



PORTLAND PARKS & RECREATION

Healthy Parks, Healthy Portland



Forest Park Ecological Prescriptions

August 2011

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Introduction



Forest Park is an unparalleled natural resource; an oasis for plants, wildlife, and the urban explorer. Unique in the nation, Forest Park is the largest forested natural area within city limits and provides a place for quiet reflection, nature-based recreation, environmental research, and educational discovery. With over 5,000 acres of undeveloped natural area, Forest Park is home to over 100 species of native birds and more than 50 mammals. The park includes special status habitats, such as Interior Forest and Oak Woodlands (designated in the City of Portland Terrestrial Ecology Enhancement Strategy), and hosts flora and fauna rarely seen in an urban setting.

The management of the park is provided by Portland Parks & Recreation (PP&R) which utilizes an Ecosystem Management Program to manage natural area properties. The program uses a science-based approach to ecological management and includes six interrelated steps: Inventory, Desired Future Condition, Assessment, Prescription, Intervention, and Monitoring. Applied over time, the sequence of steps informs management and provides the feedback required to modify practices for the best intended outcome.

Background

In 1995, the Forest Park Natural Resource Management Plan (NRMP), which provides guidance for the management of Forest Park, was adopted through City Council. A vegetation and ecological conditions inventory was completed in 2004. In January 2011, the Desired Future Condition (DFC) statement was completed for Forest Park. The DFC, with an exclusively ecological focus, is designed to be complementary to the Forest Park NRMP; the two should be utilized as tools for comprehensive park management.

As a foundation of ecosystem management, five ecological goals were identified for the park. These goals will be accomplished through management strategies achieved through project actions.

1. Protected Air and Water Quality
2. A Forest with Structural Complexity: Vertically (canopy, midstory and understory, snags, down wood) and Landscape Scale (mosaic of habitat types, natural gaps)
3. Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Introduction

4. Intact Native Plant and Animal Communities with Minimal Disturbance from Non-native Species and Invasive Species Populations Controlled Through Management
5. Reduction of Catastrophic Fire Risk

The next steps in the Ecosystem Management Program included conducting an assessment of the stressors or data gaps that are impeding the realization of the DFC and developing prescriptions to address the identified stressors and gaps. A team of PP&R staff and partner organizations was convened to draft the list of prescriptions. While PP&R has limited capacity to work outside of the park, the goals and prescriptions acknowledge the ecological connections beyond the park boundaries. This team met over several months with the objective to develop a ten-year prescription plan which outlines the projects needed to achieve the desired future condition of Forest Park.

About the Prescription Project List Tables

For each ecological goal, the series of projects listed are ones deemed to be critical to accomplishing that goal. The table is organized to provide a summary of information associated with each project and includes the following elements.

- **PP&R Committed Resources:** A check indicates that PP&R has committed staff and/or dedicated funds to implement this project.
- **Project:** Each project has a unique alpha-numeric code to assist in matching projects to project summaries. Starred projects (*) indicate ones determined to be among the highest priority for meeting the ecological goal under which each is listed. Note that all projects listed are considered critical to the ecological goals; some not identified as highest priority may be necessary to meet other park goals or requirements or be among the highest priority for a given organization.
- **Stressor/Gap:** The primary disturbance or data gap that limits the current condition from reaching the Desired Future Condition.
- **Measure of Success:** Metrics/measures utilized to evaluate project success.
- **Key Components:** Critical elements or steps in the project.
- **Preliminary Budget Estimates:** Summary estimates on total project cost (detail provided upon request). Some projects include an implementation phase that will be calculated following assessment; for these projects the cost is listed as TBD (To Be Determined). Funds Needed details the amount of additional outside funding required to achieve the total budget and complete the project.

A complete summary of each project begins on page 7.

Partner Roles

Forest Park is a regional resource for the Portland metropolitan area. As such, partnerships are an essential component of making progress toward reaching the ecological goals for the park. PP&R will take a lead role on projects that are conducted within the park and will partner with staff from other City bureaus; local, state, and federal agencies; and citizen's groups. Formal commitments made by other organizations have been noted in the summary documents. It is expected that PP&R and partners will work to raise funds and take on additional commitments to implement the prescriptions over time. Several projects have been identified that extend beyond the boundaries of Forest Park, but are considered to be critical to protecting and enhancing the ecological health of the park. For

these projects, PP&R will provide support to those entities that commit to taking a lead role in project implementation.

Next Steps

Stressors from park use were not addressed through the Forest Park Ecological Prescription projects. PP&R is currently in the process of updating the Forest Park NRMP and will address stressors related to park use in that process.

Moving forward with the implementation of prescription projects, this document will be utilized to develop work plans, facilitate partnerships, and generate funds for project completion. To provide opportunities for collaboration and communication, annual updates on prescription project progress will be provided to partner agencies and organizations.

Table 1: Protected Air and Water Quality

PP&R Committed Resources	Project #	Project	Stress/Gap	Measure of Success	Key Components	Preliminary Budget Estimates	
						Total Budget	Funds Needed
	W1A	Reduce Water Quality Impacts from Infrastructure	Erosion from infrastructure	Streambank/streambed stability associated with infrastructure	<ul style="list-style-type: none">Identify trail and roadway impacts to water qualityDevelop priorities for rebuilding, relocating, and/or restructuring	\$50,000	\$50,000
					<ul style="list-style-type: none">Implement high priority projects	TBD	TBD
	W1B	Address Turbidity Inputs to Balch Creek Watershed	Turbidity		<ul style="list-style-type: none">Turbidity levels in park streams reducedIdentify sources within park boundaryDevelop strategy for addressing sources outside of park boundary	\$90,000	\$90,000
					<ul style="list-style-type: none">Outreach, monitoring, and priority project implementation	\$190,000	\$190,000
✓	1C	Best Management Practices (BMPs) for Instream Maintenance Work	Erosion from maintenance activities	Erosion reduced	<ul style="list-style-type: none">Identification of regular and emergency maintenance sitesCoordination with Bureau of Environmental Services to develop BMPs for maintenance and erosion control	\$25,000	0
✓	1D	Pet Waste Management	Waste management	Ammonia levels in park streams reduced; Reduction in off-leash dog use; <i>E. coli</i> associated with domestic dogs reduced	<ul style="list-style-type: none">Measure and identify <i>ecoli</i> inputs to Forest Park streamsDevelop outreach and education campaign around resultsContinue to fund educational programs, including Ranger efforts	\$40,000	\$5,000
	1E	Control Erosion Issues from Invasive Species	Erosion from invasive species	Reduced distance of riparian corridor dominated by species of concern for erosion	<ul style="list-style-type: none">Develop list of species of concern for erosionAssess riparian corridors for these speciesPrioritize areas for treatment and enhancementImplement high priority projects	\$55,000	\$55,000
	1F	Septic System Education and Outreach Program	Waste management	Ammonia levels in park streams reduced	<ul style="list-style-type: none">Develop target outreach list for Balch Creek watershedCreate outreach materials and/or outreach/education programWork with BES and BDS to determine potential for incentive program and/or assistance with outreach	\$200,000	\$200,000
	1G	Headwater Land Protection Program	Turbidity	Turbidity levels in park streams reduced; Headwaters landowners are aware of conservation issues and programs	<ul style="list-style-type: none">Develop and Implement outreach program	\$10,000	\$10,000
					<ul style="list-style-type: none">Acquire and maintain easements	\$250,000	\$250,000
✓	1H	Air Quality Assessment	Data gap: air pollutants	Air quality assessment completed; Areas of concern identified and management recommendations established	<ul style="list-style-type: none">Identify areas of air quality concern within and surrounding Forest ParkCoordinate with ongoing research evaluating bio-indicators (lichen distribution)Develop response plan for areas of concern (revegetation, education and outreach, and policy change)	\$55,000	0

W Indicates highest priority prescriptions for meeting the ecological goal

✓ Indicates that staff and/or funds have been committed to implement this project

Table 2: A Forest with Structural Complexity

PP&R Committed Resources	Project #	Project	Stress/Gap	Measure of Success	Key Components	Preliminary Budget Estimates	
						Total Budget	Funds Needed
	W2A	Stand Trajectory Assessment	Data gap: stand trajectory assessment	Stand management plans for all alliances; Stand management plan that addresses NRMP recommendations for maple thinning and documents management strategies	<ul style="list-style-type: none">Evaluate representative stands of each alliance type to determine successional trajectorySampling will include geographic distribution throughout alliances and will evaluate such variables as mortality, regeneration, stem density, and the presence of snags and large down wood	\$90,000	\$90,000
✓	W2B	Invasive Vine Monitoring and Removal Program	Invasive vines	Invasive vines (ivy/clematis) controlled within park boundary	<ul style="list-style-type: none">Create pre/post monitoring program to evaluate and document changeEstablish cyclical removal program that provides treatment through manual and chemical techniques	\$280,000	\$150,000
✓	2C	Old Growth Survey	Data gap: old growth status	Old growth patches identified and documented and management strategy developed to protect stands and associated species	<ul style="list-style-type: none">Locate and map old growth habitatCollect data on old growth patches throughout park, including age, structural elements, habitat features, rare plants	\$10,000	0
	2D	Forest Disease Assessment	Data gap: forest disease assessment	Survey complete; Plan developed for managing diseased sites	<ul style="list-style-type: none">Survey for laminated (<i>Phellinus</i>) root rot pocketsUtilize aerial imagery for initial assessmentFormulate plan for managing diseased sites	\$12,000	\$12,000

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Table 3: Floristic Native Biodiversity with Increased Opportunities for Wildlife

PP&R Committed Resources	Project #	Project	Stress/Gap	Measure of Success	Key Components	Preliminary Budget Estimates	
						Total Budget	Funds Needed
✓	W3A	Wildlife Study	Data gap: wildlife use	Multi-season monitoring complete and protocol in place to provide subsequent monitoring	<ul style="list-style-type: none">Conduct a wildlife study that determines presence/absence, distribution and population, and patch size of target speciesMonitoring protocol to inform adaptive managementIntegrate opportunities for citizen science	\$80,000	0
✓	W3B	Wildlife Use Characterization	Data gap: wildlife needs	Target guilds and/or species for specific management practices (including habitat structure recommendations) for each vegetation alliance	<ul style="list-style-type: none">Informed by/dependent upon 3A Wildlife StudyDevelopment of target species/guilds listCreate species/guild based management recommendations for each vegetation alliance	\$20,000	0
	W3C	Improve Wildlife Habitat Structures throughout Park	Lack of habitat structure	Snags, down wood, and brush piles created at appropriate densities throughout park	<ul style="list-style-type: none">Develop guidelines for snag, brush pile, and down wood creation/retentionIncorporate guidelines into MOUs with utility companies	\$20,000	0
					<ul style="list-style-type: none">Implement opportunities for habitat structure creation throughout park	TBD	TBD
✓	W3D	Rare Plant Protection	Data gap: rare plant distribution	Plant list of plants rare to Forest Park completed; Database developed to track species presence and distribution; Survey and manage protocol implemented	<ul style="list-style-type: none">Create a survey and manage protocol for parkDatabase developed to track location and distributionMapping of all species within park	\$60,000	\$10,000
✓	W3E	Habitat Fragmentation Response	Habitat fragmentation	Natural areas protected from additional fragmentation; Priority corridor connections protected	<ul style="list-style-type: none">Assess special status habitats that are increasingly fragmented in parkDevelop plans and prescriptions to minimize further fragmentation and to enhance habitat types and features within patchesAssess the feasibility of reconnecting fragmented habitatsDesign and implement a wildlife area management program that protects priority patches of non-fragmented habitat	\$20,000	0
	W3F	Oak Habitat Conservation, Restoration, and Management Program	Oak habitat loss	Improved health and protected acreage of oak woodland habitat	<ul style="list-style-type: none">Work with BES TEES to complete City of Portland Oak Habitat Conservation StrategyUsing all available maps and data conduct an inventory of oak habitats. Revise/Edit map to illustrate all oak habitat polygonsUtilize inventory and to establish assessment areasUtilize oak conservation and restoration assessment tools (landscape and project scale) to determine the health, function and management needs of inventoried oak habitat patchesDevelop an oak habitat restoration and management plan with prescriptive activities.Target acquisition areas that have oak woodland habitat and/or restoration potential	\$30,000	\$30,000
					<ul style="list-style-type: none">Implement oak restoration projects	TBD	TBD

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Table 3: Floristic Native Biodiversity with Increased Opportunities for Wildlife

