

The following regulations apply throughout the basin and are intended to reduce stormwater runoff, provide groundwater recharge, reduce erosion, enhance water quality, and retain and enhance native vegetation throughout the plan district:

- With several minor exceptions (public bridges, fire hydrants, outfalls), new above ground structures, substantial alterations to existing structures and additional building coverage are prohibited within the Johnson Creek floodway;
- Water releases from Powell Butte reservoirs to Johnson Creek are prohibited except in the case of a malfunction or when the water will be minimal;
- Groundcovers and shrubs identified on the Nuisance Plants List may be removed;
- Planting of plants listed on the Nuisance Plants List is prohibited; and
- All vegetation removal activities must prevent erosion and sediment from leaving the altered site.

The following regulations encourage development in unconstrained areas:

- **Transfer of Development Rights:** The transfer of development rights regulations allow density to be transferred from sites with the environmental protection overlay zone or sites where any portion of the site is in the special flood hazard area to areas that can accommodate the additional density without environmental conflict.
- **Density Bonus:** Density bonuses promote more intensive development in areas that have full and efficient urban services. They also encourage development patterns that reduce impact on environmentally sensitive sites. Density can be increased by 50 percent except within the environmental conservation and protections overlay zones, Class I and II lands, and sites where any portion of the site is in the special flood hazard area.

In both the South Subdistrict and the special flood hazard area, impervious surfaces can cover no more than 50 percent of a site.

Tree removal is limited within the South Subdistrict, the special flood hazard area, and within 20 feet of the Springwater Corridor. The limit reduces stormwater

runoff, flooding, erosion, and landslides, protects water quality and native vegetation, and protects the scenic and recreational quality of the Springwater Corridor.

### **Northwest Hills Plan District (33.563)**

The Northwest Hills area in Portland is characterized by steep ravines, major streams with intricate networks of headwater tributaries draining to them, dense, closed canopy forest, and important wildlife habitat not found in other places in Portland. The Northwest Hills plan district protects sites with sensitive and highly valued resources and functional values.

The Northwest Hills is home to the Balch Creek Watershed and Forest Park. There are 2,999 acres of HCA within the Northwest Hills plan district, 93 percent of which is within an existing environmental overlay zone, and almost three-quarters of which is within the most stringent environmental protection overlay zone. In addition the City has applied environmental overlay zones to 4,094 acres in this plan district that are not in HCAs. These natural resources are located primarily in the upland portions of Forest Park.

The portions of the plan district that include the Balch Creek Watershed and the Forest Park Subdistrict contain unique, high quality resources and functional values that require additional protection beyond that of the environmental overlay zones.



*Balch Creek provides cool clear water and habitat for fish and wildlife.*

In both the Balch Creek Watershed and the Forest Park Subdistrict activities that expose soil between Oct 1 and April 30 are prohibited, and transfer of development rights regulations allow density to be transferred from sites entirely within the environmental protection overlay zone to sites that can accommodate the additional density without environmental conflict. The transfer of development rights option reduces development pressure on protected sites while containing safeguards to protect receiving sites.

The following additional regulations apply in the Balch Creek Watershed:

- Post-development stormwater flows must not exceed pre-development flows;
- Cleared areas must be covered with mulch by October 1st;
- Erosion control features must be removed by October 1st;
- Permanent vegetation must be seeded or planted by October 1st;
- All soil not covered by a building or other impervious surface must be completely vegetated by December 1;
- With a few exceptions, 90 percent of the environmental overlay zone on the site must be retained or established with closed canopy forest; and
- During environmental review the adequacy of habitat suitable for deer and elk must be addressed.

The following additional approval criteria apply during an environmental review in the Forest Park Subdistrict:

- The quality and sufficiency of habitat and travel corridors for pileated woodpecker, sharp-shinned hawk, Roosevelt elk, white-footed vole, and red-legged frog must be addressed;
- The recreational, scenic, open space and educational values of Forest Park can not be diminished; and
- Development activities can not degrade the water quality, flow and temperature of Miller Creek.

The Linnton Hillside subarea contains a residential area that is constrained by natural conditions and limited existing infrastructure. The development standards for this subarea are intended to protect the public health and safety by limiting the potential number of new housing units.

### ***Pleasant Valley Plan District (33.564)***

The Pleasant Valley area in Portland is currently rural in nature, characterized by farms, nurseries, and large lot development. Currently infrastructure is not adequate to support urban development.



*Pleasant Valley*

The Comprehensive Plan (and the Zoning Code) envisions Pleasant Valley developing into a community comprised of neighborhoods, a town center, neighborhood centers, employment districts, parks and schools, open spaces and trails, with a range of transportation choices, and extensive protection, restoration and enhancement of the natural resources. The purpose of the Pleasant Valley plan district includes integrating significant natural resources into the new, urban community.

The Pleasant Valley plan district (33.564) area in Portland contains approximately 38 acres of HCA. The area is relatively flat and contains several streams—a short segment of Johnson Creek near SE 174th and SE Jenne Rd., and several tributaries to Johnson Creek, including Kelly Creek which runs through the area to its confluence with Johnson Creek near SE 162nd and SE Foster Road. The area also contains forested area adjacent to the streams, steep ravines through which the streams meander, and several wetlands.



Virtually all of the Title 13 HCA within the plan district boundary is within the pleasant valley natural resources overlay zone (v-overlay) described above. The v-overlay has also been applied to 93 acres in the plan district that are not in an HCA.

In addition to the protections provided by the v-overlay, the Pleasant Valley plan district includes the following regulations related to natural resources:

- **Transfer of Development Rights:** The transfer of development rights provisions of the plan district preserves development opportunities for new housing and reduces development pressure in environmentally sensitive areas. The regulations allow density to be transferred from areas within the pleasant valley natural resources overlay zone to areas that can accommodate the additional density without environmental conflict.
- **Maximum Density.** Within the pleasant valley natural resource overlay zone, maximum density in the R7 base zone is reduced to one unit per acre from one unit per 7,000 square feet. This change further reduces development pressure on natural resource areas.

### **Portland International Raceway Plan District (33.566)**

The purpose of the Portland International Raceway plan district is to preserve and enhance the special character and opportunities of this unique area. The plan district recognizes existing uses and their impacts, and works to minimize the impacts of future development. The PIR plan district is part of West Delta Park. West Delta Park and the plan district in particular, have unique and varied characters. The activities currently occurring in the park, coupled with the characteristics of the land and the location, are unlike any other park in the region.

The Portland International Raceway Plan District contains 75 acres of Title 13 Habitat Conservation Area. The natural setting of this plan district is a broad open, natural area with unusual expansive vistas of the Columbia River flood plain. In contrast, many of the City's other large areas of Open Space zoning contain hilly and forested terrain. Geographically, West Delta Park is a transition area between the natural areas of Smith and Bybee Wetlands to the west and the freeway-oriented special event uses to the east: the East Delta



*Habitat for fish, wildlife and people on the Columbia Slough*

Park sports complex, Portland Meadows, Portland Speedway, and the Expo Center. Within the park, the character of the land similarly changes as one moves from west to east: the Heron Lakes Golf Course has more wildlife and other environmental resources than the Portland International Raceway (PIR), while PIR is a more developed use and absorbs large crowds for special events.

The PIR plan district is zoned Open Space, a zone with a number of uses. The PIR plan district helps to implement those purposes by:

- Preserving and protecting public open and natural areas;
- Providing opportunities for outdoor recreation;
- Providing contrasts to the built environment;
- Preserving scenic qualities;
- Protecting sensitive or fragile environmental areas; and
- Preserving the capacity and water quality of the stormwater drainage system.

The regulatory framework for the PIR plan district recognizes a mix of open space and major special event uses. Within the plan district are several distinct areas, or subdistricts:

- Environmental resource areas accommodate a rich array of wildlife, providing opportunities for food, shelter, and breeding. Because these areas include

many sloughs and wetlands they are particularly valuable to the region. The primary purpose of these areas is to support wildlife, with only passive or unintrusive recreational uses;

- The natural, grassy, open areas provide food and some shelter for wildlife, and also help to accommodate the occasional larger recreational events. Primarily however, these areas provide a special experience of an open, undeveloped, and natural setting for those who are within it, or those who are viewing it from the racetrack core area;
- The racetrack core area provides both recreational and entertainment opportunities for the region. This is the part of PIR that is used most regularly for recreation, and is the part where development and year-round activity can be the most intense.

The approval criteria are:

- The timing, frequency, and location of large spectator events in the plan district must be controlled to limit wildlife disturbance year-round, with extra limits during breeding season (mid-February to the end of May). Aspects to be controlled include: size, timing (time of day, time between events, numbers of events per day), and location (directing spectators and activity away from certain areas);
- Lighting must be designed so as to have no adverse impact on environmental zones; and
- The requirements of Chapter 33.430, Environmental Overlay Zones, and the requirements of the Natural Resources Management Plan for Peninsula Drainage District No. 1 must be met.

The PIR master plan was approved in 2004.

### ***Portland International Airport (33.565) and Cascade Station/Portland International Center Plan Districts (33.508)***

The Portland International Airport Plan District was adopted in April 2011 and the Cascade Station/Portland International Center Plan District regulations were updated in April 2011 to be consistent. The plan districts together contain 933 acres of Title 13 Habitat Conservation Area and are intended to serve as Title 13 District Plans. Through development of the plan districts the City produced an updated natural resource inventory for the Middle Columbia Slough watershed area including Portland International Airport. This area-specific inventory honed the updated citywide inventory, which in turn relied on the science and methodology embodied in the Title 13 inventory of regionally significant riparian corridors and wildlife habitat.

The Middle Columbia Slough/Portland International Airport Natural Resources Inventory included information on riparian resources relating to the Columbia River, the Columbia Slough and secondary drainageways, and wetlands. The inventory also addressed upland habitat, most notably the designation of several sparsely vegetated, grassy areas and several golf courses as Special Habitat Areas, the City equivalent of Title 13 Habitats of Concern. The sparsely vegetated grassy areas were found to support grassland species, including the streaked horned lark and other special status species. The golf courses support migratory birds and bats including several special status species.



*Portland International Airport, Columbia River and Government Island*



After producing an updated, area-specific Economic, Social, Environmental and Energy (ESEE) Analysis, the City updated the existing environmental zones in the planning area. The update included boundary revisions as well as the application of new overlay zones to land within the two plan districts. The net result was an increase of 205 acres of overlay zone.

The Portland International Airport plan district and the Cascade Station/Portland International Center plan district applies environmental overlay regulations intended to work in conjunction with the standards of Chapter 33.430 to:

- Protect inventoried significant natural resources and their functional values specific to the plan district;
- Address activities required to manage Port facilities, drainageways and wildlife on and around the airfield for public and avian safety;
- Address resource mitigation and enhancement opportunities consistent with managing wildlife and vegetation on and around the airfield for public safety; and
- Encourage coordination between City, county, regional, state, and federal agencies concerned with airport safety and natural resources.
- Facilitate continued operation of the golf courses.
- Protect inventoried significant archaeological resources where those resources overlap with an environmental protection zone or environmental conservation zone.

Specified sections of Chapter 33.430 are superseded or supplemented by the environmental regulations of each plan district, specifically:

- exemptions,
- standards,
- procedures for environmental review when wildlife hazard management is proposed, and
- the environmental plan check process.

