

PORTLAND PLAN

Natural Resource Inventory



PORTLAND PLAN BACKGROUND REPORT
FALL 2010

PLANNING AND SUSTAINABILITY COMMISSION
RECOMMENDED DRAFT
DECEMBER 14, 2010



City of Portland Bureau of
Planning and Sustainability
Sam Adams, Mayor | Susan Anderson, Director

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NATURAL RESOURCE INVENTORY



PROSPERITY AND BUSINESS SUCCESS



SUSTAINABILITY AND THE NATURAL ENVIRONMENT



DESIGN, PLANNING AND PUBLIC SPACES



NEIGHBORHOODS & HOUSING



TRANSPORTATION, TECHNOLOGY AND ACCESS



EDUCATION AND SKILL DEVELOPMENT



HUMAN HEALTH, FOOD AND PUBLIC SAFETY



QUALITY OF LIFE, CIVIC ENGAGEMENT AND EQUITY



ARTS, CULTURE AND INNOVATION

PORTLAND PLAN



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INTRODUCING ...

PORTLAND'S NATURAL RESOURCE INVENTORY UPDATE PROJECT

Overview

This document summarizes Portland's Natural Resource Inventory Update Project to date. A detailed account of this work is documented in the Portland Natural Resource Inventory: Riparian Corridors and Wildlife Habitat — Project Report, Discussion Draft November 2009.

*The **Introduction** section describes the context and need for the inventory update. The **Project History** section explains the project origin, and introduces Metro's regional inventory which provided the scientific and methodological basis for the City inventory update. The **Project Approach** section highlights the science basis for the work, and outlines the steps taken to customize the regional information and produce new inventory information for Portland. Some key information from the City inventory project is featured in the **Project Results, Products and Uses** section including information about the types of natural resources that exist today, their relative quality, current projections and program updates. The concluding section outlines a set of **Next Steps**.*



The updated inventory:

- Greatly improves quality and accessibility of information about riparian corridors and wildlife habitat in Portland
- Is “information only” — does not propose programs or regulations
- Will inform and support many actions in the City's *River Renaissance Strategy*, the *Portland Watershed Management Plan*, and the *Portland Plan*
- Doesn't start from scratch — builds on and refines the well-vetted science and methods used to produce Metro's regional resource inventory
- Reflects the urban landscape, resource conditions range from good to highly degraded; includes “natural” and “constructed” features
- Uses current data and state-of-the-art mapping tools that allow the information to be kept up-to-date over time

Portland would not be here today were it not for an historic abundance of natural resources. The waterways, forests, woodlands and prairies, fish and fur-bearing animals, and fertile soils, have supported people for thousands of years.

Today more than 582,000 people call Portland home (PSU Population Research Center, 2009). The landscape has changed dramatically over the past 150 years. In some areas, much of the trees and vegetation have been removed to make way for roads and buildings. Many of the streams in Portland have been placed underground in pipes, and many of Portland's waterways do not meet current water quality standards for pollution and temperature.

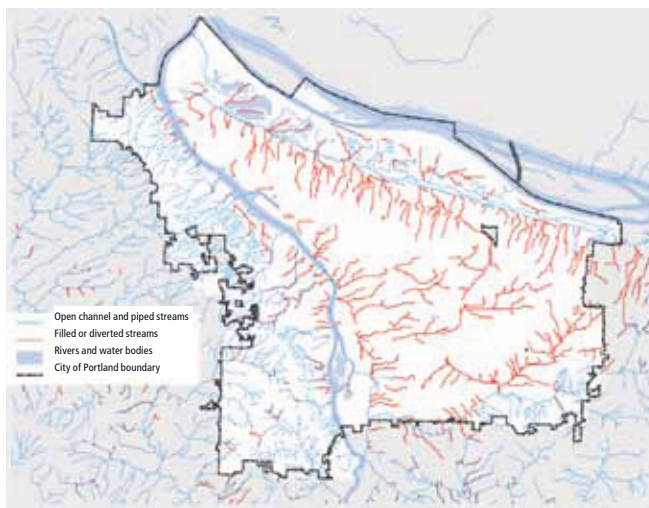
Yet, a wealth of rivers, streams, wetlands, forests and other types of vegetation remain interwoven throughout Portland's parks and natural areas, many residential neighborhoods, golf courses, cemeteries, college campuses, and along the Willamette River and in the Columbia River corridors.

These natural resources provide important functions and services across today's urban landscape. Rivers, streams, floodplains and wetlands provide conveyance and storage for streamflows and stormwater, and provide critical habitats for aquatic and terrestrial plants and animals. Trees and vegetation stabilize stream banks and slopes and prevent landslide risks. Vegetation also intercepts rain and slows stormwater runoff, thereby reducing peak streamflows and flooding. Trees and vegetation also filter sediments and pollutants. Such services reduce costs to maintain and expand the City sewer systems and treatment facilities.

Trees and vegetation help maintain healthful air quality, reduce energy demand, and help capture carbon dioxide which contributes to global warming. Trees are often associated with higher property values and desirable neighborhoods within which to live, work and play.



1905 LOG RAFT CONSTRUCTION ON THE WILLAMETTE RIVER



PORTLAND'S CURRENT AND HISTORIC STREAMS



NEIGHBORHOOD STREET TREES



BALCH CREEK

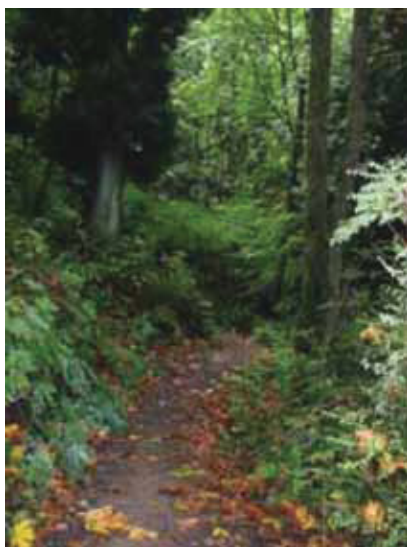
Tree shading helps keep the water in local streams cool enough to support native fish. Trees and vegetation also provide critical habitat for numerous wildlife species that live in or migrate through Portland. A number of the fish and wildlife species that rely on local habitats in Portland have been deemed 'at risk' by state or federal agencies and well-established wildlife organizations.

The Natural Resource Inventory Update project is part of Portland's long-standing investment in conserving the natural resources in the City.

Over the past 60 years, the City has acquired and now manages 8,000 acres of natural area parks. The City also actively pursues partnerships and sponsors revegetation and stormwater retrofit projects to enhance the condition of Portland's watersheds.



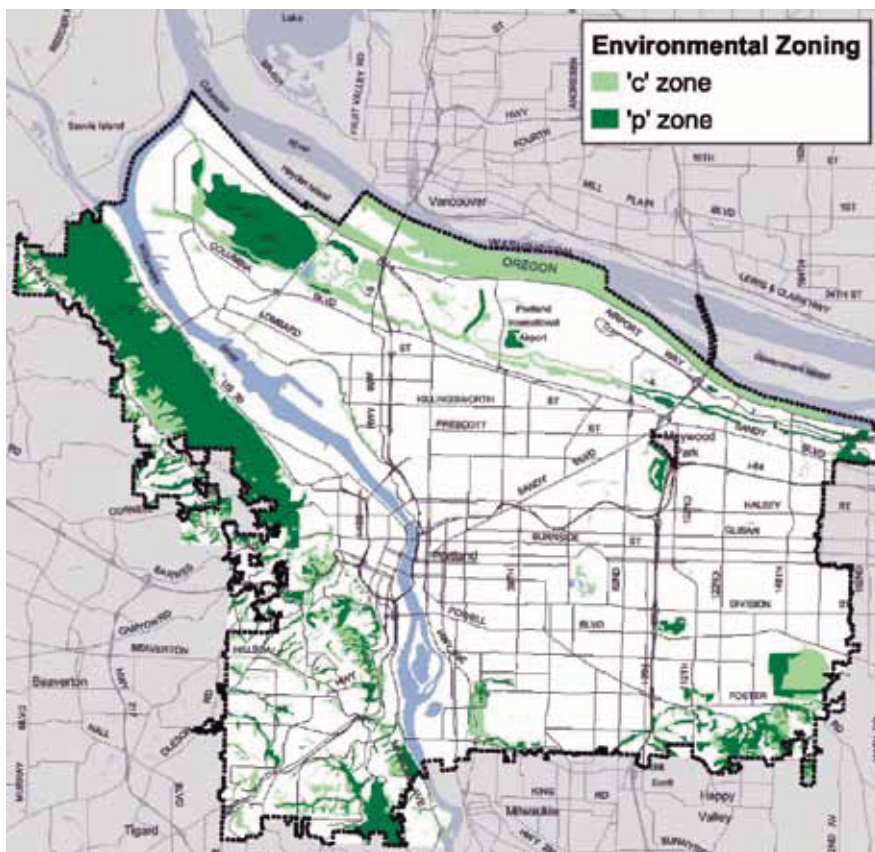
CUTTHROAT TROUT, TRYON CREEK 2007



MARQUAM NATURAL AREA

The City has established regulatory tools to safeguard important natural resources in Portland. Land use and zoning programs are in place to manage stormwater, prevent erosion, maintain flood storage capacity, and to protect important natural resources as the city continues to grow.

Natural resource inventories were created to document the location and extent to resources and their relative condition. This information was used to inform the design of land use and zoning tools such as the City's Environmental and Willamette Greenway overlay zoning programs. These programs were developed to meet statewide land use planning goals to protect significant natural resources, maintain air, land and water quality, reduce public health and safety risks from natural hazards, and meet multiple objectives for the Willamette River Greenway.



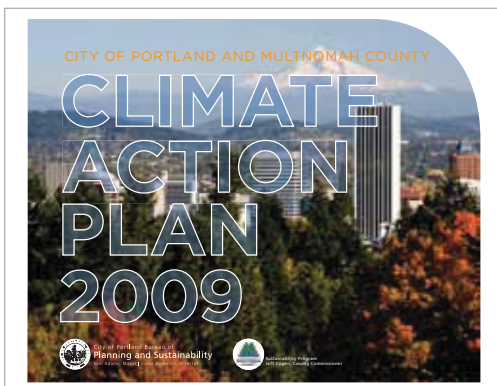
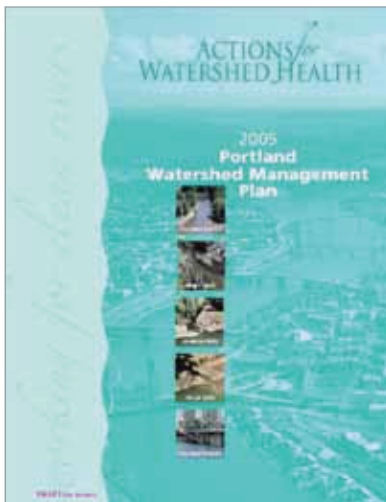
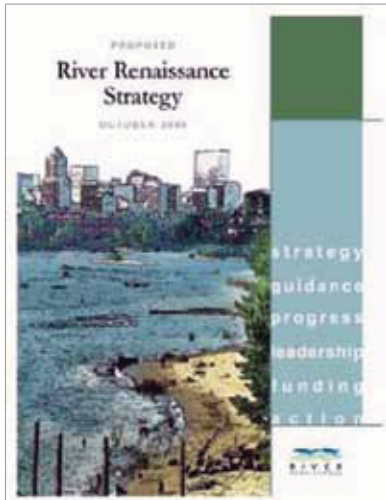
NATURAL RESOURCE INVENTORY AREAS*



CITY OF PORTLAND ENVIRONMENTAL ZONING

1. COLUMBIA CORRIDOR (1989)
 2. BALCH CREEK (1991)
 3. NORTHWEST HILLS (1991)
 4. JOHNSON CREEK BASIN (1991); BORING LAVA DOMES SUPPLEMENT (1997)
 5. SOUTHWEST HILLS (1992)
 6. FANNO CREEK AND TRIBUTARIES (1993)
 7. EAST BUTTES, TERRACES AND WETLANDS (1993)
 8. SKYLINE WEST (1994)
- *WILLAMETTE RIVER AND MULTNOMAH COUNTY POCKETS INVENTORIES NOT SHOWN.

The Natural Resource Inventory Update Project also helps to implement recent City initiatives that recognize healthy watersheds as a key to a sustainable, vibrant city.



In 2001, the City Council adopted the *River Renaissance Vision* to revitalize the Willamette River. The *River Renaissance Vision* calls for City government, citizens, business, and public agency partnerships to foster natural systems, a prosperous working harbor, vibrant waterfront districts and neighborhoods, and opportunities for recreation and river access. The *River Renaissance Strategy*, adopted in December 2004, establishes additional policy guidance, progress measures, and a set of actions for the city's river-related activities.

In early 2006, the City Council adopted the *Portland Watershed Management Plan and Framework for Integrated Management of Watershed Health*. Together, the *Framework* and the *Portland Watershed Management Plan* establish ecological principles and citywide watershed health goals and objectives to guide City bureaus in implementing their respective programs. The plan also contains strategies and actions to achieve watershed health goals.

In 2009 the City Council adopted the first *Portland Climate Action Plan*. Guided by this *Climate Action Plan*, Portland and Multnomah County will carry out policies and programs to minimize household, business and government emissions and prepare for the coming environmental and economic challenges. Among a varied set of directions, the *Climate Action Plan* establishes goals and actions for the Urban Forest and Natural Systems to help mitigate and adapt to the impacts of climate change. The plan sets targets for tree canopy and water quality in Portland, and calls for a diverse set of actions to protect, conserve and restore tree canopy and other natural resources throughout Portland's watersheds.

Both the *River Renaissance Strategy* and the *Portland Watershed Management Plan* call for the City's natural resource inventories to be updated to provide current, high-quality information in the future.

PROJECT HISTORY

As the *River Renaissance Vision* and *Portland Watershed Management Plan* were emerging, Portland's Bureau of Planning and Sustainability was taking initial steps to update the City's natural resource inventories. Updating the City's inventories would be a big undertaking involving large areas and complex landscapes. The existing inventories contain good information on which to build, however the reports are somewhat dated and many of the maps were produced before the advent of geographic information systems (GIS) technology and are therefore difficult to keep current.