PP&R Committed Resources	Project #	Project	Stress/Gap	Measure of Success	Key Components	Preliminary Budget Estimates	
						Total Budget	Funds Needed
	W3G	Wildlife Corridor Connections	Habitat fragmentation	Natural areas protected from additional fragmentation; Priority corridor connections protected	<ul style="list-style-type: none"> Develop Local Pilot project Identify all priority corridor connections for Forest Park including Willamette River, Pacific Coast and Tualatin Valley Designation of agency/organization to take on project coordination for corridor protection 	\$200,000	\$200,000
					<ul style="list-style-type: none"> Multi-county partnership to pursue easements and acquisition 	TBD	TBD
	3H	Wetland Protection and Enhancement	Data gap: wetland documentation	Wetlands protected and enhanced	<ul style="list-style-type: none"> Mapping of all existing wetlands 	\$10,000	0
					<ul style="list-style-type: none"> Development and implementation of protection/enhancement strategies for all wetlands 	TBD	TBD
	3I	Balch Creek Enhancement	Lack of stream complexity	Channel complexity and aquatic habitat improved; Prioritization of instream and streambank issues	<ul style="list-style-type: none"> Identification of reaches that lack critical habitat features, passage issues, and erosion concerns 	\$40,000	\$40,000
					<ul style="list-style-type: none"> Funding identified to implement priority projects Implementation of priority projects 	\$700,000	\$700,000
	3J	Miller Creek Enhancement	Lack of stream complexity	Channel complexity and aquatic habitat improved	<ul style="list-style-type: none"> Identification of reaches that lack critical habitat features, passage issues and erosion concerns Prioritization of instream and streambank issues 	\$30,000	\$30,000
					<ul style="list-style-type: none"> Funding identified to implement priority projects 	TBD	TBD
✓	3K	Wildlife Friendly Design Standards	Impacts to wildlife from park development	Infrastructure that utilizes “wildlife-friendly” design	<ul style="list-style-type: none"> Building standards for upgrades and new construction Integration of these standards into any development within the park Evaluate and minimize impacts to birds and other wildlife during design and construction, and regular maintenance to buildings, structures, and infrastructure 	\$30,000	0
✓	3L	Roadside Management Program	Impacts to plant and animal communities from roadside management	Invasive species cover reduced and native species plant cover increased along roadsides and within open meadows	<ul style="list-style-type: none"> Maintenance plans that address timing of mowing, brushing, and herbicide application to reduce impacts to wildlife and native plants, and invasive species distribution Coordinate with staff who implement this work to develop guidelines 	\$10,000	0
✓	3M	Inholding Acquisition	Habitat fragmentation	Natural areas protected from additional fragmentation and priority corridor connections protected and expanded	<ul style="list-style-type: none"> Prioritization of inholding acquisitions Pursue acquisition of priority properties 	\$1,200,000	\$600,000
✓	3N	Pollinator Habitat Program	Lack of habitat for pollinators	Increased pollinator habitat in areas of disturbance throughout the park	<ul style="list-style-type: none"> Identify trail entrances, roadsides, meadows, and powerline corridors for pollinator habitat creation and enhancement Implement pollinator enhancement projects with consultation with Xerces society Develop citizen science component to measure and monitor pollinator presence 	\$15,000	0
	3O	Stream Enhancement	Lack of stream complexity	Increased aquatic and riparian habitat quantity/quality	<ul style="list-style-type: none"> Conduct stream surveys and riparian assessments Prioritize enhancement projects 	\$30,000	\$30,000
					<ul style="list-style-type: none"> Implement and monitor priority projects 	TBD	TBD

Table 4: Intact Native Plant and Animal Communities

PP&R Committed Resources	Project #	Project	Stress/Gap	Measure of Success	Key Components	Preliminary Budget Estimates	
						<i>Total Budget</i>	<i>Funds Needed</i>
✓	W4A	Long-term Invasive Plant Management Plan	Invasive plants – Non-EDRR species	Geographic distribution and localized cover of target invasive species reduced	<ul style="list-style-type: none"> Create target plant list for control Develop pre/post project monitoring to evaluate and document change Establish benchmarks for invasive species cover and geographic distribution that include timelines and measures of success Create priority target areas and phases for implementation Address stabilization of PTB and FEMA acreage 	\$50,000	0
					<ul style="list-style-type: none"> Treat new priority target areas 	TBD	TBD
✓	W4B	EDRR Plant Control	Invasive plants – EDRR species	EDRR species mapped and treatment/ monitoring protocol in place	<ul style="list-style-type: none"> Partner with City of Portland EDRR program on target plant list Formalize mapping/monitoring protocol and implement with partners Treat high priority species and areas 	\$70,000	0
					<ul style="list-style-type: none"> Continue monitoring and treatment protocols through 2021 	\$500,000	\$500,000
	W4C	Forest Park Buffer Program	Invasive plants	EDRR species mapped and treatment/ monitoring protocol in place; Geographic distribution and localized cover of target invasive species reduced	<ul style="list-style-type: none"> Define buffer area for invasive removal on lands adjacent to the park Provide outreach and education about impacts from humans to wildlife (domestic animals, release on non-native wildlife, feeding/habituation, trapping, etc.) Partnership between programs and organizations that work on private land to share resources Prioritization of areas for targeted outreach and initial treatments 	\$40,000	\$20,000
					<ul style="list-style-type: none"> Ongoing outreach and vegetation management 	TBD	TBD
	4D	EDRR Animal Pest Control	Invasive animal pests	EDRR species target list developed and assessment/response protocol in place; Invasive animal list created and assessment/response protocol in place; Control of newly introduced EDRR species	<ul style="list-style-type: none"> Develop EDRR pest list for Forest Park Establish protocols and identify responsibilities for response Public education around new and potential pests 	\$60,000	\$60,000
					<ul style="list-style-type: none"> Fund and implement demonstration scale fire resistant landscape projects 	\$180,000	\$180,000
	4E	Animal Pest Management Plan	Invasive animal pests	Invasive animal list created and assessment/response protocol in place	<ul style="list-style-type: none"> Create Invasive animal list for Forest Park Establish protocols and identify responsibilities for response Public education 	\$10,000	0

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✓ Indicates that staff and/or funds have been committed to implement this project

PP&R Committed Resources	Project #	Project	Stress/Gap	Measure of Success	Key Components	Preliminary Budget Estimates	
						Total Budget	Funds Needed
	W5A	Defining and Mapping Wildland Urban Interface Areas in the Vicinity of Forest Park	Wildland Urban Interface (WUI) and utility corridor infrastructure and maintenance	Hazardous wildfire fuels reduced; Invasive species cover reduced and native plant diversity increased; Long-term management/maintenance plans in place; Wildfire resistant landscape at high priority public/private interfaces	<ul style="list-style-type: none"> Definition of WUI around Forest Park perimeter Develop and assign risk categories to land within WUI Accurately map all utility corridors in Forest Park Map WUI around Forest Park perimeter 	\$80,000	\$80,000
	W5B	Wildfire Fuels Inventory and Monitoring	Unknown fire risk and adjacent development	Wildfire resistant landscape at high priority public/private interfaces	<ul style="list-style-type: none"> Inventory/characterize wildfire fuels Establish vegetative fuel bed plots throughout the park 	\$10,000	\$10,000
					<ul style="list-style-type: none"> Monitor vegetative fuel beds and establish fire information system 	\$30,000	\$30,000
	5C	Utility Corridor Fire Risk Reduction	Wildland Urban Interface (WUI) and utility corridor infrastructure and maintenance	Hazardous wildfire fuels reduced; Invasive species cover reduced and native plant diversity increased; Long-term management/maintenance plans in place	<ul style="list-style-type: none"> Field inventory and survey utility corridors to determine vegetative composition, hazardous wildlife fuels, and suitability for management as emergency access, fire break, and/or habitat enhancement corridors Analyze and prioritize inventory data (from above) to determine highest risk areas and long-term utility corridor management needs Identify secure source of funding for long-term management Coordination with utility companies to adopt fire resistant landscape management and maintenance agreements 	\$50,000	\$50,000
					<ul style="list-style-type: none"> Partner with public/private utility managers to develop demonstration-scale hazardous fuel reduction projects 	TBD	TBD
	5D	Wildfire Resistant Landscape Program	Unknown fire risk and adjacent development	Wildfire resistant landscape at high priority public/private interfaces	<ul style="list-style-type: none"> Using maps from project 5A, conduct field survey to identify high priority public/private WUI areas for vegetation management and wildfire fuel reduction Develop a coordinated wildfire education and outreach plan for City staff, park stewards, and private landowners through programs and partners (FPC,WMSWCD, Backyard Habitat Certification, Multnomah CWPP, etc.) Using wildfire retardant plant species, develop designs for wildfire resistant landscape plantings on high priority public/private WUI areas 	\$80,000	\$80,000
					<ul style="list-style-type: none"> Fund and implement demonstration scale fire resistant landscape projects 	TBD	TBD

W Indicates highest priority prescriptions for meeting the ecological goal

✓ Indicates that staff and/or funds have been committed to implement this project

Ecological Prescription Projects



Project Summaries by Ecological Goal

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Projects marked with * are among the highest priority actions for achieving the ecological goal associated with the project.

Project *1A – Reduce Water Quality Impacts from Infrastructure

Ecological Goal: Protected Air and Water Quality

Background

“Forest Park’s predominantly undeveloped character plays an important role within the City of Portland. Its vast unbroken area of forested land – spanning eight miles from W. Burnside to NW Newberry Road – functions as a sequence of naturally occurring wilderness watersheds.... Forest Park’s eleven major watersheds still function as they have for hundreds of years and are considered among the most native in the city when compared with their historical conditions.” — Marcy Houle, *One City’s Wilderness*

Forest Park contains more than 70 miles of trails. This trail system crosses the larger perennial streams in the park, as well as many small intermittent drainages. Dozens of culverts cross under the trail system. In most cases, both the trail system and culverts are decades old and are in need of maintenance, if not redesign and replacement. Firelanes, in particular, were not designed in a sustainable manner and are a source of erosion each year. Additionally, Forest Park trails are moderately to heavily used in the rainy months.

In 2010, the Bureau of Environmental Services (BES) conducted extensive culvert surveys along Leif Erikson Drive. This assessment was utilized to produce a ranked list of priority culverts for repair and replacement.

Project Summary

The project will define and list infrastructure and maintenance activities. Existing data will be synthesized and distilled on the perennial streams within the park boundary and will identify:

- Sites and water bodies with degraded conditions.
- Infrastructure projects that have the potential to reduce water quality. The City will develop best management practices to limit aquatic resource degradation.
- Opportunities to work with the Portland Area Watershed Monitoring and Assessment Program (PAWMAP) to create more ongoing monitoring sites for long-term assessment.

All new infrastructure will be evaluated to determine the ability to enhance aquatic and terrestrial wildlife habitat and provide optimal protection to water quality.

Action Items and Timeline

- Synthesize and distill existing data into a summary report on the water quality in perennial streams flowing through Forest Park. (Year 1)
- Gain access to PAWMAP data for all Forest Park watersheds. Work with BES to develop monitoring reports that meet the needs of PP&R’s Water Quality Improvement program. (Year 1)
- Map intersecting conflicts between infrastructure and water resources and construct GIS database. (Year 1)
- Develop a set of best management practices (BMPs) to address infrastructure replacement that will improve conditions in Forest Park. These BMPs will promote improvements to water quality and the protection of aquatic organisms that are impacted by culverts, trails, and roads. (Year 1)
- Develop an action plan of priority projects and activities for implementation for ten-year time frame. (Year 1)
- Develop sequence of priorities and annual costs. Develop a timeline that follows available budget resources. Develop sample biennial reports on progress to date toward ten-year goals. (Year 1)
- Implement projects. Update GIS layer as projects are implemented and completed. (Years 2-10)

Ecological Prescriptions – Protected Air and Water Quality

Measure of Success

- Reduction in the number of infrastructure conflicts
- Identification of significant conflicts between infrastructure for park use and perennial water bodies
- GIS database of projects
- Ongoing monitoring of major watersheds in the park
- List of high priorities (ten-year plan)
- High priority projects implemented

Partner Commitments

- PP&R will identify conflicts between park infrastructure and water resources and will develop BMPs.
- BES will continue to partner with PP&R on projects that promote improvements to water quality and stream conditions that are supportive of aquatic organisms.

Budget

Assessment and planning	\$50,000
Design and construction	TBD

Project *1B – Address Turbidity Inputs to Balch Creek Watershed

Ecological Goal: Protected Air and Water Quality

Background

Forest Park streams provide exceptional wildlife habitat and water quality for their urban context. Resident trout inhabit Balch Creek. During storm events, Balch Creek turbidity increases similar to other urban streams, creating poor water quality conditions within the park and downstream in the Willamette River. Bureau of Environmental Services (BES), during an assessment of six years worth of water quality for Balch Creek, identified that total suspended solids in Balch Creek are increasing at a rate of 25% a year, while other westside streams are showing a slight decrease in this metric.

Project Summary

Balch Creek turbidity will be addressed by looking for and remediating sediment sources on public and private land. The project will identify and map potential non-point source areas throughout the basin as well as infrastructure (roads, culverts) that could contribute or carry sediment into the creek. Areas of active erosion will also be mapped and described.

The mapping effort will be translated into a project list for public and private sites. An outreach program will be designed to contact landowners and other responsible jurisdictions to implement projects. If possible, the mapping, outreach, and project implementation will be coordinated with other projects.

Action Items and Timeline

- Conduct comprehensive basin land-use and infrastructure assessment, including mapping and attributes of potential sediment sources. (Years 1-2)
- Engage in outreach to landowners and jurisdictions for erosion control and infrastructure improvements. (Years 2-3)
- Work with the Portland Area Watershed Monitoring Assessment Program (PAWMAP) to continue to monitor sediment in Balch Creek. (Years 2-10)

Measure of Success

- Reduction in sediment in PAWMAP surveys
- Comprehensive basin assessment and mapping
- Implementation of high priority projects

Partner Commitments

- PP&R will assess infrastructure within the park to evaluate sediment sources. PP&R will coordinate with interested partners to provide outreach to landowners regarding erosion control and infrastructure improvements.
- West Multnomah Soil & Water Conservation District (WMSWCD) will coordinate the Balch Creek Partners, a cooperative interagency task force that strives to coordinate conservation efforts to protect and enhance the natural resources of the Balch Creek watershed.
- WMSWCD will provide private landowners an opportunity to tour Balch Creek streambank enhancement project sites and will provide technical assistance to landowners interested in conducting streambank enhancement projects.

Budget

Basin assessment	\$90,000
Outreach and implementation	\$190,000

Project 1C – Best Management Practices (BMPs) for Instream Maintenance Work

Ecological Goal: Protected Air and Water Quality

Background

In an urban context, Forest Park streams provide high quality wildlife habitat within the park and provide cold, clean water to the Willamette River. The Bureau of Environmental Services (BES), the Bureau of Maintenance (BOM), and Portland Bureau of Transportation (PBOT) maintain many trash racks and culverts as they exit the park. These structures require periodic maintenance, creating disturbance in the riparian zone. An assessment of maintenance locations and activities will allow for better practices to minimize impacts to wildlife and water quality.

