

Willamette River



Conditions Report



October 2004

A comprehensive report on the economic, ecological, recreational and urban development conditions of the Willamette River, including its tributaries and watersheds in Portland, Oregon.



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Bureau of Parks and Recreation
Office of Sustainable Development
Portland Development Commission

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Portland Office of Transportation
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City of Portland
October 2004

Note to reader:

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1.1 OVERVIEW

The Willamette River is the heart of Portland's history, landscape, economy, and culture. The river and its tributary streams provide a connection with nature in the midst of a thriving urban area and a world-class port. The working harbor's industrial districts have been prosperous for many decades, in large part because of Portland's strategic position at the confluence of two major rivers. Salmon and other native fish are found in the Willamette year-round. People enjoy numerous opportunities to hike, bike, boat, or simply appreciate the beauty of the river. Portlanders place a high value on the remarkable recreational resources that contribute so much to their quality of life.

At the same time, Portland's growth and prosperity have resulted in many critical challenges:

- Sewer and stormwater overflows, increased impervious surfaces, loss of tree canopy, soil erosion, and high water temperatures threaten water quality.
- Polluting land uses have led to toxic sediments and a Superfund listing in the Portland Harbor.
- Populations of many species native to this area are greatly diminished and have been

River Renaissance—A Call to Action

In late 2000, more than 1,000 Portlanders shared their hopes for a revitalized Willamette River through a series of interactive workshops held around the city. These hopes are reflected in the River Renaissance Vision, endorsed by the Portland City Council in March 2001.

The River Renaissance Vision proposes five mutually supportive themes:

- Ensure a clean and healthy river system.
- 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.



The River Renaissance Initiative seeks to realize the vision through a partnership of residents, businesses, industry, not-for-profit organizations, and public agencies. Areas of focus include planning (e.g. developing the River Renaissance Strategy and continuing work that advances River Renaissance); showcasing early actions; solidifying partnerships; engaging the public; and developing a sustainable funding strategy to implement River Renaissance projects.

For more information: <http://www.river.ci.portland.or.us>

listed as threatened under the federal Endangered Species Act.

- Portland's continued industrial growth is threatened by changing global market conditions, the need to upgrade freight movement systems (channel, rail, and highways), limited vacant land, redevelopment constraints on underused sites and competition from other ports.
- Demand for parkland and river-related facilities continues to grow along with Portland's population. Increased use of these facilities results in more conflicts among trail users, boating enthusiasts, and people using the parks for recreation.
- Access to the river from adjacent neighborhoods can be very difficult, and in some locations is impossible. Rail lines, freeways, or topography obstruct riverfront access in many locations.

**Looking through
a River Renaissance Lens**

At the core of River Renaissance is the notion that the best and only way to achieve the vision is to make decisions based on optimizing economic, environmental and social benefits simultaneously, rather than pitting one goal against another. The more we can achieve multiple vision themes simultaneously the better; however, we recognize that achieving all of the vision themes everywhere along the river may not be possible. Other key River Renaissance concepts and principles include:

- *an understanding of the economic, natural and social/cultural systems of which a City and region are comprised;*
- *shared ownership of the costs and impacts of accomplishing the River Renaissance vision among stakeholders;*
- *a commitment by City government to develop and refine meaningful measures to monitor progress and success of River Renaissance actions;*
- *a commitment by City government to consider the effects of decisions on future generations, in order to preserve options and opportunities and reduce future costs and liabilities, and a commitment to search for root causes and invest in solutions that avert costly cleanup or corrective action later on; and*
- *a commitment by City government to demonstrate civic leadership to influence private actions through positive examples.*

River Renaissance calls for a new way of approaching these challenges. During the past two years, City bureaus have worked to integrate the City's river- and watershed-related programs and services and have studied the natural and economic systems related to the river; forged public-private partnerships, leveraged resources, and engaged the community. Numerous collaborative efforts—involving residents, businesses, industry, community groups, property owners, City bureaus, and government agencies—have resulted in a wealth of information, analysis, ideas, energy and commitment.

River Renaissance is a comprehensive vision that encompasses the entire city of Portland. (Indeed, the vision offers an opportunity to extend even further, uniting Portland with neighboring cities in a common river agenda.) While focusing on the Willamette River, the River Renaissance Vision also acknowledges and reflects the interconnectedness between the Willamette and Columbia Rivers; their tributary streams and watersheds; the parks, open space and trail system; and the freight and human transportation network.



Figure 1-1. Portland in the 1800's. A brief glimpse into Portland's history reveals the changing landscape of the Willamette and Columbia Rivers. It is believed that for thousands of years, Native Americans lived in harmony with the rivers valuing their precious resources. In the mid-1800's, the first Western Europeans settled in Portland because the site offered deepwater moorage for sailing ships journeying up the Columbia River. Thereafter, multilayer wooden wharves and docks lined the riverbanks allowing Portland to flourish economically. To view this map in color visit www.river.ci.portland.or.us

Figure 1.1 illustrates the Portland Region Circa 1850

Vegetation (woodland, shrubland, savanna, prairie and unvegetated)

This information represents "presettlement" vegetation in Oregon as described by surveyors for the General Land Office between 1851 and 1909, when surveying township and section lines.

Wetlands and Streams

Historic streams, wetlands and waterbodies were digitized from geo-referenced cadastral surveys from 1852 to 1875.

Towns

Towns digitized by Bureau of Planning from survey images from 1852-1875.

1.2 PURPOSE AND SCOPE OF THIS REPORT

This Conditions Report summarizes the results of some of the research and analytical work the City has accomplished since City Council endorsed the River Renaissance Vision. Each of the five theme chapters was developed by a different team of City staff with expertise in that area. Chapters 2 through 6 provide information about conditions and trends for each of the vision's five themes, and also identify constraints and opportunities related to achieving the vision. Each chapter also summarizes what each system needs to move towards a healthier state. These "system needs" present a set of challenges to be addressed over time through the River Renaissance Strategy; through City programs, projects and activities; and by other entities – both private and public.

For this report to be manageable in scale and scope, it concentrates primarily on the Willamette River and the land along the river corridor, but includes important references to the larger economic, cultural, recreational and urban systems that extend beyond the river corridor. The "Clean and Healthy River" chapter, however, has a broader geographic scope than other chapters, because it is not possible to understand river health in isolation from the context of the full watershed system.

This report will serve as an appendix to the River Renaissance Strategy that will be considered by City Council in late 2004.

River Renaissance Terminology

The River Renaissance Vision – a sketch of the Willamette River as Portlanders would like to see it in the future. It contains five vision themes that promote the health of the watershed, the river economy, waterfront districts, river-related recreation and partnerships.

The River Renaissance Initiative – a citywide partnership to revitalize the Willamette River. It is comprised of five efforts: developing and carrying out a comprehensive and coordinated river agenda; showcasing early implementation projects; solidifying partnerships; engaging the public; and, raising funds to leverage City investment.

The Willamette River Conditions Report – this document summarizes the results of some of the research and analytical work the City has accomplished since City Council endorsed the River Renaissance Vision.

The River Renaissance Strategy - policy guidance and actions that convey how the Vision will play on Portland's landscape. The strategy also includes ways to measure our progress to achieve River Renaissance objectives over time.

River Renaissance Vision:



2.1 INTRODUCTION

A clean and healthy Willamette River is essential to Portland's River Renaissance. Achieving a clean and healthy river requires looking beyond the riverbank to the broader landscape because what happens on the land, even miles away, affects the river.

Rain shapes and defines this part of the Pacific Northwest. Towering Douglas firs, sparkling rivers, dense tangles of fern, ever-changing gray skies, and flashing bright salmon all exist here because of the rain.

While the rain makes this place so special, it also threatens the very things Portlanders value.

Before Portland was built, the rain fell through a dense canopy of trees, dripped onto a carpet of shrubs and moss, soaked the rich, living soil, and slowly made its way into the river. Today many of the trees are gone, exotic plants have replaced the native vegetation, and much of the soil is covered with pavement.

Now the rain splashes off roofs and parking lots and collects into urban torrents that run down streets. Along the way it can pick up metals, oil, and other

A healthy watershed has hydrologic, habitat, and water quality conditions that protect human health and support native fish and wildlife.

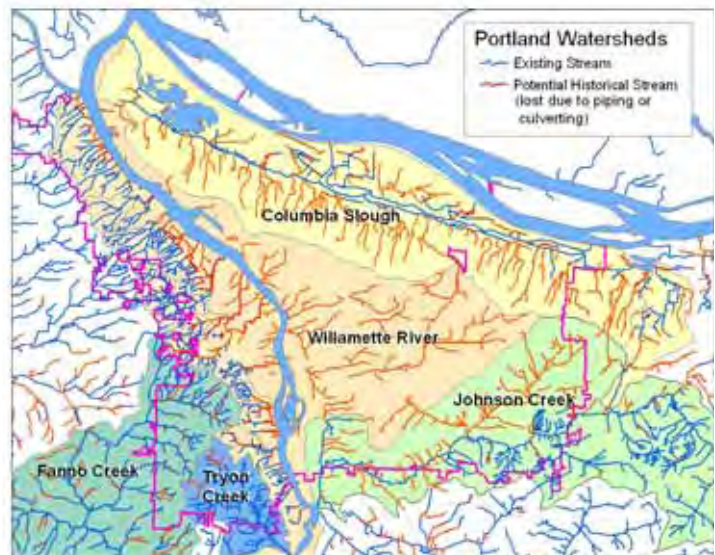


Figure 2-1: Portland's watersheds and potential historic streams. The Metro Council of Governments (Metro) developed the map using information about current and historic landscape drainage patterns. Much of the historic natural drainage network has been placed in pipes or filled for development. To view this map in color visit www.river.ci.portland.or.us.

pollutants and carry them into the sewers and often into rivers and streams – sometimes treated, sometimes not.

Along with affecting river health, the rain’s concentrated runoff can erode stream banks, damaging fish and wildlife habitat. If left unmanaged, it can disrupt the natural relationship between the landscape and river and affect how the watershed provides cool, clean water. These changes have occurred over many years, and while the impacts are not always immediately obvious, the resulting polluted river and threatened fish are clear warnings that it is time for action.

2.1.1 Taking a Watershed Approach

As a result of the actions of committed Oregonians, untreated industrial wastes are no longer dumped directly into the river, and better sewage treatment plants have been built. Further, Portland’s efforts to improve the Willamette River are founded on an understanding that a healthy river starts with a healthy watershed.

A watershed approach requires restoring the natural relationship between the rain and the landscape.

A watershed is a geographic area that includes the river and the lands it drains. It can be challenging to describe what a “healthy watershed” is because each watershed is unique. Generally, however, a healthy watershed has hydrologic (water flow), habitat (such as soil, vegetation, and trees) and water quality (such as temperature and lack of pollutants) conditions suitable to protect human health and support biological communities of native fish and wildlife species. Figure 2-1 shows the watershed systems that flow through the City of Portland and into the Willamette River.

Taking a “watershed approach” requires protecting, conserving, and restoring the natural relationship between the rain and the landscape. It requires modifying what has been built so it acts more like nature. This will need to be done site by site. In most cases, it will mean changing how the land is developed, not whether it is developed. It is possible to have both economic vitality and healthier watersheds.

The City is developing a watershed-oriented approach to planning and projects that will focus on preventing new watershed problems, continuing to identify and manage those problems that already exist, and restoring watershed health over time. For example, past efforts to control flooding on Johnson Creek focused on floods solely as problems to be controlled, rather than as one of the watershed’s many natural functions. Consequently, habitat was destroyed, fish and wildlife populations suffered declines, and the flooding problem persisted. Today, projects planned for Johnson Creek strive to mimic nature by reconnecting floodplains



Figure 2-2: Retrofitted parking lot. Before and after pictures show how this parking lot was redesigned to allow rain to soak back into the ground instead of entering the local sewer system.

and allowing flooding to occur on carefully designed sites. This approach reduces the risks to both human safety and property, and improves fish and wildlife habitat.

Instead of sending rain into sewers, the watershed approach means managing stormwater as close to its source as possible and protecting Portland's existing natural resources (link to [Sustainable Stormwater Principles brochure](#)).

Healthy watersheds are a prerequisite for the River Renaissance vision of a clean and healthy river.

It also means allowing rain to soak into the ground whenever possible, planting more trees where appropriate, replacing invasive non-native plants with native species, keeping toxic chemicals and other pollutants off the streets and the ground, and allowing nature to clean and cool water instead of using technology to do so. Adapting the urban environment to act more

like a natural environment will help restore the functions that can provide cool, clean water to the river and habitat for fish and wildlife.

Portland is already ahead of most other cities when it comes to treating stormwater. Existing programs foster innovative, sustainable technologies, such as [ecoroofs](#), and help developers design their projects to manage runoff and improve water quality. There is also a major effort aimed at keeping pollutants out of rivers and streams by controlling combined sewer overflows. Portland's watershed approach complements regional efforts to improve the entire Willamette River Basin and follows the Oregon tradition of environmental leadership.

Healthy watersheds are a prerequisite for the River Renaissance Vision of a clean and healthy river. Healthy watersheds will also help achieve the other River Renaissance vision themes, plus many other City objectives, including quality of life, economic vitality, and health and safety. For example: a clean and healthy river will reduce costs and uncertainty associated with economic activities along the river. This does not mean, however, that environmental benefits should be a measure of economic success. In addition, healthy watersheds will improve the City's ability to meet its obligations under federal, state, and regional laws, such as the Clean Water Act, Safe Drinking Water Act, Endangered Species Act, Superfund, and state and regional land use goals.

It is not realistic to expect urban watersheds to be pristine. Improvements to watershed health can be made, however, if the built environment is made more compatible with the natural environment.

2.1.2 What is Portland Trying to Accomplish?

Portland is attempting to reestablish the conditions needed to achieve and maintain healthy watersheds. This is expressed in the City's four watershed health goals:

- **Hydrology:** Move toward normative flow conditions to protect and improve watershed and stream health, channel functions, and public health and safety.
- **Physical Habitat:** Protect, enhance, and restore aquatic and terrestrial habitat conditions to support key ecological functions and improved productivity, diversity, capacity, and distribution of native fish and wildlife populations and biological communities.

Making the urban environment act more like a natural environment will help restore the functions that can provide cool, clean water to the river and habitat for fish and wildlife.

- **Water Quality:** Protect and improve surface water and groundwater quality to protect public health and support native fish and wildlife populations and biological communities.
- **Biological Communities:** Protect, enhance, and restore native aquatic and terrestrial species and biological communities to improve and maintain biodiversity in Portland’s watersheds.

2.1.3 The Implications of Improving Watershed Health in an Urban Area

Achieving healthy watersheds will require both protecting remaining natural resources and restoring degraded watershed functions and conditions. Portland policy makers recognize that an urban environment constrains the level of watershed health that is practical to achieve and sustain. It is not realistic to expect urban watersheds to be pristine. Improvements to watershed health can be made, however, if the built environment is made more compatible with the natural environment.

Achieving healthy watersheds requires more than just protecting remaining undeveloped land; it also means restoring watershed functions and conditions that have been significantly diminished or even lost.

Healthy watersheds require a consistent, long-term effort to restore watershed functions wherever possible. A variety of incentives, regulations, partnerships, actions, and projects can be used to make improvements—for example, tax credits; required changes in the design and development of sites, buildings, streets, storm and sanitary sewers; on-the-ground habitat restoration projects; and public education.

Detailed descriptions of local watersheds’ important attributes will provide policy makers with a clearer picture of the environmental implications of development, redevelopment, and other actions. Detailed information about watershed conditions will also help policy makers and citizens set priorities for watershed protection and restoration actions, especially actions that have potentially significant budget and workplan implications for City programs and those that could change taxes, fees, or other requirements.

Portland’s *Framework for Integrated Management of Watershed Health* (<http://www.river.ci.portland.or.us/mainpages/publications.htm>) outlines the specific steps necessary to apply watershed health goals through the prioritization, implementation and monitoring of select actions.

The success of the watershed approach depends on many elements. One critical element is understanding the condition of key watershed characteristics or attributes related to hydrology, habitat, water quality, and biological communities in each of the City’s watersheds. Like barometers, or canaries in coal mines, these attributes indicate if watersheds are healthy or unhealthy.



Juvenile Salmonids These sensitive organisms reflect watershed health conditions.

2.1.4 Salmon as Key Indicators of Watershed Health

This chapter pays special attention to the health of salmonids (salmon and trout) and their riverine and

In the future, the City will select indicators, determine objectives, and identify protection and restoration actions for terrestrial components of watersheds.

riparian (streamside) habitats. Salmonids are a good reflection of many important watershed processes because their health, abundance, and productivity are linked to watershed conditions. They are highly sensitive to all components of watershed health (hydrology, habitat, water quality, and biological communities) and are considered a keystone species, meaning that their presence (or absence) is central to many other physical, chemical, and biological processes in the ecosystem. Salmon have cultural, economic, and regulatory importance. Finally, more is known about the life

histories of salmonids and the relationships between stream conditions and salmonid population abundance and productivity than is known about most other species in the Pacific Northwest. More information is provided on a factsheet on [urban development's effect on salmon](#).

This does not mean there are no other important indicators of watershed health. This chapter presents information about a number of other features of the water and land. If salmonids are healthy, however, it can be assumed that watershed functions and conditions are healthy.

If salmonids are healthy, it can be assumed that the watersheds are healthy.

It is expected that improvements in hydrology, water quality, and aquatic and riparian habitat that benefit salmonids will also aid some terrestrial wildlife species and help protect and improve their habitats. However, the City recognizes the need for more specific and comprehensive analyses of terrestrial wildlife species and habitats. In the future, the City will select indicators of the health of terrestrial components of watersheds, determine management objectives, and identify protection and restoration actions to more fully achieve watershed health goals.

2.1.5 How This Chapter Is Organized

Following this introduction, this chapter is divided into the following sections:

- 2.2: Citywide Summary
- 2.3: Lower Willamette River Watershed¹
- 2.4: Tryon Creek Watershed
- 2.5: Fanno Creek Watershed
- 2.6: Johnson Creek Watershed
- 2.7: Columbia Slough Watershed
- 2.8: Lower Columbia River Watershed²
- 2.9: Financial Issues and Implications

Section 2.2 presents an overview of citywide conditions and trends and their implications. It also identifies challenges to address in developing the River Renaissance Plan. Sections 2.3 through 2.8 present conditions and trends for each watershed; identify protection and restoration

¹ The Lower Willamette River Watershed refers to the portion of the Willamette River Basin within Portland's jurisdiction and the land within Portland except for the land that drains to the Columbia Slough, Fanno Creek, Tryon Creek, Johnson Creek or the Columbia River.

² In this report, "Lower Columbia" refers to the section of the southern bank of the Columbia River within the City of Portland and the land area that drains directly to the Columbia River.

opportunities; and, where appropriate, identify watershed-specific challenges to address. Section 2.9 discusses the financial issues and implications related to environmental restoration.

Figure 2-3 illustrates the elements of a clean and healthy river system. It includes:

Watersheds

A watershed is a geographic area that includes a river or stream, its tributaries and the lands they drain. The City of Portland is drained by five watersheds, although the watershed labeled as Portland's Willamette Watershed represents the lowest 17 miles of the Willamette's 295 miles. It encompasses those portions of Portland not in the four other watersheds. Watershed boundaries often extend beyond city boundaries.

Wetlands

Wetlands are land areas where excess water is the dominant factor in determining the nature of soil development and the types of plants and animals that inhabit them. Wetlands are linked to streams and other wetlands through groundwater and may be permanent or seasonal (ephemeral).

Environmental Overlay Zones

Environmental overlay zones protect resources and functional values that have been identified by the City as providing benefits to the public.

Floodplains

Floodplains are physically linked to river and stream corridors and are caused by the natural lateral movement of rivers and streams, experiencing seasonal fluctuations in water quantities. They function as centers of biological diversity and production, nutrient cycling, water filtration and groundwater recharge.

Streams

As a stream flows, it links upstream and downstream portions of the river. Water in streams comes from water held in the soil, precipitation, and groundwater. Within any stream and river network, headwater streams make up most of the total channel length. As Portland has urbanized, many stream channels have been piped and placed underground.

Outfalls

Outfalls relieve capacity in the wastewater collection system when flows are greater than the system's pipes can convey. Combined sewer outfalls contain a mixture of both stormwater and sewage. Stormwater outfalls contain only stormwater runoff from impervious areas. This map only shows municipally owned, active outfalls. There are hundreds of privately owned outfalls.

Sumps

In some areas stormwater drains into large perforated manholes called sumps. Public sumps are mainly used on Portland's Eastside where porous soils allow runoff to seep into the soil easily. Sumps have been used to remove stormwater from the combined sewer system, reducing overflows to the Willamette River and Columbia Slough.

Transportation System

Portland's transportation system is one of the sources of pollutants of concern in the Willamette River and its tributaries. Roads are impervious and generate stormwater runoff carrying sediments, heavy metals, oils, grease, and residue from brakes and tires.

Map Sources:

Watersheds: Bureau of Environmental Services, 2002 (With Modification of Columbia South Shore, 2004)

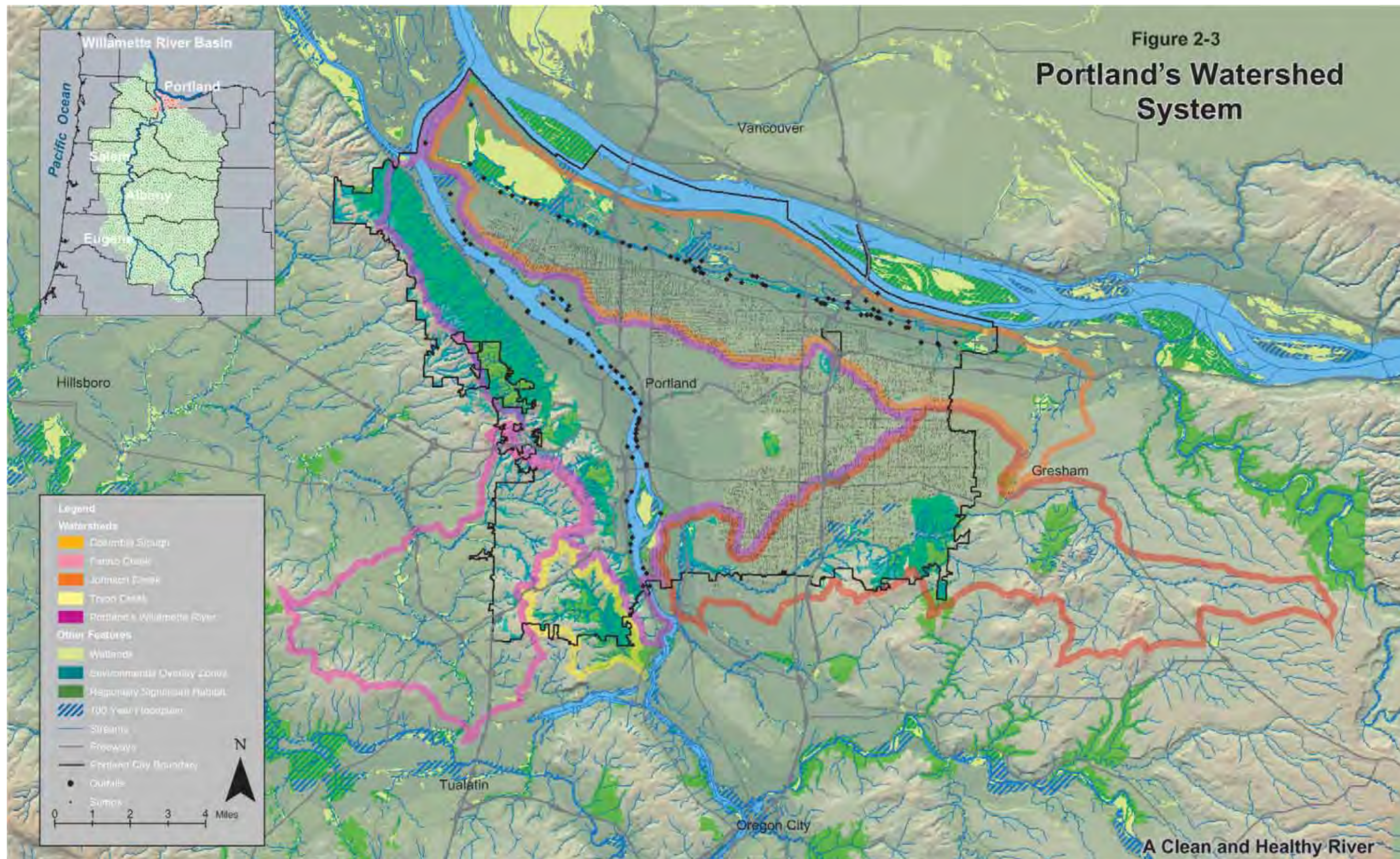
Wetlands: Metro, 2002

Environmental Overlay Zones: Bureau Of Planning 2004

Regionally Significant Habitat: Metro Goal 5, 2004.

100-year flood plain: City of Portland representation of FEMA maps, updated in 2001.

Streams: Bureau of Planning, 2004



2.2 CITYWIDE SUMMARY

2.2.1 Conditions and Trends

Based on detailed data analyses for dozens of watershed health attributes, the City has identified a number of conditions and trends that need to be addressed in order to realize the River Renaissance Vision of a clean and healthy river. One of the most significant challenges is stormwater and the variety of watershed health problems it creates. Managing stormwater effectively requires actions not just along rivers and streams but across the landscape. The following conditions and trends that occur consistently across the City are listed below under the four watershed health goal headings. These are the trends that will need to be addressed to see improvements in watershed health.

Hydrology

- Changes in the timing and volume of stream flows.
- Changes in the length, width, depth, and complexity of local rivers and streams.
- Declining ability of the landscape to absorb and filter rain, resulting in increased stormwater runoff.

Physical Habitat

- Declining amount and quality of habitat for native fish, wildlife, and plant species.
- Declining ability of watersheds to create and sustain habitat features (i.e., native trees and plants, wetlands, sediment-free gravel in rivers and streams).

Water Quality

- Increasing river and stream temperatures in summer.
- Increasing amount and nature of sediment and other pollutants in streams and streambeds.

Biological Communities

- Declining health and number of native fish, wildlife, and plant species.
- Increasing number of non-native fish, wildlife, and plant species.

Stormwater, and the variety of watershed health problems it creates, is one of the most significant challenges. Effective stormwater management requires actions not just along rivers and streams, but across the entire landscape. ([Stormwater Management Manual](#), 2004.)

Focused programs and projects in the past have made some limited, incremental improvements in some conditions. However, with the exception of a limited number of water quality indicators (e.g., bacteria), the general trend in watershed health is negative.

Portland's Geology

Geology is an important factor in determining watershed structure and function. It affects many of the most important elements that shape watersheds, such as topography; sediment quantity and quality; the amount of groundwater discharge into streams, especially during summer low-flow periods; and vegetation distribution and composition. Portland area geology is both complex and diverse. It includes marine, lake, and stream sediments, and volcanic activity has played a strong role.

Chapter 2 A CLEAN AND HEALTHY RIVER

These different geologic characteristics determine the type and amount of sediment in Portland's rivers and streams. Sediment contributions come from streambank erosion (material scoured directly from underlying bedrock) or from soil creep and landslides. The hardness of the material determines the quality of sediments, reflected in characteristics such as size distribution and durability during transport. Geologic characteristics also control stormwater infiltration, groundwater flow, in-stream temperatures, and discharge to streams. Highly permeable geologic units allow rapid infiltration of stormwater and rapid flow of groundwater, and support larger seeps and springs. Deep groundwater discharge from springs and seeps helps maintain base stream flows into the summer months, which is critical for the health of the stream and its resident communities. Areas with low permeability tend to have low summer base flows, compromising stream health.

To manage watershed health effectively, the geology of each individual watershed must be considered in terms of its effect on sediment supply, transport, permeability, and summer base stream flow.



Figure 2-4: Portland's different geologic zones. To effectively manage watershed health, the geology of each individual watershed needs to be considered in light of its effect on sediment supply, transport, and permeability and summer base stream flow. To view this map in color visit www.river.ci.portland.or.us.

Sources of Watershed Conditions and Trends

To adequately protect, manage, and improve poor watershed conditions and trends, the causes or sources of those conditions and trends must be identified. The City of Portland is using a variety of methods to identify problem sources, as well as existing healthy conditions. At the citywide scale, increased urbanization associated with population growth is the leading cause of negative watershed health trends. Achieving the goal of a clean and healthy river will require significant resources and conscious efforts to change how Portland develops and redevelops. Most human development actions -- especially in urban areas -- affect biological communities, and very often stormwater conditions.

The following development-related sources of existing watershed conditions and trends are discussed below:

- Land use and urban development patterns
- Filled and piped streams

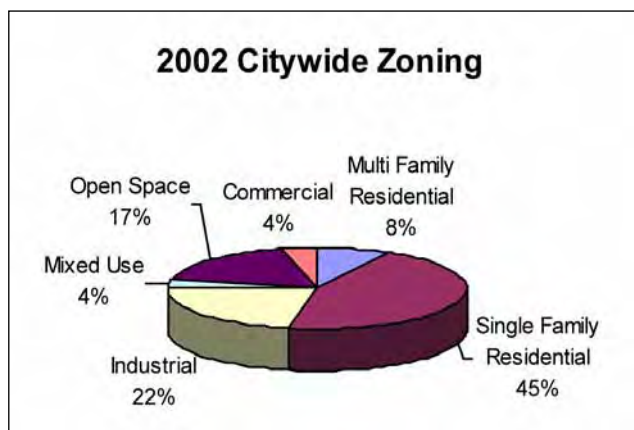


Figure 2-5: 2002 Citywide Zoning. Different land uses have different impacts on watershed health. Zoning represents the allowed use of the tax lot and may differ slightly from the actual land use.

- Increases in impervious area and loss of tree canopy and vegetation
- Invasive non-native plant species
- Erosion and sediment
- Hardened riverbanks
- Human behavior

Land Use and Urban Development Patterns

Portland's urban form is the ultimate cause of many watershed problems. Human development covers much of Portland's landscape. Different land uses have different effects on watershed health. City analyses suggest that the transportation network and industrial, commercial, and dense residential uses likely create the most significant environmental management challenges. Figure 2-5 shows the percentages of Portland dedicated by zoning to various uses.

Since the late 1980s, the City has developed extensive inventories of important water bodies, vegetation, and habitat resources throughout its watersheds. Portland has established environmental zone to protect and conserve high-value resources. Development is strictly

limited in environmental protection overlay zones and allowed in environmental conservation overlay zones if certain standards or approval criteria are met. These standards ensure that adverse impacts on significant resources are avoided, limited, or mitigated.

Approximately 15,000 acres currently receive some level of protection through environmental overlay zones.



Figure 2-6: The City of Portland's existing environmental overlay zones. Approximately 15,000 acres currently receive some level of environmental protection based on the overlay zones (the bulk being Forest Park).

Filled and Piped Streams

Rivers, streams and wetlands are critical to hydrology and flow functions in watersheds. These features provide water storage and conveyance between river and stream systems. Headwater streams serve as the source of stream networks and are critical to maintaining healthy watersheds. Within any intact stream or river system, headwater streams make up most of the total channel length. Therefore, such small streams offer the greatest opportunity for exchange

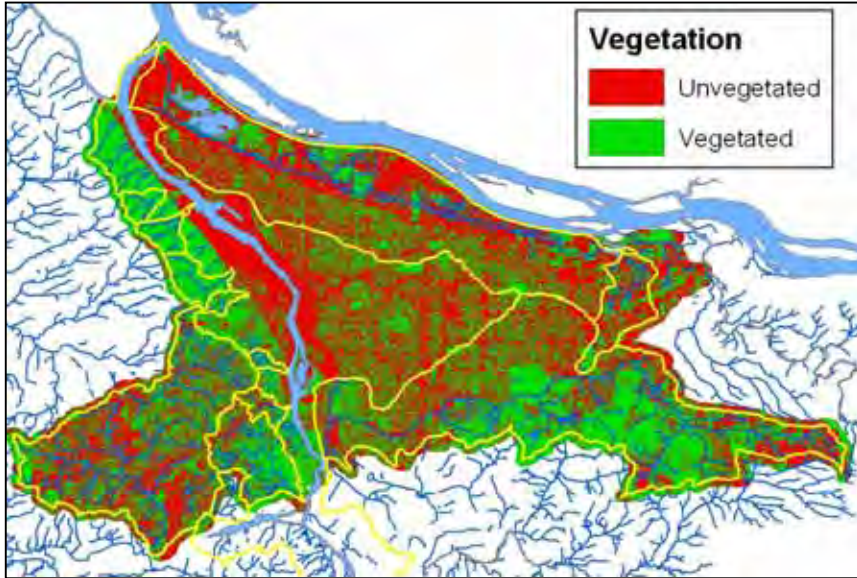


Figure 2-7: The City of Portland used the latest imaging technology to document areas with and without vegetation. The lack of vegetation in upland areas of Portland watersheds contributes to stormwater and habitat problems. Improving tree canopy and vegetation cover is one strategy to improve watershed conditions. To view this map in color visit www.river.ci.portland.or.us.

between the water and the terrestrial environment. They have a particularly important role to play in recharging groundwater.

Figure 2-1 on page 2-1 shows the variety of streams that have been filled or routed to underground pipes. Some of the stream locations, especially on the eastside of the Willamette River, are approximations based on topography and anecdotal evidence. Extensive riparian areas that formerly provided habitat and water filtration and detention have been lost. Pipes

reduce groundwater recharge and transport water faster than stream channels, altering the hydrology of the natural system.

Increases in Impervious Area and Loss of Tree Canopy and Vegetation

Large expanses of Portland's landscape are devoid of vegetation. In addition, the extensive use of lawns in urban landscaping is generally less effective in detaining and treating stormwater and



Streambank erosion contributes significant amount of sediment to the City's streams and rivers.

providing habitat than a more diverse landscape of trees, shrubs, and native grasses. Removal of tree canopy along streams reduces shading, which can contribute to water temperatures too high to sustain aquatic ecosystems. Loss of tree canopy and vegetation and increases in impervious area also increase air temperatures, which can in turn adversely affect water quality and cause air pollution and associated public health problems.

The lack of vegetation in upland areas of Portland watersheds also contributes to stormwater and habitat problems. Urban areas without vegetation often have significant impervious areas and are deficient in biological communities.

Revegetation and other watershed management actions to improve tree canopy and native vegetation are being planned and implemented to counter these trends.

Invasive Non-Native Plant Species

Invasive non-native plant species dominate vast areas of Portland’s landscape. Nearly 70 percent of publicly owned natural areas surveyed by the City of Portland have high or moderate problems with invasive non-native species such as English ivy and Himalayan blackberry. For example, nearly 97 percent of the Oaks Bottom Wildlife Refuge has either a moderate or high level of invasive plant species (Figure 2-8). Non-native invasive plant species diminish the value of habitat for native plants, fish, and wildlife by altering or reducing the amount and types of food and cover provided. They decrease native species and reduce biodiversity. They also are less effective at filtering and detaining stormwater. In addition, invasive plants are costly to manage and increase the risk of wildfire. ([Guide to Native Plants: Selection Guide for Portland](#))

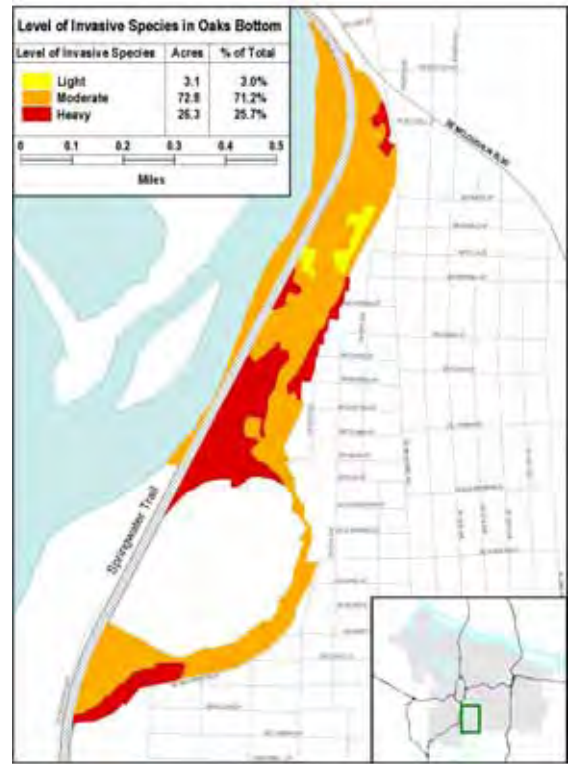


Figure 2-8: Invasive plant species dominate vast areas of Portland’s landscape. Invasive plants change the way stormwater infiltrates into the ground and diminish the value of natural areas as habitat. For example, almost 97 percent of the Oaks Bottom Wildlife Refuge is affected by invasive plants. To view this map in color visit www.river.ci.portland.or.us.

Erosion and Sediment

Sediment (also called total suspended solids, or TSS) is a good indicator of watershed health challenges because pesticides, oil, grease, metal, and other pollutants bind themselves to sediment and are transported with it to rivers and streams. In some instances, the sediment itself can cause environmental problems, such as soil erosion and landslides. Sediments eroded from stream channels are washed downstream and can collect in depositions that alter stream flow and affect the feeding and reproduction of aquatic organisms.

Using an extensive database of stormwater pollutant concentrations collected from land uses throughout western Oregon, the City developed a vegetation and impervious cover map to predict pollutant loading rates and concentrations throughout Portland. This valuable planning-level information is helping the City set priorities for management actions and additional analytical work.

Figure 2-9 shows that Portland’s transportation system and the heavily industrial, commercial, and dense residential sections of the city are likely the leading potential sources of watershed health problems. These areas are relatively impervious and generate significant stormwater runoff that carries sediments and pollutants. In addition, industries and businesses sometimes

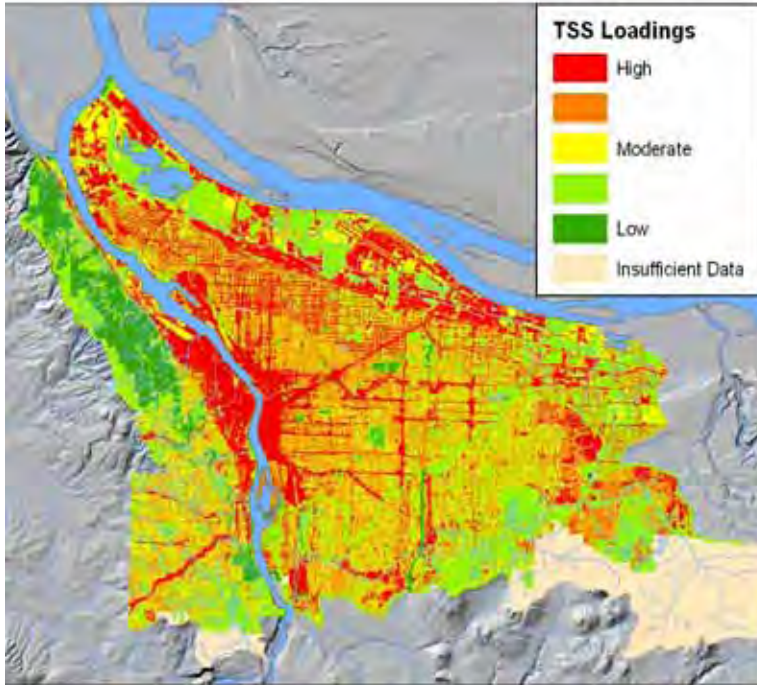


Figure 2-9: Total Suspended Solids (TSS) Loadings Roads, industrial areas commercial and dense residential areas have significant potential to shed sediment (TSS) and other pollutants during storms. The degree of connection, and the amount of time it takes water to move between these source areas and receiving waters, effects actual pollutant loads. To view this map in color visit www.river.ci.portland.or.us.

use materials that, without proper management, can pose potential harm to streams and rivers. Finally, because these areas employ, serve, and house significant numbers of people, they also attract large numbers of motor vehicles. Cars and trucks drip oil, grease, and gasoline. Tires, brakes, and exhaust also create pollutants that can be washed into rivers and streams when it rains.

Figure 2-9 also indicates that parks, open spaces, and other areas with significant vegetation appear to have less potential to produce sediment and other pollutants. Forest Park, Mount Tabor, and areas in southwest and southeast Portland with a lot of vegetation appear less likely to produce sediment during storms, and therefore are probably strongholds of watershed health.

Hardened Riverbanks

The banks of many Portland rivers and streams are “hardened” with riprap, sheet pile, and other human-made structures. As shown on Figure 2-10, less than one-third of the mainstem Willamette’s banks in Portland are in a natural condition; the rest have been hardened with concrete or other materials or developed with docks, piers, and other human-made structures that limit watershed functions.

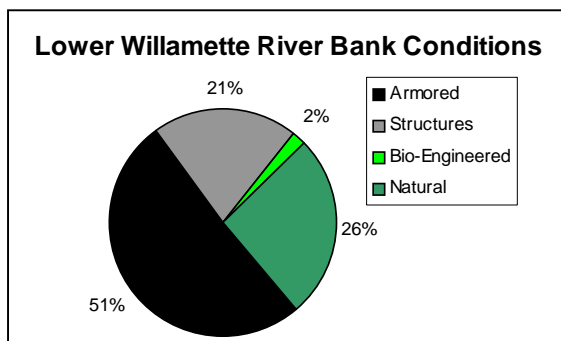


Figure 2-10: Bank treatment types on the lower Willamette River. Less than one-third of the lower Willamette’s banks are in natural condition. The rest have been hardened with concrete or other materials or developed with docks, piers and other human-made structures that limit watershed functions.

Many of Portland’s rivers and streams have their banks “hardened” with riprap, sheet pile and other human-made structures. Several of Portland’s smaller streams have been straightened and lined with rock and other imported materials. These features alter the velocity and timing of river and stream flows, disconnect rivers and streams from their floodplains, and limit the establishment of native vegetation and the natural maintenance of gravel beds and other important habitats.

Human Behavior

Changing how Portland develops and makes room for growth will diminish negative impacts on watershed health. It is necessary to address societal and behavioral factors as well as physical landscape impacts. Moving toward a more sustainable way of interacting with the environment will require City residents to modify their individual behavior and become stewards of a clean and healthy river system. Reducing water use, disposing of hazardous waste correctly, minimizing the use of fertilizers and pesticides, keeping pets on leashes and picking up their waste are all important contributions.

The best available science suggests that protecting existing healthy conditions, functions, and areas is one of the most effective ways to contribute to watershed health.

Public Health

Improving watershed health will also lead to improvements in public health. One of the most obvious linkages between watershed health and public health is water quality. Portland's combined sewer outfall system releases sewage into the river nearly every time it rains which results in very contaminated water. This occurs because rainwater from paved surfaces quickly fills the combined sewers, which carry both sanitary sewage and runoff from streets, parking lots, and rooftops. The overflows (CSOs) carry bacteria from the untreated sewage as well as other pollutants washed off streets and rooftops. The bacteria in the water contaminates fish and creates very unhealthy conditions for people swimming in the river. Environmental Services is completing a number of projects that will provide additional capacity in the pipe system for stormwater to reduce the frequency of CSOs. Combined outfalls to the Willamette River will be reduced by 94 percent when the projects are completed in 2011. The total cost to Portland sewer ratepayers for the 20-year program will be about \$1 billion.

Other actions that support watershed health, such as reducing impervious areas and increasing the amount of vegetation, will also benefit human health. Vegetation filters the air, consumes carbon dioxide, and reduces the heat island effect of urban development. Cooler temperatures and cleaner air may reduce the instances of asthma, respiratory illness and heat related illness. Human exposure to potentially toxic chemicals through plants and animals in the food chain is another area of concern in which watershed health can contribute. Containing and treating contaminated soils and toxics will reduce bioaccumulation in plants and animals and reduce direct human contact.

2.2.2 Implications of Existing Watershed Conditions and Trends

To implement the River Renaissance Vision, current watershed health conditions and trends will need to change. Some changes are underway, and work to meet federal environmental laws will require significant investments in watershed management actions.

Watershed Protection

The best available science suggests that protecting existing healthy conditions, functions, and areas is one of the most effective ways to contribute to watershed health. The implication is that these attributes should be assigned high priority for protection, using a variety of policy and

management tools. The City is identifying the areas in, along, and draining to Portland's rivers and streams that provide the greatest watershed benefits under current conditions and would provide the best opportunities for watershed protection initiatives.

Metro's recently completed inventory of riparian and wildlife habitat resources identifies more than 28,000 acres of regionally significant resources in Portland. Portland's existing environmental zones do not cover approximately 8,400 of these acres.



Riparian habitat is critical for recycling nutrients, storing water, trapping sediments, and sustaining the biological diversity of the watershed.

Watershed Restoration

Because watershed conditions in Portland are degraded, protecting existing healthy and functional areas will not alone achieve the City's goals. Restoration actions will also be necessary. The City is identifying areas that would provide the greatest opportunities to create watershed health benefits if improved, and the specific improvements needed at those sites. The implication is that these areas warrant high-priority consideration for restoration, using a variety of policy and management tools.

How Portland is Identifying Watershed Protection and Restoration Opportunities

Recently, each of Portland's streams has been the subject of detailed watershed assessments using a protocol designed by the State of Oregon. Upland areas across the City are also being surveyed and analyzed through inventories of natural resources.

Protecting areas that currently function well is one of the most effective ways to contribute to watershed health.

The City also conducts water quality monitoring and uses water quality models like the one described above to define protection and restoration priorities in upland areas of the City.

For the Willamette River, Tryon Creek and Johnson Creek, the City has completed initial analyses using a tool called Ecosystem Diagnosis and Treatment (EDT). EDT provides a detailed means of identifying reach-specific limiting habitat conditions and

inferring salmon and trout performance based on those conditions. EDT incorporates the effects of up to 45 specific variables that affect fish survival. For Fanno Creek, the Columbia Slough, and the streams draining Forest Park, the City is using other tools and expert opinion to define priorities and the implications that go with them. Combined with the extensive data collected to date, the methods provide a means of identifying upland, stream, and streamside protection and restoration priorities.

Portland's updated inventory of riparian and wildlife habitat resources and the functional values they provide, also will guide future protection and restoration activities. The City is gathering new and more accurate information on the location of streams and vegetation to revise the inventory. The City is developing a geographic information systems (GIS) model that incorporates this improved data for landscape features like slopes and floodplains and guidance from recent scientific literature. Portland's inventory is being coordinated with Metro's regional inventory of significant riparian and wildlife habitat resources.

