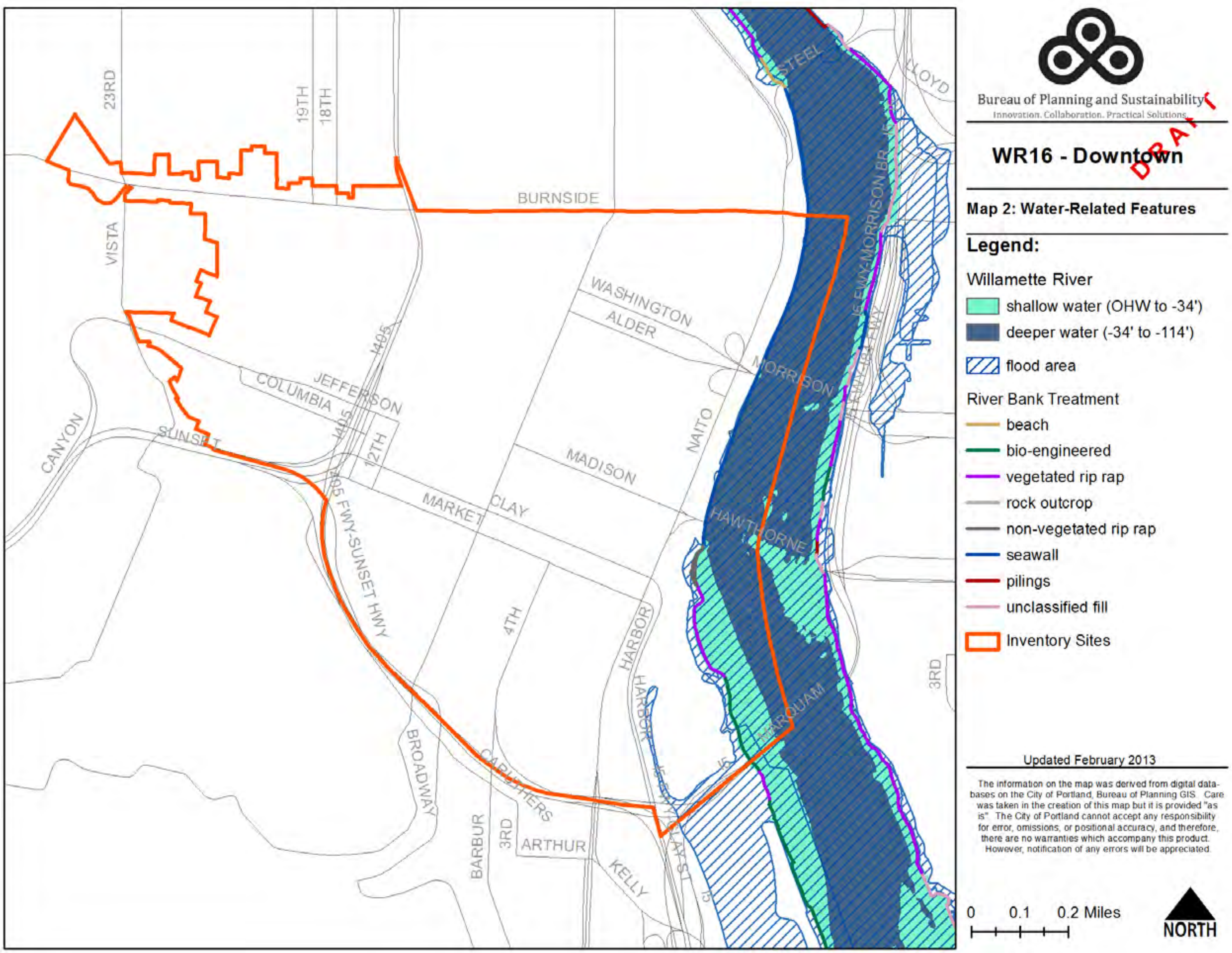
Legend:

Inventory Sites

Updated February 2013

0 0.1 0.2 Miles

NORTH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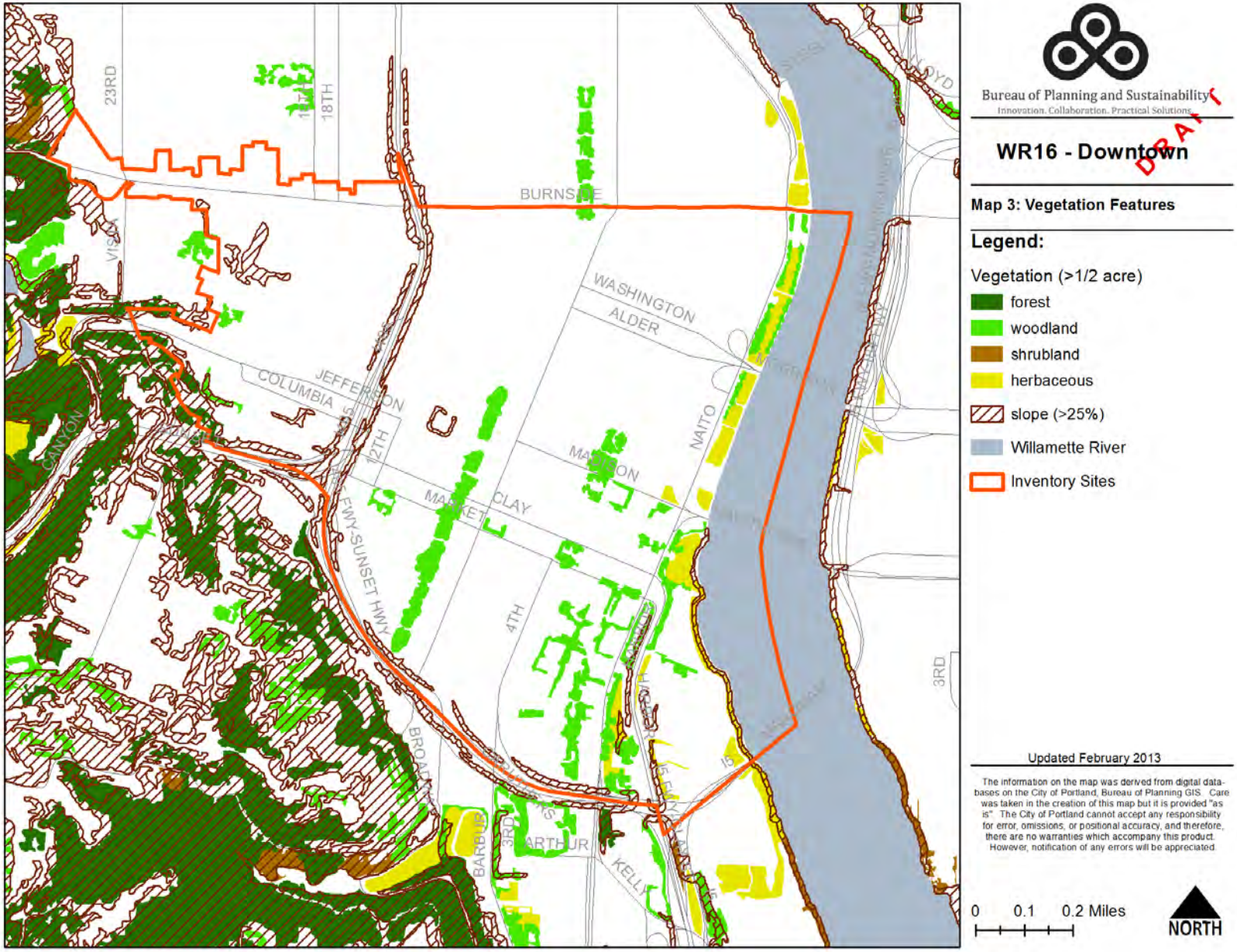
DRAFT
WR16 - Downtown
Map 2: Water-Related Features
Legend:
Willamette River
shallow water (OHW to -34')
deeper water (-34' to -114')
flood area
River Bank Treatment
beach
bio-engineered
vegetated rip rap
rock outcrop
non-vegetated rip rap
seawall
pilings
unclassified fill
Inventory Sites
Updated February 2013
The information on the map was derived from digital databases on the City of Portland, Bureau of Planning GIS. Care was taken in the creation of this map but it is provided "as is". The City of Portland cannot accept any responsibility for error, omissions, or positional accuracy, and therefore, there are no warranties which accompany this product. However, notification of any errors will be appreciated.
0 0.1 0.2 Miles
NORTH
23RD
19TH
18TH
BURNSIDE
VISTA
WASHINGTON
ALDER
MORRISON
COLUMBIA
JEFFERSON
I405
CANYON
SUNSET
12TH
MADISON
NAITO
MARKET
CLAY
I405 FWY-SUNSET HWY
HAWTHORNE
4TH
HARBOR
BROADWAY
CARUTHERS
BARBUR
3RD
ARTHUR
KELLY
MARQUAM
STEEL
LLOYD
MORRISON BR
3RD


23RD
18TH
BURNSIDE
WASHINGTON
ALDER
JEFFERSON
COLUMBIA
12TH
MADISON
MARKET
CLAY
NAITO
4TH
3RD
BARBUR
ARTHUR
KELLY
CANYON
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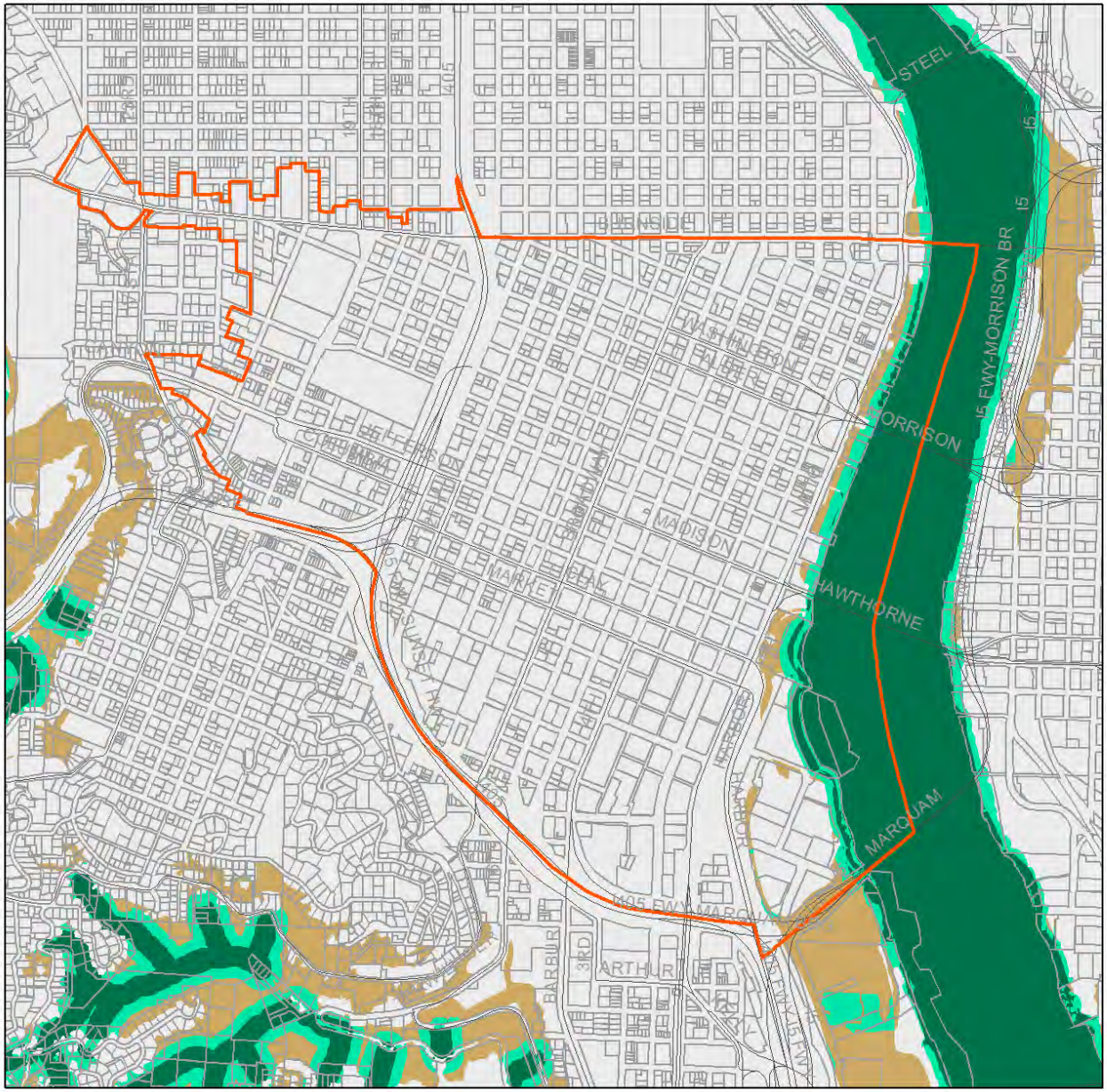
WR16 - Downtown
Map 3: Vegetation Features
Legend:
Vegetation (>1/2 acre)
forest
woodland
shrubland
herbaceous
slope (>25%)
Willamette River
Inventory Sites
Updated February 2013
The information on the map was derived from digital data-bases on the City of Portland, Bureau of Planning GIS. Care was taken in the creation of this map but it is provided "as is". The City of Portland cannot accept any responsibility for error, omissions, or positional accuracy, and therefore, there are no warranties which accompany this product. However, notification of any errors will be appreciated.
0 0.1 0.2 Miles
NORTH



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WR16 - Downtown

Map 4: Riparian Corridors Resources

Legend

- high relative rank
- medium relative rank
- low releative rank
- Inventory Sites

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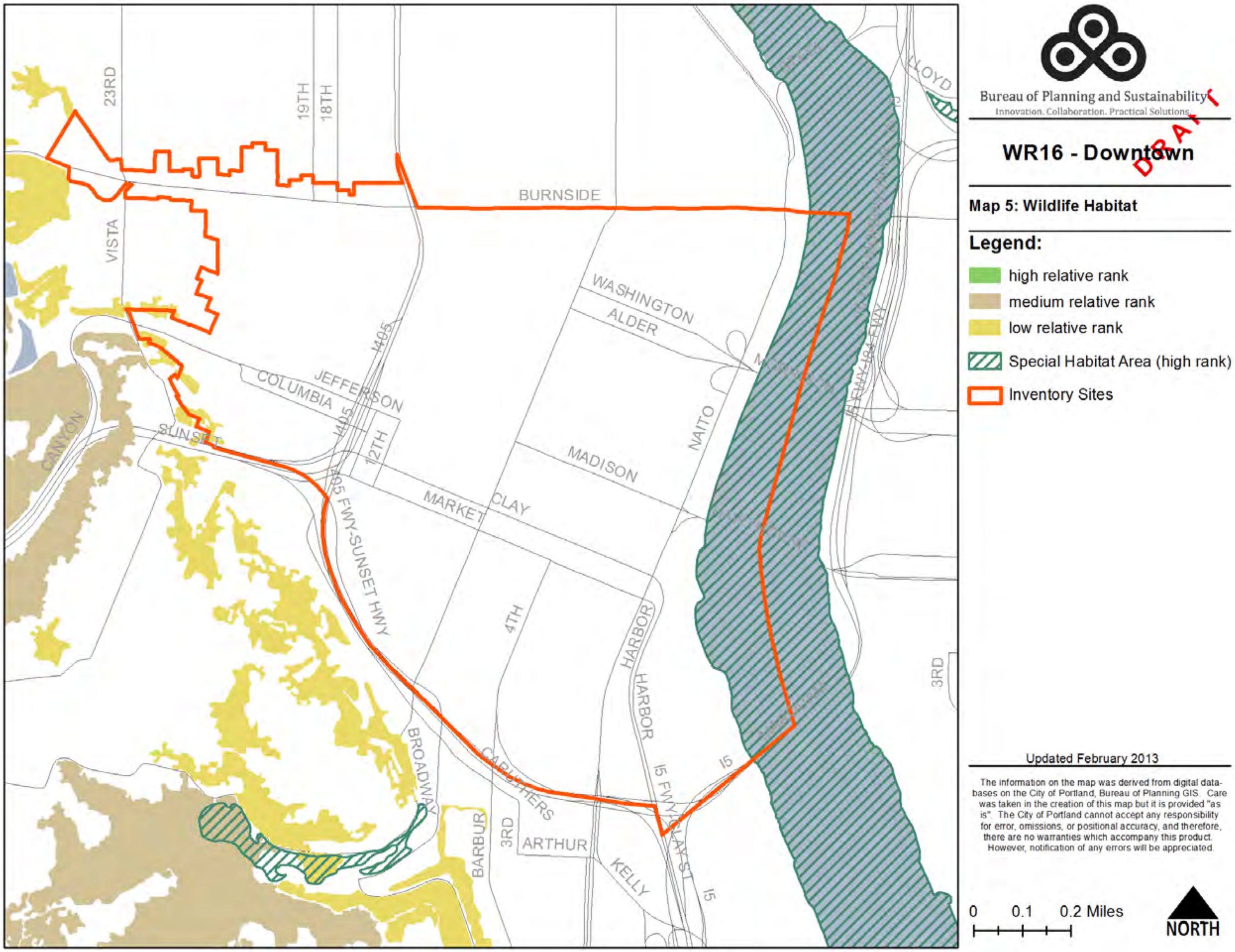
Updated February 2016

0 0.1 0.2 Miles

NORTH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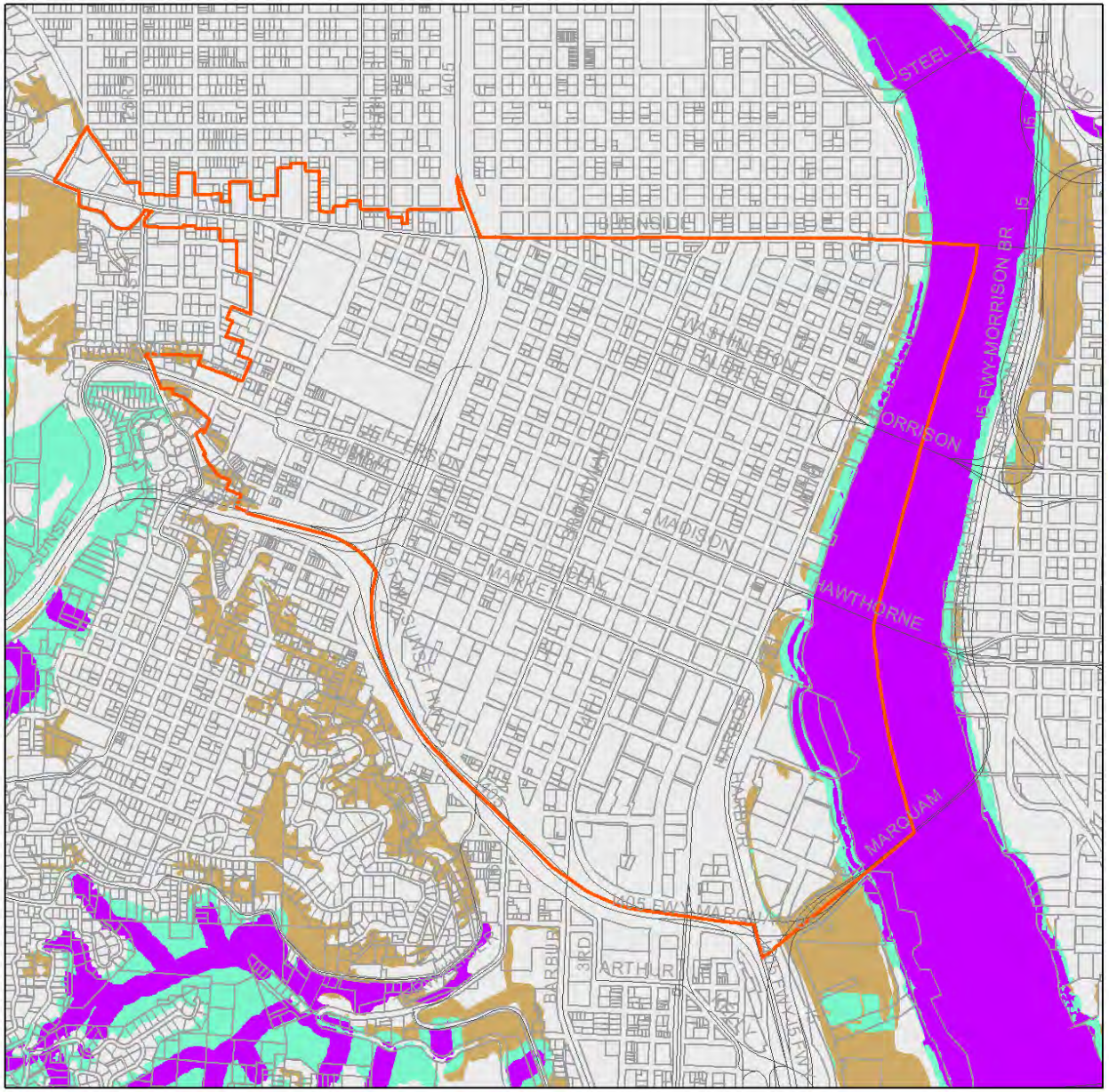
WR16 - Downtown
DRAFT
Map 5: Wildlife Habitat
Legend:
high relative rank
medium relative rank
low relative rank
Special Habitat Area (high rank)
Inventory Sites
Updated February 2013
The information on the map was derived from digital databases on the City of Portland, Bureau of Planning GIS. Care was taken in the creation of this map but it is provided "as is". The City of Portland cannot accept any responsibility for error, omissions, or positional accuracy, and therefore, there are no warranties which accompany this product. However, notification of any errors will be appreciated.
0 0.1 0.2 Miles
NORTH
23RD
19TH
18TH
BURNSIDE
LLOYD
VISTA
WASHINGTON
ALDER
COLUMBIA
JEFFERSON
I405
CANYON
SUNSET
12TH
MADISON
NAITO
MARKET
CLAY
I405 FWY-SUNSET HWY
4TH
HARBOR
3RD
BROADWAY
CARUTHERS
BARBUR
ARTHUR
KELLY
I5
I5 FWY
I84 FWY



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WR16 - Downtown

Map 6: Combined Riparian/Wildlife Relative Ranks

Legend

- high relative rank
- medium relative rank
- low relative rank
- Inventory Sites

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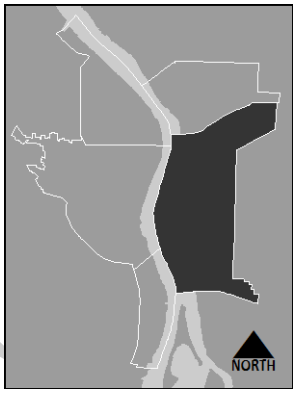
Updated February 2016