Project Summary

The project will identify and map all sites that could receive regular and emergency maintenance. The sites will be mapped and potential activities will be listed in a geo-spatial database. The primary bureau responsible for maintenance of these sites will be identified with appropriate contact information. The data will include the likely schedule and return interval for maintenance activities. Ten-year goals will include an annual meeting between partners and a brief annual report which details the amount of material removed from the area.

Action Items and Timeline

- Locate and map instream maintenance sites. (2012-2013)
- Define best management practices (BMPs). (2012-2013)
- Create map layer and attributes for maintenance information, treatments, schedule, and history. (2012-2013)
- Update GIS layer as projects are implemented and completed. (2012-2013)
- Develop annual report format. (2012-2013)

Measure of Success

- BMPs for sustainable instream activities
- List of in-stream maintenance sites
- GIS database of activities
- Compliance with BMPs
- Annual report and interagency coordination

Partner Commitments

PP&R will facilitate the project, create the database, and involve partners in the development of BMPs and annual reporting format.

Budget: \$25,000

Project 1D – Pet Waste Management

Ecological Goal: Protected Air and Water Quality

Background

Pet waste contributes substantial pollution to Balch Creek and other Forest Park streams. For their urban context, Forest Park streams provide high quality habitat and water quality. Off-leash dogs are a documented problem in Forest Park. Dogs are known to significantly reduce water quality through pet waste. Studies in the Tualatin Basin in Washington County identified that as much as 13% of fecal coliform was of canine origin and the Environmental Protection Agency notes that over 20% of bacteria found in the area around Seattle comes from domestic dogs. It is more likely that pet waste from dogs off-leash will go unnoticed and uncollected by their owners.

The Dogs for the Environment program has been in place since 2006, providing outreach and education to park users about the impacts from off-leash dogs. This program has expanded the PP&R Ranger program and provided funding to enforce leash and scoop laws. Through this program a wealth of data has been generated about times and locations where off-leash dogs are particularly problematic. In Forest Park, the Lower Macleay Trail which runs through Balch Creek Canyon has been noted to have a non-compliance with the leash laws higher than any other site that is actively patrolled. Recommendations have been made to target enforcement to weekends and holidays when park use is at its highest. Additional funding would be required to implement this recommendation.

Project Summary

The project will create ongoing monitoring of *E. coli* inputs to Forest Park Streams. This project will be coordinated with other existing monitoring efforts in Forest Park. Results will be used to continue and build on existing education and enforcement efforts.

Action Items and Timeline

- Coordinate with Portland Area Watershed Monitoring and Assessment Program (PAWMAP) program to ensure adequate monitoring sites for *E. coli*. (2012-2013, ongoing)
- Create outreach/education program, including work with the media. (2012-2013)
- Target priority areas for education and enforcement. (2012-2013)
- Consider additional fines for non-compliance with scoop law. (2012-2013)
- Continue to fund Ranger and volunteer watch programs. (2012-2013, ongoing)

Measure of Success

- Reduction in off-leash dogs
- Reduction of *E. coli* found in monitoring samples

Partner Commitments

PP&R will continue to support and provide staffing for ranger, volunteer watch, and other educational programs that educate the public about dog use and natural resources.

Budget: \$40,000

Project 1E – Control Erosion Issues from Invasive Species

Ecological Goal: Protected Air and Water Quality

Background

Invasive plant species dominate the landscapes they invade. They outcompete the diverse flora that occupies intact native plant communities. At their extreme, they create allelopathic conditions hostile to other plant life. Some knotweed species are also examples of highly aggressive plants, where a single plant dominates an entire strata within the forest. With knotweed, a small piece of rhizome can readily migrate downstream and root in a new location. These dense populations of invasive species often suppress all other plant species, providing rooting at only one depth. There is some speculation that monocultures, therefore, provide less substantial root complexes to control erosion.

Diverse native plant communities, by contrast, typically have a network of herbaceous and woody species that occupy several strata in both the above ground and subsurface environments. It is believed that these diverse rooting structures provide better erosion control through the year.

Project Summary

The project will assess invasive species in the park and determine the risk of increased erosion in riparian areas. The assessment will include an evaluation of risk by species, mapping, and prioritization of treatments.

Action Items and Timeline

- Assess problem plants with regard to increased erosion. (Year 1)
- Map the presence of these species in the park. (Year 1)
- Develop priorities and develop treatment methodologies. (Years 2-3)
- Treat high priorities and monitor results. (Years 3-6, ongoing)

Measure of Success

- Reduction in acres of invasive species
- Reduction in erosion caused by invasive species
- Information on invasiveness and erosion
- Map of populations of invasive weeds

Partner Commitments

PP&R will support assessment, mapping, and treatments as new funding becomes available for this project. Funding for staff time for this project is not programmed in the ten-year budget plan.

Budget: \$55,000

Project 1F – Septic System Education and Outreach Program

Ecological Goal: Protected Air and Water Quality

Background

Water quality sampling data show elevated ammonia levels in Balch Creek due to inadequate function of septic systems in the basin. Outreach is needed to improve the quality of septic systems or create incentives for landowners to connect to the municipal sanitary sewer where feasible.

Project Summary

The project will inventory septic systems in the Balch Creek watershed. An outreach and education program will target inventoried sites. An initial assessment will be conducted by determining dwelling structures that are not connected to the municipal sewer system.

Action Items and Timeline

- Develop target outreach list for Balch Creek watershed. (Year 1)
- Create outreach materials and/or outreach/education program. (Year 2)
- Work with the Bureau of Environmental Services to determine previous work/program to connect their ratepayers to the City sanitary sewer system. (Year 2)
- Work with Bureau of Development Services to explore opportunities for incentive programs. (Years 2-4)

Measure of Success

- Reduction in ammonia in Balch Creek
- Inventory of septic systems in Balch Creek watershed
- Outreach program developed with incentives/assistance for landowners

Partner Commitments

- PP&R will provide review of the program documents, strategy, and reports.
- West Multnomah Soil & Water Conservation District, in collaboration with the Balch Creek Partners, will help disseminate technical information and organize an outreach event regarding septic systems for private landowners that live in the Balch Creek watershed.

Budget: \$200,000

Project 1G – Headwater Land Protection Program

Ecological Goal: Protected Air and Water Quality

Background

The 1995 Forest Park Natural Resources Management Plan describes two separate projects which have been combined in this prescription: Protection of Balch Creek Watershed and Acquisition and Protection of Headwater Areas.

Management of land along the headwater drainages that lead to the major park streams has a large effect on water quality within and beyond Forest Park. A recent synthesis of six years of water quality data from the Bureau of Environmental Services showed that total suspended solids in Balch Creek are increasing at a rate of 25% a year, while other westside streams are showing a slight decrease in this metric. The report notes that recent development and land clearing may be contributing to the annual increases in total suspended solids. Since the headwaters of the Balch Creek watershed are primarily in private ownership, this land has the greatest potential to negatively impact water quality since land management is currently not coordinated or consistent.

Three Rivers Land Conservancy (TRLIC) had a temporary program aimed at acquiring conservation easements to protect land within the Balch Creek watershed. Several easements were donated and are managed by Columbia Land Trust which merged with TRLIC. The City of Portland provided funding for stewardship of the easements and co-holds the easements.

Project Summary

Outreach to private property owners along headwater drainages can educate neighbors in water quality protection. Cooperative habitat management programs and conservation easements can be explored. The City of Portland is not in a position to hold easements or isolated tracts of land beyond the immediate borders of Forest Park; a partner such as a land trust will be needed.

Action Items and Timeline

Outreach & Education

- Identify conservation and incentive programs available for property owners. (Year 1)
- Develop outreach program. (Year 1)
- Track land use proposals and coordinate with City and County agencies. (Year 1, ongoing)

Easements

- Identify organization to hold conservation easements. (Year 2)
- Develop criteria for accepting easements. (Year 2)
- Identify priority easements. (Year 2)
- Outreach for easement acquisition program. (Year 2)
- Acquire easements. (Years 3-10)

Measure of Success

- Property owners aware of the value of the resources they manage and programs to assist in management
- Headwater streams protected from direct impacts of development

Partner Commitments

- PP&R will provide maps and ownership information for headwaters streams. PP&R will track land use applications for headwaters sites within the City of Portland.

Ecological Prescriptions – Protected Air and Water Quality

- The Forest Park Conservancy will support outreach and education efforts, contacting landowners adjacent to Forest Park as part of the outreach component of the Greater Forest Park Conservation Initiative.

Budget

Program development and outreach	\$10,000
Acquisition of ten priority easements	\$250,000

Ecological Prescriptions – Protected Air and Water Quality

Project 1H – Air Quality Assessment

Ecological Goal: Protected Air and Water Quality

Background

In order to understand the ecological role and projected health of Forest Park, it is critical to understand the relationship between how air quality impacts the forest and what role this forest plays in attenuating air quality concerns.

Project Summary

The air quality assessment of Forest Park will utilize air quality monitors, lichen and moss surveys, and nutrient assessments to determine areas of air quality concern within and surrounding Forest Park. This project will involve coordination with local universities to conduct the assessment and analyses. Areas of concern will be documented along the park boundary and into the interior of the park to assess the impacts and gradient of air quality concerns. A response plan will be developed for areas of concern which may include a variety of techniques such as vegetated buffers, education and outreach, and/or policy change.

Action Items and Timeline

- Develop study design and roles/responsibilities with Portland State University (PSU). (2011)
- Install air quality monitors and perform lichen assessment. (2011)
- Analyze results and report. (2012)
- Develop response plan. (2013)

Measure of Success

- Air quality assessment complete
- Areas of concern and response plan in place

Partner Commitments

- PSU will complete data collection, analysis, and reporting.
- PP&R will provide direction on research locations, review report, and develop response plan.

Budget: \$55,000

Project *2A – Stand Trajectory Assessment

Ecological Goal: A Forest with Structural Complexity: Vertically (canopy, midstory, understory, snags, down wood) and Landscape Scale (mosaic of habitat types, natural gaps)

Background

A variety of recommendations have been proposed for interventions to alter the current stand dynamics present in Forest Park. These recommendations have included thinning of bigleaf maple (*Acer macrophyllum*) to provide conifer release¹ and thinning of conifers to retain a mixed conifer-deciduous composition for wildfire risk reduction.² These recommendations present conflicting management approaches to a specific vegetation alliance, the Bigleaf Maple Forest Alliance. A stand trajectory assessment is necessary to address these divergent recommendations and to inform management goals.

Additional recommendations have included revegetation to address an apparent lack of regeneration throughout the park.³ While some work has been done to assess regeneration in the park, additional research is required to determine if and where regeneration is a problem. A context is needed for how regeneration rates relate to regional and worldwide trends; it is critical to determine if the regeneration response found throughout the park is abnormal for the successional stage being evaluated.

Stand trajectory assessments for each alliance type will greatly add to the ability of Forest Park managers to make informed management decisions. Vegetation alliances have been mapped through the vegetation inventory process that was completed by the City of Portland in 2003 and 2004. Additional review of this data and some field verification will be required to ensure stands evaluated through this process represent the diversity found not only between, but within, alliances.

Project Summary

The assessment will evaluate representative stands within each alliance type to determine the successional trajectory of the stand. Sampling will include geographic distribution throughout alliances. Variables such as mortality, regeneration, stem density, and the presence of snags and large wood will be collected. The assessment will describe the likely outcomes from no intervention.

Potential interventions will be evaluated to determine how thinning, invasive species removal, and/or revegetation will influence the stand trajectory versus managing the site for natural succession. Recommendations will be made for interventions that optimize forest health, increase native biodiversity, and reduce wildfire risk and threat of forest disease. Successional processes will be evaluated with the potential impacts of climate change in mind.

Action Items and Timeline

- Identify funding and research methodologies, tools, and resources for assessment. (Year 1)
- Develop sampling strategy that provides significant geographic and alliance type distribution. (Year 2)
- Implement forest stand trajectory assessment. (Year 3)
- Analyze results and report. (Years 4-5)

¹City of Portland. Portland Parks & Recreation and Bureau of Planning. 1995. *Forest Park Natural Resource Management Plan*. Gronowski, Sjulín, Brooks, and Nilsen. Ordinance no. 168509. Portland, Oregon.

²Trout Mountain Forestry. 2008. City of Portland – Forest Park. Wildlife Risk Reduction Final Report.

³Broshot, N. 2007. "The influence of urbanization on forest stand dynamics in Northwest Oregon." *Urban Ecosystem* 10:285-298.

Ecological Prescriptions – A Forest with Structural Complexity

Measure of Success

- Forest stand trajectory assessment completed
- Stand management plans in place, representing each alliance and stand type within alliances

Partner Commitments

- Portland State University will review methodologies, tools, and resources and assist in the development of sampling design. PP&R will review assessment and will participate in the development of stand management plans.
- West Multnomah Soil & Water Conservation District will assist in assessment methodology and stand management plan review.

Budget: \$90,000

Project *2B – Invasive Vine Monitoring and Removal Program

Ecological Goal: A Forest with Structural Complexity: Vertically (canopy, midstory, understory, snags, down wood) and Landscape Scale (mosaic of habitat types, natural gaps)

Background

English ivy (*Hedera helix*) and clematis (*Clematis vitalba*) are both invasive species of concern in Forest Park. Both of these plants establish first in the understory and then climb up trees and shrubs into the forest canopy – threatening tree health, reducing biodiversity, and distributing seed aerially.