By using the latest analytical methods to identify areas likely to produce the most significant watershed health benefits if protected and/or restored, the City of Portland will improve the cost-effectiveness of its watershed management actions. The challenge for River Renaissance is to find ways to protect existing healthy areas and to restore areas identified as having significant potential while also advancing the other River Renaissance Vision themes.

More details about watershed conditions in Portland and about the analytical methods are available in the City’s watershed characterizations, fish and habitat survey reports, and other documents. These resources are available at www.cleanrivers-pdx.org, www.fish.ci.portland.or.us, or portlandonline.com.

CITYWIDE WATERSHED STATISTICS	
Acres of land in Portland	92,630
Miles of Willamette River in Portland	17
Miles of rivers and streams in Portland	227
Miles of known piped streams in Portland	41
Acres of land with environmental overlay zones in Portland	19,170
Acres of Metro Regionally Significant Habitat in Portland	27,892

Portland is part of the Willamette River and Columbia River Watersheds-huge basins that extend hundreds of miles in length beyond our city boundaries. This table contains statistics for the area just within the city of Portland.

Existing Conditions and Trends in Portland’s Watersheds

2.3 Lower Willamette Watershed

2.3.1 Overview

The Willamette River is the 10th largest river in the contiguous United States in terms of streamflow. The Willamette Basin (Figure 2-11) covers 11,460 square miles and constitutes 12 percent of Oregon. In 1990, about 70 percent of Oregon’s population lived in the Willamette Basin. The lower reach of the Willamette extends from the falls at Oregon City to its confluence with the Columbia River. Portland is situated along the lower 17 of the river’s 187 miles.

Topography, hydrology and land use distinguish the east and west sides of the Willamette River in Portland. The westside covers 16,325 acres and is characterized by the Tualatin Mountains (also known as the West Hills) rising from a narrow terrace along the Willamette River. The westside contains approximately 27 miles of piped streams and about 133 miles that flow in open channels, primarily those that drain Forest Park. All of the Forest Park streams flow through culverts or pipes before reaching the Willamette.

The 22,690-acre eastside area is relatively flat except for



Figure 2-11: Willamette Basin Dam Locations. More than two dozen major dams have altered the timing and volume of the Willamette River’s flows. To view this map in color visit: www.river.ci.portland.or.us.

a few volcanic buttes such as Mt. Tabor and Rocky Butte. The eastside has been almost completely urbanized, and any streams that once crossed the area (other than Johnson Creek) have been diverted into sewers.

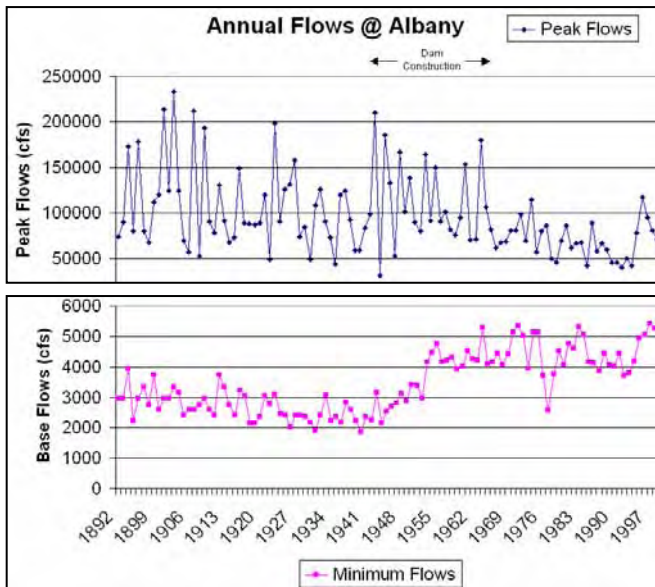


Figure 2-12: Willamette River Base and Peak Flows. Construction of dams throughout the Willamette Basin has increased base summer flows and decreased peak winter and spring flows. Altered flows influence habitat quality, water quality, fish, and wildlife.

For planning purposes, the Willamette watershed is divided into 27 subwatersheds. Except for the Forest Park subwatersheds, they are all highly urbanized with impervious surfaces ranging from 25 to 90 percent. Combined sewers serve about half of the total area. In areas served by separate storm sewers, runoff is discharged to the Willamette River. Discharges to the river through combined sewer overflows (CSOs) and urban stormwater outfalls are the primary flow inputs to the river from the area.

2.3.2 Conditions and Trends

Hydrology

The Willamette River Basin's storage reservoir/hydropower system has altered the

Willamette River's flows (Figure 2-12). Winter flood flows have been reduced and summer low flows have been increased. For example, before flood control dams were built in the Willamette Basin, flows in Portland were equal or greater than the 1996 flood every six to ten years. Flow changes affect water temperature and river-floodplain interactions.

Portland-area urban activities such as channel deepening and straightening, bank hardening, removal of vegetation, and increases in impervious surfaces--both along tributary streams and in upland areas that drain to tributaries and the mainstem--have local-scale impacts on the Willamette's flows. Bank alterations and floodplain development prevent the river from overtopping its banks and connecting with its floodplain.

In sum, changes caused by dams and changes in physical conditions through the Portland reach have altered the interaction between the river and its floodplain, groundwater recharge and discharge,

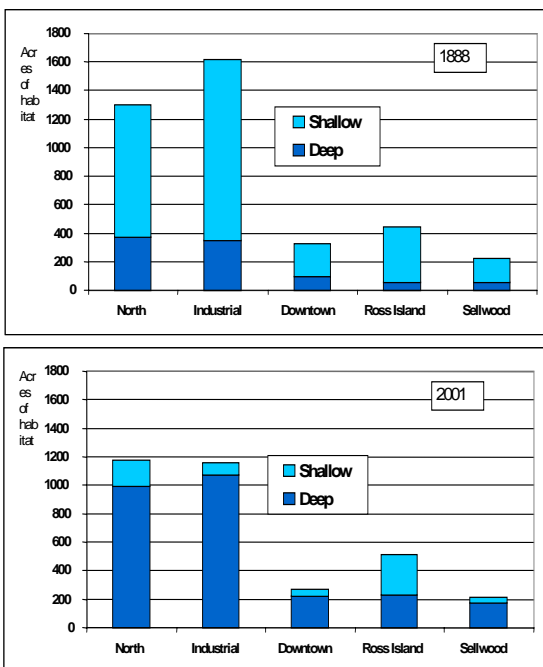


Figure 2-13: Changes in Shallow and Deep Water Habitat through Portland. Nearly 80 percent of the lower Willamette used to be less than 20 feet deep. Dredging, diking, and channeling of the river have reversed those figures. Nearly 80 percent of the lower river is now deeper than 20 feet.

small-scale patterns of flow and velocity, tributary inflows and the nature of the interaction between the tributaries and the mainstem. Continued growth in the Willamette Basin and in Portland will exacerbate these trends.

Habitat

Upland habitats have been heavily impacted by development in the upland portions of the watershed with the exception of Forest Park. The mainstem has been narrowed and deepened, and off-channel habitat has been virtually eliminated. The river’s banks have been hardened precluding important naturally caused channel changes and minimizing the interaction between the river and riparian and floodplain vegetation. Habitat has been simplified and large tracts of riparian vegetation have been cleared. Actions taken as a result of new regulations and improving scientific knowledge are beginning to reverse some of these trends. However, continued demand for riverside industrial and residential land, and for development in upland areas, has the potential to compete with efforts to improve habitat.

Water Quality

Willamette River temperatures recorded in Portland and upstream regularly exceed state and federal standards during summer (Figure 2-14). Review of 10 years of data suggests a modest (but not statistically significant) pattern of increasing temperatures from the Morrison

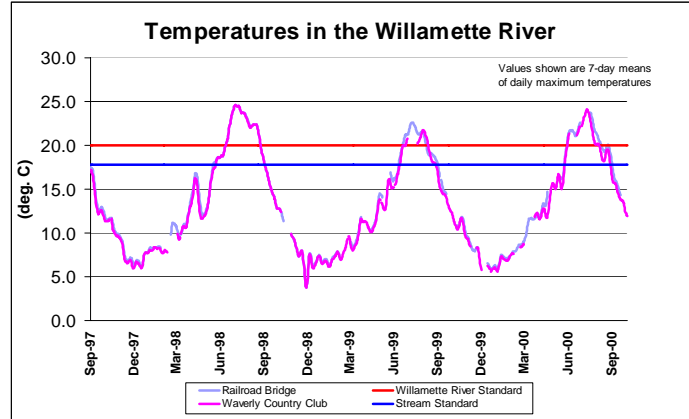


Figure 2-14: Temperatures in the Willamette River. Temperatures in the Willamette River routinely violate standards during the summer. Addressing temperature problems in the Willamette will require actions across the entire Willamette Basin.

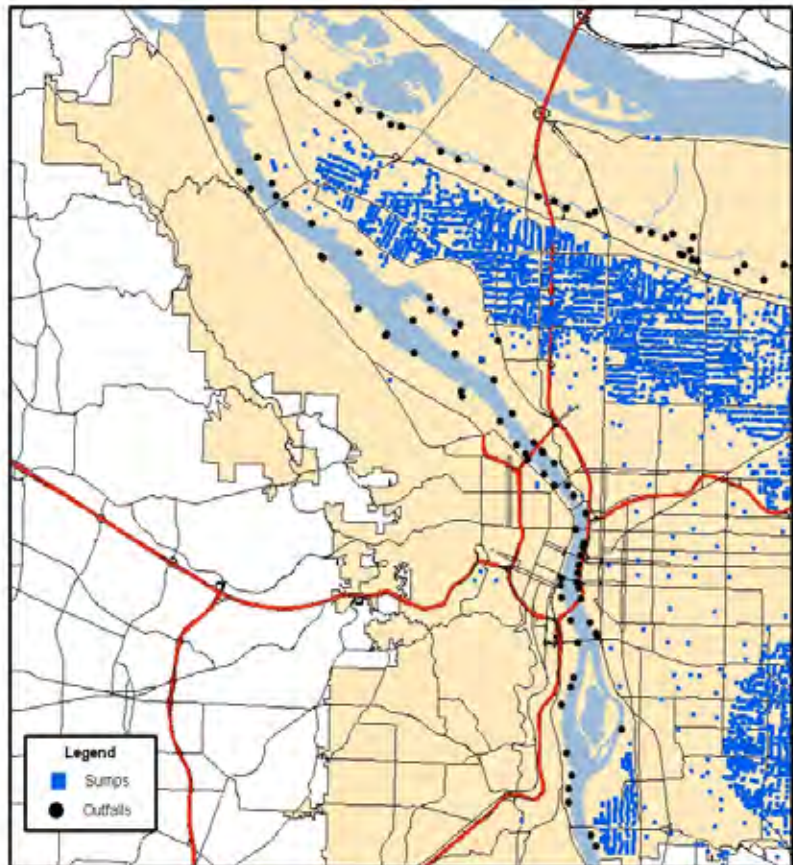


Figure 2-15: Public Outfalls and Sumps. Stormwater is routed to the Willamette River and the Columbia Slough through hundreds of privately owned outfalls (not shown) and dozens of City-owned outfalls. Stormwater also is infiltrated into the ground through more than private and drywells (not shown) and public sumps and test wells (indicated by blue squares). Keeping stormwater clean to protect and improve water quality will require changes to a variety of common practices and retrofits of existing development with stormwater-friendly facilities. To view this map in color visit www.river.ci.portland.or.us.

Bridge upstream. Progress has been made in reducing the amount of copper, lead, and bacteria in the lower Willamette River, but levels of these pollutants are still of concern. The ongoing Combined Sewer Overflow (CSO) Project ultimately will result in even greater reductions in the bacteria entering the Willamette in Portland. However, even after the CSO Program is complete, a large amount of stormwater, and the pollutants it carries, will continue to drain to the Willamette River via hundreds of private and dozens of municipal outfalls (Figure 2-15), creating the need for additional watershed management actions.

Stormwater from streets and developed areas is the most important and most difficult to manage conveyor of pollution because it comes from countless diffuse sources. It is also called non-point source pollution. In addition to direct discharges to waterways, stormwater is also managed through a system of more than 9,000 sumps and test wells located in many parts of the Willamette Watershed in Portland (Figure 2-15). Protecting and improving the quality of stormwater entering sumps helps protect groundwater, which often returns to local waterways.

Pollutants in water often bind to sediment. Because of the level of pollution in lower Willamette River sediments, the Portland Harbor was added to the federal Superfund cleanup list in December 2000. Pollutants generated throughout the Willamette Basin, including industrial discharges, toxics carried by stormwater, and other sources have contributed to elevated levels of DDT, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and heavy metals in lower Willamette River sediment. These water and sediment issues have become more critical as regulations become more stringent and comprehensive, at the same time that new laboratory techniques allow lower concentrations to be detected.

Continued population growth and development throughout the Willamette Basin likely will increase water temperature and pollutants unless appropriate counteractive actions are taken.

Biological Communities

Development has greatly reduced the biotic integrity of the Willamette River watershed and the mainstem Willamette within Portland. Some native species of fish and aquatic insects have gone extinct, and introduced species currently occupy native species' habitat or compete with them for food, cover, and other habitat features.

In particular, local and upstream salmon populations have been greatly reduced from historical numbers and several have been listed under the Endangered Species Act (Figure 2-16). Recent city-sponsored research has documented that subyearling salmon are present in the lower Willamette River year-round. That research also documented that at least 39 species of both warm-water and cool-water fish from 17 families inhabit the river. Of these, 19 species from seven families are non-native to the Willamette River system. Recent sampling also indicates that aquatic insect and macroinvertebrate populations are less abundant and diverse than populations in healthier rivers of similar size.

ESA Status of Fish in the City of Portland

Species	ESU	Status
Steelhead	Lower Columbia/ Upper Willamette	Threatened
Chinook	Lower Columbia	Threatened
Chinook	Upper Willamette	Threatened
Chum	Columbia River	Threatened
Coho	Lower Columbia	Proposed
Coastal Cutthroat	Basinwide	Candidate
Pacific Lamprey	Basinwide	Candidate

Figure 2-16 In March 1998, steelhead were listed as threatened under the Endangered Species Act – the first listing of an aquatic species in a predominantly urban area. In 1999, Chinook salmon were added to the list.

LOWER WILLAMETTE WATERSHED STATISTICS*	
Acres in Total Basin	7,334,400
Acres within City of Portland	40,030
Miles of Piped Stream	182 ³
Miles of Open Channel	75 ⁴
Acres in Environmental Zones	7,600
Acres of Metro Regionally Significant Habitat*	14,300
<i>*Figures are calculated based on natural topographic watershed boundaries. BES's watershed plans may report slightly different figures because their management areas reflect human-altered hydrology</i>	

*within City of Portland

Figure 2-17 Portland's Willamette Watershed includes Forest Park, the downtown commercial core, industrial districts on both sides of the river, and the City's most densely populated residential neighborhoods.

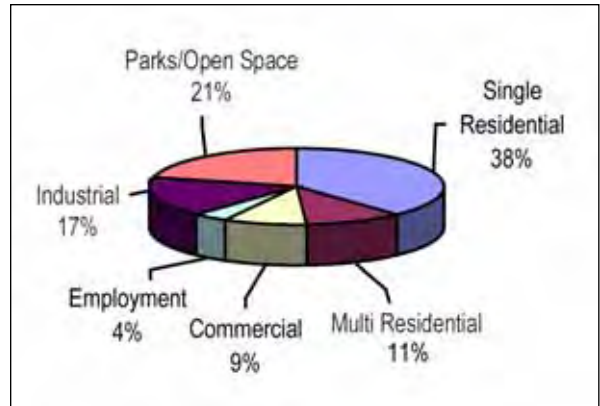


Figure 2-18: Willamette Watershed Zoning The Willamette watershed has very diverse land use, including Forest Park, industrial riverfront, residential neighborhoods, and the Central City.

³The exact location of many historic streams on the eastside of the watershed is speculative, and historic pipe records are incomplete.

⁴ There are no open waterways on the eastside of the watershed.

2.3.3 Willamette Watershed Protection and Restoration Opportunities

Protection Opportunities

Based on EDT analyses, the Industrial, Ross Island, and North segments along the mainstem of the Willamette River in Portland are particularly valuable watershed assets (Figure 2-19). These areas provide habitat for migrating salmon and other fish and wildlife.

North Segment

The North segment of the Willamette between the St. Johns Bridge and the confluence with the Columbia includes both remnant off-channel areas and relatively intact bank conditions.

Industrial Segment

The Swan Island lagoon and other terminal facilities in the Industrial segment provide areas for fish and wildlife to move out of the river's main current (off-channel habitat).

Ross Island

Ross Island provides valuable off-channel and shallow water habitat, relatively intact streamside vegetation, and natural bank conditions. The adjacent wetlands at Oaks Bottom also provide valuable watershed functions.

Riparian and Terrestrial Opportunities

Forest Park and most of Portland's riverside parks provide important watershed health benefits. Forest Park is the largest urban park in the nation, providing habitat for many species of birds and mammals. Powers Marine, Sellwood, Willamette, Oaks Bottom, Cathedral, and Kelley Point parks represent, to varying degrees, Portland's remaining natural riparian areas. Although Stephens Creek has been affected by urbanization, its confluence with the Willamette just north of the Sellwood Bridge provides important habitat. Similarly, although the lower reaches are blocked by culverts, the upper reaches of Balch, Saltzman, Doane, and Miller Creeks, along with several unnamed streams in Forest Park are protected from intensive development by their location mostly within the park. While recreational use does cause some erosion, the water quality, hydrology and habitat in the streams' upper reaches contribute to watershed health. Several of these streams also support populations of cutthroat trout, sculpin, and other native fish. The lower reaches are conveyed in pipes and culverts across the industrialized floodplain terrace, blocking fish passage from the mainstem to upper reaches. Even if fish passage is not restored, the confluence areas of these streams provide valuable watershed health benefits, including refuge areas for fish in the Willamette.

Currently, almost 7,360 acres of land in Portland's Willamette Watershed are within environmental overlay zones. Metro's recently completed inventory of riparian and wildlife habitat resources estimates that more than 10,000 acres of land within this watershed provide regionally significant riparian resources and/or wildlife habitat.



Figure 2-19: Protection Value of Willamette River Reaches. Based on an analysis of salmon habitat needs, sections of the Willamette River in dark green currently provide significant watershed health benefits. Areas in red provide fewer benefits because they are degraded or because they historically provided less value for salmon. To view this map in color visit www.river.ci.portland.or.us.

Restoration Opportunities

The City's initial analyses of the Willamette and its banks have identified the Industrial and Ross Island sections as those with the highest potential to provide watershed health benefits if restored (Figure 2-20). These areas are compromised by dramatic changes in hydrology (seasonal flow patterns), elevated summer water temperatures, bank armoring, loss of shallow water habitat, high levels of bacteria, pollution in river sediments, and the presence of non-native fish species. Similar analyses of the upland portions of the Willamette Watershed within the City Portland are underway.

Hydrology

Changes in seasonal flow patterns will require actions throughout the entire Willamette Basin. These problems cannot be addressed solely or even predominantly through restoration actions in Portland, but Portland can and is required by law to do its part. Actions in Portland can certainly contribute positive benefits but they must be coordinated with broader efforts throughout the basin. In particular, there are opportunities to work with upstream jurisdictions and the US Army Corps of Engineers to influence the way upstream flood control and hydropower dams are operated. There are a number of regional-scale planning and regulatory efforts underway in which Portland could seek to influence the hydrology of the lower Willamette River. They include NOAA Fisheries' development of new rules and regulations for the operation of the federal dams in the upper basin; action in the Willamette Subbasin Plan being developed by the Northwest Power and Conservation Council; and, recommendations resulting from the Corps of Engineers' Willamette Floodplain Restoration Study. Local actions that improve the Willamette River's connection to its current and historic floodplain will improve hydrologic conditions at the site-specific scale.

Habitat

Portland has the ability to influence significantly the condition of the banks of the lower Willamette River as well as upland areas through a variety of means including acquisition, incentives, zoning, and other regulations and partnerships. The City also can establish new priorities for the land it owns along the Willamette River. Portland also can work to increase the amount of shallow water habitat, particularly in the areas identified as priorities above. Initial efforts as part of the development of the Eastbank Esplanade, South Waterfront, and other districts are models for additional restoration actions, as are restoration plans for Ross Island and the Port of Portland's Terminal 4. The work at South Waterfront and Terminal 4 are the result of successful public private partnerships where public money was used to leverage private dollars.



Figure 2-20: Restoration Value of Willamette Reaches. Sections of the Willamette River in dark green have the best potential to provide increased watershed health benefits if restored. Areas in red indicate relatively less potential benefit because the sites historically were less valuable or because they currently are in relatively good condition. To view this map in color visit www.river.ci.portland.or.us.

Water Quality

Like hydrology, elevated summer water temperatures will require actions throughout the entire Willamette Basin, but Portland can and is required to play a significant role. High bacteria levels are being addressed by the large investments the City is making in its sewer system and by a state regulatory program that aims to limit bacteria in the upper Willamette and in the tributaries draining to it (e.g., Columbia Slough, Johnson Creek, and the Tualatin River).

Improving stormwater quality and recharging the groundwater to reduce stormwater impacts are some of the most important restoration priorities for the Willamette Watershed in Portland.

Pollution can be significantly (though not solely) addressed by local efforts in Portland. Pollution, particularly in sediments, will be addressed by risk assessment, source control, and cleanup conducted under the Portland Harbor Superfund Program, and by stormwater management actions throughout the upland portions of Portland's Willamette Watershed planning area and Portland's tributary watersheds that drain to the Willamette. Controlling the sources of pollution is the most cost-effective management approach to improve water quality.

The Combined Sewer Overflow (CSO) project work in the Willamette Watershed provides an opportunity to integrate the watershed approach into sewer facility planning. For instance, reducing stormwater flow into the combined sewer system by infiltration helps reduce the CSO problem, relieves overloaded and deteriorating pipes, reduces basement flooding and improves watershed health.

Biological Communities

Non-native species probably will never be completely eliminated from the Willamette River, but their numbers and impact could be reduced by all the actions described above, which will provide conditions that are more favorable to native species and less favorable to non-native species. Portland also could increase its efforts to work with regional fish hatchery reform programs like those being conducted by NOAA Fisheries, the Northwest Power and Conservation Council, and the Oregon Department of Fish and Wildlife. A comprehensive inventory of upland, terrestrial wildlife restoration opportunities has not yet been conducted but is currently being planned.

Stormwater Management

Improving urban stormwater management to restore water quality and reduce quantities of stormwater runoff is one of the most important restoration priorities for the Willamette planning area. Runoff from urban areas contains copper, lead, bacteria, and other pollutants. It also can contribute to high water temperatures. Stormwater runoff also causes combined sewer overflows that discharge untreated sewage into the Willamette. It will be especially critical to explore methods for controlling the sources of stormwater pollution and for treating and disposing of stormwater runoff from streets.

Revegetation

The City's Revegetation Program and ongoing support of street tree plantings provide watershed benefits, particularly water quality and habitat functions, throughout the planning area. On the

eastside of the Willamette, particularly along the bluffs in the subwatersheds north of the Fremont Bridge, revegetation projects provide examples of active urban restoration with native plantings. A project to improve trail access to the river in the Mock's Bottom subwatershed near Swan Island compliments the revegetation work already underway.

Area and Neighborhood Plans

Area and neighborhood planning projects provide opportunities to improve stormwater management. Considering the effects of proposed zoning and land use changes on stormwater will provide important opportunities to improve watershed health. The Marquam Hills Nature Park in the Sheridan-Woods subwatershed provides water quality, hydrology, and habitat benefits. Planned development in the South Waterfront area includes a creative stormwater swale and bank restoration project and other stormwater and habitat improvements along the Willamette River. There will be additional opportunities for watershed improvements as part of the South Waterfront greenway development project and Oregon Health and Science University (OHSU) and other private development projects.

2.4 Tryon Creek Watershed

2.4.1 Overview

Tryon Creek is a seven-mile long free-flowing stream that drains a roughly 4,200-acre watershed. The stream flows in a southeasterly direction from Mt. Sylvania in the Southwest Hills of Portland to the Willamette River near Lake Oswego. Including all of its tributaries, Tryon Creek includes approximately 27 miles of stream drainage. This includes those streams that flow year-round and those that flow seasonally when it rains. It is primarily a moderate gradient stream with steep slopes, which results in a high frequency of landslides and erosion. The upper watershed has suffered impacts commonly associated with urban development, including increased instream flow velocities and volumes following storm events and subsequent stream bank erosion. Soils in the watershed are underlain by clay that impedes water infiltration and root penetration, resulting in a high incidence of trees being blown down by wind, landslides, channel incision, and bank erosion.

2.4.2 Conditions and Trends

Hydrology

Historical information on flows in Tryon Creek is lacking. Modeling information indicates that the creek is "flashier," or in other words has higher peak flows, which is corroborated by marked channel incision in a number of reaches.

Habitat

Instream habitat conditions range from marginal to optimal (optimal only in a few areas), with most of the marginal habitat within the more heavily urbanized upper watershed. Highest quality instream and upland habitats are located within the Tryon Creek State Natural Area. Impassable or partially passable culverts limit salmon access and affect watershed processes through much

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of the watershed. Stream complexity and habitat quality have been greatly reduced by significant channelization, downcutting, lack of wood (Figure 2-21), lack of floodplain connectivity, underground piping of tributaries, and bank erosion, particularly in the upper watershed. Sedimentation is an ongoing problem because it degrades instream habitat (Figure 2-22). Development and streamside disturbance have reduced streamside vegetation along many sections of Tryon Creek and its tributaries.

Portland has applied environmental zones to approximately 1,020 acres in the Tryon Creek watershed. Metro identified approximately 1,500 acres of significant resources in the watershed. Some of these are covered by environmental zoning, others are not.

Water Quality

Continual water quality monitoring at Boones Ferry Road indicates that temperatures in Tryon Creek exceed state standards for 7-day averages 27 to 42 days each summer (Figure 2-23).

Random sampling of Tryon Creek also shows bacteria levels that exceed standards. Nutrients, dissolved oxygen, and suspended solids do not exceed standards, but are found in elevated levels throughout the watershed.

The City of Portland is currently monitoring the concentrations of 13 different pollutants and recently completed an analysis of available water quality data. The analysis indicates that with the exception of temperature, water quality generally meets state standards; however, there are no standards for a number of pollutants that are found in stormwater that can affect aquatic species. There is anecdotal information that

suggests that toxic contamination related to motor vehicles and stormwater may be harming benthic communities below the Interstate 5 bridge and the urbanized upper watershed. Recent research by NOAA Fisheries documents that relatively low levels of pollutants typically found in urban stormwater can affect the health of salmon.



Figure 2-22: Percentage of fine sediments in riffles through Tryon Creek. State of Oregon fine sediment criteria are only applied in riffle habitats; other habitat types are indicated in black. Much of the high quality habitat in Tryon Creek is smothered by fine sediment created by upland activities and practices and carried to the creek by stormwater. Sediment also is created when stormwater from paved surfaces rushes to the creek instead of infiltrating into upland soils. The increased flows following storms scour streambanks, causing erosion and sedimentation. To view this map in color visit www.river.ci.portland.or.us.



Figure 2-21: Large Wood in Tryon Creek. The number of pieces of wood per 100 meters of stream length. Scientists consider 20 or more pieces per 100 meters of stream length desirable. The vast majority of Tryon Creek has less than 1 piece of wood per 100 meters, significantly less than desired conditions. To view this map in color visit www.river.ci.portland.or.us.

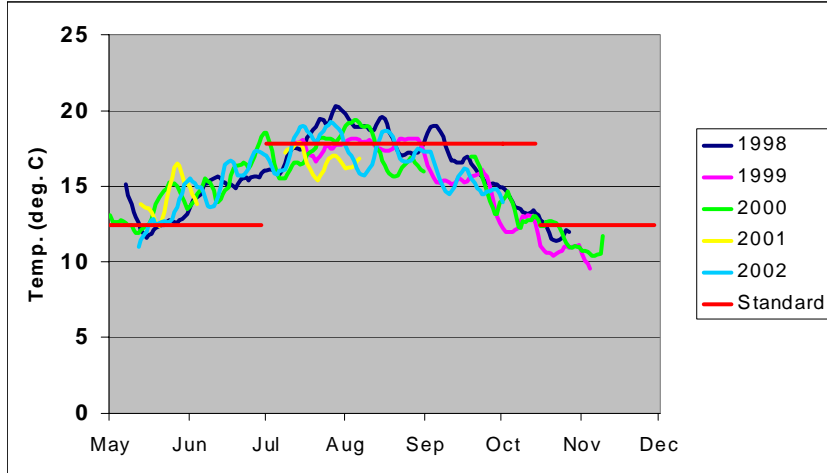


Figure 2-23: Seven day average daily maximum summer temperatures in Tryon Creek. Temperature is typically measured from May through November in Tryon Creek. Summer temperatures typically exceed the summer standard, but the length and severity of exceedences vary by year. Early summer temperatures exceed the spawning and incubation standard, which applies when salmon are rearing in the gravel. The likely period during which rearing takes place is indicated by red lines on the graph.

Biological Communities

While the biotic integrity of Tryon Creek has been greatly reduced from historical conditions, many assets still remain. Tryon Creek watershed contains large parks including the 630-acre Tryon Creek State Natural Area, 25-acre Marshall Natural Area and 17-acre Maricara Nature Park. These wooded areas contain many native vegetation species providing habitat for a range of wildlife including over 60 species of birds and fish species. Invasions of nonnative plants are evident

even within the higher quality areas of Arnold Creek and Tryon Creek State Natural Area and are a threat to habitat integrity.

TRYON CREEK WATERSHED STATISTICS*	
Acres in Total Basin	4,200
Acres in City of Portland	3,050
Miles of Known Piped Stream*	3
Miles of Open Channel	27
Acres in Environmental Zones	1,020
Acres of Metro Regionally Significant Habitat*	1,671

*Figures are calculated based on natural topographic watershed boundaries. BES's watershed plans may report slightly different figures because their management areas reflect human-altered hydrology.
*within City of Portland

Figure 2-24 The Tryon Creek Watershed in southwest Portland covers an area of approximately 6.5 square miles. About 21 percent of the watershed is outside the City of Portland's boundary and within the jurisdictions of Multnomah County, Clackamas County, and the City of Lake Oswego.

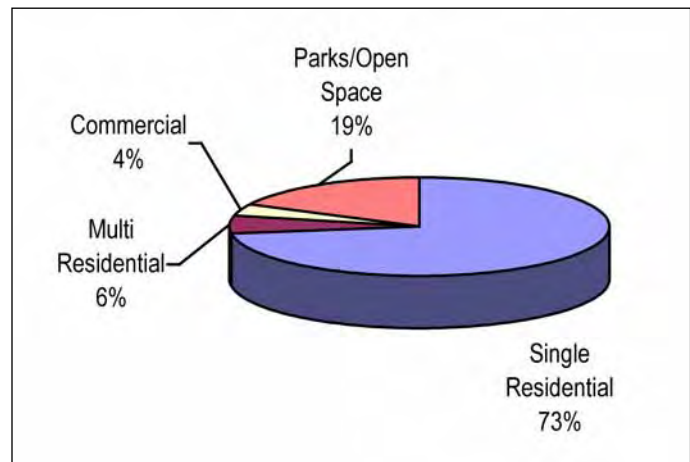


Figure 2-25: Tryon Creek Watershed Zoning – Tryon Creek Watershed is predominantly residential. The large proportion of parks and open space can be attributed to Tryon Creek State Park.

2.4.3 Tryon Creek Protection and Restoration Opportunities

Protection Opportunities

Based on EDT and other analyses, Lower Tryon is particularly valuable for purposes of achieving watershed health goals (Figure 2-26). This area, which includes Tryon Creek State Natural Area, provides important habitat for migrating salmon and fish and wildlife.

Lower Tryon Creek

Lower Tryon has good riverbed conditions for salmon and trout spawning. It retains more intact streamside vegetation and complex, winding river channel area than other parts of the creek. In the lower section, important habitat features that benefit fish include riffle gravels, deep pools, beaver ponds, and access to intermittent and perennial tributaries.

Trees and shrubs in this area are at an age and size that they will provide good sources of wood in the creek in the very near future. The existing tree (and shrub) canopy helps prevent stream temperatures from exceeding lethal and unhealthy levels; and indirectly helps ensure enough dissolved oxygen in the creek to support fish and other aquatic species. Native fish, including cutthroat, steelhead, chinook and coho use this portion of Tryon Creek year-round.

Upper Tryon Creek

Upper Tryon contains some important watershed health features, in particular Marshall Park, which is adjacent to the creek. Because of the existence of the park, riverside conditions are healthier than in many other parts of Upper Tryon. In addition, the reach of Upper Tryon just above Boones Ferry Road also has intact streamside vegetation and relatively healthy riverbank conditions.

Arnold Creek

Arnold Creek's water quality provides benefits both for that creek and for the Tryon Creek mainstem. Most of the beneficial features of Upper and Lower Tryon Creek and Arnold Creek can be maintained and enhanced by local actions. Allowing damage to these areas would create significant harm to watershed health. For this reason, they have a high "protection value."

Restoration Opportunities

To achieve a healthy watershed, the City will need to restore sections of Tryon Creek that have been degraded. The City's initial analyses have revealed that the lower section of

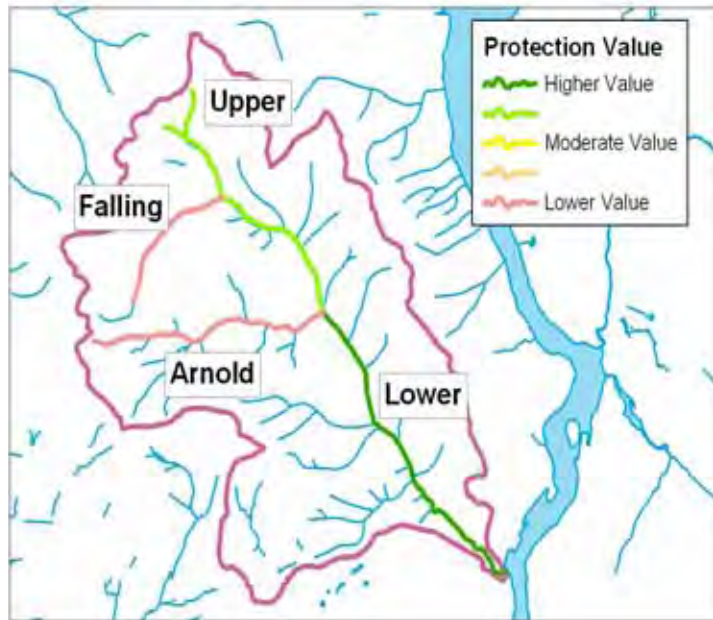


Figure 2-26: Protection Value of Tryon Creek. Based on an analysis of salmon needs, areas of Tryon Creek in dark green currently provide significant watershed health benefits. Areas in lighter green, yellow and pink currently provide fewer benefits because they are degraded or because they historically provided less value for salmon. To view this map in color visit www.river.ci.portland.or.us.

Tryon Creek has the greatest potential to provide watershed health benefits if restored (Figure 2-27).

Hydrology

Increased peak flows after storm events have caused deep incisions and erosion in the Tryon Creek channel. The incisions often prevent the creek from accessing its historic floodplain, further contributing to increased flows and velocities within the creek. Reductions in the amount of pavement and other impervious surfaces in the watershed, if accompanied by on-site stormwater management, tree planting and revegetation programs, would help reduce the volume and rate of stormwater entering the creek. This is because fewer paved surfaces generally means more opportunities for stormwater to infiltrate into the ground instead of flowing directly to creeks and streams. Removing or improving culverts and other crossings that currently block fish passage and alter the volume and timing of instream flows would help restore the health of the watershed.

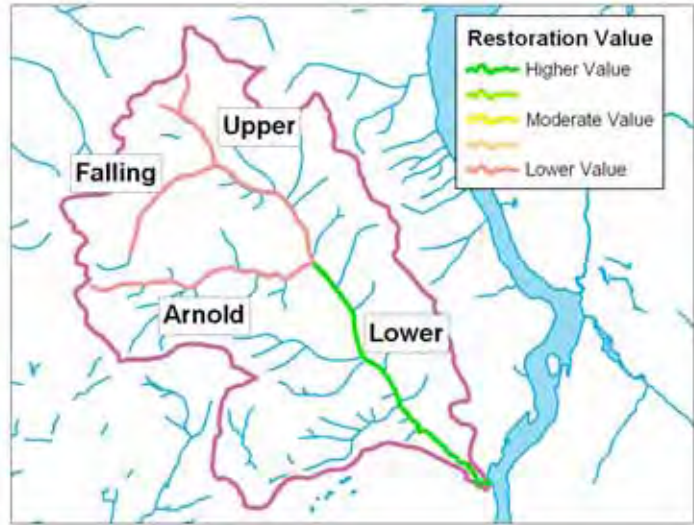


Figure 2-27: Restoration Value of Tryon Creek Tributaries. Based on an analysis of salmon needs, areas of Tryon Creek in dark green have the potential to provide the most significant watershed health benefits if restored. Areas in lighter green, yellow, and pink have less potential because they are currently relatively healthy or because they historically provided less value for salmon. To view this map in color visit www.river.ci.portland.or.us.

Habitat

Improving conditions at the culverts at Highway 43 and at Boones Ferry Road is an important restoration opportunity. Providing fish access above Highway 43 and Boones Ferry Road would provide critical habitat to native steelhead, coho, cutthroat, and perhaps chinook (in the lower reaches).

Tryon Creek has lost a significant amount of its former habitat complexity (e.g., winding back channels and large trees in the creek). In Lower Tryon, there is potential to improve the connectivity between the creek and its floodplain in certain areas up to the confluence with Arnold Creek. Channel incision has reduced the creek's access to its historic floodplain, changing the nature and extent of vegetation along the creek.

Reductions in the amount of pavement would increase infiltration and help reduce the volume and rate of stormwater entering the creek.

Arnold Creek, one of the larger tributaries to Tryon, has good instream habitat within its lower section, but fine sediments, bank erosion, and channel incision have degraded the creek's upper sections. Arnold Creek also is highly segmented by culverts from road and driveway crossings. Falling Creek, another major tributary to Tryon, has poor to marginal instream habitat, with a lack of instream cover, poor bank and streamside structure, and excessive fine sediments. Restoration actions could be designed to address these problems. Invasive non-native plant



Large wood in streams provide structural complexity, habitat and flow control.

species are evident throughout the higher quality areas of Arnold and Falling Creeks. These species compete with native species, resulting in diminished habitat quality.

Water Quality

There is excessive sediment in Tryon Creek throughout Tryon Creek State Natural Area. Sediment is transported in stormwater from upland sources. Loose sediment is also generated by

storm-driven peak flows scouring streambanks. Sediment smothers fish spawning beds and is linked to a variety of toxic pollutants such as oil, grease, metals, and pesticides. Addressing the sediment challenge will require a variety of stormwater and other upland management actions. Those actions would be most effective if they are aimed at reducing sediment-laden runoff and the excessive peak flows that scour streambanks. Tree planting and revegetation programs, water quality swales, and reductions in pavement and other impervious surfaces in the watershed will help reduce peak flows, and therefore are likely to be effective techniques for reducing sediment loads.

Prioritizing source control and stormwater treatment actions would produce significant watershed health benefits.

Tryon Creek also suffers from elevated summer water temperatures. Tree planting and reductions in impervious area would help address the temperature problem. Stormwater also contributes to bacteria, phosphorous, and other pollution problems in Tryon Creek. The upper section of Tryon Creek is heavily urbanized. Initial information from the City's detailed pollutant load analyses and water quality monitoring suggest that pollution from roads and other urban sources entering upper Tryon Creek may be a significant problem for the entire creek.

Biological Communities

Addressing the flow, habitat, and water quality issues also will address the needs of fish and wildlife in the Tryon Creek watershed. Creating and investing in strategies to address invasive plant species is a high priority restoration action. Additional research on insects and benthic organisms would help frame additional management priorities.

Stormwater Management

The heavily urban sections of the upper Tryon Creek Watershed and the Interstate 5, Barbur Boulevard, and Terwilliger Boulevard transportation corridors are likely the largest potential sources of ongoing stormwater related watershed health problems. Prioritizing source control and stormwater treatment actions such as green streets, treatment swales, and detention along these corridors would likely produce the greatest watershed health benefits.

For more information, visit the [Fanno-Tryon Creek Watershed Management Plan](#) (on the City's website).

2.5 Fanno Creek Watershed

2.5.1 Overview

Fanno Creek is a tributary to the Tualatin River Basin, which drains about 20,500 acres. Of that land area, 4,528 acres falls within the City of Portland jurisdiction. Land use in the Fanno Creek Watershed is dominated by residential, industrial, and commercial activities. Impervious surfaces cover about 1,500 areas of the watershed. Within the City of Portland, the Fanno Creek watershed contains approximately 5 miles of piped streams and about 28 miles that flow in open channels.

2.5.2 Conditions and Trends

Hydrology

The hydrology of Fanno Creek has been altered by impervious surfaces and a decrease in the infiltration and retention of water in vegetated areas. This results in higher peak flows, particularly during the winter, which increase erosion and decrease channel stability. Summer flows are probably low compared to historical conditions.

Habitat

Instream habitat quality in Fanno Creek and two of its tributaries – Vermont and Woods creeks – is rated as extremely impaired or threatened, primarily due to the adverse effects of excessive fine sediment (Figure 2-28). Channel complexity and habitat quality have been greatly reduced by significant channelization, downcutting, lack of wood (Figure 2-29), lack of floodplain connectivity, underground piping of tributaries, and bank erosion, particularly in the upper watershed. Watershed development and streamside disturbance have reduced riparian vegetation along many sections of Fanno Creek and its tributaries. Impassable or semi-passable culverts limit salmon access and affect flows and other stream processes throughout much

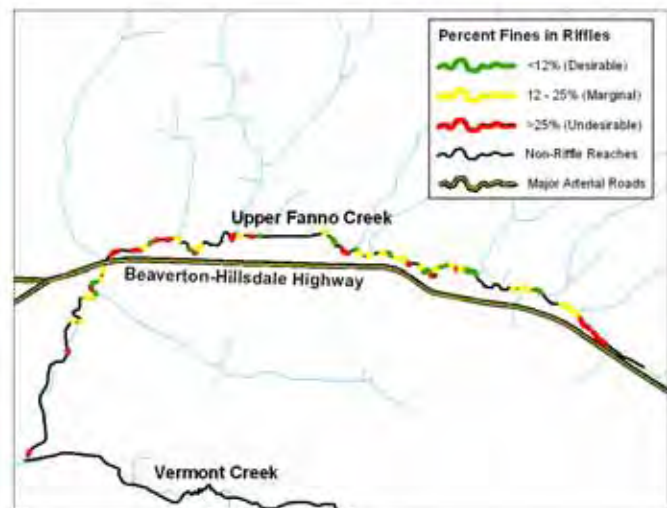


Figure 2-28: Fine sediment in a section of Fanno Creek. The City of Portland has detailed information about sediment in Fanno Creek and its tributaries. Sediment, which carries pollution and smothers fish spawning beds, is created by upland practices and by the increased velocity of stream flows created by the stormwater that flows off pavement and other impervious areas throughout the watershed. To view this map in color visit www.river.ci.portland.or.us.



Figure 2-29 Fanno Creek – Large Wood: The number of pieces of wood per 100 meters of stream length in a section of Fanno Creek. Scientists consider 20 or more pieces per 100 meters of stream length desirable. The vast majority of Fanno Creek has less than 2 pieces of wood per 100 meters, significantly less than what is considered healthy. To view this map in color visit www.river.ci.portland.or.us.

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of the watershed.

Portland’s environmental zones cover about 690 acres of the watershed. Metro identified about 1,500 acres of significant resources in the watershed. Some of these are within the environmental zones, others are not.

Water Quality

Water temperatures in Fanno Creek regularly exceed state standards 44 days on average through the summer (Figure 2-30). The creek has four established TMDLs for bacteria, dissolved oxygen, total phosphorus, and temperature. Background concentrations of phosphorus in Fanno Creek are generally below the standard. Dissolved oxygen levels are low during the summer. Data on toxics is limited and DEQ determined that background levels are not from human sources. Urban and suburban development within the watershed has contributed to these water quality problems by reducing or eliminating streamside vegetation and by increasing stream temperatures and nutrient loadings (nutrient loadings cause algae and other plants to grow, reducing the amount of oxygen available for fish and other aquatic species).

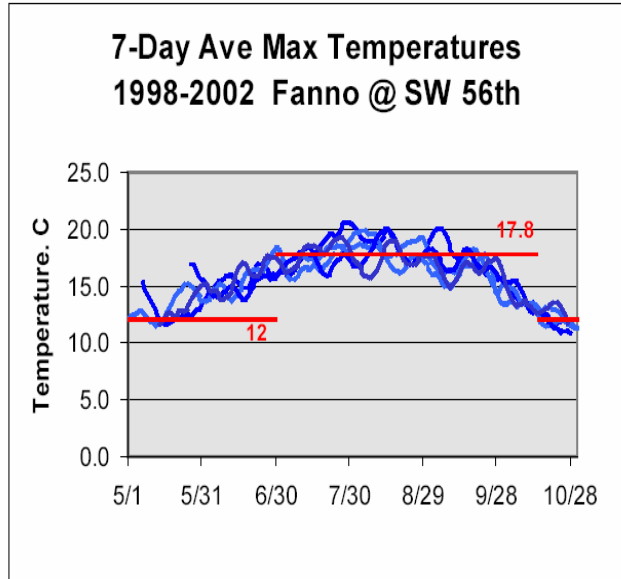


Figure 2-30: Seven-day Average Temperature in Fanno Creek. Temperatures regularly violate state standards during the summer. Improving tree canopy and vegetation in the upland areas of the Fanno Creek watershed and improving stormwater infiltration by reducing the amount of impervious area would help address temperature problems.

Biological Communities

The health of Fanno Creek’s biological communities has been greatly reduced from historical conditions. Many native species of fish and aquatic insects are at risk, and many introduced or nuisance species currently compete with native species for food and habitat. The abundance of salmon, both locally and downstream, has been greatly reduced from historical numbers.

Fanno Creek’s limited habitat quality leaves too few places in the creek for fish and wildlife to rest and hide from predators. Most of Fanno Creek within the City of Portland is inaccessible to salmon and steelhead because of impassable culverts downstream of city limits. The City of Portland sampled fish populations in 1993 and found reticulate sculpin, reddsideshiner, cutthroat trout and peamouth present in the upper reaches.