0 0.1 0.2 Miles

NORTH

Section 3.d.iv: Inventory Site WR17 - Central Eastside

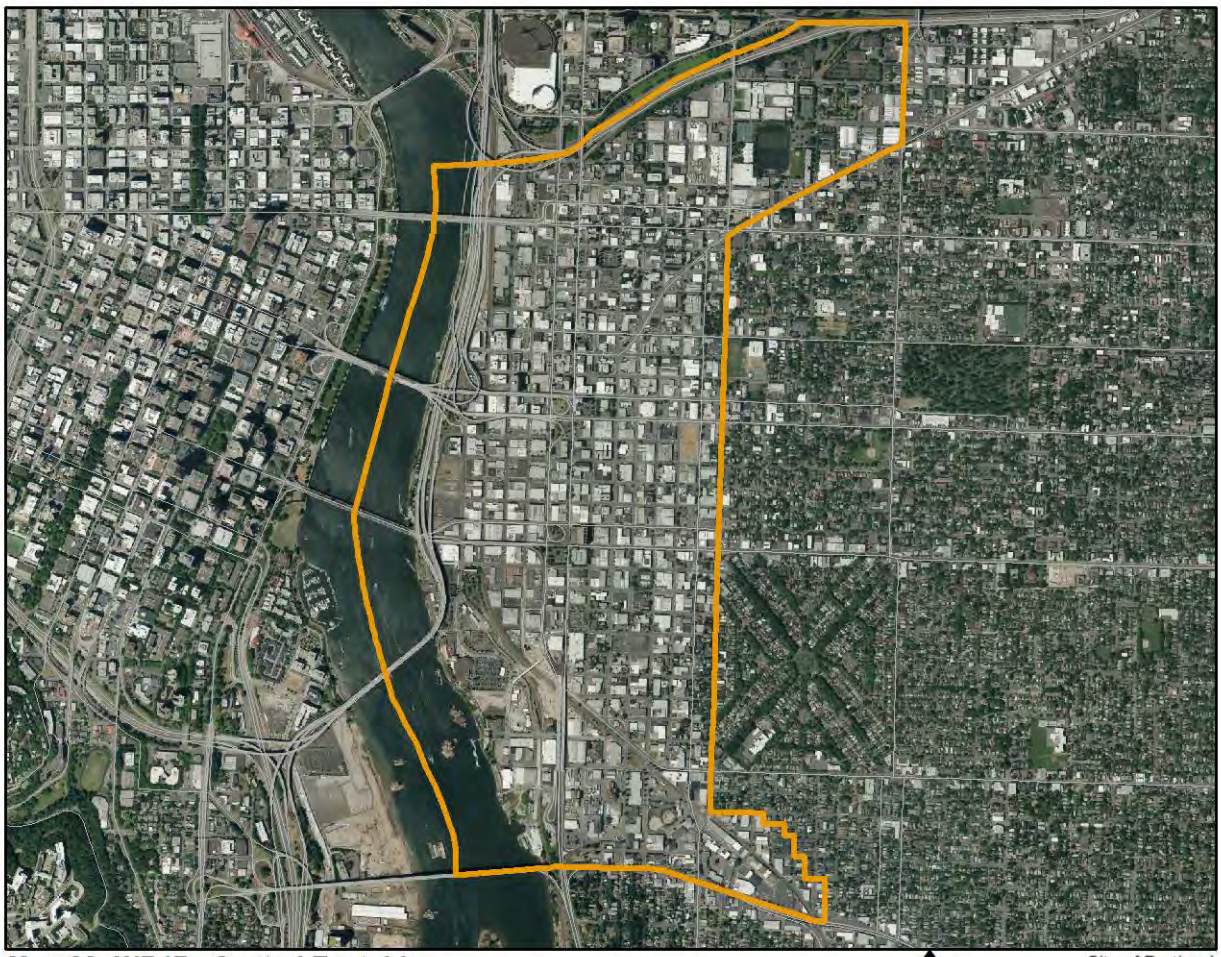


Summary Information

Watershed:	Willamette River Watershed
Neighborhood:	Kerns, Buckman, Hosford-Abernethy
USGS Quadrangle and Quarter Section Maps:	1N1E34d, 1N1E35a, 1N1E35b, 1N1E35c, 1N1E35d, 1S1E02b, 1S1E02c, 1N1S03a, 1N1S03d, 1S1E10a, 1S1E10b, 1S1E11a
River Mile:	12.2 – 13.9
Site Size:	925 acres (land and water)
Previous Inventory:	Lower Willamette River Wildlife Habitat Inventory, March 1986
Zoning:	General Industrial 1 (IG1) Heavy Industrial (IH) Central Employment (EX) General Employment 2 (EG2) General Employment 1 (EG1) Central Commercial (CX) Storefront Commercial (CS) General Commercial (CG) High Density Multi-dwelling Residential (RH) Medium Density Multi-dwelling Residential (RI) Open Space (OS)
Existing Land Use:	Downtown commercial, industrial, parks and open space, freeway and residential to the east
General Description:	This site is a mix of primarily industrial, commercial, and parks and open spaces. The Willamette River frontage is occupied by industry to the south and the East Bank Esplanade to the center and north. I-5 crosses the site, as does Highway 99. There are four bridges in the site: Burnside, Morrison, Hawthorne and Marquam.
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, pollution control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; 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 Sullivan's Gulch: (U) – unique feature
Special Status Species:	Fish: Lower Columbia River Chinook salmon, Columbia River chum salmon, lower Columbia River steelhead trout, Pacific lamprey
Natural Hazards:	Flood area, landslide, fire hazard
Contamination:	Yes

Site Description

This 925 acre site is located between the Burnside Bridge to the north, Powell Boulevard to the south and 12th Avenue to Sandy Boulevard to 21st Avenue on the east. The site is developed primarily with industrial, commercial, and parks and open spaces, with some residential on the eastern edge. The shoreline is defined by industry in the southern portion of the site, and the Eastbank Esplanade along the central and northern portions of the site. The southern edge of Sullivan's Gulch, which is located along I-84, is also within the site.



The site contains 484 acres (52 percent) of impervious surface coverage, including 51 miles of road. Of the vegetated areas over ½ acre in size, there are approximately 7 acres of woodland vegetation, 7 acres of shrubland vegetation and 5 acres of herbaceous vegetation. There are 165 acres of flood area in this site (City of Portland, 2002), most of which is the Willamette River (127 acres). The remaining flood area on land is largely developed.

Table 18: Summary of Natural Resource Features in WR17 - Central Eastside	
	Study Area (miles/acres)
River (miles/acres)	2/127
Stream/Drainageway (miles)	0
Wetlands (acres)	0
Flood Area (acres)*	
Vegetated (acres)	4
Non-vegetated (acres)	33
Open Water** (acres)	128
Vegetated Areas >= ½ acre (acres)+	
Forest (acres)	0
Woodland (acres)	7
Shrubland (acres)	7
Herbaceous (acres)	5
Impervious Surfaces (acres)	484

* 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 Willamette River in the Portland area was comprised of an extensive, interconnected system of active channels, open slack waters, emergent wetlands, riparian forests and adjacent upland forests. Today, the Central Eastside is a largely developed landscape. The predominant existing natural resource is the Willamette River, including the flood area and vegetation along the banks. Elements of the built environment also provide natural resource functions, including street trees, ecoroofs and vegetated landscaping.

The natural resources description is divided into sections that focus on habitat types:

- Open Water and River Banks
- Landscape Vegetation and Street Trees

Open Water and River Banks

Below is a summary of the Lower Willamette River in inventory site WR17. Additional information about the water quality, hydrology, and fish and wildlife use of the Willamette River is provided in Section 3.c: The Central City.

Inventory site WR17 includes 128 acres of the Lower Willamette River. The river is the primary habitat linkage providing connectivity to upstream and downstream aquatic habitats. This linkage is critical for supporting salmonids, 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 bull 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 watershed. Seasonal migrants use habitat within the inventory site for only short periods and usually occur at 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.

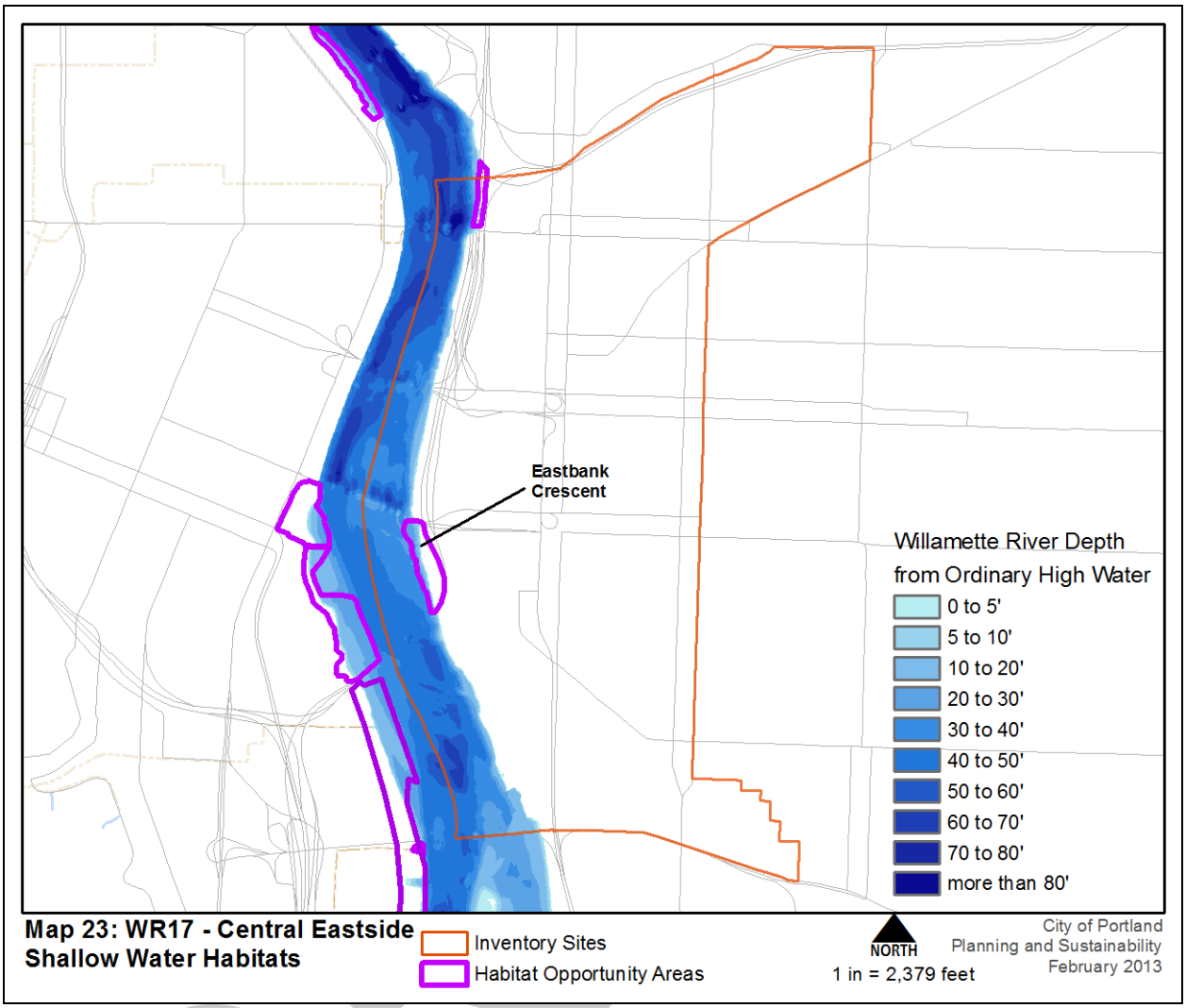
Columbia eulachon pass through the lower Columbia and Willamette Rivers as opportunistic migrants as well. Adults return to their natal river every winter; however, their out-migration timing is not as well documented.

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 the Willamette Falls and the Columbia River confluence describe an abundant population of white sturgeon with multiple age classes present.

There is currently relatively little scientific literature characterizing Pacific lamprey rearing and out-migration in the Lower Willamette River. However, the freshwater juvenile rearing stage of Pacific lamprey is known to last between four and seven years, and juvenile Pacific lamprey have repeatedly been found burrowing in Lower Willamette River sediments.

Resident fish assemblages within this reach include both native and non-native species that both support and prey upon native salmonids. These species include natives 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.

There is one notable shallow water habitats in site WR17: Eastbank Crescent (Map 23).



The Eastbank Crescent is comprised of an 11,000 foot-long, steeply sloped bank with unclassified fill along its length. A bench of shallow water off the banks widens downstream as the thalweg switches from the east to the west bank. This represents the widest stretch of shallow water in the Willamette River Central Reach. The bank is dominated by Himalayan blackberry. One large tree and a few shrubs are also present. The sediment is gravelly sand and sand, with a small amount of hard ground at the downstream end near the Hawthorne Bridge.

Inventory site WR17 is part of the Pacific Flyway and is used by over 200 resident and migratory bird species, including iconic species such as great blue heron, osprey, Peregrine falcon and bald eagle. Wildlife use the open water and habitat in the reach for foraging and as a migratory corridor. Avian species also use man-made structures for perching, resting and foraging. Shallow water areas and exposed sand and mud are used by shorebirds and waterfowl. Vegetation on the banks, including trees and shrubs, are used by Neotropical migratory songbirds.

The Lower Willamette River does not meet 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. Oregon Water Quality Index values from 2001 to 2010 for the Lower Willamette River in Portland have been fair 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)	Year-round	1998, 2002	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
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

Due to the presence of mercury, PCBs, dioxins and mainly legacy pesticides (DDT, dieldrin) in Willamette River fish tissue, a fish advisory for the mainstem recommends that people, especially pregnant or breastfeeding women, limit or avoid consuming fatty fish such as carp, bass and catfish. There is no restriction on the consumption of salmon or steelhead. The Lower Willamette River in Portland is deemed unsafe for swimming during and immediately after sewer overflows as a result of larger storm events. However, since 2011, such overflows are exceedingly rare (about one every three years) during the summer recreating season.

In the inventory site, the flood area is generally confined to the Willamette River itself, but the flood area extends under the Marquam Bridge and further south. The developed flood plain provides the function of water storage during events like the 1996 flood.

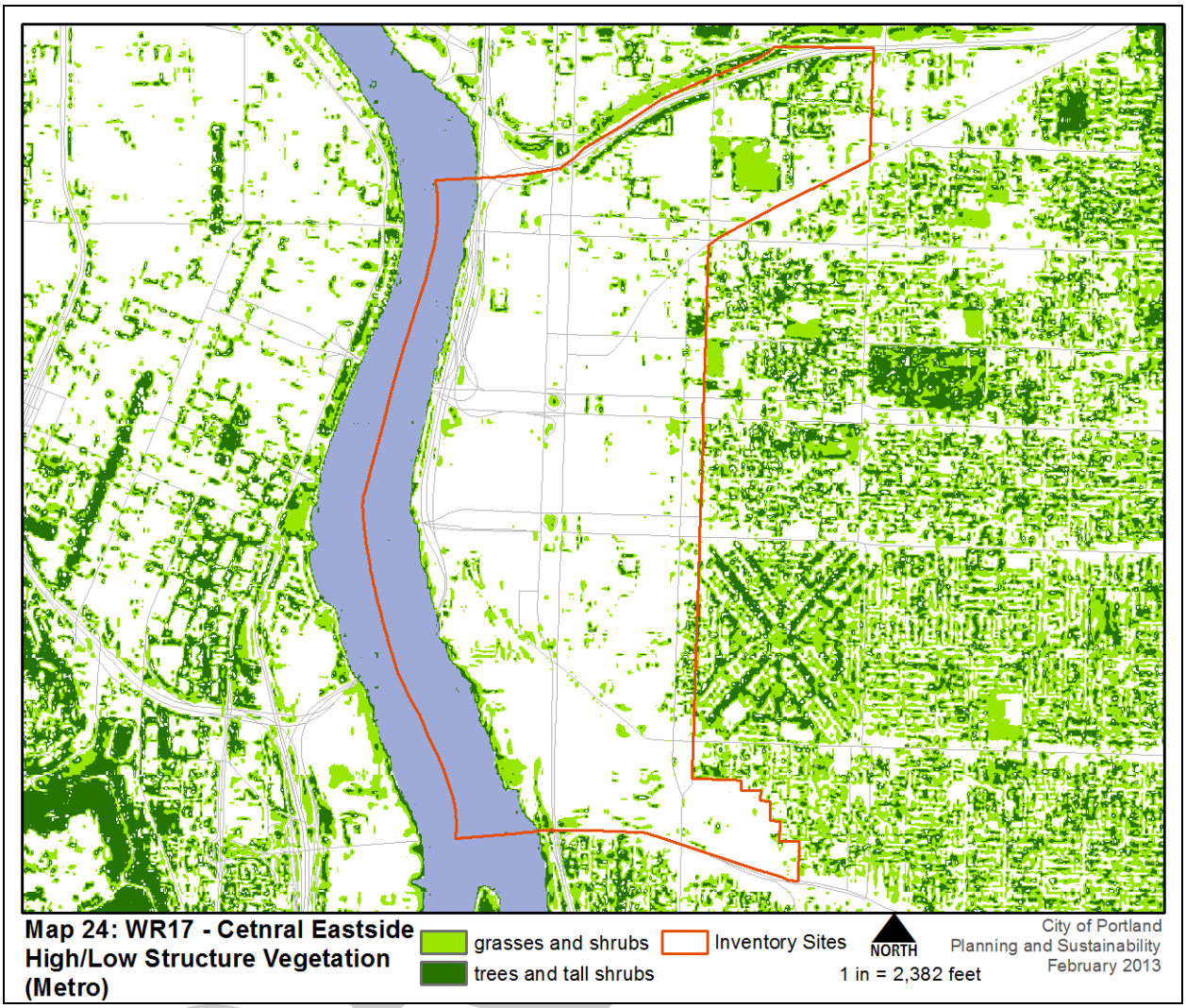
Sullivan's Gulch and Steep Slopes

Along I-84 is a steeply sloped, largely vegetated corridor, known as Sullivan's Gulch. Sullivan's Gulch runs along both sides of I-84 from NE 28th Avenue to the Willamette River. On the south side of I-84, between NE 20th Avenue and NE Grand Avenue, vegetation includes some non-native large trees and understory of Himalayan blackberry and English Ivy.

Steep slopes in Portland are relatively prone to wildfire and landslides. Although Sullivan's Gulch has not burned recently, north of the inventory site is Waud Bluff which experienced fires in 2001 and 2003. The primary sources of fuel were non-native plant species such Himalayan blackberry. Native species, including Oregon oak, Douglas fir, Oregon grape, snowberry, Gilia capitata (globe gilia) and Penstemon ovatus (broad leaved penstemon), are more fire-resistant plants.

Landscape Vegetation and Street Trees

For purposes of the Natural Resources Inventory mapping and modeling, only vegetation patches at least ½ acre in size are captured. However, smaller landscaped areas and individual street trees also provide functions, including cleaning and cooling the air and water, capturing greenhouse gases, capturing and uptaking stormwater, reducing energy demand and providing wildlife habitat (Map 15: High/Low Structure Vegetation).


Map 24: WR17 - Cetnral Eastside High/Low Structure Vegetation (Metro)
grasses and shrubs
trees and tall shrubs
Inventory Sites
NORTH
1 in = 2,382 feet
City of Portland
Planning and Sustainability
February 2013

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: Project Approach and Methodology Overview of this report and Appendix G: 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 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. High and medium relative functional ranks are assigned to vegetated, non-hardened river banks or flood areas. Low relative ranks are generally assigned to non-vegetated flood area and hardened, non-vegetated river banks.

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 WR17 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:

- 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

- Sullivan's Gulch, upland habitat along I-84 that is also subject to potential landslides and wild fire is designated SHA because it meets the following criteria:
  (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 20: Summary of Ranked Resources in WR16 - Downtown District

Total Inventory Site = 925				
	High	**Medium**	**Low**	**Total**
Riparian Resources*				
acres	132	18	25	175
percent total inventory site area	14	2	3	19
Wildlife Habitat				
Wildlife Habitat*				
acres	0	0	0	0
percent total inventory site area	0	0	0	0
Special Habitat Areas**				
acres	137			
percent total inventory site area	15			
Wildlife Habitat - adjusted by Special Habitat Areas***				
acres	137	0	0	137
percent total inventory site area	15	0	0	15
Combined Total***				
acres	142	18	25	185
percent total inventory site area	15	2	3	20

* 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.

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WR17 - Central Eastside

Map 1: 2011 Aerial Photography

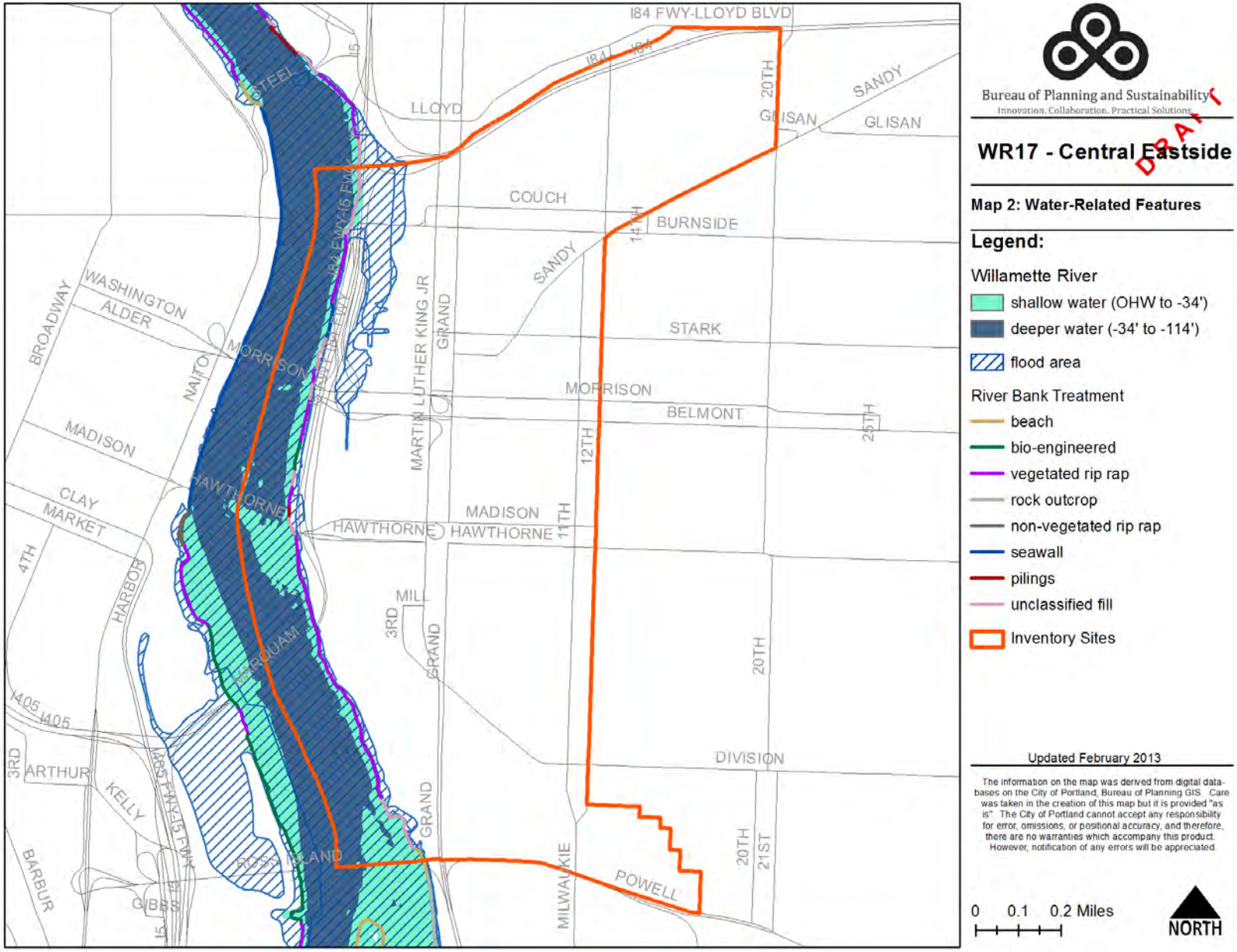
Legend:

Inventory Sites

Updated February 2013

0 0.1 0.2 Miles

NORTH



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WR17 - Central Eastside

Map 2: Water-Related Features

Legend:

Willamette River
- shallow water (OHW to -34')
- deeper water (-34' to -114')
- flood area

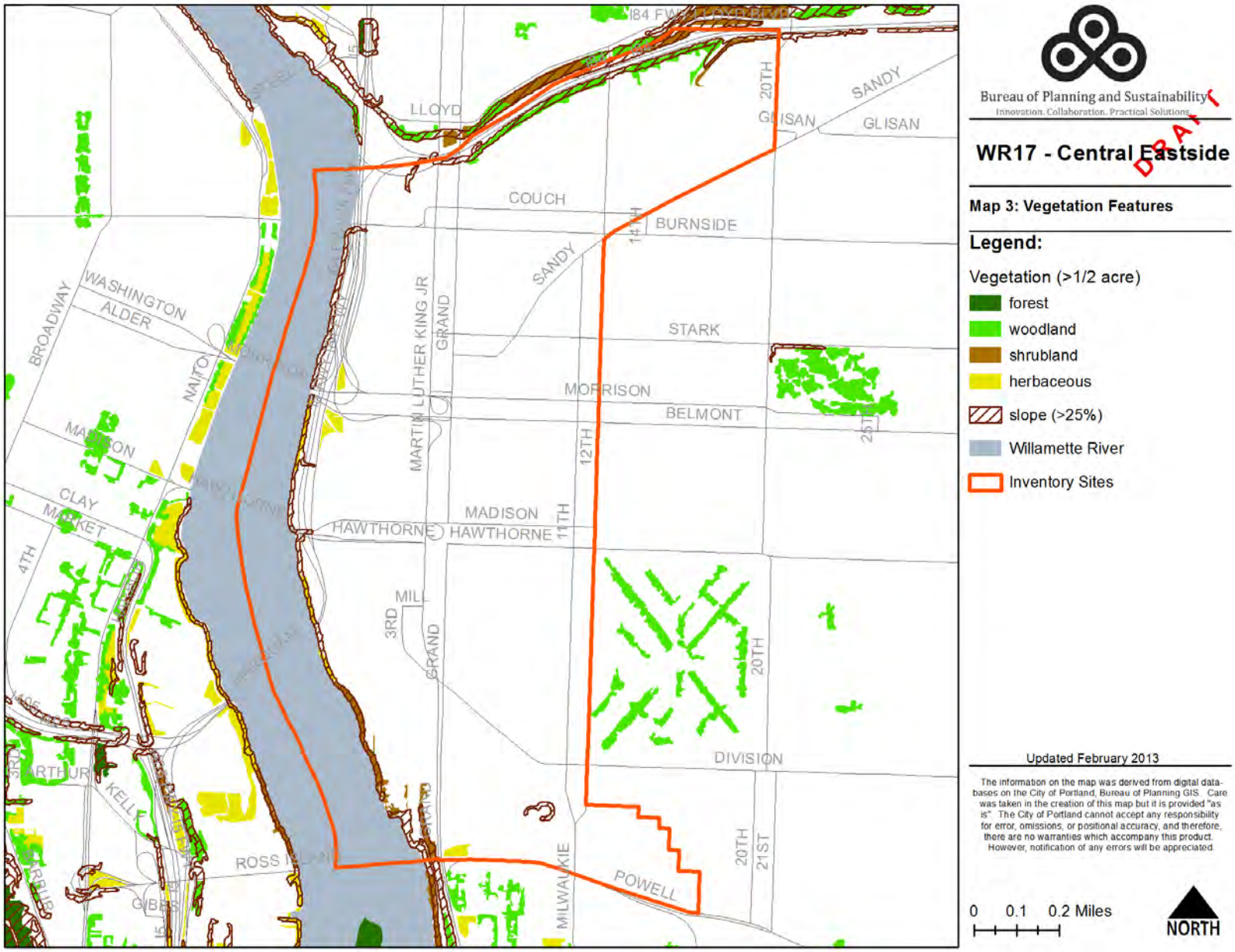
River Bank Treatment
- beach
- bio-engineered
- vegetated rip rap
- rock outcrop
- non-vegetated rip rap
- seawall
- pilings
- unclassified fill