As of 2011, over 75% of the park has received an initial treatment for invasive vines through PP&R programs and grants. Addressing invasive vines in the forest canopy is a first step in long-term invasive species management and an essential component of tree canopy protection.

Project Summary

The project is focused on addressing invasive vines in the tree canopy throughout Forest Park. This program will establish cyclical removal utilizing manual and chemical techniques and will incorporate initial treatment and maintenance for previously treated areas.

Areas of the park that have presence of these species will be delineated into treatment zones and phased through a rotating cycle to eliminate the vertical presence of invasive vines. This project is designed to occur in conjunction with the *Long-Term Invasive Plant Management Plan* to address the horizontal distribution of English ivy and clematis through comprehensive restoration.

Action Items and Timeline

- Designate treatment zones, strategy, and timing of treatment. (2012)
- Conduct pre-project monitoring for all initial treatment sites. (2012)
- Complete treatment of all initial sites. (2012)
- Conduct post-project monitoring to determine efficacy of treatments and optimal interval for retreatment. (2013, ongoing)
- Utilize data collected during monitoring to inform target areas for comprehensive restoration through the Forest Park Buffer Program (Project 4C). (2013, ongoing)

Measure of Success

- Number of acres treated per year
- Trees per acre impacted by invasive vines reduced

Partner Commitments

- PP&R will develop treatment zones, strategy, and timing of treatment and coordinate project management. PP&R No Ivy League stewardship program will coordinate and assist in the completion of manual treatments where appropriate, as well as public education efforts such as No Ivy Day. Protect the Best (PTB) will be utilized to complete chemical treatments in PTB qualifying acreage.
- The Forest Park Conservancy (FPC) will work with PP&R to identify sites appropriate for the FPC field crew and volunteer corps to engage in manual treatment of invasive vines throughout Forest Park, including Day of Stewardship restoration sites.
- In 2011-2012, West Multnomah Soil & Water Conservation District will implement a pilot Weed Canopy Removal demonstration program that provides free technical assistance and invasive removal crews to landowners in four target areas surrounding Forest Park.

Budget: \$280,000

Ecological Prescriptions – A Forest with Structural Complexity

Project 2C – Old Growth Survey

Ecological Goal: A Forest with Structural Complexity: Vertically (canopy, midstory, understory, snags, down wood) and Landscape Scale (mosaic of habitat types, natural gaps)

Background

Old growth currently occupies no greater than 0.05% of the park, but provides important habitat to wildlife and may have rare plants associated with this forest type. Survey and mapping are critical to help further define and protect the stands of old trees and associated vegetation in Forest Park. Some initial work has been done to survey and map known stands of old growth present in the park.

Project Summary

The project will map the presence of old growth stands within the park and document information about age, structural composition, habitat features, and rare plants. Following the survey of these areas, a management strategy will be developed to protect these stands and associated species.

Action Items and Timeline

- Review Light Detection & Ranging (LIDAR) analysis to determine potential survey areas. (2012)
- Design survey methods. (2012)
- Conduct survey. (2013)
- Compile data in GIS database. (2013)
- Develop management strategy. (2014)

Measure of Success

- Database with old growth data
- Management strategy

Partner Commitments

PP&R will conduct survey and develop management strategy.

Budget: \$10,000

Project 2D – Forest Disease Assessment

Ecological Goal: A Forest with Structural Complexity: Vertically (canopy, midstory, understory, snags, down wood) and Landscape Scale (mosaic of habitat types, natural gaps)

Background

Laminated root rot (*Phellinus weirii*) can readily spread throughout Douglas fir (*Pseudotsuga mensiezii*) forests. Trees that are infected with laminated root rot are weakened and may be susceptible to secondary infection or infestation of Douglas fir beetles (*Dendroctonus pseudotsugae*). In areas where laminated root rot or insect pests are found, other native vegetation can be introduced that is either less susceptible or not susceptible to the disease or pests.

Project Summary

The assessment will identify any diseased areas and develop a plan for managing diseased sites. Aerial imagery will be utilized to determine sites for on-the-ground survey. Survey sites will also be evaluated for the presence of Douglas fir beetles, a native species commonly associated with large areas of down trees.

Action Items and Timeline

- Identify funding for project implementation. (Year 1)
- Conduct aerial analysis in GIS to identify sites for ground survey. (Year 2)
- Complete on-the-ground survey of all interior forest sites. (Year 3)
- Complete on-the-ground survey of all edge forest sites. (Year 4)
- Develop and implement management plan for diseased sites. (Year 5)

Measure of Success

- Disease assessment completed
- Management plan in place

Partner Commitments

- PP&R will assist in survey and develop management plan if funds are identified to conduct survey.
- West Multnomah Soil & Water Conservation District will assist in plan review.

Budget: \$12,000

Project *3A – Wildlife Study

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

The Forest Park Natural Resource Management Plan (1995) calls for a wildlife study in order to develop baseline data for tracking the ecological health of the natural area and to make responsible, informed decisions about park use.

Project Summary

The project is a critical path element to Wildlife Use Characterization (Project 3B). It is also an essential step needed prior to making decisions about allocation of restoration dollars and park use modifications. The project will collect new data and will synthesize it with previous research and other documentation. The study will conclude with recommendation for ongoing research from known baselines. It will also create a reference library of previous research and a list of off-the-shelf research projects available for future graduate students.

Action Items and Timeline

- Develop scope for wildlife study. (2011-2012)
- Explore opportunities for citizen science. (2011-2012)
- Create deliverables for Wildlife Study Coordinator (project description and timeline). (2011-2012)
 - Establish a timeline consistent with getting good data; minimum two monitoring seasons.
 - Development of database or tracking mechanism and complementary mapping.
- Establish a technical review committee. (2011-2012)
- Gather all existing wildlife research data for Forest Park and other supporting documentation. (2011-2012)
- Complete initial study. (2013)
- Create opportunities for ongoing monitoring utilizing trained citizen naturalists. (2012, ongoing)

Measure of Success

- Comprehensive wildlife study
- Identification of distinct wildlife use areas
- Baseline information and stations
- Database and mapping protocol
- Completed study that lends itself to gathering ongoing data using graduate students and trained citizen naturalists

Partner Commitments

- PP&R will coordinate the study elements, including partner coordination, data synthesis, and contract for necessary professional services.
- Bureau of Environmental Services (BES) will share any relevant wildlife-related data that has been collected in Forest Park, including Portland Area Watershed Mapping and Assessment Project data.
- BES will participate in the technical review committee for the wildlife survey and also partner with PP&R to apply for grants to conduct the parkwide wildlife survey.

Budget: \$80,000

Project *3B – Wildlife Use Characterization

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

Some of the diversity of wildlife species using Forest Park has been documented and to date includes more than 50 different mammals and over 100 bird species. The park is home to a variety of reptiles and amphibians including garter snakes (*Thamnophis spp.*), Pacific giant salamanders (*Dicamptodon tenebrosus*), rough-skinned newts (*Taricha granulosa*) and red-legged (*Rana aurora*) and Pacific tree frogs (*Hyla regilla*), to name a few. Two perennial streams that flow through the park, Balch and Miller Creeks, have populations of cutthroat trout (*Oncorhynchus clarkia*) (Miller and Balch) and Coho salmon (Miller); cottids (*Cottus spp.*) have been observed in Miller Creek. On occasion, large mammals such as North American black bear (*Euarctos americanus*) and North American elk (*Cervus elaphus*) have been documented within the park.

In order to protect and enhance the wildlife habitat of Forest Park, it is critical to develop target species and/or guild priorities for management. The Wildlife Study (Project 3A) is a prerequisite essential to understand wildlife utilization throughout the park. Once this information has been collected it can be utilized to inform management decisions.

Project Summary

The project will develop a list of target species and guilds for management. For each target species or guild, habitat needs will be fully defined. This will include, but may not be limited to, minimum management area, required habitat features, and identification of potential threats or impacts to these species. Management recommendations will include creation and/or expansion of habitat features (e.g., snags, down wood, brush piles, rock piles) as well as suggestions for changes in use, infrastructure, and park amenities.

Action Items and Timeline

- Develop a list of target species and guilds in conjunction with the City's Terrestrial Ecology and Enhancement Strategy (TEES). (2014)
- Create species/guild based management recommendations for each vegetation alliance or habitat type. (2015)
- Develop a map of areas in the park that are critical to implementation of management recommendations. (2015)

Measure of Success

Characterization report including:

1. Target species/guilds for each vegetation alliance or habitat type
2. Management recommendations for target species and locations in the park to implement the management recommendations

Partner Commitments

- Bureau of Environmental Services (BES) will assist in the development of target species and management recommendations.
- PP&R will lead development of target species list and management recommendations with key partners (Audubon; BES Science, Fish & Wildlife; and TEES staff).

Budget: \$20,000

Project *3C – Improve Wildlife Habitat Structures throughout Park

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

Due to the logging and fire history in Forest Park, snag and down wood abundance is low in some portions of the park. Previous practices included not only extraction, but also slash fires, to remove down material that remained on site after harvest. Currently, snag creation opportunities are limited to hazard tree removal and maintenance along powerline corridors.

PP&R and the Bureau of Environmental Services (BES) have begun the development of guidelines for wildlife habitat structures through the Terrestrial Ecology Enhancement Strategy (TEES).

Project Summary

The project will include the completion of snag, brush pile, and down wood creation/retention guidelines. These guidelines will be incorporated into Memorandums of Understanding (MOUs) with utility companies active in Forest Park, coordinated with Utility Corridor Fire Risk Reduction (Project 5C). Several pilot projects will be developed that include pre- and post-installation monitoring to evaluate wildlife use. As a component of the Stand Trajectory Assessment (Project 2A), stands that could benefit from the addition of wildlife habitat structures will be identified. These data will be fundamental in identification of where the need is greatest need for structure creation.

Action Items and Timeline

- Complete wildlife habitat structure guidelines. (Year 1)
- Incorporate guidelines into utility MOUs. (Year 2)
- Develop pilot projects and evaluate wildlife use. (Years 2-3)
- Implement highest priority projects. (Years 3-10)

Measure of Success

- Wildlife habitat structure guidelines
- Updated utility MOUs
- Priority pilot projects

Partner Commitments

- PP&R will assist with guidelines, incorporate guidelines into utility MOUs and develop and implement pilot projects.
- BES will assist in completion of guidelines.

Budget

Develop guidelines	\$20,000
Install wildlife structures throughout park	TBD

Project *3D – Rare Plant Protection

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

Plants rare to the Portland metropolitan area have been observed in Forest Park. Several special status habitats are present within the park and large acreages of land with no history of development make it likely that additional uncommon plants exist within the park. Currently, no rare plant survey and response protocol exists for Forest Park. A list of plants rare to Portland can be found in the Native Plant Society publication, *Urbanizing Flora of Portland, Oregon, 1806-2008*.¹

Project Summary

The project will include the creation of a rare plant list for Forest Park. A survey and manage protocol will be developed for rare plants and appropriate PP&R staff will be trained in this protocol. Areas with previously documented rare plants will be surveyed and species will be mapped and recorded in a GIS database. In addition to surveying known locations for rare plants, a subset of special status habitats will be evaluated. The PP&R inventory will be used to identify potential survey locations. All mapped plant locations will be submitted to the *Oregon Plant Atlas* which tracks plant distribution throughout the state of Oregon.

Action Items and Timeline

- Create rare plant list for Forest Park. (2015)
- Develop GIS database for tracking rare plant data. (2015)
- Develop survey and manage protocol and provide staff training. (2015)
- Document known locations of rare plants. (2016, ongoing)
- Survey subset of special status habitats. (2016, ongoing)
- Submit all mapped occurrences to *Oregon Plant Atlas*. (2016, ongoing)

Measure of Success

- PP&R rare plant list completed
- Rare plant database established
- Survey and manage protocol adopted
- Number of acres of special status habitat surveyed

Partner Commitments

- PP&R will lead development of rare plant list, create database, and conduct survey with key partners.
- Bureau of Environmental Services will review and provide comment on the rare plant list and survey and manage protocol.

Budget: \$60,000

¹Christy, J.A., A. Kimpo, V. Marttala, P.K. Gaddis & N.L. Christy. 2009. *Urbanizing Flora of Portland, Oregon, 1806-2008*. Native Plant Society of Oregon Occasional Paper 3: 1-309.

Project *3E – Habitat Fragmentation Response

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

Special status habitats have been identified for the City of Portland through the Terrestrial Ecology Enhancement Strategy (TEES). Five of these habitat types are found in Forest Park: herbaceous wetlands, oak woodlands, interior forests, late successional conifer forests, and bottomland hardwood forests and riparian habitats. An initial GIS analysis of interior forest habitat has occurred within the park.

Project Summary

The project will assess special status habitats to determine the current and potential fragmentation of these habitats within Forest Park. To complete the assessment, data will be pulled from several related projects including Wetland Protection and Enhancement (Project 3H) and Oak Habitat Conservation, Restoration, and Management Program (Project 3F). During the assessment, the feasibility of reconnecting fragmented habitats will be evaluated. Products from the assessment will include recommendations to minimize further fragmentation and to enhance habitats and features within habitat patches.

The data gathered during this assessment will be utilized to implement a Wildlife Area Management Program that protects priority patches of non-fragmented habitat and provides management recommendations for allowable use in these areas. The Wildlife Study (Project 3A) is essential in informing the designation of these priority areas. The project timeline reflects the dependency of this project on accompanying projects.

Action Items and Timeline

- Assess fragmentation of special status habitats. (2014)
- Implement Wildlife Area Management Program. (2015-2016)

Measure of Success

- Assessment complete
- Wildlife Area Management Program in place

Partner Commitments

- PP&R will facilitate the assessment of fragmentation of special status habitats with a technical team composed of partners. This technical team will develop the Wildlife Area Management Program.
- Bureau of Environmental Services will assist in the development of a habitat fragmentation assessment for Forest Park.