The Bureau of Planning and Sustainability took initial steps to update the natural resource inventories as part of the former Healthy Portland Streams project to update the City's environmental overlay zones. After releasing the draft *Healthy Portland Streams* proposal in 2002, the Bureau decided to continue working to improve the inventories, but to defer any major environmental overlay zone updates until 1) the *Portland Watershed Management Plan* was completed, and 2) Metro had established the new Nature in Neighborhoods program to protect and restore riparian corridors and wildlife habitat, and to improve water quality in the tri-county region.

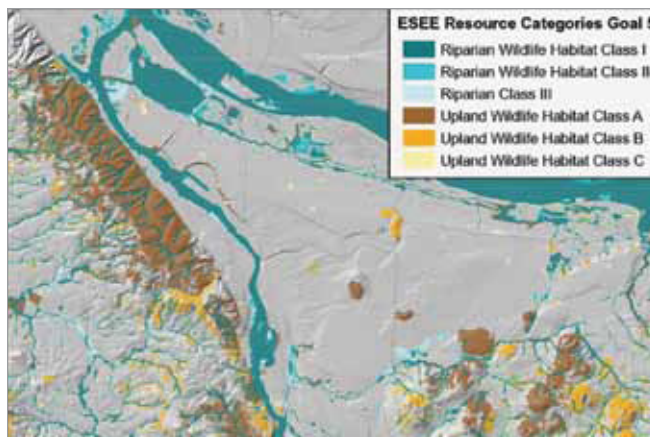
One of Metro's first steps toward developing the Nature in Neighborhoods program was to produce a comprehensive inventory of riparian corridors and wildlife habitat in the region.

To make best use of work already done, the City used Metro's inventory as the scientific and methodological basis for Portland's inventory update project.

Metro's inventory was based on current scientific information relating to watershed and ecological systems. After completing a comprehensive review of the scientific literature, Metro mapped key natural resources and developed GIS models to rank and map the relative quality of riparian corridors and wildlife habitats in the region. Metro's inventory was reviewed by leading experts in the Pacific Northwest and Metro's technical and policy advisory committees. Public workshops were held in different parts of the region and a public hearing was conducted before the Metro Council. After evaluating different program options through an Economic, Social, Environmental, and Energy Analysis, Metro adopted the inventory as part of the Title 13 Nature in Neighborhoods program in September 2005. Metro's inventory project is documented in the *Technical Report for Fish and Wildlife* (Metro 2005), *Metro's Riparian Corridor and Wildlife Habitat Inventories* (Metro 2005) and *Addendum and Update to Metro's Riparian Corridor and Wildlife Habitat Inventories* (Metro 2005).



SOUTHWEST HILLS RESOURCE PROTECTION PLAN INVENTORY MAP (1992) CITY OF PORTLAND



METRO REGIONAL INVENTORY OF RIPARIAN CORRIDORS AND WILDLIFE HABITAT

PROJECT APPROACH

The Bureau of Planning and Sustainability has since refined and updated Metro's inventory to incorporate more current natural resource data and additional information from the scientific literature. The City continued to incorporate and build on the science, analysis, technical review, and public scrutiny that went into developing Metro's regional inventory. This is to ensure that Metro can accept the City's inventory for use in meeting Title 13 requirements. The basic project approach is described below.



COLUMBIA SLOUGH

SCIENTIFIC FOUNDATION

The City's inventory incorporates the following information on the key features, functions and attributes of riparian corridors and wildlife habitat.

Riparian corridors are comprised of rivers and streams, 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. Riparian corridors also include areas that provide the transition between the stream banks and upland areas. Intact riparian corridors provide the following critical watershed functions:

- **Microclimate and shade** — Open water bodies, wetlands, and surrounding trees and woody vegetation are associated with localized air cooling and increased humidity.
- **Bank function and control 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.
- **Stream flow moderation and flood storage** — Waterways and floodplains provide for conveyance and storage of streamflows and floodwaters; trees and vegetation intercept precipitation and promote infiltration which tempers streamflow fluctuations or "flashiness" that often occurs in urban watersheds.
- **Large wood and channel dynamics** — Streams, riparian wetlands, floodplains and large trees and woody vegetation contribute to the natural changes in location and configuration of stream channels over time.
- **Organic inputs, food web and nutrient cycling** — Water bodies, wetlands and nearby vegetation provide food for aquatic species (e.g., plants, leaves, twigs, insects) and are part of an ongoing chemical, physical and biological nutrient cycling system.
- **Wildlife movement/corridors** — Vegetated corridors along waterways, and between waterways and uplands, allow wildlife to migrate and disperse among different habitat areas, and provide access to water.

Wildlife habitats provide food, cover, roosting and nesting sites, and movement pathways for a broad array of birds, mammals, reptiles and amphibians. Terrestrial features providing these functions include forests, woodland, shrubland, grassland and meadows, rocky slopes and uplands, and buttes. Urban tree canopy and landscaped areas can also provide important habitats for wildlife.

The inventory defines a habitat patch as an area of forest vegetation and/or wetland, at least two acres in size, plus woodland adjacent to that forest vegetation. The inventory identifies the following wildlife habitat attributes as indicators of habitat function and habitat fragmentation due to urbanization:

- **Habitat patch size** — Larger patch sizes generally provide more food, cover and nesting opportunities for a diverse wildlife species.
- **Habitat interior area** — Rounder-shaped habitat patches experience lesser “edge effects” (disturbance from urban land uses, predation and invasive species) than narrow patches.
- **Connectivity between habitat patches** — 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** — Habitat patches located close to water are valuable to wildlife survival.
- **Special habitat areas** — Unique and/or declining natural and human-made habitats (e.g., upland meadows, stands of Oregon white oak).



EDGE EFFECT

INVENTORY STEPS

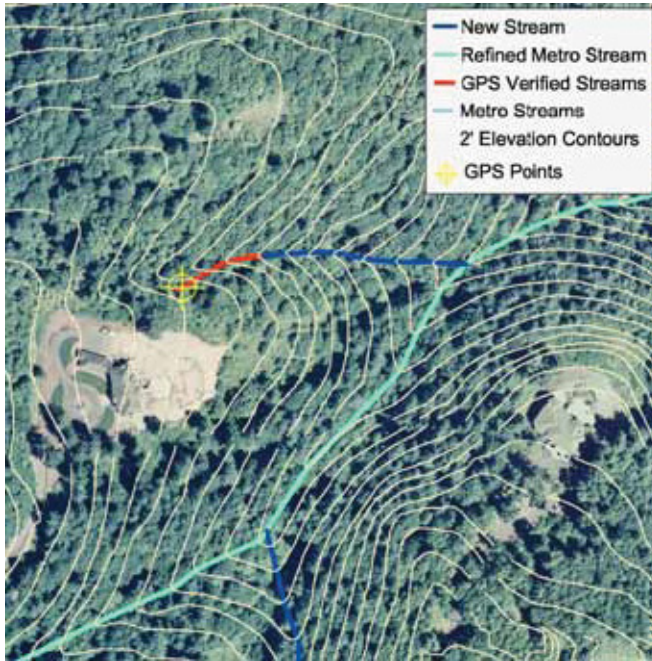
Relying on this fundamental information, and Metro’s general methodology, the Bureau of Planning and Sustainability:

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

Natural resource feature data is the basic building block of Metro’s and Portland’s inventories. The quality of the inventory reflects the quality of available data for streams, wetlands, floodplains, vegetation and topography. The Bureau of Planning and Sustainability produced new or revised data sets to increase the level of detail and improve on the accuracy of the regional data. The inventory project area is the area within City limits and the unincorporated urbanizing portions of Multnomah County. Data and mapping update activities include:

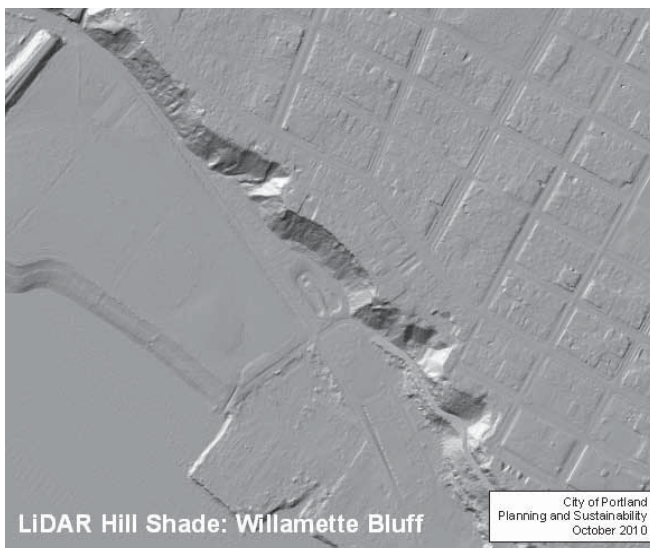
- Initial remapping of more than 160 stream centerlines, resulting in the addition of multiple stream segments to the maps. More recently, incorporating new slope and stream data derived from LiDAR, laser light data that measures the elevation at the earth’s surface. All in all, the stream remapping effects have identified more than 100 additional stream miles for inclusion in the inventory.
- 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).
- Updating the City’s flood area data for use in the inventory, including incorporation of the 2004 and 2010 FEMA 100-year floodplain.
- Incorporating new slope and stream data derived from LiDAR, laser light data that measures the elevation at the earth’s surface.
- Conducting additional site visits in specific areas, resulting in data refinements.

Streams — Between 2002 and 2004, the Bureau of Planning and Sustainability remapped more than 160 miles of stream centerlines, adding 70 stream miles to the maps. The stream remapping was based on recent aerial photographs, other data sources, and information collected during site visits. The City provided the updated GIS stream data to Metro for inclusion in the regional inventory.



CITY STREAM REMAPPING PROJECT

In 2009–2010 the City worked with Metro and other local jurisdictions to use LiDAR (Light Detection and Ranging) data to update local topography and stream maps. This increased the estimated number of river and stream miles in Portland from 242 miles to 298 miles. LiDAR technology uses remote laser light technology to locate objects on the land, allowing more accurate mapping than other types of remote imagery.



LIDAR Hill Shade: Willamette Bluff

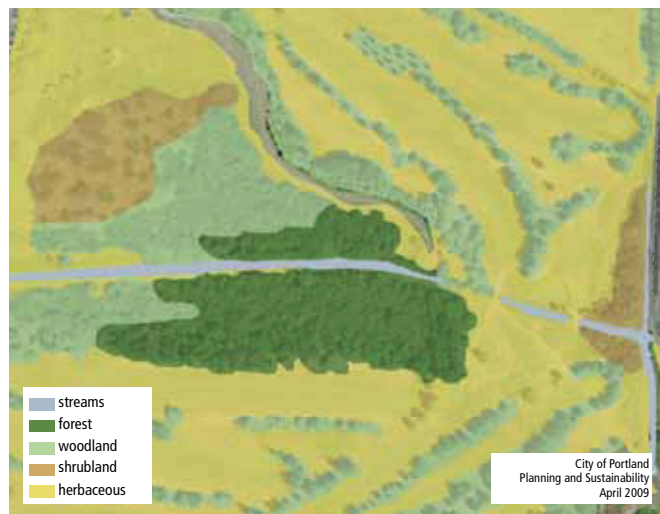
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October 2010

Vegetation — Vegetation mapping was carried out between 2004 and 2006, and has been updated based on 2007 aerial photos. The Bureau of Planning and Sustainability produced new GIS vegetation data and maps for Portland using the most recent aerial photographs and targeted site visits. The City’s minimum vegetation mapping unit size is 1/2 acre, down-sized from Metro’s minimum 1-acre mapping unit. In addition, Metro mapped vegetation types other than forest only within 300 feet of a stream. The Bureau extended the classification of vegetation types (forest, woodland, shrubland and herbaceous) to 1/4 mile from any stream, environmental zone or regionally significant resources and assigned labels of natural, semi-natural or cultural, to further distinguish between vegetation characteristics. The Bureau used the National Vegetation Classification System (NVCS) which allowed this data to be merged with existing vegetation information produced by the Bureau of Parks and Recreation for the City’s natural areas.



METRO'S VEGETATION DATA

City of Portland
Planning and Sustainability
April 2009



PORTLAND'S VEGETATION DATA

City of Portland
Planning and Sustainability
April 2009

Flood Area — The Bureau of Planning and Sustainability has continued to update the City’s flood area data for use in the inventory, including incorporation of the 2004 FEMA 100-year floodplain and information from the Port of Portland and others regarding alterations to the floodplain as a result of development or other alterations to the landscape.



BROOKSIDE CONSTRUCTED WETLANDS

2 Developed criteria and GIS models to “rank” and map the relative quality of natural resources based on the specific riparian functions and wildlife habitat attributes listed above.

The City’s **riparian corridor model** assigns primary and secondary scores to natural resources for specific riparian functions. Scores reflect the types of natural resource features present, and how close the features are 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, riparian functions. The model assigns certain riparian functions to all land within 50 feet of a river, stream or wetland regardless of land cover. The predominance of riparian functions take place within vegetated areas approximately 100 to 300 feet of a water body and/or flood areas. However some functions can occur up to several hundred feet from a water body.