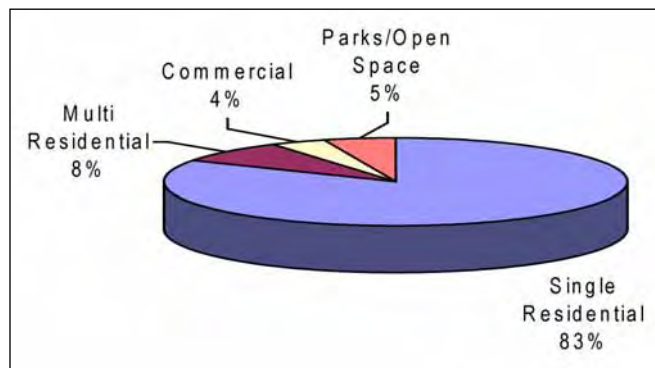


Figure 2-31: Fanno Creek Watershed Zoning – Similar to Tryon Creek, single-family residential represents the largest zoning designation.

FANNO CREEK WATERSHED STATISTICS*	
Acres in Total Basin	20,310
Acres in City of Portland	4,528
Miles of Known Piped Stream*	5
Miles of Open Channel*	28
Acres in Environmental Zones*	695
Acres of Metro Regionally Significant Habitat*	2,057
*Figures are calculated based on natural topographic watershed boundaries. BES's watershed plans may report slightly different figures because their management areas reflect human-altered hydrology	

*within City of Portland

Figure 2-32 Fanno Creek flows in a southwesterly direction to the Tualatin River, which then flows east to the Willamette River. Three fourths of the watershed is within the jurisdictions of Washington County.

2.5.3 Fanno Creek Protection and Restoration Opportunities

Protection Opportunities

Upper Fanno Creek and the tributaries that drain to it from the north (Pendleton Creek, Vermont Creek, Woods Creek and South Ash Creek) currently provide the most significant watershed health benefits (Figure 2-33).

Upper Fanno Creek

Development has affected stream connectivity the least in upper Fanno Creek from the Beaverton Hillsdale Highway and Scholls Ferry Road interchange to Patton Creek (Shattuck Road). Columbia Creek, and Patton Creek enter Fanno Creek in this reach; they likely provide critical off-channel habitat during high storm flows, and cool water areas in the summer. This reach also contains the best fish spawning and rearing habitat (riffles with gravel and cobble with relatively low amounts of fine sediment). These habitats also sustain much of the macroinvertebrate production in the upper creek. Deep, complex pools (and a beaver pond) and undercut banks found immediately upstream of this area provide critical habitat for fish during winter's intense rains. Pools with fallen trees in them and undercut banks provide the predominant forms of instream structure, particularly in this reach.

North Ash, Upper Woods Creeks

North Ash Creek and about half of the upper part of Woods Creek provide riffle habitat with gravels, cobbles, and low amounts of fine sediment. The other half of the Woods Creek's bed is smothered with fine sediments. Despite this, it still contains important pool areas. Given the degraded nature of Fanno Creek, this area has high protection value despite the sediment problem.

South Ash Creek

South Ash Creek, particularly below SW 55th Avenue, provides important pool habitat. Although the pool area is low in quantity, the gravels and sands are of moderately high quality, and the amount of fine sediment is low. Additionally, pools are deep, providing important areas

for fish to hide. The pools contain downed trees and boulders that provide important cover and shelter.

Restoration Opportunities

Hydrology

Figure 2-34 shows areas of Fanno Creek with significant restoration potential. Reclaiming lost upland drainageways, creeks, and intermittent flows (seeps, springs and groundwater recharge) in the headwaters would likely provide significant watershed health benefits (e.g., improved water storage, additional habitat, and enhanced water filtration.)

Habitat

In the Upper Fanno mainstem and its northern tributaries, reclaiming stream connectivity at the Beaverton-Hillsdale Highway and Scholls Ferry Road intersection would provide additional habitat for anadromous salmon as well as resident trout. Areas above these roadways contain spawning and rearing habitat; improved access would

significantly improve fish productivity.

Adding boulders, large downed trees, overhanging vegetation, and channel complexity (side channels, backwater pools, deep pools, and undercut banks) in this section would improve channel roughness and help the creek withstand high scouring flows. In addition, added channel complexity would provide refuge to fish during winter storm flows and cover from predators. Repairing this section's actively eroding streambank, and enhancing habitat quality in the short-term would prevent further streamside erosion.

Water Quality

The sources of water quality problems in Fanno Creek are not completely known; however, dogs and other urban pets and wildlife may be contributing to elevated levels of bacteria. Improving tree canopy, planting vegetation in swales and other water quality friendly approaches that reduce stormwater runoff and filter sediment would help address these problems as well as summer high temperature problems.

Fanno Creek's banks are highly erosive, delivering sand, silt and other pollutants into the creek

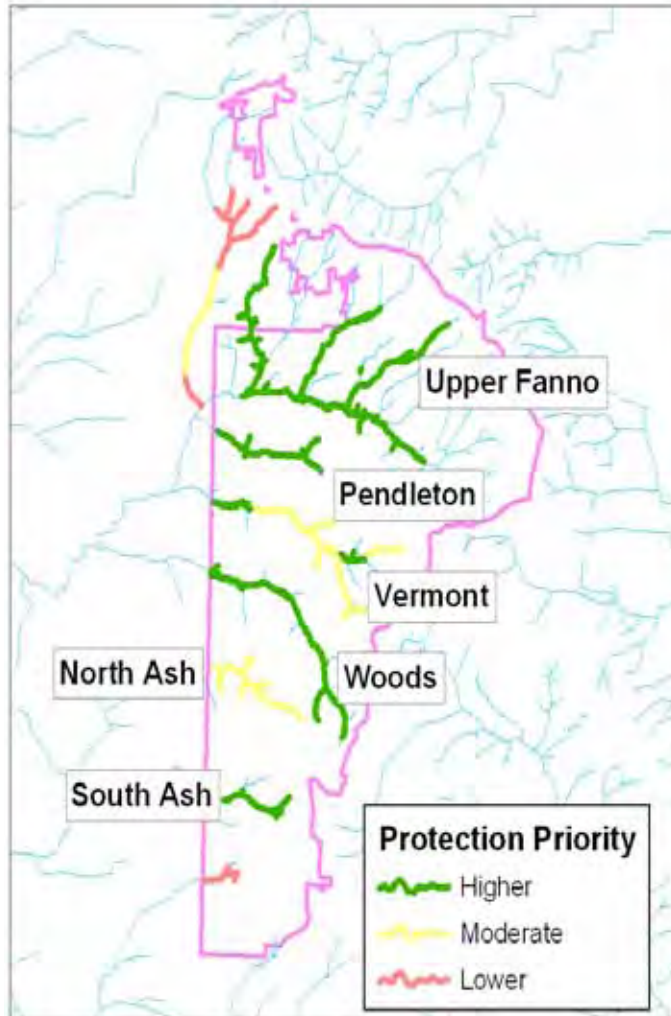


Figure 2-33: Protection Value of Fanno Creek Tributaries. Areas of Fanno Creek in dark green currently provide important watershed health benefits. Areas in yellow and red provide fewer watershed benefits under current conditions because they are degraded or because they historically were less valuable. To view this map in color visit www.river.ci.portland.or.us.

and infusing soil, particulate matter, and phosphorus into the creek. Subsequently, these sediments and pollutants settle to the stream bottom and cover potential spawning and rearing habitat. Streambank erosion and scour result from development in the upland portions of the watershed and the increased stormwater development creates. Repairing actively eroding banks, and enhancing habitat quality would prevent further streamside erosion.

Biological Communities

Because riffles generally comprise a low proportion of available habitat, reclaiming high quality riffle habitat and additional riffle area is critical to improving fish productivity throughout Fanno Creek and its tributaries. Notably, the abundance of deep pools and lack of riffles, severely limit the number of fish that can survive in Fanno Creek.

Reclaiming stream connectivity in Vermont, Woods, Ash, and Sylvan creeks would provide additional habitat to resident fish. Notably these tributaries might provide additional spawning and rearing areas, and provide off-channel habitat for fish living in mainstem Fanno Creek. Improved access into these areas could substantially improve fish productivity.

Stormwater Management

Beaverton-Hillsdale Highway runs parallel to mainstem Fanno Creek and occasionally crosses over the creek. The proximity of this major arterial highway to the headwaters of Fanno Creek impairs stream connectivity (for migratory fish) and disrupts some wildlife movements. In addition, the stormwater runoff from the highway has very high pollutant load potential, and is likely a major contributor of suspended solids and other urban pollutants into the creek.

Corridors along Woods and Ash creeks provide good tree canopy cover, which helps reduce stormwater impacts. Conversely,

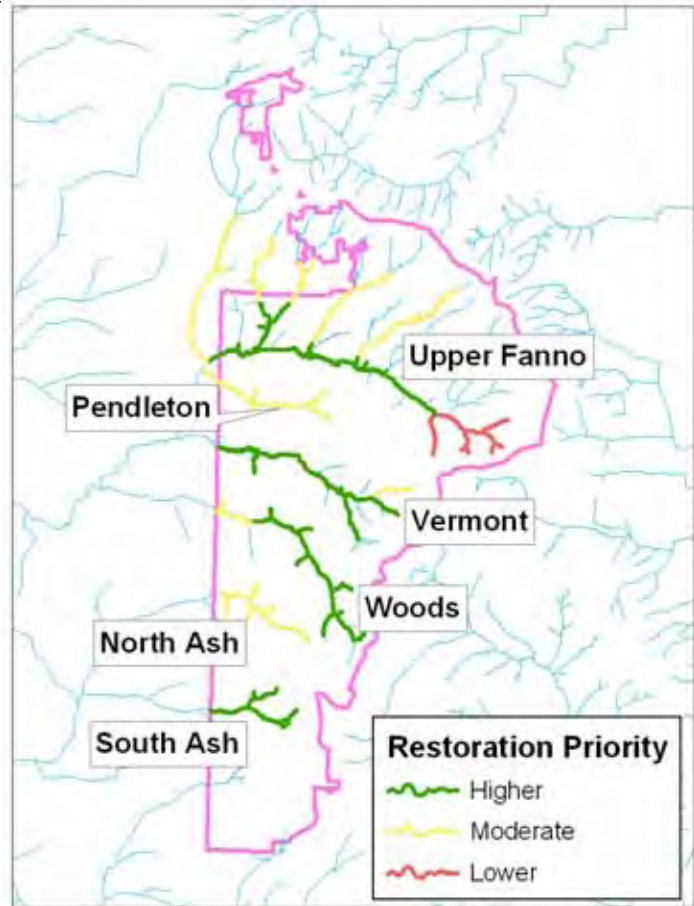


Figure 2-34: Restoration Values of Fanno Creek Tributaries. Areas in dark green likely would provide the greatest watershed health benefits if restored. Areas in yellow and red would likely provide less restoration benefits because they currently are in relatively good condition or because they historically provided fewer watershed benefits. To view this map in color visit www.river.ci.portland.or.us.

Storm runoff from Beaverton-Hillsdale Highway is likely a major contributor of suspended solids and other urban pollutants into Fanno Creek.

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extensive impervious areas along mainstem Fanno, Vermont, Sylvan, and Red Rock creeks create stormwater flows and pollution that impairs watershed health.

Maintaining existing riparian corridors, increasing canopy cover and diversity, and maintaining open spaces within the entire corridor and remnant floodplain are possible means to reduce or eliminate the stormwater-related problems in Fanno Creek and its tributaries.

The upland areas that drain to Pendleton Creek, Vermont Creek, Woods Creek, and Ash Creek contain valuable natural resources that detain and treat stormwater. The City of Portland and Metro manage open areas in this lower region of the watershed (parks, schools, and other public institutions).

For more information, visit the [Fanno-Tryon Creek Watershed Management Plan](#) on the City's website.

2.6 Johnson Creek Watershed

2.6.1 Overview

Johnson Creek originates in the hills east of Portland and flows westward approximately 25 miles to its confluence with the Willamette River. The stream receives water from several major tributaries, including Crystal Springs Creek, Kelley Creek, Mitchell Creek, Butler Creek, Hogan Creek, Sunshine Creek, and Badger Creek. The Johnson Creek Watershed contains approximately 3 miles of piped streams and about 33 miles that flow in open channels. Land use in the 34,310-acre watershed ranges from heavily developed urban and industrial areas to rural farm and nursery lands.

Kelley and Mitchell Creeks provide important habitat diversity that protects fish and other species in case of landslides, spills or other problems.

2.6.2 Conditions and Trends

Hydrology

Peak flows have increased in size since the 1940's. In addition, the historical floodplain of Johnson Creek is minimally accessible or inaccessible to creek waters through much of its length due to channel alterations. The lack of floodplain access means that flood flows cannot spread out and slow down on the floodplain, but are instead directed and concentrated into the main channel, increasing scour and degrading instream habitat. Summer baseflows do not meet Oregon Department of Fish and Wildlife instream flow standards designed to protect streamflows supporting salmon life cycles. Below Crystal Springs, which provides consistent and abundant groundwater flows, minimum instream flows are typically met. Development in the upland areas of the watershed has increased impervious area and reduced

vegetation, contributing to flow and hydrology problems. Personal property, streets, and parks in the Johnson Creek watershed have also been negatively affected by flooding.

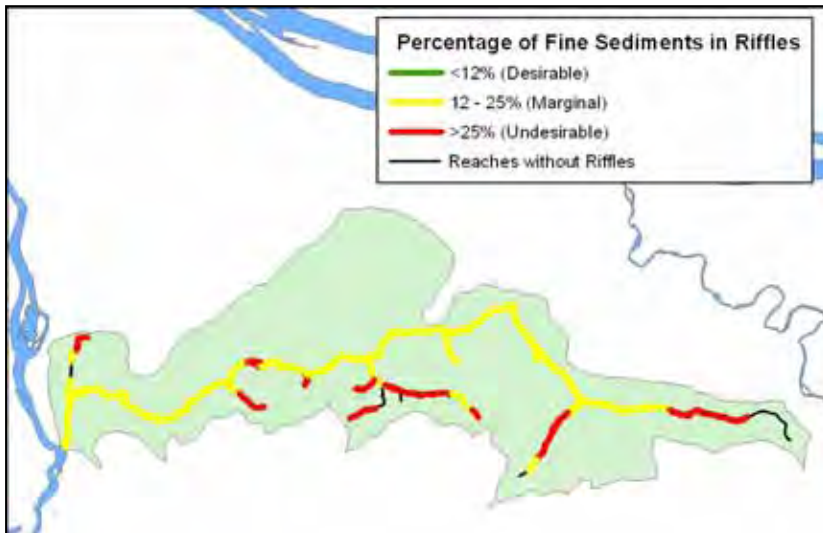


Figure 2-35: Percentage of Fine Sediments in Riffles in Johnson Creek. Fine sediment covers a large percentage of potential spawning habitat in Johnson Creek. Sediment is created by a variety of upland activities including the transportation network, agriculture, urban development, and other everyday activities. Increases in the speed and volume of stormwater that result from increased impervious areas across the watershed also scour streambanks, creating erosion. Sediment also carries pollutants that harm watershed health. To view this map in color visit www.river.ci.portland.or.us.

Habitat

Significant channelization, downcutting, and bank erosion of Johnson Creek has occurred. Hardened banks have confined the creek. The lower 15 miles was widened, deepened, rock-lined, and channelized in the

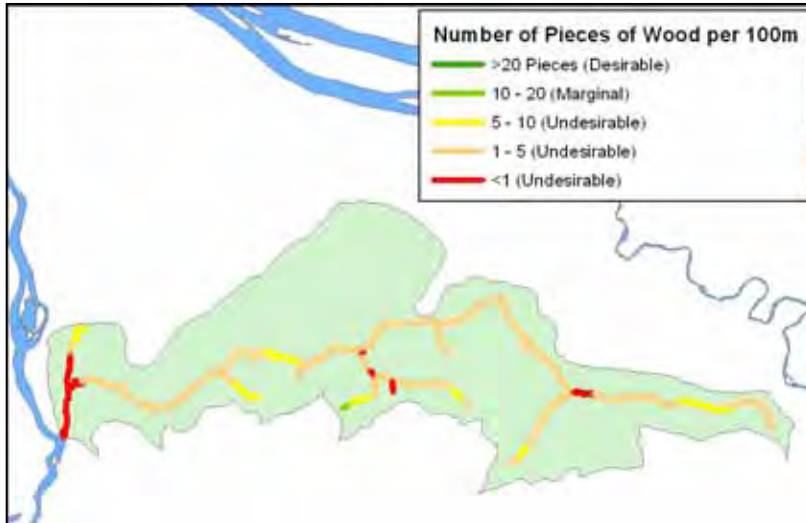


Figure 2-36: Woody Debris in Johnson Creek. The number of pieces of wood per 100 meters of stream length in Johnson Creek. Scientists consider 20 or more pieces per 100 meters of stream length desirable. The vast majority of Johnson Creek has less than 2 pieces of wood per 100 meters, an order of magnitude less than what is considered healthy. To view this map in color visit www.river.ci.portland.or.us.

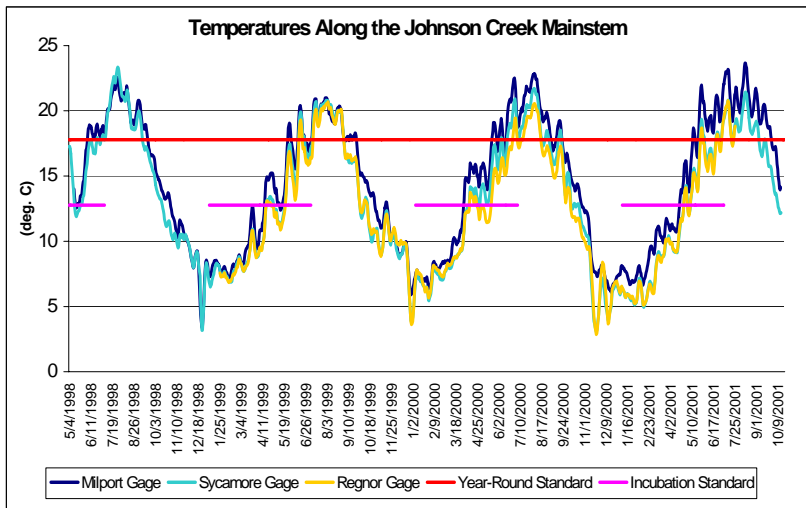


Figure 2-37: Temperatures Along the Johnson Creek Mainstem. Temperatures in Johnson Creek routinely violate state standards during the summer (the red line). The pink line shows the temperature standard for fish spawning and the times of year it applies. Again, Johnson Creek routinely violates the standard. More vegetation and less impervious area across the Johnson Creek watershed would help address the creek's temperature problem.

1930's as a Works Progress Administration project. Banks and channel structure have been severely altered, precluding natural habitat creation and overflow of floodwaters into low-lying areas. Habitat has been simplified and natural cover has been replaced. Fine sediment in certain portions of Johnson Creek currently are at levels that seriously limit fish food production and smother spawning areas (Figure 2-35). Streamside development has reduced vegetation along many sections of the creek and its tributaries.

Habitat surveys indicate that Johnson Creek has extremely low wood volumes (Figure 2-36), a high percentage of hardened banks, a lack of places for fish and other species to hide, rest and feed, channel incision and high levels of fine sediment. Riparian vegetation is minimal or lacking throughout much of the watershed. Interestingly, riparian vegetation is as lacking in the more rural upper watershed as it is in the lower watershed due to agricultural practices.

Although there are no culverts on the mainstem except high in the watershed, they are present on nearly all the tributaries to Johnson Creek. Crystal Springs, an area used by local and

migratory Willamette River salmon, has a series of partially impassable culverts along its length, and some of the least developed tributaries along the southern side of the middle watershed also have culverts where they join with the mainstem.

Portland’s environmental overlay zones cover approximately 2,390 acres of the watershed. Metro identified about 3,100 acres of significant natural resources in the area. Some of these are covered by environmental zones, others are not.

Water Quality

Temperatures regularly exceed state standards during the summer (Figure 2-37). Higher temperatures lead to dissolved oxygen concentrations that frequently drop below healthy levels. DDT and dieldrin are present in Johnson Creek at elevated levels. Instream DDT concentrations are among the highest measured in the region.

Biological Communities

Johnson Creek’s biological communities have been greatly reduced from historical conditions. Many native fish populations, including salmon, have declined significantly, and many introduced or nuisance species currently compete with native species for food and habitat. Diversity of aquatic insects is significantly reduced compared to healthy sites. The fish community in Johnson Creek is dominated by native reddsides, reticulate sculpin, and speckled dace. Large-scale suckers are abundant in the lower reaches. Adult coho, chinook, cutthroat trout, and steelhead have been observed in the stream. Lamprey juveniles and adults also have been observed in the creek and its tributaries.

JOHNSON CREEK WATERSHED STATISTICS*	
Acres in Total Basin	34,000
Acres in City of Portland	13,170
Miles of Known Piped Stream	3
Miles of Open Channel	33
Acres in Environmental Zones	2,390
Acres of Metro Regionally Significant Habitat	3,230
<i>*Figures are calculated based on natural topographic watershed boundaries. BES’s watershed plans may report slightly different figures because their management areas reflect human-altered hydrology.</i>	

Figure 2-38 Johnson Creek flows 26 miles from its headwaters near the Sandy River to its confluence with the Willamette River, passing through 4 cities (Gresham, Portland, Milwaukie, and Happy Valley) and 2 counties (Clackamas and Multnomah) along the way.

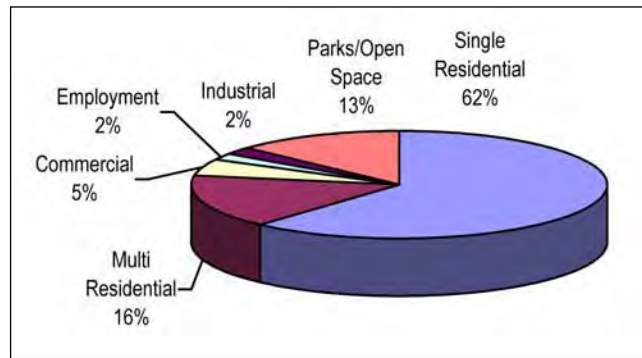


Figure 2-39: Johnson Creek Watershed Zoning – The Johnson Creek Watershed supports a variety of land uses within the City of Portland, but is still predominantly residential. Johnson Creek is also affected by land uses in upstream jurisdictions (e.g., Happy Valley and Gresham).

2.6.3 Johnson Creek Protection and Restoration Opportunities

Protection Opportunities

The City of Portland modeled baseline environmental conditions to determine habitat protection and restoration priorities in and along the creek (Figures 2-40 and 2-41). Then, Johnson Creek watershed jurisdictional partners collaborated with the Johnson Creek Watershed Council on a strategy to prioritize limited financial resources to protect, expand, and connect these important habitats. The strategy was developed by: 1) Combining comprehensive data analysis and model results with fish sightings; 2) Identifying existing and potential refuge areas; and, 3) Surveying the needs of the various jurisdictions involved in the Johnson Creek Watershed Council.

The map portrayed in Figure 2-40 shows the areas along Johnson Creek that provide the greatest current contributions to watershed health.

Upper Johnson Creek

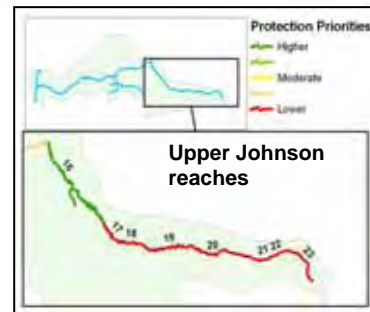
The upper sections of Johnson Creek currently provide the most important functions in the watershed. Much of the capacity (the number of salmon a watershed can support) and nearly all of the productivity (the number of young salmon produced by each adult) depend on the upper sections of Johnson Creek. The section of Johnson Creek from Butler Creek to Hogan Creek (reach 16) is one of the most critical habitats in the watershed. Industrial development currently is planned for portions of this reach and reaches upstream. Any degradation of this part of Johnson Creek would seriously threaten the watershed's last salmon populations.

Kelley and Mitchell Creeks

Fish surveys show that Kelley and Mitchell Creeks contain resident and potentially ocean-going trout populations. These tributaries to Johnson Creek currently provide significant and extremely valuable habitat diversity. Habitat diversity provides fish and other species a variety of places to live. This habitat diversity is especially important should landslides, spills, or other problems affect portions of a creek or stream. Kelley and Mitchell Creeks also contain high quality remnant habitat for resident fish and wildlife and important water quality values for the entire watershed.



Figure 2-40: Protection Value of Johnson Creek Sections. Areas in dark green represent the sections of Johnson Creek that now provide the most watershed benefits and thus have a high protection value. Detailed, reach-scale analysis shows all of the protection benefit for the entire upper section comes from a single reach -- reach 16 -- increasing its protection value. Portland has reach-scale data for all of its watersheds. To view this map in color visit www.river.ci.portland.or.us.



The Pleasant Valley Concept Plan (PVCP) calls for significant urban development in the Kelley Creek Watershed. The PVCP calls for managing future development in a way that maintains the resource quality of Kelley Creek and does not diminish the value of ongoing city actions downstream of Pleasant Valley. These actions include projects to restore Kelley Creek's confluence with Johnson Creek, the 162nd and Foster culvert replacement, the Powell Butte restoration project, and others that have been and are currently being implemented.

Restoration Opportunities

Portland and the Johnson Creek Watershed Council have determined that the middle and lower sections of Johnson Creek have the potential to provide the most significant watershed



Figure 2-41: Restoration Value of Johnson Creek Sections. The areas of Johnson Creek in dark green were identified by the Johnson Creek Watershed Council and the City of Portland as restoration priorities. The sites, and the areas that connect them, would provide the most watershed benefits if restored. To view this map in color visit www.river.ci.portland.or.us.

benefits if restored because they currently are the most degraded and they historically provided the most valuable habitat. In addition, restoring existing and potential refuge areas for fish and other species, and reaches that connect them, also would provide significant benefits if restored. Specific sites that present restoration opportunities include Crystal Springs, Tideman Johnson Park, the middle segment of the mainstem, and the Gresham reaches of the Johnson Creek mainstem. These areas are shown in Figure 2-41.

Hydrology

Addressing stormwater impacts across the upland portions of the watershed with tree planting, green streets, and infrastructure retrofits to replace pipes with swales would reduce peak winter flows, improve infiltration, and increase base summer flows. Revegetation and extensive tree planting in stream corridors would help decrease stream temperatures by increasing shade during the summer. Removing culverts in tributaries to Johnson Creek would allow flows to move more naturally from headwater areas to the mainstem without flooding. Acquiring land along the creek and removing the WPA channel lining would provide the creek better access to its historic floodplain, allowing peak winter flows to spread out across a broader area without damaging private property.

Tree planting, revegetation, green streets, ecoroofs, and infrastructure retrofits would reduce peak winter flows, improve infiltration and increase base summer flows.

Habitat

Potential habitat restoration projects in the Tideman Johnson area and the Middle Johnson Creek (as shown in Figure 2-41) are identified in the Johnson Creek Restoration Plan and the Johnson

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Creek Watershed Council's Action Plan. Some projects are ready to implement, particularly Kelley Creek Meanders, Alsop Brownwood, West Lents Restoration, and East Lents Restoration, which includes the South of Foster and Springwater Wetland Complex restoration projects.

The Johnson Creek floodplain in Gresham is nearly adjacent to high quality habitat in upper Johnson Creek. The large amount of floodplain in public ownership in the area makes it very well suited for restoration. The City of Gresham has been partnering with the Johnson Creek Watershed Council and the Portland Watershed Revegetation Program to restore riparian vegetation in the Gresham Woods area since 2001. The City of Gresham has also identified three project sites in this location for floodplain reconnection and wetland and riparian restoration.

Johnson Creek has a very limited amount of large wood in its main channel and tributaries, which is a significant limiting factor for salmon and trout. Adding large wood to the stream and ensuring that riparian areas are capable of growing trees that eventually can fall into the creek are important restoration opportunities.

Water Quality

Temperatures throughout Johnson Creek exceed water quality standards during summer months, often reaching lethal levels for fish and other wildlife and insects. The duck pond at Westmoreland Park is a significant cause of elevated temperatures in Crystal Springs Creek and Johnson Creek. The temperature of Crystal Springs Creek during the summer can be as much as five degrees warmer below the duck pond than it is above the pond. Crystal Springs receives an abundant supply of 55°F groundwater. However, the creek is rapidly heated because of artificial ponds and human-caused changes to the creek's channel. Crystal Springs Creek is now warmer than Johnson Creek. Removing the duck pond would reduce temperature and bacteria, increase dissolved oxygen, and provide improved habitat.

Reducing the amount of sediment created by upland activities and high stream flows that erode stream banks would help protect gravel beds in middle Johnson Creek that are critically important to salmon and steelhead and other species and aquatic insects. Collaborating with the Johnson Creek Watershed Council and the U.S. Geological Survey to better evaluate threats posed by DDT, dieldrin, and other human-generated toxic pollutants would improve understanding of how these toxic pollutants affect watershed health.

Information from in-stream surveys and on-the-ground observations suggests that the agricultural areas in the headwaters of Johnson Creek likely make a significant contribution to sediment, pollution, and habitat problems. Providing incentives for improved education and agricultural practices would help address these problems. Actions throughout the Johnson Creek watershed would help address high summer water temperatures, excessive sediment, and toxic pollution.

Biological Communities

Invasive plant species present a considerable challenge throughout the riparian and upland portions of the watershed. Pollution, altered flows, and lack of habitat severely limit the number and diversity of benthic organisms and insects, reducing food sources for fish and wildlife. A

lack of food is a key limiting factor for salmon in Johnson Creek. All of the opportunities described above would contribute to improved biological communities in Johnson Creek.

Stormwater Management

The industrial areas of Milwaukie, Clackamas County and Gresham and the Interstate 205 corridor appear to be good initial priorities for stormwater management and pollution source control. The Boring Lava Domes area in southeast, Powell Butte, and other open spaces appear to pose fewer stormwater and pollution risks; however, growth may lead to more intensive development in those areas, potentially resulting in the loss of valuable watershed health benefits. More aggressive invasive plant species management in these open spaces would reduce stormwater problems and provide habitat benefits.

Coho, chinook, cutthroat trout, steelhead, and lamprey have been observed in the creek and its tributaries.

The [Johnson Creek Watershed Action Plan](#) on the Johnson Creek Watershed Council's website (www.jcwc.org) contains more detailed information about conditions and recommended management actions.

2.7 Columbia Slough Watershed

2.7.1 Overview

The Columbia Slough extends 19 miles from Fairview Lake on the east to the Willamette River at Kelley Point Park on the west. Including the drainage areas of Fairview Creek and Fairview Lake, the slough watershed drains 33,220 acres, of residential neighborhoods, vegetable farms, industrial areas and transportation corridors. The watershed contains approximately 6.5 miles of piped streams and about 55 miles that flow in open channels. The Columbia Slough itself is a remnant of the very large system of marshes, wetlands, lakes, and side channels that historically formed the floodplain of the Columbia River between the mouths of the Willamette and Sandy rivers. Other remnants of historic conditions include the sloughs, lakes, and drainageways scattered throughout the lowlands north of Columbia Boulevard. Wilkes Creek and Alice Springs are two of the few remaining cold-water streams that used to feed the lowland area.

2.7.2 Conditions and Trends

Hydrology

The hydrology of the Columbia Slough Watershed has been severely altered from historic conditions to make way for extensive agricultural, urban, and industrial development. The creation of the levee on which Marine Drive is located has blocked the direct connection between the Columbia Slough and the Columbia River. Fairview Lake, which used to drain directly to the Columbia River, now feeds the Columbia Slough. Streams draining down the slope from the Alameda Ridge have been completely covered with urban development.

Although the lower Columbia Slough is still subject to tidal influences, the middle and upper sections of the slough are now a highly managed water conveyance system with dikes and pumps that provide watershed drainage and flood control and maintain a highly artificial pattern of water flows. A levee and a pump station at NE 18th Avenue mark the boundary of the lower

slough and blocks fish passage to the middle slough. Dams on the Columbia River further alter the original pattern of water flows, affecting the lower slough, as well as management options for the middle and upper sloughs.

Habitat

Historically, much of the Columbia Slough was probably seasonal emergent wetlands, but the Columbia Slough channel has been severely modified over the years. Road and infrastructure developments have blocked historic channels and decreased channel complexity throughout the slough. Banks and channel structure have been severely altered, precluding natural habitat creation and overflow of floodwaters into low-lying areas. Habitat has been simplified and natural cover has been replaced.

Watershed development and streamside disturbance have reduced riparian vegetation along many sections of the slough.

Portland's environmental zones cover approximately 4,016 acres of the watershed. Metro identified about 5,600 acres of significant natural resources in the watershed.

Some of these are covered by environmental zones, others are not.

Water Quality

Bacteria, dissolved oxygen, temperature (Figure 2-42), nutrients, pH, chlorophyll a, lead, DDT, DDE, PCBs, and dioxin are problems in the slough. Although these organic toxics are not measurable in the water or even in most of the sediments, they are found in fish tissues at levels that pose a risk to humans and aquatic species health.

Water quality in the Columbia Slough is fair to poor. The State of Oregon has identified bacteria, dissolved oxygen, eutrophication (temperature, nutrients, pH, chlorophyll a), lead, and organic toxics (DDT/DDE, PCBs, and dioxin) as problems in the Columbia Slough. Although these organic toxics are not measurable in the water or even in most of the sediments, they are found in fish tissues at levels that pose a risk to humans and aquatic species health.

Temperatures regularly exceed standards through the summer. Excessive nutrient levels contribute to problems associated with low dissolved oxygen and high algae and macrophyte concentrations. Elevated concentrations of certain heavy metals and synthetic organic chemicals pose ecological and human health risks.

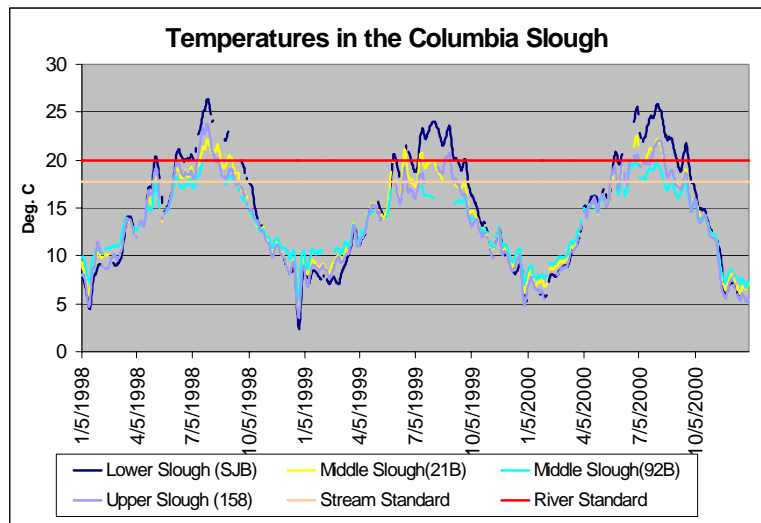


Figure 2-42: Temperatures in the Columbia Slough. The Slough exceeds healthy temperatures during the summer on a regular basis.

Bacteria, dissolved oxygen, temperature, nutrients, pH, chlorophyll a, lead, DDT, DDE, PCBs and dioxin are problems in the Columbia Slough.

Biological Communities

The biological communities in the Columbia Slough are altered as a result of the extensive flow modification, habitat loss, and water quality conditions. Fish communities are dominated by nonnative warm-water species such as common carp and bluegill. Sensitive benthic macroinvertebrate species have been found in the remaining cold-water streams draining to the slough. Because of the levee at NE 18th Avenue, juvenile salmon from the lower Willamette River seeking out rearing habitat have access only to the lower section of the slough. What was once a high quality rearing area is now either completely inaccessible (middle and upper slough) or highly degraded. Benthic macroinvertebrates communities are very sparse.

Smith and Bybee Lakes and the Peninsula Drainage Canal provide some of the last good habitat available for a small population of painted and western pond turtles, both listed as critical on the State of Oregon’s sensitive species list. Some 175 species of birds use the various habitats in the watershed, including a nesting pair of bald eagles. However, species such as the western meadowlark are rarely seen anymore and the yellow-billed cuckoo is now locally extinct.

COLUMBIA SLOUGH WATERSHED STATISTICS*	
Acres in Total Basin	33,220
Acres within City	27,230
Miles of Piped Stream	11
Miles of Open Channel	46
Acres in Environmental Zones	3,800
Acres of Metro Regionally Significant Habitat	6,620
<i>*Figures are calculated based on natural topographic watershed boundaries. BES’s watershed plans may report slightly different figures because their management areas reflect human-altered hydrology.</i>	

Figure 2-43 The Columbia Slough watershed also includes Fairview Lake and Fairview Creek, and portions of Troutdale, Fairview, Gresham, Maywood Park, Wood Village, and Multnomah County are within the watershed.

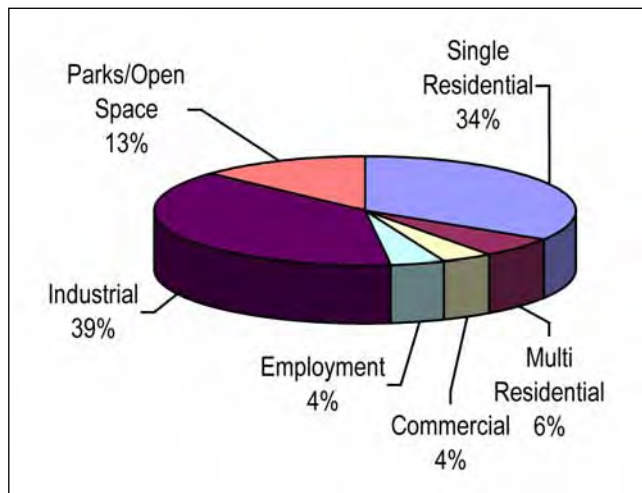


Figure 2-44: Columbia Slough Watershed Zoning – The Columbia Slough supports proportionately more industrial, employment and commercial uses than the other watersheds.

2.7.3 Columbia Slough Protection and Restoration Opportunities

Protection Opportunities

The Columbia Slough has two core habitat areas that currently provide important watershed health benefits: Big Four Corners in the upper slough and Smith and Bybee Lakes Wildlife Area in the lower slough. Figure 2-45 shows the relative watershed health value of various areas of the slough based on existing conditions.

Lower Slough

The off-channel habitat from the mouth of the lower slough to Simpson Cove, including Smith and Bybee Lakes, is very valuable for migrating salmon. It represents one of the last remaining areas of its kind near the confluence of the Columbia and Willamette rivers.

Wetland complexes such as the Heron Rookery provide valuable habitat for a variety of wetland species. Smith and Bybee Lakes and the Peninsula Drainage Canal in the lower slough provide valuable habitat for painted and western pond turtles, as well as red-legged frogs, also on the State of Oregon sensitive species list.

Middle Slough

The Subaru Wetlands provide valuable habitat for wetland species. Smith and Bybee Lakes and the Peninsula Drainage Canal in the lower slough provide valuable habitat for painted and western pond turtles, as well as red-legged frogs.

Prison Pond meets temperature standards year-round. Macroinvertebrates that are sensitive to watershed degradation have been found at this site, documenting its relative health.

Upper Slough

Wilkes Creek and Alice Springs in the upper slough meet temperature standards year-round. Macroinvertebrates that are sensitive to watershed degradation have been found at these sites, documenting their relative health. Because the rest of the slough has been altered so significantly, all of these remaining areas have very high value.

Restoration Opportunities

Restoration potential lies in restoring riparian canopy and managing hydrology within the existing channel to mimic conditions that are more natural. Figure 2-46 shows restoration opportunities in the Columbia Slough. In the lower slough, opportunities include the lower reach near its confluence with the Willamette River, the Bonneville Ponds area, and Smith and Bybee Lakes. The Peninsula Crossing Trail and the Bonneville Ponds wildlife corridor offer high restoration potential because they connect the Willamette and slough systems.

Hydrology

Increasing stormwater infiltration across the watershed would increase groundwater flows, resulting in cooler water throughout the slough system. Expanding upon the relatively intact tree canopy on Rocky Butte is one potentially valuable opportunity. Working with local drainage districts on management actions that more closely mimic historic flows is also a possibility. Replacing 13 culverts on the southern arm of the middle slough with bridges would improve hydrologic conditions favorable to watershed health.

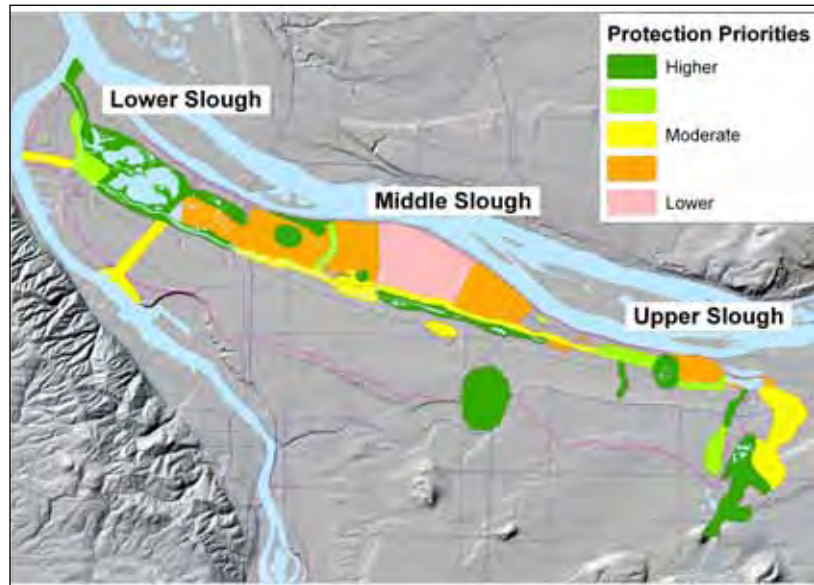


Figure 2-45: Protection Value of Columbia Slough Sections. Areas of the Columbia Slough in dark green currently provide important watershed health benefits. The dark green areas include Smith and Bybee Lakes in the Lower Slough, Big Four Corners in the Upper Slough, the main channel of the Middle Slough, and Rocky Butte in the upland area of the watershed. Areas in other colors currently provide less value because they are degraded or because they were historically less valuable. To view this map in color visit www.river.ci.portland.or.us.

Habitat

The mainstem slough provides a thin ribbon of connectivity between the upper and lower sections of the watershed. Removing the culverts on the southern arm of the middle slough

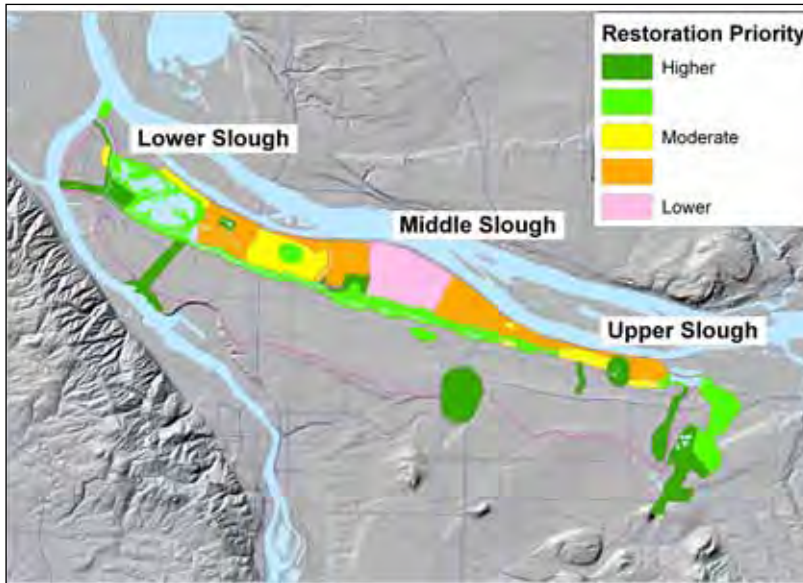


Figure 2-46: Restoration Value of Columbia Slough Sections. Areas of the Columbia Slough in dark green likely would provide the greatest watershed benefits if restored. The Columbia Slough's confluence with the Willamette River, the Bonneville Ponds area and Smith and Bybee Lakes are among the areas that present significant restoration opportunities. To view this map in color visit www.river.ci.portland.or.us.

would allow the creation of emergent wetlands, and improve terrestrial and aquatic habitat connectivity. The Subaru Ponds wetlands add additional habitat restoration potential to the middle slough. In the upper slough, the Salish Ponds, Big Four Corners, and Wilkes Creek areas present the most valuable potential restoration opportunities.

Although currently under closure procedures, the St. John's Landfill represents one of the last remaining meadow habitats in the slough watershed. It is an excellent candidate for open meadow habitat restoration. It has additional value because it is

adjacent to the slough as well as Smith and Bybee Lakes. Creation of emergent wetland benches within the lower slough would provide new instream habitat. This can be done by using dredged or fill material from the slough channel to "overbuild" portions of the existing levee while creating deeper channels in a portion of the sites.

The area along the north side of the island located south of Heron Lakes Golf Course and the Portland International Raceway dries out in the summer months, creating extensive mudflats each year. With the addition of emergent wetland plants and other habitat structures, this area could provide additional watershed health benefits.

Water levels in the Kenton Cove Peninsula area become shallow and mudflats emerge each year. The area immediately to the north, along the south wall of the levee is devoid of vegetation with the exception of grasses. Improving the vegetation at this site would provide habitat benefits.

The south riparian edge of the lower slough between North Denver and NE Martin Luther King Boulevard is a blackberry-covered levee. At low water levels, concrete rubble and other fill emerge. The blackberries could be removed and the rubble capped with clean fill to support native vegetation.

Creating wetland benches and placing large wood in the lower slough between the Willamette River confluence to approximately North Portland Road would improve and increase salmon habitat. Habitat enhancement potential also exists in the Blind Slough, Wapato Wetlands, and Ramsay Lake Wetlands areas.

Water Quality

Improving hydrology and habitat, also will improve water quality. Improved groundwater recharge, continued pollution source control efforts, and revegetation projects will help limit additional water quality challenges. The recent completion of the City's Combined Sewer Overflow Program in the slough has made a significant contribution to improved water quality in the watershed.

The city's Combined Sewer Overflow Program in the Slough made a significant contribution to improved water quality

Biological Communities

Improving hydrology, habitat and water quality will improve the Columbia Slough's biological communities. In addition, developing management strategies to address invasive, non-native aquatic species like Asian shrimp, carp and invasive aquatic and terrestrial plants would provide watershed health benefits.