Budget: \$20,000

Project *3F – Oak Habitat Conservation, Restoration, and Management Program

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

In the past decade, several PP&R Forest Park projects have identified the presence of Oregon white oak (*Quercus garryana*) in the park. Both PP&R's Forest Park Vegetation Survey and the Federal Emergency Management Agency (FEMA)-funded Forest Park Wildfire Planning Study identified patches of oak woodlands and mixed stands of oak and other tree species. In particular, significant stands of oak were identified adjacent to Highway 30.

Project Summary

An oak habitat conservation plan for Forest Park is needed to guide future restoration and management work. The Bureau of Environmental Services (BES) and PP&R staff will soon complete the City of Portland Oak Habitat Conservation Strategy which will provide a framework for this planning. Before preparing an oak habitat and restoration plan for Forest Park, additional field surveys need to be conducted. To inform these field surveys, all existing data and maps will be utilized to identify the location of the park's existing oak woodlands. While conducting the field survey, an assessment of the ecological health of the oak trees and their associated plant community will be conducted. This assessment will evaluate oak tree health, determine approximate age and mast production, and identify the oak associated understory shrubs, grasses, and forbs.

Utilizing the decision matrix tools in the City of Portland Oak Habitat Conservation Strategy and the data collected during the survey and assessment, a Forest Park oak restoration and management plan will be prepared by PP&R and Bureau of Environmental Services (BES) Terrestrial Ecology Enhancement Strategy (TEES) staff. This plan will identify sustainable oak habitat conservation areas, specify active oak habitat restoration and management activities, and identify high priority projects. Thereafter, funding will be secured for a PP&R Request for Proposal (RFP) for a Professional Technical Expertise (PTE) contract to implement the restoration and management work. After the initial work has been completed, additional funding for ongoing restoration and management activities will be sought.

Action Items and Timeline

- Complete City of Portland Oak Habitat Conservation Strategy. (Year 1)
- Design/implement an oak survey and ecological health assessment of oak habitats. (Year 1)
- Map oak habitat areas. (Year 2)
- Prepare an oak habitat restoration and management plan that identifies oak habitat conservation areas and specifies oak habitat restoration and management work. (Year 3)
- Secure funding and prepare a RFP for a City PTE contract to implement oak habitat restoration and management work. (Year 4)
- Secure funding to permit and implement ongoing oak management projects. (Year 5, ongoing)

Measure of Success

- Oak survey and detailed maps showing oak habitat areas
- Oak habitat conservation and restoration decision matrix tools
- Oak habitat assessment
- Forest Park Oak Habitat Conservation, Restoration, and Management Program
- Acres of oak restoration and management

Partner Commitments

- PP&R will lead the implementation of the survey, mapping, assessment, and Forest Park Oak Habitat Plan. Additionally, PP&R will assist in the completion of the Oak Habitat Conservation Strategy.
- BES will lead the completion of the Oak Habitat Conservation Strategy and provide staffing assistance with surveying, mapping, assessment, and Forest Park Oak Habitat Plan.

Budget

Assessment and planning	\$30,000
Implement oak restoration projects	TBD

Project *3G – Wildlife Corridor Connections

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

“Forest Park covers the entire hillside overlooking the confluence of Oregon’s two major rivers: the Columbia and the Willamette. With the Cascades in the distance, two major rivers below, and broad valleys and the Coast Range behind, a more spectacular setting for a park is hard to imagine. The park is a major green spine linking the Portland metropolitan region with natural areas to the north and west and providing a stepping stone for species dispersal within the region.” — 1995 Forest Park Natural Resources Management Plan

The species diversity in Forest Park is largely due to its size and connection to the Oregon Coast Range, Willamette River, and Tualatin Basin through wildlife corridors that functionally link the park to a greater geographic area. Currently, these wildlife corridors are largely unprotected and in the ownership of a mix of private and public properties that span the jurisdiction of Multnomah, Columbia, Clatsop, and Washington counties. The preservation and management of the interior lands of Forest Park alone will not protect the species diversity found within the park’s boundaries.

Project Summary

The project will identify and map the key wildlife corridor connections for Forest Park, including those to the Willamette River, Pacific Coast, and Tualatin Valley. The project will seek an existing agency or organizational structure to facilitate coordination between agencies, non-governmental organizations, and the public in order to facilitate protection and enhancement of key wildlife corridors. The project will be coordinated with the Wildlife Study (Project 3A) and Wildlife Use Characterization (Project 3B).

As a key component of the Greater Forest Park Conservation Initiative (GFPCI), Forest Park Conservancy (FPC) will lead a portion of this effort and work with partners to develop a plan and program for maintaining and/or enhancing wildlife corridor connections within the identified geographic boundary of the GFPCI (Highway 26, NW Skyline Blvd, NW Logie Trail Rd, Willamette River).

Action Items and Timeline

Local Pilot Project

- FPC will coordinate with Intertwine’s Regional Conservation Strategy and will work with other partners to develop plan and program. (Year 1)
- Identify and map key corridors, utilizing information from the Intertwine’s Regional Conservation Strategy. (Year 1)
- Develop goals and objectives for Forest Park and off-site corridors. (Year 1)
- Develop priorities for workplan. Develop multi-tiered program. (Year 1)
 - Zoning
 - Easements
 - Incentives for voluntary private landowner participation
 - Acquisition
 - Education and collaboration
 - Ongoing monitoring and education

- Create funding strategy. (Year 1, ongoing)
- Implementation. (Year 2, ongoing)

Regional Effort

- Identify all priority corridor connections for Forest Park, including Willamette River, Pacific Coast, and Tualatin Valley. (Year 3)
- Designate agency/organization to take on project coordination for corridor protection; multi-county partnership to pursue easements and acquisition. (Year 3)
- Pursue easements, acquisitions, and other protection strategies. (Year 4, ongoing)

Measure of Success

- Mapped primary and secondary corridors
- Identified threats and opportunities
- Specific priorities (corridor width, etc.) outlined
- Acres and miles of connections to and between protected habitats

Partner Commitments

Local Pilot Project

- As a key component of the GFPCI, FPC will lead a portion of this effort and work with partners to develop a plan and program.
- West Multnomah Soil & Water Conservation District (WMSWCD) can continue their commitment of working with landowners along these corridors to improve wildlife habitat on their properties. The WMSWCD can also assist in the outreach to these constituents to solicit further involvement.

Regional Effort

- PP&R will assist partners (the project will be partner-led) in developing the plan and program.
- PP&R will work to protect and restore wildlife corridors within Forest Park based on results from Projects 3A and 3B.

Budget

Program development (local pilot and regional effort) and initial outreach	\$200,000
Ongoing outreach, easements, and acquisition	TBD

Project 3H – Wetland Protection and Enhancement

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

Forest Park hosts a variety of wetland types that contribute to the floral and faunal biodiversity of the park. These wetlands should be surveyed to inform road, trail, and other management practices that may alter hydrology. Surveys will also identify where wetlands contain any rare plants and/or are supporting special status wildlife species.

Project Summary

The project will involve the development of a survey protocol for documenting wetlands. The protocol will include a wetland functional assessment, rare plant survey, wildlife use assessment, documentation of size and depth, and evaluation of current and potential adverse impacts. This protocol will be applied to all known wetlands and will be utilized when new wetlands are discovered. Slope wetland definition will be developed to assist in the detection of these less obvious wetlands, and a portion of these sites will be surveyed to evaluate species composition and wildlife use. This work will be used to create response and manage protocol for staff and provide recommendations for protection and enhancement opportunities.

Action Items and Timeline

- Create survey methodology and assessment tools and GIS database for tracking information. (Year 1)
- Survey known wetlands. (Year 1)
- Assess inventory data to determine potential sites for slope wetland survey. (Year 2)
- Survey subset of slope wetlands. (Year 2)
- Develop response and manage protocol. (Year 3)
- Develop protection and enhancement recommendations. (Year 4)
- Implement priority recommendations. (Years 4-10)

Measure of Success

- Wetland database with known site locations and data; subsample of slope wetland locations and data
- Response and manage protocol
- Protection and enhancement recommendations
- # of priority wetlands protected and/or enhanced

Partner Commitments

- PP&R will create a wetland database, methodology, and assessment tools; perform assessment with interested partners; and develop response and manage protocol and protection and enhancement recommendations. Priority recommendations will be implemented as funding and feasibility allow.
- Bureau of Environmental Services will review and provide comment on wetland assessment tools.

Budget

Survey and protocol development	\$10,000
Enhancement implementation	TBD

Project 3I – Balch Creek Enhancement

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

For decades, Balch Creek riparian area has been degraded by trail and road development, degrading culverts, and park use. The stream channel in Forest Park has been simplified and affected by high use by park visitors. The current trail (one of the highest park use areas) is at risk of washout. Opportunities exist for complementary stream restoration and trail protection or relocation.

In 2010, the Bureau of Environmental Services (BES) created a Portland Area Watershed Monitoring and Assessment Program (PAWMAP) to evaluate water quality, hydrology, toxics, habitat, fish, and macroinvertebrates to establish a baseline of data to measure changes in watershed health. This data may be useful in identifying additional enhancements to improve habitats for aquatic organisms in Balch Creek.

Project Summary

The project will enhance the Balch Creek riparian conditions, including the stability of the stream, the instream and riparian habitat conditions, and the Lower Macleay Trail. A riparian corridor assessment will identify opportunities for bed, bank, and floodplain enhancements, while integrating trail improvements for long-term use and reduction of erosion and disturbance to adjacent vegetation. The assessment will also evaluate the instream habitat conditions for fish and aquatic organisms. While the stream and trail improvements can be designed and constructed as stand-alone projects, this effort should consider opportunities to recreate the Lower Macleay Trail experience and interpretation, including controlled creek access. The assessment and planning process should also consider removing and upgrading the trash rack and associated catwalk at the same time or through the same planning process.

Action Items and Timeline

- Conduct riparian area assessment of Balch Creek on park property. (Year 1)
- Conduct riparian assessment on Audubon property. (Year 2)
- Develop enhancement project goals and criteria. (Year 2)
- Prioritize project list. (Year 2)
- Implement Phase I enhancements. (Years 3-4)
- Implement Phase II enhancements. (Year 5)
- Monitor outcomes at enhancement sites. (Years 4-10)

Measure of Success

- Implementation of identified priority projects
- Enhanced aquatic and riparian habitat quantity and quality
- Lower Macleay Trail stability

Partner Commitments

- PP&R will work with BES to identify opportunities to conduct stream assessment and plan for integrated restoration that allows for water quality and riparian improvement, while stabilizing trails and controlling public access to the creek.

Ecological Prescriptions – Floristic Native Biodiversity

- BES will share PAWMAP data and 2010 Culvert Survey for Leif Erikson data and assist in the evaluation of fish passage issues related to other aquatic organisms and recommendations for priority enhancements.
- BES (Watershed Services Group and Science, Fish & Wildlife) will assist with the identification of best management practices to address road, stream, and culvert infrastructure improvements in Forest Park that are supportive of fish and aquatic organisms.
- West Multnomah Soil & Water Conservation District (WMSWCD) will coordinate the Balch Creek Partners, a cooperative interagency task force that strives to coordinate conservation efforts to protect and enhance the natural resources of the Balch Creek watershed.
- WMSWCD will provide private landowners an opportunity to tour Balch Creek streambank enhancement project sites and will provide technical assistance to landowners interested in conducting streambank enhancement projects.

Budget

Survey and prioritization	\$40,000
Fundraising and priority project implementation	\$700,000

Project 3J – Miller Creek Enhancement

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

Miller Creek is one of two perennial streams in Forest Park with documented fish presence. In 2002, the Oregon Department of Transportation replaced a culvert that impeded salmon passage from the Willamette River. In subsequent years, salmon have been found upstream within Forest Park. However, fish passage may be restricted to high flow conditions. Further assessment of the culverts and lower stream reaches is needed.

In 2010, the Bureau of Environmental Services (BES) created a Portland Area Watershed Monitoring and Assessment Program (PAWMAP) to evaluate water quality, hydrology, toxics, habitat, fish, and macroinvertebrates to establish a baseline of data to measure changes in watershed health. These data may be useful in identifying additional enhancements to improve habitats for aquatic organisms in Miller Creek.

Project Summary

The project will first evaluate existing stream surveys for Miller Creek, conducted by PP&R, PAWMAP, and Oregon Department of Fish and Wildlife (ODFW), to identify priority opportunities for enhancement. This initial evaluation will be followed by field verification of priority sites. Additionally, surveys will focus on fish passage issues adjacent to the park to evaluate the need for further enhancement to improve access. The project will include an evaluation of the impacts of culverts, roads, and trails on fish and aquatic organisms in Miller Creek.

Action Items and Timeline

- Evaluate existing stream surveys for Miller Creek. (Year 1)
- Coordinate with PAWMAP/ODFW to determine current fish utilization. (Year 1)
- Survey priority reaches for enhancement opportunities. (Year 2)
- Develop best management practices (BMPs) for roads, trails, and culverts supportive of fish and biological organisms. (Year 2)
- Evaluate fish passage issues adjacent to the park. (Year 2)
- Provide recommendations and budgets for priority enhancement. (Years 2-3)
- Secure funding for and implement highest priority projects. (Years 3-10)

Measure of Success

- Number of priority projects completed
- Increased stream reaches accessible to fish during variable flows
- Greater channel complexity and improved fish habitat
- BMPs for roads, trails, and culverts that support habitat for aquatic organisms

Partner Commitments

- PP&R will facilitate survey, evaluation, and recommendations with technical team.
- BES will share PAWMAP data and assist in the evaluation of fish passage issues and recommendations for priority enhancements.
- BES (Watershed Services Group and Science, Fish & Wildlife) will assist with the identification of BMPs to address road, stream, and culvert infrastructure improvements in Forest Park that are supportive of fish and aquatic organisms.