Inventory Sites

Updated February 2013

0 0.1 0.2 Miles

NORTH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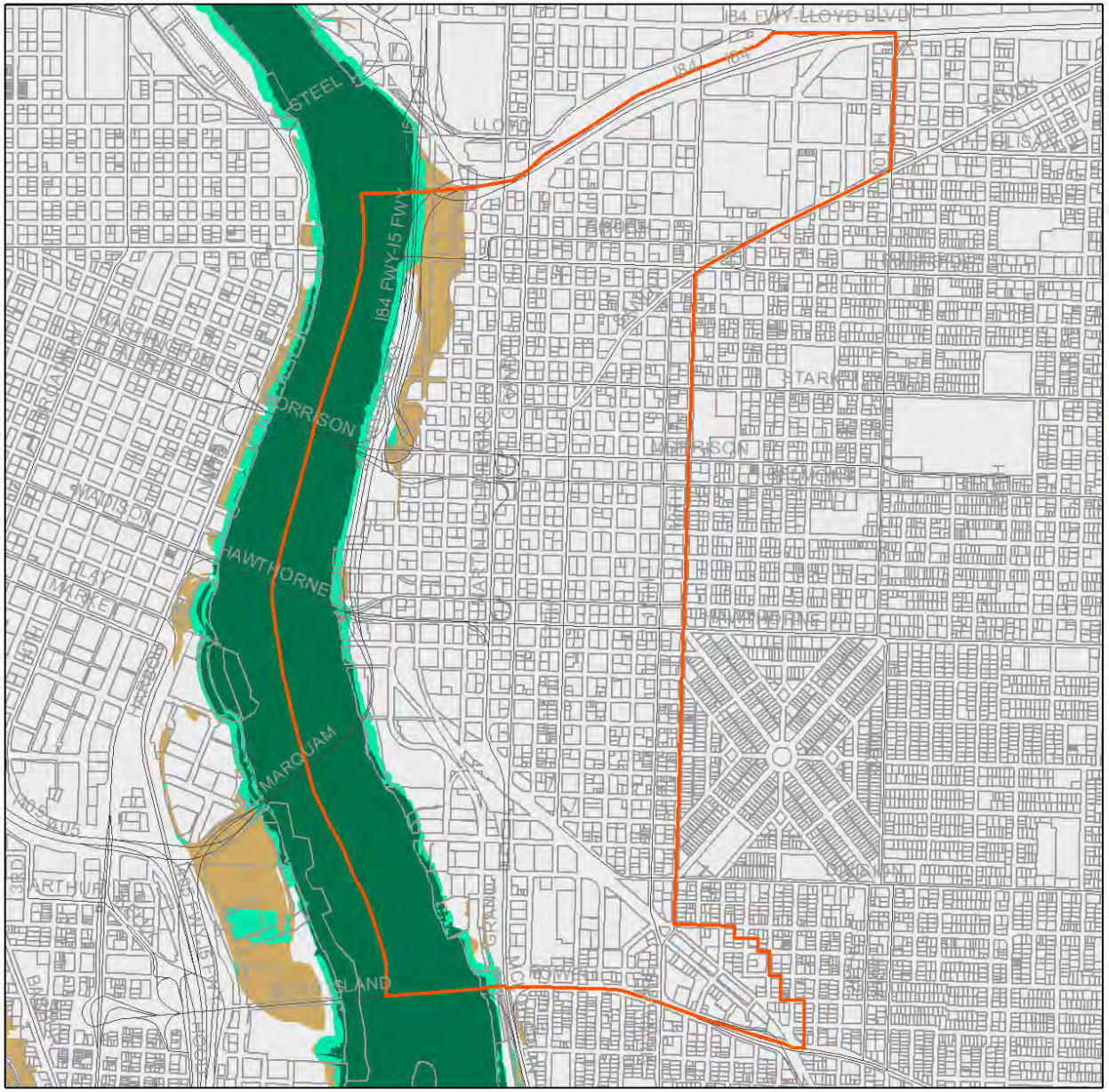
WR17 - Central Eastside
Map 3: Vegetation Features
Legend:
Vegetation (>1/2 acre)
forest
woodland
shrubland
herbaceous
slope (>25%)
Willamette River
Inventory Sites
Updated February 2013
The information on the map was derived from digital data-bases on the City of Portland, Bureau of Planning GIS. Care was taken in the creation of this map but it is provided "as is". The City of Portland cannot accept any responsibility for error, omissions, or positional accuracy, and therefore, there are no warranties which accompany this product. However, notification of any errors will be appreciated.
0 0.1 0.2 Miles
NORTH
LLOYD
COUCH
BURNSIDE
SANDY
GLISAN
STARK
WASHINGTON
ALDER
BROADWAY
MORRISON
BELMONT
MADISON
HAWTHORNE
CLAY
MARKET
MILL
DIVISION
POWELL
MARTIN LUTHER KING JR
GRAND
MILWAUKIE
20TH
21ST
12TH
11TH
14TH
3RD
4TH



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WR17 - Central Eastside

Map 4: Riparian Corridors Resources

Legend

- high relative rank
- medium relative rank
- low releative rank
- Inventory Sites

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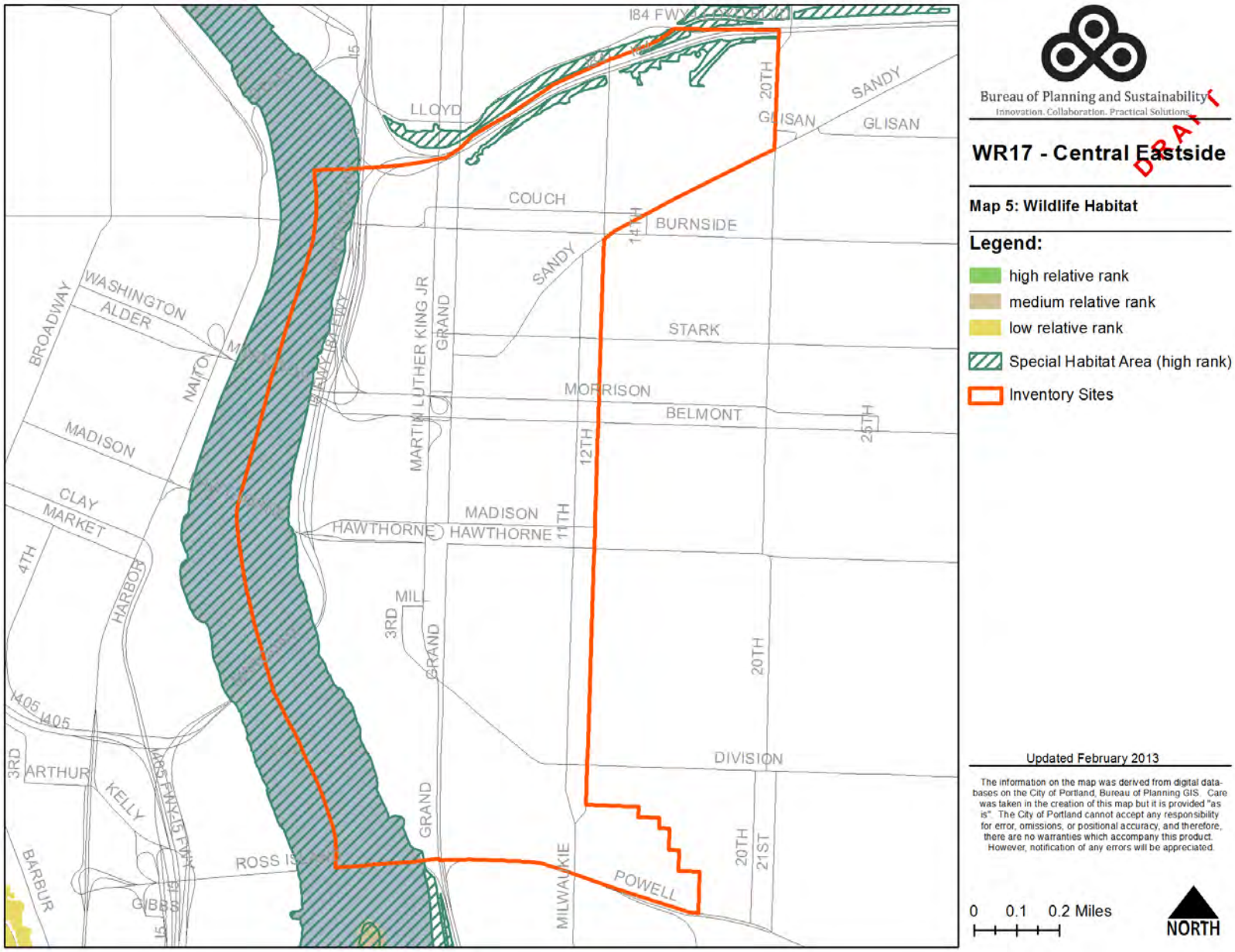
Updated February 2016

0 0.1 0.2 Miles

NORTH


I84 FWY
LLOYD
GLISAN
SANDY
20TH
COUCH
BURNSIDE
14TH
STARK
MORRISON
BELMONT
26TH
12TH
11TH
MADISON
HAWTHORNE
MILL
3RD
GRAND
MARTIN LUTHER KING JR
BROADWAY
WASHINGTON
ALDER
MADISON
CLAY
MARKET
4TH
HARBOR
I405
ARTHUR
KELLY
BARBUR
ROSS ISLAND
DIVISION
POWELL
21ST
MILWAUKIE
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DRAFT
WR17 - Central Eastside
Map 5: Wildlife Habitat
Legend:
high relative rank
medium relative rank
low relative rank
Special Habitat Area (high rank)
Inventory Sites
Updated February 2013
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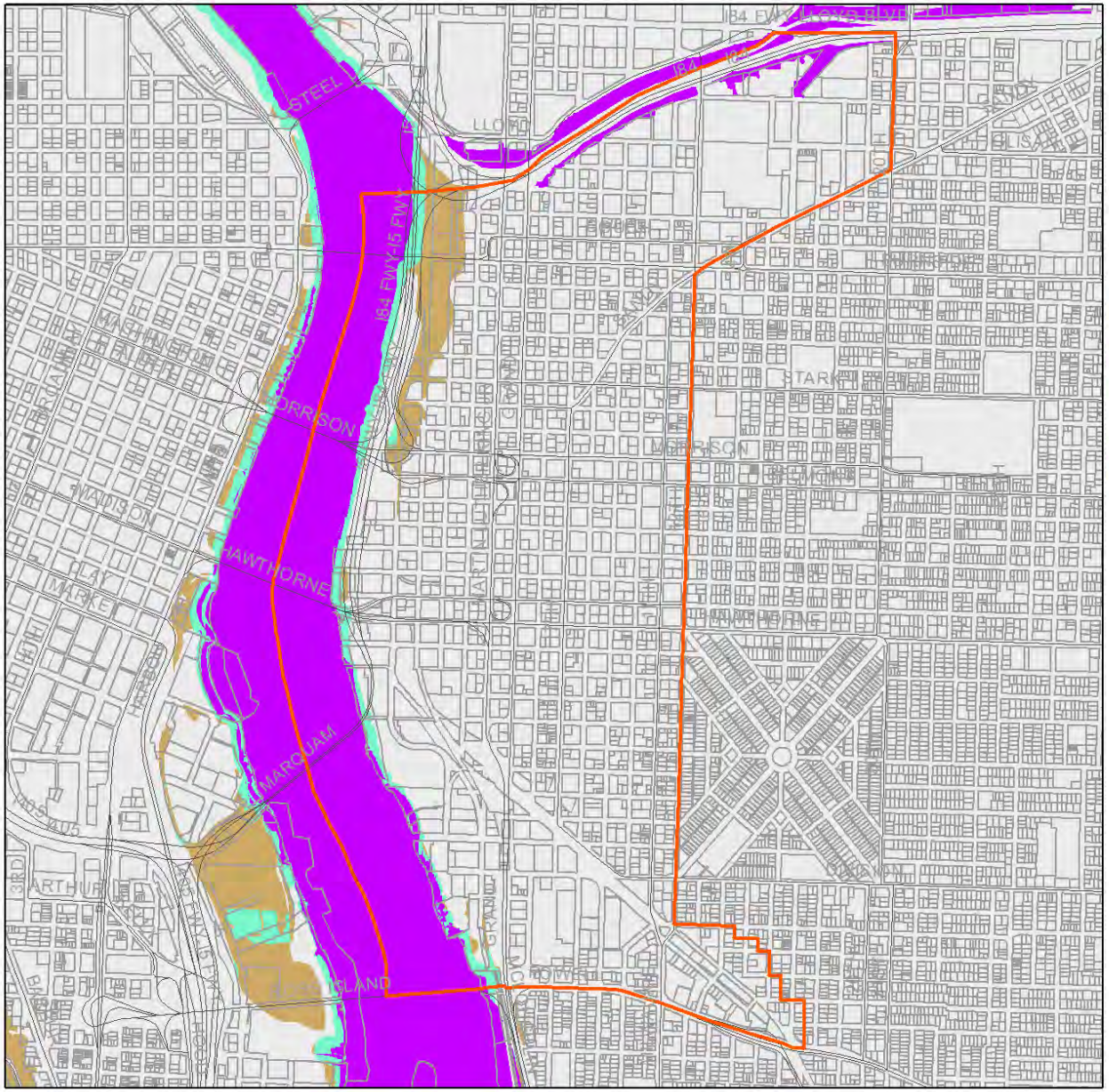

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WR17 - Central Eastside

Map 6: Combined Riparian/Wildlife Relative Ranks

Legend

- high relative rank
- medium relative rank
- low relative rank
- Inventory Sites

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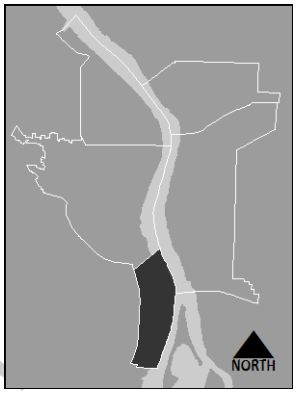
Updated February 2016

0 0.1 0.2 Miles

NORTH

Section 3.d.v: Inventory Site WR18 - South Waterfront



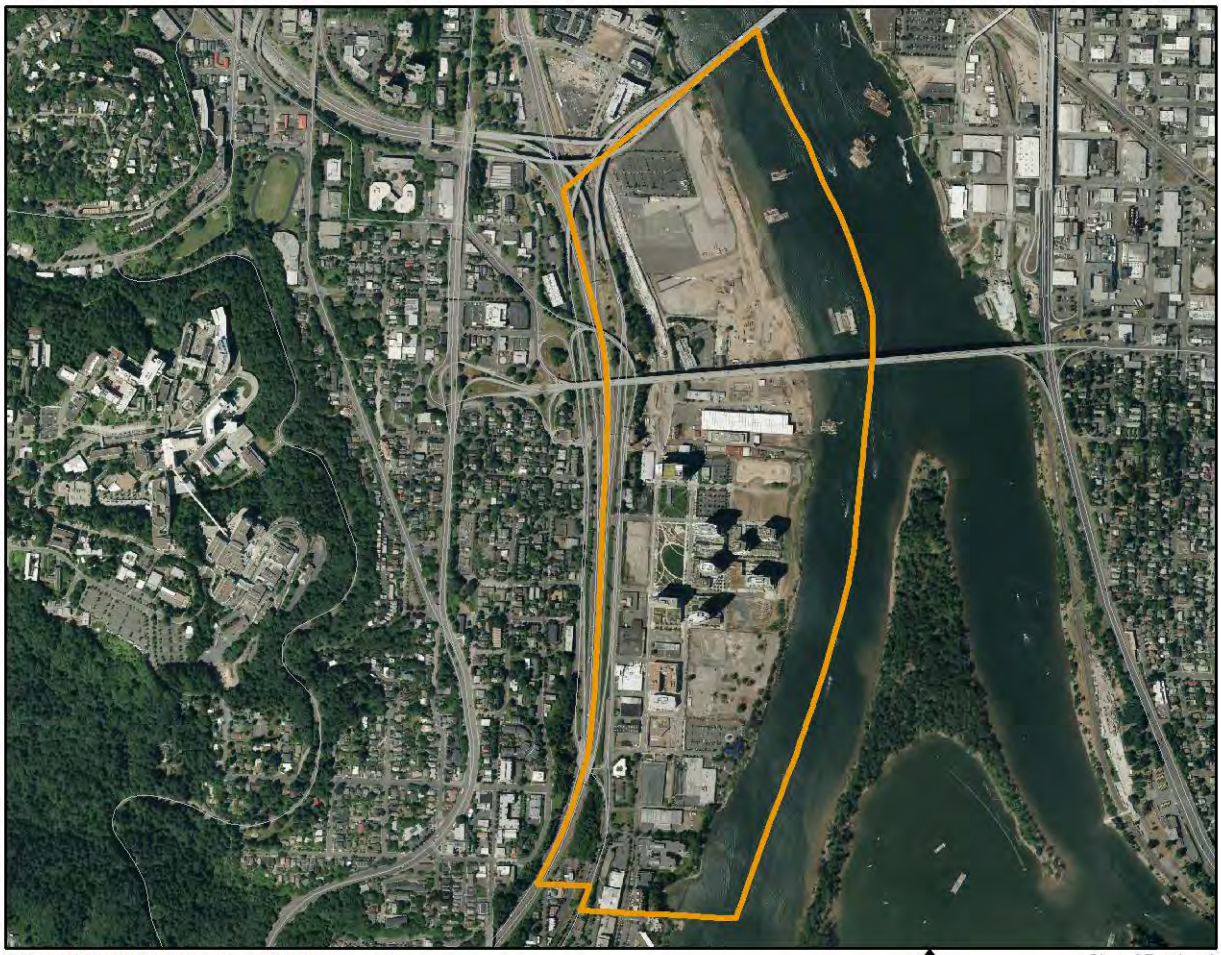
Summary Information

Watershed:	Willamette River Watershed
Neighborhood:	South Portland
USGS Quadrangle and Quarter Section Maps:	1S1E03, 1S1E10, 1S1E15, and 3229-30, 3329-30, 3429-30, 3529-30
River Mile:	12.9 – 14.3
Site Size:	318 acres (land and water)
Previous Inventory:	Lower Willamette River Wildlife Habitat Inventory, March 1986
Zoning:	Central Commercial (CX) Office Commercial 2 (CO2) Storefront Commercial (CS) High Density Residential (RH) Open Space (OS) Design Overlay (d) River General Overlay (g)
Existing Land Use:	Commercial, residential, park
General Description:	The site begins at the southern property line for Waterfront Park and extends south to SW Hamilton Court
Resource Features:	Bottomland forest, scrub/shrub upland, beach, open water, flood plain
Resource Functions:	Microclimate and shade; streamflow moderation and water storage; bank function, and sediment, nutrient, pollution control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; riparian wildlife movement corridor; wildlife habitat migratory stopover habitat; connectivity
Special Habitat Area:	Willamette River: (S) – provides habitat for at-risk wildlife species; (C) – wildlife connectivity corridor; (M) – migratory stopover habitat
Special Status Species:	Fish: Lower Columbia River Chinook salmon, Columbia River chum salmon, lower Columbia River steelhead trout, Pacific lamprey
Natural Hazards:	Landslide, flood area
Contamination:	Yes

Site Description

This 243 acre site extends from the Willamette River centerline westward, where the western boundary follows SW Harbor Drive and I-5. On the north end, the site extends southward from the southern property line of South Waterfront Park to SW Hamilton Court, and the southern property lines of R991100170 and R991100890. The terrestrial portion of this site is approximately 244 acres in size and contains more than 7,485 linear feet of bank along the Willamette River. Map 1 shows the aerial view of the South Waterfront inventory site.

This site is characterized by intensive shoreline development related to commercial, industrial and public uses. The river bank in this site is mostly unclassified fill. South Waterfront Park is located along the waterfront in the northeast corner of land within this site. Adjacent to South Waterfront Park are condominiums which comprise the majority of residential development on this site. South of the condominium development, the site is dominated by commercial and industrial uses. The cove known as Cottonwood Bay begins at the southernmost section of this site and continues into site WR20 John's Landing. This site represents a transition from the heavily modified and industrial conditions downstream to the less developed conditions upstream.



The site contains 96 acres of impervious surface coverage, including 9 miles of road. Of vegetated areas over 1/2 acre in size, there are roughly 6 acres of forest and woodland vegetation, 3 acres of shrubland and 18 acres of herbaceous vegetation. There are 129 acres of flood area on this site, more than half of which is the Willamette River (67 acres). The remaining flood area on land is largely developed.

Table 21: Summary of Natural Resource Features in WR18 - South Waterfront	
	Study Area (mile/acres)
River (miles/acres)	1.2/67
Stream/Drainageway (miles)	0
Wetlands (acres)	0
Flood Area (acres)*	
Vegetated (acres)	12
Non-vegetated (acres)	51
Open Water** (acres)	67
Vegetated Areas >= ½ acre (acres)+	
Forest (acres)	2
Woodland (acres)	3
Shrubland (acres)	3
Herbaceous (acres)	18
Impervious Surfaces (acres)	96

* 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 Willamette River in the Portland area was comprised of an extensive, interconnected system of active channels, open slack waters, emergent wetlands, riparian forests and adjacent upland forests. Today, the South Waterfront is a largely developed landscape. The predominant existing natural resource is the Willamette River, including the flood area and vegetation along the banks. Elements of the built environment also provide natural resource functions including street trees, ecoroofs and vegetated landscaping.

The natural resources description is divided into sections that focus on habitat types:

- Open Water and River Banks
- Landscape Vegetation and Street Trees

<u>Open Water and River Banks</u>
Below is a summary of the Lower Willamette River in inventory site WR18. Additional information about the water quality, hydrology, and fish and wildlife use of the Willamette River is provided in Section 3.c: The Central City.

Inventory site WR18 includes 67 acres of the Lower Willamette River. The river is the primary habitat linkage providing connectivity to upstream and downstream aquatic habitats. This linkage is critical for supporting salmonids, 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 bull 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 watershed. Seasonal migrants use habitat within the inventory site for only short periods and usually occur at 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.