Overall, the plan district provisions will further benefit natural resources including Title 13 Habitat



*Flocks of Cackling geese can pose aircraft safety risks at Portland International Airport.*



*Aircraft landing at Portland International Airport.*

Conservation Areas. For example the plan district establishes a specific approach to measuring *top of bank* that is intended to remove disincentives to channel restoration projects. In addition, new or altered vehicle or pedestrian crossings of the Middle Columbia Slough, Whitaker Slough, Buffalo Slough, or Elrod Slough must be by bridge instead of culverts because culverts impede passage of fish and other wildlife species such as native turtles.

The ESEE Analysis paid special attention to airport-specific wildlife hazard issues. As a result the City did not apply overlay zones to natural resources within the airport perimeter fence, where intensive wildlife management is necessary for public and wildlife safety. In addition, special plan district provisions were adopted to address wildlife hazard issues and the requirements of the Federal Aviation Administration approved Wildlife Hazard Management Plan. For example, there are new exemptions for tree crown maintenance and land management to reduce wildlife

hazards. Area-specific landscape standards and a plant list were developed to support the urban forest but not attract or provide roosting habitat for large birds or flocking birds. In addition, the plan district standards allow the conversion of emergent or herbaceous wetlands to scrub-shrub wetlands. Scrub-shrub wetlands are not as attractive to large water fowl that can pose risks to aircraft.

These provisions are consistent with Title 13, 03.07.1340.A.9 which allows activities on Port of Portland property that are needed to meet the Wildlife Hazard Management Plan. Title 13 does not require these activities to avoid or minimize adverse impacts on natural resources, but does require mitigation for detrimental impacts on natural resources. The plan district requires mitigation to be located in areas where it mitigation will not increase wildlife-related risks to aircraft.

In addition to amending the City's comprehensive plan and zoning code, the Portland International Airport project resulted in an intergovernmental agreement between the City and the Port of Portland. The agreement outlines mitigation requirements that will apply to grasslands identified as Special Habitat Areas before and during development. Mitigation for loss of these grasslands, which support at-risk and grassland-associated species, will occur on Government Island starting in 2012 and continuing in 50 acres increments as development occurs. The IGA serves as an alternative approach that to help meet the intent and requirements for District Plans.

In summary, the products of the Airport Futures Project substantially comply with Title 13 requirements for a District Plan, specifically section 3.07.1330 B and 03.07.1340.A.9. The plan district regulations supplement or supersede existing environmental overlay zones provisions for activities within the Portland International Airport and Cascade Station/ Portland International Center plan districts. The overlay zone regulations combined with the plan district regulations and comport generally with the performance standards and best management practices outlined in Title 13. Coupled with the intergovernmental agreement, the products of the Airport Futures project balance the protection and enhancement of significant natural resources with the specific issues associated with the Portland International Airport.



*South Waterfront view across the Willamette River*

### **Central City Plan District—South Waterfront Subdistrict (33.510.253)**

In contrast to the other plan districts described in this section so far, the greenway regulations for the South Waterfront Subdistrict of the Central City Plan District regulations do not supplement the greenway overlay zone regulations in Chapter 33.440. Rather they apply to within the South Waterfront Subdistrict instead of the regulations of Chapter 33.440. The purpose of the South Waterfront Subdistrict greenway regulations is to:

- Protect, conserve, enhance and maintain the natural, scenic, historical, economic and recreational qualities of lands along the Willamette River with the South Waterfront Subdistrict;
- Increase public access to and along the Willamette River;
- Support the development of the South Waterfront Subdistrict as a vibrant mixed-use neighborhood within the Central City;
- Ensure a clean and healthy river for fish, wildlife and people;
- Embrace the river as Portland's front yard;
- Enhance stormwater management in the South Waterfront Subdistrict;
- Respond the federal Endangered Species Act and Clean Water Act; and
- Implement the Willamette Greenway Plan and state law.



There are 60 acres of HCA in the South Waterfront Subdistrict of the Central City. The greenway area within the South Waterfront Subdistrict is the area between ordinary low water and a point 100 feet from the top of bank. The greenway area is divided into 3 subareas and development. Within the greenway area some development is allowed by meeting development standards, and some development must meet development standards and go through a South Waterfront greenway review.

The development standards require landscaping and limit the amount of area that is not landscaped. Buildings must be not river-dependent or river-related must setback 45 feet from top of bank. Landscaping must cover 80 percent of the area that is not covered by buildings, trails, or other area that is not landscaped. The South Waterfront greenway area has an extensive plant list that must be adhered to when designing greenway landscaping.

The South Waterfront greenway review guidelines focus on:

- Designing a cohesive greenway trail system;
- Addressing greenway edges;
- Addressing gathering places and public art;
- Utilizing riverbank stabilization strategies that enhance the river and riverbank ecosystems;
- Where appropriate, integrating public access to the water that is safe and supportive of adjacent riverbank areas;
- Selecting appropriate species of native plants based on the soil, light, moisture conditions, context and adjacent uses of the site;
- Creating and enhancing habitat through renaturalization, encouraging a structurally diverse and ecologically valuable greenway.

### ***Columbia South Shore Plan District (33.515)***

Like the South Waterfront Subdistrict section of the Central City Plan District, the Columbia South Shore plan district (CSS) regulations supersede rather than supplement the environmental overlay zone regulations in Chapter 33.430. As such, they apply directly to environmental overlay zones within the plan

district instead of the regulations of Chapter 33.430. The purpose of the CSS plan district environmental regulations is to:

- Protect inventoried significant natural resources and their functional values;
- Implement the Comprehensive Plan environmental policies and objectives;
- Encourage coordination between City, county, regional, state and federal agencies; and
- Protect inventoried significant archaeological resources where those resources overlap an environmental overlay zones.

There are 400 acres of HCA in the Columbia South Shore plan district. The procedures for development approval are similar to the procedures of 33.430 in that some development activities can be approved through the plan check process, while other development activities must go through an environmental review.

However, the CSS plan district allows only a very narrow list of activities and uses by meeting development standards alone. Environmental review is required more often for new development or alterations to existing development within the CSS plan district. Destruction of a resource in the environmental protection zone is not allowed. However, the environmental review approval criteria that apply to development in environmental conservation zones focuses on limiting the impacts of development, mitigation, and revegetation rather than avoidance of development in or near a natural resource. This reflects the City's dual goals to promote economic development and ensure resource protection in the Columbia South Shore area. The Columbia South Shore is one of the City's primary locations for industrial and employment economic development.

Mitigation requirements in the CSS plan district are more stringent than in 33.430. The approval criteria allow for destruction of resources within environmental conservation zones if the resource is replaced through mitigation that provides a net increase in resource values (again destruction of a resource in an environmental protection zone is not allowed). Mitigation for development abutting a resource area must be at least 110 percent in size and provide 110 percent of the resource value affected by

the development. Mitigation for development within a resource area must be at least 330 percent of the size and provide 110 percent of the resource value lost. In addition, when development is approved on a site with environment overlay zones, the development standards require revegetation of the environmental overlay zone, even if the development will be located outside of the environmental zone.

The CSS plan district does not address resource location verification in the same way that the Environmental Overlay Zones (33.430) regulations do. Environmental zone boundaries in the CSS plan district may only be modified to reflect the loss of resources after development has been approved and to reflect the creation of new resource areas as a result of mitigation.

As documented in this section Portland has established a number of plan districts that provide additional protection and mitigation requirements for Title 13 HCAs both within and outside the City's natural resource overlay zones.

## **Land Division Code (33.600)**

The City's land division code contains regulations that further the Title 13 goals of protecting, conserving and restoring the region's riparian corridors and wildlife habitat resources:

- A percentage of the large and significant trees on a land division site must be preserved when it is feasible to do so and still meet the other regulations of the code. When it is not feasible to preserve some portion of the trees, mitigation for the loss of trees is required;
- Lot sizes are flexible to allow for trees and other natural site features to be preserved;
- All lots must be located outside of flood hazard areas. Where this is not possible, all buildings must be located outside the flood hazard area or constructed in a way to provide protection from flooding. Minimum density is reduced based on the amount of area located within a flood hazard area;
- Minimum density may be reduced for sites in potential landslide hazard areas;
- Where landslides are a possibility, all lots, buildings, services and utilities must be located on the safest part of the site; and
- Streams, seeps and springs located outside of an Environmental Overlay Zone must be preserved in a tract.





*Smith and Bybee Lakes Natural Resource Management Plan has provided a long-term road map for management of this unique resource area.*

## Natural Resource Management Plans (33.430.310)

Natural Resource Management Plans (NRMPs) are intended to serve as a long term natural resource management plan for lands within environmental overlay zones. They are appropriate for large sites or areas in single ownership or multiple ownership. NRMPs are also intended to provide additional certainty by modifying and streamlining review procedures projects carried out in accordance with the plan.

Currently three Natural Resource Management Plans have been established in the City of Portland, the Forest Park NRMP, Smith and Bybee Lakes NRMP, and the Pen 1 NRMP. These NRMPs are described briefly below.

### Natural Resources Management Plan for Smith and Bybee Lakes

The Smith and Bybee Wetlands complex, formerly called Smith and Bybee Lakes, is a Title 13 Habitat Conservation Area. The City adopted a NRMP in 1990 to protect and manage Smith and Bybee Lakes as an environmental and recreational resource for the Portland region, and to preserve the area as an historic remnant of the Columbia River riparian and wetlands system. Recreation is to be managed in a manner that

is compatible with the resource. Key objectives include protecting water quality, allowing development for passive recreation, and monitoring. The plan also called for managing the area along with the St. Johns Landfill when its role as a landfill was terminated.

The Smith and Bybee Lakes NRMP was prepared primarily by the Port of Portland and the City of Portland Bureau of Parks and Recreation. The plan includes extensive information about the natural resources at the site, as well as existing environmental impacts from various factors. From the environmental assessments emerged a number of proposed activities to improve environmental conditions in the area. Activities range from projects to manage water levels and improve water quality, to habitat restoration, to modeling and monitoring. The plan also includes a recreational assessment and recommendations, and an evaluation of educational opportunities.

The NRMP presents a list of development and management projects to be carried out over a long period of time, such as vehicle parking, canoe and boat launches, 40-mile loop and other trail development, and restroom facilities. The plan establishes recreation management priorities as well.



The plan established a set of policies outlining roles and responsibilities for various agencies including Metro, the City of Portland, and the Port of Portland, and a management committee to advise implementation of the plan. The NRMP identifies the land use review procedures that would be used to evaluate conformance with the plan for the various projects and activities, as well as procedures to handle exemptions to the plan.

Today, Metro manages Smith and Bybee Wetlands (renamed), and the Management Committee that was established by the plan remains active. In 2010 Metro met with the City of Portland to discuss options for updating the NRMP. Metro noted that most of the actions outlined in the plan had been accomplished and that the plan was now obsolete. Metro pointed out the the process to establish or update a NRMP is costly and time-consuming. Metro requested that the City establish a more flexible process to encourage master planning for large natural resource areas. The City responded by adopting a new mechanism called a Comprehensive Natural Resource Plan in 33.809. The CNRP allow the establishment of a 10-year master plan for land within environmental overlay zones through a quasi-judicial process. Metro is currently planning to submit an application for a new CNRP for Smith and Bybee Wetlands, and the Portland City Council has approved the termination of the Smith and Bybee NRMP when a new Comprehensive Natural Resource Plan is approved.

