

Adaptive Management for the Columbia River Estuary

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Lower Columbia River Estuary Partnership

Columbia River Estuary Conference

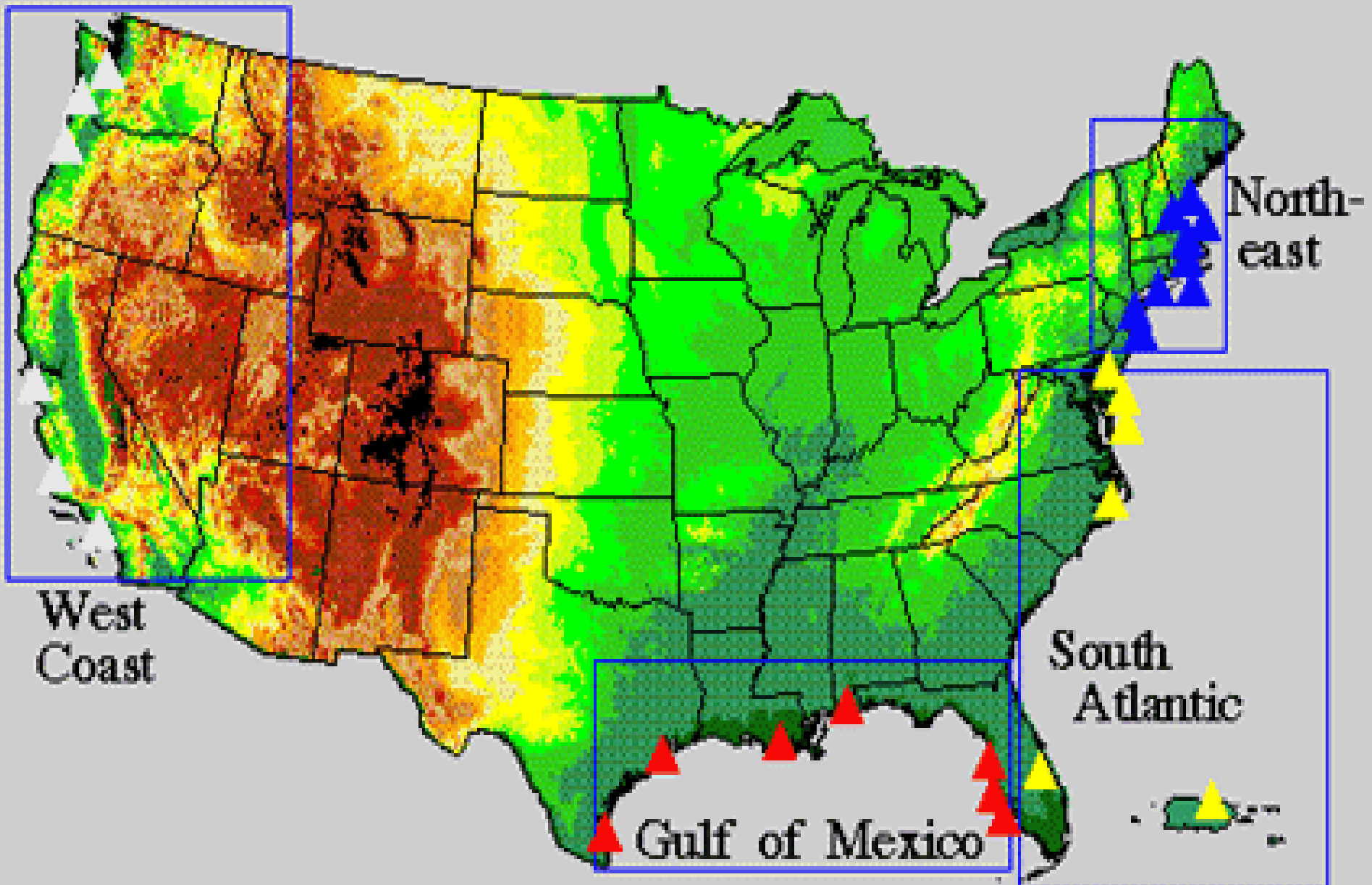
May 25-26, Astoria, Oregon



National Estuary Program

- **EPA supported program**
- **Section 320 of Clean Water Act**
- **28 in the United States & Puerto Rico**
- **Collaborative decision-making and consensus**
- **Community Driven**
- **Develop and implement a *Comprehensive Conservation and Management Plan (CCMP or Management Plan)***

National Estuary Programs



Estuary Partnership

Charge from Governors

- **Bring together the whole picture:** complex ecosystem, multiple partners; multi-species; diverse uses and issues; focus on the lower Columbia: Ecosystem Based
- **Build capacity of partners and leverages resources** to fill gaps and deliver tools, data and information to all citizens
- **Remove barriers to better management** of the lower Columbia River through collaboration, convening and coordination: community based solutions, locally driven implementation; science based
- **Add to, support, enhance, coordinate**
- **Regional cohesiveness, efficiencies, regional funds**