TABLE OF FEATURES THAT PROVIDE RIPARIAN CORRIDOR FUNCTIONS

RIPARIAN FUNCTION	LANDSCAPE FEATURE	FUNCTIONAL DISTANCES*
Microclimate and Shade	Rivers, streams and wetlands**	Primary — water body or wetland feature itself
	Trees and woody or shrubby vegetation; floodplain	Primary — woody vegetation in a flood area, or up to 100 ft. Secondary — between 50 and 780 ft.
Stream Flow Moderation and Water Storage	Rivers, streams, and wetlands	Primary — water body or wetland feature itself
	Flood area	Primary — vegetated flood area Secondary — non-vegetated flood area
	Vegetation	No primary Secondary — woody vegetation up to 780 ft.; herbaceous vegetation up to 100 ft. or 200 ft. if slope is at least 25%
Bank Function and Sediment, Pollution and Nutrient Control	Rivers, streams, and wetlands	Primary — water body (except Willamette River North and Central Reaches) or wetland feature itself Secondary — Willamette River North and Central Reaches
	Vegetation	Primary — woody vegetation up to 100 ft.; or up to 200 ft. if slope is at least 25% Secondary — up to 100 ft. for herbaceous vegetation, or 200 ft. if slope is at least 25%; hardened, non-vegetated river bank in the Willamette River North and Central Reaches
Large Wood and Channel Dynamics	Rivers, streams, and wetlands	Primary — water body (except Willamette River North and Central Reaches) or wetland feature itself Secondary — Willamette River North and Central Reaches
	Flood area	Primary — wetland within the flood area or 150 ft. No secondary
	Vegetation	Primary — trees/forest vegetation within a flood area or up to 150 ft. Secondary — trees/forest vegetation between 150 and 260 ft.; hardened, non-vegetated river bank in the Willamette River North and Central Reaches
Organic Inputs, Food Web and Nutrient Cycling	Rivers, streams, and wetlands	Primary — water body or wetland feature itself
	Vegetation	Primary — woody vegetation in flood area, or up to 100 ft. Secondary — trees/forest or woody vegetation between 100 and 170 ft.
Wildlife Movement Corridor	Rivers, streams, and wetlands	Primary — water body or wetland feature itself
	Vegetation	Primary — contiguous to water body, and up to 100 ft. Secondary — contiguous to water body, and between 100 and 300 ft.

* Distance is measured from a river, stream, drainageway or wetland — mapping is edge of mapped wetland or surface water area from Willamette and Columbia Rivers, Columbia Slough, and Johnson Creek; otherwise distances are mapped from stream centerline due to data limitations. Some criteria vary for areas within local drainage districts.

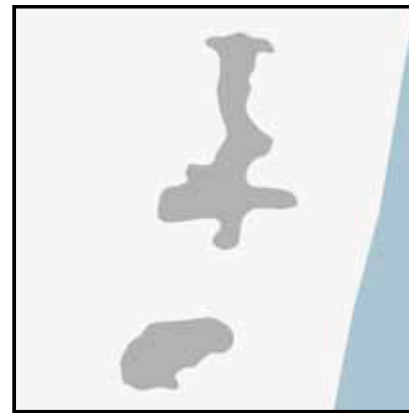
** Includes wetlands located with 1/4 mile of a river or stream

The City's **wildlife habitat model** assigns relative rankings of high, medium, or low to mapped habitat patches based on their size, shape, and connectivity to other patches or water bodies.

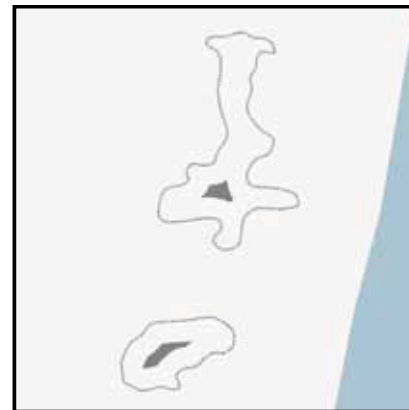
- **Habitat Patch Size — Low:** 2 to 30 acres in size; **Medium:** 30 to 585 acres in size; **High:** at least 585 acres in size
- **Interior Habitat Area (forest/wetland area net 200 ft. buffer around patch perimeter) — Low:** 2 to 15 acres; **Medium:** 15 to 500 acres; **High:** at least 500 acres
- **Connectivity between patches —** estimated using a “proximity index,” (Fragstats 3.3), measures relative size and distance between patches; **Low:** index value less than 30; **Medium:** index value between 30 and 100; **High:** index value at least 100
- **Connectivity/proximity to water —** **Low:** less than 25% of patch is within 300 feet; **Medium:** between 25% and 75% of patch is within 300 feet; **High:** at least 75% of patch is within 300 feet of a river, stream, or wetland



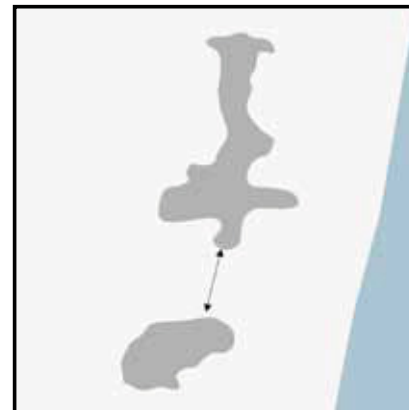
RAMSEY LAKE



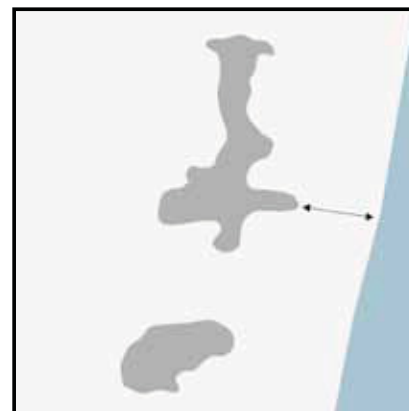
HABITAT PATCH SIZE



PATCH SHAPE/INTERIOR AREA



CONNECTIVITY BETWEEN PATCHES



PROXIMITY TO WATER

City refinements to regional mapping/

ranking criteria: The City's inventory models are comprised of the same general mapping criteria that Metro developed for the regional inventory, however, the City has refined and "customized" some of the regional criteria to reflect additional detail and local information. For example, the City's riparian corridor mapping criteria are more detailed in terms of the functions provided by wetlands and by different vegetation types (e.g., lawn vs. tree canopy or more complex assemblages).

The City's mapping criteria reflect differences in how riparian areas function within local drainage districts (where flows, water levels, and channels are heavily managed). Drainage districts manage the levee system, drainage channels, and flows to prevent flooding in the Columbia Corridor. However, even within the managed floodplain, resources provide important functions including water quality and habitat.

Also, the inventory has been refined to reflect the extent of river bank hardening and reduced overall function in the North Reach of the Willamette River.

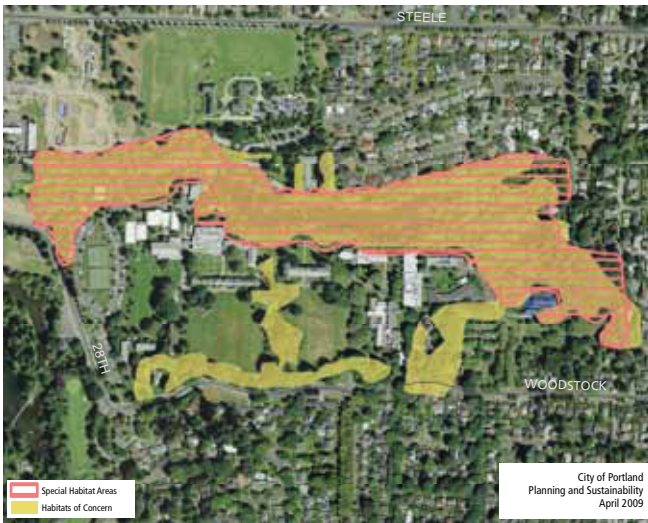
The City's mapping criteria assigns wildlife habitat function to woodland vegetation that is adjacent to core forest/wetland patches. (Metro included only forest vegetation and wetlands in the regional habitat patches). In addition, the regional criteria for patch size, interior habitat area, and connectivity have been scaled to correlate more closely with Portland's urban conditions, and to incorporate information from more recent local research. For example, the regional criteria assigns Oaks Bottom and Ross Island low ranks for habitat patch size compared to all the habitat patch sizes in the region. Applying the City's scaled criteria, Oaks Bottom and Ross Island receive medium relative ranks for habitat patch size.



OAKS BOTTOM WILDLIFE REFUGE/ROSS ISLAND



COLUMBIA SLOUGH AND LEVEE



COMPARISON METRO HABITAT CONCERN AND PORTLAND SPECIAL HABITAT AREA: REED LAKE/CRYSTAL SPRINGS CREEK



LINNTON BEACH



PEREGRINE FALCON ON THE ST. JOHNS BRIDGE (COURTESY OF BOB SALLINGER)

3 Designated Special Habitat Areas and updated Metro’s regional species lists.

The Bureau of Planning and Sustainability worked with the Bureaus of Environmental Services and Parks and Recreation to update regional Habitats of Concern that Metro had designated within the city.

The City inventory refers to “Habitats of Concern” as “Special Habitat Areas.” The new name is meant to focus attention on the special role of these areas. Special Habitat Areas contain or support sensitive/threatened fish or wildlife species, sensitive/unique plant populations, wetlands, native oak stands, grasslands, bottomland hardwood forests, riverine islands, migratory bird stopover areas and connectivity corridors.

Special Habitat Areas (SHA) include some natural resource features not addressed by inventory mapping models. These areas are also mapped more generally than the landscape features which serve as inputs to the riparian and wildlife models. Therefore the SHA boundaries may extend beyond the specific landscape features.

The City inventory has produced more detailed SHA boundaries and eligibility criteria than were developed for the regional Habitats of Concern.

For example, the City has included waterways that are designated Critical Habitat Areas under the Endangered Species Act. These include the Willamette River, Johnson and Kelley Creeks, and portions of Tryon Creek and the Columbia Slough. They also include beaches along the Willamette River. The designation of Willamette beaches is based on a four-year study conducted by the Oregon Department of Fish and Wildlife (2005). The study found significant correlations between Willamette River beaches and the occurrence of listed salmonids in the river.

The City has also designated several structures as Special Habitat Areas such as chimney roosting sites for Vaux’s Swifts and several bridges on the Willamette and Columbia rivers that provide nesting sites for Peregrine Falcons. In addition, the City has “localized” the regional fish and wildlife species lists to include only those that are either known or expected to occur in the city.

4 Produced resource ranking maps based on GIS model results and information on Special Habitat Areas.

The City developed formulae to rank and map the relative functionality of riparian corridor and wildlife habitat areas. The City's ranking formulae are similar to those Metro used for the regional inventory. Riparian corridors and wildlife habitat are ranked "high," "medium," or "low," based on the aggregated GIS model-based scores for specific functions and attributes. In addition, all Special Habitat Areas receive a high rank which supersedes lower model-based ranks for wildlife habitat. The City can produce maps showing the overall riparian corridor and wildlife habitat ranks. The City has also produced a combined riparian corridor/wildlife habitat rank and a single relative ranking map. Where riparian corridors and wildlife habitat areas overlap, the higher of the two relative rankings is retained on the combined inventory map.



5 Consulted with experts to ensure that City refinements are appropriate.

The Bureau of Planning and Sustainability worked closely with Metro and the Bureau of Environmental Services to ensure that the refinements to the regional inventory would be consistent with Metro's work and would support the City's watershed health goals.

"Wetlands, even away from a stream channel, affect nutrient processing, microbial production, etc. The hydrologic connection between streams and wetlands is not always apparent from the surface topography."

Nancy Munn

NOAA/National Marine Fisheries Service
June 21, 2006

In May 2006, the Bureau of Planning and Sustainability convened a group of technical experts to review the City's proposed refinements to Metro's regional inventory methodology. The technical reviewers included representatives from U.S. Fish and Wildlife Services, Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, Metro, Multnomah County Drainage District, Audubon Society of Portland, Port of Portland, Portland State University, and consulting companies in environmental science and planning-related fields.



STEPHENS CREEK AT APARTMENT COMPLEX

On scaling the habitat patch size to reflect smaller patches in the City:

"Overall this change appears very sound . . . My one concern is with the 2-acre minimum at the low end...some species of native flora and fauna may yet thrive in smaller patches . . ."

Dr. Alan Yeakley
PSU, July 16, 2006

The technical reviewers provided valuable critique, information, insights, and suggestions. They concurred with many parts of the inventory update proposal, commending the City for incorporating more recent data and locally-based research. Reviewers also raised concerns and provided valuable suggestions to improve several parts of the proposal.

“I support ascribing a lower functional value to lawns... given their potential negative contributions (e.g., pesticides, nutrients, bacteria).”

Karen Font Williams

Oregon Department of Environmental Quality
June 13, 2006

For example, while most reviewers agreed with the proposal to downgrade rankings assigned to riparian corridors dominated by herbaceous vegetation (i.e., without trees or woody vegetation), a number of reviewers had concerns because even low-functioning riparian corridors still provide important functions and may have high restoration potential. The reviewers' input helped to hone and clarify some of the refinements, and led to some changes to the City's mapping and Special Habitat Area designation criteria.

The City also engages technical reviewers during focused NRI updates for area-specific planning projects such as the River Plan/North Reach and Airport Futures.

On ranking herbaceous riparian vegetation lower than trees and woody vegetation:

“My concern is whether by taking this approach the restoration potential of a site is lost.”

Mike Houck

Urban Greenspaces Institute
July 12, 2006

SAMPLE MAPS

The two map series presented on the next pages show the City's inventory “building blocks” for different areas of the city: 1) Southwest Hills and Willamette River, including Ross Island, and 2) Johnson Creek, Kelley Creek and Powell Butte. The maps are presented in the following order to demonstrate how natural resource features provide the basis mapping and ranking riparian corridor and wildlife habitat functions and values.