### **Natural Resource Management Plan for Forest Park**

Forest Park contains many streams and associated high value riparian corridors and wildlife habitat that have been designated Title 13 High Habitat Conservation Areas. The Portland City Council adopted the Forest Park NRMP 1995 to respond to new challenges, including increased use in the park, new forms of recreation, spread of invasive plants, conflicts between users, and problems with homeless camps. In addition, Portland citizens had an increasing recognition of the more than 5000 acre Forest Park as an important and unique community resource. Because the NRMP replaces the environmental regulations, the City pursued a NRMP for Forest Park to streamlined process for project approval.

The NRMP was designed to balance goals for natural resource protection with goals for recreational use and education. Resource conservation goals aim to protect

native plants and animals, and sustain viable forest ecosystem for future generations, and to design resource enhancement projects to provide wildlife habitat and migration opportunities, promote biodiversity, improve water quality and aquatic habitat, and restore fragmented ecosystems.

The NRMP identified high and medium priority projects to carry out a list of key strategies. Examples of strategies are to acquire and protect more land, manage recreation to protect natural resources, improve park safety and access, and enhance educational, interpretive and research opportunities. Examples of projects include conducting user surveys, restoring Balch creek and other resource enhancement projects, acquiring more inholdings, funding and hiring a park ranger, establishing trail connections. developing an education program, and monitoring natural resource conditions. Many of these actions have been completed or established and are ongoing.



*Portland's jewel – the 5,000 plus acre Forest Park*

### **Natural Resource Management Plan for Peninsula Drainage District No. 1**

The Peninsula Drainage District No. 1 (Pen 1) contains a number of wetlands and drainageways that are also Title 13 Habitat Conservation Areas. The City adopted a NRMP for Pen 1 to manage wetlands, wildlife habitat, and natural areosources in a coordinated manner, to evaluate the ecosystem as a whole and provide direction for protection and enhancement, and to provide a level of certainty in the environmental review process by identifying primary mitigation areas for approved development projects. There was also an interest in addressing recreation other than that addressed previously for Portland International Raceway and the Heron Lakes Golf Course.

The NRMP areas includes land owned by seven different public and private property owners. The area



contains extensive natural resources and wildlife. The Plan was initiated by the Planning Bureau and the Kenton Neighborhood Association given concern about growing pressures on the land from development and a lack of local recreational options.

The plan establishes management objectives for wetlands and natural areas, including limiting slough crossings, enhancing habitat for native turtles, and restoring vegetated interconnections between wetlands and forest areas. Management objectives for land use and recreation include improving public access to natural areas through an improved trail system, access to public transportation, improving educational and scenic resource areas, and allowing needed water quality and drainage facility enhancements

The plan presents detailed hydrologic, water quality and sediment, and wetlands and wildlife habitat information. This is followed by an extensive site of priority enhancement and mitigation areas, and a set of natural resource policies and objectives. The plan outlines future development projects anticipated by the various property owners, and a set of NRMP action items focused on resource enhancement. The NRMP establishes the various actions allowed in conformance with the plan, and specifies the land use and permitting procedures required anticipated actions, providing certainty beyond what would be possible absent the NRMP. Finally the plan identifies actions subject to the usual zoning code requirements and procedures for modify the plan.

Today, many of the anticipated projects have been carried out, including mitigation and enhancement of identified priority resource areas.

In conclusion, NRMPs are a powerful, if somewhat rigid tool for protecting and enhancing Portland's Natural Resources, particularly in publicly owned parks and open spaces as required by Title 13 3.07.1340.A.5.

## Alternative Programs

In addition to zoning tools, Portland administers regulatory and non-regulatory programs that provide significant additional protection, enhancement and restoration of Title 13 HCAs and other significant resources in Portland. These programs are integral to Portland's Title 13 compliance package as explained in the introduction to this report. They reinforce,

complement, and significantly augment the zoning and non-zoning regulations described in previous report sections.

For the most part the alternative programs are administered by the Bureau of Environmental Services and the Bureau of Parks and Recreation. Many of these programs are key implementation elements of the Portland Watershed Management Plan or the Urban Forestry Management Plan, as are the zoning tools described in the previous section.

The Portland Watershed Management Plan (2006), led by the Bureau of Environmental Services, establishes goals and objectives relating to hydrology, habitat, water quality and biological communities. The Urban Forestry Management Plan (2004), led by the Bureau of Parks and Recreation, establishes goals for a healthy urban forest that provides benefits equitably to all Portlanders. These plans provide technical and policy foundations for most of the programs described in this section and are, along with the Comprehensive Plan, integral to the City's Title 13 compliance package.

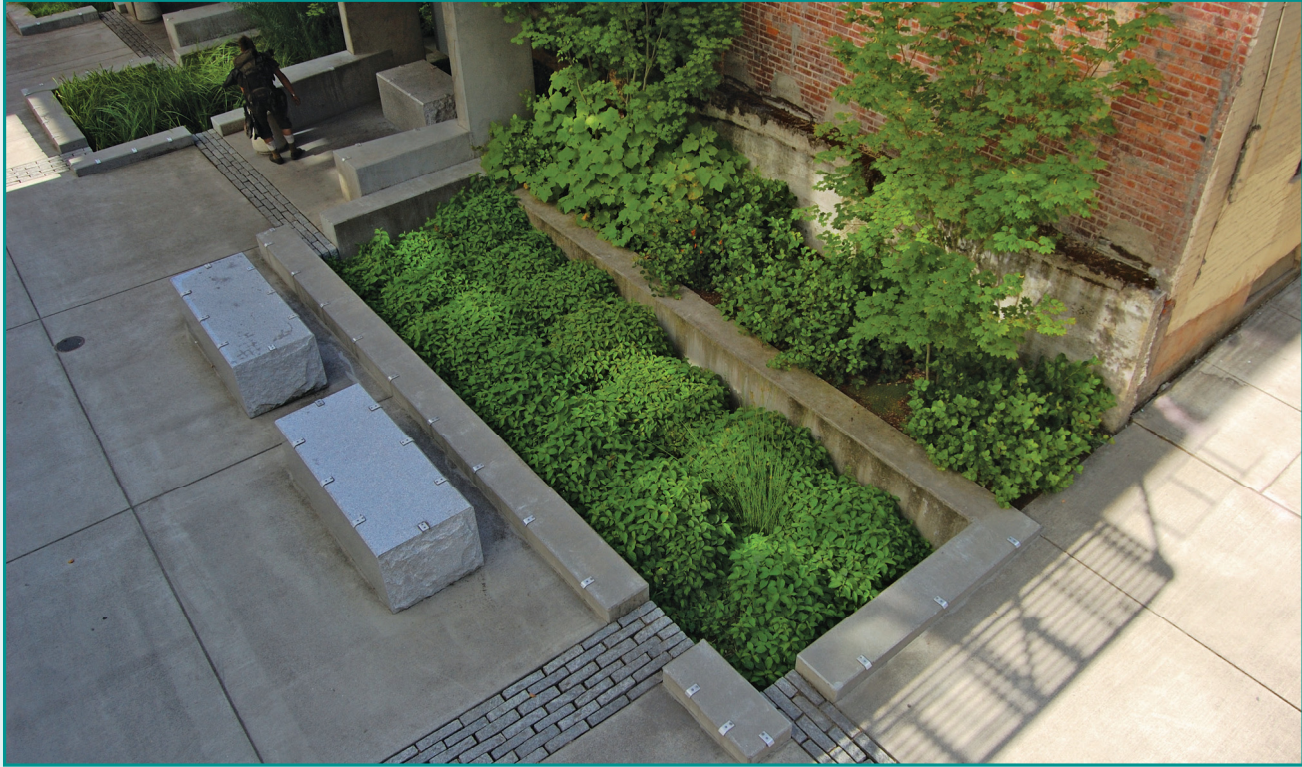
Title 13 requires that these alternative programs provide adequate certainty in terms of proven effectiveness and stable funding. The regulatory and non-regulatory programs described below are well-established elements of Portland's long-term strategies to meet state and federal requirements (e.g., Clean Water Act), and the City's own watershed health and urban forest management goals.

## Regulatory programs

This section provides a summary of regulatory tools outside the zoning code that contribute significantly toward the protection of city watersheds including but not limited to Title 13 Habitat Conservation Areas. Described below are the following programs:

- Stormwater Management Manual
- Drainage Reserve Rules
- Floodplain Regulations
- Tree Codes
- Invasive Plants – Required Eradication List
- Illicit Discharge Program
- Spill Response Program





*Green stormwater management facilities provide design amenities.*

### Stormwater Management Manual

In response to the impacts of urbanization on water quality, Congress passed the Clean Water Act of 1972 (amended in 1987). The CWA regulates the discharge of pollutants into waters of the United States through a variety of point and non-point runoff controls via National Pollutant Discharge Elimination System (NPDES) permits. NPDES permits are granted for wastewater and stormwater discharges to waters of the United States.

Compliance with the NPDES MS4 permit requires the cities to establish a comprehensive stormwater management program. Such programs must include controls on all post-development stormwater runoff and source controls for commercial and industrial related discharges to the MS4 system.

In response to these mandates, the City of Portland adopted its first Stormwater Management Manual (SWMM), establishing stormwater-related requirements for new development and redevelopment. The SWMM establishes stormwater management principles and techniques that help preserve or mimic

the natural hydrologic cycle, minimize sewer system problems and improve water quality.

The SWMM includes water quality, flow and volume control design standards for managing stormwater runoff. Since 2004, the SWMM has prioritized the use of onsite, vegetated stormwater management facilities. The program focuses on low-impact development practices, structural source control devices, and maintenance and operational best management practices (BMPs) designed to improve stormwater quality.

All new development and redevelopment proposals in the City of Portland must address requirements of the SWMM during project review and permitting including land use reviews, and site development and building permits. The SWMM provides developers and design professionals with specific requirements for reducing the impacts of stormwater from new development and redevelopment.



The SWMM requirements apply to:

- Properties that propose new or increased offsite discharges or new connections to the public storm sewer and drainage system;
- Projects that develop or redevelop over 500 square feet of impervious surface; and
- Multifamily, commercial or industrial projects that disturb an activity area of concern as specified in the SWMM.

Proposals meeting these thresholds must comply with stormwater **infiltration/volume** requirements as specified in the stormwater hierarchy, **flow control** requirements, and **pollution reduction** requirements. Projects disturbing activity areas of concern must meet the **source control** requirements of the SWMM. All projects must also comply with SWMM operations and maintenance requirements.

Portland's infiltration and discharge requirements are designed to:

- Protect watershed health by requiring onsite infiltration wherever feasible in order to mimic pre-development hydrologic conditions;
- Protect the capacity of downstream infrastructure and minimize combined sewer overflows and basement sewer backups within the combined sewer system;
- Protect groundwater resources by preventing and removing stormwater pollutants before discharging into an underground injection control (UIC) facility; Portland's flow control requirements are designed to:
- Minimize undercutting and flashiness in local area streams;
- Control intense storm events within the combined sewer basin.
- Portland's pollution reduction and source control requirements are designed to:
- Remove pollutants from discharges through absorption, filtration and plant uptake processes;
- Prevention pollution at its source – site by site rather than relying on larger regional facilities for pollutant removal;

- Prevent contamination of stormwater with materials of concern.

Stormwater must be infiltrated onsite to the maximum extent feasible before discharging flows offsite. The appropriate use of infiltration depends on soil type, soil conditions, slopes, depth to groundwater, and the presence of contaminated soils or hazardous materials. The point of discharge is also site-specific and dependent on the availability and condition of public and private infrastructure and the stability of receiving system (local streams or groundwater). Sites must address the feasibility of on-site infiltration before being approved for an off-site discharge point. While many of the stormwater management facilities presented in the SWMM aim to maximize infiltration, many sites will still need a secondary on-site or off-site discharge point for runoff from large, intense rainfall events.