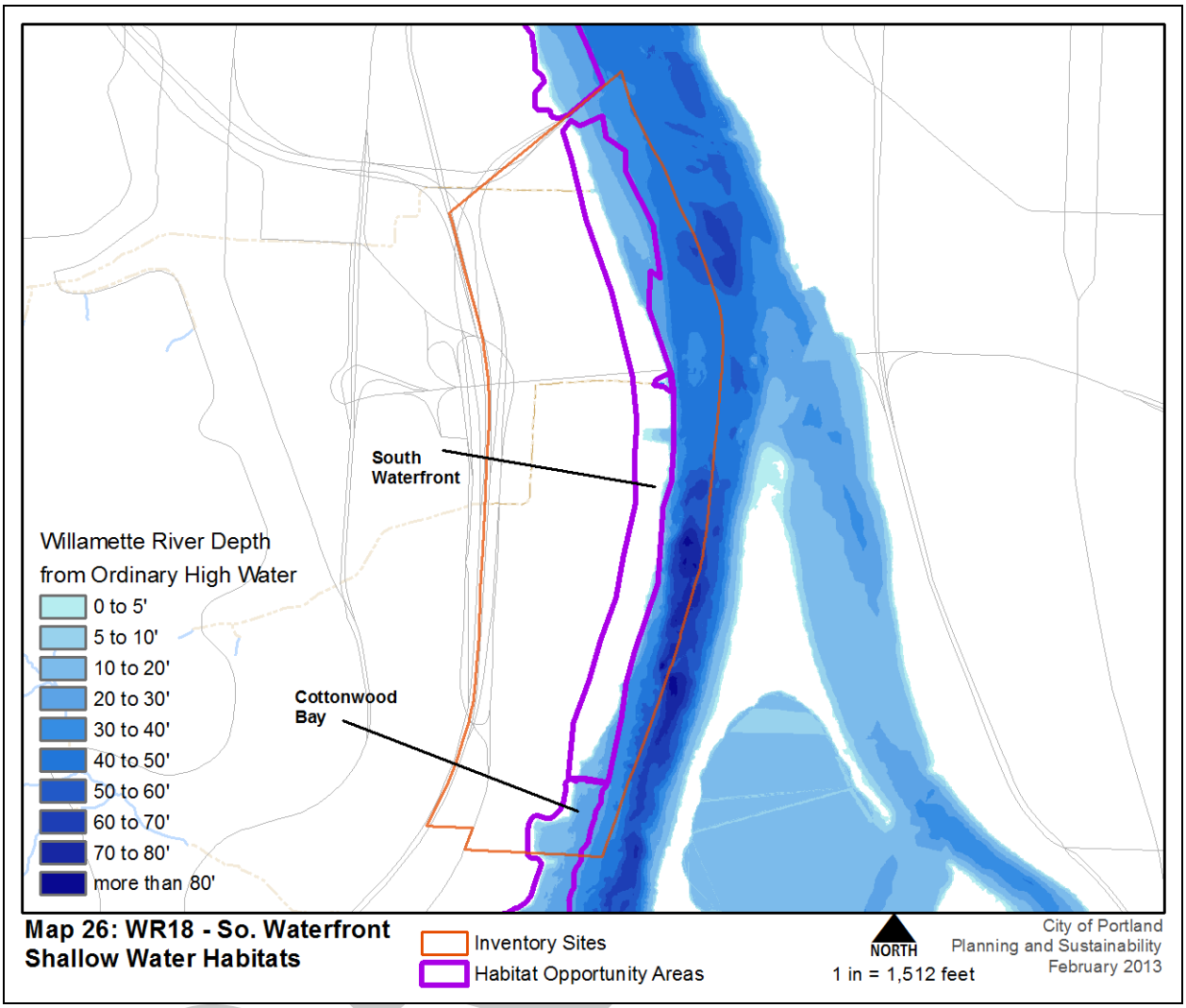
Columbia eulachon pass through the lower Columbia and Willamette Rivers as opportunistic migrants as well. Adults return to their natal river every winter; however, their out-migration timing is not as well documented.

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 the Willamette Falls and the Columbia River confluence describe an abundant population of white sturgeon with multiple age classes present.

There is currently relatively little scientific literature characterizing Pacific lamprey rearing and out migration in the Lower Willamette River. However, the freshwater juvenile rearing stage of Pacific lamprey is known to last between four and seven years, and juvenile Pacific lamprey have repeatedly been found burrowing in Lower Willamette River sediments.

Resident fish assemblages within this reach include both native and non-native species that both support and prey upon native salmonids. These species include natives 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.

There are two notable shallow water habitats in site WR18: (1) South Waterfront and (2) Cottonwood Bay (Map 26).



Map 26: WR18 - So. Waterfront Shallow Water Habitats

South Waterfront stretches over 5,000 feet along the river bank. The banks are a highly varied mix of unclassified fill – concrete, piers and pilings, ramps and riprap. Recently, some bioengineered banks with root wads were installed on in front of the new development. Root wads provide bank stabilization and in-water structure for aquatic species. There is a row of trees along the banks at the Landing at Macadam and at other points along the bank, but this area is otherwise sparsely vegetated and the vegetation is dominated by Himalayan blackberry. A thin strip of shallow water in the southern half widens in the northern half as the thalweg transitions to the eastern side of the river. Much of the river bottom is hard ground with patches of gravelly sand, sandy mud, muddy sand and sand.

white-crowned sparrow

Two projects have recently taken place within the South Waterfront stretch: (1) Zidell Marine Remediation and (2)_South Waterfront Greenway Project.


Zidell

- Zidell Marine Remediation – One hundred years of heavy industry, including ship building and dismantling, left Zidell's 30 acres contaminated with PCBs, asbestos, lead, arsenic and other chemicals. The more than $20 million dollar cleanup targeted 3,000 feet along the Willamette River, capping and removing dangerous contaminants, and re-sloping and replanting the banks. Project elements included capping 16 acres with 154,000 cubic yards of clean fill, including smaller, more fish-friendly rock that made up the top 6 inches of clean fill. Along the banks, 15,000 shrubs and 200 trees were planted. The expected result is a renewed shoreline complete with a 100-foot-wide greenway and restored wildlife habitat. The remediation work took place during the summer of 2011 and was overseen by Oregon Department of Environmental Quality (DEQ).

So. Waterfront Greenway

- South Waterfront Greenway Project – In the summer of 2012, Portland Parks and Recreation began the first phase of a $9.5 million central district greenway project that was born out of the South Waterfront Greenway Development Plan accepted by City Council in 2004. A partnership with TriMet has leveraged the City's $1 million contribution to improve the habitat along the riverbank in order to mitigate the impacts to fish habitat resulting from the Portland-Milwaukee Light Rail Project. This greenway project runs between SW Gibbs Street and Lane Street and will create shallow water fish habitat, stabilize the river banks, plant riparian vegetation, and create wildlife habitat. During Phase I (riverbank restoration), the work elements included: soil and debris excavation; the driving of sheet pile walls that will form the foundations for the SW Whitaker and SW Curry Street overlooks; the installation of vault walls (i.e., a system of interlocking concrete boxes) that shore up the upper portion of the Greenway; and erosion control measures. The water level of the Willamette River did not recede enough this summer to allow for the construction of the shallow water habitat (i.e., the beach) so this work will be done in summer 2013, along with the Phase II work elements. Phase II work elements will be a mixture of upland improvements that will include a combination of lawn, park and plaza areas, with separate paths for bicycles and pedestrians.

Cottonwood Bay spans from the Willamette River Central into South Reach. Cottonwood Bay is one of the larger natural resources areas in the Central/South Reach and provides many riparian corridor and wildlife habitat functions. The larger northern embayment is approximately 1.2 acres in size and the southern embayment is approximately 0.6 acres. The banks are primarily non-vegetated and vegetated riprap with an abandoned concrete boat ramp in the northern embayment. There is a grove of large cottonwoods along the innermost banks of the two embayments. The water within the embayment is shallow, and the bottom is hard ground within the northern embayment, and sand in the southern embayment.

Inventory site WR18 is part of the Pacific Flyway and is utilized by 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 man-made

structures for perching, resting and foraging. Shallow water areas and exposed sand and mud are used by shorebirds and waterfowl. Vegetation on the banks, including trees and shrubs, are used by Neotropical migratory songbirds.

The Lower Willamette River does not meet 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. Oregon Water Quality Index values from 2001 to 2010 for the Lower Willamette River in Portland have been fair and the trend is steady.

Table 22: Water Quality (303(d)) Listings in the Lower Willamette River and Tributaries

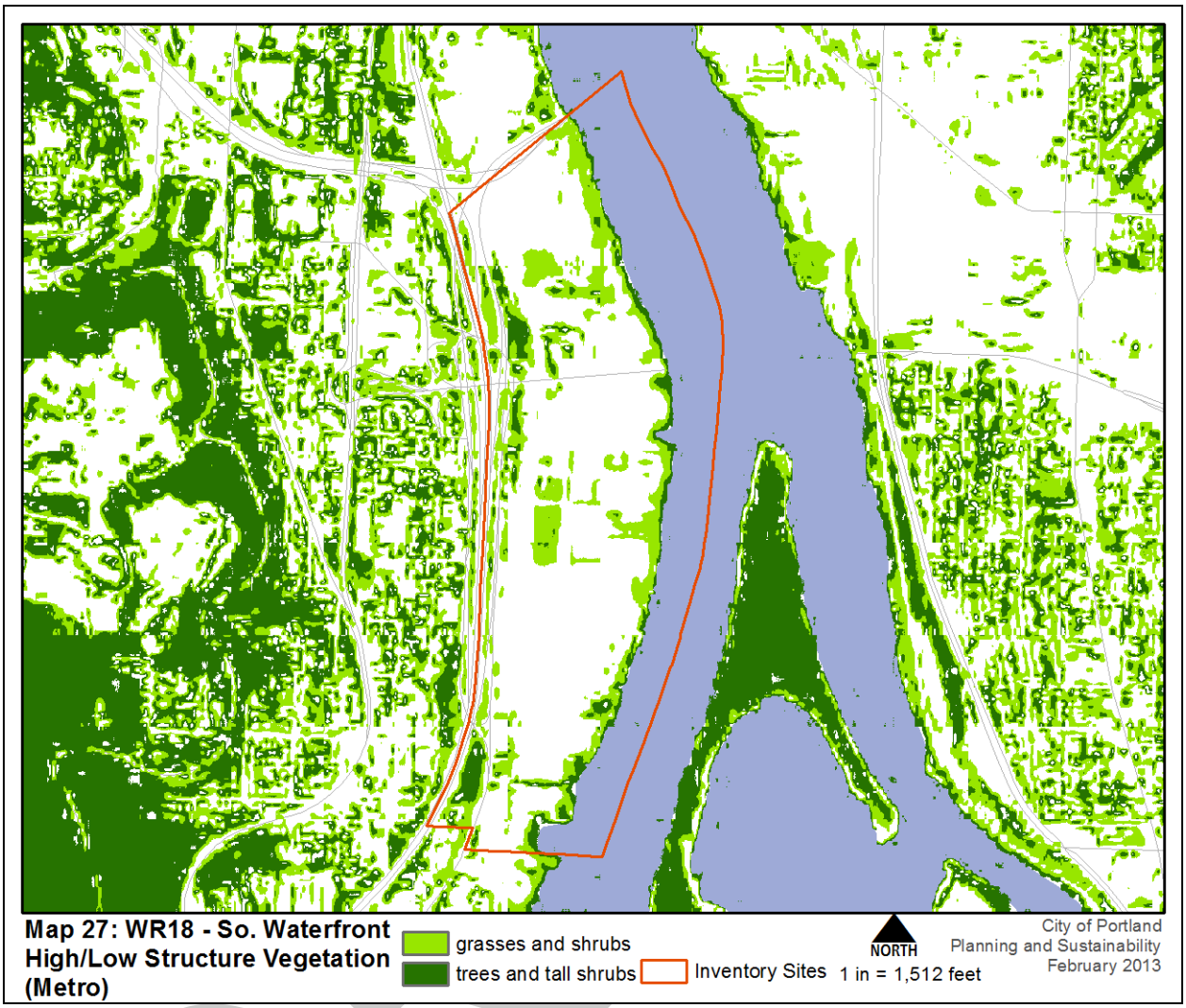
Pollutant	Season	Year River was Listed for this Pollutant	Risk Factors
Pesticides and Toxics (DDT/DDE, Dieldrin, Aldrin, Pentachlorophenol, PCB, PAH)	Year-round	1998, 2002	Fishing, drinking water, resident fish and aquatic life, anadromous fish passage
Heavy Metals (iron, manganese, mercury)	Year-round	1998, 2002	Fishing, drinking water, resident fish and aquatic life, anadromous fish passage
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

Due to the presence of mercury, PCBs, dioxins and mainly legacy pesticides (DDT, dieldrin) in Willamette River fish tissue, a fish advisory for the mainstem recommends that people, especially pregnant or breastfeeding women, limit or avoid consuming fatty fish such as carp, bass and catfish. There is no restriction on the consumption of salmon or steelhead. The Lower Willamette River in Portland is deemed unsafe for swimming during and immediately after sewer overflows as a result of larger storm events. However, since 2011, such overflows are exceedingly rare (about one every three years) during the summer recreating season.

The flood area of the Willamette River spreads out wider in this inventory site than in the rest of the reach. The flood area in South Waterfront is undergoing development, including filling which will reduce the amount of flood capacity. The developed flood plain provides the function of water storage during events like the 1996 flood.

Landscape Vegetation and Street Trees

For purposes of the Natural Resources Inventory mapping and modeling, only vegetation patches at least ½ acre in size are captured. However, smaller landscaped areas and individual street trees also provide functions, including cleaning and cooling the air and water, capturing greenhouse gases, capturing and uptaking stormwater, reducing energy demand and providing wildlife habitat (Map 15: High/Low Structure Vegetation).


Map 27: WR18 - So. Waterfront
High/Low Structure Vegetation
(Metro)
grasses and shrubs
trees and tall shrubs
Inventory Sites
NORTH
1 in = 1,512 feet
City of Portland
Planning and Sustainability
February 2013

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: Project Approach and Methodology Overview and Appendix G: 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 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. High and medium relative functional ranks are assigned to vegetated, non-hardened river banks or flood areas. Low relative ranks are generally assigned to non-vegetated flood area and hardened, non-vegetated river banks.

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 WR18 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:

- 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

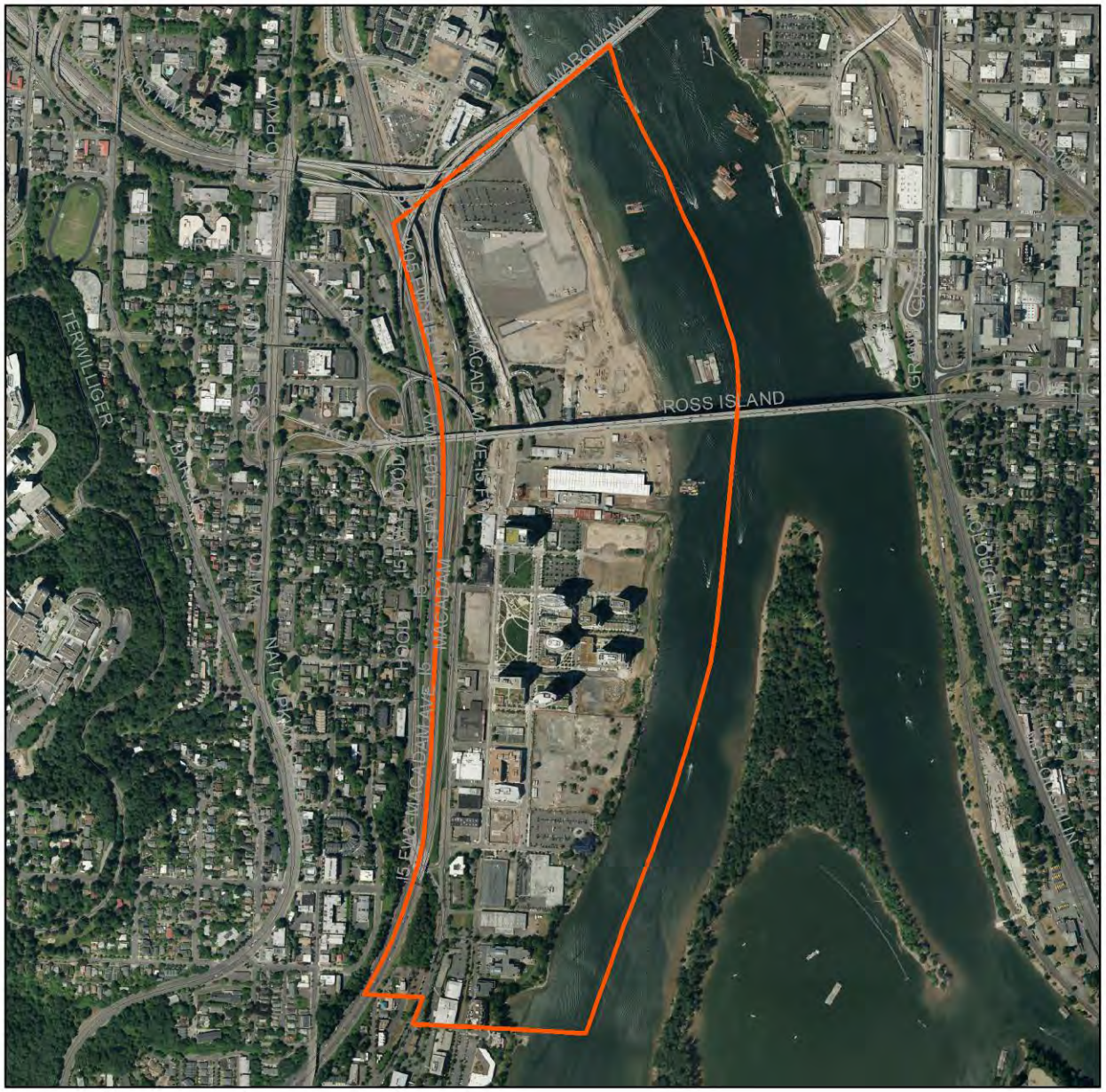
Combined Relative Riparian/Wildlife Habitat Ranking

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 WR18 – South Waterfront

Total Inventory Site = 243				
	High	**Medium**	**Low**	**Total**
Riparian Resources*				
acres	74	14	47	135
percent total inventory site area	30	6	19	55
Wildlife Habitat				
Wildlife Habitat*				
acres	0	0	0	0
percent total inventory site area	0	0	0	0
Special Habitat Areas**				
acres	68			
percent total inventory site area	28			
Wildlife Habitat - adjusted by Special Habitat Areas***				
acres	68	0	0	68
percent total inventory site area	28	0	0	28
Combined Total***				
acres	74	13	47	135
percent total inventory site area	30	6	19	55

* 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.



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WR18 - South Waterfront

Map 1: 2011 Aerial Photography

Legend:

Inventory Sites

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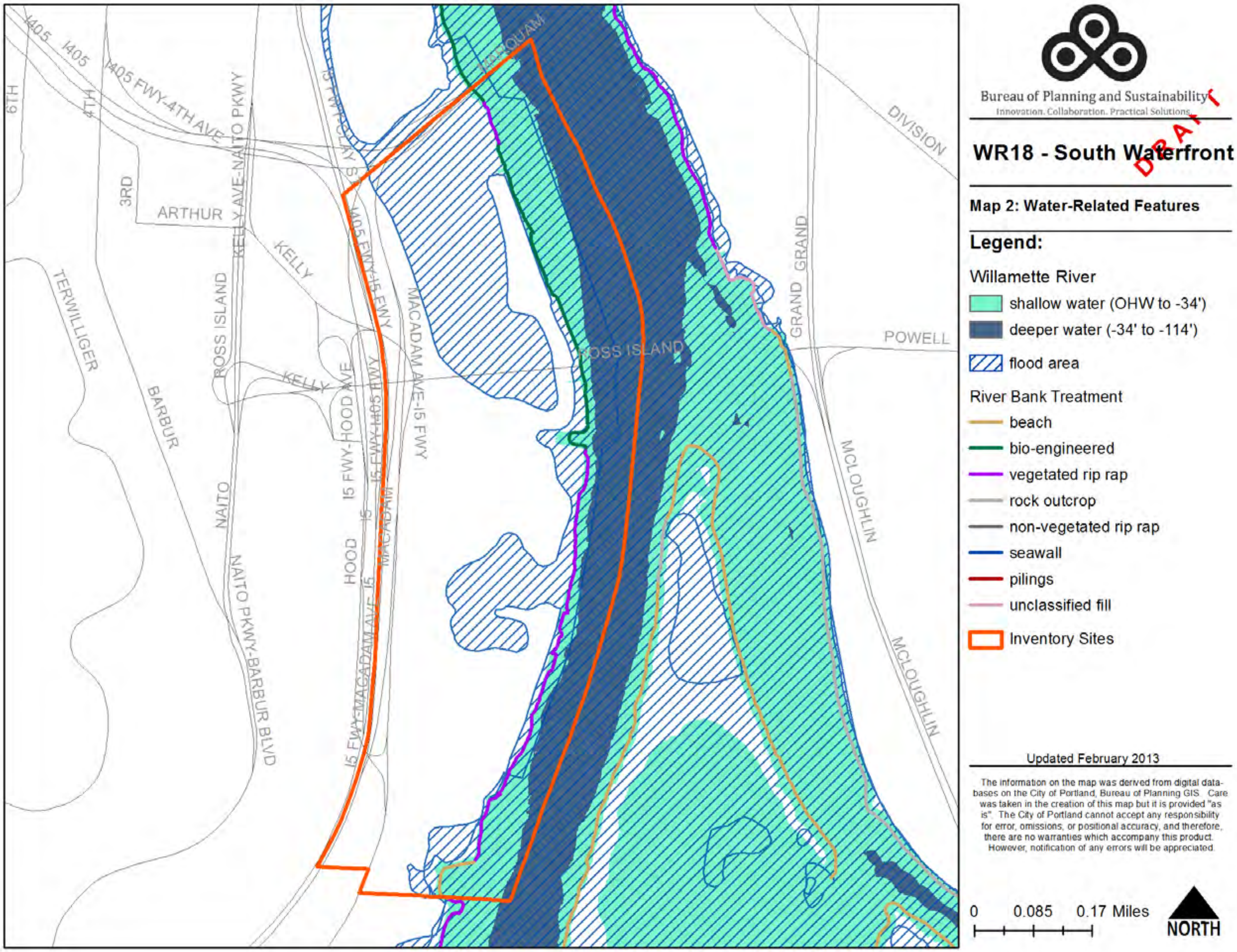
0 0.085 0.17 Miles

