

Methodology



Many projects have been undertaken by PP&R staff or with partnering agencies to evaluate and enhance the ecological health and connectivity of natural areas in the five major watersheds within the city. Data on each natural area was compiled and scored to determine the natural resource functions and values. A matrix was created to show the current ecological health and natural resource value of parks and natural areas in order to determine the management priorities for allocating limited resources.

Ecological Health

PP&R inventoried and surveyed the vegetation of its natural area parkland from 2003 to 2008 as step one in the ecosystem management process. This field methodology identified vegetation community characteristics such as dominant and invasive plant species, management concerns, and overall ecological health to inform park management and citywide natural resource planning. A total of 1,072 surveys were conducted covering 8,213 acres. The average unit size was eight acres (17 acres within Forest Park). Forest Park accounted for 4,743 (58%) of the total acres surveyed.

The surveys rated the ecological health of each unit from Healthy to Severely Degraded. The following table is a summary of the ratings:

Ecological Health Score	Acres	% of total Acreage
1 - Healthy	97	1.2
2 - Good	2,593	31.8
3 - Fair	3,128	38.3
4 - Poor	1,587	19.4
5 - Severely Degraded	757	9.3

For the purpose of the plan, Healthy and Good are combined to give an ecological health of Healthy. The category of Fair remained the same, and Poor and Severely Degraded were combined to give an ecological health of Poor.

Natural Resource Function and Value

The natural resource function and value is the cumulative score for the following weighted factors (see Appendix A) for individual natural areas or a set of natural areas that are managed as a unit (natural area complex):

- Salmon-bearing stream contained or within 100 feet of the property
- Stream (not salmon-bearing) contained or within 100 feet of the property
- Stream condition from PP&R 2007 inventory

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- Ecological health of the riparian area from surveys conducted in 2007 by PP&R
- Wildlife Assessment completed between 2003-2008 by PP&R
- Special habitat type identified by the City of Portland Bureau of Environmental Services Terrestrial Ecological Enhancement Strategy (TEES)
- Anchor habitat identified by TEES or an area greater than 30 acres
- Connectivity to Patches, Bureau of Sustainability and Planning (GIS layer updated regularly)
- Completed invasive species removal/native plant restoration
- Mid-size restoration project requiring permits such as grading
- Capital projects that significantly improved the ecological health
- Active volunteer/stewardship group
- Organized educational activities

The data were collected through a review of geographical information system (GIS), natural resource inventories, permits, planning documents, and interviews with PP&R staff. The factors were selected based on state, regional, and city natural resource priorities for protection, restoration, and enhancement. The total possible score for a natural resource function and value is 26 points, though 22 was the highest number of points recorded.

Natural resource function and value scores were grouped as Low (0-6), Medium (7-12), and High (13-22). Scores for all areas were graphed and break points in the scoring determined the range for each category.

Management Priority Matrix

The ecological health and the natural resource function and value of the natural area or natural area complex were listed in a Parks and Natural Area Management Priority Matrix to determine protection, enhancement, and restoration priorities for projects and management actions. For data consistency, the results from the 2003-2008 Ecological Health survey were used. Parks or natural areas where restoration activities have occurred and the ecological health has improved are marked with an asterisk (*) in the matrix. The parks are placed into nine management priority categories based on a combination of ecological health and natural resource function and value (Ecological Health/Natural Resource Function and Value) from Poor/Low (P/L) to Healthy/High (H/H).