The SWMM complements and supports the City's Portland Watershed Management Plan, System Plan, Revegetation Program, Greenstreets Program, and other City standards and practices. Portland's emphasizes the use of vegetated surface facilities to minimize pollutants in and volume of stormwater on the property where the stormwater runoff is created. Infiltrating stormwater onsite with vegetated surface facilities is a multi-objective strategy that provides a number of benefits, including:

- pollution reduction;
- volume and peak flow reduction;
- groundwater recharge;
- shading and temperature control on ponded and running waters, buildings and other impervious surfaces;
- erosion prevention;
- provision of habitat resources; and
- financial benefits from energy conservation and potentially property value increase from the use of vegetated facilities.

These benefits play a critical role in protecting stormwater infrastructure and improving watershed health.

The SWMM was revised in 2000, 2002, 2004 and 2008.

The 2008 update was extensive and reorganized the document to eliminate duplication, and improve the overall presentation of the information.

As a complement to the SWMM, the City created the Stormwater Solutions Handbook a more educational and less technical document for people interested in managing stormwater on their property. It presents techniques to help meet City objectives for stormwater management, clean water, and healthy habitat for people, fish and wildlife.

### Drainage Reserve Rules

The Bureau of Environmental Services administers the City's Drainage Reserve Rules which are an appendix to the Stormwater Management Manual (2008). The Drainage reserve rules are a critical component of the City's Title 13 compliance package in that they provide baseline protections for streams and drainageways that are located outside City environmental overlay zones.

The drainage reserves protect more than 60 additional acres of HCA in Portland and a total of about 71 acres citywide.

The main goal of the drainage reserve code and associated administrative rules is to protect flow conveyance in both natural and manmade surface channels (drainageways), thereby minimizing scouring and erosion in local stream systems and protecting properties from impacts related to modifications of drainageways.

Drainage reserves act as a no-build area, not an easement. Drainage reserves ensure that properties with drainage downstream and upstream of developing properties are not damaged or destabilized by ponding, flooding, or other impacts from excess flows.

While reserves are implemented on a site-by-site basis, the drainage reserve code and administrative rules strive to protect local waterways from cumulative impacts of development, especially in headwater areas.

The code and administrative rules are intended to establish standards and appeal processes to meet the following objectives:

- **Responsibly manage stormwater and limit site impacts.** Maintain the location of stormwater discharges and flows where they naturally occur within the development area and cause least detrimental environmental impact;
- **Limit off-site impacts** – if any encroachments into the drainageway channel are proposed, identification of the upstream tributary drainage and a downstream analysis shall be required to ensure there are no substantive impacts to downstream properties. The kind of analysis required will depend on the cumulative impact of problems identified within the basin and the size of the planned project;
- **Control runoff** – proposed construction projects and system modifications or improvements shall provide runoff controls to limit the developed condition's peak rates of runoff to the pre-development peak rates for a specific design storm frequency, based on the proposed project site's existing runoff conditions;
- **Control erosion** – All conveyance systems shall be designed and modified to prevent and reduce construction erosion and long-term, scour-related erosion within the drainageway. This includes the establishment of woody vegetation for scour protection and enhanced infiltration and water quality;



*A no-build drainage reserve area runs through a multifamily residential development.*



- **Provide operation and maintenance** – the private property owner is responsible for retaining the drainageway as an open system and for maintaining all drainage facilities constructed or modified by a project, unless the City has specifically agreed to City Operation and Maintenance (O&M) before plan approval. Owners shall also be responsible for maintaining all enrichment elements approved by the City and covered by a drainage reserve O&M plan;
- **Maintain capacity** – because drainageways serve an important hydrologic function for small waterways, there may be a requirement to demonstrate that any encroachments into the drainageway will not affect storage or conveyance volumes of the drainageway. Mitigation may be required for any lost capacity in the drainageway resulting from encroachments.

While protecting flow conveyance is the express purpose for establishing drainage reserves, the rules also include elements to meet secondary City goals such as plant diversity, water quality, habitat and other watershed health issues such as restoring onsite hydrology, improving water quality, habitat, and biological communities.

Drainage reserves are routinely required at the building permit stage of development. BES staff will evaluate, identify, and propose conditions of approval at the land division stage of development to help enhance the ability of developers to design around reserve areas.

These rules do not specifically address existing development that has previously been built in areas that would meet the drainageway definitions found in this document. However, any new expansion of structures that encroach in the drainage reserve and trigger a building permit must comply with these rules.

Drainageway-related regulations are required as a separate review in any of the following situations:

- The development proposal requires an environmental plan check and there is a drainageway on the site that is not identified on the map of streams and water bodies;
- The development proposal requires an environmental plan check;

- The development proposal is exempt from E-zone regulations;
- The drainageway is outside of the E-zone.

Drainage reserves are typically 30 feet in width and placed on a site in one of the following manners:

- 15 feet from the centerline of the identified channel on both sides;
- Within the boundary of designated environmental zones (if the zone is less than a total 30-foot zone); or
- For full coverage of the channel, plus 15 feet from top of bank, if the 30-foot width will not fully protect the channel width on larger drainageways.

BES staff retains the authority to modify or remove drainage reserves if the drainageway poses or may pose a landslide, flooding, or other public health and safety concern. In those instances, BES may allow drainageways to be moved, modified, or piped to protect public health and safety, in compliance with Title 24 and 33 regulations.

Drainage reserves shall be protected during the course of any proposed or future development to ensure the continuation of flow conveyance and other benefits. Drainage reserves shall be protected and maintained to meet the following standards:

- The limits of the drainage reserve shall remain in natural topographic condition to the maximum extent practicable, as determined by BES; and
- No new vegetation proposed within the drainage reserve limits shall be on Portland's lists of nuisance plants or prohibited plants. Preference shall be given to native vegetation, especially for erosion control and water quality purposes.

To help ensure long-term protection of drainage reserve areas, BES will require the applicant to record notice of condition against the property deed. This notice of condition is to notify future property owners of the presence of a drainage reserve onsite and the requirements to maintain it as an open, functional flow conveyance feature.

Development proposals shall meet all of the following minimum standards to ensure drainageway protection:

- All proposed disturbances on the site, including but not limited to structures, pipes, culverts, excavations, and fills, shall be located away from the existing drainageway and drainage reserve limits to the maximum extent practicable, as determined by BES review staff. Small facility outfalls are exempted;
- Temporary and permanent erosion control measures shall meet the requirements in the City's Erosion Control Manual (City Code Title 10.30.020). Additional erosion control measures (e.g., reinforced silt fence, bio-filter bags, or erosion blankets) may be required to ensure adequate protection of the drainageway during construction and during the establishment of vegetation within the drainage reserve;
- During site construction, water shall be safely conveyed around or through the drainageway. The channel shall not be obstructed, with the exception of properly employed erosion control measures (such as bio-filter bags) when necessary. Seasonal limitations on development in or near the reserve may be placed if there are special site conditions such as those defined in Title 10; and
- No heavy machinery that produces ground compaction shall be allowed within the drainage reserve limits during construction. Low ground-pressure vehicles (such as spider hoes) may be allowed if the applicant can show adequate soil and vegetation protection.

### Erosion Control (Title 10)

To comply with the erosion control requirements of *Metro Title 3, (Metro Code Sections 3.07.310 – 3.07.370) – Water Quality, Flood Management and Fish and Wildlife Conservation*, the City adopted a new Erosion Control code and subsequently an Erosion Control Manual. Title 10 provides requirements for development and construction related activities in order to control the creation of sediment and to prevent the occurrence of erosion at the source during construction and development.

The City's erosion control requirements are an important element of the Title 13 compliance strategy

as well. They help keep air and water clean, protecting critical riparian corridor functions and biological communities. They help reduce sedimentation into streams and wetlands, preserving channel stability and aquatic habitats such as salmon spawning areas.

The Erosion and Sediment Control Regulations seek to:

- Reduce the sediment and pollutants contained in erosion caused by construction and development;
- Reduce the amount of sediment and pollutants entering storm drainage systems and surface waters from all ground disturbing activity;
- Reduce the amount of erosion placing dirt and mud on the public right-of-way and surrounding properties during construction and development; and
- Reduce the amount of soil and dust placed into the air during ground disturbing activity.



*Erosion control measures on steep slope*

The overarching requirements of the Erosion Control Manual are:

- No visible and measurable sediment or pollutant shall exit the site, enter the public right of way or be deposited into any water body or storm drainage system;
- Depositing or washing soil into a water body or the storm drainage system is prohibited;
- Ground-disturbing activities requiring a permit shall provide adequate public notification of the City's Erosion Control Complaint Hotline.



In order to meet these requirements responsible parties must:

- Install measures intended to keep soil on site or out of water bodies, storm drainage systems or the public right of way as the first step in any development;
- Remove any soil that enters the public right of way;
- Protect stormwater inlets that are functioning during the course of the development;
- Apply permanent or temporary soil stabilization to denuded development site areas in conformance with a specified seasonal schedule;
- Plant replacement vegetative cover that does not include plants listed in the Nuisance Plant List;;
- Secure or protect soil stockpiles throughout the project with temporary or permanent soil stabilization measures;
- Select BMPs from the Erosion Control Manual; and
- Post signage on the site of the permitted ground-disturbing activity that identifies the City's Erosion Control Complaint Hotline number or the responsible City project manager or inspector.

The Erosion Control Manual establishes additional special site requirements for:

- Slopes before development that are greater than 10 percent (1 Vertical: 10 Horizontal);
- Ground disturbance of a natural vegetative buffer within 50 feet of a wetland and or water body;
- The development site is located entirely or partially within an Environmental Overlay Zone or Greenway Overlay Zone;
- The development site or development phase will have ground disturbance at any one time of 10,000 square feet or more. Single family dwellings and duplex dwellings are exempt from this size limitation;
- The development includes a land division containing 10,000 square feet or more;

- Project timing is such that ground-disturbing activity will take place between October 1 and April 30; and
- The development involves discharge or offsite disposal of dewatering or trench spoils.

Additional requirements may include:

- Requiring drainage control in compliance with Titles 17 and 24, during all development phases;
- Requiring that a State of Oregon registered professional engineer, other professional certified by the State of Oregon with experience or qualifications in preparing erosion control plans, or a registered CPESC prepare and/or implement the erosion and sediment control plan;
- Prohibiting ground-disturbing activities between October 1 and April 30;
- Limiting the amount of denuded soil at any given time; and
- Requiring a bond, letter of credit or other guarantee.

The Erosion control manual also establishes maintenance requirements and requires submittal of an Erosion, Sediment, and Pollutant Control Plan (ESPCP) for permitted development projects if the disturbance area is 500 square feet or greater in area or if the disturbance is in a special site.

## **Floodplain regulations (Title 24, Building Regulations, 24.50 Flood Hazard Areas)**

To comply with the flood hazard management requirements of Metro Title 3, Water Quality, Flood Management and Fish and Wildlife Conservation, the City adopted new floodplain management requirements in Title 24, Building Regulations. These provisions require balanced cut and fill in flood hazard management areas, except as specifically exempted from the requirements. While these provisions are intended primarily to reduce risk to public health and safety, and to property, the provisions also provide an opportunity to protect and restore the floodplain-related functions identified in Title 13 as well, including nutrient cycling, organic inputs, and habitat.