NORTH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WR18 - South Waterfront
Map 2: Water-Related Features
Legend:
Willamette River
shallow water (OHW to -34')
deeper water (-34' to -114')
flood area
River Bank Treatment
beach
bio-engineered
vegetated rip rap
rock outcrop
non-vegetated rip rap
seawall
pilings
unclassified fill
Inventory Sites
Updated February 2013
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I405
I405 FWY-4TH AVE
KELLY AVE-NAITO PKWY
6TH
4TH
3RD
ARTHUR
KELLY
TERWILLIGER
ROSS ISLAND
BARBUR
NAITO
NAITO PKWY-BARBUR BLVD
I405 FWY-I5 FWY
I5 FWY-HOOD AVE
I5 FWY-I405 FWY
HOOD
I5
MACADAM
I5 FWY-MACADAM AVE-I5
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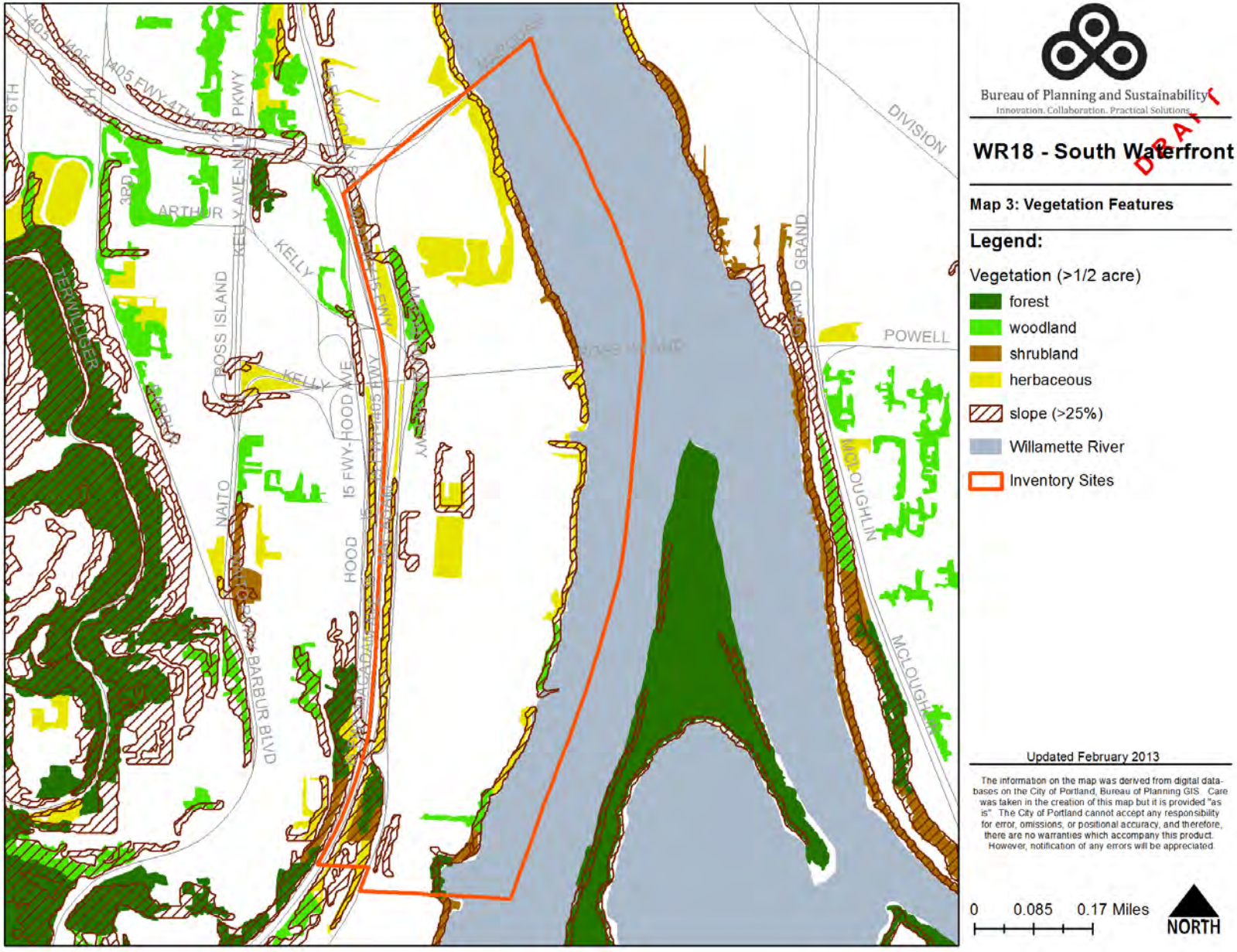
MARQUAM
ROSS ISLAND
DIVISION
GRAND
POWELL
MCLOUGHLIN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WR18 - South Waterfront
Map 3: Vegetation Features
Legend:
Vegetation (>1/2 acre)
forest
woodland
shrubland
herbaceous
slope (>25%)
Willamette River
Inventory Sites
Updated February 2013
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NORTH
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KELLY
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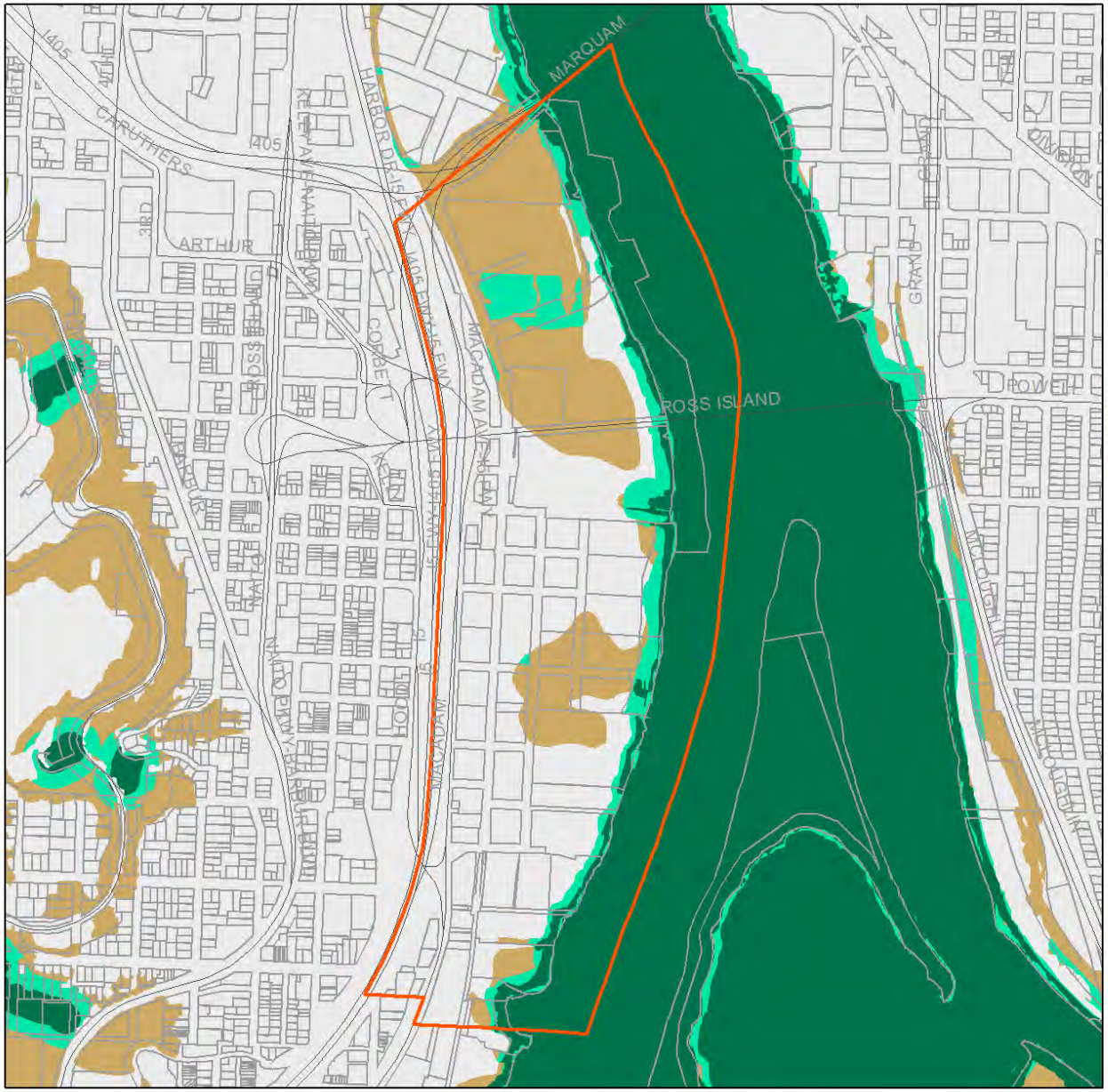
BARBUR BLVD
DIVISION
GRAND
POWELL
MCLOUGHLIN



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WR18 - South Waterfront

Map 4: Riparian Corridors Resources

Legend

- high relative rank
- medium relative rank
- low releative rank
- Inventory Sites

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Updated February 2016

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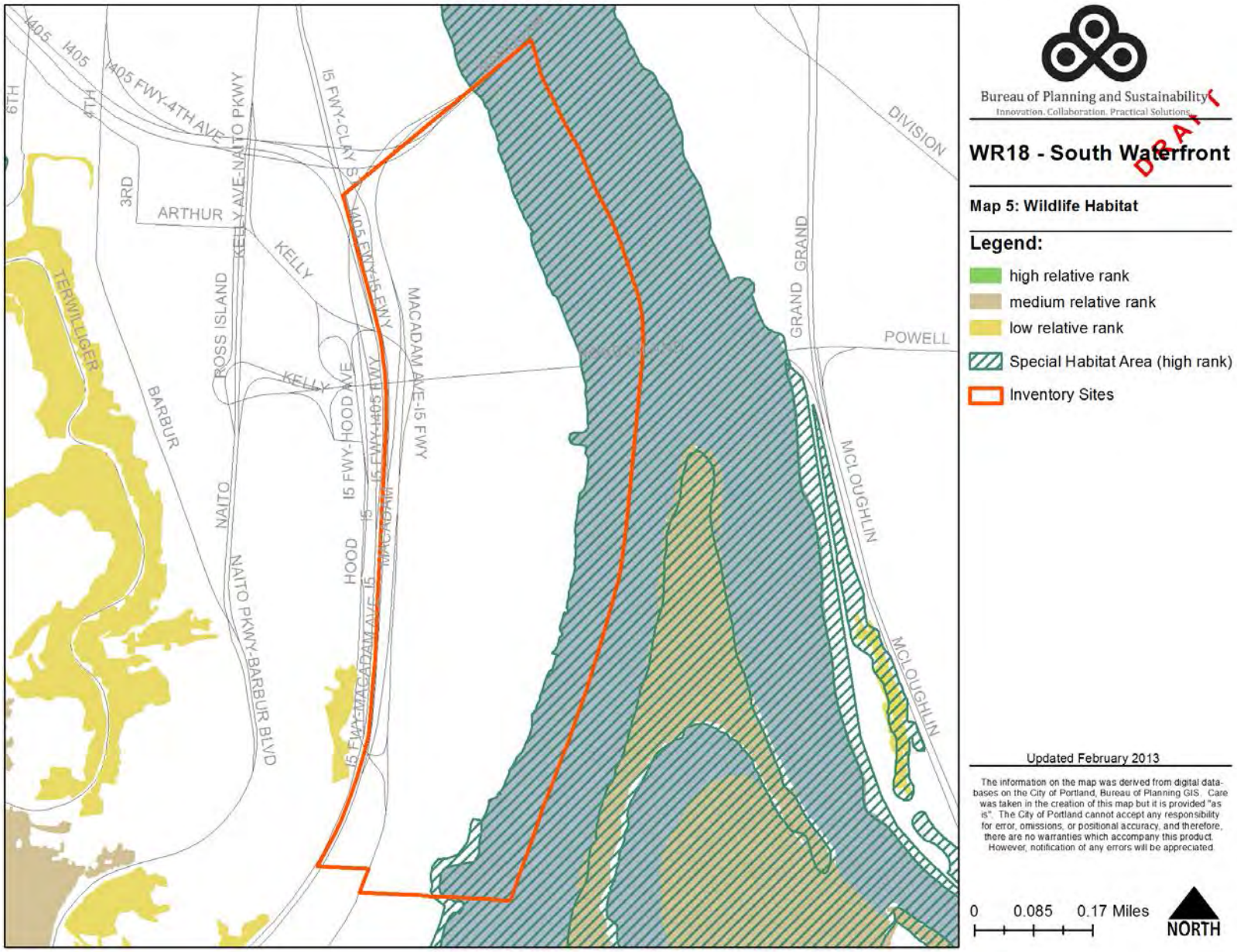
NORTH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WR18 - South Waterfront
Map 5: Wildlife Habitat
Legend:
high relative rank
medium relative rank
low relative rank
Special Habitat Area (high rank)
Inventory Sites
Updated February 2013
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0 0.085 0.17 Miles
NORTH
I405 FWY-4TH AVE
I5 FWY-CLAY ST
I5 FWY-MACADAM AVE
MACADAM AVE-I5 FWY
I5 FWY-HOOD AVE
KELLY AVE-NAITO PKWY
NAITO PKWY-BARBUR BLVD
ARTHUR
KELLY
BARBUR
TERWILLIGER
ROSS ISLAND
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POWELL
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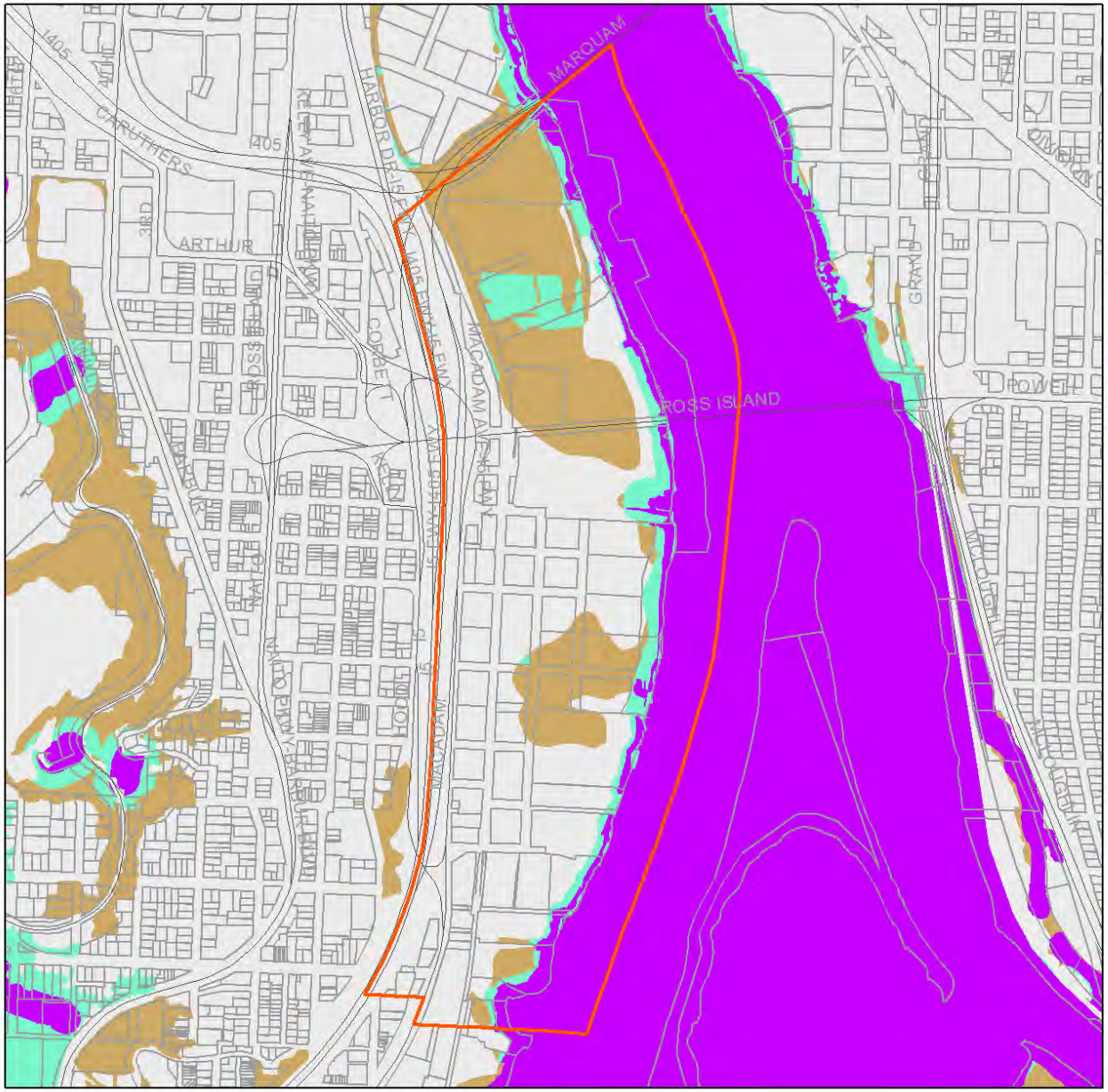

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WR18 - South Waterfront

Map 6: Combined Riparian/Wildlife Relative Ranks

Legend

- high relative rank
- medium relative rank
- low relative rank
- Inventory Sites

DRAFT

Updated February 2016

0 0.085 0.17 Miles

NORTH

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APPENDIX A: PORTLAND WATERSHED MANAGEMENT PLAN, CITY-WIDE GOALS AND OBJECTIVES

(BUREAU OF ENVIRONMENTAL SERVICES, 2006)

Hydrology Goal: Move toward normative stream flow conditions to protect and improve watershed and stream health, channel functions, and public health and safety.

Objectives

Stream Flow and Hydrologic Complexity: Protect and increase rainfall interception areas, create infiltration and detention areas to normalize stream hydrographs, reduce stormwater flow to sewer systems, and reduce basement flooding.

Channel and Floodplain Function: Protect and restore the extent, connectivity, and function of streams, other open drainageways, wetlands, riparian areas and floodplains to improve bank stability and natural hydrologic functions and reduce risk to development and human safety.

Stormwater Conveyance: Maintain stormwater collection and conveyance infrastructure capacity.

Physical Habitat Goal: Protect, enhance, and restore aquatic and terrestrial habitat conditions and support key ecological functions and improved productivity, diversity, capacity, and distribution of native fish and wildlife populations and biological communities.

Objectives

Aquatic Habitat: Protect and improve aquatic, riparian, and floodplain habitat extent, quality, and connectivity that supports the persistence of native fish and wildlife communities.

Terrestrial Habitat: Protect and improve upland habitat extent, quality, and connectivity that support the persistence of native terrestrial communities and connectivity to aquatic and riparian habitat.

Water and Sediment Quality Goal: Protect and improve surface water and groundwater quality to protect public health and support native fish and wildlife populations and biological communities.

Objectives

Stream Temperature: Protect and improve stream temperatures, dissolved oxygen, and pH levels that protect ecological health and achieve applicable water quality standards.

Human Pathogens: Maintain and manage sewer infrastructure and stormwater inputs and runoff to limit sewage overflow and the delivery of pathogens to waterways and achieve applicable water quality and sewer design manual standards.

Urban Pollutants: Manage the sources and transport of urban stormwater and industrial pollutants and nutrients to limit surface water, groundwater, soil, and sediment contamination to levels that protect ecological and human health and achieve applicable water quality standards.

Biological Communities Goals: Protect, enhance, manage and restore native aquatic and terrestrial species and biological communities to improve and maintain biodiversity in Portland's watersheds.

Objectives

Fish and Other Aquatic Organisms: Implement watershed actions to maximize the persistence of native Willamette and Columbia River fish and other aquatic organisms and assist with species recovery and potential population productivity by protecting and improving hydrology, habitat, and water quality.

Terrestrial Wildlife and Vegetation: Implement watershed actions to restore populations of terrestrial organisms to healthy, self-sustaining levels, protect and restore the composition and structure of native vegetation communities, and reduce populations of non-native plants and organisms to levels that do not compete with native species.

APPENDIX B: Regulatory Requirements Memo

Update September 2012

Introduction

There are multiple federal, state and local environmental regulations and requirements that could apply to development actions within the Willamette River and on adjacent lands. Some of those regulations require actions to avoid, minimize or compensate for unavoidable impacts to natural resources. In addition to regulatory requirements, there are guiding policies and goals that go beyond the regulations and are frequently explored during these processes.

The purpose of this memo is to summarize federal, state and local environmental regulations, policies and goals that could likely be triggered by future development impacts to natural resources and to generally describe mitigation requirements that may need to be addressed prior to or during future development. The draft memo is information only and does not have any binding or precedential effect; nor does it reflect decisions or positions of the participants. Actual development impacts and permit requirements cannot be determined until there is a development proposal.

Mitigation in the context of natural resources generally means to avoid, minimize or compensate for negative impacts to natural resource features or functions as a result of a change in land use.

Environmental mitigation, compensatory mitigation, and mitigation banking are terms used to describe projects or programs intended to offset unavoidable impacts to existing natural resources such as streams, wetlands, or endangered species. Environmental mitigation is typically a part of an environmental crediting system established by governing bodies which involves allocating debits and credits. Debits occur in situations where a natural resource may be impaired or destroyed and credits are given in situations where a natural resource has been deemed to be improved or preserved. Therefore, when an entity such as a business or individual is likely to incur a “debit” as a result of a project, the entity is required to develop their “credit” on or very near the development site. In other cases, credits may be purchased from "mitigation banks" which are large mitigation projects established to provide credit to multiple parties in advance of development when such compensation cannot be achieved at the development site or is not seen as sufficiently beneficial to the environment. While not all regulatory schemes describe it as a credit system, they generally follow this approach to satisfy their particular functional regulatory goals.

The remainder of this memo is divided into two sections 1) regulatory requirements to assess impacts on natural resources; and 2) policies and goals for natural resources.

1. Regulatory Requirements

Note: The sequencing of federal and state permits varies depends on the agency and permits needed. For example, if a US Army Corps of Engineers (USACE) permit is required, the USACE will coordinate with other federal agencies and in most cases attach additional conditions and permits/certifications to the USACE permit (e.g., these are commonly the National Marine Fisheries biological opinion and the Oregon Department of Environmental Quality (DEQ) 401 water quality certification, etc.) Some state agency requirements, such as the Oregon State Historic Preservation Office (SHPO) Section 106 requirements, can be added to the USACE permit conditions. The Oregon Department of State Lands can also incorporate DEQ water quality certifications, Oregon Department of Fish and Wildlife fish passage requirements and SHPO conditions into the Removal Fill permit on a case by case.

1.a. Federal Requirements

1.a.1. Clean Water Act (CWA) Section 404 Permit

CWA Section 404 establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. Responsibility for administering and enforcing Section 404 is shared by the US Army Corps of Engineers (USACE) and Environmental Protection Agency (EPA).

Permit review and issuance follow a sequential process that encourages avoidance of impacts first, followed by minimizing impacts and, finally, requiring mitigation for unavoidable impacts to the aquatic environment. This sequence is described in CWA Section 404(b)(1). Only after avoidance and minimization criteria are satisfied can the USACE consider compensatory mitigation. The USACE or EPA has the right to require the developer to mitigate any unavoidable impacts on waters of the United States as a condition of an individual 404 permit. The developer can be required to enhance, restore, or create wetlands or aquatic habitat on or near the development site. In establishing mitigation requirements, the USACE must strive to achieve a goal of no overall net loss of functional values and functions, meaning a minimum of one-for-one functional replacement with an adequate margin of safety to reflect scientific uncertainty. Mitigation banking, using a mitigation bank that has been approved by EPA and the USACE for this purpose, is encouraged.

Common activities that take place in waters of the US and require a federal permit include:
Excavation or dredging in waters of the US

- Channel changes, realignments or relocations;
- Construction of a dock, pier, wharf, seawall, boat ramp, intake or outfall structure;
- Placement of fill, riprap or similar material;
- Placing fill to construct levees, roadways and bridges; and
- Bank or shore stabilization projects including jetties and revetments.

A federal permit is required regardless of the amount of area affected by the activity and amount of fill used. Under the CWA, the EPA and USACE follow the mitigation framework set out in the Section 404(b)(1) guidelines to evaluate applications for Section 404 dredge and fill permits.

The issuance of this permit is a federal action that triggers consultation with National Marine Fisheries Services (NMFS) under the Endangered Species Act, tribal governments, US Fish and Wildlife Services USFWS) and historic preservation delegated to State Historic Preservation Office (SHPO). (See also Oregon Department of State Lands Removal-Fill Permit).

http://water.epa.gov/lawsregs/guidance/wetlands/sec404.cfm

1.a.2. Clean Water Act Section 401 Certification

Section 401 of the federal Clean Water Act (CWA) requires that any federal license or permit to conduct an activity that may result in a discharge to waters of the United States must first receive a water quality certification from the state in which the activity will occur. In Oregon, the Department of Environmental Quality (DEQ) is the agency responsible for reviewing proposed projects under this requirement.

A federal permit is required to conduct any activity, including, but not limited to, the construction or operation of facilities which may result in any discharge into navigable waters. Federal permits that are most frequently subject to Section 401 water quality certification include CWA Section 402 (NPDES) permits issued by EPA, Section 404 (dredge and fill) permits issued by the USACE, and Rivers and Harbors Act (RHA) Section 9 and 10 permits issued by the USACE.

There is no compensatory mitigation required under CWA Section 401. However, because water quality certifications are attached to the USACE permit, conditions accompanying Section 401 certifications may be included in the USACE permit conditions. These conditions generally include monitoring and reporting requirements to help the state determine whether water quality is being degraded and may halt

operations if conditions are not met during permitted activities, and allows for assessment of the effect of operational practices and conditions on water quality to help shape future certification decisions and conditions.

http://water.epa.gov/lawsregs/guidance/wetlands/sec401.cfm

1.a.2. National Environmental Policy Act (NEPA)

In enacting NEPA, Congress recognized that nearly all federal activities affect the environment in some way and mandated that before federal agencies make decisions, they must consider the effects of their actions on the quality of the human environment. Under NEPA, the Council on Environmental Quality was established to work with agencies to balance environmental, economic, and social objectives in pursuit of NEPA's goal of "productive harmony" between humans and the human environment (42 U.S.C. §4331(a)). NEPA assigns CEQ the task of ensuring that federal agencies meet their obligations under the Act. CEQ NEPA regulations require an analysis of environmental impacts and, if necessary, identification

CEQs regulations (40 C.F.R. Parts 1500-1508) set the standard for NEPA compliance. They also require agencies to create their own NEPA implementing procedures. These procedures must meet the CEQ standard while reflecting each agency's mandate and mission. The NEPA analysis bears similarities with other federal agencies review requirements and can be used to inform review under the Endangered Species Act and National Historic Preservation Act, Executive Orders on Environmental Justice, and other Federal, State, tribal, and local laws and regulations.

The NEPA process begins when a federal agency proposes to take an action, which may include rule making, regulations, plans, funding or specific projects (40 C.F.R. § 1508.18). For example, Department of Transportation funding for a bridge or rail improvement is an action that would trigger the NEPA process. NEPA requirements. The NEPA process is begun when an action or project is at 10% design. A concept plan, which may not be the preferred design by which permits are acquired, is not considered a 10% design and the NEPA process would not start.