Stormwater Management

Although many of the upland areas are not highlighted on the map, protection and restoration of the upland areas will benefit the parts of the slough to which they drain. For areas that drain to the slough, restoration potential lies in addressing both water quality and water quantity of stormwater runoff. For areas that drain to the ground, restoration potential lies in addressing the water quality of stormwater runoff.

The [Columbia Slough Watershed Council Action Plan](http://www.columbiaslough.org) on the Columbia Slough Watershed Council's webpage at (www.columbiaslough.org) contains more information about conditions and recommended management actions.

2.8 Lower Columbia River Watershed

2.8.1 Overview

The Columbia River is the second largest river in the contiguous United States in terms of stream flow. Land uses within the lower Columbia River watershed are urban/industrial, residential, and rural/agricultural. Many of the region's heaviest industrial users are present in the lower Columbia watershed. Land uses in the basin upstream of Portland include timber production, grazing, irrigated and dryland agricultural and a variety of urban uses. The lower Columbia watershed has been heavily urbanized and industrialized in the vicinity of Portland for decades and has had many point source and nonpoint source pollution problems. The south bank of the Columbia River in Portland is moderately urbanized. The banks are a mixture of steep natural cobble, sandbanks and riprap; riparian vegetation is generally sparse to absent and consists mostly of invasive plants and shrubs.

The bulk of the Columbia River's bank in Portland is a levee managed by the U.S. Army Corps of Engineers.

2.8.2 Conditions and Trends

Hydrology

The Columbia River's storage reservoir/hydropower system has altered the river's flows, which has affected water temperature and river/floodplain interactions. Seasonal flows have been markedly changed by development: winter flood flows have been reduced and summer low flows have been increased. Portland-area urban activities have had local scale impacts on altered flow

regime; bank alterations and floodplain development preclude access of flow to the historic floodplain.

Habitat

Significant dredging, diking, and channelization of the mainstem Columbia has occurred in the Portland area. The mainstem has been narrowed and deepened, and off-channel habitat has been diked, filled, and eliminated in a large portion of the metropolitan area. Banks have been hardened preventing natural habitat creation and minimizing the interaction between the river and riparian and floodplain vegetation. Riparian vegetation has been cleared and other habitat simplified.

The river's steep, rip-rapped shorelines have reduced expansion of riparian areas and recruitment of large wood into the river (i.e., wood deposited through natural processes). Most of the historical off-channel habitats (e.g., side channels, oxbow lakes and marshes) have long been cut off from the channel and filled. Silt and sand dominate the river substrate.

Environmental overlay zones protect and conserve resources on the banks of the Columbia River.

Water Quality

Temperatures regularly exceed state standards through the summer. The Columbia River is listed under the federal Clean Water Act as water quality limited for toxics that pose potential human health threats due to their accumulation in fish tissue. In addition, arsenic exceeds statutory standards.

Biological Communities

The biological communities of the Columbia River are greatly reduced from historical conditions. Many native species of fish and aquatic insects have gone extinct (e.g., yellow-billed cuckoo, California condor), and many introduced species currently compete with native species for food and habitat. Salmon populations locally and upstream have been greatly reduced from historical numbers. Salmon hatcheries also have affected native fish populations. Species such as river otters and bald eagles have suffered effects of toxics in the river's food chain.

2.9 Financial Issues and Implications

2.9.1 Environmental Restoration Costs

The City of Portland will need to invest significant resources in environmental programs simply to meet existing regulatory obligations. The cost of addressing current obligations alone – not to mention pending and future obligations--demonstrates the importance of ongoing natural resource planning and analysis work. In short, investing now in scientifically sound planning and analysis will increase the value and effectiveness of City actions and will significantly reduce the time and cost associated with meeting environmental obligations.

Because the standards related to Superfund, Clean Water Act, Safe Drinking Water Act, Endangered Species Act and other laws and regulations and implementing rules have not been finalized, it is difficult, if not impossible, to make perfect assumptions. For example, the extent of contamination in Portland Harbor and the cleanup standard that will be imposed are unknown. Under the Clean Water Act, the load allocations for various pollutants are not entirely established. Temperature standards are being revised. Under the Endangered Species Act,

NOAA Fisheries has not established the criteria for delisting populations of fish. For these reasons, taking a conservative or precautionary approach to activities that have the potential to damage watershed health makes economic and environmental sense.

Meeting the City’s natural resource obligations is critical to the success of all the River Renaissance Vision themes and a host of other City objectives. Without a strategically managed program designed to meet the City’s environmental needs, other important City objectives and other components of the River Renaissance Vision could be tied up in regulatory uncertainty, costs could increase, and time could be wasted.

2.9.2 Action Now Will Significantly Reduce Total Costs

A lack of City investment in restoration now will increase the City’s ultimate liability because damages associated with Superfund continue to accrue until restoration is complete (Figure 2-47). Under Superfund, the sooner restoration begins, the lower the total costs the City will face. Under the Clean Water Act, Water Quality Management Plans will require significant investments in changes to our landscape. The longer it takes to make those investments, the more costly they will become. Under the Endangered Species Act, the longer the City waits to restore habitat, the worse condition fish populations will be in, and the more it will cost to achieve delisting.

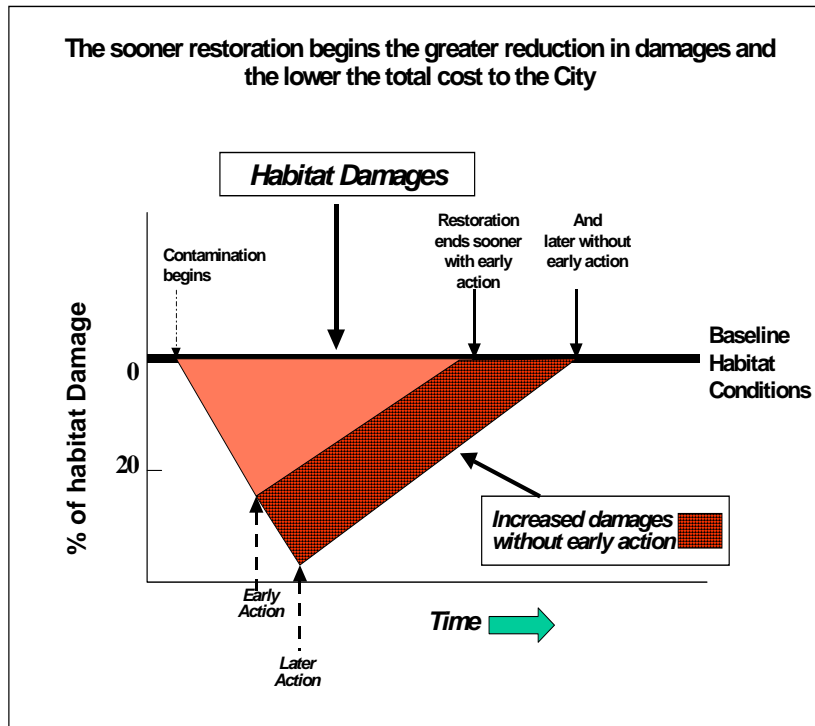


Figure 2-47: Impacts of Delayed Restoration Efforts. The damages associated with contamination in the Portland Harbor continue to accrue until cleanup is complete. The sooner the City starts cleanup and restoration activities, the lower the total cost of compliance.

2.9.3 System Needs

In summary, the following are needed to move toward a healthy river and watershed system:

- ◆ A more natural flow regime in riparian and floodplain areas to support storage for floodwaters and sediment, nutrient exchange, groundwater and wetland recharge, sources of organic matter and refuge for fish and wildlife.

- ◆ Stream and river channel complexity in the form of variation in depth, channel meanders, side channels, banks, logs, rocks, gravel bars to provide habitat for fish as well as for plant, insect, and other species on which fish and wildlife depend.
- ◆ Diverse, native plant communities that are not threatened by invasive species in the uplands, floodplain and riparian areas of the Willamette River and its tributaries.
- ◆ Aquatic and riparian habitat conditions that support the abundance, productivity and diversity of native fish and wildlife with stable banks, opportunities for fish passage, woody debris and cool, clean water.
- ◆ Cool water refuges and micro-habitats for fish and wildlife communities in off channel and other areas on the Willamette River and its tributaries and uplands.
- ◆ A reduction in pollutants that impact water quality such as sediment, temperature, metals, mercury, toxics, pharmaceuticals, and phthalate esters.
- ◆ Site development and redevelopment that incorporates elements of on-site stormwater treatment, infiltration and groundwater recharge to reduce the amount of water and pollutants leaving the site.
- ◆ Wildlife and riparian resources identified in the City's natural resource inventories that are protected from further degradation because of their effectiveness and efficiency in providing essential watershed functions.
- ◆ Containment and treatment of contaminated sediments to protect the integrity of existing and future restoration sites and the recontamination of cleaned up sites.
- ◆ Council-adopted, science-based measurable management objectives that clearly define the watershed health outcomes the City is attempting to achieve.
- ◆ A stable, long term funding source for watershed protection and restoration actions consistent with achieving the City's science-based watershed health objectives.
- ◆ Actions that are sequenced and prioritized according to their affect on watershed health, including human activities such as development and redevelopment, land use, and operations and maintenance.
- ◆ Education and outreach that allows decisions makers and the public to take an active role in improving watershed conditions, both in policies and projects.
- ◆ More effective enforcement of existing environmental regulations and land use policies that protect upland and riparian natural resources identified in the City's natural resource inventories.
- ◆ A comprehensive, long-term environmental monitoring program to measure progress towards watershed health objectives.

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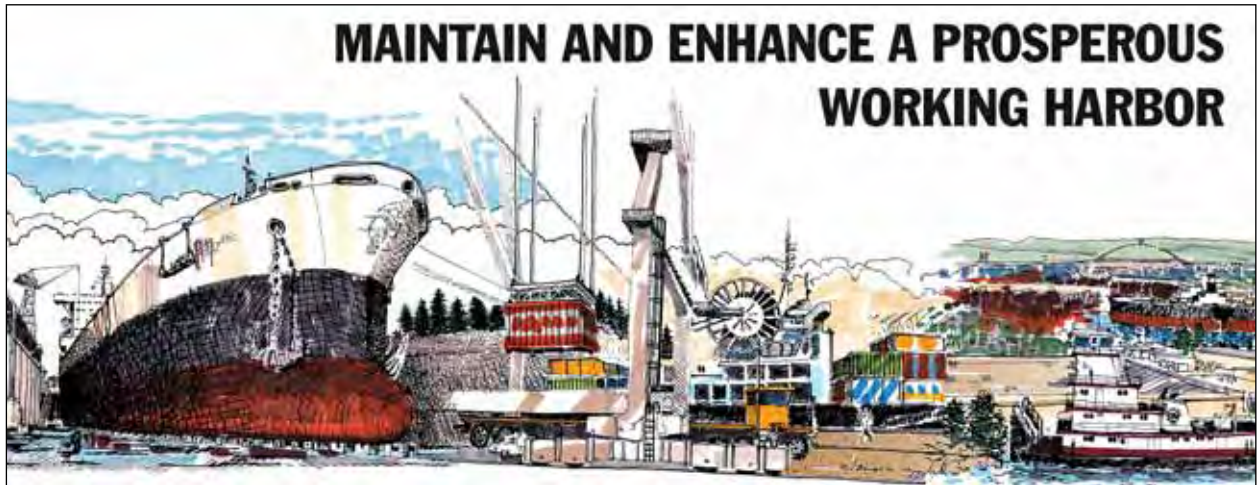
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**For a more complete list, please refer to the references in the *Framework for Integrated Management of Watershed Health* and the City's watershed characterization reports.

River Renaissance Vision:



3.1 INTRODUCTION

Portland's working harbor consists of the industrial districts along the harbor shipping channel, including Lower Albina, Guild's Lake, Swan Island, St. Johns, Linnton, and Rivergate (Figure 3-1). Detailed descriptions of these districts can be found in the [Citywide Industrial Land Inventory and Assessment](#) (Portland Bureau of Planning et al. 2003). These districts include about 5,500 acres of land (generally excluding rights-of-way), roughly one-third of the city's industrial land supply. The U.S. Army Corps of Engineers maintains the lower Columbia River deepwater shipping channel from the Pacific Ocean to Portland and Vancouver. The deepwater channel in Portland includes the lower 12 miles of the Willamette River downstream from the Broadway Bridge and about two miles of the Columbia River adjacent to the Port of Portland's Terminal 6 in Rivergate.

3.1.1 Why Is A Prosperous Working Harbor Important?

A healthy economy is an essential element of a vibrant and livable city. A living-wage job is critical for each family.

The tax base and municipal revenue associated with a robust economy help fund public facilities and services, including schools, transportation systems, and parks. These resources also help fund Portland's goals, such as a clean and healthy river. In turn, a livable and environmentally healthy community is a strong asset for attracting and keeping businesses.

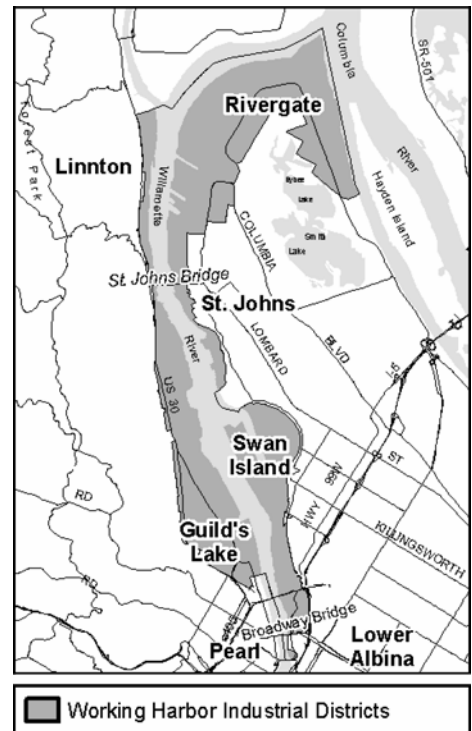


Figure 3-1 Working Harbor Area

Freight networks, industrial land, the labor market, and industry clusters are interrelated elements of a regional industrial system, which in the Portland area is largely concentrated along rivers (Figure 3-2). Portland’s working harbor is a unique and important component of this industrial system and the regional economy. It is Oregon’s primary seaport; a West Coast hub of river, rail, and highway networks; the region’s largest heavy industrial area; and a cluster location for some of the region’s largest basic industries. Each of the 34,300 industrial jobs in the harbor area supports nearly two additional jobs in the region. With this “multiplier” effect, harbor area industries generated about 100,000 jobs—one in every eight jobs in the Portland metropolitan area—and an annual payroll of \$3.5 billion in 2000 (Portland Bureau of Planning, [PHILS 2003](#)).

The working harbor is a unique and important component of the regional economy.

Figure 3-2 illustrates the elements of the regional industrial system:

Industrial Land

Local zoning codes generally guide industrial development in designated industrial areas, which are linked to freight networks and separated from residential neighborhoods. Industrial land in Figure 3-2 is represented by the industrial zones mapped by Metro and by Clark County, Washington.

Industrial Labor Market Area

Industries draw workers from the diverse labor force of the metro area. The labor market area shown in Figure 3-2 reflects Metro’s “urban growth boundary” in Oregon and the “urban growth area” of Clark County, Washington.

Industry Cluster Locations

Industry clusters are regional economic specialties, identifiable by having a higher share of employment in the region than the nation. Figure 3-2 recognizes some of the region’s larger industry clusters, showing the general location of a dominant facility, firm, or group of firms that represent a focal point of the cluster within the region.

Freight Transportation Networks

Portland is a West Coast hub for marine, rail, air, and highway freight networks. Figure 3-2 shows the deepwater navigation channel to the Pacific Ocean, the Columbia/Snake/ Willamette River barge routes, two national railroads (Burlington Northern Santa Fe and Union Pacific), Portland International Airport (PDX), and the regional freeway system linked to I-5 and I-84. The region’s two primary gateways for international trade are also highlighted: the entry point to the ports of Portland and Vancouver at the Willamette/Columbia River confluence and PDX.

Map Sources:

Industrial Land Supply: Metro and Clark County Industrially Zoned Land, 2003.

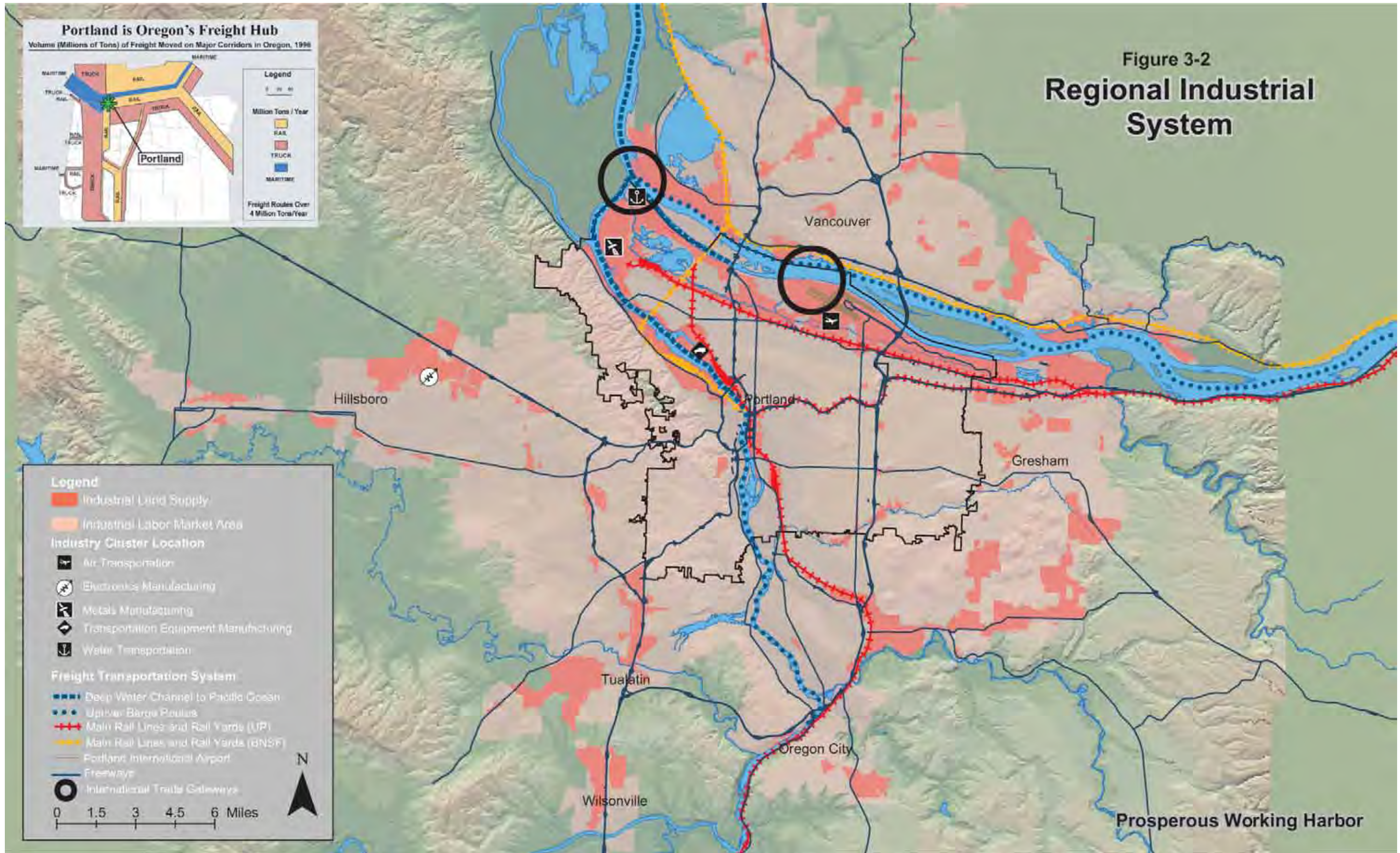
Labor Market: Metro Urban Growth Boundary and Clark County Urban Growth Area, 2003

Cluster Locations: Bureau of Planning 2004

Water Channel and Barge Routes: Bureau of Planning 2004

Rail Lines: Metro Regional Transportation Plan, 2003

Trade Gateways: Bureau of Planning, 2004.



3.1.2 How This Chapter Is Organized

Following the introduction, this chapter is divided into the following sections:

- 3.2: Freight Infrastructure
- 3.3: Industrial Land Supply
- 3.4: Jobs and Labor Market
- 3.5: Industry Clusters
- 3.6: Regulations

These sections represent distinct but interrelated elements integral to describing and assessing how the working harbor performs as part of the region’s industrial system. Each section begins with a brief overview of functions (how the element works). It then presents existing conditions and trends; describes constraints and opportunities related to the topic; and identifies system needs to support and maintain a prosperous working harbor.

3.2 FREIGHT INFRASTRUCTURE

3.2.1 Functions of Freight Infrastructure

Convergence of Distribution Networks

Portland’s working harbor and the adjacent Columbia Corridor are a West Coast freight distribution hub, where the seaport, Columbia/Snake/Willamette River barge routes, two national railroads (Burlington Northern Santa Fe and Union Pacific), Portland International Airport (PDX), the Olympic Pipeline, and two interstate highways (I-5 and I-84) converge (Figure 3-3).

Expansive Distribution Sector

Distribution is one of the region’s leading basic industries. Portland’s freight hub location and infrastructure underpin “transshipment” operations that serve markets outside the region. Access to multiple modes of transportation allows for flexible logistics. This flexibility is increasingly important for regional industries to remain globally competitive, and is an advantage for the distribution sector’s continued growth in Portland.

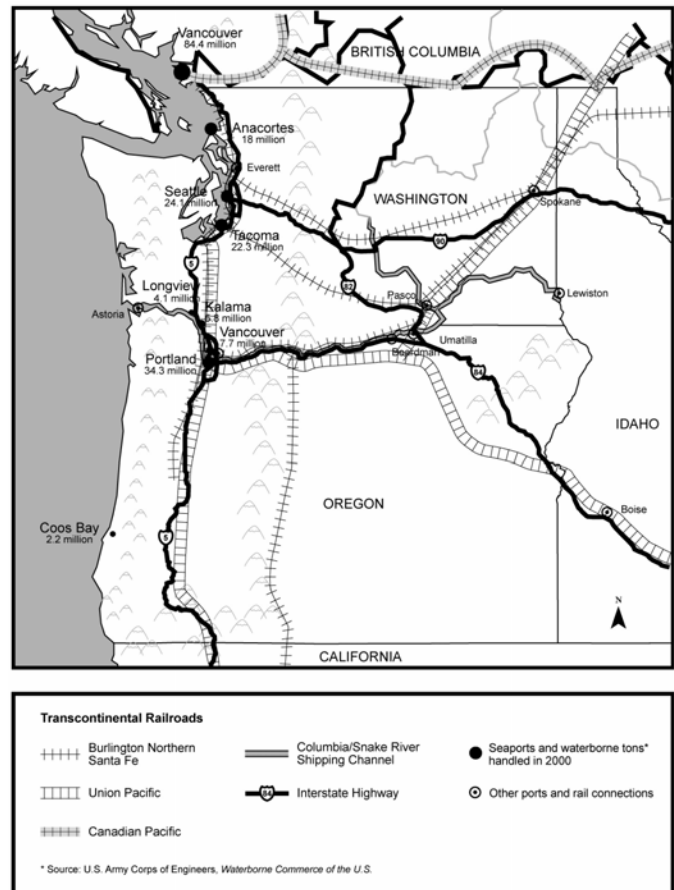


Figure 3-3: Northwest States Distribution Network

Global Market Access

Portland’s harbor and airport create Pacific Rim market access and reduce transportation costs for Oregon producers and consumers. As global trade continues to increase, particularly with Asia, so does the importance of these gateway facilities.

3.2.2 Conditions and Trends

Portland was the fourth-largest West Coast port by tonnage (specializing in heavy bulk cargoes) in 2000, behind Los Angeles, Long Beach, California, and Vancouver, BC (Bureau of Planning, [PHILS 2003](#)). Cargo moving through Portland Harbor increased by about 250 percent from 1960 to 2000, growing at an average annual rate of 2.3 percent. It is predicted that the total freight tonnage moving through the Portland-Vancouver metropolitan area will double by 2030 (Figure 3-4).

Figure 3-4 Freight Tonnage Mode Share and Growth

	Truck	Rail	Barge	Ocean	Air	Pipeline	Total*
Freight tonnage** mode share, 1997 (percent)	64.0	5.6	5.4	9.7	0.1	10.8	100.0
Forecasted annual growth, 1997-2030 (percent)	2.53	2.47	0.29	0.97	3.77	0.31	2.12

Source: DRI-WEFA 2002.

- * Intermodal freight accounted for a 4.5 percent share of freight tonnage in 1997, which is not shown in the table but is included in the total column. The DRI-WEFA forecast does not project the annual growth rate of intermodal freight.
- ** The tonnage of cargo transferred between modes in the region was generally double-counted in the mode share analysis. For example, all air freight was delivered to or transported from the airport by truck, so that tonnage was counted as both air and truck freight.

Of the ocean-going cargo handled in the Portland metro area in 1997, 42 percent was transported to or from marine terminals by truck, 37 percent by rail, and 21 percent by barge. Trucks also carry the largest share of freight tonnage overall in the region—64 percent in 1997 and projected to grow to 73 percent in 2030. Trucks are the “default” mode of freight transportation, providing connections and delivery to and from other modes for most goods shipped and representing a significant share of national distribution.

The Portland metro area distribution sectors are a leading basic industry. The proportion of Portland metro area employment in the wholesale and transportation industries substantially exceeded the U.S. average in 2000 (Bureau of Planning, [PHILS 2003](#)):

Industry Share of Employment in Portland Metro <u>Area as a Percent of Average Share in U.S.</u>	
Wholesale trade	138%
Trucking and warehousing	128%
Air transportation	120%
Water transportation	169%

The transportation and wholesale sectors created over 35,000 net new jobs in the Portland metro area from 1980 to 2000, accounting for 46 percent of the job growth in all industrial sectors. Transportation and wholesale sectors employed a higher share of the workforce in Portland in 2000 than any other U.S. metropolitan area, except Atlanta and Miami (Port of Portland 2003).

3.2.3 Constraints and Opportunities

Constraints on Freight Mobility

- The North Portland-Vancouver segment of I-5 is one of the most congested segments along this primary West Coast highway. Without improvements to this segment, vehicle hours of truck delay on metro area truck routes are projected to increase by 93 percent from 2000 to 2020; congested lane miles on truck routes will increase by 58 percent; and the costs of truck delay will increase by 140 percent. The Portland/Vancouver I-5 Transportation and Trade Partnership, a collaborative effort of state and local jurisdictions in Oregon and Washington, published these findings in 2002. This bi-state partnership has proposed widening this segment of the freeway to three continuous lanes in each direction and making bridge improvements, including expanded freight rail capacity and light rail access to reduce commuter traffic.
- As Portland grows, increasing traffic congestion on local streets is constraining freight mobility. Portland is responsible for the local freight street system, which provides critical access—the last mile—in the larger freight network that serves the entire state and southwest Washington. The Portland Freight Master Plan project was launched in early 2003 and will evaluate freight mobility constraints within the local Portland street system.
- Trains experience as much or more delay in the Portland area as in the Chicago and Los Angeles areas, which have substantially more train movements. Congestion on the region's rail system is estimated at 100 accumulated hours of delay per day (Portland/Vancouver I-5 Transportation and Trade Partnership 2002). The bi-state partnership has proposed a package of ten incremental rail improvements over 5-10 years that can significantly improve rail capacity. The estimated cost of these improvements is \$170 million. Major, long-term improvements to rail bridge capacity over the Columbia River were also recommended to

The North Portland-Vancouver segment of I-5 is one of the most congested segments along this primary West Coast highway.

Wheat from Oregon Farms to Asia

The six grain terminals at the Ports of Portland, Vancouver, and Kalama on the lower Columbia River shipped about 40 percent of U.S. wheat exports in the 1990s. Three of the terminals are in Portland: Columbia Grain at Rivergate, Cargill at Lower Albina, and Louis Dreyfus at Lower Albina. From July 1999 through June 2000, 259 grain ships were loaded at these three terminals.

From farm silos in eastern Oregon, Washington, and Idaho, export wheat is typically brought by barge or rail to Portland, Vancouver, or Kalama, where it is loaded onto ships bound for Asia, the South Pacific, or the Middle East. The low transport costs of this farm-to-market system are important to inland wheat farmers who commonly operate at thin profit margins.

accommodate rail freight growth, provide additional passenger service, and correct safety constraints related to barge movements under the existing bridge.

- The existing 40-foot depth of the lower Columbia shipping channel constrains access by the expanding global fleet of larger vessels in the container, bulk minerals, and grain trade. Permitting agencies recently approved a project to deepen the channel to 43 feet, and dredging could begin as early as 2005. With the proposed channel deepening, lower Columbia marine cargo tonnage is projected to grow at an average annual rate of 0.7 percent (the midpoint of the forecast range) through 2030. Without the proposed deepening, the projected average annual growth rate is 0.2 percent (DRI-WEFA 2002).

The existing 40-foot depth of the lower Columbia shipping channel constrains access by the expanding global fleet of larger vessels in the container, bulk minerals, and grain trade.

- Channel maintenance dredging in Portland Harbor has generally been done every two to three years to remove sediments that build up in some areas of the shipping channel. Regular maintenance dredging is necessary to ensure safe ship clearance in the 40-foot-deep by 600-foot-wide channel section of the river and to reduce the risk of accidents. Maintenance dredging has not been done since 1997, however. This is because statutes and agency policies have increased scrutiny and regulatory oversight for new maintenance dredging projects following the listing of a six-mile segment of Portland Harbor as a Superfund site and Endangered Species Act listings of steelhead trout and Chinook salmon in the Willamette River and tributaries. The U.S. Army Corps of Engineers has proposed preparing a Lower Willamette Dredge Materials Management Plan to resolve maintenance dredging issues.

Opportunities for Freight Mobility

- Harbor area managers cited access to solid intermodal transportation infrastructure as the area's greatest locational advantage for attracting and retaining industry (E.D. Hovee & Company 2003).
- Access to deepwater navigation via the 40-foot channel, combined with potential brownfield redevelopment, could generate marine industrial development opportunities.
- Federal and state transportation funding is available.
- Public-private partnerships can be expanded—for example, to fund improvements to the freight rail system.
- Bi-state and regional coordination is important to address regional transportation issues, particularly on I-5 improvements, navigation issues, and international trade.



Port of Portland Terminal 4 in St. Johns includes Toyota's Motor Sales USA's marine terminal (upper right).

- Portland can take better advantage of its significant east-west rail advantage. The Burlington Northern Santa Fe and Union Pacific Railroads have river-grade crossings of the Cascade Range along the Columbia River to the inland United States.

3.2.4 System Needs

To support and maintain a thriving harbor system, the following are needed:

- ◆ Significant improvements and maintenance investments in the regional channel, rail, and highway systems and the local freight street system to keep Portland a competitive West Coast distribution hub.
- ◆ Expansion of transportation infrastructure funding.

3.3 INDUSTRIAL LAND SUPPLY

3.3.1 Functions of Industrial Land Supply

Industrial Sanctuaries

The Portland Harbor area is the largest heavy industrial district in the city and region, characterized by marine terminals, rail yards, heavy equipment factories, steel mills, and petroleum tank yards. Portland's industrial sanctuary zoning prohibits housing and large-scale commercial use in the city's industrial areas. This designation of relatively exclusive industrial districts serves several public objectives:

- Encourages industrial development that provides local jobs and tax base.
- Keeps aesthetic, noise, odor, and other industrial impacts out of residential and commercial areas.
- Protects substantial investments in industrially related infrastructure and public facilities.
- Reduces speculative pressure for conversion of industrial land to higher-value land uses.
- Prevents the loss of industrial land, a finite resource for economic growth.

Concrete Industry at Lower Albina

Concrete is one of the basic materials used in new construction, and cement is the key ingredient in concrete. Nationally, cement production does not meet demand. In Oregon, nearly all of the cement used to produce new concrete is imported, much of it through the Glacier Northwest marine terminal in Lower Albina. Ash Grove Cement and concrete producers Ross Island Sand & Gravel and Sakrete also have river-dependent facilities nearby in Lower Albina. Availability of industrial land in Portland Harbor is important to this integral segment of the region's construction sector, which relies on barge transport of aggregate and other supplies and central truck access to customers. As a transport option, a river barge can carry the equivalent of about 100 gravel trucks.

Environmental Sustainability in Industrial Areas

The public's awareness of Portland's industrial areas is limited and often includes perceptions of polluted sites and smokestacks. This chapter focuses on the economic development aspects of the working harbor. However, environmental sustainability is also an aspect of Portland's working harbor that bridges the topics discussed in chapters 2 and 3 of this report.

- *Environmental protection and stewardship have become an increasing part of what industry does. These efforts typically do not bring in revenues that benefit a business' bottom line. In some cases, however, they do bring in revenue as more firms market such efforts to environmentally conscious customers and stockholders. On the cost side of the bottom line, waste management and environmental impacts can be expensive. Innovations in waste reuse, conservation, and green design present opportunities to improve long-term business efficiency and competitiveness.*
- *The Portland Harbor Superfund Project is underway to assess and clean up contaminated sites and sediments. An initial focus is on source control, which involves research and cleanup of about 50 upland sites, as well as control of new sources of contamination that could discharge into the river. Today's source control methods are far ahead of past approaches. Smarter, more regulated handling of hazardous materials has replaced the historical dumping practices that contributed to much of the site contamination now being cleaned up.*
- *Some industrial processes involve risk in handling society's hazardous materials on a mass scale and generating production wastes. However, evolving approaches to research, innovation, regulations, and new practices are responding to the challenge. Moreover, local environmental expertise and innovation are on the rise in response to recent Superfund and Endangered Species Act listings.*

Finite Resource

Industrial land along Portland Harbor—Oregon's primary freight distribution hub (along with the adjacent Columbia Corridor)—is a unique, finite resource of statewide economic importance. Portland's river industrial overlay zoning reserves riverfront industrial sites along Portland Harbor (about half of the land in the harbor industrial districts) for river-dependent and river-related uses.

Industrial land along Portland Harbor is a unique, finite resource of statewide economic importance.

Urban Redevelopment Constraints

Reinvestment and redevelopment in older industrial areas is often challenged by the presence of brownfields (underutilized urban sites where hazardous substances may be present), infrastructure needs (upgrades and maintenance), congestion, and incompatibility with surrounding urban areas. In some cases, the high costs of readying vacant industrial lands for development can keep that land out of the competitive land market for new industrial development for many years.

3.3.2 Conditions and Trends

The decline of manufacturing and the dispersion of new industrial development into suburban areas have been common trends in U.S. cities in recent decades. The Portland metro area, however, has been a notable exception. Manufacturing and other industrial employment continue to grow in Multnomah County and the metro area (see Section 3.4: Jobs and Labor Market). Multnomah County continues to be the region's largest industrial location, although its share of the metro area's (Oregon portion) industrial employment dropped from 59 percent in 1980 to 48 percent in 2000.

Forecasts predict a moderate continued growth in demand for industrial land in the region and the

Portland Harbor area. It is estimated that sufficient market demand will exist between 2000 and 2025 to develop and occupy an additional 1,900 gross acres of industrial land in the City of Portland (EcoNorthwest 2003). Most of that projected industrial land demand is attributed to the growing freight distribution sector. Short-term demand, however, fluctuates with business cycles. Current industrial land demand is expectedly low coming out of the recent recession.

The proportion of land in industrial and river-dependent uses along Portland Harbor has been relatively stable or growing since 1960. Two exceptions are the Pearl District and St. Johns waterfronts, where most of the land was in river-dependent industrial use in 1960 and is now either vacant or has been converted to nonindustrial uses. Land absorbed by marine terminals and marine industrial development along Portland Harbor grew at an average rate of 21 acres per year from 1960 to 1997. Interviews with harbor area managers in 2002 revealed little near-term demand for river-dependent industry (E.D. Hovee & Company, [PHILS 2003](#)). If demand rebounds to the levels of recent decades, however, the supply of vacant, buildable land along the harbor would be depleted within a few years.

Metro expanded the region's urban growth boundary by about 2,000 acres in December 2002 to accommodate forecasted demand for industrial land, and will consider additional expansion in 2004. Further analysis is needed to compare the costs and tradeoffs of extending infrastructure to serve new suburban industrial areas, versus expanding public investment to reduce development constraints on vacant and redevelopable land in existing Portland districts.

3.3.3 Constraints and Opportunities

Constraints on Industrial Land Supply

- There is a regional shortage of development-ready industrial sites to meet expected demand, particularly large sites of 50 acres or more (Otak 2002). Metro's 2000 inventory of vacant (unimproved) industrial land estimates a current supply of only 33 acres of unconstrained, vacant industrial property (Tier A) in the Portland Harbor area, and approximately 220 acres in the City of Portland.
- As Portland grows, development pressure persists to convert industrial land to residential and commercial uses that command higher land values. Between 1991 and 2003, approximately 540 acres of industrially zoned land (general industrial, or IG, and heavy industrial, or IH) were converted to other zones. This represents about three percent of Portland's gross industrial land supply. The primary example along the harbor is the Pearl District area. While the Guild's Lake Plan adopted in 2002 reaffirmed industrial sanctuary policies north of Vaughn Street (coined the 'steel curtain'), approximately 90 acres of land primarily south of Vaughn have been rezoned from 'industrial' to 'central employment' since 2001. That rezoning has made land available for urban-density redevelopment in the Pearl District and Northwest neighborhoods and for support of the recently installed streetcar line.

As Portland grows, development pressure persists to convert industrial land to residential and commercial uses that command higher land values.

Chapter 3
A PROSPEROUS WORKING HARBOR

- Environmental protection (p) overlay zoning has been applied to approximately 570 acres of industrially zoned land since 1989 to protect lands with the most important natural resource and functional values in streamside and habitat areas. This zoning overlay permits development only in rare and unusual circumstances.
- A recent study (E.D. Hovee & Company, [PHILS 2003](#)) rated Portland Harbor riverfront sites by 14 types of constraints for new river-dependent uses, such as mooring depth, rail and street limitations, lot depth, site contamination, proximity to housing, and other environmental site constraints, with the following results (Figure 3-5):
 - 21 percent (670 acres) did not meet two threshold criteria: industrial zoning and adequate water depth for barge access. Almost none of these 670 acres are included in the current river industrial zone, which reserves land for river-dependent and river-related uses.
 - Nine percent (270 acres) had four to 11 constraints that may be amenable to remediation or, on the other hand, may exceed what industrial users would find feasible to develop in today's market. Sites with four to 11 constraints that have river industrial zoning include the south end of the St. Johns area (McCormick & Baxter and Triangle Park LLC sites), most of Linnton from the village area to the Wacker Siltronic site, and the narrow sites abutting the Albina Rail Yard.
 - 51 percent (1,600 acres) had one to three constraints that could require some form of mitigation for the land to remain in maritime use.
 - 19 percent (580 acres) of the riverfront land area—all of it in Rivergate—had no identified constraints.



Central location and solid truck, rail, and harbor access are among the locational advantages of the Swan Island industrial district (shown here) for manufacturing and distribution firms.

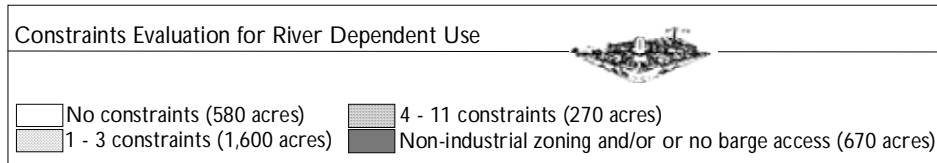
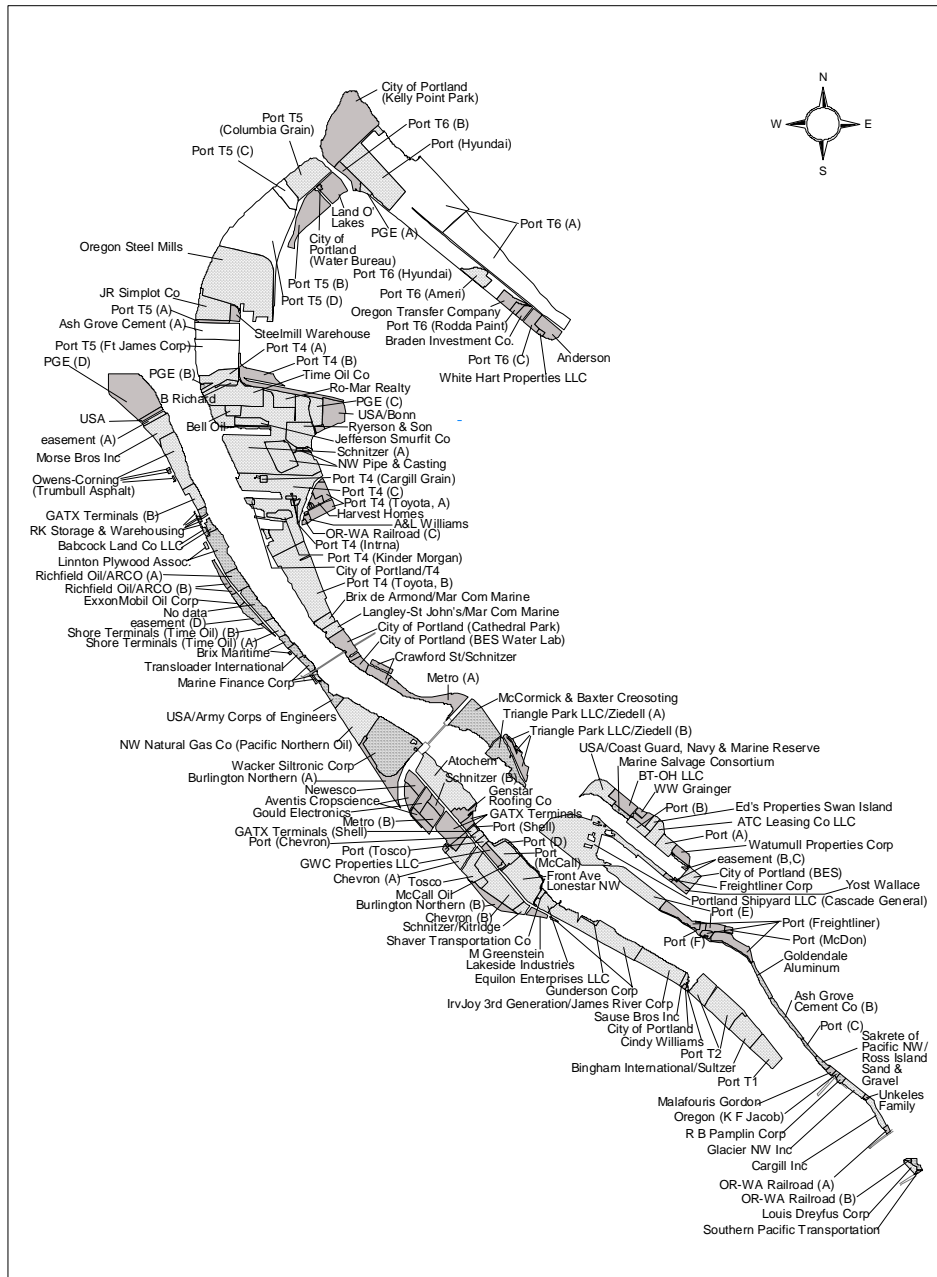


Figure 3-5 Site Constraints Evaluation for New River-Dependent Industrial Uses.
Source: E.D. Hovee & Company, 2003

- Site contamination in Portland’s older industrial districts along the harbor poses significant investigation and cleanup costs for existing industry and a cost constraint for redevelopment of underused land. In 2000, six river miles of the harbor were listed as a federal Superfund site, and the Portland Harbor Superfund Project currently includes the investigation or cleanup of about 50 upland properties. In addition, the Oregon Department of Environmental Quality (DEQ) has identified approximately 50 other investigation and cleanup sites in the Rivergate, Swan Island, Lower Albina, Linnton, and Guild’s Lake industrial areas.
- A recent study based on 80 interviews with harbor area managers and business leaders (E.D. Hovee & Company, [PHILS 2003](#)) identified several local issues that are affecting industrial investment in the harbor area:
 - At riverfront sites, two primary issues were cited. The first issue is the uncertain implications of the Portland Harbor Superfund Project, including how much it will cost, how costs will be allocated, and future constraints on harbor operations and construction. The second issue is whether multimodal transportation improvements, such as proposed I-5 widening and Columbia River channel deepening projects, will proceed as needed to keep Portland competitive with other port cities in terms of transportation costs and unique advantages.
 - At upland sites, identified issues included regional traffic congestion (for both freight and employees), the encroachment of non-industrial uses, permitting challenges, concern about public policy changes, and lack of community support for industrial retention.
- Very little of the harbor riverfront has access to urban renewal resources to assist industrial redevelopment.

Site contamination in Portland’s older industrial districts along the harbor poses significant investigation and cleanup costs for existing industry and a cost constraint for redevelopment of underutilized land.

Opportunities for Industrial Land Supply

- Redevelopment of brownfields and underused land represents a significant opportunity to expand the available supply of industrial land.
- Application of redevelopment tools (such as urban renewal and infrastructure investments) can be expanded in industrial areas to facilitate industrial reuse.
- Regional coordination can improve the effectiveness of local industrial land policy and related public investments.
- Public-private partnerships and coordination can be expanded to create and implement industrial development strategies.
- The Portland Development Commission and the Port of Portland can expand their roles as public land bankers and brownfield redevelopers.

3.3.4 Systems Needs

To support and maintain a thriving harbor system, the following are needed:

- ◆ An adequate, stable supply of industrial land along Portland Harbor to accommodate the area's basic industries and take advantage of the freight hub infrastructure. An adequate, stable supply of land for river-dependent industries to support Portland's long-term vitality as a seaport.
- ◆ An improved toolkit to overcome brownfield and infrastructure constraints and to increase the potential to recycle industrial land in older districts.
- ◆ Adequate buffers between industrial districts and other land uses to prevent the loss of industrial land and to reduce the impacts on adjacent neighborhoods.

3.4 JOBS AND LABOR MARKET

3.4.1 Functions of Jobs and Labor Market

Regional Job Engines

Industrial districts are regional job engines. Each industrial job in the harbor area supports nearly two additional jobs in the region, as high industrial wages and inter-firm trade create employment "multiplier" effects.

Labor Quality

Recent industrial location literature recognizes labor force attributes—both cost and quality—as the most important determinants of where firms locate (Portland Development Commission 2002). The literature also identifies the importance of a region's quality of life for attracting and retaining skilled, highly educated workers. The labor pool associated with Portland's built-up industrial specialties is an important catalyst for retention and growth in those industries.