## Tree codes (Title 11, Trees, Title 33, Planning and Zoning)

Title 13 includes existing tree ordinances in the list of alternative approaches that may be part of a city or county's compliance program. The City of Portland's existing tree codes establish permitting requirements for trees on public and private property. The current codes require permits to plant, remove or prune all trees on city owned or managed property, including rights of way. The City requires public trees to be replaced when removed. The city also requires permits to remove trees on private property except single family residential property with an existing house. These code provisions are in Title 20, Parks and Recreation. Trees in development situations are addressed through zoning code provisions. The zoning code requires tree preservation and replacement in environmental zones and in conjunction with land divisions. Tree planting is also addressed through the City's landscaping requirements.

In 2011, the Portland City Council approved a major overhaul to the City's tree rules. Led by the Bureau of Planning and Sustainability, the Citywide Tree Project consolidated Portland's tree rules into a new code title called Title 11, Trees. Title 11 updates the City's permit system establishing a \standardized tree permit program and new tree preservation and planting standards for public and private development projects. Title 11 also prohibits planting of Nuisance Trees on City property and contains revised enforcement provisions.

The Citywide Tree Project also updated tree provisions in the zoning code. New qualitative and quantitative tree preservation criteria were established for use in reviewing land division applications. The updated criteria are intended to improve the quality of tree preservation by focusing on large healthy trees and groves. Tree preservation was also added as an explicit factor to consider in conditional use and design reviews. The tree-related provisions that apply in natural resource overlay zones were updated to more clearly address trees that are not native species or nuisance species and to clarify that tree replacement is required in the transition area of environmental overlay zones.

Further, clarifications in the definitions section of the zoning code will ensure that setbacks from identified



*Treetops – tall conifers in Portland*



*East Portland neighborhood characteristics include mature conifers.*



*Heritage tree in downtown Portland*



water bodies (streams, wetlands) are applied more consistently within existing environmental overlay zones. More consistent application of water body setbacks will help preserve and maintain riparian vegetation that is critical to the health of Title 13 HCAs.

As a result of the code amendments it is estimated that more than 100 acres of future tree canopy per year will be generated due to additional tree preservation and planting. Additional tree preservation and replanting will occur on thousands of acres of environmentally sensitive land, given clarifications to code provisions that apply in environmental overlay zones, including along Portland's riparian corridors that comprise Title 13 HCAs.

Title 11, Trees and the bulk of the zoning code amendments are scheduled to go into effect in July 2013. Nevertheless, the City Council has, even in severely constrained budget years, approved funding in FY 2011-2012 and 2012-2013 sufficient to continue progress toward full implementation

## Invasive Plant Management – Required Eradication (Title 29, Property Maintenance)

Portland is committed to managing invasive plants citywide through a combination of regulatory and voluntary approaches. In addition to prohibiting the planting of nuisance plants in natural resource overlay zones and City-required landscaped the City recently established a new *Required Eradication List* in Title 29, Property Maintenance. The intent of this new rule is to control the spreading of highly invasive plants that have not yet become widespread in Portland. If one of the species on this list is discovered the property owner must remove the plant. The City will offer to assist with the removal, however the removal is mandatory. Additional information on City invasive plant management programs is described below under non-regulatory programs.

## Illicit Discharge Elimination Program

The City's Illicit Discharge Elimination Program (IDEP), initiated in 1994, includes the following elements:

- Identifying and eliminating illicit cross-connections to the system.

- Monitoring the storm drainage system during dry weather to identify and eliminate illicit or non-stormwater discharges of concern.
- Tracking stormwater outfalls added or removed from the system.

In 2006, the City completed a two-year update of City Code and administrative rules for the City's enforcement program for illicit discharges to stormwater and sanitary systems. The administrative rules identify the enforcement tools that can be used for violations. These include written warnings, written citations, cease and desist work orders, administrative reviews, voluntary compliance agreements, penalties, termination of permit, and summary abatement by BES.

## Spill Response Program

The City's Spill Response Program was developed in 1994 to provide immediate response to emergency spills (liquid and solid) and investigate pollution complaints. Staff investigate reports of stormwater pollution and problems in the sewage and drainage collection system, and monitor sewage cleanups. Staff monitor the program's spill response hotline 24 hours a day, 365 days a year and respond to reported spills, slicks, and other unknown discharges. The program also refers problems to other enforcement agencies as appropriate.



*The City runs a 24-hour spill response dispatch center to prevent pollutants from contaminating soil and waterways.*

## Non-regulatory programs

In addition to the local zoning regulations and other regulatory tools described in previous sections of this report, the City of Portland uses a diverse set of non-regulatory tools to protect, conserve and restore natural resource functions and watershed conditions.

A number of the City's non-regulatory program tools, including willing seller land acquisition, restoration, education, and low impact development projects, are documented in the reports the City has submitted to Metro in accordance with Section 03.07.1360.C. This section addresses some of these programs as well as other key programs that are integral to the City's Title 13 compliance package.

These non-regulatory activities contribute substantially to the City's compliance with Title 13, addressing required best management practices for City managed natural areas and city-wide, leveraging public dollars and partnerships with public agencies and private property owners. The City of Portland has made a long term commitment to watershed health through a number of plans including the Urban Forest Management Plan (2004), Portland Watershed Management Plan (2006), Climate Action Plan (2009), and most recently, the Portland Plan (2012)

This summary is not intended to provide an exhaustive list of all City programs to improve watershed health. This summary is intended to highlight programs that, in concert with City regulations do the heavy lifting to protect, conserve and restore Title 13 Habitat Conservation Areas and overall watershed health.

Programs are organized and presented under the headings:

- Protection
- Resource Management, Restoration and Green Infrastructure
- Watershed Investment - Major Projects
- Financial Incentives
- Education and Stewardship
- Monitoring and Evaluation
- Ongoing Partnerships

## Protection

In addition to City regulations the City has been proactive in protecting land through other non-regulatory means, primarily through purchase, but also through limited support for conservation easements and other tools. This section features the City's Willing Seller Land Acquisition programs which provide additional protection for Title 13 Habitat Conservation Areas throughout the city.

### Willing Seller Land Acquisition

The City of Portland has established priorities and programs to acquire land from willing sellers to help achieve watershed health goals as outlined in the Portland Watershed Management Plan, protect public health and safety, and meet regulatory obligations under the Clean Water Act. In addition, the City's land acquisition programs are an integral component of the Title 13 compliance strategy, preserving the functions and values of significant riparian corridors and upland habitats in perpetuity.

### Johnson Creek Willing Seller Land Acquisition Program

In 1997, as part of a changing national trend to avoid and reduce flood hazard risk, the Bureau of Environmental Services (BES) launched the *Johnson Creek Willing Seller Land Acquisition Program*. The program helps move people and development out of frequently flooded areas, reducing risk to life and property, and creating opportunities to increase flood storage capacity, improve fish and wildlife habitat, restore wetlands, and create passive recreational activities for city residents.

The Johnson Creek Willing Seller Land Acquisition Program helps implement BES' *2001 Johnson Creek Restoration Plan and the Johnson Creek Watershed Council's 2004 Johnson Creek Watershed Action Plan*. These plans use a multi-objective, watershed approach to address a broad suite of issues in the Johnson Creek Watershed. The Restoration Plan specifically focuses on reducing nuisance floods, improving water quality, and enhancing fish and wildlife habitat, and identifies practical solutions to restore natural floodplain functions.

Since inception, 261 acres have been acquired in the Johnson Creek Watershed through the Willing Seller program. Willing sellers are offered fair market value



for their property and are under no obligation to sell to the City. After purchase the City removes structures and impervious surfaces from the property. The City places deed restrictions on each property designating it as open space in perpetuity and ensuring no future expenditure of federal disaster assistance funds for the property. Acquired properties are held in reserve while floodplain management concepts are designed and funds are secured. Ultimately, many of the properties will be used to create constructed wetlands, floodplain terraces and open space for flood management, habitat and passive recreation purposes.



*Acquisition of frequently flooded properties reduces hazard risk and allows restoration of East Lents section of Johnson Creek.*

Initial funding for the program was secured through FEMA and Community Development Block grants, Bureau of Environmental Services (BES) Capital Improvement Program (CIP) funds, and Metro's 26-26 Regional Bond. Since then, the program continues to be funded through City capital funds and a variety of other inter-jurisdictional public and non-profit partners connected to the Johnson Creek Watershed.

### Natural Area Acquisition Strategy

In 2006 the City Council adopted a citywide Natural Area Acquisition Strategy proposed by the Bureau

Parks and Recreation. The strategy provides a vision for protecting a healthy connected system of natural areas in the city, outlining a general approach and highlighting priority actions to achieve that vision. The protected system of natural areas will consist of green ribbons along major waterways and feature large natural area parks and preserves, providing access to nature from neighborhoods and trails.

The City's Natural Area Acquisition Strategy uses a mix of funds including revenues from regional greenspaces bond measures and various City funding sources. Adding and connecting to existing natural areas is a key goal of the strategy. The Bureau of Environmental Services and Portland Parks and Recreation, with local partners, have purchased 289 acres. Recent acquisitions include:

- the 146-acre River View site;
- the 21-acre Wilkes Headwaters (Columbia Slough);
- the 9-acre Deardorff Creek Natural Area (Johnson Creek Watershed);
- parcels within Baltimore Woods, a 30-acre corridor between residential and industrial areas in North Portland.

Environmental Services uses Grey to Green capital funding to partner on those acquisitions that have high watershed health and stormwater management benefits; planning is underway for a second phase of BES CIP-funded land acquisition beyond 2016 as part of watershed, water quality, and stormwater system planning.



*Rare remnant Oak/Madrone habitat preserved through Natural Area Acquisition program.*



## Resource Management, Restoration and Green Infrastructure

The programs featured in this sub-section focus on policy and activities to preserve, enhance and restore natural resources function and values *on the ground* through both built and natural green infrastructure. Some of these programs focus on City-managed land, while others operate across the watersheds on both public and privately owned land. In addition to efforts in natural areas, integrating green infrastructure that provides habitat connectivity, stormwater management, and other natural resource function in the built environment is becoming the norm in Portland's infrastructure planning and projects.

### Natural Area Management – City Nature Program

The *City Nature Program*, administered by the Bureau of Parks and Recreation (PP&R) was formed in 2004 to raise awareness of the importance of natural areas and their contribution to the livability of our city. City Nature promotes the stewardship of City-managed natural areas in natural and hybrid parks and oversees a variety of activities that enhance their ecological and recreational functions and values. This program is responsible for managing over 8,000 acres of natural areas within the city limits ranging from Forest Park, at more than 5,000 acres, to a web of small but important natural areas along the Willamette River.



*East buttes provide important upland habitat areas..*

A major goal of *Parks Vision 2020* (2001) is to 'preserve, protect, and restore Portland's natural resources.' The 2008-2011 PP&R Strategic Plan (updated May 2009) identified the following desired outcomes for this goal:

- Effective management of built and natural assets;
- Adequate land and facilities are provided to meet identified recreation, open space and biodiversity needs.