Under NEPA, the agency determines whether the action is a Categorical Exclusion (CE) or if additional analysis is necessary. To perform an analysis, the applicant must identify the purpose and need of the action and alternatives that meet the purpose and needs. Through an Environmental Assessment (EA) or Environmental Impact Statement (EIS), the applicant identifies measures that will be taken to mitigate (avoid, minimize or compensate for) environmental impacts.

The EIS process includes a statement of purpose/need, identification of alternative solutions (including no action), and impacts of the preferred alternative. The Draft EIS is published for public review and comment for a minimum of 45 days. The agency must considers all substantive comments, conduct further analysis if necessary, and prepare a Final EIS, which is available for public review for 30 days. This review period must be completed before the agency makes a decision on the proposed action. The EIS process ends with the completion of a Record of Decision. The ROD explains the agency's decision, describes the alternatives the agency considered (including the environmentally preferred alternative), and discusses plans for mitigating potential environmental effects and monitoring those commitments.

http://www.epa.gov/compliance/nepa/index.html

1.a.4 Endangered Species Act

NOAA National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) use the Federal Endangered Species Act (ESA) to protect species including many listed species found in the Willamette River. NMFS is responsible for protecting salmon and other ocean-migrating fish, as well as marine animals. USFWS is responsible for protecting wildlife, bird species and inland (primarily freshwater) fish such as bull trout and coastal cutthroat trout. Currently, salmon species and trout are federally listed and present in the Central Reach.

Under Section 7 of the ESA, federal agencies must use their authorities to protect listed species and habitats that are critical to their survival. Section 7 also requires federal agencies to ensure that their actions, including any actions they authorize, fund or carry out, do not jeopardize listed species or destroy or adversely modify their critical habitat.

NMFS and USFWS designate "critical habitat" for species that are listed under the ESA. "Critical habitat" is the "specific areas within the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of this Act, on which are found those physical or biological considerations or protection." NMFS has designated critical habitat for most of their species that are listed under the ESA that may be found in the Central Reach. For several species, it extends 300' from the top of bank, for others to top of bank.

Section 7 requires all federal agencies, including the US Army Corps of Engineers (USACE), to assess whether federally listed threatened or endangered species and/or critical habitat may be affected by a project under their jurisdiction. The USACE requires the applicant to prepare a Biological Assessment to evaluate if such an effect is possible, and if it is, are required to consult with USFWS and/or NMFS before approving a permit that might affect species in these ways. This process is called "consultation". This serves as consultation for the Magnuson-Stevens Act on Essential Fish Habitat (see E below).

If no impacts on federally listed threatened or endangered species and/or critical habitat are found to be associated with the proposed project, the USACE will be able to issue a permit without consultation.

If there will be adverse effects to listed species or critical habitat, consultation with NMFS is required. NMFS evaluates the project as proposed for its impacts to ESA listed species. If NMFS determines that the project will not result in jeopardy to the species it will issue an "Incidental Take Statement" that includes reasonable and prudent measures with terms and conditions to minimize incidental take. If NMFS finds that the project will result in jeopardy to the species it will provide a "reasonable and prudent alternative" that would not result in jeopardy.

If the project design and implementation plan are deemed adequate, the USACE issue a permit to the applicant. The permit may include conditions to avoid, minimize, and compensate for expected impacts of the project. Conditions are designed to protect water quality, fish and wildlife and their habitats, and adjacent properties.

Section 9 of the ESA states that no one may "take" an animal that is listed as endangered. "Take" includes the harassment, harm, pursuit, hunting, shooting, wounding, killing, trapping, capture, or collection of any threatened or endangered species. "Harm" may include habitat modification that results in the death or injury of a listed species. This is referred to as a "take prohibition". For species listed as threatened, Section 4(d) of the ESA (referred to as the "4(d) rules") requires NMFS to issue rules that citizens, organizations and governments must follow in order to protect the species. The rules may include any or all of the general take prohibitions that apply to endangered species. By regulation, NMFS applies take prohibitions to all threatened species (except plants) at the time of listing or later. The ESA provides some exceptions to general take prohibitions and 4(d) rules, and under section 10 landowners can obtain permits for work that incidentally affects listed species (Incidental Take Permit). These permits can only be issued for:

- Scientific work;
- Projects designed to enhance the survival of the species; or
- Activities that may only incrementally take or harm species during the course of the work.

Incidental Take Permits require development of a Habitat Conservation Plan (HCP) that specifies how impacts to a listed species and its habitat will be minimized. In issuing Incidental Take Permits, USFWS and NMFS must comply with the NEPA as well as state and local environmental laws. For these reasons, HCPs also require an Environmental Assessment or Environmental Impact Statement for the proposed activity.

http://www.mrsc.org/Subjects/Environment/esa/esa-bioass.aspx
http://www.nmfs.noaa.gov/pr/laws/esa/

1.a.5. Magnuson-Stevens Act – Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act is the federal law that governs U.S. marine fisheries management. In 1996 Congress added new habitat conservation provisions to that act in recognition of the importance of fish habitat to productivity and sustainability of U.S. marine fisheries. The re-named Magnuson-Stevens Act mandated identification of Essential Fish Habitat for managed species. The act also requires measures to conserve and enhance the habitat needed by fish to carry out their life cycles. Essential Fish Habitat (EFH) for the Pacific salmon means those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem. The definition for EFH includes currently viable aquatic habitat and most of the habitat historically accessible to Pacific Salmon.

The federal agency taking an action can use existing processes to support EFH consultations. For example, as part of ESA Section 7, NMFS and USFWS consult on the conservation of species and assist the agency taking an action to meet their responsibilities under Section 7. This serves as consultation for the Magnuson-Stevens Act on EFH. NMFS/USFWS would evaluate the effects of the action, determine jeopardy and adverse habitat modification and estimate incidental take and issues a take permit if necessary.

http://www.nwr.noaa.gov/Salmon-Habitat/Salmon-EFH/

1.a.7. Federal Emergency Management Agency Flood Plain Management

The Federal Emergency Management Agency (FEMA) manages the National Flood Insurance Program (NFIP) which includes regulatory components for floodplain management, floodplain mapping and flood insurance. The NFIP floodplain management regulations (44 CFR 60) are implemented through local jurisdictions. The City of Portland's local floodplain ordinance is found in Portland City Code 24.50. FEMA identifies the Nation's floodplains and publishes Flood Insurance Rate Maps (FIRMs), which depict the floodplain data. FEMA maps the area that has a 1% chance of being flooded in any given year. This establishes the 100-year floodplain, which is the standard used by the NFIP and most federal and state agencies for floodplain management and to determine the need for flood insurance. FEMA most recently updated the FIRMs for Willamette River in 2009.

The principal regulatory requirements for development in the 100-year floodplain include, but are not limited to, the following:

- Development within the Floodway is prohibited unless hydraulic engineering analysis demonstrates the development will result in no increase in 100-year flood elevations. The
- Floodway is the channel of the watercourse and that portion of the adjacent floodplain that must remain open for passage of the 100-year flood without significantly increasing flood elevations. Floodway boundaries are depicted on the FIRMs.
- Occupied or inhabited structures must be built at least one foot above the 100-year flood elevation. This is often achieved by placing fill within the 100-year floodplain to raise the ground elevation and allow development in that area. Other site improvements such as parking or exterior storage, may be below the base flood elevation.
- Fill material placed below the 100-year flood elevation must be balanced with an equal or greater volume of excavation below the 100-year flood elevation such that the flood storage capacity of the floodplain in maintained; this is often referred to as flood storage compensation or "balanced cut and fill". (See also Metro Title 3.)

FEMA is undergoing consultation with NMFS under ESA to evaluate the impacts of the NFIP on listed salmon species in Oregon. This consultation may result in additional regulations and changes in how the NFIP is implemented in Oregon. A similar consultation in Washington has resulted in changes in how the NFIP is implemented there.

http://www.fema.gov/plan/prevent/floodplain/nfipkeywords/permit.shtm

1.a.8. Rivers and Harbors Act of 1899

The Rivers and Harbors Acts address projects and activities in navigable waters and harbor and river improvements. The USACE administers Section 9 and Section 10 of the Rivers and Harbors Act.

Section 9 of the Rivers and Harbors Act (33 U.S.C. 401) prohibits the construction of any dam or dike across any navigable water of the United States in the absence of Congressional consent and approval of the plans by the Chief of Engineers and the Secretary of the USACE. Section 9 also pertains to bridges and causeways; however, the authority of the USACE is transferred to the Secretary of Transportation under the Department of Transportation Act.

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters, is unlawful unless the work has been recommended and authorized by USACE. This work includes excavation or fill, which could contain contaminated sediments. (See also NPDES permits.)

http://el.erdc.usace.army.mil/emrrp/emris/emrishelp5/rivers_and_harbors_acts_legal_matters.htm

1.a.9. Marine Mammal Protection Act, 1972

The Marine Mammal Protection Act (MMPA) is intended to conserve marine mammals. All marine mammals are protected under the MMPA. The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S.

The implementation of the MMPA is divided between two federal departments. The Department of Commerce, which NMFS is part of, is charged with protection of cetaceans and pinnipeds other than walrus. The Department of the Interior, USFWS, is responsible for all other marine mammals, including sea otter, walrus, polar bear, dugong and manatee.

http://www.nmfs.noaa.gov/pr/laws/mmpa/

1.b. State Requirements

1.b.1. Oregon Department of State Lands Removal-Fill Permit

In Oregon, a state permit issued by the Department of State Lands (DSL) is required if activities involve filling or removing more than 50 cubic yards of material in waters of the state. In areas determined to be Essential Salmonid Habitat or a State Scenic Waterway a permit is required for any amount of fill or removal. DSL regulates all wetlands, including isolated or ephemeral wetlands.

Currently, DSL and the USACE use a joint permit application form, so that in many cases applicants need to prepare only one application to obtain both permits. However, all projects require separate authorizations (or permits) from DSL and the USACE, and each agency may request information in addition to the application.

The analysis for the permit must include a purpose and need statement and each alternative must meet the purpose and need. If the alternative chosen includes unavoidable impacts to natural resources, then the analysis includes an evaluation of how impacts can be minimized and if compensatory mitigation is necessary. Compensatory mitigation means activities conducted to restore, create or enhance wetland and

waterway impacts (tidal and non-tidal) to compensate for the adverse effects of the project. The ecological functions (biotic and abiotic) that are impacted by the project must be replaced. In addition to determining which ecological functions should be replaced, DSL uses ratios for spatial considerations; ratios are specific to the restoration, creation, or enhancement types of compensatory mitigation.
DSL prefers mitigation within the same watershed; payment in lieu of mitigation may be possible or by acquiring mitigation credits from a DSL approved mitigation bank.

http://www.oregon.gov/DSL/PERMITS/r-fintro.shtml

1.b.2. National Pollutant Discharge Elimination System (NPDES)
As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. In Oregon, the NPDES permit program is administered by Oregon Department of Environmental Quality (DEQ).

The NPDES 1200-C, 1200-CN and 1200-CA general permits apply to construction activities including clearing, grading, excavation, materials or equipment staging and stockpiling that will disturb one or more acres of land. These permits also apply to construction activities that will disturb less than one acre that are part of a common plan of development or sale, if the larger common plan of development or sale will ultimately disturb one acre or more. In addition, DEQ may require registration for any other construction activity based on the potential for contribution to an excursion of a water quality standard or potential for significant contribution of pollutants to waters of the state.

DEQ issues stormwater discharge permits to industries that discharge stormwater into rivers, lakes and streams from pipes, outfalls or other point sources at a site. Based on federal regulations, NPDES permit coverage is required for industrial facilities that discharge stormwater from their industrial areas to surface waters of the state, or to storm drains that discharge to surface waters. Examples of industrial activities that require a permit include manufacturing, transportation, mining, and steam electric power industries, as well as scrap yards, landfills, certain sewage treatment plants, and hazardous waste management facilities.

A municipal separate storm sewer system (MS4) is a conveyance or system of conveyances (e.g., roads with drainage systems, municipal streets, catch basins, curbs, gutters, manmade channels or storm drains) owned or operated by a governmental entity that discharges to waters of the state. Sources that need to obtain an MS4 permit are classified as either "Phase I" or "Phase II". Phase I MS4s are those with populations greater than 100,000, while regulated Phase II (or "small") MS4s serve populations less than 100,000 located within Census Bureau-defined Urbanized Areas.

http://www.deq.state.or.us/wq/stormwater/stormwater.htm

1.b.3. Oregon Waterway Authorization Program
The Oregon Department of State Lands (DSL) is responsible for establishing rules controlling public use of submerged and submersible land underlying state-owned waterways. State-owned waterways are navigable waterways below ordinary high water. Many uses of and structures occupying state-owned waterways require DSL's written approval. Types of uses that require authorization include but are not limited to:

1. Waterway Lease for commercial and non-commercial marina/moorages, industrial, non-marine uses, floating homes, and large (more than 2,500 square feet) non-commercial docks, and boathouses
2. Waterway Structure Registration for non-commercial docks, and boathouses under 2,500 square feet.

3. Waterway Registration of a structure that is actively and exclusively used to accommodate ships, boats, or vessels engaged exclusively in the receipt and discharge of goods or merchandise, or in the performance of active government functions on the waterway
4. Public Facility License for public agency owned, operated, and maintained docks/floats, boat ramps, boat landings, floating restrooms, navigational aids, and viewing structures with no, or a nominal, fee.

Note: DSL plans to convene a rules advisory committee in Fall 2011 to assess the valuation of state owned submerged and submersible lands.

http://oregonstatelands.us/DSL/NAV/index.shtml

1.b.4. Oregon Department of Fish and Wildlife – Fish Passage

In Oregon, providing fish passage over man-made dams and diversions has been required since before statehood in 1859. Fish passage statutes have evolved over the past 150 years. In 2001, House Bill 3002 (HB 3002), which addresses fish passage at artificial obstructions, was signed into law.

As a state policy, upstream and downstream passage is required at all artificial obstructions in Oregon waters where migratory native fish are currently or have historically been present, except under certain clearly defined circumstances. Overwater structures, such as a dock or pier, would be evaluated under this rule.

HB 3002 requires the Oregon Department of Fish and Wildlife (ODFW) to complete and maintain a statewide inventory of artificial obstructions, which will be used to prioritize artificial barriers. The primary method for implementing this policy should be through active collaboration and cooperation between the ODFW and owners or operators of artificial obstructions. HB 3002 provides the Fish and Wildlife Commission with emergency authority to require installation of fish passage at the owner/operator's expense if a population of native migratory fish is adversely impacted.

The ODFW will review fish passage in consultation to the DSL permit. ODFW also establishes the in-water work windows.

http://www.dfw.state.or.us/fish/passage/

1.b.5. Archeological Review Oregon Parks and Recreation Department: Heritage Programs: State Historic Preservation Office (SHPO)

A number of federal and state laws protect Oregon's historic properties, such as archaeological sites, historic structures, and other cultural resources. Any state water-related permit must take into account the effects of the applicant's activities on historic properties. When a state agency permits an activity that may affect cultural resources, the agency must consult with the SHPO.

SHPO Archaeological Services´ staff assists state agencies and their applicants in protecting historic properties in Oregon. This consideration process involves a series of steps:

1. Identify if any historic properties exist within the project area;
2. If there are historic properties, evaluate the eligibility of the historic properties and determine the effects the proposed project will have on those properties; and
3. If the project will have a negative impact on a significant historic property, explore alternatives to avoid, minimize, or mitigate the effects.

Historic properties include all Native American cairns and graves and associated cultural items in Oregon protected under The Native American Graves and Protected Objects State Law (Indian Graves and Protected Objects (ORS 97.740-97.760). Historic properties also include archaeological sites 75 years of age or older, and items of significance and cultural patrimony (ORS 358.905-358.955)

The Scenic Waterways Law (ORS 390.805-390.925) establishes a state policy that protects historic and archaeological sites that are located adjacent to designated scenic waterways (i.e., rivers or lakes) from destruction due to the building of dams, construction, mining, etc., and provides tax incentives to private land owners who agree to restrict their use of such lands.

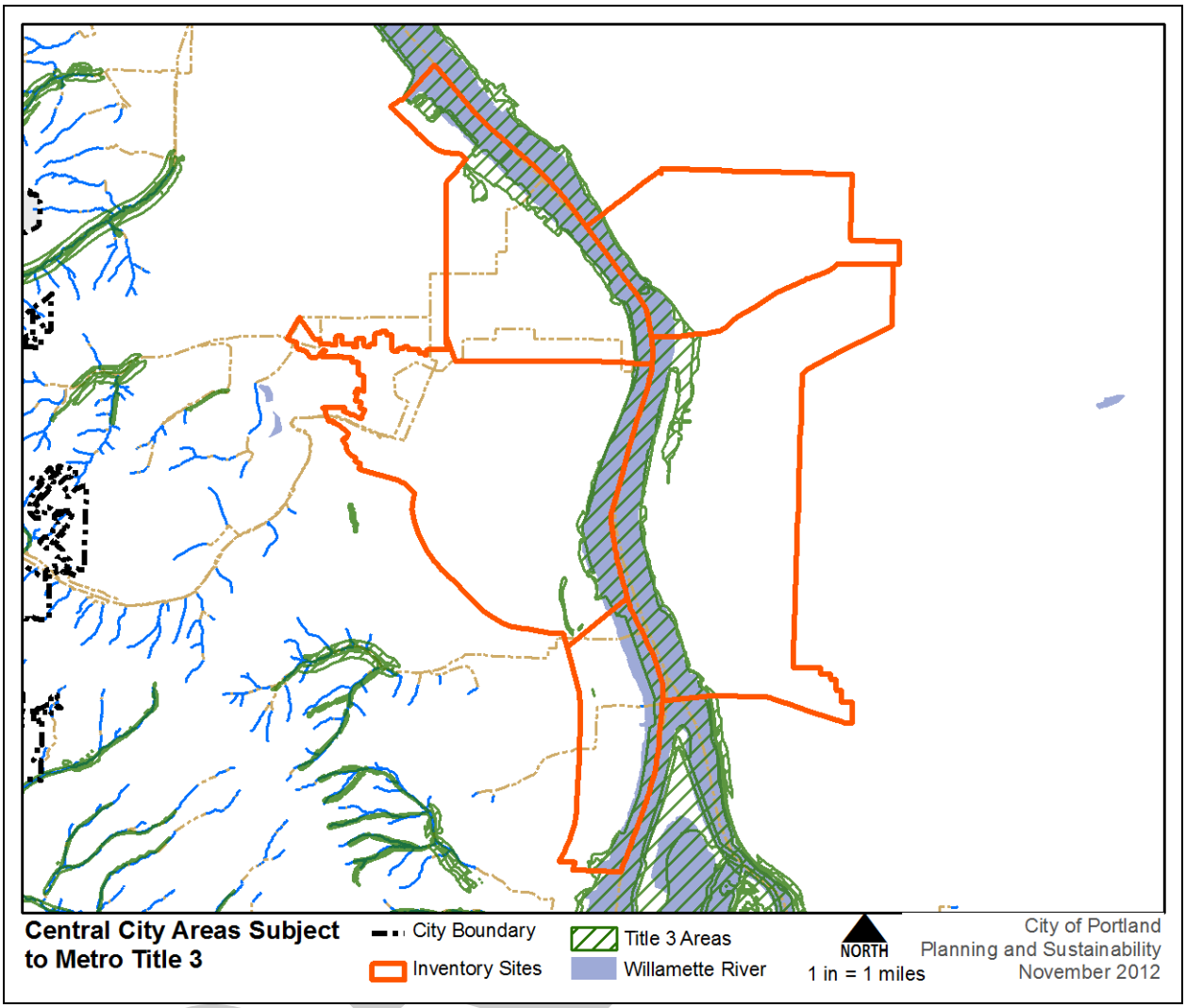
http://www.oregon.gov/OPRD/HCD/ARCH/index.shtml

1.c. Local Requirements

1.c.1. Metro Titles 3 and 13

Metro's Urban Growth Management Functional Plan was adopted in the 1990's to provide a regional approach to growth management by tailoring several key state planning goals to meet regional population growth expectations. The Plan includes nine titles that are derived from or relate to state planning goals (the rest are procedural). Of the nine titles, Titles 3 and 13 pertain most directly to natural resources management and watershed health.

Title 3 (Water Quality, Flood Management, and Fish and Wildlife Conservation) was established to protect the region's health and public safety by reducing flood and landslide hazards, controlling soil erosion, and reducing pollution of the region's waterways (note: fish and wildlife conservation was ultimately addressed in Title 13 as described below). Title 3 contains performance standards related to streams, rivers and wetlands to protect and enhance water quality. It establishes and maps Water Quality Resource Areas (WQRA) along rivers, streams and wetlands, with a designated width of generally 25 feet, unless slopes exceed 25% in which case the width increases to 200 feet. The performance standards are intended to prevent encroachment into vegetated corridors along these water bodies, require erosion and sediment control, planting of native vegetation along stream banks when development occurs, and prohibit storage of new uses of uncontained hazardous materials in any WQRA. Title 3 also established and mapped Flood Hazard Management Areas, and a regional requirement for balanced cut and fill in areas identified on Title 3 maps.



Title 13 (Nature in the Neighborhoods) was established to conserve, protect and restore a continuous ecologically viable streamside corridor system that is integrated with upland wildlife habitat and the surrounding urban landscape, and to control and prevent water pollution. Metro completed the required process to comply with State Land Use Planning Goal 5 in developing the Nature in the Neighborhoods Program. They first developed an inventory of regionally significant riparian corridors called Class I and Class II corridors and wildlife habitat based on a scientific assessment of functional values. Then, Metro completed an ESEE analysis to assess the tradeoffs of protecting or not protecting the resources identified in the inventory. Based on this ESEE analysis, Metro determined to allow and to limit some conflicting uses, but not to prohibit any conflicting uses; thereby establishing different levels of protection for significant fish and wildlife habitat based on habitat quality and urban development potential. The resulting High, Moderate and Low Habitat Conservation Areas (HCA) are protected through a tiered approach outlined in Title 13. Within the Urban Growth Boundary, Habitat Conservation Areas were only developed for areas designated in the inventory as Class I or Class II riparian corridors.

The City of Portland will be required to demonstrate that its comprehensive plan and implementing ordinances that the City is maintaining compliance with Title 3 and are in substantial compliance with Title 13. The City may establish regulatory and non-regulatory mechanisms to protect, conserve and restore significant riparian corridors and fish and wildlife habitat in the Central Reach and may establish regulatory protections for areas Metro has designated as HCA without conducting a local ESEE analysis. Metro designated the Willamette River a high HCA and the riparian area a mix of low, moderate and high HCA under Title 13.

http://www.oregonmetro.gov/index.cfm/go/by.web/id=274

1.c.2. City of Portland Title 33: Environmental Zoning Program

Chapter 33.430 of the City of Portland Planning and Zoning code establishes environmental protection zones within the City. The City follows the Goal 5 steps: inventory existing natural resource, conduct an ESEE analysis and apply a program to conserve and protect significant resources.

Through the City's ESEE analysis, conflicting uses (aka development) are either allowed, limited, or strictly limited. (The City generally does not prohibit conflicting uses.) The limit decision is typically applied through a conservation overlay zone. Within conservation overlay zones, proposed development must avoid and minimize impacts to natural resources and mitigate for unavoidable impacts. The strictly limit decision is applied through a protection overlay zone. Within the protection overlay zone, development is not allowed unless it is needed for access or if the public benefits outweigh the negative impacts to the natural resources; mitigation for unavoidable impacts is required.

Where development is proposed within the overlay zone the applicant must meet the zoning code chapter 33.430. The proposal will be reviewed by the City using either an Environmental Plan Check or an Environmental Review procedure. The Environmental Review procedure will require a greater level of environmental impact analysis than is required for the Plan Check, with detailed environmental studies needed to support the analysis. Proposed development location and design will need to be justified, and mitigation is required to replace lost environmental resources. Depending on the degree of significance of the potential impacts, mitigation may be required in either the resource area of an Environmental Conservation Zone or the resource area of an Environmental Protection Zone. A mitigation plan must be developed and is subject to land use review by the Bureau of Development Services. The mitigation plan includes:

- Identification of the resources and functional values to be restored, created, or enhanced on the mitigation site;
- Documentation of coordination with appropriate local, regional, special district, state and federal regulatory agencies;
- Construction timetables;
- Operations and maintenance practices;
- Monitoring and evaluation procedures;
- Remedial actions for unsuccessful mitigation; and
- Information showing compliance with Section 33.248.090, Mitigation and Restoration Plantings.

http://www.portlandonline.com/auditor/index.cfm?c=28197&a=53343

1.c.3. Legal Agreements as an Alternative Mitigation Tool

As part of a legislative process to refine or apply the City's Environmental Program, the City may consider legal agreements to supplement the requirements of environmental overlay zones within the project area. These agreements are appropriate for large parcels of land under a single ownership that contain diverse, extensive and/or unique natural resource areas and for which a legal agreement would better achieve the goals of the City and compliance with other relevant regulations and goals for natural resources. *Note: Legal Agreements cannot be used to comply with Metro Title 13 or State Land Use Goal 5.*

These agreements offer a customized approach to natural resource protection and mitigation for a specific site. The agreement can be designed to achieve a similar or better level of resource protection and mitigation as would have been achieved using an environmental overlay zone. It could also involve different types of approaches than would typically be achieved through implementing the overlay zone e.g., off-site mitigation or "out-of-kind" mitigation.

