Progress in Habitat Restoration and Protection in the Columbia River Estuary

Chris Collins, Catherine Corbett, Keith Marcoe, and Evan Haas
Lower Columbia River Estuary Partnership

Photos courtesy of SBWC
Outline of Today’s Presentation

• Background on Estuary Partnership Restoration Program
• Summary of restoration in the estuary over the past decade
• Cost analysis
• Thoughts and considerations as we move forward
• Questions

Photos courtesy of City of Portland, BES
Funding Partners

NPCC/BPA
– ca. $4,000,000 (2003-2007)
– ca. $9,000,000 (2008-2010)

NOAA – Community Based Restoration
– ca. $350,000 (2008-2010)

NOAA – Marine Debris Removal
– ca. $100,000 (2008)

EPA – Targeted Watershed
– ca. $700,000 (2003-2005)
– NEP funds (2003 to date)

Corps of Engineers - Section 536
– ca. $2,000,000 since 2002
Implementation Partners

- Local Governments
- SWCDs
- Conservation Organizations
- Watershed Councils
- Councils of Government
- Federal and State Agencies
- Consulting Firms
Only looking at EP-funded projects

Bonneville Dam

Where We Are Now…

- 54 projects funded
- 2,946 acres protected or restored
- 570 acres historic floodplain reconnected
- 58 miles of improved stream access

…How We Got There

Average # of Projects per Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Acquisition</th>
<th>Design/Permitting</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999-2000</td>
<td>1.6</td>
<td>1.7</td>
<td>5.6</td>
</tr>
</tbody>
</table>

Map Legend
- ★ Completed Project
- ✭ Project Underway
- ✱ Project Delayed

Lower Columbia River Estuary Partnership

Habitat Restoration Projects Funded By the Estuary Partnership
1999 to 2009

Map: Habitat Restoration Projects Funded By the Estuary Partnership
1999 to 2009

Legend:
- ★ Completed Project
- ✭ Project Underway
- ✱ Project Delayed
- City Limits
- Estuary Partnership Study Area

Bonneville Dam

W A S H I N G T O N
...How We Got There

Habitat Restoration Projects Funded By the Estuary Partnership
1999 to 2009

Percentage of Projects by Type

- Tidal Reconnection: 48%
- Passage Improvement: 23%
- Vegetation Enhancement: 15%
- Channel Modification: 13%

Map Legend:
- Completed Project
- Project Underway
- Project Delayed
- City Limits
- Estuary Partnership Study Area

Tidal Reconnection
Passage Improvement
Vegetation Enhancement
Channel Modification

Map of projects and habitat restoration sites in the Lower Columbia River Estuary Partnership study area.
...How We Got There

~50% of our projects have occurred in the vicinity of Astoria and Portland

~33% of our projects have occurred in the vicinity of

~80% of our projects have occurred in the vicinity of Astoria and Portland
How We Got There

30 projects vs. 24 projects
...How We Got There

and what does all this restoration cost??

Criteria:
- Only looking at EP-funded projects (full or partial funding)
- Included only projects for which we had ALL costs
- Project had to be complete
- Used dollar value from the year the project was funded (no effort to standardize for inflation)
- Did not consider costs for initial development (finding sites, meeting with landowners, etc.) or effectiveness monitoring
- Considered all acreage (e.g., not just portion of site inundated by a dike breach)
Four Types of Restoration:
1) Passage Improvement
2) Channel Modification
3) Veg. Enhancement
4) Tidal Reconnection

Mirror Lake Restoration Project – Part I (2008)
Young Creek Culvert Replacement (2005)
Mirror Lake Restoration Project – Part II (2010)

How Do You Categorize Costs?