The *2010 Natural Areas Restoration Plan* focuses on six management strategies for City-managed natural areas, based on ecological health and the natural resource functions and values to achieve its goals:

1. Establish a predominance of native vegetation (removal of invasive plant species)
2. Watershed-based salmon recovery
3. Preserve and restore biological diversity
4. Best management practices to enhance water quality
5. Engage the public
6. Monitoring and adaptive management

In general, City natural areas with high natural resource value have the greatest potential for meeting the restoration goals, and are the highest management priority for City Nature. Overall, these areas are large, complex, and connected to fish-bearing streams or contain unique ecosystems and critical habitat types. As such, the management of these areas serves to protect, conserve, and restore the values and functions of extensive Title 13 Habitat Conservation Areas. These areas include:

- Forest Park
- Oaks Bottom Wildlife Complex
- Buttes Natural Area Complex (where?)
- Marshall Park Natural Areas
- South Portland Riverbank Properties (where?)
- Lower Powell Butte Floodplain Complex
- Tideman Johnson Natural Area/Errol Heights Natural Area
- Powell Butte Nature Park
- Elk Rock Island



### ***Invasive Plant Management***

The City of Portland has taken considerable steps to prevent and control the spread and negative effects of invasive plants, thereby contributing to the protection, conservation and restoration of the significant riparian corridors and upland habitats that comprise Title 13 Habitat Conservation Areas in Portland. These activities also contribute to the City's compliance with requirements of the Clean Water Act and Endangered Species Act.

### ***Invasive Plant Management Strategy***

In November 2005, the Portland City Council adopted Resolution 36360 which required bureaus to develop a three-year work plan and ten year goals to integrate invasive plant management into existing city programs and reduce invasive plant coverage in Portland. City bureaus collaborated to produce the *Invasive Plant Management Strategy*, in 2008 which is administered by the Bureau of Environmental Services (BES), and supported by multiple bureaus. Ongoing activities include:

***Invasive Plants Control*** – The City's Early Detection and Rapid Response (EDRR) and Protect the Best programs focus on managing invasive plants. The programs were initially funded through the Grey to Green initiative; planning is underway for program continuity beyond 2013.

***Early Detection Rapid Response (EDRR)*** – By 2011, the EDRR Program had completed over 800 acres of treatments in rights-of-way and on private property for priority invasive plant species, targeting invaders such as garlic mustard, knotweed, and giant hogweed. The program removes small patches of highly invasive plants and works to prevent new invaders from becoming established.

***Protect the Best*** – The Protect the Best Program is administered by the Bureau of Parks and Recreation and focuses on maintaining and enhancing City-owned and managed natural area assets. Protect the Best maintains the highest quality habitat by removing small patches of invasive plants in natural area parks. The program has treated over 2,300 acres with ongoing treatment and monitoring on hundreds of additional acres. Portland Parks and Recreation utilizes Integrated Pest Management strategies in managing City parks and natural areas. In 2003, PP&R was the nation's first park system to be *Salmon-Safe* certified.

This certification process includes extensive on-site visits by Salmon-Safe, an independent certification organization to ensure that standards are being met. PP&R was recertified Salmon Safe in 2012, remaining the only park district that has been certified. Salmon Safe includes irrigation, mulching, and use of pesticides following best management practices.

***Portland Plant List*** – First created in 1991 by the Bureau of Planning, the Portland Plant List includes lists of native plants and nuisance plants that serve as an education resource, and are used to implement a number of City regulations described in previous sections. The City has recently updated the plant list to rank each nuisance plant species according to its current distribution and invasion potential. It also added a required eradication list to the Portland Plant List.

***Outreach and Education*** – Portland Parks and Recreation holds volunteer work parties to remove invasive plants. Bureau of Environmental Services ongoing classroom and field programs teach students about watershed health, the importance of restoration, and identification of native and invasive plants.

***Coordination*** – City of Portland partners with multiple agencies to address invasive plants, including Clean Water Services, Three Rivers Land Conservancy, East and West Multnomah Soil and Water Conservation Districts, four County Cooperative Weed Management Area, SOLV, and Metro.



*Removing invasive plants before they become widespread is key to protecting rivers and streams.*



## Watershed Revegetation Program

The goal of this Environmental Services (BES) program is to enhance and manage green infrastructure in the natural and built environments across Portland's watersheds in service of clean rivers and healthy watersheds. The program actively establishes public and private partnerships to build awareness and community stewardship, and leverage resource to make the most effective use of public and private dollars.

The Watershed Revegetation Program (WRP) has four components: restoration of natural areas, planting and maintenance of stormwater management facilities, tree planting in the built environment, and control of invasive plants (including the EDRR program, discussed below). This restoration and enhancement work improves water quality, controls erosion, reduces stormwater pollution, aids in long-term salmon recovery, and enhances wildlife habitat.

**Natural Area Revegetation** – The natural areas team forms partnerships with public and private landowners to restore degraded stream bank and upland areas. BES started restoring streamside and upland areas in 1996. Since that time, the program has planted:

- 2,327 acres
- 645,004 lineal feet of stream bank with
- 1,395,457 broadleaf trees, 709,718 conifers, and 1,114,295 shrubs.

Restoration work has started on more than 2,800 new acres, including ivy removal on more than 1,000 acres in Forest Park. Over 110,000 tree seedlings have been planted in natural areas.

Property owners, working in partnership with BES, pay from 50 to 100 percent of the project expenses. BES provides native plants, contract labor, materials, and technical assistance. Projects include riparian and upland plantings, riparian zone-restoration and construction. Partners are encouraged to participate with these incentives:

- **Cost effectiveness** – Using professional forestry contractors and reforestation techniques, 78 percent of project funds are spent on the planting and maintenance. Wholesale purchasing power for labor, plants, and materials is a cost-saving incentive;

- **Maintenance and monitoring** – Projects are maintained and monitored for five years. Maintenance includes weeding, mulching, inter-planting, and watering;
- **Partnership** – The program combines the efforts of many agencies, businesses, and individuals to restore riparian areas and watersheds, with staff experienced in native plants and revegetation;
- **Local labor and materials** – Local contract nurseries and farm-forest contractors provide over 95 percent of the project labor and plant materials;
- **Plant diversity** – The program produces and uses seed and plant materials of 37 grass species, 15 shrub species, and 13 tree species, and the list grows each year. Many seeds are collected locally, in the Portland area.



*Before removal of invasive species*



*After just one season of treatment for invasives, the Riverview Natural Area in southwest Portland shows progress toward healthier native plant communities.*



**Tree Planting in the Built Environment** – The Watershed Revegetation Program plants trees in the built environment three ways: in partnership with nonprofit Friends of Trees, with on-call contractors, and through the residential incentive program Treebate (discussed below). Using this multi-pronged approach enables the city to effectively plant a diversity of trees in a wide range of locations. Since 2008 when Grey to Green initiative funding enabled a greater investment in tree planting, the program has helped to plant more than 37,000 trees along city streets and highways, on school grounds, and in residential yards. Over the next several years, the program will continue to focus attention on planting in underserved neighborhoods, finding opportunities to plant large, native trees, and targeting planting efforts to best benefit the stormwater system.



*Innovative green street designs bring nature and stormwater management into the Central Eastside Industrial District.*



*The City partners with Friends of Trees and community volunteers to increase tree canopy in all neighborhoods.*

### Green Streets

Green streets are facilities such as curb extensions, planters or rain gardens that naturally manage stormwater runoff, using vegetation and soil to filter pollutants and either allowing the water to soak into the ground or slowing it before it flows to other stormwater management facilities. Green streets are facilities remove pollutants from street runoff, and that also provide other benefits including traffic calming and additional vegetated area as a neighborhood amenity. The City uses green street facilities as an integral part of infrastructure projects to address stormwater system capacity, water quality, and other stormwater management needs. The facilities also enhance watershed health by increasing vegetation

and trees in urbanized neighborhoods, providing habitat connectivity, groundwater recharge and other benefits. Approximately 1,200 green street facilities are currently in operation, such as those recently completed in the *Tabor to the River Program* area, where the Bureau of Environmental Services has completed 137 green streets to manage stormwater runoff and help manage combined sewer overflows. The Portland Bureau of Transportation's East Burnside-Couch Couplet project included constructing 32 green streets. Construction has started on several green street projects, including several dozen as part of the Eastside Streetcar and Multnomah Village projects. Green streets are a critical component in the City's compliance with Clean Water Act regulations and continue to be planned and funded as part of various capital projects and programs, including BES's combined sewer and stormwater system planning, Sustainable Stormwater Management Program, and Watershed Investment Fund.



### ***Culvert Replacement***

Between 2007 and 2011, the City retrofitted or removed several culverts to improve fish passage, hydrology and/or water quality along Errol Creek, Tryon Creek, Forest Park and the Columbia Slough. Recently, BES has partnered with other agencies and community partners to replace one culvert (SE 28th Avenue) on Crystal Springs Creek in southeast Portland and will replace the remaining eight over the next two years. These actions will remove all fish passage barriers and improve hydrology and water quality on this tributary to Johnson Creek. BES CIP funding is planned through 2016 to leverage partnerships to replace other high-priority culverts in several watersheds. BES and Parks continue to collaborate on culvert repairs and replacements in Forest Park.



*Before Crystal Springs Culvert Replacement – barrier to native fish passage.*



*After Crystal Springs Culvert Replacement – native fish can migrate to spawning grounds.*



*Ecoroofs help manage stormwater and bring nature into the South Waterfront area.*

### ***Portland Ecoroof Program***

The Portland Ecoroof Program has been in existence since 1996. Since the program was bolstered by the Grey to Green initiative in 2008, Portland has added 330 ecoroofs covering more than 14 acres. Program components include both direct incentives (discussed below) and resources and technical assistance to property owners, businesses, and professionals interested in getting involved in the ecoroof industry. Information on how ecoroofs help keep rivers, streams and watersheds clean is provided on the BES website, as well as through public events, literature and the ecoroofs blog. Ecoroof Program funding is currently forecasted through 2016 as part of the Grey to Green initiative, and budget planning is underway for future years. Ecoroofs will continue to be a tool in BES's system planning to manage more stormwater on site while also providing other environmental and community benefits.



## Watershed Investment - Major Projects

### Capital Improvement Projects

Recently completed major Capital Improvement Program (CIP) projects for watershed health include aforementioned green street and culvert projects, as well as the East Lents floodplain restoration project, the SW Texas green street and wetland project, and partnership with the Army Corps of Engineers on multiple restoration projects along the Columbia Slough. Current and upcoming projects include work in every Portland watershed, including significant restoration at Oaks Bottom, stormwater and wetland improvements in Columbia Slough, additional floodplain and habitat restoration in Johnson Creek, and stormwater-related improvements in Fanno and Tryon Creek watersheds. Initial planning is underway for restoration at Swan Island Beach and the riverbank in Willamette Park.

### Watershed Investment Fund

In 2006, the Portland City Council adopted *Actions for Watershed Health: The Portland Watershed Management Plan*. That same year, the city established the Watershed Investment Fund (WIF) at BES to support projects to protect and restore Portland's rivers and streams. WIF projects often leverage additional funding from grants or other agencies, and demonstrate best practices and new approaches for urban watershed restoration.