Table 1: Natural Area Management Priority Matrix

Ecological Health	Watershed	Natural Resource Function and Value		
		Low	Medium	High
Healthy (Healthy/Good)	Willamette River (WR)			Forest Park North, Forest Park Central
	Fanno Creek (FC)	Forest Heights Park		
	Tyron Creek TC)		*Maricara Natural Area (NA)	
Fair	WR	Washington Park	Cottonwood Bay, Hoyt Arboretum, Marquam Nature Park	Forest Park South, Elk Rock Island, Oaks Bottom Wildlife Complex (Sellwood Riverfront, Sellwood, Oaks Crossing, Oaks Bottom Wildlife Refuge, Springwater-Willamette, Riverside, Ross Island, Toe Island)
	FC	Council Crest Park	Ash Creek NA, Dickinson Woods	
	Johnson Creek (JC)		Johnson Creek Park, Kelly Butte NA	Powell Butte Nature Park, Buttes NA Complex (Clatsop Butte, Gentemann Property, Kingsley D. Bundy, Eastridge, Campfire, Tenino)
	TC		West Portland Park NA, Arnold Creek NA, Tryon Creek Headwaters	Marshall Park Natural Areas (Jensen, Foley-Balmer, Marshall Park)
	Columbia Slough (CS)		Whitaker Ponds NA, Moore & Wright Islands	Kelley Point Park
Poor (Poor/Severely Degraded)	WR	Burlingame Park, Fulton Park, Governors Park, Portland Heights Park, Rosemont Bluff NA, Munger Property (includes Jefferson St. Property), North Escarpment Properties (Overlook Park & House, Madrona, Mocks Crest, Harbor View)	Cathedral Park, Mt Tabor Park, Peter Kerr Property, Rocky Butte NA, Stephens Creek NA, SW Terwilliger Complex (George Himes Park, SW Terwilliger Parkway, Duniway Park)	South Portland Riverbank Properties (Powers Marine, Willamette Moorage, Willamette Park, Butterfly Park)
	FC	Albert Kelly Park, Fanno Creek NA, Lesser Park, Sylvania Park, SW Thomas & 53rd	Gabriel Park, Woods Creek Complex (April Hill Park, Woods Memorial NA)	
	JC	Lents Floodplain	Leach Botanical Garden, West Lents Floodplain, Crystal Springs Hybrid Parks	Lower Powell Butte Floodplain, *Tideman Johnson NA, *Errol Heights NA
	TC	Kerr Site		
	CS	Columbia Children's Arboretum	Columbia Slough NA, Johnson Lake Property	

* indicates Ecological Health may have improved through restoration projects completed since the vegetation inventory

Goals and Strategies



The overarching goals for the restoration plan are:

1. Contribute to the biological diversity of the Portland metropolitan region.
2. Preserve and improve the ecological health of natural areas.

To achieve these goals, PP&R management priorities are based on:

1. Size – the ability of the natural area to provide a full range of ecological services and potential for the greatest biodiversity.
2. Location – the proximity to salmon streams, connectivity for wildlife movement and transitional areas between habitat types.
3. Unique – sites that contain flora or fauna that is rare, threatened or endangered as identified by the Terrestrial Ecology Enhancement Strategy.

The restoration plan focuses on six management strategies based on ecological health and the natural resource functions and value to achieve its goals:

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

These strategies are applied to natural areas with the greatest potential for meeting the restoration goals.

In general, natural areas that have *high natural resource value independent of ecological health* have the greatest potential for meeting the restoration goals and are the highest management priority for City Nature. Overall, these areas are large, complex, and connected to fish-bearing streams or are unique. These areas include:

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

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The parks and natural area with *medium natural resource function and value, and either healthy or fair ecological health* will take more resources to restore than the previous group, but they still have good potential for improving ecological health and functions of the watershed and/or contain unique flora or fauna. Generally, these areas are medium size, and have a manageable infestation of invasive plants.

The larger areas in these categories include:

- Marquam Nature Park
- Johnson Creek Park
- Maricara Natural Area
- Kelly Butte Natural Area

Parks and natural areas with *medium natural resource function and value and poor ecological health* generally have a predominance of invasive species, are located adjacent to a stream, and/or are part of a hybrid parks. Improving the ecological health would potentially be costly but in the long term would meet the goals of the plan. These areas have a lower management priority than the sites with Healthy or Fair ecological health and medium natural resource functions and values.

Examples of these sites include:

- Woods Creek Complex
- Columbia Slough Natural Area
- Rocky Butte Natural Area
- West Lents Floodplain

Parks and natural areas with *low natural resource function and value and poor ecological health* tend to be small, disconnected from other areas, and often are part of a hybrid park. Large amount of resources would be needed to improve these areas or the ecological return on investment would be small. City Nature staff and resources have been reduced over the past three years because of the economic downturn and loss of general fund revenues. Natural areas in such poor shape will get little or no attention unless they are part of a larger project in the watershed.

Strategy 1 – Establish a predominance of native vegetation (removal of invasive plant species)

Native plant diversity provides an array of habitat functions including improved water quality, biodiversity, fish and wildlife habitat, tree cover, and reduction of fire risk. The ecological objective is to increase the size of weed-free habitats and maintain or increase native plant species. When sites are invaded by non-native plants, these functions are impacted. The City of Portland *Invasive Plants Strategy Report* (2008) sets out 10-year goals and a 3-year work plan for reducing invasive species in the city's natural areas. PP&R manages the greatest number of natural area acres within city limits, and continues to fight invasive species through a number of actions identified in the Invasive Strategy.