1. **Aerial photo** — 2005 aerial of the area and main arterial streets, which are labeled
2. **Riparian Resources** — water bodies, streams (both open channels and piped), wetlands and flood areas
3. **Vegetation** — forest, woodland, shrubland and herbaceous cover
4. **Riparian corridor relative ranks**
5. **Wildlife habitat relative ranks** — including Special Habitat Areas Special Habitat Areas
6. **Combined relative riparian and wildlife habitat ranks**

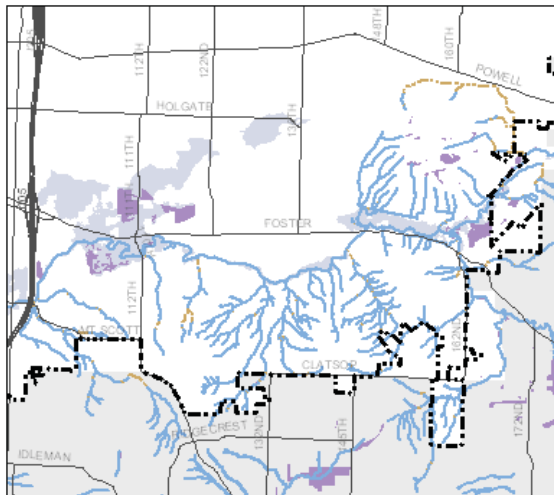
**Johnson Creek and Powell Butte
 Natural Resource Inventory
 map series**



Natural Resources Inventory Update
 Johnson Creek/Powell Butte

- City Boundary
- Arterials

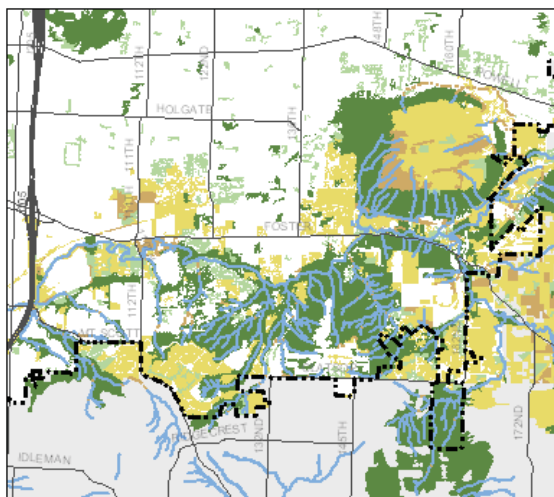
City of Portland
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 October 2010



Natural Resources Inventory Update
 Johnson Creek/Powell Butte
 Water Features

- City Boundary
- Arterials
- Water Features
 - stream/drainageway
 - piped stream/drainage segment
 - wetlands
 - flood area

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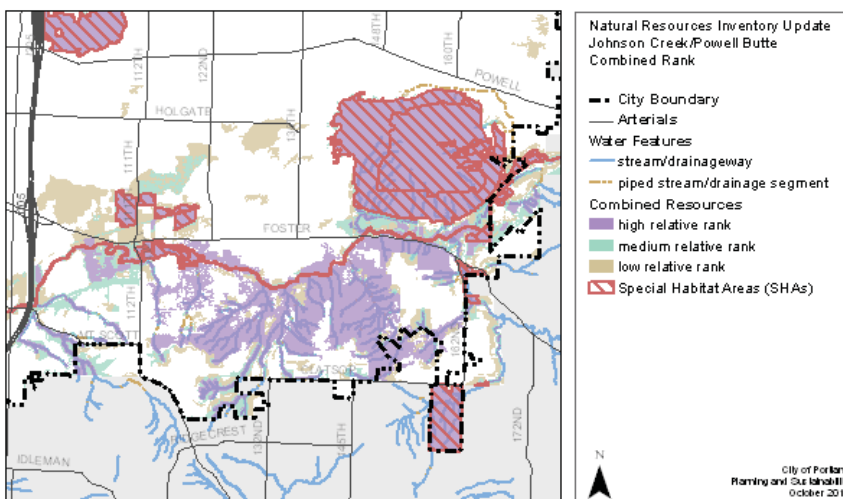
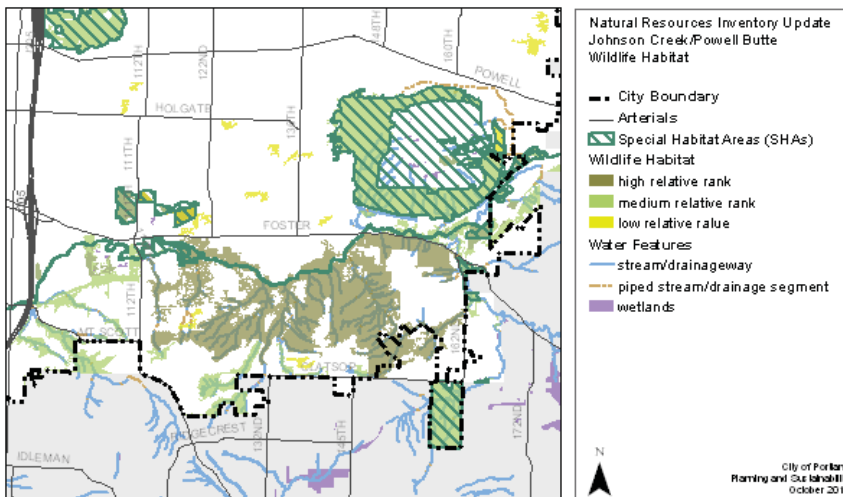
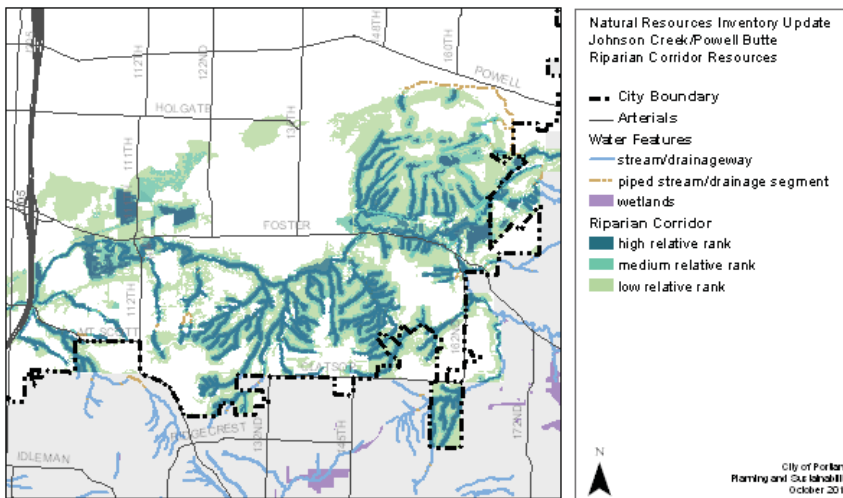


Natural Resources Inventory Update
 Johnson Creek/Powell Butte
 Vegetation

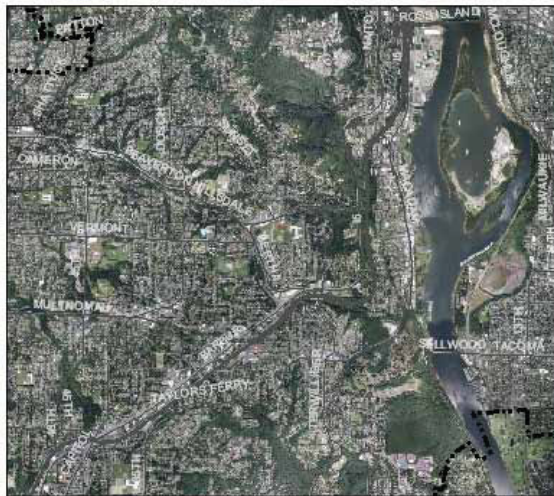
- City Boundary
- Arterials
- Water Features
 - stream/drainageway
 - piped stream/drainage segment
- Vegetation
 - forest
 - woodland
 - shrubland
 - herbaceous

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 Planning and Sustainability
 October 2010

Johnson Creek and Powell Butte Natural Resource Inventory map series



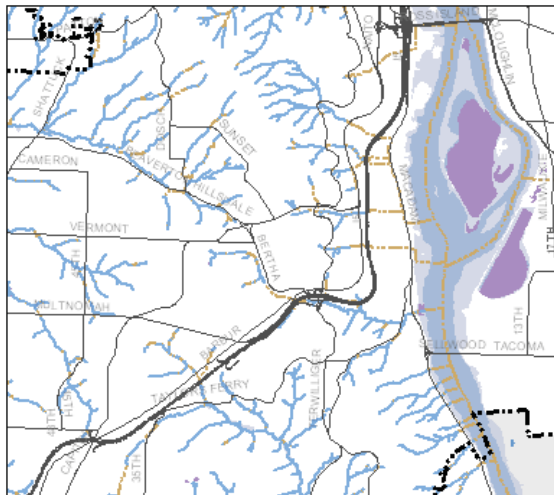
**Southwest Hills,
 Willamette River
 and Ross Island
 Natural Resource Inventory
 map series**



Natural Resources Inventory Update
 SW Hills/Willamette River/Ross Island

- City Boundary
- Arterials

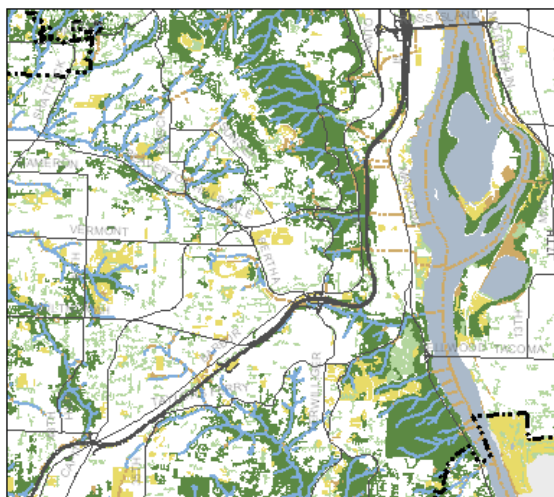
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 October 2010



Natural Resources Inventory Update
 SW Hills/Willamette River/Ross Island
 Water Features

- City Boundary
- Arterials
- Wetlands
- Water Features
- stream/drainageway
- piped stream/drainage segment
- flood area

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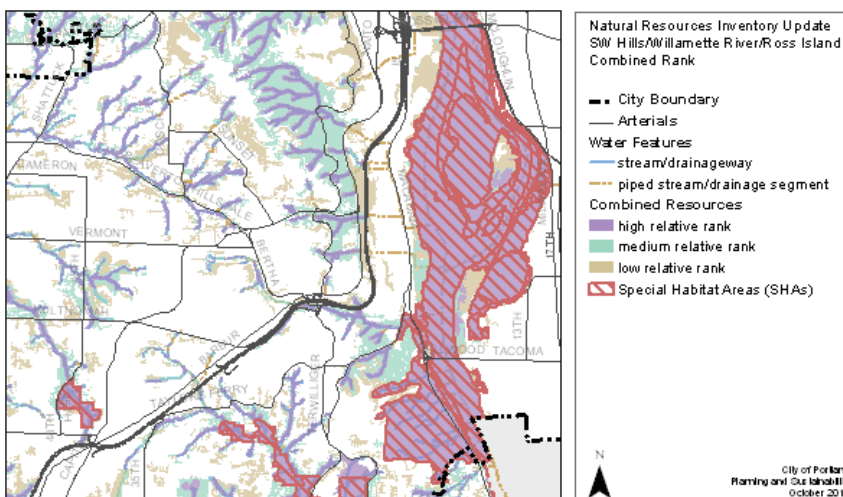
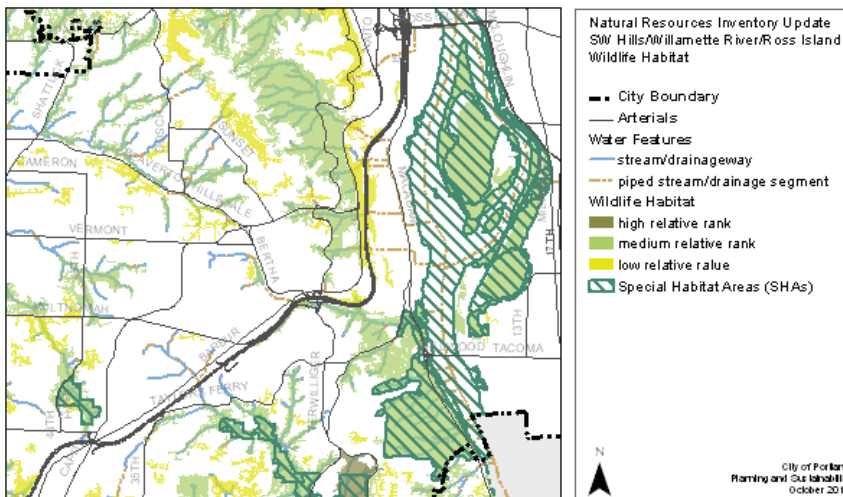
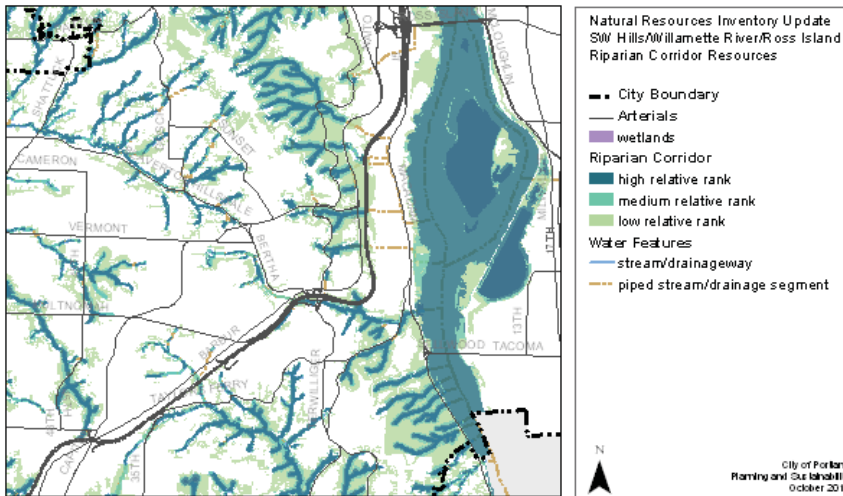


Natural Resources Inventory Update
 SW Hills/Willamette River/Ross Island
 Vegetation

- City Boundary
- Arterials
- Vegetation
- forest
- woodland
- shrubland
- herbaceous
- Water Features
- stream/drainageway
- piped stream/drainage segment