Gunderson, Inc., a railcar and barge manufacturer, employs approximately 1,100 workers in the Guild's Lake area.

Labor Costs

As industries compete with each other and locate their production activities in a global context, Portland-area labor costs are a competitive challenge for industrial retention and growth. The relocation of assembly and other manufacturing processes to lower-cost overseas locations has been a national trend since the 1970s.

3.4.2 Conditions and Trends

While the rising share of jobs in the service sectors and the loss of industrial jobs to overseas competition have been newsworthy trends, the overall number of jobs in the industrial sectors also grew by 12 percent nationally and 37 percent in the Portland metro area between 1980 and 2000. The industrial sectors in the Portland metro area substantially outperformed their national counterparts in job creation (Figure 3-6).

Portland Harbor area industries supported one in eight jobs in the six-county metro area in 2000 (Bureau of Planning, [PHILS 2003](#)). For each of the 34,300 industrial jobs in the harbor area, purchases made by harbor area firms and employees supported an average of 1.9 additional jobs. Accounting for these multiplier effects, harbor area industries generated about 100,000 jobs in the metro area and an annual payroll of \$3.5 billion in 2000. Most of the region’s industrial sectors have significantly higher multiplier effects than the service sectors because of higher wages and higher levels of purchases from regional suppliers and service businesses.

Metro’s employment forecast to 2030 shows continued moderate employment growth in the industrial sectors: 1.5 percent average annual growth in transportation, 1.6 percent in wholesale trade, and 0.8 percent in manufacturing (Metro 2002).

The Portland metro area, however, has been hard hit by the 2001-2002 national recession, and recovery has been slow. The average number of unemployed workers in the six-county Portland-Vancouver metro area was approximately 85,000 in 2002, resulting in an annual unemployment rate of 7.8 percent compared to 5.8 percent nationally (Oregon Employment Department 2003). Contraction of the manufacturing sector, particularly high-tech industries, has been a major source of the recent downturn in regional employment. Of the 21,800 net jobs lost in the metro area from 2001 to 2002, 57 percent (12,400 jobs) were lost from the manufacturing sector and 23 percent (4,900 jobs) from computer and electronic products manufacturing.

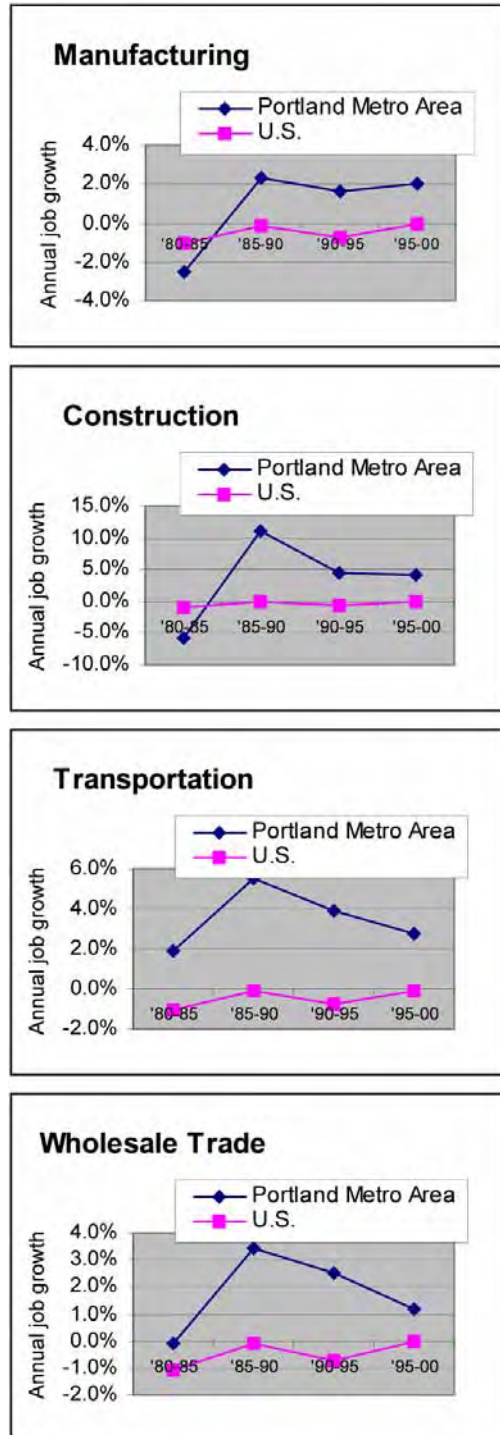


Figure 3-6 Industrial Job Growth Trends Portland Metro Area and U.S. (1980-2000)

3.4.3 Constraints and Opportunities

Constraints on the Jobs and Labor Market

- Portland Harbor area managers have expressed concern that their inability to access skilled blue collar labor is an emerging constraint to local growth (E.D. Hovee & Company 2003). Firms cite the inadequacy of the K-12 school system to provide a broad set of vocational skills, from welding to computers.
- Harbor area managers also identify rising costs of health benefits and workers compensation as a significant potential disadvantage in Portland's cost competitiveness as an industrial location.
- Oregon's lagging investment in grades K-12 and higher education has recently drawn national attention, as recession-related shortfalls in state revenue have led some school districts to shorten their school years. Eroding educational funding limits the potential to attract workers and industries to the state and to strengthen vocational training programs. Multnomah County voters in spring 2003 approved a county income tax levy to meet education budget shortfalls, but this is a short-term fix. The Oregon Legislature approved a tax measure in August 2003 intended in part to shore up education funding, but the issue of establishing a stable, long-term funding source for education remains unresolved.

Portland Harbor area industries supported one in eight jobs in the six-county metro area in 2000.

Opportunities for Jobs and Labor Market

- Local educational institutions can partner with local industry—for example, for research and development or vocational training.
- Inter-firm labor pool networking can help re-employ and retain laid-off workers.
- Portland's livability can be protected and marketed to attract and retain skilled labor and entrepreneurs.
- Regional coordination can address labor issues that affect regional competitiveness.

3.4.4 System Needs

To support and maintain a thriving harbor system, the following are needed:

- ◆ Improvements in education, training, and job placement programs to develop and sustain a skilled industrial labor force.

3.5 INDUSTRY CLUSTERS

3.5.1 Functions of Industry Clusters

Regional Economic Base

Basic industries (also called ‘traded sectors’) are those that compete with firms in other regions and typically export much of what they produce out of the region. Basic industries tend to cluster in a relatively few competitive locations globally. A region’s basic industries tend to drive up its relative wage levels, paying high wages that reflect the need for high productivity to compete in national and global markets. A region’s mix of basic industries also tends to determine the long-term rate of economic growth, as fast-growing basic industries bring income into the region while declining industries reduce regional income. The Portland Harbor area is a core location for some of the region’s largest basic industries in transportation equipment manufacturing, metals manufacturing, and transportation (water, rail, air freight, and long-distance trucking).

Portland’s largest marine cargo niche is in dry bulk exports, primarily wheat and mineral bulks, which account for more than half of the tonnage handled at Portland Harbor terminals.

Agglomeration Economies

A local cluster of interrelated firms in an industry generally builds up the region’s locational advantages for that industry, such as labor, infrastructure, support institutions, and fixed capital investments. Local inter-firm competition, linkages, labor skills, and supportive values also contribute to innovation in new products and production processes and new business formation.

3.5.2 Conditions and Trends

Transportation equipment manufacturing (e.g., trucks, rail cars, barges, ship repair) is by far the largest industry cluster by employment in the Portland Harbor area, accounting for 7,800 jobs in

Portland’s Auto Distribution Cluster

Portland’s rail access and location are ideally suited for its continued growth as a West Coast distribution hub for auto producers in Asia and the American Midwest. The Honda, Hyundai, and Toyota marine terminals in the Rivergate and St. Johns areas are situated nearly adjacent to the Ford and General Motors land-side distribution facilities. Trains that bring Ford, GM, and Honda automobiles from the Midwest to North Portland for regional distribution by truck make return trips to the inland U.S. loaded with Honda, Hyundai, Subaru (from its Vancouver marine terminal), and Toyota automobiles.

2000—nearly two thirds of the metro area’s employment in that industry. Other harbor area clusters—industries with high concentrations of their regional employment in the harbor area—are in metals, food products, printing and publishing, chemicals, water transportation, trucking, rail, air freight, and various wholesale segments (Bureau of Planning, [PHILS 2003](#)).

Portland’s largest marine cargo niche is in dry bulk exports, primarily wheat and mineral bulks, which account for more than half of the tonnage handled at Portland Harbor terminals. Other marine cargo niches are in automobile imports, petroleum barge shipments to serve the regional market, steel imports, local shipments of concrete

and aggregate materials, and the regional container service (primarily agricultural and forest product exports) provided at Port of Portland Terminal 6.

The types of industries in the Portland Harbor area characterize it as a ‘hub and spoke’ district, where large, often locally headquartered firms have customers outside the region while supporting a range of local suppliers and subcontractors (E.D. Hovee & Co. [PHILS 2003](#)). Examples include large harbor area firms in transportation equipment manufacturing (Freightliner, Gunderson, Cascade General), metals manufacturing (ESCO, Oregon Steel), and water transportation (Port of Portland). However, the harbor area may be transitioning to more of a ‘satellite platform’ pattern, characterized by local branch facilities of firms that are based elsewhere, and having few local customers and suppliers. This pattern is driven by trends toward corporate consolidation and by the growth of the distribution sectors based in other cities relative to locally headquartered manufacturers.

3.5.3 Constraints and Opportunities

Constraints on Industry Clusters

- Remaining globally competitive is an uphill challenge. In contrast to past growth trends and relative stability during the recent recession, harbor area managers have expressed substantial uncertainty about future reinvestment in the harbor area as a result of changes in global market conditions, local costs, and public policies. There is a growing perception that Portland has become a high-cost place to do business.
- Many long-time manufacturers expect the need to reinvent their business operations over the next 10 to 20 years to remain competitive domestically and globally. Investment strategies to remain competitive include focusing on quality goods, technological innovation, customer service, and cultivating relationships with vendors and customers.

Opportunities for Industry Clusters

- Retention of existing businesses is often a more effective strategy than attracting new businesses.
- Federal and state economic development funding is available to leverage local resources.
- Public-private partnerships can be expanded.
- Regional coordination can improve the effectiveness of local economic development strategies.

3.5.4 System Needs

To support and maintain a thriving harbor system, the following are needed:

- ◆ An effective package of economic development policies and public investments (e.g., addressing infrastructure, land, labor, finance, and regulations) to foster the retention of industry clusters and the growth of emerging industries.
- ◆ Expanded community awareness about the integral role of industry in the region's economic health, as well as the competitive challenges facing local industry.

3.6 REGULATIONS

3.6.1 Functions of Regulations

Land Use and Permitting

Oregon's statewide planning program and Metro's 2040 plan set the parameters for Portland's land use policy and zoning. These programs require cities and counties to adopt more detailed, localized policy frameworks in comprehensive plans and to regulate development through zoning, building codes, and infrastructure requirements. For example, Statewide Planning Goal 9 requires local jurisdictions to implement comprehensive plans that provide an adequate supply of industrial sites of suitable sizes, types, locations, and service levels; Goal 15 requires Willamette River Greenway development standards to protect natural, scenic, historical, economic, and recreation values. Metro's Title 4 implements state Goal 9 and requires the designation and protection of regionally significant industrial areas. Harbor-related features of the *Portland Zoning Code* include industrial sanctuary restrictions on incompatible uses, river industrial zones that reserve riverfront sites for river-dependent and river-related uses, and greenway requirements for a riverfront setback and landscaping. [Appendix A](#) summarizes Willamette River-related policies and regulations.

Federal Mandates

Federal environmental mandates in the Endangered Species Act (ESA), Clean Water Act (CWA), and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund) have significant potential effects on how Portland's industrial and waterfront properties are developed.

Federal security measures have been mandated for marine cargo and passenger terminals since the events of September 11, 2001. The Transportation Security Agency (TSA) is promulgating new regulations through the Coast Guard, and will increasingly focus on facility improvement and modernization.

3.6.2 Conditions and Trends

Oregon’s statewide planning program and Metro’s 2040 plan are leading examples of coordinated state and regional comprehensive planning in the nation. In particular, the framework and 30-year longevity of the statewide planning program establish a strong institutional structure for local planning, as well as for making and protecting long-term property investments. The risk of making a long-term investment in a new manufacturing plant is less in an established industrial zone where incompatible uses are prohibited or limited.

Oregon’s statewide planning program and Metro’s 2040 plan are leading examples of coordinated state and regional comprehensive planning in the nation.

Business leaders, however, have also identified increasing permit costs, review time, uncertainty, and application needs as impediments to economic development in Portland. According to the City Auditor’s January 2003 report to City Council, Portland is taking longer to process building permits than it did six years ago. The report also notes that the quantity, complexity, and inconsistent interpretation of regulations cause significant frustration for permit applicants, as well as for City staff.

Portland ranks as solidly “middle of the road” among similar cities (those Portland competes with for basic industry location and expansion) in most business climate attributes, such as educational attainment, economic diversity, utility costs (except sewer), business taxes, property taxes, regulations, and housing costs (Portland Development Commission 2002). However, the same report notes that surrounding jurisdictions are more consistent and timely in processing permits and addressing regulatory uncertainty.



In contrast to a seawall riverbank, the long-arm design of the ship-loading facilities at some marine terminals, such as this bulk terminal at Port of Portland Terminal 4, allows most of the riverbank to remain relatively undisturbed. This is an example of how site design can meet both industrial and natural resource objectives.

3.6.3 Constraints and Opportunities

Regulatory Constraints Affecting Businesses

- Portland faces a challenging agenda of recent environmental mandates that increase business costs and add uncertainty to the investment climate in the short term. For example, local species of Chinook salmon and steelhead trout have been listed under the Endangered Species Act. Over the long term, a cleaner and healthier river will contribute to the economic growth advantages of a more livable community, and current restoration and cleanup efforts could substantially reduce the difficulty and expense of deferred responses for future generations. In the short term, some typical costs to businesses resulting from endangered species listings include:
 - Increased cost of permitting (extended schedule, greater specificity in design, inflexibility, and many more conditions of approval).
 - Increased cost of waterfront improvements (design, mitigation, conservation measures).
 - Uncertainty over future ability to construct docks and related improvements.
- A six-mile stretch of Portland Harbor has been listed as a Superfund project, which places liability for investigation and cleanup costs on potentially responsible parties that can be identified. Oregon statutes (ORS Chapter 465) establish liability for environmental cleanup costs and injury or destruction of natural resources caused by release of hazardous substances. With some limitations, these liability provisions extend to those who become site owners or operators after releases occur and who knew or reasonably should have known of the release when first becoming the owner or operator.
- Clean Water Act requirements to reduce Portland’s combined sewer overflows have increased local sewer rates and expanded stormwater treatment requirements.
- Permitting time for local land use and development review, application costs, and uncertainty all add to development costs. The comparative costs of permitting and the regulatory uncertainty for industrial development in Portland have not been compared with competing cities. However, interviews with harbor area managers (E.D. Hovee & Co., [PHILS 2003](#)) indicate a common perception that the regulatory costs of doing business in Portland are high. This issue of local regulatory process costs overlaps with business concerns about environmental remediation and protection requirements, as discussed above. As the extent and complexity of environmental issues grows, so do the public policy responses to address them. Some policy issues remain unresolved, such as the greenway code and the possible expansion of environmental zones. Because policy and regulatory changes can affect site size, configuration, and use, uncertainty about how they will be applied is a disincentive to development of the affected properties, which include much of the Portland Harbor area. While development regulations provide important long-term benefits in protecting community livability and ecosystem services, these benefits generally represent non-market values that are less widely understood and difficult to quantify. In the meantime, regulatory

Permitting time for local land use and development review, application costs, and uncertainty all add to development costs.

restrictions, complexity, and uncertainty can be significant stumbling blocks for strategic business location and investment decisions that offer long-term economic growth opportunities for the community.

Regulatory Opportunities for Businesses

- Portland's Regulatory Improvement Project, currently underway, is attempting to address some of the permitting problems identified by stakeholders throughout the city. Changes may include reduced code complexity and improved processes. Continuing to allocate adequate resources to this project can help address both small and large regulatory barriers.
- The City of Portland, NOAA Fisheries, U.S. Fish and Wildlife Service, and U.S. Army Corps of Engineers signed an agreement in February 2003 that established a cooperative process for streamlining Endangered Species Act Section 7 consultations, the first example in the nation of such an agreement. The Streamlining Team has been meeting since September 2003 to advise on Portland projects that are applying for federal and state permits. State government participants include the Department of Environmental Quality, Division of State Lands, and Department of Fish and Wildlife. The agreement has shortened the time needed to ensure projects take appropriate steps to protect the environment and has reduced the costs and uncertainties associated with the Endangered Species Act, Clean Water Act, and other federal and state environmental laws.
- Multi-objective approaches can be used to involve stakeholders with competing interests and work toward integrated solutions.
- Voluntary best management practices can be used as an alternative to regulations. One example is the LEED (Leadership in Energy and Environmental Design) Green Building Rating System standards.
- Incentives are another alternative to regulations. Examples include state tax credit programs, such as the business energy tax credit and pollution control tax credits.
- Performance standards, as an alternative to prescriptive standards, can be used to encourage innovation.
- Regional and City coordination of land use and environmental regulations can reduce conflicts, delay, and duplication.

3.6.4 System Needs

To support and maintain a thriving harbor system, the following are needed:

- ◆ Incorporation of economic development analysis and goals into land use, infrastructure, watershed planning and management practices.

- ◆ Consideration of the economic costs and benefits of development and regulatory decisions, including the long-term implications for ecosystem services and economic development. Fair and predictable cost-sharing strategies in regulations that substantially increase development costs or business operating costs.
- ◆ Increased regulatory predictability. Reduction of undue complexity, permitting time, and costs of development regulations in Portland relative to competing cities. Expansion of permitting assistance for strategic economic development projects.
- ◆ Protection of public safety and industrial security in the alignment and design of public trails in harbor industrial areas.

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River Renaissance Vision:



4.1 INTRODUCTION

Embracing the river as Portland's front yard" means acknowledging and celebrating that the Willamette River plays an integral role in Portland's economy, livability and natural resource systems. A front yard offers the first glimpse of someone's home and similarly, the riverfront offers an important look at Portland and its history. In many places Portland actively uses the riverfront as its front yard. The working harbor (discussed in the previous chapter) provides the first look into Portland for those arriving by ship. The harbor's marine terminals and corporate headquarters connect employees with the river.

This chapter focuses on the riverfront park and open space system that comprises Portland's Front Yard. This system encompasses a variety of facilities, including developed parks, habitat refuge parks, inland neighborhood parks, the Willamette Greenway Trail, bike lanes, and other trails. In this chapter, "embracing the river as Portland's front yard" means:

- Creating an interconnected system of parks, trails, and open spaces that radiate from the river.
- Completing the Greenway Trail for Portland's 34 miles of riverfront, as part of the regional trail system along the Willamette River.
- Connecting new and expanding neighborhoods and districts visually through the urban forest, view



Willamette Park

corridors, and viewpoints of the river; connecting neighborhoods and districts physically by expanding public access, signage, bike lanes, and pedestrian ways.

- Celebrating Portland's historic relationship with the Willamette River through public art, landmarks, and interpretive signs along the riverfront.
- Protecting, restoring, and enhancing functioning riparian ecosystems located on public lands to support the City's commitment to salmon recovery and improved water quality.

4.1.1 Why is Portland's Front Yard Important?

Portland is a river city, and the riverfront is one of the city's most important civic spaces. It is in riverfront parks and open spaces that Portlanders are most able to directly experience the city's connection to the river and the river's role in the city's identity and history. Riverfront parks and trails also promote public health by encouraging physical activity.

Just as a front yard creates the first impression of a home, the riverfront creates a first impression of Portland's downtown and riverfront districts. All of these characteristics contribute to the quality, character, distinctiveness, and diversity of the urban design along the riverfront.

Just as a front yard creates the first impression of a home, the riverfront creates a first impression of Portland's downtown and riverfront districts.

Portland prides itself on its unique identity and values. The Willamette River can reflect this pride through improvements that promote active lifestyles, incorporate sustainable building and operational practices, and implement visionary plans that benefit the Central City and neighborhoods alike.

- [Tom McCall Waterfront Park](#) is well established as a central civic space and front yard for Portland.

- Recent investments in the [Eastbank Esplanade](#) and the [Springwater on the Willamette Trail](#) have created new front yard roles for the Willamette River. These public amenities enhance the city in diverse ways as locations for recreation, social interaction, and personal reflection. The attractions are still new and have the ability to evolve, grow, and improve over time.



Riverplace Marina

- St. Johns, Linnton, South Waterfront, and the River District have opportunities to connect to the river in ways that stimulate activity and investment and create a strong sense of place, attracting visitors with varying interests. St. Johns and Linnton have great potential as places where evolving waterfront districts and strong industrial areas share the riverfront within close proximity. The South Waterfront area is planned to be a vibrant community that embraces innovation and integrates nature into a highly urban environment. The riverfront in this area will truly be exemplary with new parks

and open spaces. In the River District, Centennial Mills, purchased by the City in 2000, presents an opportunity to reconnect with the riverfront and acknowledge the mill's historic relationship with the Willamette River.

As Portland grows into the 21st century, more and more Portlanders will want to reconnect with the city's most prominent resource – the Willamette River – through Portland's front yard.

4.1.2 How This Chapter Is Organized

Following this introduction, this chapter is divided into the following sections:

- 4.2: Regional Context
- 4.3: Riverfront Park, Recreation, and Open Space System
- 4.4: River Access
- 4.5: Water-Based Recreation
- 4.6: Natural Resources
- 4.7: Historic Resources (including interpretive signs and artwork)

Section 4.2 places Portland's riverfront park and open space system within the larger context of the regional greenspace and trail system. Sections 4.3 through 4.7 then focus on specific aspects of Portland's system. Each of these sections presents existing conditions and trends; discusses constraints and opportunities related to the topic; and identifies what is needed to achieve a system that will embrace the river as Portland's front yard.

4.2 REGIONAL CONTEXT

Portland's riverfront parks provide a way to connect the river's natural and recreational resources to the rest of Portland and the region. They serve as a refuge for the city's residents and wildlife, and help define Portland's character, based on a unique relationship with the natural environment. The Olmsted Plan of 1904 originally proposed such an interconnected system of parks, open spaces, and landscaped boulevards for Portland (Figure 4-1). The plan even proposed establishing the reservoirs at Mt. Tabor as a park. A century later, much of the Olmsted Plan has been realized.

Portland's riverfront parks and trails are part of a larger regional greenspace and trail system that serves over



Figure 4-1: Olmsted Plan of 1904 Source: Portland Office of Transportation
To view this map in color visit www.river.ci.portland.or.us

800,000 people. The regional system includes Metro's greenspaces, local parks, natural areas, and trails contained within the region (Figure 4-2). A large portion of the regional trail system, referred to as the "40-Mile Loop Trail," has grown to include over 140 miles of trail that radiate throughout Portland and the region. This network is composed of individual trails, such as the Willamette Greenway Trail that parallels the Willamette River, [the Springwater Trail Corridor](#); [Columbia Slough Trail](#), and [Peninsula Crossing Trail](#).

Figure 4-2 The Regional Parks, Trails and Open Space System Map illustrates the elements of the regional park, trail, and open space system. The purpose of a regional map is to convey that the park, trail and open space system in Portland is part of much larger interconnected system. Figure 4-2 includes:

Parks and Open Space

The Parks and Open Space information includes all of the public parks and open spaces in the metro region.

Waterfront Districts

Waterfront districts are located on the Willamette and Columbia Rivers and their tributary streams.

Existing Regional Trails

Existing regional trails are at least partially complete and open to the public (as of July 2003). They connect neighborhoods, schools, parks, and jobs; provide access to nature; and offer opportunities to hike, bike, walk, and run.

Proposed Regional Trails

Planners and community advocates have proposed several future trail projects that are a conceptual part of the regional trails system. A master planning process and many opportunities for public involvement will occur before decisions are made about trail alignment and appropriate use.

Proposed Inter-Regional Trails

Proposed Inter-Regional Trails are trails that will connect the Portland metropolitan region to other areas, such as the Columbia River Gorge, Mt. Hood National Forest, Pacific Coast, and Willamette Valley.

Water Trails

Water Trails in rivers and other waterways offer a unique view of the nature of the region. Defining a route as a water trails means providing access points, resting places and information for canoes, kayaks, boats and rafts.

Public Docks

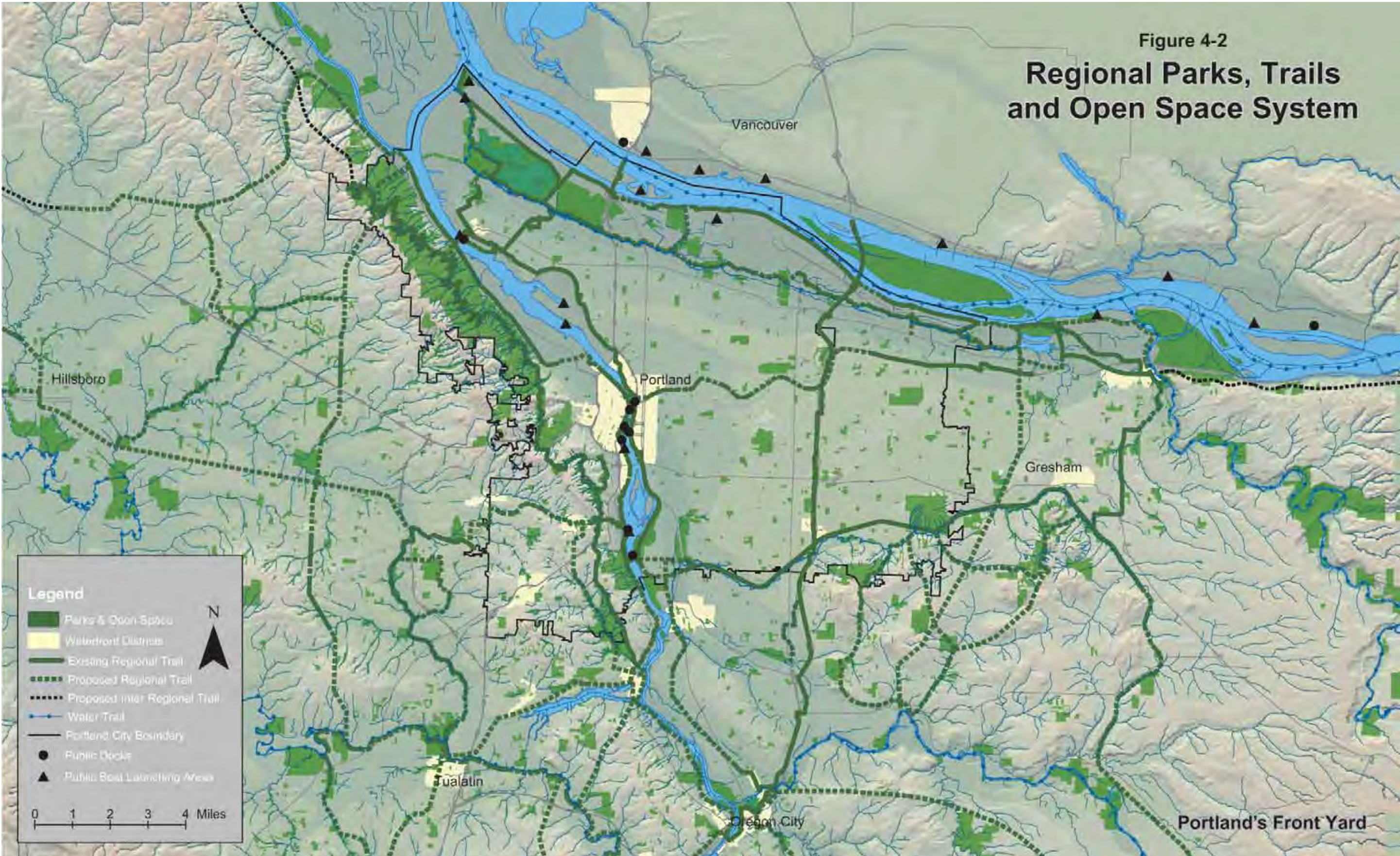
Public Docks are facilities that exist for the public to dock boats or other watercraft along the Willamette and Columbia Rivers. Many people use these docks to launch non-motorized watercraft.

Public Boat Launching Areas

Public Boat Launching Areas are places where the public is able to launch boats or other watercraft in the Willamette and Columbia Rivers. This map does not distinguish between motorized and non-motorized launches. Non-motorized boats can use both types of launches.

Map Sources:
Parks and Open Space, Metro RLIS data, 2003.
Waterfront Districts, subset of Metro 2040 Centers, 2002.
Trails, Metro's Regional Trails and Greenways 2003.
Public Docks and Launches, Bureau of Planning, 2004.

Figure 4-2
**Regional Parks, Trails
 and Open Space System**



4.3 RIVERFRONT PARK, RECREATION, AND OPEN SPACE SYSTEM

4.3.1 Conditions and Trends

This section describes the riverfront park and open space system in terms of developed parks, habitat parks, and undeveloped public land. The system is very diverse and includes more than just parks and open space. It also includes the Willamette Greenway Trail (discussed in section 4.4 of this chapter) and all of the public and private lands that constitute the system of natural resources in the river corridor (discussed in Chapter 2: Clean and Healthy River).

When discussing Willamette riverfront parks and open spaces, this chapter refers to the following three stretches¹ in figure 4-3 to summarize existing conditions:

- **Northern stretch:** Confluence of the Willamette and Columbia Rivers to the Fremont Bridge
- **Central City stretch:** Fremont Bridge to Ross Island Bridge
- **Southern stretch:** Ross Island Bridge to City boundary

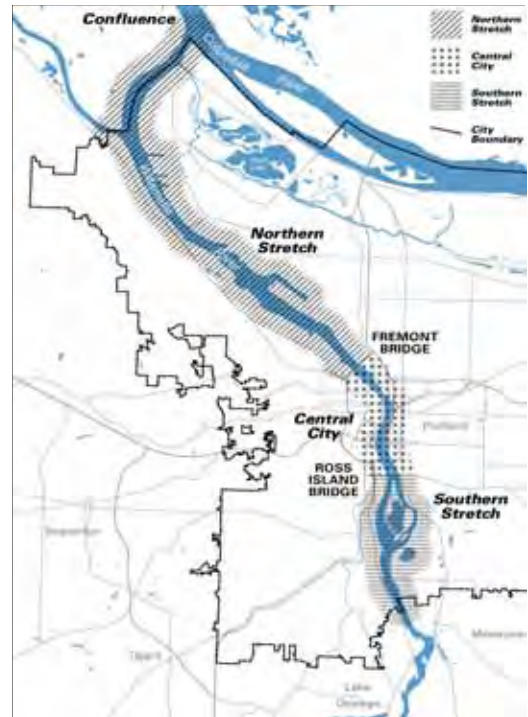


Figure 4-3: Willamette River Stretches

As the region's population grows, more and more people will want to experience the river directly. In evaluating the riverfront park, recreation, and open space system, it will be important to visualize the system as a whole – an assembly of diverse resources and experiences. The central image to sustain and build upon is that of the Willamette River flowing through Portland and supporting a coherent and robust network of interconnected habitats (both human and natural systems). The expansion, planning, design, and management of this integrated system will need to take advantage of opportunities as they arise, without compromising the balance of the whole system.



Developed Park
 (South Waterfront Park)



Habitat Park (Oaks Bottom)



Undeveloped Public Land
 (Cottonwood Bay)

¹ The boundaries were determined using 2000 U.S. Census data for block groups adjacent to the Willamette River within approximately a quarter mile.

Developed Parks on the Willamette River

Developed parks (Figure 4-4) include both publicly and privately owned sites on the Willamette River that are used for recreational purposes. These parks may include walkways, sports fields, tennis courts, picnic facilities, trails, public gathering spaces, and parking.

Figure 4-4. Developed Parks on the Willamette River

Developed Parks	River Stretch	Owner	Linear Riverfront ^a (Miles)	Total Acres	Free Parking	Picnic Tables	Boat Docks	Motorized Boat Launch ^b	Non-Motorized Boat Access ^c	Athletic Facilities
Kelley Point Park	Northern	City	0.6	96.0	Y	Y	0	0	N	N
Cathedral Park	Northern	City	0.2	17.5	Y	Y	1	1	Y	Soccer
McCarthy Park	Northern	Port	0.4	1.0	Y	N	0	0	N	N
Eastbank Esplanade	Central City	City	1.4	6.2	N	N	2	0	N	N
Tom McCall Waterfront Park	Central City	City	1.4	36.6	N	N	2	0	N	Basketball
South Waterfront Park	Central City	City	0.2	6.9	N	N	0	0	Y	N
Willamette Park	Southern	City	0.5	30.4	Y	Y	2	1	Y	Tennis, Softball, Soccer, Horseshoes
Sellwood Park	Southern	City	0	16.4	Y	Y	0	0	N	Basketball, Swimming, Baseball, Softball, Football, Horseshoes
Sellwood Riverfront Park	Southern	City	0.1	8.75	Y	Y	1	0	Y	N
Ira Powers Marine Park	Southern	City	0.8	12.0	Y	Y	0	0	N	N
Liberty Ship Memorial Park	Central City	Private	N/A	0.5	N	N	0	0	N	N
Oaks Amusement Park	Southern	Private	0.4	44.0	N	Y	0	0	N	N

^a Linear riverfront is defined as the length of parkland (in miles) on the riverfront.

^b In addition to the launches noted here, one public motorized boat launch is on the southern end of the Swan Island Lagoon.

^c People also launch non-motorized boats at the end of Spokane Street in southeast Portland and next to Kelley Point Park.

Portland Parks and Recreation also owns Lotus Park on West Hayden Island. The park fronts the Columbia River and comprises approximately 1.1 acres.

Habitat Parks on the Willamette River

Habitat parks (Figure 4-5) are public parks that are primarily natural areas, with trails and/or other modifications to facilitate public access.

Figure 4-5. Habitat Parks on the Willamette River

Habitat Parks	River Stretch	Owner	Linear Riverfront ^a (miles)	Acres
Butterfly Park	Southern	City of Portland	0.4	11.3
Oaks Bottom Wildlife Refuge	Southern	City of Portland	1.6	163.0

^a Linear riverfront is defined as the length of parkland on the riverfront.

Undeveloped Public Land on the Willamette River

Undeveloped public land (Figure 4-6) is not developed and does not have official public access. Some of these properties have significant natural habitat and could be developed as habitat parks in the future.

Figure 4-6. Undeveloped Public Land on the Willamette River

Undeveloped Public Land	Location	Owner	Linear Riverfront ^a (miles)	Acres
Holgate Slough ^b	Southern	Metro	0.4	44.0
Cottonwood Bay	Southern	City of Portland	0.1	0.6
Beach under Fremont Bridge	Northern	Port of Portland	0.2	2.4
Beach area on Swan Island Lagoon	Northern	Port of Portland	0.2	3.3
The Crescent Area under the Hawthorne Bridge (will become a developed park)	Central City	City of Portland	0.2	0.3

^a Linear riverfront is defined as the length of parkland on the riverfront.

^b The Springwater on the Willamette Trail runs through this site, but people do not have access to the areas surrounding the trail or the riverfront.

A century of bold action, foresight, and commitment to Portland's riverfront park and open space system has resulted in a total of 8.6 linear miles (Figure 4-7) and over 460 acres (Figure 4-8) in Willamette riverfront park use (including public developed parks, habitat parks, and public undeveloped land). One-third of these parks contain athletic facilities, one-half provide picnic facilities, and two provide motorized boat ramps.

Figure 4-7. Linear Riverfront in Park Use

River Stretch	Total Linear Riverfront (both sides)	Total Linear Riverfront in Park Use	
Northern	20.4 miles	1.2 miles	6%
Central City	6.8 miles	3.0 miles	44%
Southern	6.8 miles	4.4 miles	65%
City	34.0 miles	8.6 miles	25%

Figure 4-8. Total Acres of Riverfront Park

River Stretch	Total Acres of Riverfront Park
Northern	114.5
Central City	49.7
Southern	298.0
City	462.2

Portland residents use the riverfront park system heavily, especially within the Central City (Waterfront Park/Downtown). In a recent survey by the Gilmore Research Group (Figure 4-9), 72 percent of respondents said they had used Waterfront Park or some other downtown waterfront location in the past year; 30 percent had used Sellwood Riverfront Park; and 27 percent had used Willamette Park. Respondents tend to use parks close to their homes, although respondents from all areas patronize Waterfront Park or other downtown locations frequently.

Although Portland is fortunate to have 25 percent of its riverfront in park use (including public developed parks, habitat parks, and undeveloped public land), certain stretches of the river are used more than others. As Figure 4-10 illustrates, the riverfront north of the Fremont Bridge (northern stretch of the river) has a significantly smaller percent of riverfront dedicated to park use than the Central City and southern stretches of the river. Two-thirds of the riverfront south of the Ross Island Bridge (the southern stretch) is in park use.

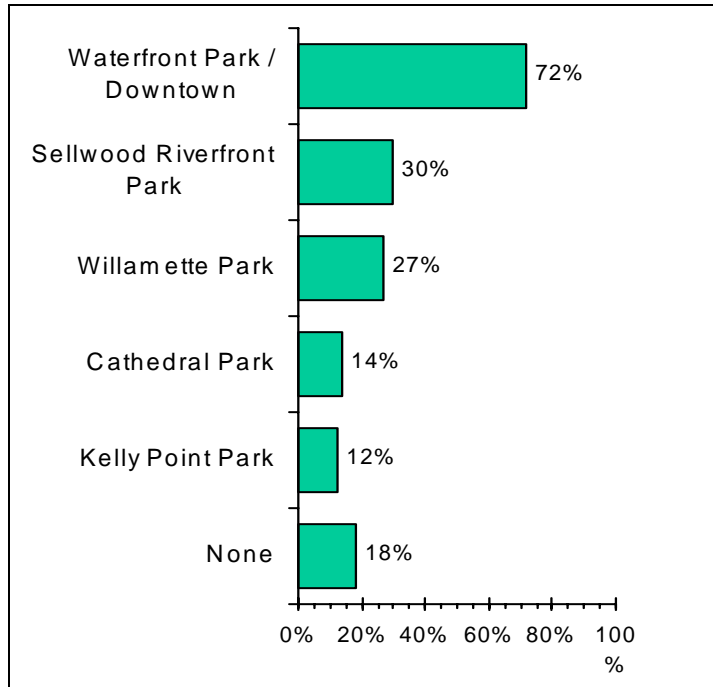


Figure 4-9. The percent of people surveyed who have been to a particular riverfront park within the last year.

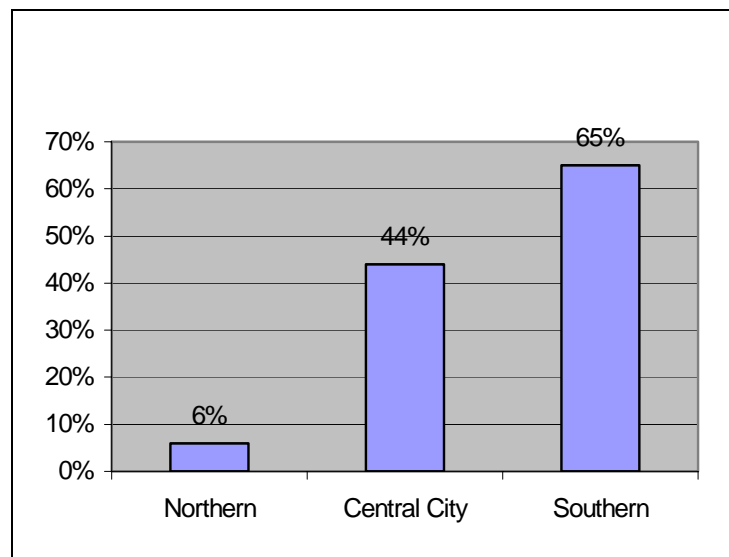


Figure 4-10 Percentage of linear riverfront in park use

4.3.2 Constraints and Opportunities

Figure 4-11 shows sites that could be added to the riverfront park and open space system, and indicates constraints and opportunities.

Figure 4-11. Potential Riverfront Sites to Add to the Park and Open Space System

Site (ownership)	Opportunities	Timeframe	Linear Riverfront	Acres	Constraints
Ross Island (Ross Island Sand and Gravel)	<ul style="list-style-type: none"> Possible environmental/habitat resource. 	2004	3.0 miles	143.0	<ul style="list-style-type: none"> Transfer details need to be worked out. Funding for management has not been identified.
Holman Building (City of Portland)	<ul style="list-style-type: none"> Portland boathouse and dock for light watercraft - kayaks, canoes, rowing shells, dragon boats. 	Open fall 2004	N/A	N/A	<ul style="list-style-type: none"> Army Corps of Engineers permit needed. Parking
Crescent Park (City of Portland)	<ul style="list-style-type: none"> Neighborhood park on Eastside Esplanade 	Timeframe unknown	0.2 miles	3.1	<ul style="list-style-type: none"> Clean-up assessment needed. Construction estimates: \$14M – \$18M. Further design needed prior to construction – schematic plans completed.
McCormick/Baxter (McCormick and Baxter Creosoting Company)	<ul style="list-style-type: none"> Potential for trail and riverside restoration. Park/Open Space use may be in combination with continued industrial use. Large undeveloped site in single ownership. Remediation in process. 	Timeframe unknown	0.4 miles	50.0	<ul style="list-style-type: none"> Superfund site; ongoing remediation, monitoring, and testing. Most uses would require access improvements, estimated to cost in excess of \$5 million. Most uses may create neighborhood traffic.
Willamette Cove (Metro)	<ul style="list-style-type: none"> Environmental/habitat resource Preliminary management plan includes trail recommendations. 	Timeframe unknown	0.5 miles	27.0	<ul style="list-style-type: none"> Clean-up assessment needed.
Centennial Mills (City of Portland)	<ul style="list-style-type: none"> Potential public use / open space that honors the historic relationship of the mill to the working harbor. New connections to the riverfront 	Timeframe unknown	650 feet	4.45	<ul style="list-style-type: none"> Funding. Condition of building may require demolition. Future use is still unclear.
South Waterfront District (Future ownership of riverfront area is unknown at this time)	<ul style="list-style-type: none"> Extension of Greenway Trail to the Central City. The riverfront area will offer bank restoration, a large trail, and places for public viewing and resting. 	Initial phases of bank enhancements and stormwater facilities under construction	1.2 miles	140.0	<ul style="list-style-type: none"> Extensive brownfield issues in northern section. Future ownership of riverfront and mechanisms for funding improvements unknown, but being considered via implementation strategy.

4.4 RIVER ACCESS

4.4.1 Conditions and Trends

River access refers to connections to the river (from neighborhoods and districts); access throughout the river corridor via a continuous trail; and visual access (Figures 4-12 and 4-13). To view this map in color visit www.river.ci.portland.or.us.

Connections to the River and within the System

Getting to the river requires determination—a combination of careful planning, local knowledge, and detailed maps. Highways or freeways, steep topography, and/or industrial development obstruct riverfront access for pedestrians and bicyclists in many places. It is a particular challenge where industrial uses are river-dependent because the riverfront is used for loading and docking. Getting to the river's edge is relatively easy from public parks, but these areas cover a small percentage of the city's 34 miles of riverfront (17 miles on each side of the river). Despite these obstacles, the City of Portland has worked hard to create access to the river. Nowhere is this more evident than in the Central Eastside, where the City opened [the Eastbank Esplanade](#) next to a 10 lane freeway. The Esplanade contains the longest floating walkway in the United States.