Using the Management Priority Matrix, the following invasive species removal actions protect and improve the ecological health of our natural areas:

1. Continue the Protect the Best Program – removal of invasive species from natural areas with Healthy and Fair ecological health and High natural resource function and value (H/H, F/H), and Healthy ecological health and Medium natural resource function and value (H/M):
 - Forest Park
 - Maricara Natural Area
 - Oaks Bottom Wildlife Complex
 - Buttes Natural Area Complex
 - Marshall Park Natural Areas
 - Elk Rock Island
2. Contract with the BES Revegetation Program or other contract crews to remove invasive species and replant native vegetation in natural areas with F/M, P/M, P/H. Follow up with neighborhood or friends group stewardship memorandum of understanding (MOU) to continue the work.
3. Early detection/rapid response (EDRR) prevents new introduction of invasive species and reduces the scale and spread of priority invasive species infestations across all properties. Train park technicians to identify and treat EDRR species.
4. Limit investment of staff resources in natural area in F/L and P/L categorized parks and natural areas unless there is a known special status habitat or species and/or a stewardship MOU is in place.

Strategy 2 – Watershed-based salmon recovery

Protect, expand, and restore salmon habitat within Portland’s five urban watersheds (see Appendix B – Map of Salmon Distribution in the City of Portland). Projects will restore natural channel processes, including reconnecting stream, wetland, and floodplains where possible, and restoring and enhancing riparian habitat. Predicted impacts from climate change will be factored into restoration of natural areas through the Ecosystem Management Steps.

PP&R will partner with the Bureau of Environmental Services, Metro, Soil and Water Conservation Districts, and watershed councils to provide the necessary resources and expertise to plan, design, and implement stream restoration, shallow water habitat, and riparian corridor plantings to provide functioning salmon habitat. Projects include:

Willamette River

1. Complete a Habitat Management and Trail Plan for the South Portland Riverbank Properties in 2011.
2. Restore riverbanks and floodplains:
 - Floodplain enhancement at Powers Marine Park
 - Riverbank restoration at Willamette Park
 - Riverbank restoration as shown in the master plan for Cathedral Park
 - Floodplain enhancement at Elk Rock Island
 - Beach and riparian restoration at SW Greenway Central Reach

Goals and Strategies

3. Replace culverts at:

- The railroad tracks at Stephens Creek Confluence to extend shallow water habitat in Willamette Moorage
- Oaks Bottom Natural Area to reconnect the Willamette to shallow water habitat

4. Restore riparian habitat:

- Continue to remove invasive species at Ross Island Natural Area and install native plant species in woodland and riparian areas.
- Restore and enhance the ecological health of Balch Creek riparian habitat through invasive removal and large woody debris placement; remove or modify artificially created instream structures; create sustainable access.

Johnson Creek

1. Restore Crystal Springs Creek and wetland habitat:

- Restore the wetland and stream at Westmoreland Park as shown in the master plan.
- Replace Crystal Springs culverts.
- Restore the wetland and stream at Eastmoreland Golf Course.
- Remove invasive species and plant native riparian plants along the pond to provide shade at Crystal Springs Rhododendron Garden. Explore the opportunity to restore the stream and wetlands within the garden.

2. Mainstem Johnson Creek:

- Create meanders and place large wood in the stream at the confluence of Johnson Creek and Crystal Springs at Johnson Creek Park.
- Complete a site assessment at Errol Heights to identify opportunities to increase the natural resource values.
- Enhance the riparian habitat at Leach Botanical Garden as shown in the master plan.
- Remove or redesign the impoundment structure at the west end of Leach Botanical Garden.
- Complete a Habitat Management and Trail Plan for Buttes Natural Area Complex and Clatsop Butte Nature Park.
- Continue wetland and riparian plantings at Lower Powell Butte Floodplain to increase stream shade and habitat.
- Assess and repair/replace if necessary the bridges along the Springwater Corridor to allow woody debris to stay in the system for improvement of stream health.

Tryon Creek

1. Remove fish barriers along Tryon Creek to restore populations to Marshall Park Natural Areas.

Columbia Slough

1. Monitor the placement of large woody debris and enhance riparian habitat at the Columbia Slough Confluence at Kelley Point Park for fish use.

2. Place large woody debris at Kenton Cove.