Strategic prioritization of urban stream restoration based on salmon habitat preferences

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Today’s purpose

- Describe Portland’s on-going process to manage and prioritize watershed management projects
- Describe procedure for rating the benefits of watershed projects
Blueprint: Managing for success in urban stream management

Plans

Actions

Outcomes

Outcomes
http://www.portlandonline.com/bes/

The Plan

- Comprehensive approach to improving health of PDX watersheds
- Guidelines for City Bureaus
- Incorporates Ecological Framework
- Addresses ESA, CWA, CERCLA et al. obligations
Lower Willamette River Watersheds

Tryon Creek Watershed
### The Actions

**Strategic Categories**

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Action types</th>
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<tbody>
<tr>
<td>Stormwater</td>
<td>Modify the storm drainage system to increase infiltration</td>
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<tr>
<td></td>
<td>Modify the storm drainage system to increase reuse or detain stormwater</td>
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<td></td>
<td>Modify the storm drainage system to treat stormwater pollutants</td>
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<td></td>
<td>Modify the storm drainage system to separate flow from combined storm/sanitary sewer</td>
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<td></td>
<td>Increase the extent of canopy and other vegetative cover</td>
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<td></td>
<td>Improve the quality and composition of vegetative cover</td>
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<td></td>
<td>Restore channel and floodplain function and stability</td>
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<tr>
<td></td>
<td>Restore or create river, stream, wetland, and terrestrial habitat structure and function</td>
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<tr>
<td></td>
<td>Restore habitat connectivity and access</td>
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<td></td>
<td>Manage for appropriate native species</td>
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<td></td>
<td>Implement management of erosion, sediment, and water</td>
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<td></td>
<td>Implement management of stormwater for flood control</td>
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<td></td>
<td>Implement management of pollutant discharge</td>
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<td></td>
<td>Protect sites and features with high water quality</td>
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<td></td>
<td>Operate and maintain the storm sewer system and infrastructure to remove and prevent pollutants</td>
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<td></td>
<td>Reduce illicit and non-stormwater discharge</td>
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<td>Maintain and repair sewer systems to ensure safety</td>
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<td>Promote watershed awareness with city staff, schools, the business community, organizations, and general public</td>
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<td></td>
<td>Provide pollution prevention education to city staff, the business community, organizations, and general public</td>
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<tr>
<td></td>
<td>Provide technical assistance and incentives to city staff, school, the business community, organizations, and general public</td>
</tr>
</tbody>
</table>

**Projects:** Application of Action types at specific locations and times
Project Purpose
Quantify potential OUTCOMES of projects

- Strategic prioritization
  - How can stream restoration actions be optimized within a watershed?
  - What is the potential gain from restoration projects?
  - What is the rationale for watershed investments?
  - How do alternative futures for the City compare?

- Regulatory obligations
  - How do Portland watershed actions contribute to ESA population recovery?
  - How can actions be prioritized to maximize ESA benefits?
Analytical Framework

EDT = Ecosystem Diagnosis & Treatment
Step One—Diagnose stream problems with EDT

Tryon Creek
Priorities for Coho Habitat Recovery

Limiting Factors

- Channel form
- Pollutants
- Flow
- Food
- Habitat diversity
- Obstructions
- Sediment load
- Temperature

Tryon Creek
Priorities for Coho Habitat Recovery

Tryon 1
Tryon 2
Tryon 3a
Tryon 3b
Tryon 4
Arnold 1

- Protection
- Restoration

Extreme
Moderate
Low
Step Two - Create Project Hypotheses

Create explicit working hypotheses regarding potential impact of actions/projects on the environment. This includes:

- Creating a consistent scientific basis for project evaluation across the city
- Separates scientific and policy issues

Effectiveness of an action to change environmental attributes

Policy:
- Intensity of implementing the action in the environment

Science:
- Effectiveness of implementing the action in the environment

Action:
- Increases consistency in project evaluation

Upper Tryon Stormwater Detention

Stormwater Infiltration
Step Three: Characterize population change in EDT

**Expectation to change the environment**

- **Science: Effectiveness**
  - Effectiveness of the action to change environmental attributes

- **Actions**

- **Projects**

- **Policy: Intensity**
  - Intensity of implementing the action in the environment
Action Editor Computes Environmental Expectations

A Scenario has been loaded for Tryon_052206

- Import Baseline Data
- Classify Reaches
- Edit Projects
- Review Action Effectiveness
- Create Scenario

- Import EDT Input File
- Edit Effectiveness & Intensity
- Export New EDT Input File
Action Effectiveness: A scientific hypothesis

Strategy: Stormwater Management
Action: increase stormwater infiltration

Attributes affected & effectiveness to address restoration potential
Project Intensity: A Policy Decision

A (• Cost
X (• Feasibility
E) (• Support
er (• Opportunity
ch (• Spatial Distribution

Spatial intensity of application
Environmental Change = Change in Habitat potential for target species

Current Condition

With Watershed Strategy

E D T

EXTREME
MODERATE
LOW

Channel form
Pollutants
Flow
Food
Habitat diversity
Obstructions
Sediment load
Temperature
How Portland Will Use This Process

- Watershed actions will be characterized
  - Environmental Expectations
  - Change in habitat potential for coho and steelhead
- City planners can examine alternative futures
  - Develop most effective programs and strategies
- Provides scientific/policy accountability for investments in watershed health
- Document City’s contribution to ESA recovery
  - Develop Portland ESA recovery strategy