Ecological Prescriptions – Floristic Native Biodiversity

- West Multnomah Soil & Water Conservation District will conduct continued site monitoring of its 60-acre Miller Creek Restoration demonstration project and will provide private landowners with technical assistance and education and outreach.

Budget

Survey and reporting	\$30,000
Project implementation	TBD

Project 3K – Wildlife Friendly Design Standards

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

Forest Park contains significant infrastructure in the form of roads, culverts, utilities, and buildings. Constructing new and replacement infrastructure, as well as maintenance activities on existing infrastructure, will affect wildlife within the park. Opportunities exist to minimize disturbance to wildlife and to create better habitat conditions as old infrastructure is replaced.

Project Summary

The project will identify the type of infrastructure in the park and the timeline for replacement and maintenance (Infrastructure Inventory). Following the inventory, PP&R will develop new design standards for each infrastructure element. When opportunities arise to install new infrastructure, wildlife impact will be evaluated not only in the design and construction of the structure but also in the site selection.

Action Items and Timeline

- Identify park infrastructure. (2013)
- Assess and document likely impacts to wildlife. (2013)
- Develop timelines for replacement and maintenance. (2013)
- Establish best management practices (BMPs) for wildlife sensitive infrastructure. (2013)

Measure of Success

- Design standards and BMPs
- New park infrastructure with net benefits for wildlife

Partner Commitments

PP&R will write standards for wildlife friendly design.

Budget: \$30,000

Project 3L – Roadside Management Program

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

Roads provide vectors for invasive plants to spread. Without careful management, roadside maintenance can create pathways and vectors for invasive species dispersal. Maintained roadways are a critical component of allowing safe vehicle and, at times, recreational passage on internal and adjacent roads to Forest Park. Routine maintenance creates opportunities, through often indiscriminate vegetation clearing, for invasive plants to establish vigorously in the right-of-way (ROW). The ROW forest edge typically becomes dominated by non-native plants that encroach into adjacent lands. This undesirable condition becomes extremely serious when a highly noxious weed, like garlic mustard, threatens the adjacent landscape.

Beyond evaluating invasive species control, the practice of vegetation maintenance is evolving to consider habitat and wildlife disturbance. The City of Portland's Terrestrial Ecology Enhancement Strategy (TEES) promotes guidelines to help land managers comply with the Migratory Bird Treaty Act and coordinate timing of maintenance activities to result in minimal wildlife disturbance.

Project Summary

The project will reexamine PP&R best management practices (BMPs) for roadside management and will work with Portland Bureau of Transportation Maintenance and Operations, PP&R, and other agencies to develop and document BMPs and ensure they are followed with all roadside treatments.

Action Items and Timeline

- Review and update documents describing BMPs for managing invasive species and minimizing disturbance to wildlife. (2013-2014)
- Outreach to agencies conducting roadside maintenance adjacent to Forest Park. (2013-2014)

Measure of Success

- BMPs for roadside management
- Reduction in invasive species along roadsides and adjacent natural areas

Partner Commitments

PP&R will facilitate the review and update of roadside BMPs by multiple bureaus.

Budget: \$10,000

Project 3M – Inholding Acquisition

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

Acquiring inholdings was identified as a project in the 1995 Forest Park Natural Resources Management Plan. Metro's 1995 Open Spaces bond measure included a target area for Forest Park and was successful in acquiring over 180 acres of inholding property within the park. Only limited funds are targeted from the regional share of the 2006 Natural Areas bond measure for additional acquisitions in Forest Park. Portland's local share of the 2006 bond measure is acquiring inholdings. Especially targeted are inholdings along mapped rights-of-way within the park. Forest Park inholdings are also targeted for acquisition by PP&R's System Development Charge (SDC) plan.

Project Summary

Using funds from Portland's local share of the 2006 Natural Areas bond measure and SDC, inholdings will be identified and prioritized. High priority parcels with willing sellers will be acquired.

Action Items and Timeline

- Identification of all remaining inholding properties. (2011)
- Develop criteria and identify high priority parcels. (2011)
- Outreach to determine willing sellers. (2011)
- Property acquisition. (2011-2013)
- Follow-up project: Vacate mapped rights-of-way that are entirely within the park. (2013 or after acquisitions are complete)

Measure of Success

- Reduced number of private inholdings in Forest Park, especially on rights-of-way, that could otherwise be vacated.

Partner Commitments

PP&R staff will perform all necessary tasks. PP&R will provide funding for up to \$600,000 in high priority inholding acquisitions and staff time.

Budget: \$1,200,000

Project 3N – Pollinator Habitat Program

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

Pollinators play a critical role in our ecosystems. Many pollinators are experiencing challenges due to habitat loss, disease, and pesticide use. Within Forest Park, there exist opportunities to increase pollinator habitat. Conditions found within the disturbed edges of the park have the potential to provide critical pollinator habitat through changes in current management and restoration of these areas with native forbs and grasses. In addition to providing habitat enhancement, the locations for enhancement at trailhead entrances or access points to the park provide the opportunity for education and outreach about a critical issue.

Project Summary

Trail entrances, roadsides, meadows, and powerline corridors will be evaluated for pollinator habitat creation and enhancement. Several demonstration projects will be selected in accessible areas and implemented. The establishment of these enhancement projects will be created in conjunction with a citizen science program that will measure and monitor pollinator presence before and after project installation.

Action Items and Timeline

- Identify demonstration project sites. (2013)
- Design enhancement projects for demo areas. (2013)
- Work with partners to provide pre-monitoring of demo sites. (2014)
- Prep sites following monitoring for enhancement. (2014)
- Implement pollinator habitat restoration at demo sites. (2015)
- Work with partners to provide post-monitoring of demo sites. (2015)

Measure of Success

- Enhancement projects implemented
- Citizen science monitoring program in place

Partner Commitments

PP&R will design and implement enhancement projects and provide support for citizen science monitoring program.

Budget: \$15,000

Project 30 – Stream Enhancement

Ecological Goal: Floristic Native Biodiversity with Increased Habitat Opportunities for Target Wildlife Species and Avian, Terrestrial, and Aquatic Native Wildlife Corridors (within and surrounding Forest Park)

Background

Forest Park streams such as Rocking Chair Creek, Saltzman Creek, and Doane Creek all play an important role in the park of providing habitat to both terrestrial and aquatic wildlife. While these streams have not been documented to support fish, the health of these streams is critical to the biological diversity of the park and the Willamette River. The insects and amphibians in each of Forest Park's streams provide the basis of the food web within the park and the Willamette River. The health of Forest Park is supported by healthy streams throughout. Protecting these streams from erosion, providing cold water temperatures, allowing for natural gravel and wood transport, and supporting diverse inwater habitats and healthy native riparian vegetation will benefit the park as a whole.

In 2010, the Bureau of Environmental Services (BES) created a Portland Area Watershed Monitoring and Assessment Program (PAWMAP) to evaluate water quality, hydrology, toxics, habitat, fish, and macroinvertebrates to establish a baseline of data to measure changes in watershed health. These data may be useful in identifying additional enhancements to improve habitats for aquatic organisms.

Project Summary

The project will enhance the Forest Park stream and riparian conditions to enhance habitat for aquatic organisms such as amphibians and invertebrates. A riparian and stream corridor assessment will identify opportunities for stream enhancements, incorporating reduction of erosion and improvements to native vegetation.

Action Items and Timeline

- Coordinate with PAWMAP/Oregon Department of Fish and Wildlife to determine current fish and aquatic organisms utilization. (Years 1-3)
- Develop best management practices (BMPs) for roads, trails, and culverts supportive of fish and biological organisms. (Year 2)
- Develop enhancement project goals and criteria. (Year 2)
- Prioritize project list. (Year 2)
- Implement enhancements. (Years 2-10)
- Monitor outcomes at enhancement sites. (Years 2-10)
- Conduct stream surveys and riparian area assessment on park property not included in PAWMAP; add priority projects to implementation plan. (Year 4)

Measure of Success

- Increased aquatic and riparian habitat quantity and quality
- Forest Park roads, culverts, and trails use BMPs supportive of healthy stream habitat for aquatic organisms and fish

Partner Commitments

- PP&R will assess data to develop enhancement project goals and a prioritized project list.
- BES will share PAWMAP data and 2010 Culvert Survey for Leif Erikson data and assist in the evaluation of fish passage and aquatic organisms issues and recommendations for priority enhancements.

Ecological Prescriptions – Floristic Native Biodiversity

- BES (Watershed Services Group and Science, Fish & Wildlife) will assist with the identification of BMPs to address road, stream, and culvert infrastructure improvements in Forest Park that are supportive of fish and aquatic organisms.

Budget

Stream assessments and prioritization \$30,000

Implement priority projects TBD

Project *4A – Long-term Invasive Plant Management Plan

Ecological Goal: Intact Native Plant and Animal Communities with Minimal Disturbance from Non-native Species and Invasive Species Populations Controlled through Management

Background

Forest Park has native biodiversity that is rarely found within urban parks throughout North America. More than 170 species of birds and 53 species of mammals live and range within its borders. The size of the park and lack of roads have created a diverse forest with vegetation unlike most urban natural areas. English ivy (*Hedera helix*) and other highly invasive plant species threaten to reduce floral diversity and subsequent wildlife species richness. English ivy was introduced in the late 19th century as an ornamental plant and it likely naturalized late in the first half of the 20th century. The PP&R Natural Area Vegetation Inventory (2003-2004) identified the level of invasiveness in the Forest Park vegetation units. Although more than 70% of the park's area has no ivy or only a trace, parts of the park have persistent problems with the invasive vines.

While English ivy might be the most publicly recognizable invasive species in Forest Park, other species pose a threat to ecosystem health. In addition to English ivy and clematis (*Clematis vitalba*), invasive tree species such as English holly (*Ilex aquifolium*), non-native laurel (*Prunus lusitanica* and *P. laurocerasus*), non-native cherry (*Prunus avium*), English hawthorn (*Crataegus monogyna*), horse chestnut (*Aesculus hippocastanum*), and Norway maple (*Acer platanoides*) are found distributed throughout the park. Of particular concern is English holly as it is present in greater number than other invasive trees and was found to be the most widely distributed invasive species in Forest Park.

In edge environments and areas of previous disturbance, Himalayan blackberry (*Rubus armeniacus*), shiny geranium (*Geranium lucidum*), herb Robert (*Geranium robertianum*) and lemon balm (*Melissa officianalis*) disturb native plant composition. Additional introductions of invasive species occur at park edges through the illegal dumping of yard debris. Species such as lesser celandine (*Ranunculus ficaria*), yellow archangel (*Lamistrum galeobdolon*), butterbur (*Petasites japonica*) and spurge laurel (*Daphne laureola*) are all newly arrived invasives found along the park's perimeter.

PP&R coordinates with a variety of partners to control and reduce the spread of invasive species. This coordination includes the utilization of staff and contractors as well as stewardship, outreach, and education to address invasive species control. Since 2007, PP&R's Protect the Best staff has treated more than 1,600 acres and BES crews have treated more than 3,000 acres. Forest Park Conservancy (FPC) and No Ivy League crews engage volunteers in park stewardship. Continuing and bolstering these efforts will protect biodiversity and ensure that the forest can be enjoyed for future generations. In the absence of invasive species control efforts, the forest health and biodiversity will degrade.

PP&R and partners have been treating invasive plant species for several years with good results. PP&R programs such as the No Ivy League and Protect the Best were designed with invasive plant removal in mind. City staff, contractors, and volunteers are treating distinct vegetation units with specific needs and methods. Each of these efforts utilizes a separate strategy to treat the specific problem present at the site; partners are collecting information on their level-of-effort and effectiveness with separate protocols. No comprehensive plan exists to guide and coordinate the efforts.

Project Summary

Ecological Prescriptions – Intact Native Plant and Animal Communities

The project will identify species targets and for each, document the extent of the problem, cost to control, and efficacy of treatments. Prescriptions will be developed for best management practices (BMPs) and the level of service needed to maintain control of invasives to allow for intact native plant communities.

The plan should result in quantifying the level of service needed based on an analysis of the interval needed to monitor the spread of specific species and the consequent method and cost of treatment. While the plan will be long-term and ongoing, it will identify specific goals and benchmarks that can be met during a ten-year timeline. Implementation will include stabilization of previously treated areas and new priority target areas.

Action Items and Timeline

- Develop a list of invasive, non-native target plant species that will be addressed in the plan. For each of these target plant species, known information will be documented about the rate of spread, competitive strategies, and life history. This list will serve as a fundamental document but will need to be reviewed and updated on an annual basis to incorporate newly identified invasive species. (2012-2013)
- Consult the Vegetation Inventory in targeted vegetation units to determine if more information is needed to establish a treatment plan. (2012-2013)
- Establish pre-treatment and post-treatment monitoring protocols that can be utilized by all partners to consistently collect data. (2012-2013)
- Gather treatment and monitoring information from all partners conducting stewardship activities. (2012-2013)
- Develop a cost per unit for each species or strata (if multiple species can be treated at the same time). (2012-2014)
- Create, gather, and document BMPs of removal for each target species. Include manual, mechanical, and chemical techniques and identify which tool is most appropriate based upon the species, site conditions, access, and available resources. Define treatment phase (stabilization, maintenance, or monitoring) and identify resources to be utilized (staff, partners, contractors, volunteers) to accomplish work. (2012-2014)
- Define tolerance/control of invasives, perhaps by species, total, and/or strata. Determine if the tolerance will vary by management unit (South, Central, North) or by vegetation unit. (2012-2013)
- Develop sequence of priorities and annual costs. Develop a timeline that follows available budget resources. Develop nomenclature for project types that denotes the sequence or treatment phase the project is currently in. For example, some units might be stabilization projects while others will be control or management projects. (2012-2013)
- Develop template for biennial reports on progress to date toward ten-year goals. (2012-2013)

Measure of Success

- Completed Long-term Invasive Plant Management Plan (adopted by City Council)

Partner Commitments

- PP&R will develop and complete the Long-term Invasive Plant Management Plan utilizing a combination of contract crews, the No Ivy League, and staff resources.
- Bureau of Environmental Services will assist as requested in development and application of monitoring protocols, creation of BMPs, and participation in other invasive plant management discussions.