The Eastbank Esplanade



The Eastbank Esplanade – Opening Day, May 2001

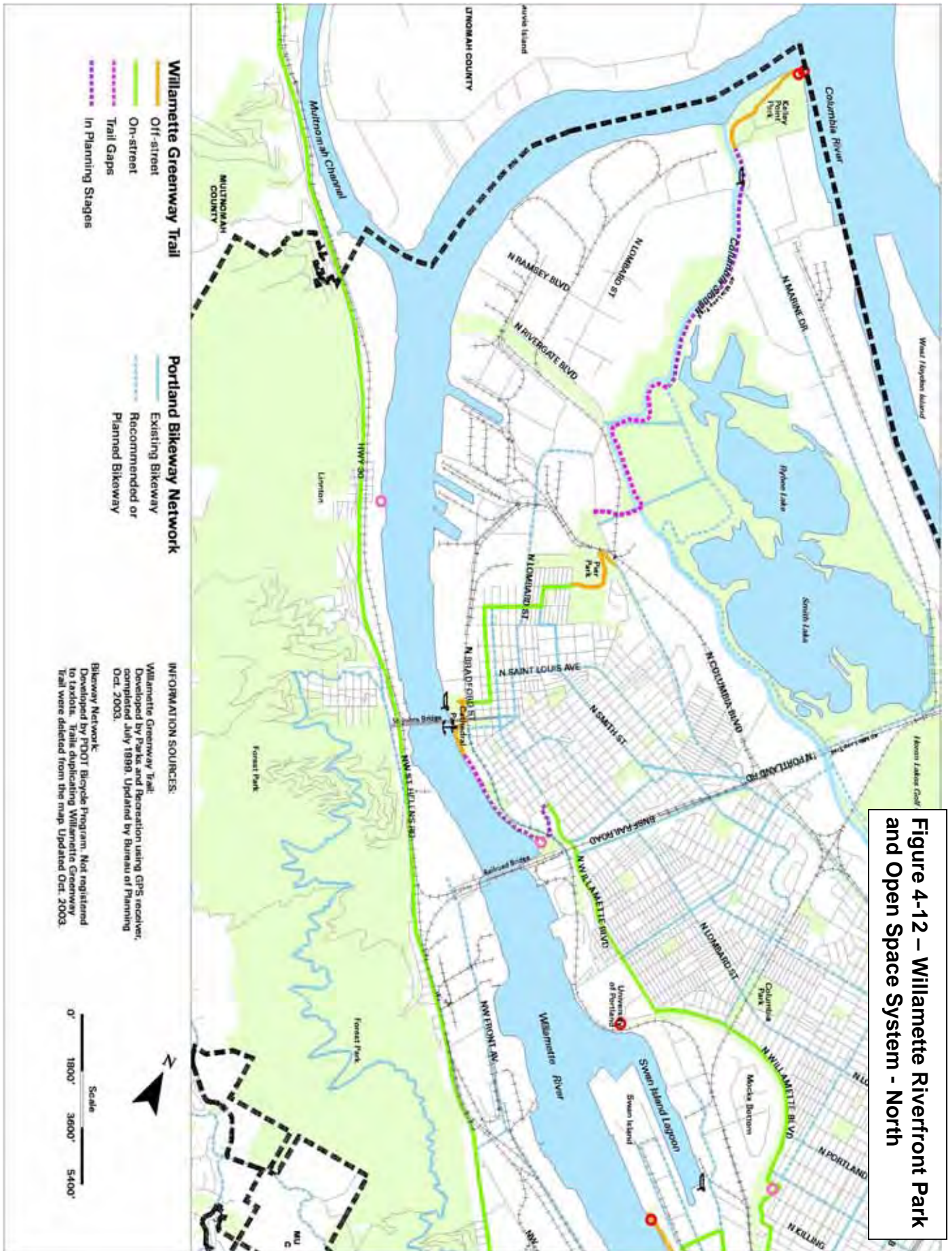


Figure 4-12 – Willamette Riverfront Park and Open Space System - North

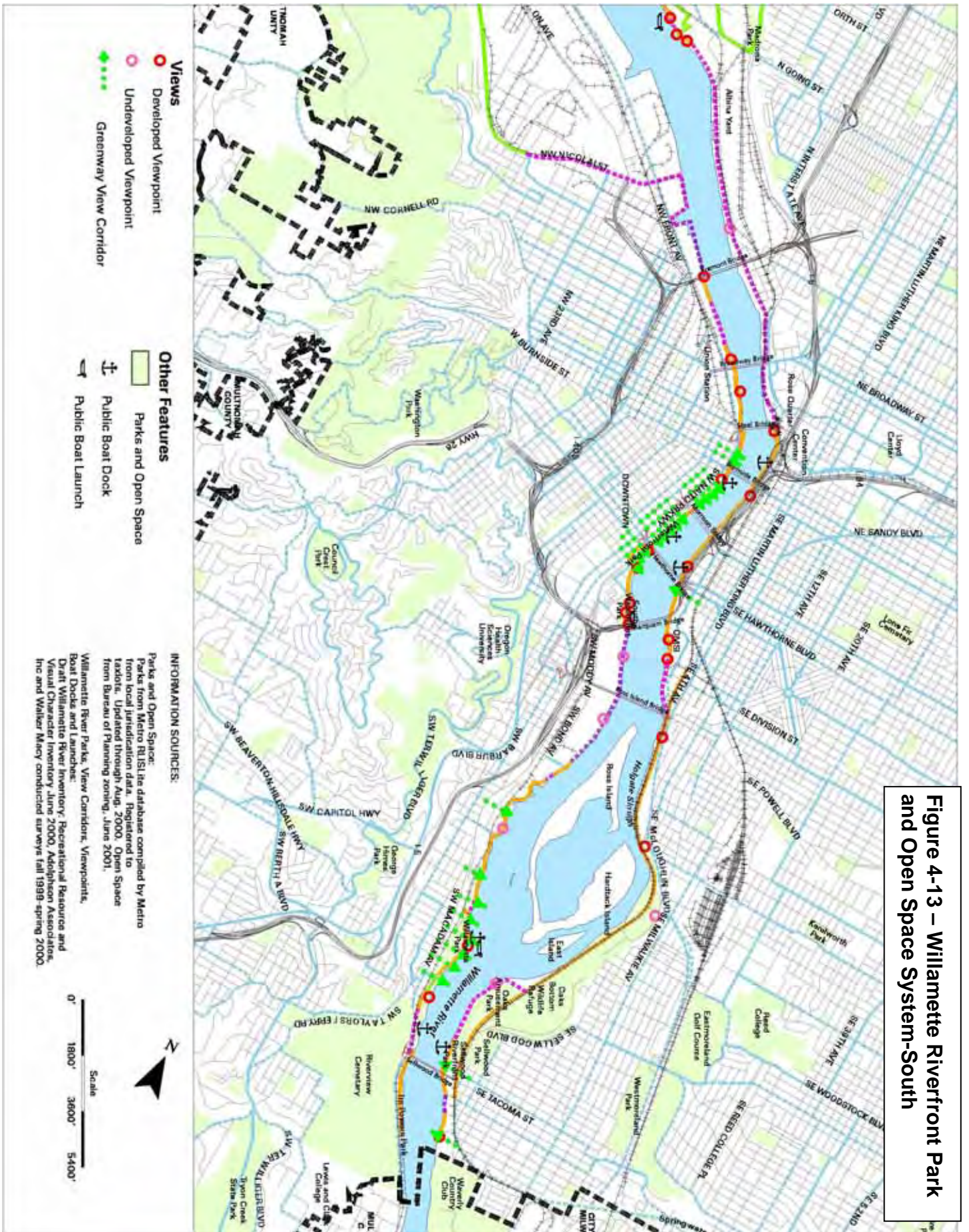


Figure 4-13 – Willamette Riverfront Park and Open Space System-South

Willamette Greenway Trail²

According to the [1987 Willamette Greenway Plan](#), the Willamette Greenway Trail is planned as a 41-mile pedestrian and bicycle trail extending along both sides of the river as a combination of on-street and off-street paths (Figure 4-14). As of September 2003, approximately 31 miles (76 percent) of the trail network had been implemented in accordance with the plan. Two miles (5 percent) are in the planning stages. The remaining trail gaps represent approximately eight miles (19 percent) of the total network. Figures 4-12 and 4-13 show the existing and proposed Willamette Greenway Trail.

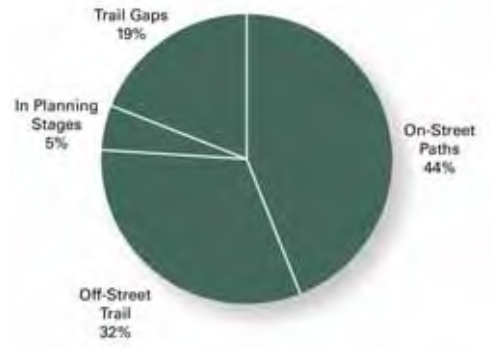


Figure 4-14: Willamette Greenway Trail

Most of the northern half of Portland's riverfront does not have a trail along the river. A bike lane on Highway 30 on the westside of the river is set back from the river to avoid conflicts with river industrial uses. The eastside is similar, with a bike lane on Willamette Boulevard. Relocating the trail to abut the river has been discussed for the North Beach area on the eastside, and opportunities may also exist in other areas. General advantages of riverside trails include the recreational attraction of the river's edge, educational access to the riverfront's built and natural environment, the appeal of a recreational promenade, and minimal traffic conflicts. Principles to consider in the alignment of trails in industrial areas include: locating the trail away from the river's edge where needed to enable river-dependent industrial functions to occur unimpeded;

The Willamette Greenway Trail is planned as a 41-mile pedestrian and bicycle trail extending along both sides of the river.



Bike lane on Highway 30

accommodating access to the river via trail spurs where possible to provide direct river access to the public where a riverfront trail is not feasible; and acknowledging safety and security as critical issues for industry and trail users in the design and alignment of the trail. Trails could also be designed so they do not harm fish and wildlife habitat.

² Chapter 5: Vibrant Waterfront Districts and [Appendix A](#), provide additional information about the Willamette Greenway Trail and regulations within the Greenway Overlay Zones.

Off-Street Trail Standards

The City of Portland does not have a uniform off-street trail standard. The standards that are applied are based on whether the trail is considered a transportation facility (in which case, Portland Office of Transportation standards are applied) or a recreation facility (in which case, Portland Parks and Recreation standards are applied).

Portland Office of Transportation (PDOT) requires a minimum of 12 feet for a shared trail, while Portland Parks and Recreation

(PPR) usually requires a minimum of 10 feet. PDOT's standard of 12 feet is derived by doubling the standard on-street bike lane width of six feet. PPR's off-street trail standards in parks and natural areas are largely designed site by site. Funding and site constraints, rather than prescribed standards, end up guiding the trail design in many cases.



Newly constructed riverfront trail connecting the Central Eastside to the Springwater Corridor Trail. It is approximately 14 feet wide.

PPR tries to provide one accessible route in each park, but not all trails (unless they are federally funded) are built to the Americans with Disabilities Act (ADA) standards.

Access to the Willamette Greenway Trail

The Greenway Trail is easy to access within the city's riverfront parks. However, long segments of the trail outside of the parks are not accessible because freeways, topography, and railroad lines serve as barriers to the river. It is very challenging to reach the trail in the following areas:

- Mocks Crest Neighborhoods above Swan Island
- Central Eastside
- Southeast Bluff neighborhoods
- Southwest Hills/South Waterfront

Integration of the Willamette Greenway Trail with the transportation system can be improved. Trail access to streets and bridges is complicated by the lack of a street grid along most of the river; railroad and freeway barriers; disjointed access to some bridges; and the one-way street system downtown. The Willamette Greenway Plan designates access paths to the Greenway Trail in concentrated locations (such as downtown), but not throughout Portland's entire riverfront. Connections within the system (between riverfront parks and nearby parks) can also be improved. (Figures 4-12 and 4-13 show the existing and proposed bikeways and Willamette Greenway Trail.)

The following graphics illustrate the challenges in accessing the Greenway Trail in the areas listed above.

To view these graphics in color, visit www.river.ci.portland.or.us



Figure 4-15: Access to the Willamette Greenway Trail from Mocks Crest

Mocks Crest Neighborhoods Above Swan Island

- The Greenway Trail is designated as a bike lane on a busy street (Willamette Boulevard).
- The bikelane on N. Going Street (very steep hill) is the only access to the Greenway Trail segment on the river.






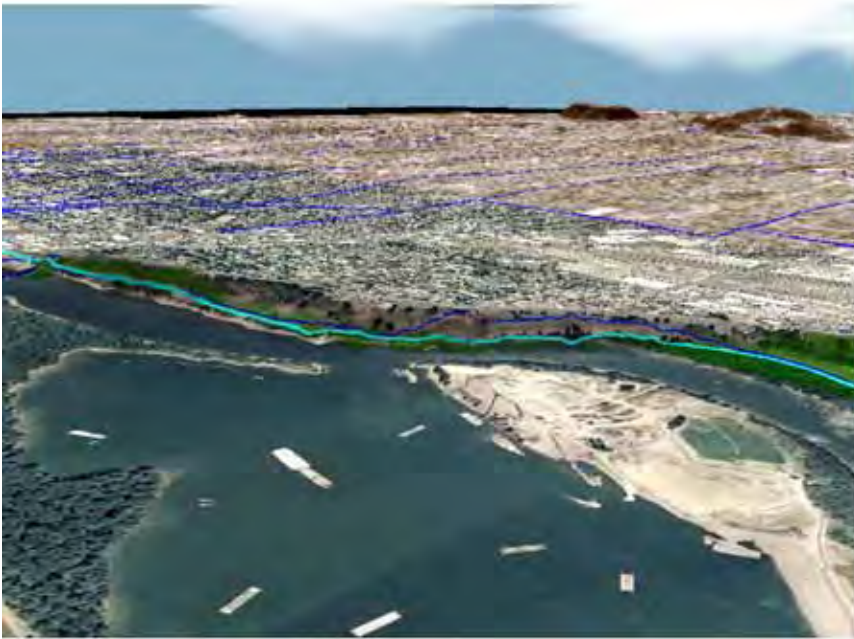
Greenway Trail	
	On street
	Off street
	In Planning Stages
PDOT Bicycle Network	
	Existing Bikelanes
	Parks and Open Space



Figure 4-16: Access to the Willamette Greenway Trail from the Central Eastside

Central Eastside

- The alignment of Interstate 5 and railroad lines along the eastbank of the river prevent access to sections of the Greenway Trail (Eastbank Esplanade).



Southeast Bluff Neighborhoods

- Highway 99 and steep topography prevent access to this section of the Willamette Greenway Trail (Springwater on the Willamette Trail) from the Brooklyn neighborhood.






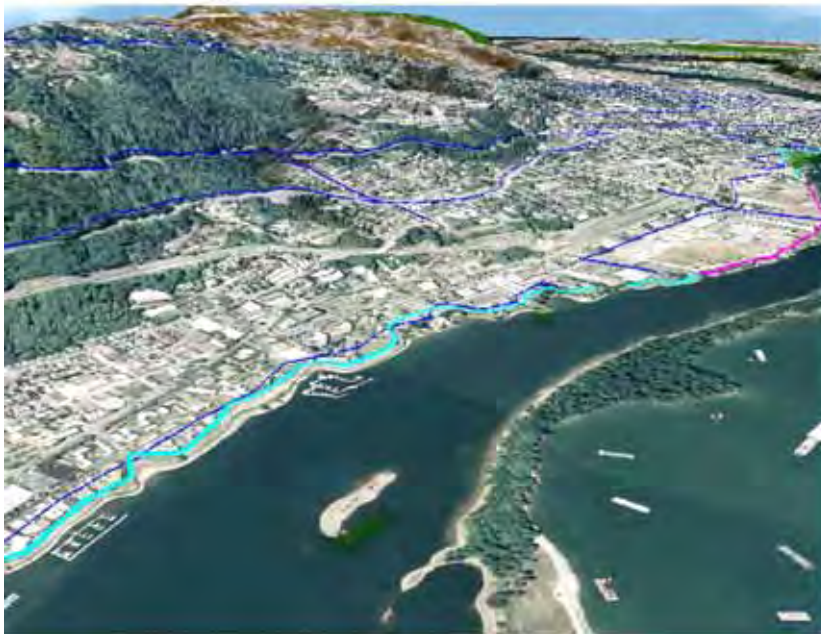
Greenway Trail	
	On street
	Off street
	In Planning Stages
PDOT Bicycle Network	
	Existing Bikelanes
	Parks and Open Space

Figure 4-17: Access to the Willamette Greenway Trail from the Southeast Bluff Neighborhoods



Southwest Hills and South Waterfront

- The alignment of Interstate 5, Macadam Avenue, and private development along the riverfront make access to the Willamette Greenway Trail difficult.

Figure 4-18: Access to the Willamette Greenway Trail from the Southwest Hills and South Waterfront

Visual Access

Viewpoints are public places along the Willamette Greenway Trail that provide resting or stopping points to view the river and surrounding environment. There are 23 developed viewpoints and 10 undeveloped viewpoints along the river (Figures 4-12, 4-13, and 4-15). Most of the developed viewpoints occur in non-industrial areas. Additional viewpoints in industrial areas could be opportunities to highlight the working harbor.

Figure 4-19 Viewpoints along the Willamette Greenway Trail

Stretch of the River	Developed Viewpoints	Undeveloped Viewpoints
Northern	7	2
Central City	14	2
Southern	2	6

4.4.2 Constraints and Opportunities

Figure 4-20 identifies opportunities and constraints related to riverfront access.

Figure 4-20 Constraints and Opportunities - Riverfront Access

Area	Opportunities	Constraints
St. Johns Area	<ul style="list-style-type: none"> • Large riverfront park (Cathedral Park) with motorized boat launch. • Kelley Point Park, St Johns Park, McKenna Park, Portsmouth Park. • Interesting harbor activity to view. 	<ul style="list-style-type: none"> • Rail lines create barrier to the river. • Only one proposed bikeway to the river. • Only one riverfront park (Cathedral Park). • Very few parks within the system.
Linnton/ Highway 30	<ul style="list-style-type: none"> • Potential to connect Kingsley Park, Forest Park, and the Linnton riverfront. • Attractive sandy beach on former industrial site in Linnton. • Interesting harbor activity to view. 	<ul style="list-style-type: none"> • Highway 30 is a barrier between Forest Park and nearby residences and the river. • No riverfront parks. • Greenway Trail is on Highway 30; no river access along entire stretch of river until the Fremont Bridge.
Willamette Bluff/Swan Island	<ul style="list-style-type: none"> • Good connection from Columbia Park to Mocks Crest (potential bluff trail). • Potential to connect Gammans Park and Arbor Lodge Park. • The developed bikeway between the University of Portland and the Columbia Slough could be extended to the river. • Peninsula Trail crossing that connects Smith and Bybee Lakes to the Willamette Greenway Trail (bike lane on N. Willamette Boulevard) could be extended to the river. • Interesting harbor activity to view. 	<ul style="list-style-type: none"> • Only one riverfront park (McCarthy Park), which is difficult to access. • No developed bikeways to the river (few proposed). • Railroad and topography act as barriers to the river. • Only small segment of the trail built at McCarthy Park.
River District	<ul style="list-style-type: none"> • Proposed series of parks along NW 10th will connect to the river via a boardwalk. • New riverfront park and/or public use proposed at Centennial Mills. • New bike lanes to the Broadway Bridge and Steel Bridge. 	<ul style="list-style-type: none"> • Railroad is a barrier. • No bike lanes to the river. • Segments of the trail not built on the river.

**Chapter 4
PORTLAND'S FRONT YARD**

Area	Opportunities	Constraints
Downtown	<ul style="list-style-type: none"> Existing Willamette Greenway Trail on the riverfront. Potential to connect several parks to the river. New Tom McCall Waterfront Park Master Plan that addresses connections between downtown and the river. Completed bike and pedestrian connection between Hawthorne and Steel Bridges. 	<ul style="list-style-type: none"> Access to the riverfront is difficult (must cross Naito Parkway). This will be improved with implementation of the new Waterfront Park Master Plan. No built bike lanes to the river or bridges (bike lanes begin on bridges). User conflicts occur throughout the Willamette Greenway Trail in Waterfront Park.
Rose Quarter	<ul style="list-style-type: none"> Russell Street Improvement Plan will help connect Lillus Albina Park to the river. New bike lanes on Tillamook overpass allow people to get close to the river (riverfront still in industrial use). 	<ul style="list-style-type: none"> Railroad and topography are barriers to the river. No riverfront parks or other parks close to the river. No riverfront trail.
Central Eastside	<ul style="list-style-type: none"> Existing Willamette Greenway Trail (Eastbank Esplanade) on the entire stretch of river. Bike lanes to the bridges. Crescent Park on the riverfront is in planning stages. 	<ul style="list-style-type: none"> No parks within the Central Eastside (except for the Eastbank Esplanade). Railroad and freeway are barriers to the Greenway Trail. Access to the trail is limited. Bike lanes only to the bridges, not to the riverfront. Conflicts between multiple users on the trail.
Southeast Bluff Neighborhoods	<ul style="list-style-type: none"> Two large parks (Oaks Bottom and Westmoreland Park) are well connected to one another. Existing riverfront trail (the Springwater section of the Willamette Greenway Trail) from the Central Eastside to the city boundary. Brooklyn Park. Wildlife viewing. 	<ul style="list-style-type: none"> Highway 99 prevents access to the Greenway Trail (Springwater Corridor Section) Topography limits access down to the riverfront at Oaks Bottom. Tacoma Street is difficult to cross. Conflicts between natural resource protection and human activity.
Southwest Riverfront	<ul style="list-style-type: none"> South Waterfront Plan will develop a system of well-connected parks within the area (6.5 acres). Large section of built trail on the riverfront (20 acres of riverfront area). Connects to large riverfront park (Willamette Park). Wildlife viewing. 	<ul style="list-style-type: none"> Macadam and Interstate 5 are significant barriers. No parks between South Waterfront Park and Willamette Park. Many private developments on the riverfront that prevent access. Willamette Greenway Trail south of Riverplace is a little narrow and highly used. Conflicts between natural resource protection and human activity.

4.5 WATER-BASED RECREATION

4.5.1 Conditions and Trends

For many people, Portland's riverfront parks provide the only access to the Willamette River for water-based recreation. Portland residents and visitors from around the region use riverfront parks heavily, especially during the summer and warm weather. As the region's population grows, the demand for water-based recreation will increase. Additional space will be required for recreational activities such as boating, fishing, and wildlife observation, and for facilities

such as docks, launching points for canoes and kayaks, fishing access, and swimming or wading areas.

Boating

A recent survey³ by the Gilmore Research Group revealed that 48 percent of the people interviewed were out on a boat on the Willamette River in Portland at some time during the last five years (Figure 4-21). People who live within two blocks of the Willamette are significantly more likely to have been out on a boat than those who do not live as close to the river's edge (63 percent versus 45 percent).

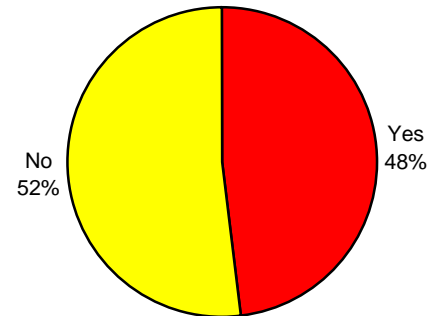


Figure 4-21: Boating on the Willamette River. Have you been on the Portland section of the Willamette River in a boat in the past five years?

Fishing is the predominant recreational boating use. Other uses include personal watercraft, waterskiing, and cruising. There is very little information about the use of non-motorized boats (canoes and kayaks). The Gilmore Research survey indicated that seven percent of the people interviewed use canoes/kayaks on the river, and 20 percent of those interviewed said they would like to use canoes/kayaks more often.

Commercial Boating

There are a limited number of commercial boating opportunities on the Willamette River in Portland. The Portland Spirit, Willamette Jet Boat Excursions and the Sternwheeler Rose offer daily cruises. The Oregon Maritime Museum, housed on the Steamer Portland at Tom McCall Waterfront Park, allows people to learn about Portland's maritime history but it does not take people out on the river. The Willamette Ferry, which operates free to the public during the month of August, circulates throughout the central city.

Boat Launching Areas

Figures 4-12 and 4-13 show the existing public boat launching areas in Portland along the Willamette River. Figure 4-3 shows the launching areas along the Columbia River. Boat launching areas provide access for the public to launch boats or other watercraft into the Willamette River. There are three publicly owned motorized boat launch sites on the Willamette River: Cathedral Park, Swan Island Lagoon, and Willamette Park. There is only one motorized launch along the Columbia River in Portland. In addition to these sites, non-motorized boats such as canoes and kayaks can launch at McCarthy Park, South Waterfront Park, and the Columbia Slough. People also use public docks and informal non-motorized launching areas such as the one on Port of Portland property next to



Boat Launch at Willamette Park

³ Gilmore Research Group. September 1999. "Portland Citizens and Individual Efforts To Improve Local Water Quality."

Kelley Point Park and one at SE Umatilla Street. Privately owned motorized boat launches (Staff Jennings and Fred's Marina) provide additional places for the public to launch motorized boats and other watercraft for a fee. Figure 4-22 shows the use days for the five motorized boat launches in Portland.

Figure 4-22. Use of Motorized Launch Sites along the Willamette River in Portland between September 2000 and October 2001

Launch Site	Use Days*	Fishing		Personal Watercraft		Water Skiing		Cruising	
		Days	%	Days	%	Days	%	Days	%
Cathedral Park	13,371	11,911	77	176	1.1	946	6.1	2,433	15.7
Fred's Marina	1,224	143	11.7	1,081	88.3	-	-	-	-
Swan Island Ramp	20,537	5,316	60.6	-	-	68	0.8	3,386	38.6
Staff Jennings Ramp	466	203	43.5	135	29.0	-	-	129	27.6
Willamette Park	15,140	6,686	41.3	1,216	7.5	4,511	27.9	3,772	23.3

* Use Days = the number of days a boat was launched from a particular site between September 2000 and October 2001. If a boat was launched more than once in a day, it was only counted as one. The combined use days for fishing, personal watercraft, water skiing, and cruising days do not always add up to the total use days because a boat could engage in more than one activity per day.

Source: Oregon State Marine Board 2002 Triennial Survey based on data from October 2000 – September 2001.

Docks/Marinas

Figures 4-12 and 4-13 show the eight City-owned facilities where the public can dock boats or other watercraft along the Willamette River. These sites are often used to launch non-motorized boats as well. They are located at Cathedral Park, Waterfront Park (one on SW Ankeny Street and one at SW Salmon Street), the Eastbank Esplanade, SE Madison Street, Willamette Park, Sellwood Riverfront Park, and Butterfly Park. The dock at SW Salmon Street, owned by the Portland Parks and Recreation, is leased to the Portland Spirit and does not allow public docking. Other privately owned docks in Portland provide additional places for the public to dock.

4.5.2 Constraints and Opportunities

The increase of motorized and non-motorized boat use on the Willamette River raises questions about regulating boat use. Non-motorized boaters often choose to paddle in less-congested areas, such as the Holgate Channel and Columbia Slough. Areas off the main channel provide many opportunities for wildlife viewing. This often conflicts with motorized boaters who may be using the area for more active uses, such as water skiing or jet skiing.

According to the Oregon State Marine Board (OSMB), boating is projected to be more and more popular. OSMB already singles out the Portland metropolitan area as having a short supply of boat ramps. On summer weekends, boaters wait an hour or more at some ramps. As demand for river access increases, more watercraft access points will be needed.

A thorough study and public involvement process focusing on water-based recreational uses along the Willamette River is needed. Public enjoyment of fishing, motorized and non-

motorized boating, and even swimming is apparent from basic observation and limited survey reporting. However, the future addition and locations of facilities for these water-based activities will require additional cooperative planning and analysis.

4.6 NATURAL RESOURCES

4.6.1 Conditions and Trends

Portland's riverfront park and opens space system is part of the city's larger natural resource system.⁴ Healthy functioning ecosystems are a fundamental building block for achieving both a revitalized river and memorable recreational experiences. Portland's commitment to salmon recovery and improved water quality requires riverfront space. Land is also needed to meet a variety of recreational needs. As the future unfolds, it will be necessary to design and maintain parks, open spaces, and trails in ways that successfully accommodate both recreational uses and natural resource functions.

Healthy functioning ecosystems are a fundamental building block for achieving both a revitalized river and memorable recreational experiences.

4.6.2 Constraints and Opportunities

More people and multiple uses can result in conflicts with natural resources that will become more frequent and intense as recreational demand increases. Managing recreational use to ensure and improve the environmental health of the Willamette River can be achieved by balancing development actions and interventions with natural resource and watershed goals. A number of approaches and opportunities can be used to achieve this, as shown on Figure 4-23.

Figure 4-23 Integrated Management of Riverfront Open Space

Objective	Opportunities/Approaches
Devise and implement an integrated and holistic management approach that applies at the regional, city, and site-specific scale.	<ul style="list-style-type: none"> • Satisfy multiple objectives when redesigning or developing parklands. • Design riverfront parks to reflect their riverfront location. • Respond to specific environmental conditions at each park site. • Incorporate principles of sustainable design.
Protect, restore, and enhance functioning riparian ecosystems and still meet growing river recreational demands.	<ul style="list-style-type: none"> • Stormwater collection and treatment can be used to create additional park amenities. • Ensure sufficient buffering between high-impact facilities and sensitive natural systems. • Plant native vegetation communities where appropriate. • Continue to implement and refine the Integrated Pest Management Program.
Design riverbank planting to serve as a transition from	<ul style="list-style-type: none"> • Use native species for riverbank plantings.

⁴ Chapter 2: Clean and Healthy River, addresses natural resource conditions and trends.

**Chapter 4
PORTLAND'S FRONT YARD**

Objective	Opportunities/Approaches
in-water to upland functions.	<ul style="list-style-type: none"> • Design access to the river in keeping with watershed and river health objectives.
Refine the concept for riverfront parks to meet multi-objective management goals for recreation, water quality, and natural resource protection.	<ul style="list-style-type: none"> • Improve habitat values at parks while improving recreational experiences. • Minimize public access to protect habitat areas that serve as a refuge for wildlife. • Manage recreational use of the river to ensure and improve water quality. • Promote and support programs for a swimmable Willamette River. • Make maintenance, monitoring, and habitat protection practices visible as a way to educate people about the complexities of natural resource and recreation management.

4.7 PLACES CONNECTED TO PORTLAND'S RIVERFRONT HISTORY

4.7.1 Conditions and Trends

Portland owes its existence to the Willamette River, and several locations throughout the river corridor celebrate this relationship through landmarks, interpretive signs, and public art.

Historic Landmark Properties

The City of Portland completed a citywide inventory of historic properties, which is compiled in the *Historic Resources Inventory* (Bureau of Planning, 1988). Figure 4-24 shows historic landmark properties near the Willamette River, designated either through the City or the National Registry. Figure 4-25 shows properties near the river that have been given a Rank 1 designation in the *Historic Resources Inventory*, based on criteria such as design/construction, rarity, integrity, and environment. The inventory designates properties with less historical significance as Rank 2 and Rank 3.

Figure 4-24 Historic Landmark Properties near the Willamette River

Property	Location
St. Johns Episcopal Church	8039 SE Grand Avenue, Sellwood Moreland neighborhood. Built in 1851. Maintained as a City park property.
Hawthorne Bridge	Located in the Central City. Built in 1909-10.
Visitors Information Center	1021 SW Front Avenue, located within Waterfront Park, Downtown neighborhood. Built in 1949.
University of Portland school building	5000 N. Willamette Boulevard, University Park neighborhood. Built in 1891.
St. Johns Bridge	6900 N Philadelphia Avenue, Cathedral Park neighborhood. Built in 1931.



Oaks Amusement Park



Steel Bridge

Figure 4-25. Rank I Properties Near the Willamette River

Property	Location
Oaks Amusement Park	5 SE Spokane, Sellwood Moreland neighborhood. Began operation in 1905.
Union Pacific Smokestack	3000 N Interstate Avenue. Built in 1887.
Steamer Portland II	Currently docked at Tom McCall Waterfront Park. Features: Sternwheeler with seven rudders; 219 feet long; two 900-horsepower steam engines. Built in 1947.
Office building	Located at 7900 NW St. Helens Road. Built circa 1920.
Steel Bridge	Located in the Central City. Built in 1912.

Historic Districts

The Yamhill and Skidmore Fountain/Old Town Historic Districts in the Central City (Figure 4-26), known for their large collection of mid- to late-19th century buildings, have historic relationships with the Willamette River that have not been reinforced through art, design, or interpretive signs.

Archaeological Sites

The State Historic Preservation Office (SHPO) has no record of archaeological sites along the Willamette River in Portland. SHPO archaeologist Dr. Leland Gilson commented that conducting an archeological inventory along the Willamette River in Portland would probably be very difficult, if not impossible, because the riverfront has been so urbanized. He added that the mainstem of the Lower Willamette may have contained few sites anyway, because annual flooding (before the flood-control measures of recent decades) covered a relatively large area.



Figure 4-26 Historic Districts

Interpretive Signs and Artwork

Embracing the river as Portland's front yard includes installing interpretive signs and artwork to make the river an interesting place to visit. Figure 4-27 identifies interpretive signs and artwork along the Willamette waterfront.

Figure 4-27. Interpretive Signs and Artwork along the Willamette Waterfront

Location	Signs/Artwork
Cathedral Park	History Wall
Swan Island	<p><u>Interpretive Signs</u></p> <ul style="list-style-type: none"> • "From Island to Peninsula: The Swan Island Story." Illustrations show the island as it was, as it evolved through channel development and filling, as an airport, and with its causeway connecting it to the mainland. • "Natural Riverbank Habitats in Urban Industrial Areas" describes the island, what Lt. Wilkes found in the 1830s, and how the island changed into an urban industrial area.
McCarthy Park	<p><u>Interpretive Signs</u></p> <ul style="list-style-type: none"> • "Portland's Shipbuilding History: From Wood to Steel" traces Swan Island and Portland's long connection with shipbuilding, from the launching of the first Star of Oregon in 1840 to World War II shipbuilding and development of the Portland Shipyard and Dry Dock 4. • "Portland's Harbor: A Historic Journey" depicts the blossoming of Portland as a seaport, from the discovery of the Columbia River to establishment of the Port of Portland and creation of the Swan Island Airport.
Tom McCall Waterfront Park	<p><u>Interpretive Signs:</u></p> <ul style="list-style-type: none"> • "Welcome to the Willamette River" • "The Clearing" • "Ferries" (James Stephens) • "The Flood Wall" • "Willamette River Cleanup" • "Governor Tom McCall" <p><u>Memorials</u></p> <ul style="list-style-type: none"> • The Battleship Oregon Memorial was built in 1956 to honor an 1893 ship. It was nicknamed "the Bulldog of the United States Navy" and fought in many famous battles before it was retired from service. On July 4, 1976, a time capsule was sealed in the base of the memorial. The time capsule is to be opened July 5, 2076. • The Founders' Stone honors Portland's founders, William Pettygrove and Asa Lovejoy, who tossed a coin to decide whether their new town would be named Boston or Portland. • The Japanese American Historical Plaza Bill of Rights Memorial was built in 1990 to remember the many contributions of the Japanese American people in Oregon and the withdrawal of their rights during World War II.
Eastbank Esplanade	<p><u>Public Art</u></p> <ul style="list-style-type: none"> • Echo Gate: Located underneath the Morrison Bridge, the Echo Gate gives human scale to this immense site. The sculpture echoes the erased pier buildings and Shanghai tunnels of Portland's past. • Ghost Ship: A glowing lantern against a grey sky, the Ghost Ship pays homage to the many ships that have come through Portland and the ones that have gone down in crossing the Columbia River Bar. • Stack Stalk: Part smoke stack, part sheaf of wheat, the Stack Stalk is a beacon holding a Japanese glass fishing float from the coast up to the sky. • Alluvial Wall: Interwoven layers of sediment and erosion, the Alluvial Wall is an echo of the natural shape of the river before Portland was Portland. • Map of the Willamette River imbedded in the sidewalk in front of the Fire Station. <p><u>Interpretive Panels</u></p> <p>Seven story themes of the interpretive panels chronicle the history and evolution of the</p>

Location	Signs/Artwork
	riverfront and provide a framework for considering the environmental and urban choices that affect the city and the life of the river. Story themes include Transportation, Commerce, Eastside and Westside Development, Bridges, and Ecology of the River. Each interpretive panel tells its story from the most advantageous location or viewpoint along the trail, where the subject can be directly observed or best understood.

4.7.2 Constraints and Opportunities

Figure 4-28 identifies constraints and opportunities related to places with a unique history along the Willamette River.

Table 4-28. Constraints and Opportunities - Historic Resources

Location	Opportunity	Constraint
Central City	Oregon Maritime Museum on the Steamer Portland	
Northern Stretch	Linnton Plywood building. Interpretive signs of harbor-related industry (that reinforce the connections between the river and Portland's development and economy).	Lack of access to the river.
River Corridor	Willamette Steamboat landings at: Bybee Lake Linnton St. Johns Mock's Landing Central Eastside Ross Island Sellwood	Difficult to tell the river's stories in a visually compelling and cohesive way.
Southern Stretch	Infrastructure from ship-building industry.	

4.8 SYSTEM NEEDS

In summary, the following are needed to improve the function and vitality of the river as Portland's front yard:

- ◆ Completion of an interconnected system of parks, trails, and natural open spaces across and along the Willamette River and its tributaries, including a continuous trail throughout the river corridor.
- ◆ Acquisition and partnerships that will add to the current assembly of parks, trails and natural areas along the Willamette River and its tributaries.
- ◆ Expanded and improved river access and visual links from city neighborhoods to the river's edge and the riverfront open space system.
- ◆ Water-related recreation facilities that are based on an assessment of user needs and are designed to protect healthy river functions and avoid potential conflicts with the viability of industrial uses.
- ◆ Landmarks, interpretive signs and public art along the riverfront to celebrate Portland's historic relationship with the Willamette River.

REFERENCES

Bureau of Planning. 1987. *Willamette Greenway Plan*.

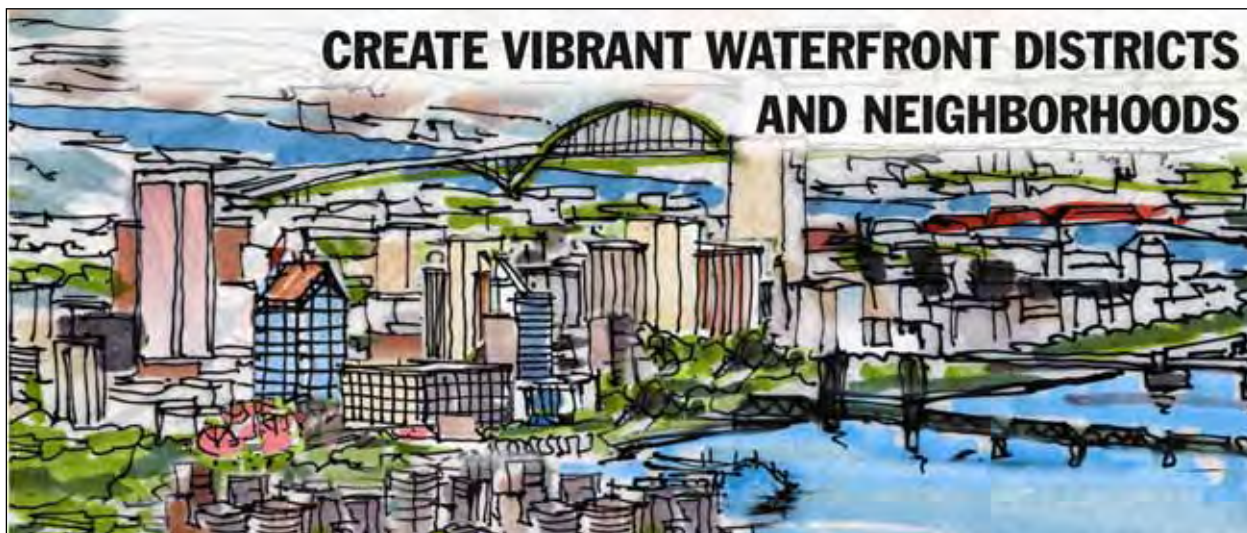
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United States Government Bureau of Census. 2003. *Decennial Census of Population*.

River Renaissance Vision:



5.1 INTRODUCTION

This chapter discusses the waterfront districts and neighborhoods along the Willamette and Columbia Rivers within Portland (Figure 5-1). In 2000 there were approximately 5005 residents living within a half-mile of the Columbia River and over 12,500 residents living within a mile. Approximately 75,000 residents lived within a half-mile of the Willamette River and 156,000 residents lived within a mile. By 2020, the number of people living within a mile of the Willamette and Columbia Rivers could increase to well over 230,000.

Portland's waterfront districts and neighborhoods have a varied nature and include:

- Large parts of the Central City.
- Areas such as St. Johns that grew up with nearby riverfront industries.
- Neighborhoods that overlook the river from its bluffs.
- The fastest-growing residential neighborhood in the city (the River District/Pearl District) and the region's center of office employment (Downtown).
- A unique boating community on the Columbia River (Bridgeton and Hayden Island).
- Floating home communities on the Willamette River.

The Portland Harbor, the marine terminals and industrial businesses discussed in Chapter 3 should be considered vibrant as well but this chapter only refers to commercial and residential districts and neighborhoods.

5.1.1 Why are Vibrant Waterfront Districts and Neighborhoods Important?

Portland’s waterfront districts and neighborhoods build and help sustain connections between the Willamette and Columbia Rivers, the city’s neighborhoods, and the region. Certain districts already pulse with energy and activity. A few of the waterfront neighborhoods have river views and access. While these areas have been subtly influenced by their waterfront locations, they have the opportunity to become truly vibrant waterfront districts and neighborhoods. In vibrant

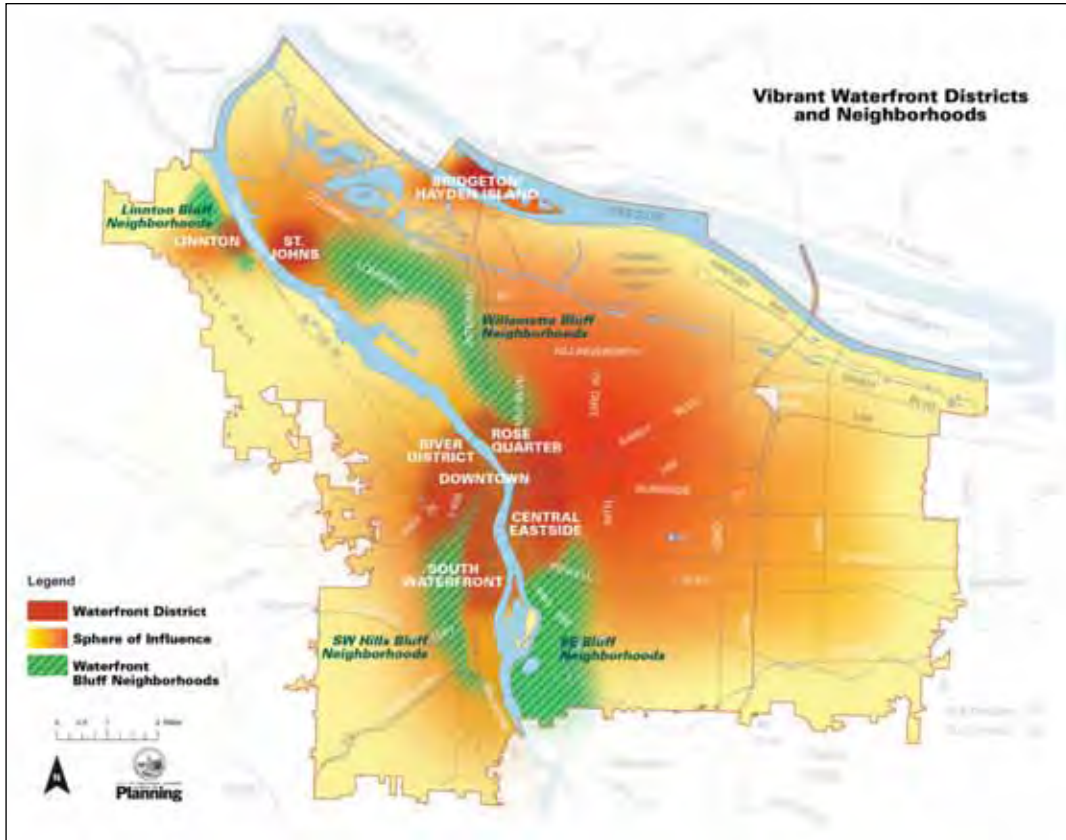


Figure 5-1: Vibrant Waterfront Districts and Neighborhoods -to view this map in color visit www.river.ci.portland.or.us

waterfront districts and neighborhoods, the river shapes urban design and creates an identity that incorporates sustainability. The riverfront offers public amenities to attract visitors, residents, and employees. Within these areas, people realize the value of the river for generating investment and development.

A key strategy for achieving vibrant waterfront districts and neighborhoods is to modify the orientation of the built environment along the river's edge. Riverfront development sites can provide powerful opportunities to create a unique setting that combines the attributes of the built and natural environments. These sites should take advantage of river views, the pastoral aesthetic associated with riparian vegetation, and opportunities to connect private development to the regional network of public trails and bikeways. These sites can also incorporate sustainable development practices to the long-term benefit of property owners and adjacent river resources.

In the Central City, vibrancy means using the river to promote new riverfront commercial and residential development and to link development on the east and west banks. The river should serve as a focal point for new development. The riverfront can also play an important civic role as a site for public attractions and institutional uses, as well as for festivals, regattas, and other events that use and celebrate the river.

Regional Context

In the late 1990s, the Metro regional government established a [2040 Growth Concept](#) that directed local governments to zone the Central City, regional centers, town centers, and main streets for mixed use development (Figure 5-2). These areas can be characterized as follows:

Riverfront development sites can provide powerful opportunities to combine the attributes of the built and natural environments.

The Central City

Portland is the region's employment and cultural hub centered on the Willamette River. It has the most intensive form of development for both housing and employment, with high-rise development common in the central business district.

Town Centers

Town centers provide localized services to tens of thousands of people within a two- to three-mile radius. Town centers have a strong sense of community identity and are well served by transit. St. Johns is a riverfront town center that serves as a hub linking the neighborhood's residents and visitors to employment, shopping, trails and recreation opportunities. Lents is a town center located on Johnson Creek in Portland.

Regional Centers

As centers of commerce and local government services serving a market area of hundreds of thousands of people, regional centers become the focus of transit and highway improvements. There are no regional centers located on the Willamette or Columbia Rivers.

Main Streets

Main streets, similar to town centers, have a traditional commercial identity, but are on a smaller scale with a strong sense of the immediate neighborhood. Several main streets on Portland's eastside could facilitate access to the river and to other districts.

Many of the Metro 2040 Concept designations in Portland are also waterfront districts. These include:

- The Central City (includes the Rose Quarter, River District, South Waterfront, Central Eastside, and Downtown waterfront districts).
- St. Johns, Lents, Hillsdale and West Portland Town Centers. The latter three are located on tributary streams.

5.1.2 How This Chapter Is Organized

Following this introduction, this chapter is divided into the following sections:

Section 5.2 addresses the **Riverfront**—the area between the riverbank and developed land.

Section 5.3 addresses the waterfront districts and neighborhoods **within the Central City**: the River District/Pearl District, Downtown, Riverplace, and South Waterfront on the westside, and the Rose Quarter/Lower Albina and Central Eastside on the eastside.

Section 5.4 addresses the waterfront districts and neighborhoods **outside the Central City**: St Johns, Linnton, Willamette Bluff, Southeast Bluff, Southwest Riverfront, and Bridgeton/Hayden Island.

Section 5.5 addressed waterfront districts and neighborhoods along streams that lead to the Willamette River, including Lents, Hillsdale, and West Portland Town Centers.

Each section presents existing conditions and trends; describes constraints and opportunities related to the topic; and identifies what is needed to achieve a system of vibrant waterfront districts and neighborhoods.

Figure 5-2 The Waterfront Districts and Neighborhoods Map illustrates the waterfront districts and neighborhoods on the Willamette and Columbia Rivers and their tributary streams within the region. Figure 5-2 includes:

Waterfront Districts / Neighborhoods

Waterfront districts and neighborhoods are areas located on the Willamette and Columbia Rivers and their tributaries.

Parks and Open Space

The Parks and Open Space information includes all of the public parks and open spaces in the metro region.

Main Streets

The Main streets illustrated have a traditional commercial identity but are on a smaller scale with a strong sense of the immediate neighborhood. They have the potential to facilitate access to the river, streams and to other districts.

Map Sources:

Waterfront Districts: subset of Metro 2040 Centers, 2002.

Open Space: Metro RLIS data, 2003.

Main Streets: Metro 2040 Main Streets, 2002.

Streams: Bureau of Planning, 2004.

Figure 5-2
**Waterfront Districts
 and Neighborhoods**



Vibrant Waterfront Districts

5.2 THE RIVERFRONT

The Riverfront, the area between the riverbank and developed land, can become an exceptional amenity for new waterfront development. It can also buffer the river and create the opportunity for a citywide amenity in the form of a trail. This section discusses the change in thinking regarding the riverfront's role in vibrant waterfront districts. This change in thinking is illustrated by a comparison of the [1987 Greenway Plan](#) and the newly developed [2003 South Waterfront Plan](#). Chapter 4: Portland's Front Yard, provides additional information about the Greenway Trail, riverfront parks, and open space. Appendix A provides a more detailed look at the regulations for this area.