*Installation of large wood at the Columbia Slough and Willamette River confluence project enhances critical habitat for migratory fish and wildlife.*

In 2008, the fund became institutionalized in BES' Capital Improvement Program budget. The City selects projects for WIF funding that have the highest potential to benefit watershed health. Examples of recently completed projects include:

- **Columbia Slough Confluence Restoration** – The confluence of the Columbia Slough and the Willamette River is a high priority habitat area for juvenile salmon, as well as other native fish, birds and turtles. This project, completed in 2010, improves in-stream, riparian and floodplain habitat area.
- **Stephens Creek Confluence Habitat Enhancement** – The Stephens Creek confluence provides critical rearing and refuge habitat for native, endangered salmon, as well as trout and lamprey. This 2008 project improves in-stream, stream bank, and floodplain wetland habitat.
- **Errol Creek Confluence Restoration** – The Errol Creek Confluence Project, completed in October 2009, removed fish barriers and daylighted the section of Errol Creek that once flowed underneath SE 44th Avenue. The project improved fish passage between Johnson Creek and Errol Creek, and created an improved channel and backwater channel to provide refuge for fish and flood water storage from Johnson Creek.
- **SW Marigold Green Street** – Environmental Services completed construction in 2008 on this vegetated swale on SW Marigold Street, with a curb extension that manages over 460,000 gallons of stormwater annually from nearly four acres of impervious surface. This project is just uphill of the Tryon Creek headwaters, and helps to prevent pollutants from washing into the creek.
- **Inverness Wetland Enhancement** – This project removed an obsolete culvert and causeway in the southern arm of the Columbia Slough near NE 112th Avenue. The city completed construction in fall 2009, creating revegetated banks and enhanced turtle habitat.



*Newly restored area at the confluence of Tryon Creek and the Willamette River, in partnership with Lake Oswego.*

- **Tryon Creek Confluence Habitat Enhancement Project** – This project, completed in 2010, enhanced 900 feet of Tryon Creek at its confluence with the Willamette River. The project involved re-grading the banks and installing large wood to improve in-stream and stream bank habitat quality and complexity for ESA listed salmonids as well as lamprey and other native species.
- **Willamette Park Boat Ramp Swale Retrofit** – In 2011 Environmental Services retrofitted an existing swale in Willamette Park to improve the treatment of stormwater from 1.6 acres of impervious area before it enters the Willamette River. The project included enhancing over an acre of Willamette River riparian habitat by revegetating the riverbank with native plantings.

Similar WIF projects for watershed health and stormwater management are underway and planned for the coming years.

## ***Subwatershed and Stormwater System Planning***

BES subwatershed planning efforts include characterizing and recommending actions to improve watershed health in each of its subwatersheds. Building on the goals and strategies of the Portland Watershed Management Plan (PWMP), BES works with local citizens and numerous community partners to identify opportunities to improve watershed health. Recommended actions include building new green streets, ecoroofs, and rain gardens; planting trees; removing invasive plants and replanting native vegetation; and protecting and restoring river, stream, wetland, and upland habitats.

BES has completed subwatershed reports for six of the Willamette watershed's SW Portland subwatersheds. Projects are implemented in collaboration and partnership with willing landowners, neighborhood groups, non-profits, other city bureaus and local agencies. Recently constructed projects that were first identified through the subwatershed planning process include the Burlingame Sewer Repair and Streambank Enhancement, Stephens Creek Confluence Habitat Enhancement, Willamette Park Boat Ramp Swale Retrofit projects. Acquisition of the River View Natural Area was also a recommended subwatershed project.

BES is currently working on more than 18 projects that are in various stages of design or construction, from a stormwater retrofit at the Barbur Transit Center to the design of a project to improve the amount and quality of riparian and shallow water habitat by regrading the riverbank at Willamette Park. Subwatershed planning is increasingly integrated with stormwater infrastructure system planning for the City. The first sub-basin stormwater plan, for Stephens Creek, is nearly complete and presents a new model of integrating watershed health goals and objectives with traditional infrastructure improvement projects in Portland's separated stormwater system areas.



### ***Tabor to the River***

The Tabor to the River-Brooklyn Creek Basin Program began in 2009, and is expected to take ten years to complete. This program is another example of Portland's evolution from conventional infrastructure solutions to multi-objective projects that incorporate green infrastructure and natural systems to meet multiple goals and regulatory mandates.

The program improves sewer system reliability and promotes natural watershed functions in SE Portland, from Mt. Tabor to the Willamette River. Resolving these problems with pipe-only solutions would cost an estimated \$144 million; the alternative stormwater management systems used by the program reduces the estimated cost to \$86 million, translating to 40 percent (about \$58 million) in lower costs.

The program addresses stormwater management and watershed health issues by:

- Adding more than 500 green street facilities, vegetated curb extensions and street planters that collect and infiltrate street stormwater runoff;
- Repairing or replacing 81,000 feet of sewer pipe, adding new pipe and installing new manholes as necessary;
- Planting nearly 3,500 street trees to absorb rain and reduce and slow stormwater runoff;
- Restoring natural areas in the basin by removing invasive vegetation and introducing native plants;
- Working with private property owners to construct facilities that will collect and manage roof and parking lot runoff.

A project that has emerged from this program is the Mt. Tabor Invasive Plant Control and Revegetation Project. This is a multi-year project to restore a healthy native forest community, started in 2010. The project will remove non-native, invasive vegetation, restore native trees, shrubs and grasses and control erosion in natural areas. Recent funding from BES, PP&R and East Multnomah County Soil and Water Conservation District (EMSWCD) will pay for 36.8 acres of additional invasive plant removal and native planting in Phase 2, bringing the total treatment area to 56.1 acres. This project will eventually remove invasive plants and plant native plants on 73.5 acres.



*Vegetated green street facilities in the Tabor to the River area will help reduce pollution and basement flooding.*

The City is partnering with the following organizations in the Tabor to the River project:

- **East Multnomah County Soil and Water Conservation District** – rain garden workshops, naturescaping
- **Audubon Society, Columbia Land Trust** – Certified Backyard Habitat Program
- **Friends of Mt Tabor Park** – invasive weed removal and related activities
- **Depave** – pavement removal projects that increase urban green space and protect water quality
- **SOLV** – volunteer planting events and presentations focused on watershed health
- **Friends of Trees** – volunteer tree planting and monitoring in partnership with the city, local businesses and community groups.

The Tabor to the River model will be applied in subsequent basin-wide projects in the combined sewer system.

## Financial Incentives

### *Stormwater Discount Program – Clean River Rewards*

In 2006 the Bureau of Environmental Services (BES) launched a stormwater utility discount program called Clean River Rewards. The program gives ratepayers a discount on the stormwater portion of their utility bill for managing some or all of their on-site stormwater.

The discount is provided when ratepayers register their property, indicating tree coverage, roof and impervious surface area, and on-site capture of stormwater.

The program is offered to residential and commercial (includes commercial, multi-family residential of 3 units or greater, industrial, and institutional) properties. The discount remains in effect through June 2017. Online technical assistance provides ratepayers with resources on how to retrofit properties with effective stormwater management techniques.

The Clean River Rewards program provides workshops to groups on request. Online technical assistance is available for residential property owners who want to manage their stormwater on-site. Assistance includes a Site Assessment guide, discount calculators, and how-to guides on stormwater facility design, specifically for downspout disconnection, landscaping, rain gardens, drywell installation and soakage trenches. A professional referral list is also offered.

Currently, of 35,606 properties active in the program (receiving discounts), 34,362 are single-family households and 1,244 are commercial users. Since program inception, there have been 46,263 registered contracts, achieving an overall demand reduction from the City's treatment system of 966.2 million gallons (573.2 M from single-family households and 393 M from all others). These contracts account for 150,579,039 square-feet or 3,456.8 acres of impervious surface area for which stormwater runoff is captured on-site, and thus removed from the system,

### *Treebate*

As noted above under the Watershed Revegetation Program, Bureau of Environmental Services (BES) offers an incentive to plant trees on private property. Trees intercept and capture stormwater that would otherwise head to the wastewater treatment plant

for costly processing, or require other management facilities. The Treebate program gives ratepayers a rebate on their sewer bills for trees planted on residential properties. The rebate amount ranges from \$15 to \$50 and depends on the size of the tree at maturity and associated stormwater management potential.

### *Ecoroof Incentive Program*

BES offers building owners and developers an incentive of up to \$5 per square foot for an approved ecoroof project, in order to offset some or all of the costs for construction of the ecoroof. This incentive has helped spur utilization of ecoroofs on both new and existing development in Portland as part of the overall Ecoroof Program discussed above.

## Education and Stewardship

The City of Portland supports community organizations, businesses and residents in protecting, conserving and restoring watersheds, including the riparian corridors and wildlife habitats that make up Title 13 Habitat Conservation Areas in Portland. The programs featured below illustrate the importance of partnering with the community to leverage public and private resources and achieve City goals and to comply with Title 13 and other regulatory mandates.



*Clean Rivers Education program engages students in learning about watershed health and how they can protect local rivers and streams.*



### Community Watershed Stewardship Program

The Community Watershed Stewardship Program (CWSP) is a partnership between BES and Portland State University. The program engages Portlanders in enhancing watershed health while promoting public awareness of these natural systems. It funds community projects, helps with project planning, and assists in connecting community groups with resources for their projects.

Since 1995 CWSP has granted \$885,000 to 192 projects; these funds have been matched by \$3.1 million in community support through donations of services, materials and volunteer time. Over 39,000 people have donated 317,000 volunteer hours, planted 117,000 native plants and trees, restored over 57 acres of riparian and upland habitat, and enhanced over 36,000 linear feet of streams.

Two types of funding for community watershed projects are offered: up to \$10,000 through a competitive process to schools, churches, businesses and other community organizations for projects that connect people with watersheds and protect and enhance watershed health; and native plant mini-grants of up to \$300 to community groups and private landowners.



*Neighborhood volunteers learn about trees in new City Tree Inventory Program.*

### Neighborhood Tree Steward Program/Tree Inventory Project

In 2009 Portland Parks and Recreation (PP&R) collaborated with the Urban Forestry Commission and the Bureau of Environmental Services (BES) to revive the Neighborhood Tree Steward program, a springboard for community volunteers to become involved in an array of volunteer opportunities in support of Portland's trees. A seven-day training in the fall prepares participants to be leaders and resources for tree advocacy in their neighborhoods; a monthly workshop series provides ongoing educational opportunities for Neighborhood Tree Stewards; and city staff from PP&R and BES support the stewards as they complete projects in their neighborhoods.

In 2010 and 2011, 165 volunteers worked 1,800 hours inventorying 25,000 trees throughout Portland for the Tree Inventory Project. After reviewing the data, neighborhoods created Tree Plans to guide their stewardship efforts. In 2012, tree inventories will be conducted in Hosford-Abernathy, Northwest District, and Sunnyside Neighborhoods. Each year Urban Forestry accepts applications for the project via a competitive application process. Planning, inventory, analysis, tree plan creation, and follow-through activities take two years to complete.

### Pollution Prevention

The Bureau of Environmental Services (BES) Pollution Prevention Program provides businesses, industries and citizens with information and practical approaches to reduce or avoid polluting the environment with an emphasis on addresses stormwater and discharges into local waterways. The following are examples of technical assistance and education programs.

#### Industrial Stormwater Program

The *Industrial Stormwater Program* works to reduce pollutants in stormwater runoff to Portland's rivers and streams. The Program began when Portland was issued its NPDES Municipal Stormwater Permit in September 1995. The permit requires that the City maintain a program to monitor and control pollutants in stormwater runoff from industrial facilities.

The program provides best management practices for industries to minimize pollutants in stormwater runoff, which may or may not be required to obtain a permit under the Industrial Stormwater Management Program. Examples of BMP information disseminated by BES include:

- Outside container storage and waste disposal;
- Loading and unloading materials;
- Outside storage of raw materials and intermediate or finished products or by-products;
- Fueling stations.