Level 1 – Site
Level 2 – Project
Level 3 – Type
Level 4 – Phase

Four Phases: 1) Planning/Outreach
2) Design/Permitting
3) Implementation
4) Monitoring
Level 3 – Types of Restoration

- Channel Modification
- Passage Improvements
- Tidal Reconnections
- Vegetation Enhancement
Levels 3 and 4 - Types & Phases

For each type, we analyzed costs for two phases

Level 3 – Type of Restoration
Channel Modification

Level 4 – Phase
Design/Permitting
Implementation

Photos courtesy of Parametrix
## Design/Permitting Costs per Type

<table>
<thead>
<tr>
<th>Restoration Type</th>
<th>n</th>
<th>Average Costs per Project</th>
<th>Average Unit Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tidal Reconnections</td>
<td></td>
<td>$17,000</td>
<td>$800 per acre</td>
</tr>
<tr>
<td>Channel Modification</td>
<td></td>
<td>$38,000</td>
<td>$3,300 per acre</td>
</tr>
<tr>
<td>Vegetation Enhancement</td>
<td></td>
<td>$175,000</td>
<td>$95,000 per mile</td>
</tr>
<tr>
<td>Passage Improvement</td>
<td></td>
<td>$49,000</td>
<td>$15,100 per mile</td>
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</table>
# Implementation Costs per Type

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<tbody>
<tr>
<td>Passage Improvement</td>
<td>4</td>
<td>$129,000</td>
<td>$47,000 per mile</td>
</tr>
<tr>
<td>Channel Modification</td>
<td>5</td>
<td>$150,000</td>
<td>$167,000 per mile</td>
</tr>
<tr>
<td>Vegetation Enhancement</td>
<td>9</td>
<td>$97,000</td>
<td>$2,700 per acre</td>
</tr>
<tr>
<td>Tidal Reconnections</td>
<td>2</td>
<td>$364,000</td>
<td>$8,900 per acre</td>
</tr>
</tbody>
</table>
Total Cost per Restoration Type

<table>
<thead>
<tr>
<th>Restoration Type</th>
<th>Project Costs</th>
<th>Unit Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition</td>
<td>$406,000</td>
<td></td>
</tr>
<tr>
<td>Passage Improvement</td>
<td>$129,000</td>
<td>$49,000</td>
</tr>
<tr>
<td>Channel Modification</td>
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Legend:
- **Average Cost per Project**
- **Average Cost per Project Design/Permitting**
- **Average Cost per Project Implementation**
Cost per Project Phase

All four restoration types combined.

<table>
<thead>
<tr>
<th>Project Phases</th>
<th>n</th>
<th>Average Cost per Project</th>
<th>Average Unit Cost</th>
</tr>
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<tbody>
<tr>
<td>Acquisition</td>
<td></td>
<td>$406,000</td>
<td>$2,500 per acre</td>
</tr>
<tr>
<td>Design/Permitting</td>
<td>15</td>
<td>$100,000</td>
<td>$2,700 per acre</td>
</tr>
<tr>
<td>Implementation</td>
<td>20</td>
<td>$143,000</td>
<td>$4,000 per acre</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$24,000</td>
<td>$15 per mile</td>
</tr>
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How Do We Get To 19,000 Acres?

…and how much will it cost?

In order to maximize the efficiency of our restoration funds, we could consider….

1. Looking for LARGE projects
   Why? – Unit costs *typically* are inversely related to project size

2. Prioritizing Vegetation Enhancement and Passage Improvement projects
   Why? – Costs per acre are roughly ¼ of those for TR and CM projects

3. Looking for opportunities on public land
   Why? – Acquisition is expensive

Photos courtesy of Columbia Land Trust
However, cost is only one factor to consider when analyzing a project!!

Other Factors:
- benefits (cost/benefit ratios)
- available opportunities (e.g., limited supply of public land; funding priorities)
- typical failure rates (by restoration type)
- project duration
- deferred benefits
- and on and on and on and on........
Next Steps

1) Hire an intern to **Expand database (i.e., sample set)**
   - Obtain data for additional EP-funded projects
   - Obtain data for non-EP projects (e.g., OWEB)

2) Hire an intern to **Consider other metrics. (Is acreage the best metric to assess goals?)**
   - It’s the easiest to track and the most straight-forward
   - But……
     - Does not capture Channel Mod. and Passage Improvement projects
     - May not accurately account for benefits to target species or habitats
   - Other options:
     - Survival benefits
     - CWS and PSU methodologies
     - Others?

3) Hire an intern to **Consider using cost/benefit analyses to inform project development and selection.**

4) Hire an intern to **Consider using unit costs to assess funding requirements for different recovery goals and programs.**
Questions?

Contact for More Information:
Catherine Corbett (503) 226-1565 Ext 240, corbett@lcrep.org

Acknowledgements:
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