5.2.1 Conditions and Trends

The Willamette Greenway Plan

Portland City Council adopted the [Willamette Greenway Plan](#) in 1987. The plan was developed to implement [Statewide Planning Goal 15](#), which seeks to “protect, conserve, enhance, and maintain the natural, scenic, historic, agricultural, economic and recreational qualities of lands along the Willamette River as the Willamette River Greenway.”

The Willamette Greenway Plan defines the various greenway overlay zones; identifies locations for public trails, viewpoints, and view corridors; and creates a strategy to build these improvements. It also includes standards and design guidelines for development within the Willamette Greenway overlay zones. The regulations covering development within the Willamette Greenway are primarily in [Chapter 33.440](#) of the Portland Zoning Code: Greenway Overlay Zones. The code defines five types of greenway overlay zones (see [Appendix A](#)) and addresses allowable uses and development standards such as minimum setbacks, maximum floor area ratios, landscaping, trails, and public viewpoints.

Each greenway overlay zone is described in three parts:

1. **Riverward of the greenway setback area** (top of bank) is an environmental area set-aside to protect and enhance natural functions and water quality. Development within this area is limited to uses that need direct access to the river or shoreline.
2. The **greenway setback area** extends landward from the top of bank 25, 50, or 200 feet, depending on the greenway overlay zone and the slope of the land. The setback area for residential/commercial uses is 25 feet from the top of the riverbank. In the River Industrial Greenway Overlay Zone the setback area is limited to river-dependent and river-related uses. In other greenway overlay zones, the setback area allows public access in the form of trails and viewpoints and landscape improvements to enhance its natural and scenic quality. The setback area in the River Water Quality Overlay Zone limits and mitigates the impact of development to improve water quality.
3. **Landward of the greenway setback area** is where development can occur.

The South Waterfront Plan

City Council adopted the South Waterfront Plan in November 2002 as part of the Central City Plan District. The South Waterfront riverfront is regulated through a set of regulations specific to the design issues in that area. These regulations call for a wider greenway setback area, averaging 100 feet, and provide more detailed standards for trail development and landscaping. The Bureau of Parks and Recreation is currently creating a master plan that will provide a more detailed design and implementation strategy for the riverfront.

In the adopted South Waterfront Plan, the area between the river and the development (Figure 5-3) comprises the following three parts:

1. **Ecological Area.** This area is located between the river edge and 45 feet inland of the top of bank. The South Waterfront regulations for this area call for the highest planting standards and the lowest level of public access. The required treatment of this area reflects Portland's aspiration to achieve a healthy river and healthy watersheds in the urban environment. The treatment is also based on the City's current understanding of riparian and floodplain ecosystems of large, low-gradient rivers, including channel dynamics, water quality, fish/aquatic habitat, and wildlife habitat.

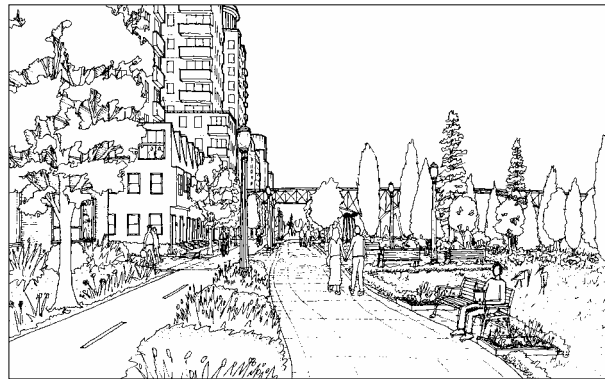


Figure 5-3: Recently Adopted South Waterfront Plan: River/ Ecological Area / Trail and Public Access Area/ Activity Area

2. **Trail and Public Access Area.** This area is approximately 30 feet wide and is located between the ecological area and the activity area. It is the portion of the setback where trails and other forms of public access are most appropriate. In response to the expected high trail use by all types of users, the plan calls for separate trails for pedestrians and cyclists. This separation will provide the opportunity to diversify trail alignments and landscaping, as well as opportunities to manage stormwater.
3. **Activity Area.** This area is approximately 25 feet wide and is designed to transition between the landscaped trail and public access area and more developed uses. For housing, the activity area will provide opportunities for patios, gardens, outdoor recreation, and connections to the trail. For businesses, the activity area will provide a place for terraces, café tables, and other activities that can complement and animate the trail and public access area. A limit on impervious pavement will contribute to water quality functions, which are important in areas close to the river.

Development Activity on the Riverfront

Between 1996 and 2003, Portland's Bureau of Development Services processed approximately 138 greenway reviews, an average of 17 per year. These reviews included small changes to

facilities within the greenway overlay zone, as well as more major changes of use or development. Some of the larger projects reviewed in this period included the Avalon Hotel in Johns Landing, a new residential tower in South Waterfront, the new Springwater on the Willamette Trail, and the new Freightliner wind tunnel.

5.2.2 Constraints and Opportunities

A comparison between the 1987 Willamette Greenway Plan and the 2002 South Waterfront Plan illustrates how the City's thinking has changed over the past 17 years.

Constraints of the 1987 Willamette Greenway Plan

- The Willamette Greenway Plan reflects science that is nearly two decades old. It does not reflect current understanding of the river's hydrology, habitat, water quality, and biological communities.
- The plan contains outdated trail standards that are inadequate for the increasing number of users and user modes on the river.
- Some citizens have expressed dissatisfaction over recent waterfront projects. In recent projects such as the Avalon Hotel and the proposal for Terminal 1 South, the developed riverfront provides minimum setbacks and limited civic space. Other issues include the scale and aesthetics of some riverfront development.
- Some applicants have expressed dissatisfaction with the plan. Applicants cannot rely on the same standard every time an application is submitted because the plan contains unclear definitions, development standards, procedures, and trail/landscaping standards.
- Some of the procedures required for riverfront development permits are costly, time-consuming, and cause confusion.
- The plan does not ensure that development along the river's edge is reserved for uses that are river-dependent, river-related, or that facilitate and enhance environmental resources and public enjoyment of the riverfront.
- The plan contains outdated definitions. Some terms need to be updated and/or clarified so their intended meaning is not lost (for example, river-dependant and river-related).

Opportunities in the 2003 South Waterfront Plan

- The South Waterfront Plan uses up-to-date science and reflects the best current thinking.
- The implementation strategy for the riverfront includes public/private investment partnerships which will serve as a catalyst for development in the district. The greenway standards support and are integral to the development of the district.
- The plan is multi-objective, requiring multiple functions (such as trails, stormwater management, and bank improvements) in the same place.

Chapter 5
VIBRANT WATERFRONT DISTRICTS AND NEIGHBORHOODS

- The plan articulates floor area ratios, setbacks, and height development standards that are conducive to achieving a vibrant waterfront district.
- The plan recognizes a relationship between the scale/type of development and the scale/design of the riverfront. Urban-intensity office and residential uses are complemented by a wider greenway setback and high-capacity trail.

5.2.3 System Needs

To improve the vibrancy of waterfront districts and neighborhoods the following are needed:

- ◆ Development that respects the unique qualities and opportunities associated with riverfront lands, such as its natural, scenic historic, economic, cultural and recreational attributes, and the river’s role as a public amenity.
- ◆ Targeted riverfront development opportunities for river-dependent uses, river-related uses, and uses that enhance natural resources, public access, and enjoyment of the riverfront.

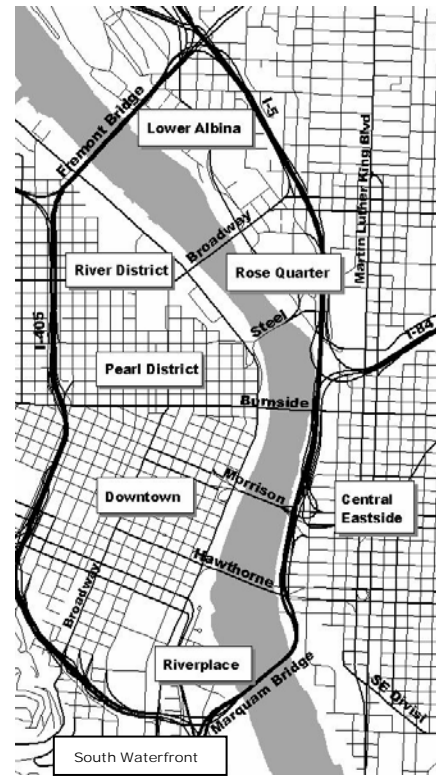


Figure 5-4 Central City Districts

5.3 THE CENTRAL CITY

5.3.1 Conditions and Trends

The Central City Plan, created in 1988 and updated in 2000, has played a significant role in shaping Portland over the past 15 years. The plan’s longstanding policy for the Willamette River is to “enhance the Willamette River as the focal point for views, public activities, and development which knits the city together.” The river flows through the heart of the Central City, touching the River District/Pearl District, Downtown, Riverplace, and South Waterfront districts on the west bank and the Rose Quarter/Lower Albina and Central Eastside districts on the east bank (Figure 5-4). As Portland’s largest waterfront area, the Central City has the potential to be a truly vibrant waterfront district. Some of this potential is already realized through three waterfront parks, eight bridges, and existing development. As new ideas emerge on how to plan for the Central City within the context of the Willamette River, the Central City Plan may need to be revisited.

Westside Districts

The **River District** (comprised of the Pearl District and Old Town Chinatown neighborhoods),



River District

historically a rail, shipping, and warehouse area, has been transformed into a distinctive vibrant urban community through new residential and commercial development. It includes historic districts, upscale and affordable housing, an artist community, a streetcar line, and new parks. The district is still relatively isolated from the riverfront, however. The redevelopment of Centennial Mills is the largest opportunity for the district to have a presence on the river.



Downtown

Portland's **Downtown** is the regional center for finance, trade, education, culture, retail, professional, and governmental services. While Downtown comprises a high concentration of office and commercial uses, its edge along Naito Parkway (next to the riverfront) is primarily parking lots, blank building walls, underused buildings, and inactive streets.

There has long been the desire to better connect the Downtown core to the waterfront. Past ideas included development of new civic attractions, such as an aquarium, and commercial uses along Naito Parkway, especially around the bridgeheads. Current ideas are reflected in the recent master plan for Tom McCall Waterfront Park, as well as in the strategy for residential development and a public market in the Ankeny Plaza/Old Town area.

The desirability of the Downtown and River districts is evident in the 16 percent increase in population over the last decade (Figure 5-5). The average household income has grown 45 percent to \$55,000, making these the wealthiest districts on the river.

Figure 5-5 Population, Income, and Employment in the Central City*

District	Population			Households			Average Household Income			Employment
	1990	2000	% Change	1990	2000	% Change	1990	2000	% Change	2000
Central Eastside	9,772	9,980	2%	5,045	5,262	4%	\$22,601	\$38,776	72%	9,042
Downtown/ River District	29,443	34,086	16%	17,724	20,839	18%	\$38,282	\$55,524	45%	32,141
Rose Quarter	15,534	17,503	13%	6,802	7,908	16%	\$19,777	\$40,598	105%	14,454
Total Central City	54,749	61,569	12%	29,571	34,009	15%	\$31,350	\$49,462	58%	155,414
City	492,104	535,317	9%	208,421	226,276	9%	\$33,968	\$54,041	59%	429,146
Region	1,174,291	1,444,219	23%	464,667	569,461	23%	\$38,513	\$59,331	54%	1,116,736

*Based on U.S. Census block groups

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Riverplace is a relatively new 10.5-acre waterfront development that includes town homes, condominiums, a marina, offices, and retail space. It forms the southern end of Waterfront Park. While the Riverplace esplanade attracts residents and visitors, the project’s retail component has struggled because the site lacks parking and a critical mass of development, and has a relatively isolated location.



Riverplace

South Waterfront is an area of 140 acres and 6,500 linear feet of waterfront. Redevelopment of this district will be a significant addition to the Central City. The district has been largely underused or vacant for many years because of needed environmental remediation and transportation infrastructure improvements. Implementation of the South Waterfront Plan and associated urban renewal efforts will infuse the district with a rich mix of urban-scale offices, housing, hotels, retail uses, additional open space, Greenway Trail, and riverfront amenities, with emphasis on the wildlife habitat along the Willamette River. Major public investment in infrastructure supports the South Waterfront project, including an extension of the streetcar line and an aerial tram to the Oregon Health & Science University (OHSU) campus on Marquam Hill.



South Waterfront Today

Eastside Districts

Located on the east bank at the north end of the Central City, the **Rose Quarter/Lower Albina** district is situated between the Fremont Bridge and the Steel Bridge across from the River District and Old Town.

The Lower Albina area is largely industrial, with rail yards and harbor industries. While the opportunity is emerging for a small pocket of active commercial uses along Interstate Avenue, particularly next to the new MAX light rail station, a vibrant mix of industries typical of the harbor area still exists on both sides of Interstate Avenue.



Rose Quarter

The Rose Quarter, which includes the Rose Garden Arena sports complex and the Oregon Convention Center, is a center for entertainment and tourism and the gateway to the Lloyd District, a center for employment, retail, and housing. The Rose Quarter is also a transit hub where light rail, bus, and a future streetcar line will converge. While this provides exceptional transit access to the area, the streets, bridges, freeway, and light rail lines and the superblock development of the area impede pedestrian connections and have resulted in a relatively isolated riverfront. The population of this area has grown 13 percent over the past decade, indicating people’s growing desire to live in the Central City. New housing units in the area consist mostly of condominiums to the east of the entertainment section.

The **Central Eastside** district is located roughly between Interstate 84 and the Ross Island Bridge (north to south) and the river and SE 12th Avenue (west to east). The Central Eastside has remained a district that supports manufacturing and light industry, wholesale, distribution, and small business. It has also become the location for major public attractions on the riverfront, including the Oregon Museum of Science and Industry (OMSI) and Portland Community College. With all the changes in the westside of the Central City and in the neighborhoods east of SE 12th Avenue, there is an ongoing debate about the future of the Central Eastside.



Central Eastside

Recent ideas include allowing a wider range of businesses to locate in the industrial sanctuary to attract more jobs and industry. There is also a continuing interest in finding ways to improve access to the river, which is extremely challenging with the freeway aligned on the riverfront. The Eastbank Esplanade has significantly improved the accessibility of the Central Eastside riverfront for recreational use.

Employment

Central City jobs are the key to the region's health and to a vibrant waterfront district. Family-wage jobs, nearby housing, and a strong transportation system are three pillars that must be maintained.

The Eastbank Esplanade has significantly improved the accessibility of the Central Eastside riverfront for recreational use.

For over two decades, efforts to protect city and regional livability have been guided by one fundamental principle: ensure that downtown remains a healthy, growing employment center. The City's strategy has been to reduce traffic congestion; improve air quality; limit sprawl; develop a diverse, affordable housing supply; and create strong neighborhoods protected from commercial encroachment.

City efforts in the 1970s and 1980s focused on bringing jobs to Downtown.

The early- to mid- 1990s brought an influx of jobs in burgeoning sectors of commerce. However, a majority of this growth occurred in the outer ring of the Portland area, not the Central City. Since then, the Portland area's unemployment rate has nearly doubled, from 3.9 percent in 1998 to 7.9 percent in late 2003. Current vacancy rates are nearly 16 percent in commercial buildings (Figure 5-6) and over 12 percent in industrial office space.

Reversing this trend and protecting the core area requires infrastructure investments that contribute to jobs, housing, quality of life, and

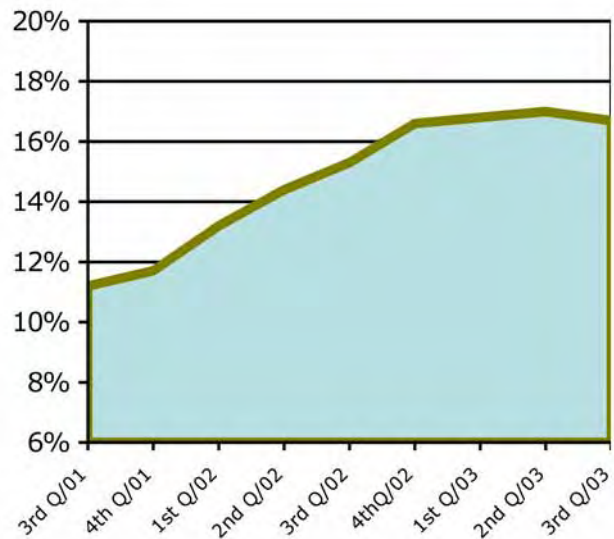


Figure 5-6: Portland Office Vacancy Rate (2001 – 2003)

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the environment. Every new job created in Portland's core area is an investment in the region's livability. As part of the Central City Plan, Portland adopted an ambitious job target for its Central City of 71,000 new jobs by 2015. As the region suffers economically and financially, Portland will struggle to reach that goal. Government, businesses, and citizens are addressing multiple issues, including education, transportation, air quality, and affordable housing. River-related investments in the Central City will indirectly contribute to decisions on where businesses and residents want to locate; however, economic development practitioners and partners must also continue to develop more direct incentives.

Boating ¹

Tour boats on the Willamette River are significant contributors to the Portland economy. Day cruises employ 250 people and generate 10 million dollars a year. Seven night cruise boats generate 40 million dollars a year. In addition the entertainment industry uses Portland's moorages and marinas in film and print. The economic benefits are unknown.

Civic Amenities/Attractions

Civic amenities along the Willamette River (Figure 5-7) contribute to the vibrancy of waterfront districts by drawing people to the riverfront and by generating jobs and money for the area. They function as more than just local attractions, drawing people from around the region to the river. Riverfronts across the United States are realizing the value of civic amenities as cornerstones of waterfront revivals. A good example is the riverfront aquarium in Chattanooga, Tennessee, which in the last ten years has been a catalyst for downtown revitalization, providing 160 jobs and generating \$1 billion in investments.

Civic amenities along the Willamette River contribute to the vibrancy of waterfront districts.

¹ Statistics based on information from the Waterfront Organization of Oregon.

Figure 5-7 Civic Amenities along the Willamette River

Civic Amenity	Location	Advantages/Disadvantages
Tom McCall Waterfront Park	Downtown	<ul style="list-style-type: none"> • New master plan creates two major activity areas in the park: Salmon Springs Fountain and Ankeny Plaza (Figure 5-8). • New master plan improves connections between the park and downtown. • There is no major attraction anchoring downtown to the riverfront.
Eastbank Esplanade and Crescent Park	Central Eastside	<ul style="list-style-type: none"> • Has brought record numbers of people to the river for recreation. • Crescent Park will be a regional park and offer a light watercraft center in the Holman Building. • Disconnected from eastside development by a 12-lane freeway and railroad tracks.
Holman Building Boat House	Central Eastside	<ul style="list-style-type: none"> • Will offer non-motorized boat rentals to the public in the Central City and will allow for crew teams and other boating organizations to store their boats downtown.
Rose Garden	Rose Quarter	<ul style="list-style-type: none"> • Arena attracts people from around the region. • Disconnected from the river.
Convention Center	Rose Quarter	<ul style="list-style-type: none"> • Attracts numerous conventions, bringing people to the area. • Disconnected from the river by an expansive railroad easement.
Oregon Museum of Science and Industry	Central Eastside	<ul style="list-style-type: none"> • Portland's largest riverfront attraction. • Submarine and Willamette Greenway Trail reinforce connections between the museum and the river. • Provides opportunities for people to learn more about river-related science and industry.
Oregon Maritime Museum (a boat on the river)	Downtown	<ul style="list-style-type: none"> • The only museum that celebrates the Willamette River. • Docked at the seawall in Tom McCall Waterfront Park. • Funding issues impair its stability.
Riverplace Esplanade	Downtown	<ul style="list-style-type: none"> • The only riverfront location with commercial activity in the Central City. • Disconnected from the rest of the downtown.
Tour Boats	Central Eastside	<ul style="list-style-type: none"> • The Portland Spirit, the Willamette Jet boats, and River Renaissance Ferry offer people the opportunity to get out on the water.



Figure 5-8: Tom McCall Waterfront Park Master Plan. The new master plan proposes activity areas at Salmon Springs and Ankeny Plaza. The remaining areas of the park will be open space for festival and recreational use.

Urban Form

Urban form in waterfront districts refers to the riverfront area and building orientation. In a vibrant waterfront district, the river should help shape urban form. The Central City has positive and negative examples of how this can be achieved. Figure 5-9 describes the urban form on the eastside and westside of the Central City.

Figure 5-9 Urban Form in the Central City

WESTSIDE DISTRICTS	RIVERFRONT CHARACTER
<p>River District</p>	<ul style="list-style-type: none"> • Office development is located along the northern section, and residential development extends along the southern section of the riverfront. Development is generally set back 25 feet from top of bank and oriented to take advantage of river views. • The Willamette Greenway Trail extends along the top of bank of the southernmost portion of the area; however, access to the trail is limited through adjacent residential and office development sites. Isolated sections of trail exist along the northern section. • The riverbank contains no vegetation and consists of rip-rap and structures such as docks, piers, and seawalls.
<p>Waterfront Park</p>	<ul style="list-style-type: none"> • Waterfront Park consists of a large public open-space area extending over one mile along the riverfront and averaging 200 feet in width. The park contains numerous gathering spaces and a trail (built in the late 1920s) that extends the length of the seawall. • Naito Parkway separates the park from Downtown, and pedestrian access across and along Naito is poor. Recent City planning efforts hope to address design problems with the park and Naito Parkway to enhance public use of the waterfront.

WESTSIDE DISTRICTS	RIVERFRONT CHARACTER
Riverplace	<ul style="list-style-type: none"> • The southern section of the riverfront contains a trail, backed by a mix of residential and retail uses, all fronting a marina. Development is well oriented toward the river, but creates a wall 850 feet long across the waterfront, blocking access to the river. User conflicts occur because the narrow trail is used both for public access and for seating at cafes located along the waterfront. • South Waterfront Park has recently been added to the southern section of the waterfront; portions of the park are backed by office development. The park creates a buffer of public open space between private development and the river's edge. The riverbank along the park is mostly bioengineered and includes two trails leading down to the water.
EASTSIDE DISTRICTS	RIVERFRONT CHARACTER
Rose Quarter/ Lower Albina	<ul style="list-style-type: none"> • The area is dominated by river-related, river-dependent, and other industrial uses; development is not well oriented to the river and is often built right along the top of the bank. • The riverfront trail is not developed in this area, although segments of the trail (through Albina Yard) are in the discussion stage. • The riverbank consists mostly of riprap, fill, and structures, except for a small amount of natural vegetation under the Fremont Bridge.
Central Eastside	<ul style="list-style-type: none"> • The Eastside Esplanade runs the length of the Central Eastside waterfront, extending from the Hawthorne Bridge to the Steel Bridge. The esplanade consists of a combined pedestrian/bike trail, with pullouts, seating, artwork, and a floating section containing a public dock and areas to fish. • Interstate 5 frames the eastside of the esplanade and extends the length of the waterfront. The freeway blocks at-grade access to the esplanade from local streets; however, access is provided down from bridges that cross the river. • South of the Hawthorne Bridge, the Willamette Greenway Trail extends past OMSI and then moves inland one block to become the Springwater on the Willamette Trail. • The riverbank along the Central Eastside is dominated by riprap; however, bioengineered work along sections of the Eastbank Esplanade incorporates native plants.

Bridges

The eleven bridges that span the Willamette River are defining characteristics of Portland. These bridges range from 27 to 90 years old and include a diversity of bridge types, such as a vertical lift span (Hawthorne Bridge), two double-leaf Bascule drawspans (Broadway and the Burnside Bridges), and the longest tied-arch span in the world (Fremont Bridge). The Hawthorne Bridge is a national landmark structure.

The eleven bridges that span the Willamette River are defining characteristics of Portland.

The Willamette Light Brigade, a volunteer group formed in the 1980's, has promoted public awareness of the unique character the bridges add to Downtown. The group has led efforts to add architectural lighting to the Central City bridges and has commissioned lighting designs for the Hawthorne, Burnside, Steel, and Broadway Bridges. Fundraising is underway.



Burnside Bridge Lighting Design Plan – proposed by the Willamette Light Brigade

Eight bridges cross the Willamette River in the Central City, connecting the eastside and westside: the Ross Island, Marquam, Hawthorne, Morrison, Burnside, Steel, Broadway, and Fremont Bridges. Of these eight, two are part of the Central City freeway loop system (Fremont and Marquam), and four are roughly aligned with Portland's street grid (Burnside, Morrison, Ross Island, and Hawthorne).

Access points to these bridges (called bridgeheads) can help shape the urban design of Portland's waterfront districts. Prominent buildings or structures flanking bridgeheads have the potential to create visible, organizing landmarks for the district, signaling a gateway location into or out of the community.



Burnside Bridge (Eastside) There are no prominent structures that signal the entrance to the Burnside Bridge on the northeast corner.

As Figure 5-10 illustrates, access to the Steel, Morrison, and Hawthorne Bridges from the eastside of the river consists of ramps and/or viaducts that extend over several blocks. In many cases, visibility to the river or Downtown is compromised by the circuitous ramps (Steel Bridge) or upward-sloping viaducts (Morrison and Hawthorne Bridges). Emphasizing the gateway nature of these access systems at their entry points could increase the vibrancy of the waterfront districts by drawing attention to the bridge structure and signaling visual (and potentially physical) access to the river. The Broadway and Burnside Bridges and the westside of the Hawthorne Bridge present the easiest short-term opportunities to create gateways to the river. The Ross Island and Morrison Bridges pose greater challenges at one or more bridgehead locations.



Prominent bridgehead in Chicago



Figure 5-10 Bridge Ramps - Access to the Steel, Morrison, and Hawthorne Bridges from the eastside of the river consists of ramps and/or viaducts that extend over several blocks.

Boating Facilities

The river as a recreational amenity is the heart of a waterfront district. Boating facilities allow people to experience the river by getting out on the water. Boat launches, docks, and other river access facilities are limited in the Central City, however. While there is one informal non-motorized boat launch on the westside of the river at South Waterfront Park, no motorized boat launches are located in the Central City area (Figure 5-11).

Five docks and a marina are available for short-term stopping in the Central City. On the westside are the Riverplace Marina and Docks, Ankeny Docks, and McCormick Condominium Docks. On the eastside are docks at the Eastbank Esplanade and at the fire station by the Hawthorne Bridge. A new light watercraft center will be developed as part of Crescent Park and the Holman Building. This will provide non-motorized boat rentals and a place to put boats in the river.

Figure 5-11 Boating Facilities in the Central City

District	Marina	Docks	Motorized Boat Launch	Non-Motorized Boat Launch
River District	No	Yes	No	No
Downtown	No	Yes	No	No
Riverplace/South Waterfront Park	Yes	Yes	No	Yes
Rose Quarter	No	No	No	No
Central Eastside	No	Yes	No	Yes . Opens in Fall 2004.

Riverfront Events and Festivals

Riverfront events are an obvious addition to the vibrancy of a waterfront district because they attract both local residents and residents from around the region. Tom McCall Waterfront Park is the site of many of these celebrations. In summer 2003, seven major festivals were held at Tom McCall Waterfront Park. The current roster of annual events includes the following.

Events

- Bridge Pedal
- Wooden Boat Show
- Portland Christmas Ships
- Dragon Boat Races

Festivals

- Cinco de Mayo
- Rose Festival
- Pride NW
- Blues Festival
- Brewers Fest
- Oregon Symphony
- The Bite



The Rose Festival at Waterfront Park

Urban Renewal Areas

The purpose of urban renewal areas is to help communities improve and redevelop areas that are deteriorated, unsafe, have a lack of infrastructure (such as streets, utilities, and sidewalks), or have vacant or underused property. The revitalization efforts are paid for by urban renewal bonds, which are eventually paid off by the rise in property tax revenue from the urban renewal area. Six urban renewal areas are located along the Willamette River in the Central City, as shown on Figure 5-12: [Interstate](#), [Oregon Convention Center](#) (which includes the Rose Quarter), [River District](#), [Downtown](#), [Central Eastside](#), and [North Macadam](#) (includes the South Waterfront neighborhood). Urban renewal areas are an implementation tool that could help with riverfront development strategies in the Central City.

Historic Districts

Designation as an historic district can also be an implementation tool for enhancing vibrant waterfront districts. Owners of listed properties can apply for certain federal benefits, including a 20 percent investment tax credit for certified rehabilitation of income-producing property, such as commercial, industrial, or rental residential buildings. In Oregon, owners of listed properties can apply for a property tax benefit. Other incentives available to buildings listed in the National Register of Historic Places include the Portland Development Commission's seismic loan program and eligibility for grants for historic preservation activities.

The Yamhill and Skidmore Fountain/Old Town Historic Districts (Figure 5-13), known for their large collection of mid-to-late 19th century buildings in the Central City, are the only historic districts next to the Willamette River.

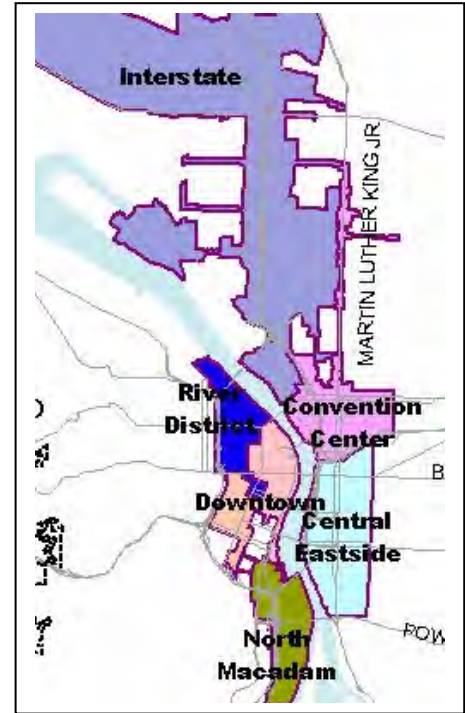


Figure 5-12: Urban Renewal Areas on the River



Figure 5-13: Historic Districts on the Willamette River

5.3.2 Constraints and Opportunities

Figure 5-14 shows constraints and opportunities to achieving more vibrant waterfronts in the westside and eastside of the Central City.

Figure 5-14 Constraints and Opportunities in the Central City

WESTSIDE	
Opportunities	Constraints
<ul style="list-style-type: none"> • Potential for cruise ship dock. • Potential open space/public use at Centennial Mills site. • Redevelopment of parking lot adjacent to Centennial Mills. • Opportunities for more parkland and Greenway Trail extensions. • Several sites available for office development, some on waterfront. • Possible non-motorized boat rental at Flanders Street/Steel Bridge connection. • Many surface parking lots on Naito Parkway. • Opportunity for a public market. • Opportunity for increased residential density through infill in northwest area. • Opportunity for new parking structure at SW 1st and Ash. • Opportunity to improve visual connections and attractions that link Tom McCall Waterfront Park to retail core, at extensions of Yamhill and Morrison. • Newly planned South Waterfront District and Greenway (see section 5.2.1) • Tram connection from South Waterfront to Marquam Hill. • Opportunity for constructing light rail to SE Portland, potentially crossing river on new bridge at Caruthers and improving connectivity to OMSI and the Central Eastside. • Opportunity to extend streetcar to connect Harrison Street to River Parkway and improve east-west access. • Union Station is a tourist attraction with its riverside weekend train excursions to Astoria. 	<ul style="list-style-type: none"> • Possible building height constraints near the river. • Urban renewal area expiration. • Funding. • Decreased demand for office space in downtown area. • Design challenges for infill to be compatible with historic district. • Naito Parkway is a barrier to the park and river and works poorly as a freight mobility corridor.
EASTSIDE	
Opportunities	Constraints
<ul style="list-style-type: none"> • River-oriented development and open space with enhanced connections to Eastbank Esplanade. • Opportunity to create Crescent Park, a new riverfront park • Potential to create a stronger gateway to Central City and support Martin Luther King Jr./Grand Avenues at Burnside Bridge. • Possible residential redevelopment opportunities. • Opportunity to build light watercraft center at Holman Building on Eastbank Esplanade. • Adaptive reuse or demolition of Coliseum. Reestablishment of street grid and new open space/connection to the river. • Potential significant waterfront development site. • Opportunity for “green” research and development or an urban industrial/office node. • Opportunity to redevelop school district site north of coliseum. (This is a large site in public ownership that could accommodate a major public attractor.) 	<ul style="list-style-type: none"> • Funding. • Freeway superstructure over western portion of area. • Unpredictable market. • Lack of sidewalks and bike facilities. • Connections to the bridges and the river need improvement. • Trucks/freight movement is constrained and forced to compete with other transportation modes. • Orientation of development toward the river is complicated by the wide rights-of-way associated with Interstate Avenue and the railroad line.

5.3.3 System Needs

To improve the vibrancy of waterfront districts and neighborhoods within the Central City, the following are needed:

- ◆ Urban form of future development and redevelopment along the east and west banks of the Willamette River that celebrates and incorporates the river as a unifying features.
- ◆ Public investment in riverfront improvements to promote the Central City’s role as a regional visitor destination, a vibrant commercial core, and a haven of downtown living opportunities close to the river.
- ◆ A clear strategy for riverfront development and enhancements, supported by strong policies and implementing measures, to integrate planning for key riverfront landmarks, and maximize public open space along the river.

5.4 WATERFRONT DISTRICTS OUTSIDE THE CENTRAL CITY

5.4.1 Introduction

Waterfront districts outside the Central City (see Figure 5-1 on pg 5-2) vary in land use, character, and orientation to the river. For the purposes of this section, “vibrant waterfront districts” refers to the non-industrial districts along the river. Discussion of the industrial activity in this area which is also vibrant appears in Chapter 3. Some are predominantly residential neighborhoods, and others are a mix of residential and commercial uses. Some of the districts are located on top of bluffs and are connected to the river mostly through views. Others are located on the river and provide opportunities for development or open space on the river. Some districts have experienced significant population growth over the last decade, while others have grown slightly or remained the same (Figure 5-16). Despite these differences, the districts share one thing in common: they have connections to the Willamette River, and these connections can be improved for the benefit of the district, the river, and Portland as a whole.



St. Johns

Figure 5-15 Population and Employment in Districts Outside the Central City

Waterfront District/Neighborhood	Population			Employment
	1990	2000	Percent Change	2000
St. Johns	23,525	25,565	8.7%	19,634
Linnton	851	1,025	20.4%	760
Willamette Bluff	23,985	24,801	3.4%	19,409
Southeast Bluff	7,752	7,512	- 3.0%	6,372
Johns Landing/Southwest Hills	6,438	7,564	17.5%	7,228
CITY	492,104	535,317	8.9%	429,146

* Based on U.S. Census block groups

5.4.2 St. Johns: A Town Center on the Riverfront

Conditions and Trends

St. Johns, located near the confluence of the Willamette and Columbia Rivers, began as a separate riverfront town and working waterfront at the end of the North Portland peninsula. Today, it is Portland’s only Metro-designated 2040 town center on the Willamette River. It also is a community that experiences the benefits and drawbacks of being next to a large and successful port and industrial area. The industries are a core part of the community’s economic prosperity. They also result in a significant volume of truck traffic passing through the community and across the St. Johns Bridge.



St Johns Bridge

The St. Johns Town Center, at the foot of the St. Johns Bridge, continues to be a distinctive and attractive commercial district and a real amenity for St. Johns residents and workers. The ongoing

challenge has been to keep the center economically vital as it faces competition from larger retailers and other centers in North Portland and the region. The adopted [St. Johns Plan](#) calls for strengthening the town center by increasing the number of people living and working in the market area. The plan gives waterfront sites south of Cathedral Park the opportunity to evolve with the market and develop over time. The plan also supports the town center’s traditional employment base by protecting St. Johns’ most viable riverfront industrial lands north of Cathedral Park.

Figure 5-16 describes the urban form of the St. Johns District.

Figure 5-16 Urban Form of St. Johns District

LOCATION	RIVERFRONT CHARACTER
<p>St. Johns</p>	<ul style="list-style-type: none"> • Historically an industrial waterfront. Buildings, uses, open spaces, and streets are not well oriented to the river. • Industrial uses are located on the riverfront north of Cathedral Park where land is zoned for industrial uses. • The Willamette Greenway Trail exists along only the northern half of the waterfront. • Cathedral Park is a large park that slopes down from a hillside residential area to the riverfront. It includes one of Portland’s few launch ramps for motorized boats. With industrial uses to the north and south, the park seems somewhat disconnected from the neighborhood. • The riverbank is mostly riprap or fill. However, significant and attractive environmental features remain, including a beach.
<p>Willamette Cove, McCormick & Baxter, and Triangle Park Sites</p>	<ul style="list-style-type: none"> • Willamette Cove is a former industrial site that is now a Metro-owned open space. It is the last riverfront site in St. Johns before the bluff begins to separate the inland neighborhoods from the riverfront. Its canopy of native and non-native vegetation is well established. It is unimproved, unprogrammed, and has known contamination from past industrial uses. In the past, it was a transient camp.

LOCATION	RIVERFRONT CHARACTER
	<ul style="list-style-type: none"> • The McCormick & Baxter site is a large superfund site undergoing cleanup. The Triangle Park site contains abandoned industrial buildings and active barge-docking facilities. • The bluff above all three sites is primarily residential development oriented toward Willamette Boulevard. This section of Willamette Boulevard has houses only on the east and acts as a parkway with grand public river views. In certain areas, residences are located between the boulevard and the bluff. There are also a few relatively isolated bluff-side residential developments. • All three sites are officially closed to the public. Access to the sites occurs along three former industrial roads; however, at least two of the roads are closed to the public. The Willamette Greenway Trail has not been constructed through these sites; however, people pass through the sites via a system of informal trails.

Constraints and Opportunities

Figure 5-17 shows constraints and opportunities in St. Johns.

Figure 5-17 Constraints and Opportunities in St. Johns

LOCATION	OPPORTUNITIES	CONSTRAINTS
St. Johns District	<ul style="list-style-type: none"> • Dramatic topography down to the river, with great views of the river and Forest Park. • Beautiful bridge offers river-related focal point. • Existing riverfront parks. • Near trails and natural areas: Smith/Bybee Lakes, 40-Mile Loop Trail, Kelley Point Park. 	<ul style="list-style-type: none"> • There are conflicts between truck traffic and residents sharing the streets that run through the town center. • Rail lines create a barrier to the river. • Access to the Columbia Slough, its habitat areas, and portions of the 40-Mile Loop Trail is difficult because of heavy traffic and inadequate pedestrian crossings on Columbia Boulevard. • St. Johns Bridge, the only river crossing in North Portland, is congested by heavy truck and automobile traffic. • There is not a strong connection from the town center to the riverfront. • A regionally significant truck route passes through St. Johns, and that truck traffic regularly conflicts with other travel modes. • Additional bike routes are needed for commuters and recreational bike users.
Willamette Cove	<ul style="list-style-type: none"> • 24-acre Metro-owned parcel acquired for open space/recreational use. 	<ul style="list-style-type: none"> • Will be developed as natural area. The main trail will not be aligned along the riverbank.
McCormick & Baxter	<ul style="list-style-type: none"> • 40-acre site is former industrial site in single ownership. Remediation is in process; potential exists for trail and riverside restoration. 	<ul style="list-style-type: none"> • Superfund site; ongoing remediation, monitoring, and testing.
Triangle Park	<ul style="list-style-type: none"> • Large site in single ownership. • Potential prime river-dependent industry site. 	

5.4.3 Linnton: A Riverfront Village

Conditions and Trends

At one time, Linnton was a mill and ship-building town on the outskirts of Portland. Today, it is a small Portland neighborhood with about 1,000 residents and a mix of commercial uses, housing, and industry. The majority of residents are located on the westside of Highway 30 on a steep hillside looking down on the waterfront. The 1960 widening of Highway 30 to four lanes removed half of Linnton’s business district and created a serious barrier between the Linnton neighborhood and the riverfront.

The Linnton riverfront includes eight petroleum marine terminals and associated tank farms, steel storage, and a former plywood mill. The redevelopment of the mill site would be an intriguing opportunity to reconnect Linnton to the riverfront and create a new center of activity in the community. The site faces many redevelopment challenges, including poor access to the river; possible safety concerns and incompatibility issues (noise and lighting) from adjacent industrial uses; and transportation conflicts between freight, neighbors, and commuters.

Figure 5-18 describes the urban form of Linnton.



Linnton from the river



Linnton's Riverfront Beach



Storage within the Linnton neighborhood along the riverfront

Figure 5-18 Urban Form of Linnton

LOCATION	RIVERFRONT CHARACTER
<p>Linnton</p>	<ul style="list-style-type: none"> • Development along the river is mostly oriented to Highway 30 and Front Avenue. • Land uses consist of current industrial storage, tank farms, and informal residential uses. • The riverbank is well vegetated, with a mix of native and non-native plants, fronted by a wide section of beach. • No formal public trails or open space areas exist along the riverfront; however, local residents use informal routes.

Constraints and Opportunities

Figure 5-19 shows constraints and opportunities in Linnton.

Figure 5-19 Constraints and Opportunities in Linnton

LOCATION	OPPORTUNITIES	CONSTRAINTS
Linnton	<ul style="list-style-type: none"> • Development synergy with the existing residential community and the working community. • Proximity to river/Forest Park. • Linnton Plywood is a potential catalyst site for development. • Changing industrial environment offers redevelopment potential. • St. Johns Bridge is a possible focal point. • Potential new vehicle and pedestrian bridges across the Willamette River and Multnomah Channel. • Lewis and Clark train excursions stop in Linnton. 	<ul style="list-style-type: none"> • Limited development opportunities along the narrow shelf between the river, rails, Highway 30, and Forest Park. • Highway 30 capacity limitations. • Willamette Greenway Trail extension conflicts with industrial uses. • Limited east/west connections across Highway 30, rails. • Remediation costs for contamination. • Access from hillside residences across Highway 30 to the commercial area and the river is very challenging and dangerous because of high traffic speeds and volume. • The land on the eastside of Highway 30 lacks connectivity.

5.4.4 Willamette Bluff: Views of the Working Harbor

Conditions and Trends

The Willamette Bluff neighborhoods extend along the top of the Willamette Boulevard and Mocks Crest Bluffs between the St. Johns neighborhood and the Fremont Bridge on the eastside of the Willamette River. The bluff location gives these mostly single-family residential neighborhoods dramatic views of the river and working harbor, with very few physical connections to the river. The riverfront below the bluff is a mixture of natural areas, vacant land, and industrial uses, including Swan Island and Albina Yards. North Killingsworth is the only commercial street that extends to the top of the bluff. The University of Portland overlooks the river to the north of the bluff. McCarthy Park on Swan Island is the only developed waterfront park serving the bluff neighborhoods (in addition to Cathedral Park in St. Johns). It offers a beach area and a segment of the Greenway Trail.



Swan Island

Willamette Boulevard extends along the top of the bluff and separates most development from the edge of the bluff, with the exception of the University of Portland and a few residential parcels. Willamette Boulevard is known for the significant views it provides of the Central City and the Willamette River extending from north to south. The top of the bluff is open space held in public ownership and contains a segment of the Willamette Greenway Trail in the form of a bike lane. Yet, the bluff lacks a sidewalk or formal pedestrian trail segment. Additionally, a long chain-link fence runs along the bluff, creating a physical barrier and visual distraction. No roads or other accessways extend from the bluff down to Swan Island.

Figure 5-20 describes the urban form of Willamette Bluff.

Figure 5-20. Urban Form of Willamette Bluff

LOCATION	RIVERFRONT CHARACTER
Willamette Bluff Neighborhoods	<ul style="list-style-type: none"> • The residential neighborhood located along Mocks Crest Bluff is oriented toward Willamette Boulevard, overlooking Swan Island, and takes advantage of views to the river and beyond. • No pedestrian and vehicular connections exist from Willamette Boulevard down to Swan Island. • The top of the bluff is a narrow band of open space extending along the length of the bluff and bordered by a chain-link fence. Neither a trail nor sidewalk runs along the top of the bluff; however, a bike lane runs along the length of the bluff on Willamette Boulevard.
Swan Island	<ul style="list-style-type: none"> • The majority of waterfront and lagoon consists of public, private, and military docks that are closed to the public. • A portion of the lagoon contains areas of natural vegetation, a beach area, and a public boat launch facility. • Commercial development exists in the southern portion of the district, fronted by a riverfront park (McCarthy Park) and a segment of the Willamette Greenway Trail. A portion of the trail and park is interrupted by a restaurant extending over the top of the bank. The bank along the park is well vegetated and is fronted by a long stretch of beach. • Large vacant parcels are located along the river north and south of the commercial area. • Vehicle, bicycle, and pedestrian access to the area is provided only along N. Going Street.

Constraints and Opportunities

Figure 5-21 shows constraints and opportunities in Willamette Bluff.

Figure 5-21. Constraints and Opportunities in Willamette Bluff

LOCATION	OPPORTUNITIES	CONSTRAINTS
Willamette Bluff Neighborhoods	<ul style="list-style-type: none"> • Views of the river. • Feasibility Study for trails down the bluff completed. 	<ul style="list-style-type: none"> • Access to the waterfront is extremely challenging because of the topography. The only street access into Swan Island is Going Street. Informal trails have been developed down the bluff. • Connections from the neighborhoods to Swan Island are lacking. • There is an ongoing need for safer routes for bikes and pedestrians, especially commuters. • There is not enough transit service.

LOCATION	OPPORTUNITIES	CONSTRAINTS
Willamette Boulevard	<ul style="list-style-type: none"> • Development opportunities exist around the bluff and the University of Portland. • Topography allows for expansive views. 	<ul style="list-style-type: none"> • Steep topography limits access.
University of Portland	<ul style="list-style-type: none"> • Possible shared rail/Willamette Greenway Trail alignment. • Dramatic location and views. • Connections east to community and transit. • Possible new Willamette Greenway Trail connections to Mocks Bottom, McCormick & Baxter site. 	<ul style="list-style-type: none"> • Strip of land along the railroad at the bottom of the bluff is very narrow and potentially a very expensive place to develop a trail. • Limited river access.

5.4.5 Southeast Riverfront and Bluff (Oaks Bottom, Brooklyn, Sellwood/Moreland)

Conditions and Trends

The Southeast Bluff area extends approximately four miles from the Ross Island Bridge to the city limits south of the Sellwood Bridge. It includes the Oaks Bottom Wildlife Refuge and Holgate Slough natural areas and the Brooklyn and Sellwood/Moreland neighborhoods.