#### Regional Pollution Prevention Outreach (P2O) Team

The City participates in the Regional Pollution Prevention Outreach (P2O) Team, a multi-agency group of air, water, wastewater, energy, hazardous waste, and solid waste professionals that promotes and implements comprehensive pollution prevention programs. The P2O Team sponsors the Eco-Logical Business Program, which certifies businesses that use environmentally responsible business practices. As of 2010, 40 automotive repair and service shops within the City of Portland have been certified under the program, as well as 15 landscape services firms that work in Portland. The current goal is to certify 10 additional auto shops and 20 additional landscape firms that provide services within the City Portland, and evaluate one new business sector for the Eco-Logical Business Program by 2015.

### Monitoring and Evaluation

The City of Portland updated its overall watershed monitoring approach in 2010, incorporating the best available science and protocols developed by the national Environmental Monitoring and Assessment Program. The Portland Area Watershed Monitoring and Assessment Program (PAWMAP) coordinates monitoring across all city watersheds so that information can be more easily compared and trends can be tracked. Elements monitored include water quality, hydrology, toxics, habitat, fish and macro invertebrates. The effort will also be expanded to include systematic monitoring of terrestrial habitat. In addition, PAWMAP will increase the rigor, accuracy and cost-efficiency of monitoring by streamlining and coordinating field efforts to fulfill many of the City's compliance monitoring requirements. The first year of monitoring, 2011, established baseline data against which future results can be compared to measure changes in watershed health.



*Monitoring watershed conditions allows the City to track trends and prioritize program investments.*

PAWMAP allows the City to identify and prioritize the most serious threats to watershed health and the resources most in need of protection, measure the implementation and effectiveness of protection and restoration actions, measure progress towards watershed health, and address regulatory requirements of the Clean Water Act, Endangered Species Act, Superfund and other state and federal environmental regulations. The City of Portland also conducts specific project effectiveness monitoring for restoration projects and green infrastructure facilities, to ensure the projects are functioning as designed.



## Ongoing Partnerships

The City actively engages with many partnering agencies, institutions and nonprofit organizations to aid in public education, volunteer recruitment and awareness, and to address issues that cross jurisdictional boundaries. This allows the City to join efforts that operate at a watershed scale, and to leverage public resources. Key long standing partners include:

### **Government agencies**

City bureaus regularly collaborate with Metro and neighbouring jurisdictions to coordinate project planning and implementation within shared watersheds. In addition, the City works with Metro, state and federal agencies to collect and analyze data and secure acquisition and restoration funding.

### **Watershed councils**

Environmental Services provides contract funding, technical and programmatic assistance to support the efforts of the Columbia Slough, Tryon Creek and Johnson Creek watershed councils. The watershed councils work with watershed residents, businesses, nonprofits and government agencies to conduct environmental education, stewardship project, technical assistance and invasive management. In addition, they are able secure funding to support projects and programs that complement efforts.

### **Soil and water conservation districts**

The City connects the public to resources available from the conservation districts, including Naturescaping classes, environmental education, stewardship programs, funding and technical assistance to aid property owners. In addition, grants from the districts have helped fund City of Portland environmental enhancement efforts.

### **Nonprofit organizations**

To maximize the benefits of public investments, City staff coordinate with the efforts of nonprofit partners – like Friends of Trees, Xerces Society and the Audubon Society of Portland – that conduct complementary projects and programs including education, restoration, and field research to monitor the presence of wildlife, habitat and other natural resources. In addition, funding partners like the Trust for Public Land and The Nature Conservancy increase the amount of land protected in public ownership to ensure that key environmental assets are protected in perpetuity.

### **Neighborhood and Friends organizations**

The City shares information with the public and provides seed funding to numerous formal and informal community-based stewardship or friends organizations. These organizations mobilize volunteers to dedicate thousands of hours to care for parks and natural areas in all parts of the city, providing critical support to augment publicly funded maintenance programs.

## Habitat Friendly Development

Title 13 requires cities and counties to identify regulatory barriers to habitat friendly development and adopt amendments if needed.

Title 13 provides examples of Design and Construction Practices to Minimize Hydrologic Impacts including green roofs, downspout disconnection, and multi-functional stormwater facilities. Title 13 also encourages local programs that reduce impervious areas such as driveways and streets, and parking areas.

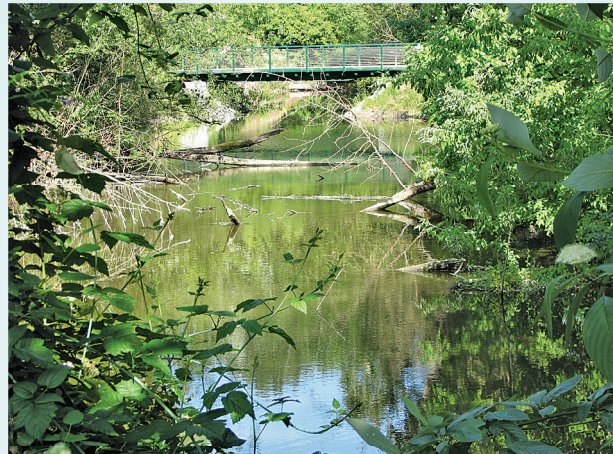
Many of these approaches are required or encouraged by Portland's Stormwater Management Manual, the Zoning Code and other City programs described above. Specifically, Portland allows paving alternatives for driveways, including pervious pavers, block pavers that allow groundcover to be planted within the pavers, and paving strips. City standards for new public streets are intended to minimize paving. Land division regulations allow alternative private streets that have significant potential to reduce the amount of paving in small to mid-scale residential developments. These street types include common greens, which provide pedestrian/bike only access, and shared courts, where all modes share space in the roadway. Environmental zone standards also establish maximum roadway and right-of-way widths for streets in environmental zones.

In 2006, the City adopted Infill Design Code Amendments which promote minimization of impervious area. The amendments allow shared driveways and shared courts designed to accommodate pedestrian and vehicles within the same space, accompanied by requirements for surfacing with paving blocks or bricks. The amendments also allow narrower walkways for portions of pedestrian systems serving no more than 4 units.

In addition, the City has reduced the minimum parking space requirements in multi-dwelling and commercial zones and waives minimum parking requirements for sites within 500 feet of peak hour frequent transit service, significantly reducing the parking requirement in close-in neighborhoods of the City. Within the Central City Plan District (33.510) there are generally no minimum parking requirements and there are limits on the size and use of surface parking lots. In addition,

the zoning code requires parking lot landscaping and allows 2 feet of parking stall depth to be landscaped instead of paved. Joint use parking is allowed citywide for uses that have parking demand at different times of day provided appropriate agreements in place.

Title 13 also calls for habitat friendly development practices to minimize impacts on wildlife corridors and fish passage. Examples include maintaining safe wildlife crossings under, over, or around transportation corridors. Title 13 also encourages local jurisdictions to minimize stream crossings and designing stream crossings for safe fish and wildlife passage, suggesting the use of bridge crossings instead of culverts where possible, designing crossings to be perpendicular to the stream, allowing narrow street rights of way through stream corridors, and maintaining vegetation along wildlife migratory routes.



*Pedestrian footbridges can provide habitat-friendly access to nature.*

In recent years the City has required the installation of underpasses to facilitate safe crossing for native turtles and other wildlife species in the Columbia Slough. These undercrossings are being utilized successfully by wildlife in this area. The City has also identified the need to address wildlife crossings in the Terrestrial Ecology Enhancement Strategy (2010) which was developed as a tool to help implement the Portland Watershed Management Plan.





*Driveway paved using conventional methods and materials.*



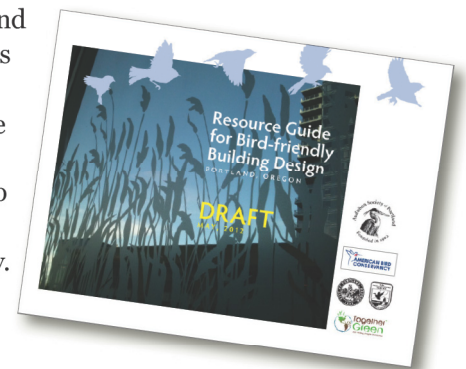
*Pavers give a pedestrian walkway a pervious surface.*

The City promotes habitat friendly stream crossings primarily through land use reviews that are required for developments proposed in natural resource overlay zones. If a stream crossing is necessary then the City must find that the project will have the least detrimental impact on the natural resources of other practicable alternatives. Often a bridge will have the least detrimental impact. In addition, the recently adopted Portland International Airport Plan District limits future crossings of the Columbia Slough to bridges only. The City is also pursuing culvert replacement to improve fish passage as described above.

The City's land division regulations were amended in 2011 through the Citywide Tree Project to strengthen the consideration of natural features, such as streams, wetlands and tree groves, when locating new streets. Clustering new developments is also allowed in Planned Developments to avoid disturbance of natural areas, vegetation and slopes. Clustering can also reduce the length of streets and driveways, thereby reducing the amount of impervious area.

The City also protects and enhances vegetation along wildlife migratory routes, including terrestrial and aquatic routes, through stewardship of City-managed natural areas and overlay zones. Examples include elk migratory routes through Forest Park, and fish and bird migratory routes along the Willamette corridor.

In 2011 the City of Portland received a grant from the U.S. Fish and Wildlife Service to develop bird-friendly building guidelines and related educational resources. The Audubon Society of Portland (Portland Audubon), partnering with the City, and adapted a template developed by the American Bird Conservancy. Portland Audubon and the City convened local architects and other agencies to review and provide input on early drafts of the resource guide. In June 2012, a forum was held to introduce the draft Bird-Friendly Building Design Guide to a broader audience. The new resource guide presents information about bird mortality from window collisions and hazards associated with lighting, or fatal light attraction. The guide provides practical technical design and lighting techniques that reduce risks to birds. The guide also provides tips for homeowners to make their homes more bird-friendly.



## Conclusion and Next Steps

Based on the well-established holistic program package presented in this report, the City respectfully requests Metro to find Portland in substantial compliance with the spirit, intent and letter of Title 13, Nature in Neighborhoods. Together, these citywide and area-specific regulatory and non-regulatory programs protect, conserve and restore thousands of acres of natural resources in Portland, including the vast majority of Title 13 Habitat Conservation Areas in the city. These programs also help preserve and enhance thousands more acres of riparian and upland resources that extend well beyond the boundaries of the Title 13 HCAs.

Metro's determination of substantial compliance with Title 13 should be viewed as a milestone along this dynamic path, not an end point. Several projects are currently underway which will continue to update Portland's natural information, policies, programs, and projects. In the next several months the City anticipates making decisions regarding the potential annexation of West Hayden Island and approaches to protect and sustain the unique mosaic of habitat functions provided there. The City will update its Comprehensive Plan, establishing new policies addressing a broad range of City and State Goals, including watershed health, economic prosperity, and community livability and equity. The City anticipates completing efforts to update its 20+-year old Willamette Greenway program and may pursue additional multi-objective planning efforts in the Columbia Corridor. The City will also look for opportunities to improve watershed conditions in headwater areas.

Metro's determination of compliance is not a signal that the City has completed its work to protect and restore Portland's watersheds. Rather, Metro's determination of substantial compliance will affirm and reinforce Portland's program package, as well as the many City-Community partnerships that are so vital to the success of these programs. The City recognizes that attaining and maintaining healthy watersheds is an ongoing process – a process that requires a long-term commitment of resources and the willingness to both track and adapt to changing conditions over time.



# Appendices

## **Appendix A: Natural Resources Inventory Update – Riparian Corridors and Wildlife Habitat, Portland Oregon, Project Report**

Recommended Draft, June 2012

## **Appendix B: Comparison of Portland Natural Resource Overlay Zone Regulations and Title 13 Provisions**

*— provided as separate documents —*