City of Portland
 Planning and Sustainability
 October 2010

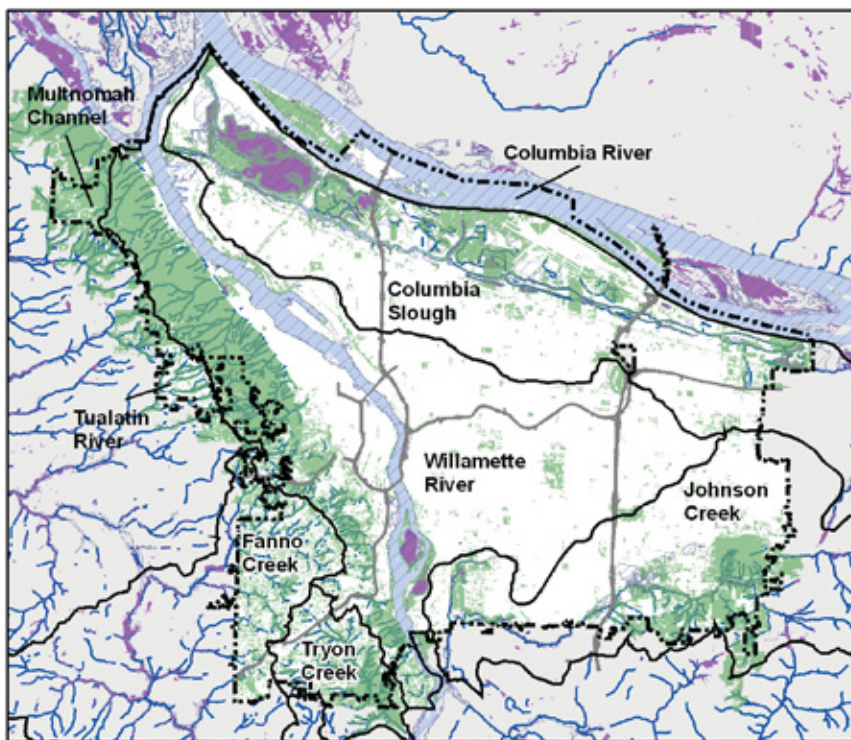
Southwest Hills, Willamette River and Ross Island Natural Resource Inventory map series



PROJECT RESULTS, PRODUCTS AND USES

CITYWIDE RESULTS AND COMPARISON TO METRO'S REGIONAL INVENTORY

The City's inventory identifies 23,150 acres of riparian resources, 17,840 acres of wildlife habitat, and 13,225 acres of Special Habitat Area citywide, including portions of Multnomah County located within Portland's Urban Service Boundary. Accounting for the overlap between these areas, the updated inventory totals 26,365 acres of ranked resource areas on the land, including 298 miles of streams and 2,520 acres of wetlands. Portions of the Willamette and Columbia rivers within the City comprise an additional 6,530 acres of ranked open water resources. The total mapped and ranked resource area represents roughly 34% percent of the area of the City of Portland and Multnomah County pockets.



Natural Resources Inventory Update Landscape Features

--- City Boundary	Vegetation	N	City of Portland Planning and Sustainability April 2005
Watershed Boundary	Flood Area		
Freeways	Wetlands		
open stream channel	River		

City Rankings: Riparian corridors and/or wildlife habitat in Portland

High Relative Riparian/Wildlife Habitat Value:	18,190 acres	69%
Medium Relative Riparian/Wildlife Habitat Value:	3,905 acres	15%
Low Relative Riparian/Wildlife Habitat Value:	4,270 acres	16%
Total	26,365 acres	100%

Note: Does not include inventoried area of the Willamette and Columbia rivers

Metro Rankings: Riparian corridors and/or wildlife habitat in Portland

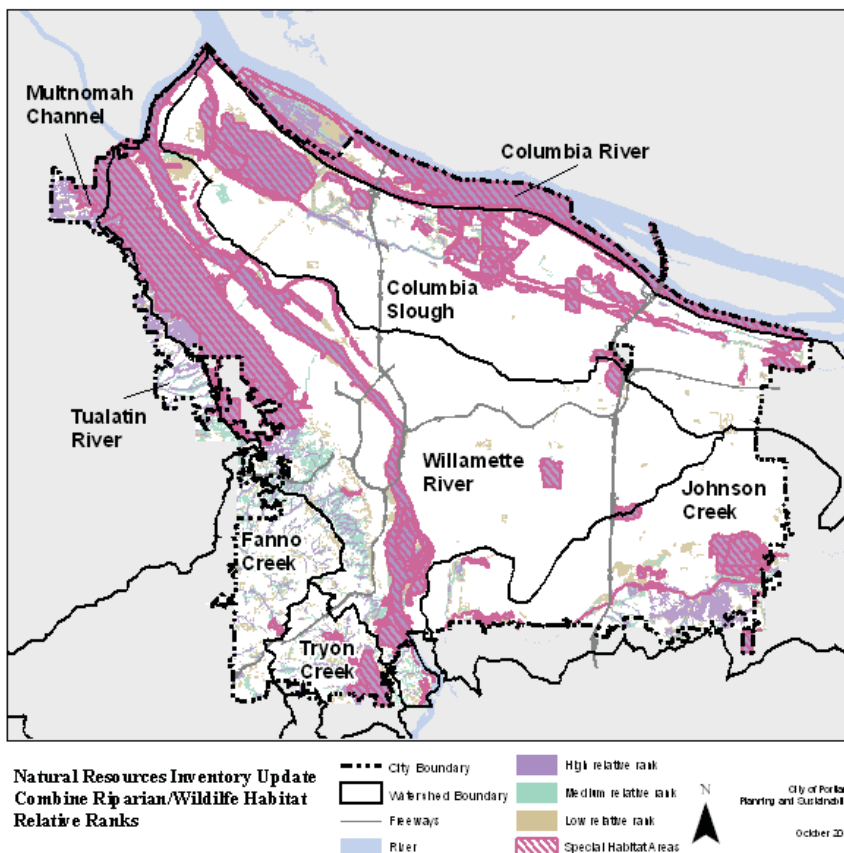
Class I Riparian/Class A Upland Wildlife Habitat:	18,220 acres	77%
Class II Riparian/Class B Upland Wildlife Habitat:	3,117 acres	13%
Class III Riparian/Class C Upland Wildlife Habitat:	2,447 acres	10%
Total	23,783 acres	100%

Note: Does not include Willamette and Columbia Rivers

Overall, the City’s inventory results are generally consistent with Metro’s regional inventory. Differences between the two inventories reflect City updates and refinements to the regional natural resource data, mapping/criteria, and Special Habitat Areas. As such, it is appropriate to use the City’s inventory in lieu of the regional inventory for planning purposes.

The City inventory contains approximately 2,582 acres or about 11 percent more total resource area than Metro included in the regional inventory. The City’s rankings are somewhat lower overall than the rankings produced for the regional inventory. The City assigns “high” relative rankings to approximately two-thirds of the identified resource areas, while Metro assigns “high” rankings to about three-quarters of the resource areas in Portland.

Conversely, the City has assigned “medium” or “low” relative resource rankings to approximately one-third of the resource areas while Metro assigned lower rankings to about one-quarter of the resource areas in the City. Special Habitat Areas total about 13,225 acres, approximately 1,930 acres more than Metro included in the regional Habitats of Concern for Portland.



WATERSHED-SPECIFIC RESULTS

The city landscape is very diverse. It is interesting to review the current natural resource inventory results for each of Portland's watersheds.

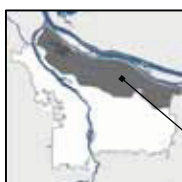
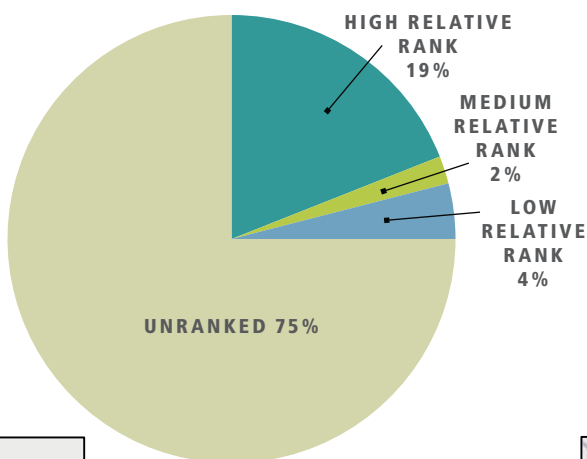
Columbia Slough

The Columbia Slough watershed is relatively large, comprising almost 30 percent of the inventory project area. The Columbia Slough contains the vast majority of the remaining wetland area in the city, a considerable portion of the remaining active floodplains, but only about 56 miles, or 19 percent of the stream miles in the city. The watershed is almost 40 percent impervious and most of the larger vegetated areas are comprised solely of herbaceous vegetation. The watershed contains nearly the largest total area of inventoried riparian corridors and wildlife habitat, resources (with the exception of the Willamette Watershed). However, inventoried resources represent only 25 percent of the watershed area which is the lowest percentage of natural resources of any of the City's watersheds. Still, more than 3/4 of the inventoried resources receive a high relative rank. In addition, this watershed contains 28 Special Habitat Areas, including Smith and Bybee Wetlands, Big Four Corners, Rocky Butte and the Grotto, the Wilkes Creek headwaters and a number of areas that support grassland species. These areas make up roughly 4,695 acres or about 17 percent of the watershed area.

Fanno Creek Watershed

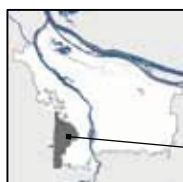
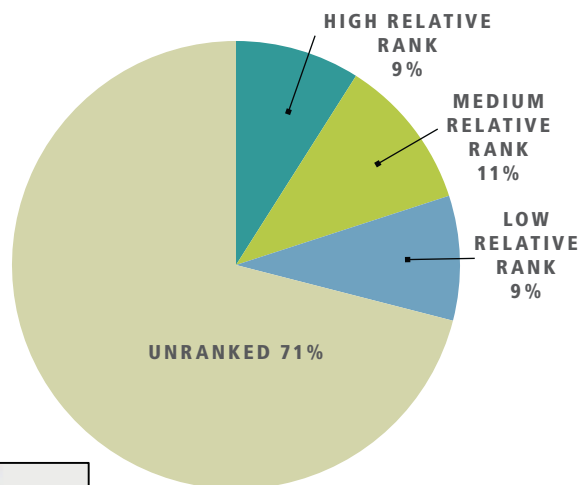
The Fanno Creek watershed comprises only about 5.5 percent, but contains approximately 9 percent, of the stream miles in the inventory project area. The watershed is 22 percent impervious. Most of the larger vegetated areas contain forest/tree canopy. Inventoried riparian corridors and wildlife habitat areas make up 29 percent of the watershed. This is the highest percentage of identified resources in any of the City's watersheds. That said, only about 1/3 of the inventoried resource areas in the watershed receive a high relative rank. The watershed contains 32 acres of Special Habitat Areas, primarily in Woods Memorial Park. This area provides important connectivity between larger habitat areas.

COMBINED RIPARIAN CORRIDOR/WILDLIFE HABITAT RESOURCE RANKS
COLUMBIA SLOUGH WATERSHED
WATERSHED AREA = 27,216 ACRES



COLUMBIA SLOUGH WATERSHED

COMBINED RIPARIAN CORRIDOR/WILDLIFE HABITAT RESOURCE RANKS
FANNO CREEK WATERSHED
WATERSHED AREA = 5,135 ACRES



FANNO CREEK WATERSHED

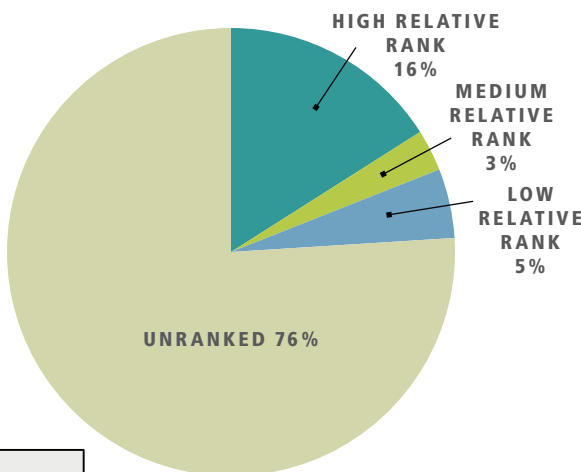
Johnson Creek Watershed

The Johnson Creek Watershed in Portland represents about 14 percent of the inventory project area. The watershed is about 28 percent impervious. About 67 percent of the larger vegetated areas are comprised of forest/tree canopy, woodland or shrubland cover, while about 33 percent is herbaceous vegetation. The watershed contains about 48 miles, or 16 percent of the stream miles and a considerable portion of the remaining active floodplain in the city. About 1/2 of the floodplain area is vegetated and about 43 percent of the floodplain area is developed. About 5 percent is in open water. Inventoried riparian corridors and wildlife habitat areas make up 24 percent of the Johnson Creek watershed area. Almost 2/3 of these resource areas receive a high relative rank. Thirteen Special Habitat Areas are designated in the Johnson Creek Watershed, including Powell Butte, Tideman Johnson Park, the Springwater Wetlands Complex, the Kelley Creek Refuge, and Johnson Creek itself. Special Habitat Areas total approximately 1,045 acres, or almost 8 percent of the watershed area.