The City has used two legal agreement mechanisms in the recent past:

1. Development agreements between the City and a private property owner; or

2. Intergovernmental Agreements, or IGAs, between public agencies.

These types of agreements can be preferable to the environmental overlay zones because they provide certainty to the property owner, City and public. The agreement can eliminate the need to review and identify mitigation requirements for each individual project on a large site. An agreement generally contains monitoring and maintenance requirements for the life of the agreement, which provides certainty to the City and the community that resource protection and mitigation will be carried out and has the best chance of being successful.

It should be noted that these types of agreements are a relatively new tool within the City, and there is no established code to guide their development or use. During recent city planning projects including River Plan and Airport Futures, a combination of environmental overlay zones/codes and agreements, were adopted as part of an overall package to protect and manage natural resources. The Airport Futures agreement resulted in a full mitigation program that would replace nearly 300 acres of upland grassland prior to development and contained a commitment by the Port of Portland to fund watershed enhancement for the next 20 years.

1.c.4. City of Portland Title 11: Trees

The new tree code will be implemented starting in February 2013. The rules apply to trees that are not addressed through the environmental overlay zone regulations (City of Portland Title 33). The tree rules will encourage preservation of large healthy trees and ensure that trees are routinely planted as new development takes place.

http://www.portlandonline.com/bps/index.cfm?a=350786&c=54923

1.c.5. City of Portland Stormwater Management Manual

The Stormwater Management Manual (SWMM) is a technical document originally adopted in 1999 that outlines the City's stormwater management requirements to comply with the National Pollution Discharge Elimination System (NPDES) permit and Safe Drinking Water Act. The SWMM was recently updated 2010. The requirements defined in the manual apply to all development and redevelopment projects within the City of Portland on both private and public property. The SWMM applies to the following:

- Properties that proposed new offsite discharges or new connections to the public system; or
- Projects that develop or redevelop over 500 square feet of impervious area.

The City's approach to stormwater management emphasizes the use of vegetated surface facilities to treat and infiltrate stormwater on the property where the stormwater is created. This approach provides a number of benefits in protecting stormwater infrastructure and improving watershed health, including pollutant reduction, volume and peak flow reduction, and groundwater recharge. If an entity cannot meet the requirement for managing stormwater onsite to the maximum extent feasible, the City may allow the entity to either construct an offsite facility or compensate the City for the future development of offsite facilities through payment of a fee. In this case, a filing of "special circumstances" must be done by the applicant, which will be reviewed and approved by the City before an alternative approach would be allowed.

The SWMM complements and supports the City's Portland Watershed Management Plan, System Plan, Revegetation Program, Sustainable Stormwater Program, and other City standards and practices.

http://www.portlandonline.com/bes/index.cfm?c=47954

1.c.6. City of Portland Streamlining Agreement

While not a regulation in and of itself, the City of Portland has a signed agreement with federal agencies that agrees to a shared and cooperative streamlining process for federal ESA consultations. This

streamlining agreement process was extended to state and local agencies in 2006 to ensure better coordination and communication between all permitting and consulting agencies.

A Streamlining Team consisting of all participating federal, state and local agencies was created along with standard operating protocols with the purpose of sharing of information needed by the agencies for their review and approval of the proposed activity. In addition to assisting City project teams, the procedures are designed to improve coordination and communication among the agencies. Through this approach, the hoped for outcome is consistent decisions between the agencies and that agency decisions will occur within the same time period whenever possible.

The streamlining agreement was originally designed to facilitate the permitting of city sponsored projects. The process has been extended to private and other public entities whenever it is determined that the City has a strong interest or connection with the proposal.

Projects that participate in the streamlining process must present a purpose and need statement and a range of alternatives to meet the project's goals, including looking at the practicable alternative with the least impacts to natural resources. If the selected option has unavoidable impacts to natural resources, mitigation requirements can also be identified early in the process. The Corps, DSL and BDS require that a mitigation sequence be explored which generally includes analyzing the following options: Avoidance, Minimize, Mitigate (Compensatory or In-kind functional replacement).

2. Guiding Policies and Goals

The following policies do not have specific requirements that pertain to analysis of environmental impacts and potential mitigation, but provide guidance or context that can inform selection of mitigation actions by the regulatory agencies.

2.a. Federal Policies and Goals

2.a.1. The Migratory Bird Treaty Act and the Urban Conservation Treaty for Migratory Birds Program

The Migratory Bird Treaty Act (MBTA), passed in 1918, established the United States' commitment to implement four bilateral treaties, or conventions, for the protection of a shared migratory bird resource. The MBTA protects over 800 species of birds. Over 200 migratory bird species migrate through Portland every year, and Portland provides critical resting, feeding and nesting habitat for numerous types of migratory and resident birds.

The MBTA uses very broad language to prohibit at any time or in any manner the pursuit, hunting, taking, capturing or killing of any migratory bird. It does not have an incidental take permit or its equivalent. The unauthorized killing of any of approximately 800 identified migratory birds constitutes a violation of the MBTA. The MBTA has no specific mitigation requirements. It is enforced by USFWS, although its enforcement is viewed as somewhat selective because of MBTA's expansive scope. The MTBA's applicability to habitat modification and destruction is unclear; the definition of "take" in the MBTA does not include "harm" or "harass", unlike the ESA. Due diligence with MTBA requirements is typically done by providing baseline studies and preconstruction surveys that document site characteristics and development of a protection plan for species known to be present.

Portland joined four other U.S. cities in 2003 in establishing a local commitment to help migratory birds and enhance their habitats within urban environments by participating in the Urban Conservation Treaty for Migratory Birds program. USFWS selected Portland as a pilot project city due to its location along the Pacific Flyway. The program was designed by USFWS in 1999 to help municipal governments conserve migratory birds that nest or fly through their cities. The Treaty sponsors public education and outreach projects to help increase public understanding of the importance of migratory bird conservation. It also helps finance the creation and restoration of city parks and greenways. Portland has developed guidelines for protecting migratory birds during construction activities.

http://www.fws.gov/pacific/migratorybirds/mbta.htm
http://www.portlandonline.com/bes/index.cfm?c=51502&

2.a.2. Environmental Protection Agency (EPA) Strategic Plan

The EPA Strategic Plan has multiple goals including taking action of climate change, improving air quality, protection US waters, clean-up, sustainable development, preventing pollution and enforcing environmental laws. The Columbia River basin is one area specific addressed in the Strategic Plan.

EPA Region 10 is working closely with the States of Oregon, Washington, Idaho, Columbia Basin tribal governments, the Lower Columbia River Estuary Partnership, local governments, citizen groups, industry, and other federal agencies to develop and implement a collaborative strategy to assess and reduce toxics in fish and water in the Columbia River Basin, including it's tributaries, and to restore and protect habitat.

http://www.epa.gov/planandbudget/strategicplan.html
http://www.epa.gov/water/waterplan

2.b. State Policies and Goals

2.b.1. State Land Use Goal 5

Cities and counties in Oregon have been required to comply with the nineteen Statewide Land Use Planning Goals since 1975 by adopting, implementing and maintaining local comprehensive plans. Portland adopted its first comprehensive plan in 1981, and is currently updating this plan. Goal 5 governs Natural Resources, Scenic and Historic Areas, and Open Spaces. The Goal 5 process follows three steps. The first step is to inventory significant natural resources, and identify the location, extent, quantity and quality of significant natural resources in the area. If a resource or site is deemed significant, the local government has three policy choices: to preserve the resource and prohibit conflicting uses; fully allow proposed uses that conflict with the resources; or establish a balance between protecting natural resources and allowing uses that conflict with the resource.

The second step of the Goal 5 process is to complete an economic, social, environmental and energy (ESEE) analysis. The ESEE analysis involves evaluating the tradeoffs associated with different levels of natural resource protection. This evaluation involves identifying the consequences of allowing, limiting or prohibiting conflicting uses in areas containing significant natural resources. Common impacts of conflicting uses include activities such as clearing vegetation; grading, excavation, filling and soil compaction; adding impervious surfaces; modifying streams, rivers, and floodplains; generating pollution; landscaping with non-native and/or invasive vegetation; building fences and other wildlife barriers; and other impacts such as activities that create noise and light, or introduce litter or domestic pets. The rule requires that this analysis be completed before actions are taken to protect or not protect natural resources.

The third step of the Goal 5 process is to adopt a program, which will define how and under what circumstances the local program will protect significant natural resources. Portland's existing Goal 5 program including environmental overlay zone (See "City of Portland Environmental Zoning Program" below) as well as other regulatory and non-regulatory tools.

http://www.oregon.gov/LCD/docs/goals/goal5.pdf

2.b.2. State Land Use Goals 6 and 7

Goal 6, Air, Water, and Land Resources Quality requires local comprehensive plans and implementing measures to be consistent with state and federal regulations on matters such as stream quality and groundwater pollution. Goal 7 deals with development in places subject to natural hazards such as floods or landslides. It requires that jurisdictions apply "appropriate safeguards" (floodplain zoning, for example) when planning for development. The City of Portland's existing Environmental Program, including the environmental overlay zones, was deemed in compliance with Goals 6 and 7 in 2002. (See also Metro Title 3.)

http://www.oregon.gov/LCD/docs/goals/goal6.pdf
http://www.oregon.gov/LCD/docs/goals/goal7.pdf

2.b.3. The Oregon Conservation Strategy

The Oregon Conservation Strategy (the Strategy) is a non-regulatory, statewide approach to species and habitat conservation. The Strategy provides a framework for limited conservation resources, to leverage investments in a more efficient and effective manner. The Strategy was developed by the Oregon Department of Fish and Wildlife (ODFW) in conjunction with a broad base of stakeholders, including, federal, state, and local agency personnel, biologists, citizens, and elected officials. A primary goal of the Strategy is to help recover currently listed species and prevent additional species listings. The approach

taken by ODFW in the Strategy is to identify "Strategy Species" which include those most in need of conservation, and "Strategy Habitats" which benefit a broad suite of species and map Conservation Opportunity Areas (COAs) for those habitat areas where conservation activities would have the greatest benefit.

Actions recommended in the Strategy include; protect and maintain priority habitats where they remain, restore and expand to improve conditions and value to fish and wildlife, protect and restore river floodplain interactions, and control invasive species.

http://www.dfw.state.or.us/conservationstrategy/

2.b.4. Columbia River Estuary ESA Recovery Plan Module for Salmon and Steelhead

NOAA NMFS released the Columbia River Estuary ESA Recovery Plan Module in January 2010 to serve as the basis of estuary recovery actions for ESA-listed salmon and steelhead in the Columbia River Basin. It is part of a larger, regional planning effort to develop recovery plans for these species, and it will be incorporated into individual recovery plans for the Columbia Basin salmon evolutionary significant units (ESUs) and steelhead distinct population segments (DPSs) by reference.

http://www.nwr.noaa.gov/Salmon-Recovery-Planning/ESA-Recovery-Plans/Estuary-Module.cfm
http://www.lcrep.org/esa-recovery-planning

2.c. Local Policies and Goals

2.c.1. Urban Forestry Management Plan/Tree Project

The Urban Forestry Management Plan (UFMP, last updated in 2004) provides direction for the maintenance and improvement of Portland's urban forest and makes recommendations to enhance and improve the urban forest now and for the future. Its three main goals are:

- Protect, preserve, restore and expand Portland's urban forest;
- Develop and maintain support for the urban forest; and
- Manage the urban forest to maximize benefits for all residents.

Specifically, it responds to recent environmental mandates, clarifies resource management and authority, better coordinates the roles of different agencies and bureaus, and provides canopy targets. It divides Portland's urban forest into five basic categories called Urban Land Environments (ULEs). Each ULE has particular physical characteristics and issues, provides various benefits and serves different needs. Each ULE is managed by different bureaus, agencies or individuals to achieve different results. The UFMP provides a description of each ULE, management goals, information about property owners/managers, and an analysis of the strengths, weaknesses, opportunities, threats and issues for the ULE. This is followed by specific objectives, recommended actions, and performance measures for assessing progress. An implementing document for the UFMP, the Urban Forest Action Plan was developed by an interbureau committee and accepted by City Council in 2007 to ensure attainment of the goals and recommendations of the UFMP. The Action Plan describes the full array of benefits and services that trees provide across the urban landscape. The prioritized actions are those that can be done by City of Portland bureaus; achieving all of the UFMP's goals will require participation from private organizations, individuals, and other public agencies.

http://www.portlandonline.com/parks/index.cfm?a=226238&c=38294

2.c.2. Portland Watershed Management Plan

The Portland Watershed Management Plan, adopted by City Council in 2005, describes the approach that will be used to evaluate conditions in the City's urban watersheds and implement projects to protect and improve watershed health. The approach is used by the Bureau of Environmental Services, other City

bureaus, agencies, and citizens' groups that all share a common goal to protect Portland's natural resources, restore critical ecosystems, and implement stormwater management solutions that integrate the urban area with the natural environment. Its overarching theme is to improve watershed health through new watershed friendly (more sustainable) development and redevelopment, installation of new stormwater infrastructure, maintenance and retrofitting of existing infrastructure in new ways that will improve watershed health, and extensive restoration and rehabilitation of key habitats both in-water and routine work of all City bureaus.

The Watershed Management Plan presents an integrated City response to local, state, and federal environmental requirements, providing the flexibility to respond to regulatory requirements in a manner that addresses the root causes of problems rather than the more traditional mandate-by-mandate approach that only addresses the symptoms. The Watershed Management Plan includes description of a management system that is used to track City progress toward well-defined watershed health goals, and to help the City adapt their strategies as needed to maximize effectiveness. An annual report is developed that tracks the progress toward achievement of the watershed health goals.

The Watershed Management Plan includes strategies and actions that will be implemented to achieve these goals. There are a number of related initiatives, including the River Plan and the Willamette River Natural Resources Inventory that advance the goals, strategies and actions of the Watershed Management Plan.

http://www.portlandonline.com/bes/index.cfm?c=38965

2.c.3. Terrestrial Ecology Enhancement Strategy (TEES)

The purpose of the TEES is to have a common body of information and agreed-upon priorities for conservation and restoration of terrestrial plant and animal species and habitats in Portland, within a regional and state context. The TEES is designed to help achieve the watershed health goals and objectives in the Portland Watershed Management Plan (PWMP).

The information assembled during the development of the TEES (updated June 2011) is available to BES watershed teams to supplement existing watershed characterizations; inform the selection and prioritization of actions; add value to projects and other actions; determine monitoring priorities; and support and inform the Grey to Green (G2G) project. The TEES work also supports and informs an array of other City programs, plans, activities, projects, and decision-making processes, including the Portland Plan update, environmental regulatory improvement, parks and natural area management, and local bond share land acquisition.

In addition, the TEES supports efforts of Metro (e.g., Nature in Neighborhoods, Intertwine and the Regional Conservation Strategy), the U.S. Fish and Wildlife Service, the Oregon Department of Fish and Wildlife (e.g., the Oregon Conservation Strategy), the Oregon Watershed Enhancement Board, and the Northwest Power and Conservation Council's sub-basin planning.

The main elements of the TEES include:

- Identification of plant and animal species and terrestrial habitats needing protection, conservation, and/or restoration (Special Status Species and Habitats)
- Identification of key management issues (e.g., invasive species)
- Articulation of watershed-specific objectives for terrestrial habitats and biological communities
- Identification and implementation of priorities and actions for the next 2 to 5 years, as well as identification of long-term actions
- Guidance to City bureaus and citizens for improving habitat and addressing plant and wildlife management issues
- Selection of species and habitats to be monitored over time to determine the health of biological communities in Portland's urban watersheds

http://www.portlandonline.com/bes/fish/index.cfm?c=51052

APPENDIX C: Special Habitat Area Criteria

Code	Criteria
P	Area contains sensitive or unique plant populations
W	Wetlands and associated seeps, springs and streams that are part of the wetland complex
O	Native oak
B	Bottomland hardwood forest
I	Riverine island
D	River delta
M	Migratory stopover habitat
C	Corridor between patches or habitats
S	An *at risk* wildlife species uses the habitat area or feature on more than incidental basis to complete one or more life history stages
E	Elk migratory corridor
G	Upland habitat or landscape feature important to individual grassland-associated species or assemblages of grassland-associated species on more than an incidental basis
U	Resource or structure that provides critical or unique habitat function in natural or built environments (such as bridges or street trees)

P - Area contains sensitive or unique plant species

This criterion applies to areas containing the following plant species:

1. Those listed by USFWS or NOAA Fisheries as Endangered, Threatened, Proposed Endangered, or Proposed Threatened under the Endangered Species Act or by the ODA or ODFW under the
2. Oregon Endangered Species Act; OR
3. Species that receive an Oregon Natural Heritage rank 1, 2 or 3
   a. 1 = Critically imperiled because of extreme rarity or especially vulnerable to extinction or extirpation
   b. 2 = Imperiled because of extreme rarity or especially vulnerable to extinction or extirpation
   c. 3 = Rare, uncommon or threatened, but not immediately imperiled

Not included are plant populations that are listed by USFWS/NOAA or ODA/ODFW as Candidate Taxa or Species of Concern, unless the plant population received an Oregon Natural Heritage rank of 1-3 or is a wetland indicator species. Also not included are those plant populations that received an Oregon Natural Heritage rank of 4 = not rare and apparently secure, but with cause for long-term concern, or 5 = demonstrably widespread and secure.

W – Wetlands and associated seeps, springs and streams that are part of a wetland complex

This criterion applies to selected wetlands, and associated seeps, springs and streams that provide critical watershed functions (i.e., water quality, hydrology, wildlife habitat, etc.) and are increasingly rare within Portland. SHAs include primarily those wetlands that:

1. Are connected to a stream or flood area;
2. Are part of a larger resource area, such as a wetland located within or adjacent to a forest; or
3. Provide connectivity between other high value habitats.

This criterion may incorporate constructed wetlands where the purpose of the wetland includes providing fish and wildlife habitat. Upland wetlands that are very small and are surrounded by development or intense land uses, such as golf courses, and certain water quality facilities are generally not designated as SHAs.

O – Native oak
The native oak criterion applies to areas that contain Oregon white oaks. Other tree species and vegetation, including invasive plants such as Himalayan blackberries, may be present.

B – Bottomland hardwood forest
This criterion applies to selected areas that contain remnant bottomland hardwood. Not all bottomland hardwood forests in the city are designated as a SHA. To be designated, an area must be considered unique, rare or declining within a particular watershed.

I – Riverine island
This criterion applies to islands or the portions of riverine islands that provide habitat for shorebirds, waterfowl, terns, gulls, Bald Eagles, river otter and other river/island-associated resident and/or migrating wildlife species. Beaches, mudflats, shoals and areas of large wood deposits are included along with other relevant resource features.

D – River delta
This criterion applies to river deltas that provide habitat for shorebirds, waterfowl, terns and gulls, Bald Eagles or other wildlife. The area shall contain beaches, mudflats and/or large wood deposits.

M – Migratory stopover habitat
This criterion is applied to vegetated areas and other landscape features (e.g., buttes) where use by migratory bird species has been documented, or is reasonably expected to occur, on more than an incidental basis. The criterion applies to areas that:
1. Provide nesting opportunities;
2. Provide food and resting opportunities;
3. Provide sufficient cover to reduce predation; and
4. Support a diverse assemblage or high concentration of migratory species

On more than an incidental basis means the identified species is documented to repeatedly or periodically use the habitat or feature.

Reasonably expected to occur generally applies to resource features that typically provide the functions listed above (e.g., buttes, ridge-topes/high elevation features, wetlands, mudflats, riparian areas or focal sites) and where local or regional technical experts state such uses by migratory birds is expected based on existing information or observations.

C – Corridor between patches or habitats
This criterion applies to vegetated areas that:
1. Provide connectivity between high value habitats including other Special Habitat Areas;
2. Provide connectivity between water bodies, riparian areas and upland habitats; or
3. Extend outward from another SHA to provide a wildlife movement corridor.

S – An *at risk* wildlife species uses the habitat area or feature on more than incidental basis to complete one or more life history stages
This criterion applies to areas with documented use by the following wildlife species (see Appendix 2: Special Status Fish and Wildlife Species in Portland):
1. Species listed by USFWS or NOAA Fisheries as:
    a. LE - Listed Endangered
    b. LT - Listed Threatened
    c. PE - Proposed Endangered
    d. PT - Proposed Threatened
    e. SoC - Species of Concern
    f. C - Candidate

g. Includes areas designated as Critical Habitats by NOAA Fisheries

2. Species Listed by Oregon Department of Agriculture (ODA) or ODFW as:
   a. LE - Listed Endangered
   b. LT - Listed Threatened
   c. SC - Critical
   d. SV - Vulnerable
3. Species that received an Oregon Natural Heritage rank or list 1, 2 or 3.
   a. 1 = Critically imperiled because of extreme rarity or especially vulnerable to extinction or extirpation
   b. 2 = Imperiled because of extreme rarity or especially vulnerable to extinction or extirpation
   c. 3 = Rare, uncommon or threatened, but not immediately imperiled;

Life cycle phases include but are not limited to:

- courtship, nesting, breeding
- rearing young, juvenile development (e.g. noise, light)
- feeding, foraging, hunting
- resting, basking, perching
- cover/protection from predators or disturbances
- dispersal, migration, migratory stopover
- over-wintering

This criterion may apply to individuals that make up a local population, pairs, colonies or a regional population.

On more than an incidental basis means the identified species is documented to repeatedly or periodically use the habitat or feature.

E – Elk migratory corridor

This criterion is applied to areas that ODFW has designated as elk migratory corridors.

G – Upland habitat or landscape feature important to individual grassland-associated species or assemblages of grassland-associated species on more than an incidental basis

This criterion is applied to areas that contain vegetative structure, topography or soil substrates that provide functions similar to a native meadow, prairie or grassland and where use by grassland-associated wildlife species has been documented. This criterion is also applied to areas that:

1. Are part of a larger resource area, such as a grassy area located adjacent to a forest;
2. Provide connectivity between other high value habitats; or
3. Extend outward from an SHA to provide a wildlife movement corridor.

For the purposes of the G criterion, grassland-associated species include:

- Deer Mouse
- Gray-tailed Vole
- Camas Pocket Gopher
- Red Fox
- Oregon Vesper Sparrow
- Savannah Sparrow
- Western Meadowlark
- White-tailed Kite
- Short-eared Owl
- Streaked Horned Lark
- Northern Harrier
- American Kestrel
- Common Nighthawk
- Chipping Sparrow

On more than an incidental basis means the identified species is documented to repeatedly or periodically use the habitat or feature.

U – Resource or structure that provides critical or unique habitat function in natural or built environments
This criterion applies to resources or structures that are generally not accounted for by other criteria, and that provide a documented critical or unique habitat function. Examples include: bridges, chimneys, rock outcrops, groundwater upwelling areas, and street trees.

Note: Special Habitat Areas have been designated based on documented information about specific sites or areas. In addition, some of the SHAs reflect specific watershed conditions.

