Spatial Distribution of Habitat Restoration in the PNW

What do we know?

Katie Barnas, Steve Katz
Northwest Fisheries Science Center
NOAA Fisheries

PNW database –
Barnas and Katz (NOAA), Jenkinson (NRRSS)

PNW interviews –
Jenkinson and McFall (NRRSS)

CAL interviews –
Anderson (NRRSS)

National River Restoration Science Synthesis
(Bernhardt et al. Science, 2005)
On the ground projects

What information would we need?

- Where are the projects located?
- When did the projects begin/ end?
- What are the types of restoration actions?
- Who is sponsoring the projects?

Goal

- Help inform the placement of future projects and the design of project effectiveness monitoring
Did project occur?
Did project actions occur as described?
Did project occur at the location indicated?

Database QAQC?

Did project occur?
20% effort

Dataset 1
Dataset 2
Dataset 3
Dataset 4

4 projects

20% effort

Standardization. Categorize by project type
80% effort

PNW Habitat Project Tracking Database
Spatial and Tabular Data

<table>
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</table>

Who/What
Where
When
Why
Project Types

• Barrier Removal
• Diversion Screens
• Nutrient Enrichment
• Restore Instream Flow
• Restore Riparian Function
• Restore Stream Complexity
  – Channel Complexity
  – Instream Structure
• Sediment Reduction
• Water Quality Improvement
• Upland Management
• Other

Project Subtypes

• Restore Riparian Function example
  – Fencing
  – Forestry Practices
  – Livestock removal
  – Livestock rotation
  – Livestock stream crossing
  – Off-channel watering
  – Plant installation/ revegetation
  – Plant removal/ control
  – Other
Database Scales

5 With data for more than 1 state (BLM, CBFWA, REO-IRDA, Ducks Unlimited)
14 State Scale (WA DOE, OWRI, IDFG)
2 Subbasin scale (Asotin, Grande Ronde)
5 Hand gathered data sets

Results - Data Providers

26 Data Sources
Total number of projects = 23,126
Number of projects by type

- Sediment Reduction
- Restore Riparian Function
- Upland Management
- Barrier Removal
- Instream Structure
- Other
- Channel Complexity
- Restore Instream Flow
- Water Quality Improvement
- Diversion Screens
- Nutrient Enrichment

100% of projects reported

# of projects by type and cost

- Sediment Reduction
- Restore Riparian Function
- Upland Management
- Barrier Removal
- Instream Structure
- Other
- Channel Complexity
- Restore Instream Flow
- Water Quality Improvement
- Diversion Screens
- Nutrient Enrichment

57% of projects reported cost
Who is funding projects?

- Federal Funders: 12,000 projects
- State Funders: 5,200 projects
- County Funders: 3 projects
- Municipal Funders: 37 projects
- Private Funders: 0 projects
- Tribal Funders: 0 projects

67% of projects reported

Completion by Year

- Snake Chinook listed: 1984
- BLM reporting: 1992
- OR coast coho OWEB formed: 1996
- WA SRFB formed: 2000
- Most salmon listings REO–IRDA starts reporting: 2002

85% of projects reported
Spatial Distribution

Projects = 23,126  Locations = 35,696

6% (2100) of project locations not mappable or inconsistent

Are project types similar across states?
Project Density

What explains the differences?

- Differences in project distributions?
- Differences in data availability?
- Differences in data collection effort?

How many projects really are out there?

Deschutes example

- Subbasin inventory: 686 projects (1509 locations)
- PNW database: 860 projects (1566 locations)
  - 73%
- In common: 376 projects (444 locations)
- Total: 1170 unique projects (2476 locations)
Data Quality

Data Donor Check of the PNHPTDB
Give data donors access
  • Check accuracy, make corrections
  • Fill in missing fields

Site Visits and Interviews
Site visit w/ upstream & down-stream visual survey
  • Identify projects:
    Documented, not present
    Present, not documented
    Documented, but different

Conclusions

DATA
  • Little standardized reporting
  • Accessibility of data - state and fed more available
  • Location, location, location

PROJECTS
  • Most projects from the Cascades west
  • Enormous number of projects
    – Minimum estimate of 2500 projects completed a year
PNW River Restoration Survey Results
Robin Jenkinson & Jeanne McFall

Interview Organization

<table>
<thead>
<tr>
<th>Verification</th>
<th>Design</th>
<th>Monitoring</th>
<th>Evaluation</th>
<th>Lessons Learned</th>
</tr>
</thead>
</table>


Randomly sampled by region, within each of 4 intent categories:

- Water Quality Improvement: 12
- Instream Habitat Improvement: 12
- Channel Reconfiguration: 12
- Riparian Management: 12