Tryon Creek Watershed

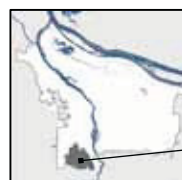
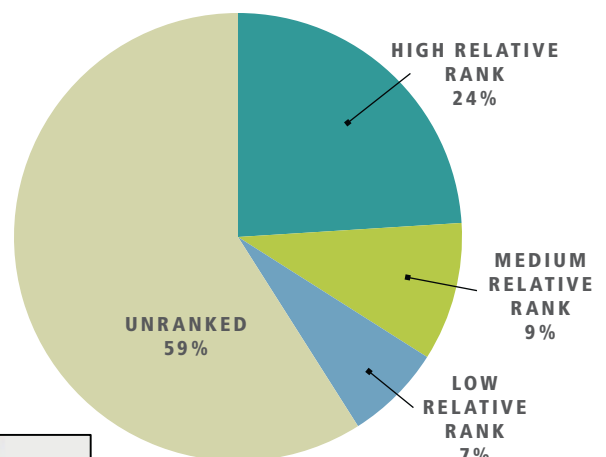
The Tryon Creek Watershed is the smallest watershed in the city and comprises only about 3.5 percent of the inventory project area. The watershed contains about 24 miles, or 8 percent of the stream miles in the city and is about 17 percent impervious. About 85 percent of the larger vegetated patches are comprised of forest or woodland vegetation. Inventoried resource areas comprise about 40 percent of the watershed area, which is the highest percentage of the watersheds. About 60 percent of the resource areas receive a high relative rank. Tryon Creek State Park is a substantial portion of the resource area in the watershed. The park is also designated Special Habitat Area (SHAs), along with several other small areas. Special habitat areas total 479 acres, or about 15 percent of the watershed.

COMBINED RIPARIAN CORRIDOR/WILDLIFE HABITAT RESOURCE RANKS
JOHNSON CREEK WATERSHED
 WATERSHED AREA = 13,660 ACRES



JOHNSON CREEK WATERSHED

COMBINED RIPARIAN CORRIDOR/WILDLIFE HABITAT RESOURCE RANKS
TRYON CREEK WATERSHED
 WATERSHED AREA = 3,290 ACRES



TRYON CREEK WATERSHED

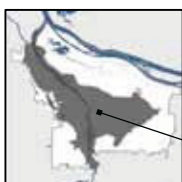
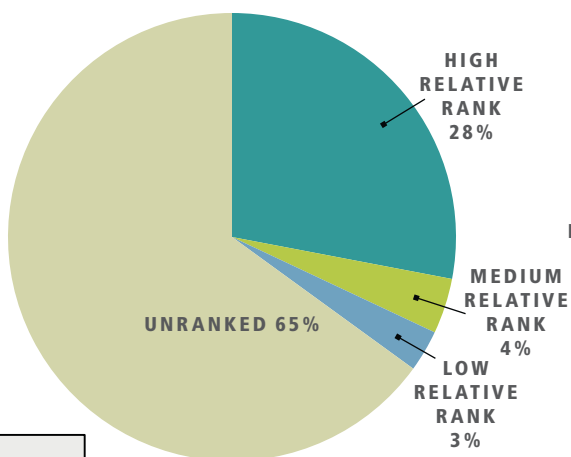
Willamette Watershed

The Willamette is the largest of the watersheds in the city and comprises about 41 percent of the inventory project area. It contains 122 miles, or about 40 percent of the stream miles in the city, including the Willamette River mainstem. The watershed is about 33 percent impervious on average, though the level of impervious coverage varies considerably in different parts of this diverse watershed. The watershed contains substantial flood area areas, however nearly 60 percent of the flood areas (not including open water areas) are developed. More than 80 percent of the larger vegetated patches in the watershed are in forest vegetation cover, however the majority of the forested area is located within the City's 5,000-acre Forest Park. About 35 percent of the total watershed area consists of inventoried riparian corridors and wildlife habitat areas. More than 80 percent of this resource area receives a high relative rank. About 9,616 acres of the high-ranked resources are located within 23 designated Special Habitat Areas including the Willamette River mainstem, Oaks Bottom Wildlife Refuge, the Ross Island complex, and areas of bottomland forest and mudflats along the river. Special Habitat Areas also include Forest Park and the upland oak bluffs that parallel the east side of the river. More than 1/2 of the inventoried resources in the Willamette watershed, and much of the high-ranked resource areas, consist of Forest Park and the Willamette River mainstem channel.

Other Watersheds

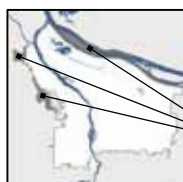
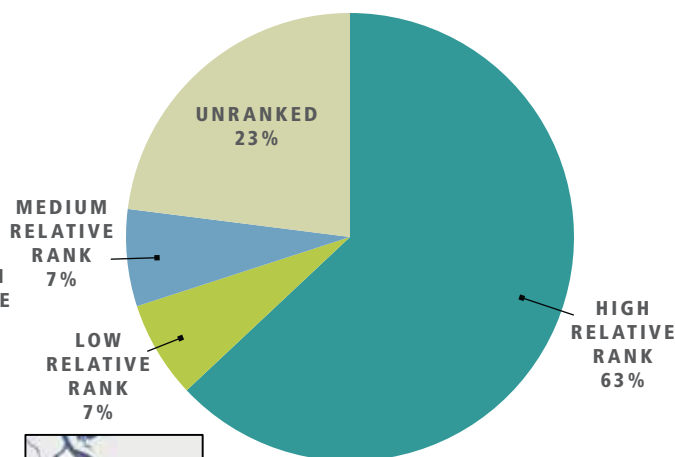
Portions of the Columbia River, Multnomah Channel and Tualatin River watersheds are located outside the Portland City limits but within the Urban Service Boundary. West Hayden Island is included. The largest portions of this area consist of land north and west of Forest Park, and portions of the Columbia River banks and channel. The "other watersheds" represent about 8 percent of the inventory study area and contain 28 miles, or about 9 percent of the total stream miles located therein. Approximately 11 percent of these areas are covered with impervious surfaces which is lower than in any of the other watersheds in Portland. Inventoried riparian corridors and/or wildlife habitat comprise about 77 percent of these areas. Approximately 82 percent of the resource areas receive a high relative resource rank. Special Habitat Areas include the Columbia River and portions of the land adjacent to Forest.

COMBINED RIPARIAN CORRIDOR/WILDLIFE HABITAT RESOURCE RANKS
WILLAMETTE WATERSHED
WATERSHED AREA = 39,159 ACRES



WILLAMETTE WATERSHED

COMBINED RIPARIAN CORRIDOR/WILDLIFE HABITAT RESOURCE RANKS
OTHER WATERSHEDS
WATERSHED AREA = 8,075 ACRES



OTHER WATERSHEDS

PRODUCTS AND USES

Products

City staff, other agencies and organizations, and citizens now have access to updated information about Portland's natural resources. Maps of local streams, wetlands, flood areas and vegetation are available online, by logging onto www.portlandmaps.com. Maps can be viewed for individual properties and nearby areas.

As data regarding the location and extent of natural resources is refined, the online maps can be updated.

New GIS modeling tools have been developed to map Portland's riparian corridors and wildlife habitat, and to assess their relative functional value. Resource rankings have also been produced in draft map form. Maintaining the GIS data and modeling tools will allow the City to update the inventory information data to reflect changing conditions in Portland's watershed. Species lists and special habitat information for Portland are also available.

Updates to City inventories for the Willamette River areas around the Portland International Airport and Hayden Island are currently underway.

Uses

The inventory maps and reports will inform an array of City and community activities, including setting priorities for land acquisition and restoration, updating local regulatory programs, and developing strategies to comply with various regional, state, and federal regulations.

Draft inventory products are already being put to good use. Metro incorporated the City's updated stream data to revise the regional inventory of riparian corridors and wildlife habitat. The City used the draft inventory maps to inform development of the *Portland Watershed Management Plan*. Draft inventory maps are also informing the development of a new City Terrestrial Ecology Enhancement Strategy. The City and Metro have used draft inventory information to help identify local and regional land acquisition priorities.

Area-specific versions of the updated inventory information will inform upcoming updates to the City's existing Willamette Greenway program and the environmental zoning program. The inventory will also support City efforts to comply with regional, state and federal regulatory requirements, including Metro's Title 3 and 13, Clean Water Act, and the Endangered Species Act.

Finally, the inventory provides a useful tool for reaching out to citizens and community organizations. Inventory maps can be used to prioritize public education and outreach activities, and to identify potential partnership opportunities.

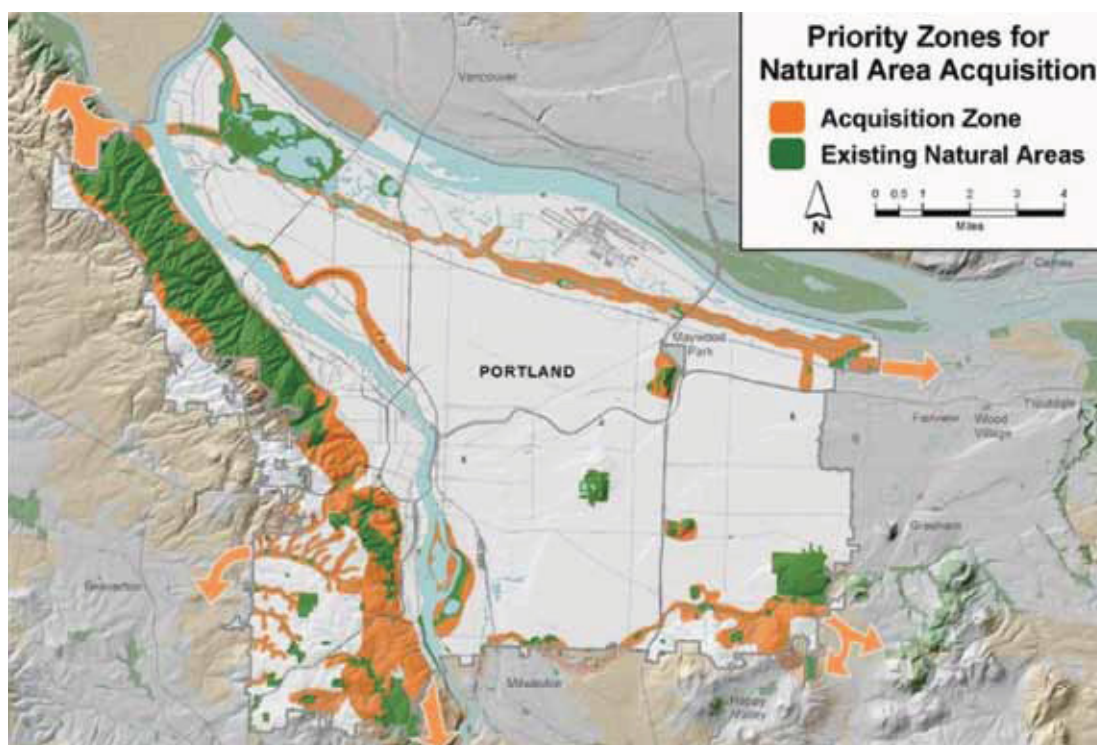


WEST HAYDEN ISLAND

KEY POINTS

The following points are important to remember when considering the products and uses of the updated natural resource inventory information:

- **The inventory is “information only”** and will inform a broad array of activities and does not propose any specific programs or regulations.
- **The new inventory information can be put to a number of uses, but will not automatically replace Portland’s adopted inventories.** Inventories used to inform land use decisions will be updated through area-specific or citywide legislative projects, such as the River Plan.
- **The inventory addresses multiple watershed functions (not just a habitat inventory), and reflects Portland’s urban landscape:**
 - **The inventory includes “natural” and “constructed” features** that contribute to the functional values of riparian corridor and wildlife habitats in the city.
 - **The conditions of inventories resources range from relatively good to highly degraded.** Most resource areas in the city are affected to some extent by human disturbance, invasive species, and other factors. Degraded areas still contribute to important watershed functions in the city and the region. Knowing which areas are high and low functions will help set priorities for protection and restoration.
- **The inventory maps reflect current information and technologies, both of which will evolve over time.** State-of-the-art mapping tools will allow the Bureau to incorporate new citywide or site-specific information as it becomes available.



CITY OF PORTLAND NATURAL AREA ACQUISITION STRATEGY, 2006

STATUS OF INVENTORIED NATURAL RESOURCES AND NEXT STEPS



MT. HOOD FROM WEST HAYDEN ISLAND

As noted, the City will use the updated Natural Resource Inventory to meet its multiple regulatory obligations and inform a variety of programs and projects that improve watershed health. The inventory will also inform the City's comprehensive plan to shape Portland's future over the long-term. In support of these efforts, this report section will:

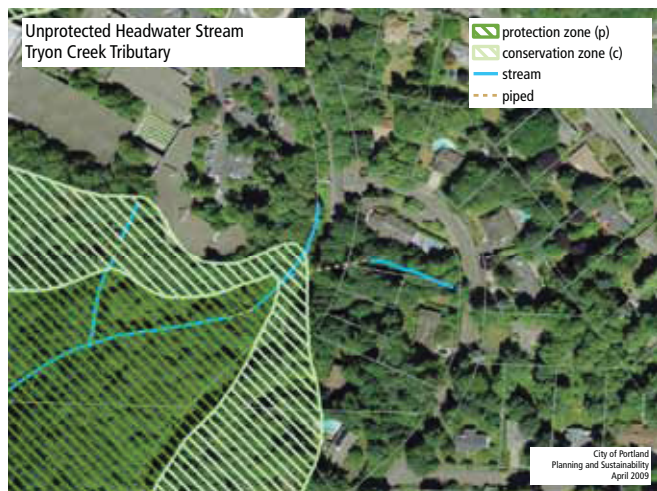
- Summarize the extent to which inventoried natural resources:
 - are currently protected by City zoning regulations; and
 - overlap with key Region 2040 planning areas;
- Identify current compliance obligations and strategies relating to inventoried natural resources in Portland; and,
- Present key issues and questions that should be addressed through the Portland Plan project and associated *Comprehensive Plan* Update.

INVENTORIED NATURAL RESOURCES: EXISTING PROTECTIONS

Natural Resource Features

Over the past 30 years the City has strived to protect and restore important natural areas using various tools including zoning regulations, public outreach, restoration projects, and land acquisition programs. The City applied environmental and greenway overlay zones to protect and conserve natural resources identified in early natural resource inventories. Comparing the updated natural resource inventory with the existing natural resource overlay zones and publicly owned land indicates where important natural resources are more or less protected, and where the overlay zones need correcting or updating.

For example, there are 298 miles of identified river and open stream channel in Portland. Approximately 90 percent of those rivers and streams are located within existing environmental and greenway overlay zones, while the remaining 10 percent are outside the overlay zones. Primarily, it is the headwaters of tributary streams and a number of secondary drainages in the Columbia Slough Watershed that are unprotected.