Ecological Prescriptions – Intact Native Plant and Animal Communities

- FPC will partner with and support PP&R in the development and completion of the Long-term Invasive Plant Management Plan for Forest Park.
- West Multnomah Soil & Water Conservation District will continue targeted invasive species removal with private landowners surrounding the park, and will provide private landowners with education and outreach regarding invasive plant management.

Budget

Plan and stabilization of previously treated areas	\$50,000
Treatment of additional priority target areas	TBD

Project *4B – EDRR Plant Control

Ecological Goal: Intact Native Plant and Animal Communities with Minimal Disturbance from Non-native Species and Invasive Species Populations Controlled through Management

Background

Forest Park has greater biodiversity than is typically found in urban parks throughout North America. With more than 170 species of birds and 53 species of mammals living and ranging within its borders, this diversity is rarely duplicated in an urban environment outside of a zoo. The floristic diversity that has been documented includes over 240 species. The size of the park and lack of roads have created a diverse forest with vegetation unlike most urban natural areas. English ivy (*Hedera helix*) and other established highly invasive plant species have substantially reduced the diversity of native flora. These species are being addressed, but at great expense of limited City and community resources. More recent introductions, such as garlic mustard (*Alliaria petiolata*), may also threaten the health of the forest.

Ecologists recognize the immense benefit of identifying potentially destructive species before they become established to the point where they alter ecosystem diversity and function. Early Detection Rapid Response (EDRR) programs operate on the philosophy of “an ounce of prevention is worth a pound of cure.” Following completion of the City of Portland Invasive Plant Strategy, the Bureau of Environmental Services (BES) created an EDRR program to help develop partnerships to identify and treat emerging problems from invasive plant species. Continuing and bolstering this effort will protect biodiversity and will ensure that the forest can be enjoyed for future generations.

Project Summary

The project will update the target species list and will formalize mapping and monitoring protocols for all the partners. Monitoring data will be reported annually.

Action Items and Timeline

- Update EDRR list. (2012-2013)
- Create mapping and monitoring protocol. (2012-2013)
- Implement annual treatments on EDRR species. (2013-2021)

Measure of Success

- Reduction in the aerial extent/number of plants in EDRR populations in the park
- Updated EDRR list
- Mapping and monitoring protocol
- Control of EDRR species spread along vector corridors (roads, trails, streams)

Partner Commitments

- PP&R will work with the EDRR program to update the EDRR list and create mapping and monitoring protocols. PP&R will utilize staff, contractors, and stewardship resources to implement treatments on EDRR species.
- BES will make regular assessments of the EDRR list in consultation with PP&R staff. Management of EDRR species beyond the boundaries of Forest Park will be coordinated with PP&R staff.
- Forest Park Conservancy (FPC) will partner with PP&R and commit the FPC field crew to implement treatment on EDRR species in Forest Park as necessary and appropriate.
- West Multnomah Soil & Water Conservation District (WMSWCD), in conjunction with EDRR partners, will continue to train and coordinate Multnomah Weed Watchers.
- WMSWCD, BES, and others will be actively engaged in the EDRR program update.

Ecological Prescriptions – Intact Native Plant and Animal Communities

- WMSWCD will continue to coordinate annual ODA Garlic Mustard grants, a current EDRR target, as long as the EDRR program update includes this as a target species and funders are perceptive to this request.
- WMSWCD will work with private landowners in unincorporated western Multnomah County on targeted EDRR treatments.

Budget

Program development and first year outreach and treatments \$70,000

Continuation of program for nine more years \$500,000

Project *4C – Forest Park Buffer Program

Ecological Goal: Intact Native Plant and Animal Communities with Minimal Disturbance from Non-native Species and Invasive Species Populations Controlled through Management

Background

Forest Park's unique character is derived partly from the vast interior habitat it provides. Interior forest habitat often provides rich, diverse native flora and fauna that is not found along edge habitat. Forest edges also contain their own unique species, but are also often the gateway where invasive plant species enter the forest and reduce overall species richness. To protect the integrity of the interior habitat it is necessary to manage adjacent edge environment. Forest Park is uniquely situated and surrounded by a boundary of private properties and major roads: to the east and west – Highway 30/St Helens Highway and Skyline Boulevard, and to the north and south – Newberry Road and Burnside Road. These edge environments feature industrial and residential development with transportation corridors such as roads and railroads that often harbor invasive species. Unmanaged, these edge conditions can migrate into adjacent environments. Immense opportunity exists to engage landowners adjacent to the park to improve habitat; stewardship/partnerships with adjacent landowners in this area will enhance stewardship of Forest Park and provide protection for the invasive control investments made within the park.

Project Summary

In addition to size, the quantity and quality of interior habitat distinguish Forest Park from other urban natural areas. The quantity, quality, and long-term ongoing management expense would be substantially improved through outreach and intervention at the park-private land interface. Addressing the interface accomplishes the following objectives:

- Preventing invasive plants on private property from spreading to Forest Park
- Preventing invasive plants on PP&R property from spreading to private land
- Educating and enlisting neighbors, providing opportunities for stewardship
- Increasing the effective size of Forest Park
- Creating opportunities for habitat corridor connections beyond Forest Park
- Addressing encroachments

The project will define buffer areas and key priority areas, develop an outreach program and materials, create a mapping layer and database, and establish a framework for partner organization to optimize effective results on the ground. All planning for public outreach and education will coordinate public messaging with the Wildfire Resistant Landscape Program (Project 5C). A pilot buffer program will be initiated in 2011-2012.

Action Items and Timeline

- Forest Park Conservancy (FPC) and West Multnomah Soil & Water Conservation District (WMSWCD) will develop scope and performance measures for the pilot buffer program. (Year 1)
- FPC and WMSWCD will develop partner organizational framework, including roles, responsibilities, and need for staffing. (Year 1)
- WMSWCD will implement a pilot Weed Canopy Removal demonstration program that provides free technical assistance and invasive removal crews to landowners in targeted areas surrounding Forest Park. (Year 1)
- FPC and WMSWCD will create outreach materials. (Year 1)
- Develop mapping and database tools. (Year 1)

Ecological Prescriptions – Intact Native Plant and Animal Communities

- Implement plan and vegetation treatments based on pilot project. (Year 1)
- Ongoing outreach and vegetation management. (Years 2-10)

Measure of Success

- Acres of adjacent private land in stewardship agreements
- Percentage of adjacent landowners involved in buffer program
- Improvement and quality of vegetation at public-private interface

Partner Commitments

- PP&R will support other partners by contributing mapping resources and assisting with program development. Staff time permitting, PP&R staff will provide technical support for site visits with landowners.
- In 2011-2012, WMSWCD will implement the pilot Weed Canopy Removal demonstration program.
- WMSWCD will provide technical assistance and education and outreach to private landowners surrounding the park.
- WMSWCD and FPC, in conjunction with partners, will continue identifying target private landowners and key areas along the Forest Park buffer.
- In 2011-2012, WMSWCD will provide partner funding to support the Backyard Habitat Certification Program of the Columbia Land Trust which will assist individual landowners under one acre with invasive removal, native plant establishment, wildlife enhancements, and stormwater management.
- FPC will develop and manage the Forest Park buffer program as a key component of the Greater Forest Park Conservation Initiative.
- FPC will partner with WMSWCD and the Backyard Habitat Program to work with landowners adjacent and/or in close proximity to Forest Park to encourage stewardship, invasive weed management, and other habitat enhancements.

Budget

Pilot program development and outreach	\$40,000
Long-term project implementation/contract costs	TBD

Project 4D – EDRR Animal Pest Control

Ecological Goal: Intact Native Plant and Animal Communities with Minimal Disturbance from Non-native Species and Invasive Species Populations Controlled through Management

Background

Introduced invasive animal species compete with native fauna for habitat and other resources. In the Portland metropolitan area, species like European starlings (*Sturnus vulgaris*), nutria (*Myocastor coypus*), and bullfrogs (*Rana catesbeiana*) reproduce abundantly and reduce native species' populations through highly competitive behavior and predation. Invasive animal species tend to rapidly reproduce, creating additional pressure on habitat resources through intense consumption of available food (plant and animal). Invasive animal pest species are a significant factor in reducing native species richness.

Additional species have the potential to spread beyond initial introduction and become as disruptive to habitat as the established animal pests. Due to Forest Park's proximity to the Port of Portland and a wood waste recycling facility where wood from around the world is recycled from shipping containers, the park has the potential to be a location where new infestations from invasive insects occur. The U.S. Department of Agriculture's Animal Plant Health Inspection Service (USDA-APHIS) and the U.S. Forest Service (USFS) work in collaboration with Forest Park managers to monitor and respond to new infestations.

In 2010, the Bureau of Environmental Services (BES) Invasive Species Program facilitated the City of Portland Terrestrial and Aquatic Invasive Animal Assessment (March 2010). The study was coordinated through the Oregon Invasive Species Council.

Project Summary

The City of Portland Terrestrial and Aquatic Invasive Animal Assessment outlines eight overall recommendations to respond to invasive animal species. Recommendation #2 calls for creating Early Detection Rapid Response (EDRR) networks in the city. The project will create an EDRR network for Forest Park by disseminating information to park neighbors, users, and partners. The project will coordinate through the City's Invasive Species Program.

The Forest Park EDRR project network will include coordination with:

- City Invasive Species Coordinator
- Federal partners USDA-APHIS and USFS
- Portland Area Watershed Mapping and Assessment Program (PAWMAP) surveys to assist with detecting aquatic invasive animals

A program will be developed to detect and control EDRR species in Forest Park, including outreach, education, and treatments.

Action Items and Timeline

- Work on Forest Park EDRR scope with City Invasive Species Coordinator. (Year 1)
- Coordinate with PAWMAP to include detecting aquatic invasive animals. (Year 1)
- Develop materials for a watch list of species that have arrived in Portland and those expected to arrive (listed in City of Portland Terrestrial and Aquatic Invasive Animal Assessment). Create materials for distribution to partners and park users. (Year 2)
- Establish a broad network that includes staff, volunteers, and university programs. (Year 2)
- Create a program for addressing vectors, not just treatments. (Year 2)
- Secure and sustain funding for EDRR treatments. (Year 3)

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- Work with City Invasive Species Coordinator to develop and maintain a database of sites and interventions. (Year 3)

Measure of Success

- Broad public awareness for early detection; easy access to City staff for reporting concerns
- Effective identification of new invasions
- Control of all EDRR species in Forest Park

Partner Commitments

- PP&R will work with the City's Invasive Species Program (ISP) to develop scope, watch list, and training opportunities for partner organizations.
- The City's ISP will assist with the creation of educational materials.
- The City's ISP, in cooperation with the U.S. Animal and Plant Health Inspection Service, Oregon Department of Agriculture, and Oregon Department of Fish and Wildlife, will provide invertebrate and vertebrate identification.
- West Multnomah Soil & Water Conservation District will help disseminate EDRR animal pest control information to private landowners in Portland's West Hills.

Budget

Program development and first year operation	\$60,000
Continuation of program for another six years	\$180,000

Project 4E – Animal Pest Management Plan

Ecological Goal: Intact Native Plant and Animal Communities with Minimal Disturbance from Non-native Species and Invasive Species Populations Controlled through Management

Background

Introduced invasive animal species compete with native fauna for habitat. In the Portland metropolitan area, species like European starlings (*Sturnus vulgaris*), nutria (*Myocastor coypus*), and bullfrogs (*Rana catesbeiana*) reproduce abundantly and reduce native animal populations through highly competitive behavior. Invasive animal species tend to reproduce abundantly, creating additional pressure on the habitat resources through intense consumption of available food (plant and animal). Invasive animal pest species are a significant factor in reducing native species richness.

In Forest Park, Eastern fox squirrels (*Sciurus niger*) have been noted to be increasing in population in specific areas. Feral cats (*Felis domesticus*) are observed along edges of the park and it is believed that the park is utilized as a dumping ground for urban species deemed a nuisance, such as raccoons.

In 2010, the Bureau of Environmental Services (BES) Invasive Species Program facilitated the City of Portland Terrestrial and Aquatic Invasive Animal Assessment (March 2010). The study was coordinated through the Oregon Invasive Species Council.

Project Summary

The City of Portland Terrestrial and Aquatic Invasive Animal Assessment outlines eight overall recommendations to respond to invasive animal species. Recommendations call for creating a species list and focusing significant resources on education and outreach. The project will create a Forest Park Invasive Animal List and will communicate with the network of park neighbors, users, and partners. The project will coordinate through the City's Invasive Species Program and will dovetail with Early Detection Rapid Response (EDRR) Animal Pest Control (Project 4D).