322 Interviews Completed Nationwide
<table>
<thead>
<tr>
<th>Stream Size</th>
<th>Landowner</th>
<th>Land Use</th>
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<td>Small (31)</td>
<td>Federal (11)</td>
<td>Undeveloped (19)</td>
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<td>Medium (10)</td>
<td>Private (19)</td>
<td>Agricultural (13)</td>
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<td>Large (1)</td>
<td>County (5)</td>
<td>Managed Forest (11)</td>
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**Project Contact Affiliation**

- Federal: 23
- County: 6
- NGO: 4
- State: 2
- Private: 1
- Tribe: 1

13
Project Costs*

<table>
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<tr>
<th>Number of Projects</th>
<th>$10K</th>
<th>$50K</th>
<th>$100K</th>
<th>$250K</th>
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<td>$ Federal (24)</td>
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* Plus In-Kind Contributions

Watershed Mgt. Plan
- Nationwide: 44%
- PNW: 53%

Watershed Assessment
- Nationwide: 53%
- PNW: 68%

Citizen Involvement
- Nationwide: 68%
- PNW: 60%
81% Conducted Monitoring

<table>
<thead>
<tr>
<th>Photo Monitoring</th>
<th>Visual Observation</th>
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<td>19%</td>
<td>12%</td>
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Enabling Factors
- + Funding Mandate
- + Personal or Agency Commitment

Constraints
- - Lack of Funding
- - Lack of People Power/Staff

Quantitative Measurements

- Biological 33%
  - Fish Counts
  - Spawning Surveys
  - Plant Survival
  - Macroinvertebrates
  - Riparian Vegetation Surveys

- Physical 22%
  - Channel morphology
  - Habitat surveys
  - Pool counts

- Chemical 15%
  - Temperature
  - Total Suspended Solids
8/47 of Projects Completed
Scientific Effectiveness Monitoring

- Biological, Chemical or Physical Monitoring: 33
- Baseline Data Collected: 27
- Post-Project Data Collected: 24
- Reference/Control Site Data Analyzed: 11
- Results Shared: 9

Kondolf and Micheli 2002

Maintenance & Resilience

- Planting (10)
- Structures relocated/replaced (8)
- Invasive species removal (7)
- Structural reinforcement (5)
River Restoration’s Little Instruction Book

Suggestions, observations, and reminders on how to have happy and rewarding projects.

To establish cedar in a heavy deer-browse area, co-plant cedar and spruce together in the same hole, allow them to grow above the browse line, and then take out the spruce.
After the 1980 Mt. St. Helens eruption, we observed logs perpendicular to the hillside catching a lot of the ashes that were washing downhill. We have successfully used trenched logs to prevent erosion.

To establish trees in a floodplain covered with reed-canary grass, make 2-3 feet tall mounds with an excavator in the summer. Plant conifers on the mounds, on lower areas, plant hard woods and shrubs tolerant to water.
Use rental contracts by the hour rather than lumped construction contracts, they’re much cheaper and more flexible.

PNW Group:
Robin Jenkinson, Jeanne McFall
Jeffrey Braatne, Steve Clayton, Mark Morehead,
Peter Goodwin, University of Idaho
Katie Barnas, Steve Katz, NOAA Fisheries

NRRSS Coordinators:
Dr. Margaret A. Palmer, University of Maryland
Dr. J. David Allan, University of Michigan
Dr. Emily S. Bernhardt, Duke University

NRRSS Working Group & American Rivers
Thank You

PNW
• U.S. Environmental Protection Agency
• Bureau of Reclamation

NRRSS
• National Science Foundation
• U.S. Geological Survey
• David and Lucille Packard Foundation
• Altria Foundation
• U.S. Environmental Protection Agency

All in all…

GOOD LUCK!
www.restoringrivers.org

Largest Database of River Restoration Projects in the World
As much $ spent in the PNW as in the rest of the U.S. from 1999-2002
Long-term and science-oriented Monitoring and Maintenance
5 Standards for Successful Restoration (Palmer et al. 2005)

1. The design of a river restoration project should be based on a specific guiding image of a more dynamic, healthy river.
2. The river’s ecological condition must show measurable improvement.
3. The river system must be more self-sustaining and resilient to external perturbations, so that only minimal follow-up maintenance is needed.
4. During the construction phase, no lasting harm should be inflicted on the ecosystem.
5. Both pre- and post-assessments must be completed and data made publicly available.

Four Policy Implications (Palmer and Allan 2006)

1. Congress should ensure that restoration projects are credible by requiring recipients of Federal funds to adhere to the standards for ecologically successful restoration projects.
2. A coordinated tracking system for restoration projects must be implemented.
3. Undertake a national study to evaluate the effectiveness of restoration projects.
4. Use existing funding for river restoration more efficiently and supplement funding.