Oaks Bottom/Holgate Slough and Brooklyn Neighborhood

Most of this section of the waterfront is undevelopable open space, except for a large sand and gravel operation at the intersection of McLoughlin Boulevard and Holgate Street. The popular Springwater on the Willamette Trail (a segment of the Willamette Greenway and 40-Mile Loop Trail systems) passes through this area. There is no improved access from the Brooklyn neighborhood to the Willamette Greenway Trail. The Brooklyn neighborhood is located on top of the bluff and mostly consists of residential uses and corridors of commercial activity on Powell Boulevard and Milwaukie Avenue. The parking lot entrance to Oaks Bottom provides the only access to the Willamette Greenway Trail.



Oaks Bottom

Sellwood/Moreland

The waterfront area north of the Sellwood Bridge contains Sellwood Riverfront Park, a portion of Oaks Bottom Wildlife Refuge, Oaks Amusement Park, the Oregon Yacht Club (a private houseboat community), and the Springwater on the Willamette Trail. The waterfront south of the Sellwood Bridge is dominated by residential development; several developments front a riverfront trail and a houseboat community. Portions of this area contain segments of the Willamette Greenway Trail, but these segments are not easily accessed from anything but the residential development fronting the river. As with other portions of the riverfront, the development fronting the riverfront takes advantage of views and access to the river, but acts as a barrier to access for most other segments of the community.

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Oaks Amusement Park and the Oregon Yacht Club also create a barrier along and to the riverfront for approximately two-thirds of a mile. The bluff overlooking Oaks Bottom contains Sellwood Park and Sellwood Boulevard, both of which provide a panoramic view of the river and Central City. Additionally, bike lanes along the bluff and pedestrian routes leading down to Oaks Bottom serve the neighborhood fronting Sellwood Boulevard.

Sellwood Park and Sellwood Boulevard provide a panoramic view of the river and Central City.

The district on top of the bluff is primarily residential. Commercial activity is centered around Bybee Boulevard and Milwaukie Avenue. Commercial areas also exist on SE 13th Avenue (informally known as Antique Row) and Tacoma Street. Crossing Tacoma Street is an issue for trail users. It is made more difficult by the volume of regional traffic on the local street network to gain access to the Sellwood Bridge. There are no pedestrian crossings except at lighted intersections. Some people using the Springwater on the Willamette Trail cross under the Sellwood Bridge before connecting with the eastbound section of the 40-Mile Loop Trail, rather than crossing Tacoma Street.

Figure 5-22 describes the urban form of the Southeast Bluff neighborhoods.

Figure 5-22 Urban Form of Southeast Riverfront and Bluff

LOCATION	RIVERFRONT CHARACTER
<p>Brooklyn Neighborhood / Holgate Slough</p>	<ul style="list-style-type: none"> • Consists of natural open space except for a sand and gravel operation at the intersection of McLoughlin Boulevard and Holgate Street. • The riverbank in this area is the most natural stretch of riverbank in Portland. Only a small portion of the bank is unclassified fill. Although the bank is considered natural, it is vegetated with both native and non-native plants. • The OMSI-Springwater Trail, which constitutes the Willamette Greenway Trail in this area, extends the length of the riverfront along a semi-active rail line. No access to the trail exists from the Brooklyn neighborhood.
<p>Oaks Bottom and Sellwood/Moreland Neighborhood</p>	<ul style="list-style-type: none"> • The waterfront consists of public open space, houseboat/marina communities, wetlands, and an amusement park. As with the northern area of the district, the riverbank is more natural than most areas along the river. • The Springwater on the Willamette Trail extends through this area, extending to the Sellwood Bridge, where the trail alignment moves inland. The trail connects with the neighborhood at two locations via the trail system leading through Oaks Bottom. Another connection exists at SE Spokane Street near the Sellwood Bridge. • Although good north/south access exists through the area, public access and views directly to the water are restricted for 0.8 miles by Oaks Amusement Park and the Oregon Yacht Club. • This area provides views of Oaks Bottom and Ross Island. It contains heron rookeries as well as habitat for bald eagles, nesting osprey, and other birds and wildlife.

Constraints and Opportunities

Figure 5-23 shows constraints and opportunities in Southeast Bluff.

Figure 5-23 Constraints and Opportunities in Southeast Bluff

LOCATION	OPPORTUNITIES	CONSTRAINTS
Sellwood/ Moreland	<ul style="list-style-type: none"> • Views. • Access at Spokane Street, connecting to the trail, makes the area accessible and of interest to people using the trail. • The trail draws pedestrians and bicyclists to the area, which could create opportunities for restaurants and other retail uses near the Sellwood Bridge. • Improved connections across the river via the Sellwood and Ross Island Bridges would enhance the trail system. 	<ul style="list-style-type: none"> • Steep topography. • Pedestrian and bike access over the Sellwood Bridge is limited. The sidewalk is narrow and no bike lanes exist. • Regional traffic uses the local street network to gain access to the Sellwood Bridge. • Pedestrians have difficulty crossing Tacoma Street.
Brooklyn	<ul style="list-style-type: none"> • Ross Island is a habitat and open space resource. • Good downtown access. • Possible new light rail transit extension with related development potential along the McLoughlin Boulevard/Highway 99 East corridor. • Potential improvements to McLoughlin include adding sidewalks on the westside of the highway, pedestrian crossings at Holgate and Ross Island Sand and Gravel, and trail spurs down the bluff to the Springwater on the Willamette Trail. 	<ul style="list-style-type: none"> • Steep topography creates barriers to the river. • Industrial uses separate the neighborhoods from the river. • 99E/McLoughlin Blvd. is a major barrier to river access. • Ross Island Bridge does not allow pedestrians and bikes to easily cross the river and connect between the eastside and westside trail segments.

**5.4.6 Southwest Riverfront
(Corbett/Terwilliger/Lair Hill Neighborhood, Johns Landing, Willamette Park, and Southwest Hills)**

Conditions and Trends

Corbett/Terwilliger/Lair Hill Neighborhood

The Corbett/Terwilliger/Lair Hill Neighborhood (CTLH) boundary extends from the river to the West Hills and from the Marquam Bridge to the southern city boundary. (This boundary technically includes the newly designed South Waterfront District; that district is discussed in



View Corridor in Southwest Portland

the Central City section of this chapter, however, because of its proximity to Downtown.) Three areas of the CTLH are discussed below: Johns Landing, Willamette Park, and Southwest Hills.

Johns Landing

Johns Landing, a model of waterfront development from the 1970s, is located along the riverfront south of the Ross Island Bridge. It consists of riverfront condominiums, apartments, office space, and a couple of commercial shopping complexes. The existing pattern of riverfront development is oriented to take advantage of river views, but also creates a barrier for convenient public access to the river. The Willamette Greenway Trail is complete in this stretch, but public access points to the trail and riverfront are not obvious because most of the development is private.

Willamette Park and South

This area extends from Willamette Park south approximately 1.7 miles to Ira Powers Park and the city limit. The river’s edge is mostly public parkland, with a few blocks of residential development and a marina and houseboat community. The Willamette Greenway Trail provides good access along the river; however, residential and commercial development located between the riverfront and Macadam Boulevard often blocks access to the trail from the neighborhoods located west of the riverfront. The routes to the river that do exist are not well marked and are hard to locate.

Freeways, highways, and industrial areas separate neighborhoods from the river.

Southwest Hills Neighborhoods

This area includes the residential hillside areas next to the riverfront. Although the Willamette River is a major recreational resource within walking or bicycling distance for many Southwest Hills residents, river access is difficult. Freeways, highways, and industrial areas separate neighborhoods from the river. Existing access routes are not well marked.

Figure 5-24 describes the urban form of the Southwest Riverfront.

Figure 5-24 Urban Form of Southwest Riverfront

DISTRICT	RIVERFRONT CHARACTER
<p>Johns Landing</p>	<ul style="list-style-type: none"> • The waterfront is heavily developed with mix of residential and office uses. Development is generally set back 25 feet from the top of the bank. The Willamette Greenway Trail is developed along the entire stretch, but is narrow in some places, which hampers movement. The development pattern and network of private streets block access to the river from inland neighborhoods. • The riverbank consists of riprap and unclassified fill, but is well vegetated in some areas and is fronted by beach and mudflats in limited areas. Very few trees exist on or near the riverbank in this area.
<p>Willamette Park and South</p>	<ul style="list-style-type: none"> • This area contains Willamette Park, Ira Powers Park, Butterfly Park, and small areas of riverfront development, including a houseboat moorage. • Most of the riverbank is natural, with some areas containing wetlands, mudflats, and beaches; however, some areas of fill, riprap, and structural development exist. The Stephens Creek inlet south of Butterfly Park provides habitat for fish, birds, and other wildlife. • The Willamette Greenway Trail extends through the length of the area. The trail is paved north of the Sellwood Bridge and unpaved south of the bridge through

	Ira Powers Park. Trail conflicts occur because the trail is narrow in some places. The current alignment passes through Willamette Park and the residentially developed areas. Commercial and residential development fronting Macadam Avenue blocks access from inland neighborhoods to the river.
Southwest Hills	<ul style="list-style-type: none"> • Through much of the area, Highway 5, Macadam Avenue, Barbur Boulevard, and other elements of the transportation network block river access from hillside neighborhoods. The development pattern between the riverfront and Macadam also presents a barrier in places. • The neighborhood topography provides views of the river and mountains, and numerous viewpoints exist along Terwilliger Parkway.

Constraints and Opportunities

Figure 5-25 shows constraints and opportunities in Southwest Riverfront.

Figure 5-25 Constraints and Opportunities in Southwest Riverfront



Willamette Greenway Trail in Southwest Portland

Location	Opportunity	Constraint
Johns Landing	<ul style="list-style-type: none"> • Could experience additional development as a result of OHSU expansion and aerial tram connection from Marquam Hill to South Waterfront. • Close to Ross Island and new South Waterfront development. • View of the river, Mt. Hood, and eastside. 	<ul style="list-style-type: none"> • Poor transportation system connectivity exists to the west. • The narrow greenway setback and trail section create conflicts. • Connections over the Sellwood Bridge to the Springwater on the Willamette Trail are poor. • Major sidewalk deficiencies exist. • There is a lack of street connectivity. • Interstate 5 and Macadam Avenue are barriers to the neighborhoods west of the river.
Willamette Park and South	<ul style="list-style-type: none"> • Long stretch of Willamette Greenway Trail 	<ul style="list-style-type: none"> • Limited riverfront development opportunities exist because SW Macadam is aligned close to river.
Southwest Hills	<ul style="list-style-type: none"> • Views of the river, Mt. Hood, and the eastside. 	<ul style="list-style-type: none"> • Although the Willamette River is a major recreational resource within walking or bicycling distance for many Southwest Hills residents, river access is difficult. Freeways, highways, and industrial areas separate neighborhoods from the river. Existing access routes are not well marked.

5.4.7 Bridgeton and Hayden Island – *A Boating Community*

Conditions and Trends

Bridgeton Neighborhood and Hayden Island are unique waterfront communities defined by water-based recreation. Bridgeton, located on Marine Drive at the northern end of Portland, consists mostly of condominium and apartment development, houseboats, marinas, and moorages. Hayden Island, located across the Columbia Channel on the Columbia River, varies in character. The west end of Hayden Island, located in Multnomah County’s jurisdiction and owned by the Port of Portland, remains undeveloped. The east end is largely developed, with a regional shopping complex (Jantzen Beach), hotel, business park, large houseboat community, two mobile home parks, condominium complexes, several private moorages and marinas, and gated communities. Because of their riverfront location, both Bridgeton and Hayden Island have more boating facilities and houseboats than any other waterfront district in Portland.



One of the many mooring facilities on Hayden Island

Despite the community’s close relationship to the river through boating, access along the riverfront is difficult for pedestrians and bicyclists. A few trail segments have been built in front of private development throughout Hayden Island; however, there is no designated public trail system. Lotus Park, a small riverfront park and trail, offers the only formal public access to the Columbia Channel. Bridgeton does not have a riverfront trail. The 40-Mile Loop Trail occurs behind riverfront development (on Marine Drive) until NE 33rd Avenue, where it is then realigned with the river. The trail does not extend across the channel to Hayden Island. The only access to Hayden Island is by vehicle on Interstate 5. Figure 5-26 describes the urban form of Bridgeton and Hayden Island.



Riverfront trail on Columbia River

Figure 5-26 Urban Form of Bridgeton and Hayden Island

Location	Riverfront Character
Hayden Island	<ul style="list-style-type: none"> • Development consists of a large houseboat community, marinas, and moorages on the east end of the island. A business park and two mobile home parks occur further west on the island. Residential development is oriented towards the river on the north side of the island and toward the channel on the south. • There is no continuous public trail. Some trail segments exist in front of residential complexes.
Bridgeton	<ul style="list-style-type: none"> • A large houseboat community, marinas, and moorages are located along the channel. • Bridgeton Road separates residential development from the riverbank. • Residential development (mostly two-story town homes) is oriented towards the channel. • No public trails or bike lanes exist on Bridgeton Road. The 40-Mile Loop Trail is aligned along the river further east toward the airport.

Constraints and Opportunities

Figure 5-27 shows constraints and opportunities in Bridgeton and Hayden Island.

Figure 5-27 Constraints and Opportunities in Bridgeton and Hayden Island

Location	Opportunities	Constraints
Hayden Island	<ul style="list-style-type: none"> • Several large sites remain undeveloped and may present opportunities to make the area a more vibrant riverfront community. • Potential exists to build a riverfront trail in several locations. • There are spectacular views of the Columbia River and Channel. 	<ul style="list-style-type: none"> • Freight traffic occurs through residential streets and local arterials. • Access is provided exclusively by Interstate 5 and can be impacted by periodic bridge closures and heavy traffic between Oregon and Washington. • Traffic generated by the Jantzen Beach commercial area dominates vehicular circulation on the westside and central part of Hayden Island. • Pedestrian access throughout the island is difficult (few sidewalks). • Current zoning may restrict a mix of certain types of development.
Bridgeton	<ul style="list-style-type: none"> • A few large sites remain undeveloped and may present opportunities to make the area a more vibrant riverfront community. • There are spectacular views of the Columbia River and Channel. 	<ul style="list-style-type: none"> • The narrow street and steep bank make development of a riverfront trail challenging.

5.4.8 Floating Home Communities on the Willamette River

Conditions and Trends

Floating homes have been a part of Portland’s Willamette riverfront for over 100 years. They are part of Portland’s history, economy, and stewardship community. In the early 1900s they lined the east bank of the river forming what was called Scow Town. Today’s floating homes are moored at Oaks Bottom and Macadam Bay. Outside the City of Portland boundary there are several additional moorages that line the Multnomah Channel and Columbia River. The total number of floating homes in Multnomah County is over 1600, valuing a quarter billion dollars. Over 3000 people live in the floating homes which contribute a source of jobs and income for small water-based businesses that build, repair and maintain floating homes, moorages and marinas.



A houseboat community

Figure 5-28 Constraints and Opportunities in Floating Home Communities on the Willamette River

Location	Opportunities	Constraints
Oaks Bottom/ Macadam Bay, and Multnomah Channel	<ul style="list-style-type: none"> • Contribute a stable source of income for small water-related businesses • Present an attraction for tourists and locals to view from the water and trails. • Contribute to the Portland community through several stewardship projects² including revegetation projects, the Christmas ship event, and river education. • Spectacular views of the Willamette River and Multnomah Channel. • Provide a historical connection to Portland’s waterfront 	<ul style="list-style-type: none"> • Only a limited number of mooring spaces exist. • The potential impact of floating homes on juvenile salmonids is unclear. More recent studies³ suggest that structures such as pilings in large rivers have been known to attract predators of juvenile salmonids. These studies did not include floating homes so it is difficult to say if there are any impacts.

² Stewardship projects include: contributions to the City’s matching fund program to protect Oaks Bottom; revegetation projects with the Bureau of Environmental Services; Oregon Yacht Club Purple Martin Sanctuary Project; Macadam Bay Watershed Revegetation Project.

³ The City of Portland Endangered Species Act Program is in the process of releasing their latest study to the public.

5.4.9 System Needs

To improve the vibrancy of waterfront districts and neighborhoods outside the Central City, the following are needed:

- ◆ Promotion of waterfront development that benefits the vitality of the district and the health and use of the river.
- ◆ Public investments and financial tools that promote development in waterfront districts, guided by strategies that identify the most critical and opportune locations for development to occur.
- ◆ Joint public and private support for development and maintenance of portions of the Willamette riverfront as an integral part of new development.
- ◆ Trail quality and configuration that supports increasing demand for a riverfront bicycling and walking trail.

5.5 EXTENDING THE CONCEPT OF VIBRANT WATERFRONT DISTRICTS/NEIGHBORHOODS TO STREAMSIDE DEVELOPMENT

Streams that feed the Willamette and Columbia Rivers run through the heart of many Portland neighborhoods (Figure 5 –2 Regional Systems Map). In Lents and Hillsdale Town Centers, along the Beaverton-Hillsdale Highway, and in other Metro 2040 mixed use areas, the contrast of urban and natural elements defines a district’s character and presents significant challenges.

Metro’s growth management concept calls for the development of vibrant centers of community life. These mixed-use areas – main streets, town centers, regional centers and transit corridors – provide a variety of housing choices, support transportation options, and reduce growth pressures on established residential neighborhoods.



Managing Stormwater Runoff

Chapter 5 VIBRANT WATERFRONT DISTRICTS AND NEIGHBORHOODS

Sensitive and imaginative design of buildings and public spaces can highlight streams as amenities, while at the same time improving their conditions. By creating naturalistic parks, using stormwater in fountains, replacing pavement with bio-swales, landscaping with native plants, and planting green roofs, neighborhood centers can accommodate additional jobs and homes, achieve environmental goals and honor the area's unique character.



Ecoroof

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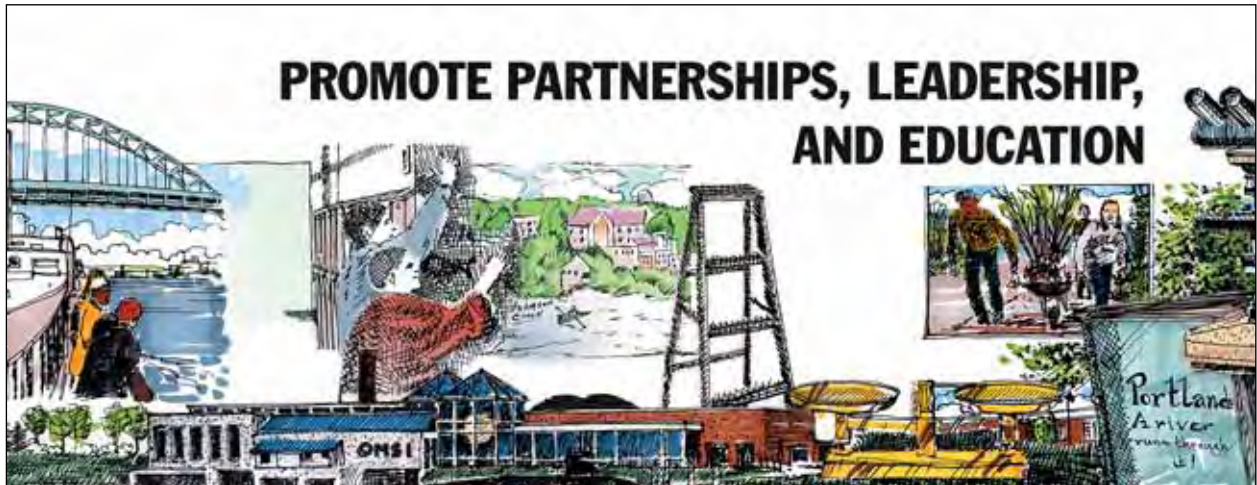
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River Renaissance Vision:



6.1 INTRODUCTION

At the heart of River Renaissance is a new way of thinking and working on behalf of the river. The River Renaissance Vision describes a comprehensive view of the Willamette River that encompasses a dynamic and interwoven set of river uses, issues, and interests. It calls for coordinated action and investments powered by an engaged community that advocates for sustained progress over a 20- to 50-year period and beyond. The River Renaissance Initiative seeks to focus public efforts, forge public/private partnerships, expand resources, and inspire community actions to revitalize the Willamette River.

6.1.1 Why Are Partnerships, Leadership, and Education Important?

The very nature of a multi-objective effort is the reliance on contributions from many partners. The complex set of interwoven river issues calls for a collaborative approach to identify and implement solutions that are mutually beneficial. No one person, group, agency, or government can be effective in isolation. An initiative of this magnitude and timeframe requires a clear strategy, adept leadership, and strong public support. A coordinated public education and involvement strategy builds trust and inspires action.

This theme is distinct from the other four themes because it focuses primarily on how to sustain the River Renaissance Initiative over time. Partnerships, leadership, and education are the common threads that unite the other themes by promoting:

- Community awareness of critical issues that integrate economic, environmental, recreational, and urban design goals related to the Willamette River.



Willamette Ferry, August 2003

- Activities of neighborhood and business associations, watershed councils, civic organizations, and government agencies.
- Public engagement and involvement opportunities

6.1.2 How This Chapter Is Organized

Following this introduction, this chapter is divided into the following sections:

- 6.2: Leadership
- 6.3: Partnerships
- 6.4: Education and engagement

Each section presents condition and trends, describes constraints and opportunities related to the topic, and identifies challenges what is needed to achieve a strong system of partnerships, leadership and education.

6.2 LEADERSHIP

6.2.1 Conditions and Trends

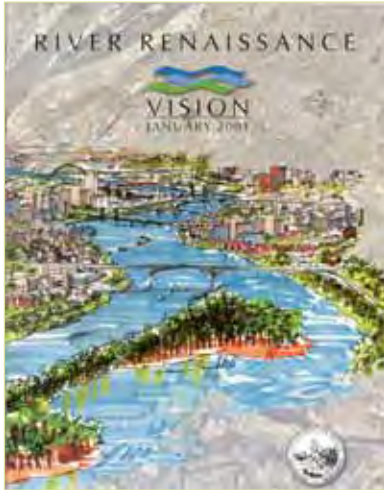
City Leadership

The [River Renaissance Vision](#) calls for the City to inspire, encourage, and assist others to take part in the River Renaissance Initiative. Mayor Vera Katz has used the profile of her office to focus public attention on the condition and future of the Willamette River. Through major speeches ([January 2001](#) and [December 2001](#)) and media events, Mayor Katz has been a compelling spokesperson for the river. She has used her position to engage civic and community leaders, convene state and federal agency representatives to establish a coordinated permitting process, and raise the profile of the Willamette River as one of Portland's highest priorities.

The River Renaissance Vision calls for the City to inspire, encourage, and assist others to take part in the River Renaissance Initiative.

Portland's City Council held a work session in May 2000 to discuss river issues and consider a multi-objective strategy to enhance river-related planning and investments. The Council called on the City's Planning Director to develop an integrated work program and manage the broad initiative through the River Renaissance Bureau Directors.

The City Council unanimously endorsed the River Renaissance Vision in March 2001 as a call to action for the entire community and a foundation for continuing river-related activities ([Council Resolution 35978](#)). The Council further directed City staff and bureaus to use the vision's goals and themes as a guide to integrate the plans, actions, and policies needed for successful implementation.



River Renaissance Vision

As the leader of the River Renaissance Initiative, the City is working to employ best practices, conduct demonstration projects, provide seed money for innovative approaches, expand river access, and support the contributions of businesses and community organizations. Already nationally acclaimed for leadership in urban development, Portland's River Renaissance Initiative has been recognized by the U.S. Council of Mayors as an honorable mention in the 2004 Livable City Competition. The initiative is also the focus of a recent report on ecological riverfront design produced by the American Planning Association.

The City's operational structure is designed to support independent bureau operations. Programs and functions have traditionally been compartmentalized within the bureaus, limiting interbureau cooperation. There is now a growing trend toward better interbureau coordination, joint planning efforts, and shared information, research, and analysis. The River Renaissance Initiative contributes to and benefits from this change in practices. Most City bureaus are actively engaged in activities that are successfully advancing the initiative. The bureaus use a variety of successful models for joint ventures to leverage resources, expand outreach and education, launch new initiatives, and promote common goals.

A structure of multi-bureau teams enhances coordination across bureaus:

- River Renaissance Bureau Directors
- River Renaissance Management Team
- River Renaissance Public Involvement and Information Team
- River Renaissance Natural Resources Team

Leadership Groups

River Renaissance is intended to improve Portland's relationship to the river through alliances with concerned individuals and groups in the private sector and more effective working relations with relevant federal and state agencies and other entities throughout the region (for example, the cities of Gresham and Lake Oswego). To date, Portland has assembled several working and advisory groups to engage these partners in the initiative, as discussed below.

River Trust

The Mayor's River Trust, first convened in April 2002, comprises senior representatives of federal environmental and natural resource agencies and the US Army Corps of Engineers. The River Trust was created to forge more effective relationships between these federal government entities and the City to help make key decisions about the future of the lower Willamette River. It addresses river issues comprehensively and allows Portland to meet federal requirements within the context of local needs and creative approaches. This unique collaboration produced an agreement to streamline the

Portland has assembled several working and advisory groups to engage partners in the River Renaissance Initiative.

process Portland uses to consult the federal government on endangered species issues, the first agreement of its kind between the federal government and a municipality.

River Renaissance Partners

Mayor Katz convened the River Renaissance Partners to help launch River Renaissance in September 2000. This large group of civic, business, neighborhood, and school representatives provided advice early in the River Renaissance effort regarding implementation, funding, and public engagement strategies. The group could be reactivated to help sustain the Initiative through changes in political leadership.



Business and industry representatives at a Wade-In Workshop, May 2003.

River Industrial and Economic Advisory Group

The River Industrial and Economic Advisory Group is a stakeholder discussion group that advises the Portland Bureau of Planning, Portland Development Commission, and Port of Portland on river economic and industrial research and policy issues. The group has met monthly since December 2000. Participants include representatives from Portland's industrial associations, other business associations along the Willamette River, major regional business associations (e.g., Portland Business Alliance and Associated General Contractors), related trade associations (e.g., Columbia River Towboat

Association), and related business consultants. The group played a key role in developing the *Portland Harbor Industrial Lands Study* (2003) and *Citywide Industrial Inventory and Assessment* (2003).

Watershed Science Advisory Group

In addition to these existing groups, the City convened a Watershed Science Advisory Group in early 2004 to provide broad-based technical review and input on watershed approaches, processes, and products. Discussion topics for the group include lower Willamette ecosystem restoration under the Water Resources Development Act, watershed planning products, regional subbasin and recovery planning, and natural resource damage assessments related to the Portland Harbor Superfund Project.

As new political and community leaders emerge, continuity will be needed to ensure significant coordinated improvements in the river.

6.2.2 Constraints and Opportunities

The River Renaissance Initiative provides a new way for the City of Portland and Portland residents to approach river issues.

As new political and community leaders emerge, continuity will be needed to ensure significant coordinated improvements in the river. The existing groups and organizations described above offer opportunities to institutionalize coordinated responses to implement the River Renaissance

Vision over time. Strengthening and expanding these networks will play an important role in meeting shared goals now and in the future.

6.2.3 System Needs

In summary, the following are needed to ensure ongoing and effective leadership:

- ◆ A governance structure to provide continuity and sustain the River Renaissance Initiative through periods of political and economic change.
- ◆ Expanded work with other jurisdictions and government agencies to influence key decisions that affect ecological health and economic vitality of the Willamette River and its tributaries within and beyond Portland’s boundaries.

6.3 PARTNERSHIPS

6.3.1 Conditions and Trends

The range of potential partners is as broad as the scope of River Renaissance. They include schools and universities, businesses, neighborhood associations, property owners, river users, watershed councils, nonprofit community organizations, tribal governments, business associations, and federal, state, and local government agencies.

The range of potential partners is as broad as the scope of River Renaissance.

Some groups, such as the [Bridlemile Creek Stewards](#), focus on a single localized issue. Other groups, such as the [Central Eastside Industrial Council](#), promote a set of issues on a district level. Regionally focused groups, such as [Audubon Society of Portland](#), have broad agendas that encompass river-related issues. A few, such as the [Willamette Restoration Initiative](#), take a basinwide approach to address the overall conditions of the Willamette River Watershed.

River Renaissance can provide an effective mechanism for these diverse groups to work together to identify critical issues, assist in public engagement and education, and develop strategies to realize the River Renaissance Vision.

Figure 6-1 provides examples of the range of community, civic, and government-related groups that have an interest in river-related issues.

Figure 6-1 Groups Interested in River-Related Issues

River Renaissance Groups	
<p>Membership: Invited or appointed by the Mayor or members of the River Renaissance Management Team.</p> <p>Mission: Support implementation of the River Renaissance Vision and multi-objective problem solving.</p>	<p>Examples:</p> <ul style="list-style-type: none"> • River Renaissance Partners • River Industrial and Economic Advisory Group

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Neighborhood Associations and Coalition Offices	
<p>Membership: Open to all residents, property owners, and business owners in a district. Mission: Support neighborhood livability through community organizing.</p>	<p>Examples:</p> <ul style="list-style-type: none"> • 95 neighborhood associations • North Portland Neighborhood Services Office
Business Associations	
<p>Membership: Business and property owners within a district. Mission: Bring local business and property owners together to support business vitality.</p>	<p>Examples:</p> <ul style="list-style-type: none"> • Portland Business Alliance • Columbia Corridor Association • Central Eastside Industrial Council
Watershed Councils	
<p>Membership: Anyone interested in the issues of a particular watershed, including residents, activists, business people, and representatives of affected jurisdictions. Mission: Address issues affecting the health of water bodies and their watersheds.</p>	<p>Examples:</p> <ul style="list-style-type: none"> • Columbia Slough Watershed Council • Johnson Creek Watershed Council • Tryon Creek Watershed Council
Friends Groups and Nonprofit Organizations	
<p>Membership: Anyone interested in supporting the organization's goals. Mission: Provide ongoing assistance to meet goals related to a specific issue or geographic location.</p>	<p>Examples:</p> <ul style="list-style-type: none"> • Bridlemile Creek Stewards • Friends of Trees • Audubon Society of Portland
Civic Organizations	
<p>Membership: Community members interested in broad public policy issues. Mission: Analyze and make recommendations regarding key public policy issues.</p>	<p>Examples:</p> <ul style="list-style-type: none"> • City Club of Portland • Coalition for a Livable Future • League of Women Voters
City Advisory Groups	
<p>Membership: Community members appointed by the Mayor or other City leadership, based on the members' expertise related to the advisory group's mission. Mission: Provide advice to City Council or City bureaus on policy and implementation issues related to specific City functions.</p>	<p>Examples:</p> <ul style="list-style-type: none"> • Design Commission • Stormwater Advisory Committee • Transportation Options Committee • Sustainable Development Commission
Intergovernmental Organizations and Committees	
<p>Membership: Staff and managers from government agencies. Mission: Ensure policy consistency among projects and programs.</p>	<p>Examples:</p> <ul style="list-style-type: none"> • Johnson Creek Inter-jurisdictional Committee (two counties and four cities within the watershed)
Professional Associations	
<p>Membership: Professionals in a particular field. Mission: Advocate for the professional field. Provide career development and advocacy for member professionals.</p>	<p>Examples:</p> <ul style="list-style-type: none"> • Homebuilders Association • International Association for Public Participation
Religious Organizations	
<p>Membership: Those who share the organization's faith. Mission: Fulfill the spiritual needs of the organization's members.</p>	<p>Examples:</p> <ul style="list-style-type: none"> • Churches • Synagogues

Educational Institutions	
<p>Membership: Students, faculty, and administrative staff of public and private schools, colleges, and universities.</p> <p>Mission: Educate students, conduct research, and provide information to the broader community.</p>	<p>Examples:</p> <ul style="list-style-type: none"> • Portland Public Schools • Private schools • Portland State University

6.3.2 Constraints and Opportunities

Constraints

- Existing groups do not represent some key river stakeholders, such recreational users.
- Most groups focus on a specific geographic area or a specific topic.
- The City lacks forums or associations that encourage “cross pollination” among groups.
- No established council or advisory group exists specifically for the Willamette River in Portland.
- Comprehensive outreach can be time consuming and expensive for the City and these groups. The effectiveness of efforts to engage these groups’ members varies considerably.
- Groups and their members are stretched thin in terms of time and resources. The number and complexity of issues that need attention can overwhelm people.
- According to the [Oregon Progress Board](#), volunteerism has slowly declined in the state over the past decade to 52 percent (Figure 6-2). This trend could weaken existing City programs and community organizations that rely heavily on volunteers.

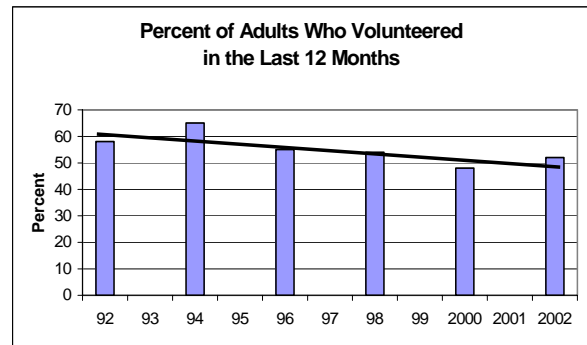


Figure 6-2 Volunteerism in Oregon

Opportunities

- There is a well-established network of neighborhood associations, business associations, “friends” groups, and watershed councils. These established organizations help engage and involve a broad range of stakeholders.
- Many City bureaus have established relationships with these organizations and stakeholders, and these partnerships can be expanded to support River Renaissance.
- Substantial community expertise exists to inform problem-solving and decision-making.

- Oregon has a tradition of public involvement; there is a shared understanding of the value of participating and influencing decision-making processes.
- Oregonians volunteer time to civic, community, or nonprofit activities at a rate higher than the national average of 44 percent.

6.3.3 System Needs

In summary, the following are needed to sustain effective partnerships:

- ◆ Enhanced involvement of groups, organizations, and agencies to reflect the broad and diverse set of interests addressed by the River Renaissance Initiative.
- ◆ Greater cooperation could improve communication and dialogue among groups, enhance collaborative efforts, and increase public understanding of river issues.

6.4 EDUCATION AND ENGAGEMENT

6.4.1 Conditions and Trends

River Renaissance Initiative

The River Renaissance Initiative has designed public engagement efforts to promote a multifaceted vision for the river, provide citizens with river experiences, increase the public understanding of all five vision themes, and highlight progress and achievements. Events and activities are coordinated to involve multiple bureaus and present the public with a broad perspective of how City

investments are contributing to a vibrant city centered on a healthy river. River Renaissance provides an overall context and common story to connect the many river-related activities and investments.

River Renaissance provides an overall context and common story to connect the many river-related activities and investments.



River Renaissance Calendar

The River Renaissance Initiative has created a number of outreach and involvement tools as summarized below.

- **Calendar of Events:** Published regularly since June 2002, the [calendar](#) promotes a variety of river activities and hands-on experiences sponsored by City bureaus, community organizations, and local groups.
- **Comprehensive Website:** The [website](#) is a central source for River Renaissance information and resources, featuring a

virtual tour of the Willamette River and links to the many City bureaus and projects that are advancing the vision. An average of 90 people visit this site daily.

- **River Renaissance Businesses:** A network of 65 participating businesses shares the quarterly calendar of events with more than 30,000 employees in Portland.
- **Portland Harbor Education:** The City has been working with the Swan Island Transportation Management Association to offer guided bike tours of Swan Island. It has also organized public events at McCarthy Park to watch newly built ships at Gunderson be launched into the Willamette River.
- **Guided Tours of the Willamette River:** From time to time the City conducts free public river cruises that feature information from City staff and an up-close look at Ross Island on the south, through the Central City, and north to the working harbor. River Renaissance has sponsored 12 tours, involving more than 650 people, since September 2000.
- **Community Engagement:** Outreach and education activities promote the economic, urban, natural, and recreational roles of the Willamette River; highlight the links between river-related projects and programs; and, share progress and achievements.
- **Database of Stakeholders and Interested Citizens:** A current mailing list of 1,500 participating individuals, businesses, and organizations receive the calendar of events, informational updates, and announcements about opportunities to participate in River Renaissance.
- **Community Vision:** More than 1,100 Portland residents participated in five guided river tours, 22 classroom discussions, and seven vision workshops to create the River Renaissance Vision in fall 2000.
- **Wade In Workshops:** In April and May 2003, several hundred residents, business leaders, and students participated in five interactive workshops to help shape the draft River Renaissance Strategy. The [Multnomah Youth Commission](#) co-hosted one special session for local high school students, and the [Port of Portland](#) co-hosted another special session for industry and business association stakeholders.



Portlanders ride the river during a River Renaissance guided tour aboard the Captain Conner tugboat.



Grant High School students help shape the River Renaissance Vision, November 2000.

Ongoing Education and Involvement

City bureaus conduct a great variety and number of activities to increase public awareness and involve citizens in river-related issues. Many of these efforts are conducted in partnership with local schools, businesses, organizations, and groups with similar missions and goals.

A comprehensive inventory of the City's educational programs focused on river issues has not been prepared. However, a preliminary review conducted through interviews with City staff indicates that most river-focused citizen education and involvement activities are related to two River Renaissance themes: A Clean and Healthy River, and Portland's Front Yard. The Bureau of Environmental Services and Bureau of Parks and Recreation are the primary sponsors of these activities, some of which are highlighted below.

- The [Clean Rivers Education Program](#) employs two full-time educators who conduct classroom presentations and stewardship projects in six Portland watersheds for local school-aged children (Figure 6-3). Assembly programs reach 10,000 students each year. The demand for field-based programs and community service/stewardship projects related to clean river issues is increasing and exceeds the program's capacity.
- The [Downspout Disconnection Program](#) has disconnected downspouts at over 42,000 homes from the combined sewer system, removing over 942 million gallons of stormwater from the system every year. More than 5,000 community volunteers, nearly 2,220 of them students, have participated in disconnecting many of these downspouts, earning over \$200,000 for other community projects.
- Classes, camps, and special events help turn [Portland parks and natural areas](#) into living laboratories. In 2002, more than 10,000 volunteers worked to teach others about the natural environment, remove invasive plants, and restore urban landscapes.
- The [Watershed Revegetation Program](#) creates partnerships between the City and private landowners to restore degraded stream banks and upland areas, with the City providing native plants, contract labor, materials, and technical assistance for revegetation projects.
- The Watershed Resource Center at the Southwest Community Center in Gabriel Park provides information and technical resources to citizens, and hosts the monthly speaker series called *Its All About Clean Rivers*.



Community volunteers work to disconnect a residential downspout.

Figure 6-3 Clean Rivers Education Program Contacts (Bureau of Environmental Services)

	1998-99	1999-2000	2000-01	2001-02	2002-03
Classroom lessons	8,000	8,281	8,840	7,029	7,205
Field programs, including stewardship projects	6,800	5,613	6,881	3,856	7,246
Teacher training	148	527	201	201	298

Far fewer programs and ongoing efforts are addressing issues related to the other River Renaissance themes: Prosperous Working Harbor and Vibrant Waterfront Districts and Neighborhoods. However, notable community assets related to these themes include the [Oregon Maritime Museum](#) located aboard the sternwheeler *Portland*, the River Walk exhibit at the [Oregon Museum of Science and Industry](#) (OMSI), and interpretive signs and art installations located along the [Eastbank Esplanade](#).

Events

Many festivals and events occur in riverfront parks, although no one event celebrates and promotes the full spectrum of River Renaissance themes. Successful ongoing events include:

- [Willamette Riverkeeper’s Paddle Oregon](#)
- [RiversWest Wooden Boat Show](#)
- [SOLV’s Down By the Riverside](#)
- [Audubon Society of Portland’s Great Blue Heron Week](#)
- [Salmon Festival](#)



Willamette Riverkeeper’s Paddle Oregon

Some past events with a river connection have recently been discontinued. The Port of Portland is not continuing the successful River City Celebration, and Portland Parks and Recreation has suspended its popular Illuminata Parade of Light on the Eastbank Esplanade.

Changing Communities

Portland is growing, and new residents are expanding the vibrant mix of cultures, languages, and faiths (Figures 6-4 and 6-5). The immigrant population in Oregon increased by 105.3 percent between 1990 and 2000, compared with a 14 percent increase in the native-born population (which includes children born to immigrants) over the same period. Immigration accounted for 38.6 percent of Portland’s overall population increase during this period. The 2000 census recorded that over one-half (54.5 percent) of Portland’s foreign-born population entered after 1990.

Portland is growing, and new residents are expanding the vibrant mix of cultures, languages, and faiths.

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The 2000 census also recorded that 16.9 percent of Portland residents (age five and older) speak a language other than English at home. More than one-half (53.4 percent) of these people said they speak English less than very well.

Figure 6-4 Racial Demographics for Portland Residents

	1990 Census		2000 Census	
	Number	Percent	Number	Percent
Total Population	437,319	100.0	529,121	100.0
Race:				
White	370,135	84.6	412,241	77.9
Black	33,530	7.7	35,115	6.6
American Indian, Eskimo, or Aleut	5,399	1.2	5,587	1.1
Asian or Pacific Islander	23,185	5.3	35,463	6.7
Other	5,070	1.2	18,760	3.5
Two or more races	not counted	not counted	21,955	4.1
Of Hispanic origin (counted separately from race)	13,874	3.2	36,058	6.8

Figure 6-5 Foreign-Born Portland Residents

1990 Census		2000 Census	
Number	Percent of Total Population	Number	Percent of Total Population
33,601	7.7	68,976	13.0

Outreach and education programs are generally conducted in English and rely on traditional methods that use information to increase awareness and motivate action. New approaches and emerging tools are needed to more effectively inform and engage the very diverse public. The City has made some inroads in reaching non-dominant cultures by providing translator services, developing materials in various languages, and designing outreach activities suited to the interests of specific communities. Notable examples include:



Explorando el Columbia Slough 2003

- Explorando el Columbia Slough - a celebration of the Columbia Slough for Spanish-speaking community members.
- Public information for recent immigrants concerning health issues related to fishing in the Columbia Slough.
- Outreach to the Hmong and Latino communities as part of the [St. Johns/Lombard Plan](#).

Community Dialogue

Both nationally and regionally, there is a wide range of opinion about how to balance environmental protection, economic health, property rights, and land use laws. In Oregon, this has polarized some local discussions and affected the quality of community dialogue. It also has contributed to a growing interest among community members in using incentives, education, and other non-regulatory approaches to achieve environmental and growth management goals.

Community members have a growing interest in using incentives, education, and other non-regulatory approaches to achieve environmental and growth management goals.

Behavioral Changes

For the most part, the City focuses on education as the main way to change public behavior. A recent survey by [Clean Water Services of Washington County](#), however, found that people's behavioral changes are usually motivated more by convenience and cost than by information. In light of these findings, it may be beneficial to use new approaches and methods. One example is to identify impediments to change and target those specific impediments to bring about the desired change in behavior.

According to a national survey sponsored by the [National Geographic Society](#) in 2001, most Americans are willing to make adjustments in everyday actions to improve the health of rivers. While two-thirds of the respondents indicated they wished to become more personally involved in conserving and protecting rivers, they cited lack of time, information, and awareness as major barriers. The survey also found that respondents were most motivated by family-oriented projects that provide educational opportunities.

6.4.2 Constraints and Opportunities

Constraints

- People are very busy. They are inundated with information and with requests to become involved in various activities.
- The rate of volunteerism in Oregon is declining.
- The integrated River Renaissance planning effort weaves together a complex set of previously fragmented issues, goals, and projects, each with its own set of interested citizens and stakeholders. There is a great need to engage the public in discussions about solutions. The ability to convene multi-interest discussions is hampered by the sheer number of people and issues involved, the lack of a central advisory group focused on the river, and the time needed to conduct meaningful problem-solving meetings.



High school students discuss river issues during a special Wade-In Workshop co-sponsored with the [Multnomah Youth Commission](#), April 2003.

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- Facilitating community conversations about critical and sometimes controversial issues is challenging. It will require carefully developed processes that allow a range of perspectives to be heard. Staff or consultants skilled in facilitation and conflict resolution will be critical.
- Limited physical access and view corridors to the Willamette River undermine efforts to promote a holistic view of the river and awareness of river issues and opportunities. Many Portland residents have not had a river experience or the opportunity to view Portland from the water.
- While the City has some education programs in place, most are focused on environmental issues. A holistic river-related education program would require institutional support and dedicated resources.
- No events specifically celebrate the river itself and promote the full spectrum of River Renaissance themes. There is a great need for sponsors and funding partners to help sustain and expand popular community events that bring Portlanders to the river to celebrate.
- Reaching and involving non-English speakers is a key challenge. Just as important is making outreach activities relevant to the values and interests of a specific community and working within or with the support of important community institutions. This kind of outreach can be resource intensive. To effectively reach a broad range of people, the City will need staff with the skills and expertise to assist in these efforts.
- Greater coordination among bureaus could identify gaps and unmet needs, expand recognition of partners, leverage work, and reinforce the connections among City programs and projects.
- The City does not have a comprehensive inventory or assessment of the number and type of education and outreach programs. The data that are collected by bureaus do not measure effectiveness or evaluate progress toward consistent benchmarks. To ensure the effective use of resources, it is critical to have clear ideas about what constitutes success and sound methods to measure progress.



[Eastbank Esplanade](#) near the Hawthorne Bridge



Volunteers remove English Ivy during "[kNOw Ivy Day](#)," May 2003.

- Little data exists to evaluate the attitudes and actions of Portland residents related to environmental issues. An annual survey could help measure progress, inform and focus work programs, and report achievement.

Opportunities

- Portland citizens have a close emotional bond with the city's rivers and streams.
- Citizens express a high interest in volunteering in ways that help rivers and streams.
- Popular events such as City-sponsored guided tours of the Willamette River and activities through the Clean River Education Program are some of the best ways to connect local residents with the river and provide education about the diversity of river uses and issues.
- The River Renaissance Initiative will be successful to the degree it can tailor activities to match the goals and interests of community members. Participation needs to provide a clear added value to an individual's life. For example, this could mean working to improve the livability of the community or finding ways for families to enjoy the Willamette River and tributaries.

6.4.3 System Needs

In summary, the following are needed to ensure that educational efforts are effective:

- ◆ Expanded and sustained public education efforts to build community awareness of the economic, recreational, environmental, and urban roles of the Willamette River.
- ◆ Constructive dialogue and successful problem-solving approaches to encourage people with strongly held views to participate in efforts to build multi-objective solutions.
- ◆ Clear objectives and benchmarks to evaluate effectiveness, monitor progress, and present a comprehensive view of achievements that contribute to River Renaissance.
- ◆ A variety of effective public outreach and involvement tools to engage Portland's diverse and changing communities in ways that are beneficial to individuals and groups.

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