UNPROTECTED STREAM

There are approximately 2,520 acres of identified wetlands in Portland; 95 percent of which are within and almost five percent are outside existing resource overlay zones.

The updated Natural Resource Inventory can also be used in evaluating the condition of the City's riparian corridors. For example, there are 4,590 acres of land within 50 feet of a river or stream in Portland. About 62 percent of that area is covered with forest vegetation patches of at least one-half acre. Between 50 and 100 feet from our rivers and streams that percentage drops to about 55 percent. More than 30% of the forested areas within 100 feet of a river or stream are in private ownership and about 5 percent of the privately owned area is outside existing resource overlay zones.



FORESTED RIPARIAN AREA



DEVELOPMENT AND INVASIVE PLANTS IN RIPARIAN AREA

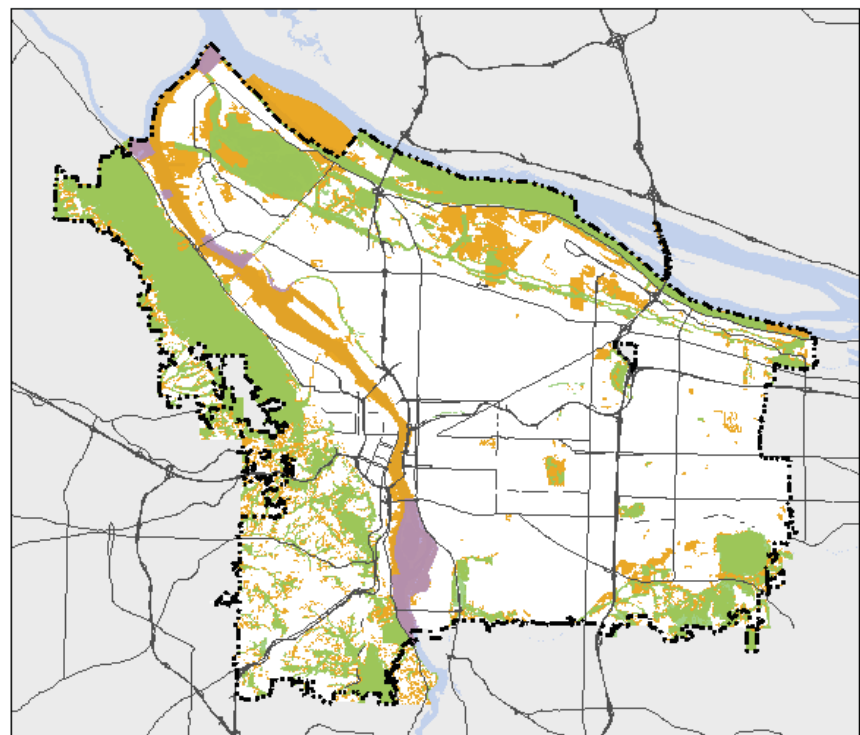
Approximately 15 percent of the land within 50 feet of Portland’s rivers and streams contains no vegetated areas of one-half acre or greater. Between 50 and 100 feet from a river or stream, approximately 25 percent of the area contains no vegetated patches one-half acre or greater. These highly fragmented riparian corridors are approximately 80 percent in private ownership.

The extent to which stream corridors are vegetated varies by watershed as well. For example, in the Johnson Creek Watershed about 60 percent of the land within 50 feet of a stream is covered in forest patches of at least one-half acre. In the Columbia Slough Watershed only 20 percent of the land within 50 feet of a stream or drainage is covered in forest patches of at least one half acre. In both watersheds almost half of the land 0–50 feet from a stream or drainage way is in private ownership.

Ranked Natural Resource Areas — Citywide

As was described earlier, natural resource features are assessed for the ecologic functions they provide — microclimate effect, stream flow moderation, nutrient cycling, wildlife habitat, etc. All natural resource features that provide a function receive a rank in the inventory; the more functions a resource provides the higher the rank. Collectively, resource areas that provide ecologic functions are referred to as ‘natural resource areas.’

Approximately two thirds of the 26,365 acres of identified natural resource areas in Portland (not including the Willamette and Columbia rivers) is within existing City environmental or greenway overlay zones. About one-third of the area’s resources is outside existing overlay zones.



Natural Resources Inventory Update
Resource Areas and Existing
Environmental Overlay Zones

- City Boundary
- Environmental overlay zones (C, P, V)
- Greenway overlay zones (A, D)
- Identified Natural Resource Areas

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Approximately three-quarters of the inventoried resource areas in Portland receive a high overall relative rank in the updated Natural Resource Inventory. High-ranked resource areas generally are rivers, streams, wetlands, forested areas and vegetated flood areas. Approximately 80 percent of the high-ranked resource areas are within existing resource overlay zones. Medium- and low-ranked resources each comprise about one-quarter of the identified resource areas. About one-half of the medium-ranked resource areas and less than 20 percent of the low-ranked resource areas are within existing resource overlay zones, respectively.

NATURAL RESOURCE AREAS WITHIN AND OUTSIDE RESOURCE OVERLAY ZONES TOTAL = 25,246

WITHIN RESOURCE OVERLAY ZONES	BY RANK		OUTSIDE RESOURCE OVERLAY ZONES	BY RANK	
17,035	High	14,350	9,405	High	3,915
	Medium	1,895		Medium	2,010
	Low	790		Low	3,480

It is also important to consider the different levels of protection applied to the inventoried natural resource areas.

Protection of High Ranked Resources — Approximately 52 percent of the high-ranked resource areas are within the environmental protection overlay zone which strictly limits development. About 23 percent of the high-ranked resource areas are within the environmental conservation zone, which applies less stringent limitations on development but does require mitigation for unavoidable impacts. About 3 percent of the high-ranked resource areas are within greenway and Pleasant Valley overlay zones. Approximately 21 percent of the high-ranked resource areas are entirely outside the overlay zones.

Protection of Medium-Ranked Resources — Roughly 10 percent of the medium-ranked resource area is within the environmental protection overlay zone, while about 35 percent is within the environmental conservation zone. Just over 2 percent of the medium-ranked resource area is within greenway and view overlays. About 51 percent of the medium-ranked resources are outside the existing overlay zones.

Protection of Low-Ranked Resources — The low-ranked natural resource area is largely outside existing environmental overlay zones. Only 2 percent is within the environmental protection overlay zone while almost 14 percent is within the environmental conservation overlay zone. About 2 percent of this area is within greenway or view overlays. Approximately 82 percent of the low-ranked resource area is outside existing overlay zones.

COMPARISON OF INVENTORIED NATURAL RESOURCES AND EXISTING RESOURCE OVERLAY ZONING CITYWIDE (ACRES)*

	OVERLAY P-ZONE	C-ZONE	N-OR Q-ZONE	V-ZONE	NONE	TOTAL
High-ranked	9,431	4,254	619	44	3,915	18,263
Medium-ranked	414	1,389	53	39	2,009	3,905
Low-ranked	94	605	67	25	3,479	4,270
Total-ranked	9,939	6,248	740	108	9,403	26,437
No NRI rank	116	1,010	111	23	—	1,260

Ranked Natural Resource Areas — by Watershed

The distribution of inventoried natural resources, overlay zones, and ownership characteristics also varies by watershed.

For example, in the Columbia Slough Watershed about 60 percent of the 5,854 acres of high- and medium-ranked resource area is within existing overlay zones. About 37 percent of the high- and medium-ranked resource area located outside the overlay zones is in private ownership.

In comparison, about 84 of the high- and medium-ranked resource areas in the Tryon Creek Watershed are within existing overlay zones. In this watershed about 93 percent of the high- and medium-ranked resource areas located outside City overlay zones is in private ownership.

COMPARISON OF INVENTORIED NATURAL RESOURCES AND EXISTING RESOURCE OVERLAY ZONING CITYWIDE (ACRES)*

	HIGH RANK		MEDIUM RANK		LOW RANK		TOTAL
	OVERLAY	NO OVERLAY	OVERLAY	NO OVERLAY	OVERLAY	NO OVERLAY	
Columbia Slough	3,226	1,971	296	361	128	892	6,875
Fanno Creek	385	94	213	340	93	371	1,496
Johnson Creek	1,886	252	241	217	159	574	3,328
Tryon Creek	724	63	165	140	43	180	1,315
Willamette River	6,951	777	681	668	307	994	10,378
Other	1,176	757	299	284	61	467	3,045
Total	14,348	3,915	1,895	2,009	791	3,479	26,437

*Not including the Willamette and Columbia Rivers



Natural Resources Inventory Update
Resource Areas and Existing Environmental Overlay Zones
Southwest Hills

--- City Boundary
 ■ environments to overlay zones

Resource Areas
 ■ high rank
 ■ medium rank
 ■ low rank

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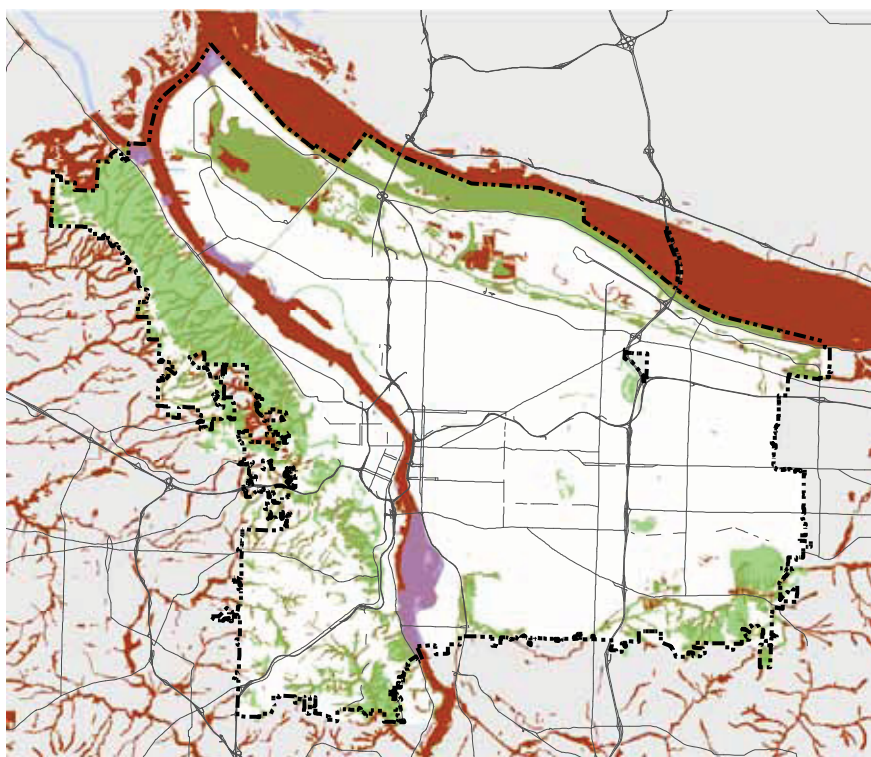
HOW THE NATURAL RESOURCE INVENTORY WILL INFORM UPCOMING COMPLIANCE EFFORTS

One important role for the updated Natural Resource Inventory is to inform the development of Portland’s strategies to comply with multiple regional, state and federal regulations. The updated inventory will be used most directly in meeting the requirements of Metro’s Title 13 Nature in Neighborhoods program.



Title 13 of the region’s *Urban Growth Management Functional Plan* requires Metro-area cities and counties to demonstrate that their local programs meet regional requirements to protect, conserve, and restore inventoried riparian corridors (called “Habitat Conservation Areas”) within their jurisdiction. Metro has adopted maps of the Title 13 Habitat Conservation Areas. The Habitat Conservation Areas are comprised of the Class I and Class II riparian corridors identified in Metro’s inventory of regionally significant riparian corridors and wildlife habitat. Title 13 also supplements the water quality related portion of Title 3 of the *Urban Growth Management Functional Plan*.

Metro established ~12,000 acres of Habitat Conservation Areas in Portland. The City’s existing resource overlay zones provide some level of protection for approximately 80 percent of the Title 13 Habitat Conservation Areas. Habitat Conservation Areas located outside existing resource overlay zones include intermittent headwater streams in the

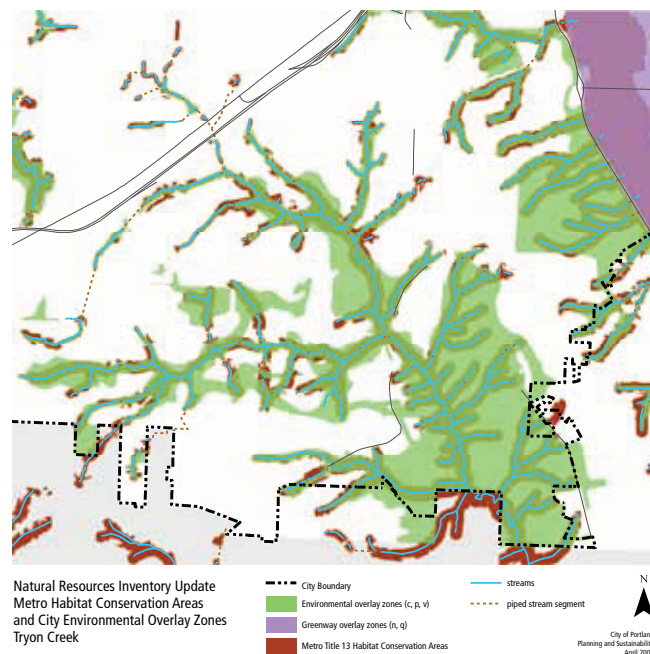
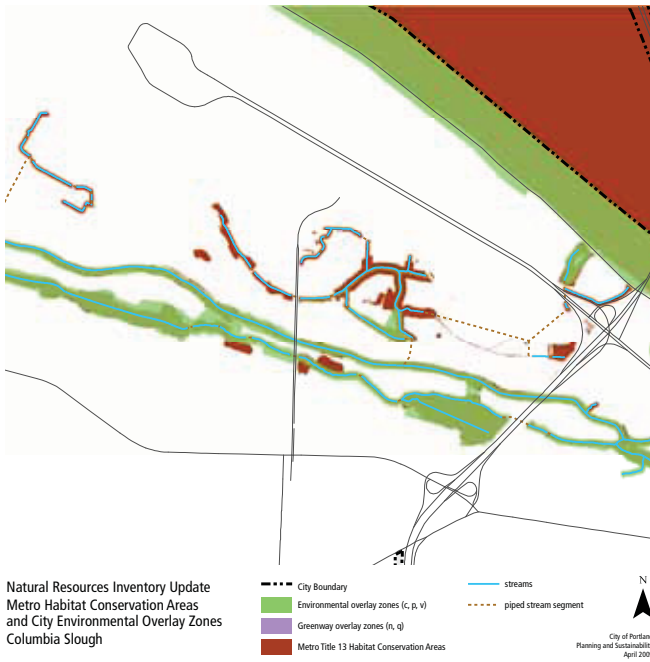


Natural Resources Inventory Update
Metro Habitat Conservation Areas
and City Environmental Overlay Zones

- City Boundary
- Environmental overlay zones (c, p, v)
- Greenway overlay zones (n, q)
- Metro Title 13 Habitat Conservation Areas



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west hills and outer southeast Portland, secondary drainages in the Columbia Corridor, and a number of wetlands in various watersheds.