APPENDIX E: Site Visit Assessments

WR14: Lloyd District
Date: 4/27/11
Surveyors: KK, MB, MP, SB

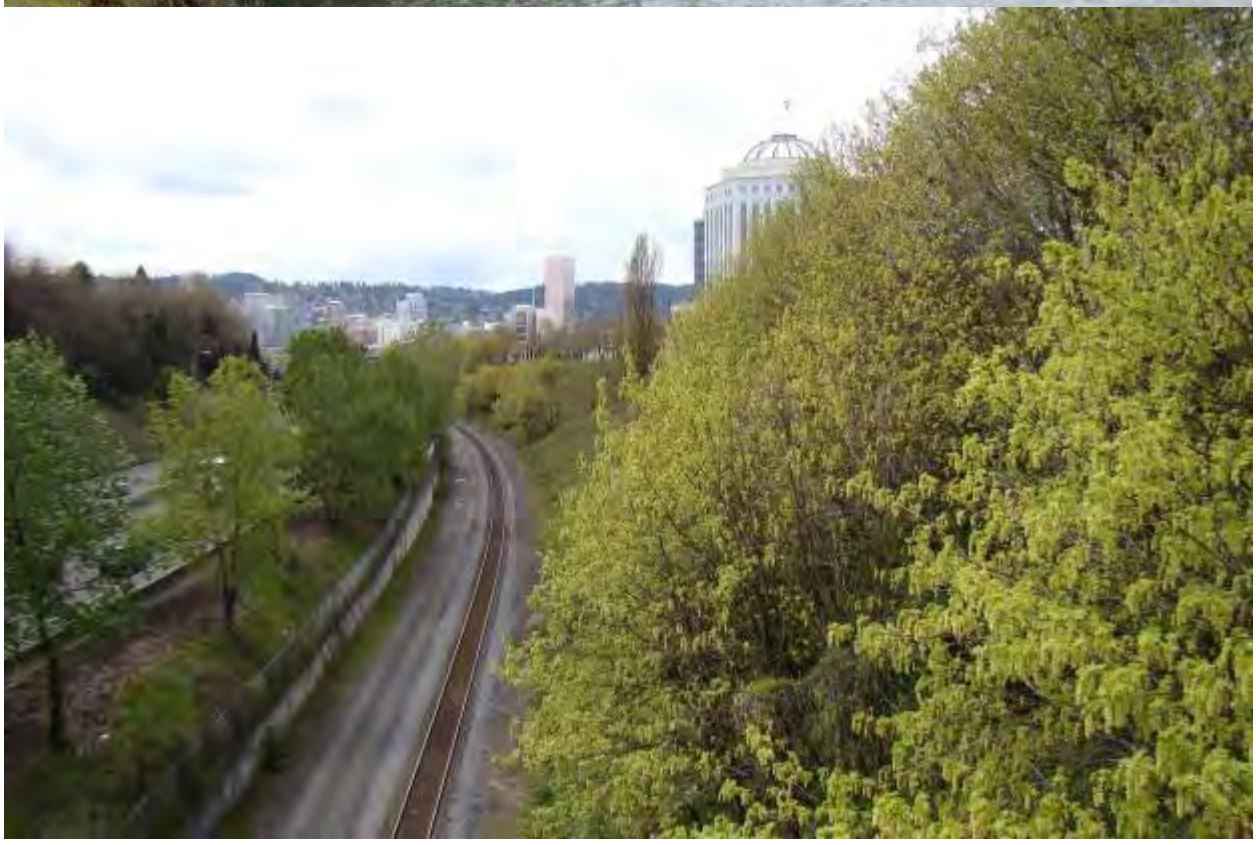
Vegetation:
Between the Lloyd Blvd/I84 onramp and NE 12th Avenue, the vegetation is comprised of black cottonwoods, indicating water is present, on the east and big leaf maple on the west; the understory is hawthorn, holly, Pacific dogwood, ivy, clematis and Himalayan blackberry; and there is some scotch broom present. Between NE 12th Avenue and NE Grand Avenue the vegetation includes big leaf maple, cherry, one Oregon white oak, hawthorn, butterfly bush, holly and ivy. The middle of this stretch of the gulch is void of large trees and dominated by Himalayan blackberry. Between NE Grand Ave and the river the vegetation includes some large trees, including one Oregon white oak, and an understory of Himalayan blackberry or turf grass. There is standing water under the I84/I5 onramp.

Streams/Wetlands:
There is standing water under the freeway ramps, but without access it is unclear if this area is a wetland. The presence of cottonwoods on the bluff suggests a seep.

Willamette River:
Willamette River banks are hardened and largely non-vegetated. The Eastbank Esplanade has a riprap or concrete bank below the trail.

Wildlife:
Birds observed using Sullivan's Gulch include: Song Sparrow, Scrub Jay, American Robin, Bushtit, Crow, Anna's Hummingbird, White-crowned Sparrow, and Yellow-rumped Warbler. In the standing water under the I84/I5 onramp, two mallards were observed.

Other Notes:
Very steep slopes. Human impacts including trash and evidence of homeless camps

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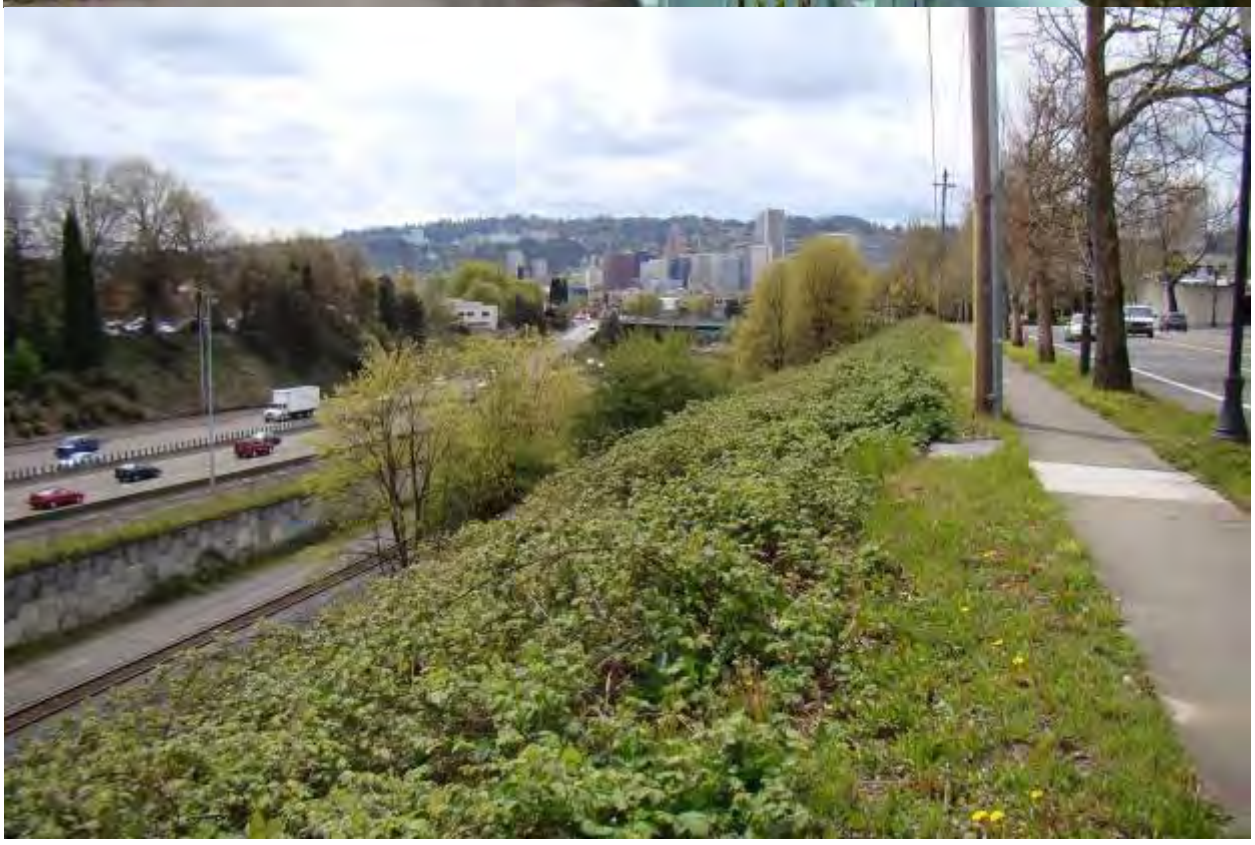


WR15: River District
Date: 08/09/11
Surveyors: MB, SB

Vegetation:
The vegetation within the River District is primarily landscape vegetation and most of that vegetation is low structure. There is little tree canopy within the district except within the North Park Blocks.

- Clove
- Vetch
- Blackberry

Streams/Wetlands:
No open streams. Tanner Creek restoration project at the confluence with the Columbia River indicates that the area can support salmonid species.

Willamette River:
Willamette River banks are hardened and largely non-vegetated. The Eastbank Esplanade has a riprap or concrete bank below the trail.

Wildlife:
Birds observed in the River District include: sparrow

Other Notes:
Very developed site. Little natural resource functions outside of the Willamette River. Even the landscape features, other than the park blocks, likely provide very little habitat.

WR16: Downtown
Date: 08/24/11
Surveyors: MB, KK, MP

Waterfront Park
Perching opportunities for birds. General stopover, similar to what is provided by most trees in Portland. Microclimate affect. Some organic matter input to river but limited due to seawall and distance from water. Rainwater infiltration but somewhat compacted due to heavy human use.

The Bowl
Beach and gravel provide habitat for invertebrates. Shallow water habitat for fish. Flood storage, geese habitat.

Note – This is a good opportunity site for improving habitat functions and recreation. Much of the riprap could be removed to create a large beach. The large rocks on the beach can be removed. The shallow water area increased. Native vegetation installed on the banks to the north and south of the beach. This would improve fish habitat and make it easier for people to have contact with the water. It was surprising that on a 90 F day, no one was in the water here. One contributing reason may be because the large rocks are hazardous.

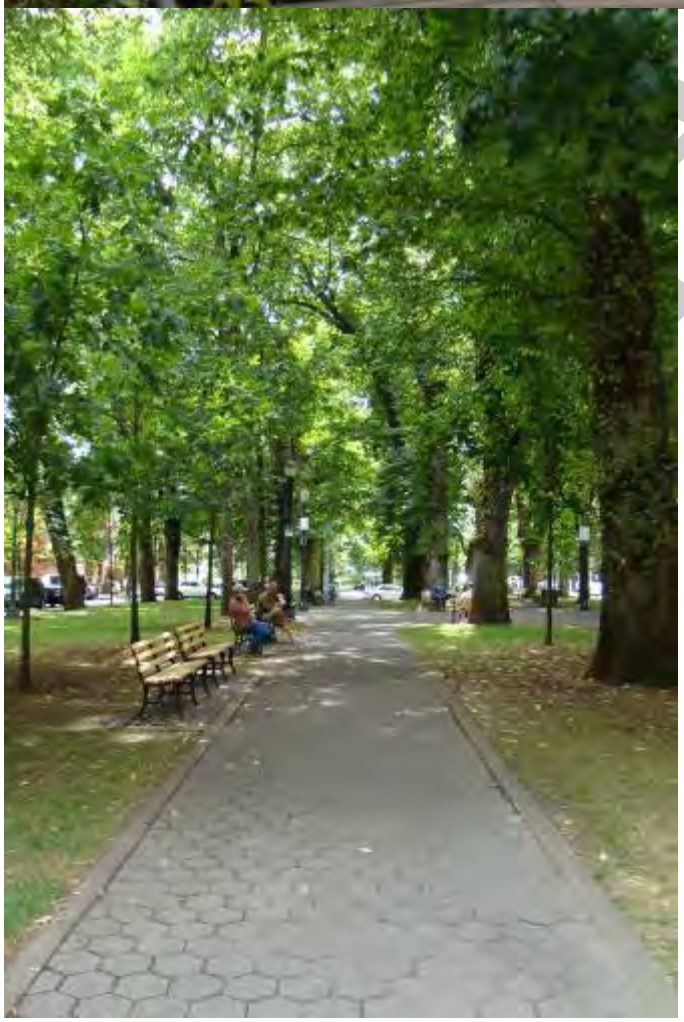
Condos
The banks are over riprapped here. There is way more riprap amount and size than is needed for this moorage. Along the upper edge of the riprap are plantings, but it's sparse. Mix of native and none native. The trees are non-native. Native understory includes blue fescue, spiraea, red osier dogwood, salal and Oregon grape.

Note – This is a good opportunity site to improve habitat. Much of the riprap could be removed and the bank could be heavily vegetated with native species.

Street Trees
The downtown patches of contiguous tree canopy should be mapped as "woodland, cultural" with a written explanation of function. Functions include rainwater capture, microclimate/heat island reduction, migratory stopover habitat similar to other street trees and landscaping in Portland (not a Special Habitat Area which requires a large concentration or diversity of migratory birds.)

South Park Blocks
Rainwater capture, microclimate/heat island reduction, migratory stopover habitat similar to other street tress and landscaping in Portland. It is an oasis in the downtown area.

Does not meet the SHA criteria. The area is significant in the context of downtown because it is a large, contiguous stretch of dense tree canopy. However, it is isolated from other patches and the river.



WR17: Central Eastside
Date: 08/31/11
Surveyors: MB, KK, MP, PK

Boat Tour of Central Eastside. Most the river bank is developed in the south part of the district and is the east bank esplanade in the middle and northern parts of the district. The esplanade is rip rap with some low structure vegetation.

WR18: South Waterfront
Date: 08/31/11
Surveyors: MB, KK, MP, PK

Boat Tour of South Waterfront. The northern portion of south waterfront includes Zidell clean up and bank restoration.

APPENDIX F: Natural Resources Inventory Project Report

The Project Report is available separately at http://www.portlandonline.com/portlandplan/?a=400492&.

APPENDIX D: Special Status Fish and Wildlife Species

	Common Name	Scientific Name	Federal Status	ODFW Status	ODFW StratSp	ORNHIC Rank	ORNHIC List	NWPCC Subbasin	PIF FocalSp	OWEB Priority	ABC/Audubon Watchlist	SHA At Risk Species
Amphibian	Clouded Salamander	Aneides ferreus		SV		G3/S3	3					**X**
	Northern Red-legged Frog	Rana aurora aurora	SoC	SV	X	G4T4/S3	2	X		X		**X**
Reptiles	Northwestern Pond Turtle	Actinemys marmorata	SoC	SC	X	G3T3/S2	1	X		X		**X**
	Western Painted Turtle	Chrysemys picta bellii		SC	X	G5/S2	2			X		**X**
Birds	American Bittern	Botaurus lentiginosus								X		
	American Kestrel	Falco sparverius						X	X	X		
	American White Pelican	Pelecanus erythrorhynchos		SV	X	G3/S2B	2					**X**
	Bald Eagle	Haliaeetus leucocephalus	Delisted	LT		G4/S3B, S4N	2	X				**X**
	Band-tailed Pigeon	Columba fasciata	SoC			G5/S4	4		X	X		**X**
	Black-throated Gray Warbler	Dendroica nigrescens							X			
	Brown Creeper	Certhia americana							X			
	Bufflehead	Bucephala albeola				G5/S2B,S5N	4					**X**
	Bullock's Oriole	Icterus bullockii							X	X		
	Bushtit	Psaltriparus minimus							X			
	Chipping Sparrow	Spizella passerina			X			X	X			
	Common Nighthawk	Chordeiles minor		SC	X	G5/S5	4					**X**
	Common Yellowthroat	Geothlypis trichas						X				
	Downy Woodpecker	Picoides pubescens							X			
	Dunlin	Calidris alpina						X		X		
	Great Blue Heron	Ardea herodias								X		
	Green Heron	Butorides virescens						X				
	Hammond's Flycatcher	Empidonax hammondii							X			
	Hermit Warbler	Dendroica occidentalis							X		Yellow List	
	Hooded Merganser	Lophodytes cucullatus								X		
	House Wren	Troglodytes aedon							X			
	Hutton's Vireo	Vireo huttoni							X			
	Loggerhead Shrike	Lanius ludovicianus		SV	X	G4/S3B, S2N	4					**X**
	Long-billed Curlew	Numenius americanus		SV	X	G5/S3B	4				Yellow List	**X**

	Merlin	Falco columbarius				G5/S1B	2					**X**
	Nashville Warbler	Vermivora ruficapilla							X			
	Northern Harrier	Circus cyaneus						X	X			
	Olive-sided Flycatcher	Contopus cooperi	SoC	SV		G5/S4	4	X	X	X	Yellow List	**X**
	Orange-crowned Warbler	Vermivora celata							X			
	Pacific-slope Flycatcher	Empidonax dificilus							X	X		
	Peregrine Falcon	Falco peregrinus	Delisted	SV		G4/T3/S1B	2					**X**
	Pileated Woodpecker	Dryocopus pileatus		SV		G5/S4	4	X	X			**X**
	Purple Finch	Carpodacus purpureus								X		
	Purple Martin	Progne subis	SoC	SC	X	G5/S3B	2	X	X	X		**X**
	Red Crossbill	Loxia curvirostra							X			
	Red-eyed Vireo	Vireo olivaceus						X	X			
	Red-necked Grebe	Podiceps grisegena		SC	X	G5/S1B,S4N	2					**X**
	Rufous Hummingbird	Selasphorus rufus							X			
	Short-eared Owl	Asio flammeus			X				X	X	Yellow List	
	Sora	Porzana carolina						X				
	Streaked Horned Lark	Eremophila alpestris strigata	C	SC	X	G5/T2/S2B	1	X	X	X		**X**
	Swainson's Hawk	Buteo swainsoni		SV	X	G5/S3B	4				Yellow List	**X**
	Swainson's Thrush	Catharus ustulatus							X			
	Thayer's Gull	Larus thayeri									Yellow List	
	Varied Thrush	Ixoreus naevius							X		Yellow List	
	Vaux's Swift	Chaetura vauxi						X	X			
	Vesper Sparrow (Oregon)	Pooecetes gramineus	SoC	SC	X	G5/T3/S2B, S2N	2	X	X	X		**X**
	Western Meadowlark	Sturnella neglecta		SC WV	X	G5/S5	4	X	X	X		**X**
	Western Sandpiper	Calidris mauri									Yellow List	
	Western Wood-Pewee	Contopus sordidulus						X	X			
	White-breasted Nuthatch (Slender-billed)	Sitta carolinensis aculeata		SV	X			X	X	X		**X**
	White-tailed Kite	Elanus leucurus				G5/S1B, S3N	2					**X**
	Willow Flycatcher (Little)	Empidonax traillii brewsteri		SV	X	G5TU/S1B	4	X	X	X	Yellow List	**X**
	Wilson's Warbler	Wilsonia pusilla							X			
	Winter Wren	Troglodytes troglodytes							X			
	Wood Duck	Aix sponsa						X				
	Yellow Warbler	Dendroica petechia						X	X	X		
	Yellow-breasted Chat	Icteria virens	SoC	SC WV	X	G5/S4?	4		X			**X**
Mammals	American Beaver	Castor canadensis						X				
	California Myotis	Myotis californicus		SV		G5/S3	4					**X**

	Camas Pocket Gopher	Thomomys bulbivorus	SoC			G3G4/S3S4	3					**X**
	Fringed Myotis	Myotis thysanodes	SoC	SV		G4G5/S2	2					**X**
	Hoary Bat	Lasiuris cinereus		SV		G5/S3	4					**X**
	Long-eared Myotis	Myotis evotis	SoC			G5/S3	4					**X**
	Long-legged Myotis	Myotis volans	SoC	SV		G5/S3	4					**X**
	Northern River Otter	Lontra canadensis						X				
	Red Tree Vole	Arborimus = Phenacomys longicaudus	SoC	SV		G3G4/S3S4	3	X				**X**
	Silver-haired Bat	Lasionycteris noctivagans	SoC	SV	X	G5/S3S4	4					**X**
	Townsend's Big-eared Bat	Corynorhinus townsendii townsendii	SoC	SC	X	G4/T3T4/S2	2	X				**X**
	Western Gray Squirrel	Sciurus griseus		SV	X	G5/S4	3	X				**X**
	White-footed Vole	Arborimus = Phenacomys albipes	SoC			G3G4/S3	4					**X**
	Yuma Myotis	Myotis yumanensis	SoC			G5/S3	4					**X**
Fish	Chinook Salmon	Oncorhynchus tshawytscha	LT, LE	LT		G5T2Q/S2	1			X		**X**
	Chum Salmon	Oncorhynchus keta	LT	SC		G5T2Q/S2	1			X		**X**
	Coho Salmon	Oncorhynchus kisutch	LT	LE		G4T2Q/S2	1			X		**X**
	Chum Salmon	Oncorhynchus keta	LT							X		
	Sockeye Salmon	Oncorhynchus nerka	LT, LE							X		
	Steelhead Trout	Oncorhynchus mykiss	LT	SC		G5T2Q/S2	1			X		**X**
	Coastal Cutthroat Trout	Oncorhynchus clarki clarki	PT	SC		G4T2Q/S2	2					**X**
	Columbia Eulachon	Thaleichthys pacificus	LT									
	Pacific Lamprey	Lampetra tridentata	SoC	SV		G5/S3	2			X		**X**
	River Lamprey	Lampetra ayresi	SoC			G4/S4	4			X		**X**
	Oregon Chub	Oregonichthys crameri	LT	SC						X		

Footnotes:

LE	Listed Endangered	Species listed by the by the USFWS, NMFS, ODFW or ODA as Endangered
LT	Listed Threatened	Species listed by the USFWS, NMFS, ODFW or ODA as Threatened
PE	Proposed Endangered	Species proposed by the USFWS or NMFS to be listed as Endangered under the ESA
PT	Proposed Threatened	Species proposed by the USFWS or NMFS to be listed as Threatened under the ESA
SoC	Species of Concern	Former C2 candidates which need additional information in order to propose as Threatened or Endangered under the ESA. These are species which USFWS is reviewing for consideration as Candidates for listing under the ESA.
C	Candidate	Species for which NMFS or USFWS have sufficient information to support a proposal to list under the ESA
SC	Critical	Species for which listing by ODFW or ODA as threatened or endangered is pending; or those for which listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Also considered critical are some peripheral species that are at risk throughout their range, and some disjunct populations.
SV	Vulnerable	Species for which listing by ODFW or ODA as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring. In some cases the population is sustainable, and protective measures are being implemented; in others, the population may be declining and improved protective measures are needed to maintain sustainable populations over time.

ODFW StratSp		Identified as a 'Strategy Species' in the ODFW Comprehensive Wildlife Conservation Strategy for Oregon (2005) for the Willamette Valley Ecoregion. Strategy species are those closely associated with 'Strategy Habitats' or are declining for a variety of reasons.
ORNHIC Rank	1	Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences.
ORNHIC Rank	2	Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences.
ORNHIC Rank	3	Rare, uncommon or threatened, but not immediately imperiled, typically with 21-100 occurrences.
ORNHIC Rank	4	Long-term Concern Not rare and apparently secure, but with cause for long-term concern, usually more than 100 occurrences.
ORNHIC Rank	5	Secure Demonstrably widespread, abundant, and secure
ORNHIC Rank	H	Historical Occurrence, formerly part of the native biota with the implied expectation that it may be rediscovered.
ORNHIC Rank	T	The taxon has a trinomial (a subspecies, variety or recognized race)
ORNHIC Rank	U	Unknown rank.
ORNHIC Rank	NR	Not yet ranked
ORNHIC Rank	G	Global rank system was developed by The Nature Conservancy and is maintained by The Association for Biodiversity Information (ABI) in cooperation with Heritage Programs or Conservation Data Centers (CDCs) in all 50 states, in 4 Canadian provinces, and in 13 Latin American countries.
ORNHIC Rank	S	State rank system was developed by The Nature Conservancy and is maintained by The Association for Biodiversity Information (ABI) in cooperation with Heritage Programs or Conservation Data Centers (CDCs) in all 50 states, in 4 Canadian provinces, and in 13 Latin American countries.
ORNHIC Rank	Q	Indicates the taxon has taxonomic questions
ORNHIC Rank	?	Assigned rank is uncertain.
ORNHIC Rank	X	Presumed extirpated or extinct.
ORNHIC List	1	Contains species that are threatened with extinction or presumed to be extinct throughout their entire range.
ORNHIC List	2	Contains species that are threatened with extirpation or presumed to be extirpated from the state of Oregon. These are often peripheral or disjunct species which are of concern when considering species diversity within Oregon's borders. They can be very significant when protecting the genetic diversity of a taxon. ORNHIC regards extreme rarity as a significant threat and has included species that are very rare in Oregon on this list.
ORNHIC List	3	Contains species for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.
ORNHIC List	4	Contains species that are of conservation concern but are not currently threatened or endangered. This includes species which are very rare but are currently secure, as well as species which are declining in numbers or habitat but are still too common to be proposed as threatened or endangered. While these species currently may not need the same active management attention as threatened or endangered species, they do require continued monitoring.

WHAT'S IN THE **CENTRAL CITY 2035 PLAN?**

Volume 1: Goals and Policies

The long-range vision for the Central City

- Big ideas to inspire a generation of Portlanders
- A framework of goals and policies to guide City projects for the next 20 years
- Highlights of the plan by district

Volume 2A: Zoning Code and Map Amendments

Regulations to implement the Plan

- Part 1: Central City Plan District
- Part 2: River, Scenic and Trails

Volume 2B: Transportation System Plan Amendments

Volume 3A: Scenic Resources Protection Plan

- Part 1: Summary, Results and Implementation
- Part 2: Scenic Resources Inventory
- Part 3: Economic, Social, Environmental and Energy Analysis

Volume 3B: Willamette River Central Reach Natural Resources Inventory

Volume 4: Background Materials

Prior plans and research provided for reference

Volume 5: Implementation Plan

City's targets and the actions it will take to implement the Plan

Volume 6: Public Involvement

CC2035 public involvement