Action Items and Timeline

- Coordinate roles and responsibilities through the City Invasive Species Coordinator. (Year 1)
- Develop Forest Park list, with priorities for intervention. (Year 1)
- Establish baseline conditions and develop performance measures. (Year 1)
- Develop materials for outreach to partners. (Year 1)
- Establish protocols and identify roles and responsibilities for addressing nuisance species. (Year 1)
- Establish a broad network that includes staff, volunteers, and university programs. (Year 1)

Measure of Success

- Reduction in invasive animal pests

Partner Commitments

- BES will serve as the coordinating local agency for invasive pests, including
 - Coordination with ODA and other regulatory agencies
 - Coordination with OISC
 - Updating the City of Portland invasive strategies as needed and convening City bureaus for coordination of species monitoring and control effort
- PP&R will provide a supportive role to the City Invasive Species Program.
- West Multnomah Soil & Water Conservation District will help disseminate EDRR animal pest control information to private landowners in Portland's West Hills.

Budget: \$10,000

Project *5A – Defining and Mapping Wildland Urban Interface Areas in the Vicinity of Forest Park

Ecological Goal: Reduction of Catastrophic Fire Risk

Background

The final product of the four-year Federal Emergency Management Agency (FEMA)/Oregon Emergency Management (OEM)-funded City of Portland Wildfire Fuel Reduction Project (2006-2010) was an assessment of the City's ability to cope with wildfire in and around PP&R's natural area parks, particularly in the vicinity of Forest Park. The Wildfire Readiness Assessment: Gap Analysis Report (2009) summarized the findings; the two highest priority actions items identified were:

1. Convene a standing City of Portland wildfire technical working group.
2. Identify and map the Wildland Urban Interface (WUI) areas in the City of Portland, starting with the area around Forest Park.

Action #1 was accomplished in the fall of 2009. As a result of the completion of a community wildfire protection plan for Multnomah County in summer 2011, the group is now known as the Portland Regional Wildfire Technical Group. This interagency group is now prepared to provide technical assistance to PP&R and Portland Fire and Rescue (PF&R) to complete the Forest Park component of Action #2.

Project Summary

The WUI – or boundary areas between park natural areas and development or utility corridors – needs to be better defined and accurately mapped to inform various planning, programmatic, and project-related activities that reduce the likelihood of catastrophic wildfire. In the vicinity of Forest Park, this defining and mapping of the WUI will establish a level of risk that can be used to establish an accurate definition of WUI standards so that future actions such as improvement of City policies, regulations, and codes can be initiated. Strengthening requirements to use fire resistant building materials, for example, would complement the establishment of defensible space around homes and business while continuing to protect the natural resources of park natural areas.

Initially, funding will be sought to use either the City Professional Technical Expertise (PTE) contract process to hire a consultant to manage the project or enable the assignment of a City staffing position. The existing Portland Regional Wildfire Technical Group will provide consultant/staff oversight and technical assistance for the project.

Action Items and Timeline

- Obtain funding for contract/staff position to coordinate a City interbureau project. (Year 1)
- Utilize the expertise and resources of the Portland Regional Wildfire Group as a technical advisory committee for the project (Year 2):
 - Establish purpose and definition of Forest Park WUI.
 - Identify criteria for defensible space and WUI mapping.
 - Refine/revise existing Forest Park Wildfire Hazard map.
 - Recommend City Code refinements for building code changes and permitting of vegetation management work to reduce hazardous wildfire fuels.

Measure of Success

- An accurate map of public/private WUI lands in the vicinity of Forest Park WUI that includes perimeter lands and utility corridors.

Ecological Prescriptions – Reduction of Catastrophic Fire Risk

Partner Commitments

- PP&R, working with PF&R through the Interbureau Planning Team, will pursue the acquisition of funding to implement action items.
- The Portland Regional Wildfire Technical Group, comprised of representatives from local, state, and federal agencies, will provide technical advice.

Budget: \$80,000

Project *5B – Wildfire Fuels Inventory and Monitoring

Ecological Goal: Reduction of Catastrophic Fire Risk

Background

The final product of the four-year Federal Emergency Management Agency (FEMA)/Oregon Emergency Management (OEM) funded City of Portland Wildfire Fuel Reduction Project (2006-2010) was an assessment of the City's ability to manage wildfires in and around PP&R's natural area parks, particularly in the vicinity of Forest Park. A Wildfire Readiness Assessment: Gap Analysis Report (2009) summarized the findings. One of the recommended actions was to inventory and monitor Forest Park's vegetative fuel during the fire season and over time to identify short- and long-term changes. Hazardous fuels can be identified using data collected from fuel beds; data analysis can predict fire behavior, fire effects, and carbon cycling in native vegetation. The U.S. Forest Service (USFS) Pacific Wildland Fire Sciences Lab in Seattle, Washington has developed protocols for establishing fuel beds for monitoring vegetative fuels and a database for classifying those fuels. The Fuel Characteristic Classification System (FCCS) database is designed to describe and represent the diversity of fuels found in the Pacific Northwest and throughout the United States.

Project Summary

The establishment of vegetative fuel beds in Forest Park will provide an approach to inventorying, classifying, and monitoring hazardous wildfire fuels during each fire season and over the long term. The monitoring of Forest Park fuel beds can be used to predict the relative fire hazard of vegetation by assessing elements of human caused change (e.g., fine fuels near ignition sources) and naturally occurring (e.g., insect and disease) changes over time. Long-term fuel bed data can also inform ongoing research on the long-term forest succession in Forest Park (Project 2A Forest Stand Trajectory Assessment).

Staff from the USFS Pacific Wildland Fire Sciences Lab is available to assist PP&R to inventory and classify Forest Park's vegetation and establish fuel beds in the park. Local university students and/or volunteers could be recruited to assist with fuel bed plot establishment, seasonal mapping, and ongoing monitoring. After the Forest Park fuel bed database is populated with several consecutive years of monitoring data, fuel bed information and wildfire weather predictions can be used to develop information for City emergency managers and the general public about the level of wildfire risk in the park and adjacent neighborhoods. Preparing this wildfire risk information seasonally would partially fulfill an additional recommended action from the City's Wildfire Readiness Assessment: Gap Analysis Report to establish a fire danger rating system and a fire information network system for Forest Park.

Action Items and Timeline

- In preparation for fuel bed establishment, classify the park's existing vegetation. (Year 1)
- Establish 10-15 vegetative fuel bed plots in Forest Park and prepare a fuel bed monitoring protocol. (Year 1)
- Conduct concurrent short- and long-term fuel bed monitoring activities. (Years 2-10)
- Analyze collected fuel bed data and fire weather information to develop a fire danger rating system and information system network for the park. (Years 7-10)

Measure of Success

- Permanent fuel bed plots in Forest Park
- Fuel bed monitoring protocols and database

Ecological Prescriptions – Reduction of Catastrophic Fire Risk

Partner Commitments

- PP&R, working with PF&R and the USFS Pacific Wildland Fire Sciences Lab, will pursue the acquisition of funding to implement action items through the Interbureau Planning Team.
- The Portland Regional Wildfire Technical Group, comprised of representatives from local, state, and federal agencies, will provide technical advice.

Budget

Establishment of fuel bed plots and monitoring protocol	\$10,000
Monitoring and establishment of danger rating system	\$30,000

Project 5C – Utility Corridor Wildfire Risk Reduction

Ecological Goal: Reduction of Catastrophic Fire Risk

Background

The final product of the four-year Federal Emergency Management Agency (FEMA)/Oregon Emergency Management (OEM)-funded City of Portland Wildfire Fuel Reduction Project (2006-2010) was an assessment of the City's ability to cope with wildfire in and around PP&R's natural area parks, particularly in the vicinity of Forest Park and Powell Butte. A Wildfire Readiness Assessment: Gap Analysis Report (2009) summarized the findings and one of the recommendations for high priority action was to secure funding for continued, long-term vegetation management projects that maintain safe fuel loads in key locations of the park. Both the FEMA/OEM project and PP&R's Natural Area Vegetation Survey have identified many utility easements through Forest Park as key high risk locations due to the placement of an ignition source (natural gas/oil pipelines and electrical transmission lines) in a natural area landscape that often includes highly flammable invasive weeds such as Himalayan blackberry (*Rubus armeniacus*), Scotch broom (*Cytisus scoparius*), and grasses.

Project Summary

The management of vegetation in high risk areas is critical in preventing a catastrophic wildfire, and hazardous wildfire fuels in utility easements require periodic attention to reduce the hazards. Utilizing the Wildland Urban Interface (WUI) definitions and mapping from Project 5A (Defining and Mapping Wildland Urban Interface Areas in the Vicinity of Forest Park), the project team and technical advisors will design and carry out a follow-up field assessment of all park utility easements to determine management needs. Thereafter, demonstration-scale projects will be designed, permitted, implemented, and maintained in the highest priority utility corridor areas in partnership with the public/private utility companies. These small projects will serve as models for future revegetation work on all high risk utility easements in the park. Maintenance agreements with utility operators will be updated to incorporate best management practices for fuel reduction and habitat improvement.

Action Items and Timeline

- Using Wildland Urban Interface (WUI) definitions and maps from Project 5A, design and implement a field inventory to survey utility corridors and determine vegetative composition, hazardous wildlife fuels, and suitability for management as emergency access, fire break, and/or habitat enhancement corridors. (Year 1)
- Analyze inventory data to determine highest risk areas and long-term utility corridor management needs. (Year 1)
- Coordinate with public/private utility companies to design fire resistant landscape designs for utility easements and adopt sustainable management/maintenance practices. (Year 2)
- Partner with public/private utility manager to permit/implement a demonstration-scale hazardous fuel reduction/fire retarding landscape design project. (Year 3)
- Partner with public/private utility managers to implement multiple hazardous fuel reduction/fire retardant demonstration landscape projects on remaining high risk utility easements within the park. (Years 4-10)

Measure of Success

- Multiple successful hazardous fuel reduction/fire retardant landscape projects
- Updated vegetation maintenance and management agreements with utility managers

Ecological Prescriptions – Reduction of Catastrophic Fire Risk

Partner Commitments

- PP&R and PF&R, working through the Interagency Planning Team, and public/private utility companies with easements through Forest Park will pursue the acquisition of funding to implement action items.
- The Portland Regional Wildfire Technical Group, comprised of representatives from local, state, and federal agencies, will provide technical advice.

Budget

Inventory, risk analysis, management planning, and design	\$50,000
Utility corridor landscape management projects	TBD

Project 5D – Wildfire Resistant Landscape Program

Ecological Goal: Reduction of Catastrophic Fire Risk

Background

The final product of the four-year Federal Emergency Management Agency (FEMA)/Oregon Emergency Management (OEM)-funded City of Portland Wildfire Fuel Reduction Project (2006-2010) was an assessment of the City's ability to manage wildfire in and around PP&R's natural area parks, particularly in the vicinity of Forest Park. A Wildfire Readiness Assessment: Gap Analysis Report (2009) summarized the findings and one of the recommendations for high priority action was to secure funding for continued, long-term vegetation management projects that maintain safe fuel loads in key locations of the park. Both the FEMA/OEM project and PP&R's Natural Area Vegetation Survey have identified much of the public/private Wildland Urban Interface (WUI) land at the perimeter of Forest Park as a key wildfire risk location due to the close proximity of business and residential structures to ignition sources (e.g., OR Highway 30, electrical transmission lines, etc.) and landscapes dominated by highly flammable invasive weeds (e.g., Himalayan blackberry (*Rubus armeniacus*), Scotch broom (*Cytisus scoparius*), non-native grasses, or dense conifer forests with hazardous ground and ladder fuels.

Project Summary

The management of vegetation in high risk areas is critical to prevent catastrophic wildfires; hazardous wildfire fuels in the vicinity of the Forest Park WUI will require periodic attention to reduce hazardous fuels. Utilizing the WUI definitions and mapping from Project 5A (Defining and Mapping the WUI in the Vicinity of Forest Park), the project team and technical advisors will design a follow-up assessment of identified high risk parklands and adjacent private lands to determine management needs and high priority fuel reduction projects. Thereafter, the project team, with the assistance of the technical advisors, will develop a coordinated plan for educating the affected landowners about wildfire risk. All wildfire education and public outreach planning will also coordinate with the Forest Park Buffer Program (Project 4C). If funding is available, the technical advisors will assist with preparation of fire resistant landscape design templates and coordinate hazardous fuel reduction work on high risk public and private lands and follow-up revegetation projects.

Action Items and Timeline

- Assess high risk WUI areas for follow-up vegetation management & hazardous fuel reduction work using WUI definitions and maps from Project 5A. (Year 1)
- Develop a coordinated wildfire education and outreach plan for City staff, park stewards, and private landowners through programs and partners. (Year 2)
- Prepare landscape design templates for wildfire resistant plantings on high risk public/private WUI areas. (Year 3)
- Obtain necessary City permits for fuel reduction projects on identified WUI public lands. (Year 3)
- Implement/maintain fire resistant landscape plantings on WUI public and private lands. (Years 4-10)

Measure of Success

- Increased stewardship engagement in the Forest Park WUI area of the park
- Successful hazardous fuel reduction/fire resistant landscape projects at the Forest Park WUI

Partner Commitments

- PP&R, Portland Fire & Rescue, and the Bureau of Development Services will pursue funding for the implementation of actions items through the Interagency Planning Team.

Ecological Prescriptions – Reduction of Catastrophic Fire Risk

- The Forest Park Conservancy, West Multnomah Soil & Water Conservation District, and the Backyard Habitat Program of the Columbia Land Trust will assist with public outreach and education.
- Columbia Land Trust will assist private property owners with revegetation planting as funding becomes available.
- The Portland Regional Wildfire Technical Group, comprised of representatives from local, state, and federal agencies, will provide technical advice.

Budget

Assessment, outreach, education, and landscape planning	\$80,000
Wildfire resistant landscape projects	TBD