Metro has approved an extension of the City's compliance deadline for Title 13. The Bureau of Planning and Sustainability proposes to meet Title 13 requirements in phases as follows:

- City Council adopts (projected completion: 2009)
 - Updated Natural Resource Inventory to inform a new Buildable Lands Inventory for Portland, and to use in implementing the current environmental and greenway overlay zoning program (2011)
 - Updated water body map and baseline setback standards in code to protect streams and wetlands outside City resource overlay zones. (2011)
- Completion of area-specific program updates currently underway (Willamette Corridor, Portland International Airport, Hayden Island) (projected completion: 2010–2012)
 - Use the current inventory information to update previously adopted inventories. This will include providing more detailed natural resource information for each area.
 - Serve as an informational tool to inform and support updates of the City's overlay zones; including completion of Economic, Social, Environmental and Energy Analyses as required by State Land Use Planning Goal 5
- Completion of citywide projects currently underway (Citywide Tree Project, Portland Plan)
 - Citywide Tree Project (2011)
 - Periodic Review; *Comprehensive Plan* Update (projected completion: 2009–2012)
- Completion of future area-specific program updates — Columbia Corridor, West Hills, Johnson Creek Watershed (projected completion: timeline to be determined)

Adoption of the inventory, regulatory and non-regulatory, and subsequent program updates will also help the City meet watershed health goals and to comply with Clean Water Act (e.g., Total Maximum Daily Loads for temperature and stormwater management rules) and Endangered Species Act requirements, and can inform restoration activities authorized through the Portland Harbor Superfund program.

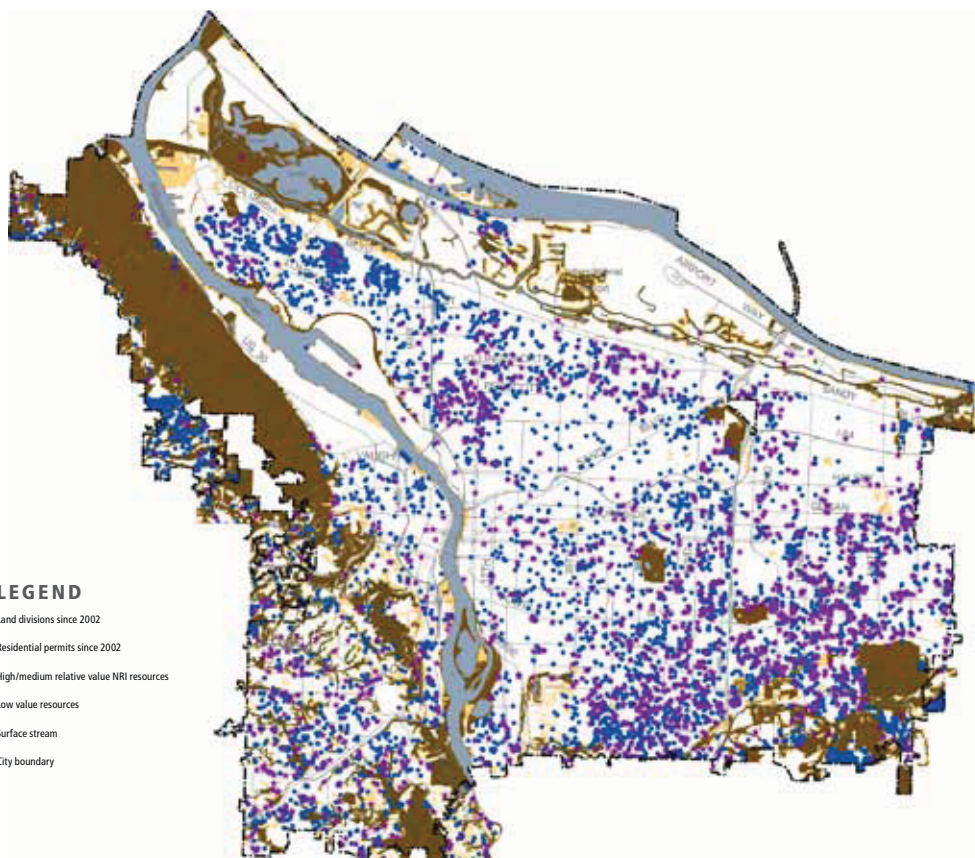


THE NATURAL RESOURCE INVENTORY AND THE PORTLAND PLAN

The Bureau of Planning and Sustainability is currently leading a citywide effort called The Portland Plan, which will update the City's *Comprehensive Plan* and Central City Plan. Through the Portland Plan, the City will address state-mandated periodic review requirements to update specific portions of the *Comprehensive Plan*: urbanization, economic development, public facilities, and transportation. The City is also required to update its Buildable Lands Inventory.

The Environment Section of the City's *Comprehensive Plan* is outdated. Natural resource policies should be updated and integrated with plans for urban form and public facilities. In addition, the goals and objectives of the *Portland Watershed Management Plan* (2006), the revised *Urban Forestry Management Plan* (2004), and the *Climate Action Plan* need to be incorporated into the City's long range planning activities.

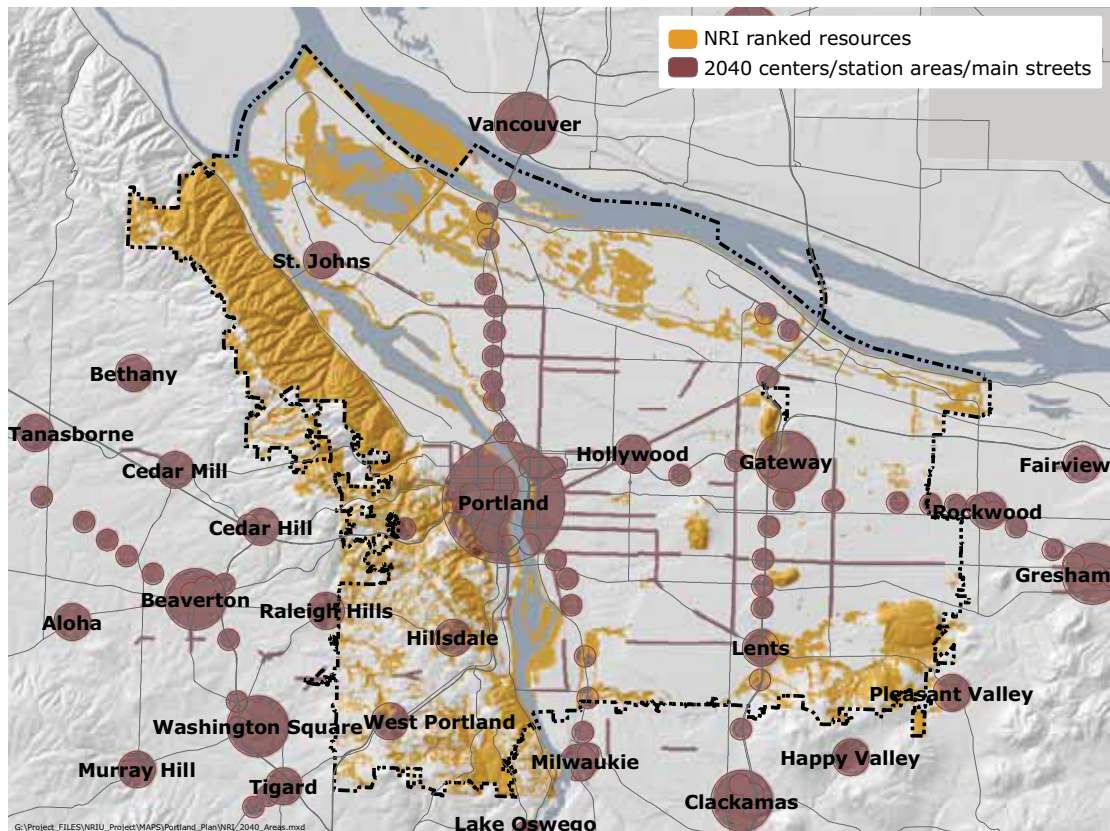
The updated Natural Resource Inventory is one of many information sources that will support these plans and inform the Portland Plan project. Natural resources maps and ranks can help the City estimate how much land is available for development and redevelopment, and identify priorities for natural resource protection, restoration and sustainable site design.



INVENTORIED NATURAL RESOURCES, LAND DIVISIONS, AND RESIDENTIAL BUILDING PERMITS, 2002-2007

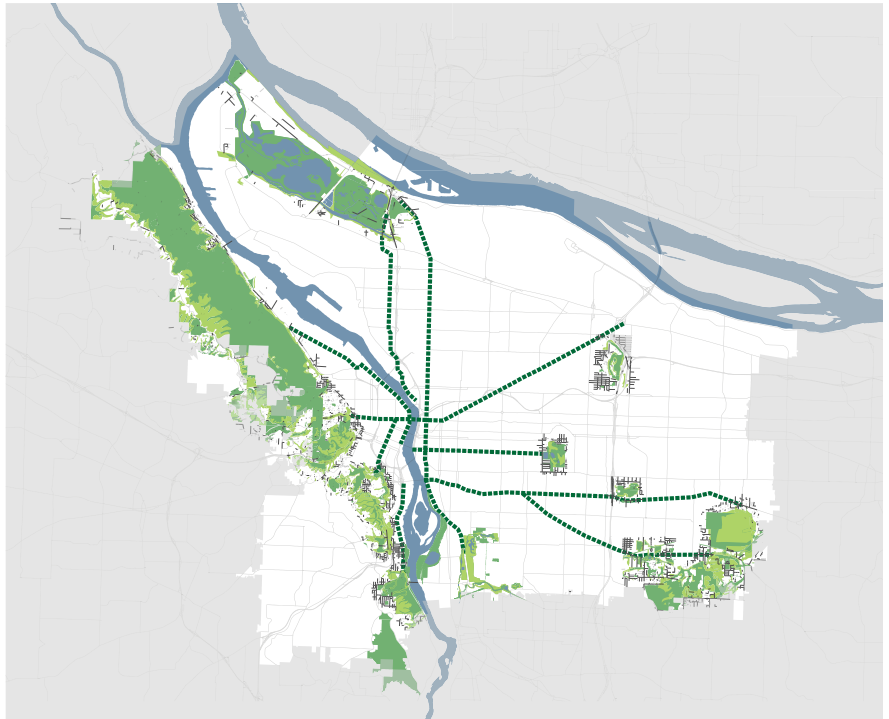
The Natural Resource Inventory can also inform the following planning tasks and activities:

- Developing an up-to-date Buildable Lands Inventory. The City is currently in the Periodic Review process to update Portland’s *Comprehensive Plan*. The City’s DLCDC-approved Periodic Review workplan includes developing a Buildable Lands Inventory, which provides a ‘snapshot’ of the City’s current housing and employment capacity. Producing the Buildable Lands Inventory involves looking at the future development capacity of the City, taking into consideration a host of constraints, including physical, regulatory and cost constraints. The City is required to consider the Natural Resource Inventory in updating the Buildable Lands Inventory, including evaluating how identified significant natural resources would likely affect future development. The Buildable Lands Inventory is, at the start, an evaluation of the impact of existing policy. Other policy choices/scenarios will also be evaluated in later stages of the Portland Plan.
- Integrating watershed plan goals, indicators and targets into urban form and growth management scenarios and decisions. The inventory will inform the development of various planning principles including the 20-minute neighborhood and City Green.
- Optimizing watershed functions (hydrologic and energy budgets, water and air quality, and fish and wildlife habitat) and City goals for neighborhood livability, public health and safety, carbon footprint, infrastructure, housing, jobs and economic development



NATURAL RESOURCE INVENTORY — RANKED RESOURCES, 2040 CENTERS, STATION AREAS AND TRANSPORTATION CORRIDORS

- Identifying areas to prioritize resource protection and enhancement, optimize development and resource protection, and areas to encourage development and redevelopment
- Determining how the built environment (e.g., roads, buildings, neighborhoods) can be designed to contribute to watershed functions, including exploration of low impact development forms that minimize fragmentation and loss of natural resource areas and systems
- Improving equity in terms of access to nature and environmental quality
- Building resiliency to address the ecological and natural hazard impacts of global warming (changing habitats, fire, flooding, landslides)
- Improving access to nature by planning new transportation and transit routes that link communities with parks and natural areas
- Prioritizing investments in land acquisition, resource enhancement projects, invasive species control and green infrastructure (trees, green street facilities, eco-roofs)
- Enhancing habitat connectivity within the city and the region



LINKING PEOPLE TO PORTLAND'S PARKS AND GREENSPACES



METRO REGIONAL PARKS, TRAILS, AND OPEN SPACE SYSTEM

For more information about the Natural Resource Inventory Update project, including updates on current uses of the data and results, please visit the website: www.portlandonline.com/bps/nri