Management Plan

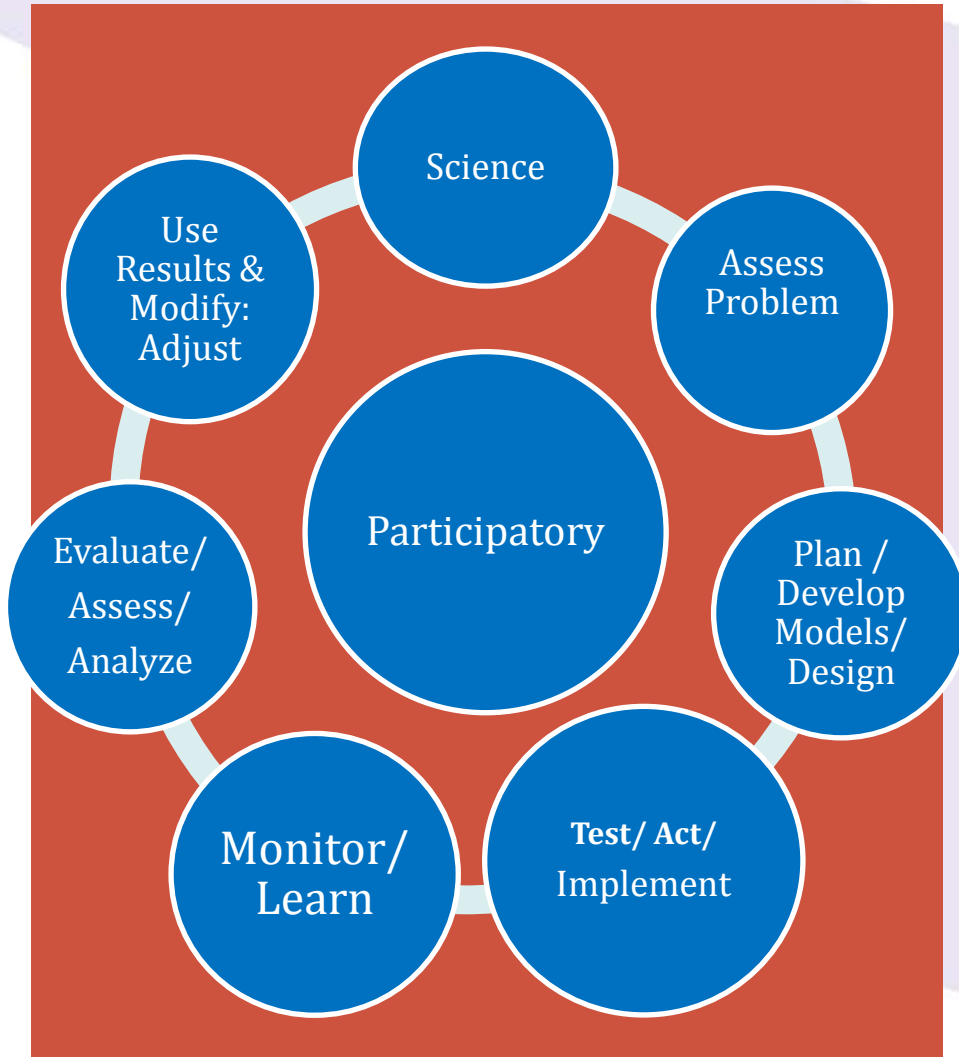
Volume 1: 43 actions to address priority issues focused on what is best for river and species

- **Framework for implementing actions**
 - **Biological Integrity**
 - **Impacts of Human Activity and Growth**
 - **Habitat Loss and Modification**
 - **Conventional Pollutants**
 - **Toxic Contaminants in Sediments**
 - **Institutional Constraints**
 - **Public Awareness and Stewardship**
- **Habitat and Land Use: Ecosystem Health, Multi-Species Habitat, Recovery of Species**
- **Stewardship: Environmental Education, Volunteer Projects, Water Trail**
- **Toxic and Conventional Pollutants: Monitoring, Pollutant Reduction**

Management Plan Goals

- Increase habitat and habitat functions by restoring 19,000 acres of wetlands by 2014; and improve land use practices to protect ecosystems by reducing runoff of toxic and conventional pollutants into waterways.
- Evaluate the impact of actions and prevent toxic and conventional pollution; eliminate persistent bioaccumulative toxics; reduce PAHs and heavy metal discharges associated with petroleum powered vehicles & equipment; and reduce bacterial contamination.
- Provide education & information programs to all citizens, including children's programs and volunteer opportunities; implement and sustain long term monitoring to evaluate the system over time; and heightened government coordination.

Adaptive Management



Adaptive management is good management, but that not all good management is adaptive management.

Adaptive management requires common sense, but it is not a license to just try whatever you want.

Adaptive management requires an explicitly experimental "scientific" approach to managing conservation projects.

Adaptive management incorporates research into conservation action. It is the integration of design, management, and monitoring to systematically **test assumptions** in order to **adapt** and **learn**.

Challenge

- Not just planning for but employing
- Defining the goals, the measures
- Setting up a process to do/ act & learn
- Seeing failure as a learning tool not a punishment
- Time

Estuary Partnership Habitat Restoration Program Goal

- **19,000 acres to be restored by 2014**
 - Includes 3,000 acres of tidal wetlands along lower 46 miles
 - Original Goal of 16,000 acres by 2010 was achieved by regional partners
 - Included in EPA Strategic Plan; Management Plan original goal was adopted into the 2000 BiOp by NOAA



Culvert Removal, Young Creek

Program Attributes

Multi-tiered approach:

- 1) Establishing clear program actions (i.e., our Management Plan);**
- 2) Identifying, securing funding, and developing projects that align with program actions:**
 - 1) Habitat restoration and protection projects**
 - 2) Filling data gaps (e.g., Estuary Ecosystem Classification, Shoreline Condition Inventory, Restoration Prioritization)**
 - 3) Coordinating, supporting partners and filling gaps**
 - 1) Technical assistance
 - 2) Capacity building
 - 3) Project development
- 3) Garnering partners' feedback/support for steps needed to implement actions and identify gaps (e.g., Science Work Group, Board of Directors, Science to Policy Exchanges)**
- 4) Decision framework supporting responsive and responsible management decisions (e.g., Science Work Group, Science to Policy Exchanges, topical workshops)**

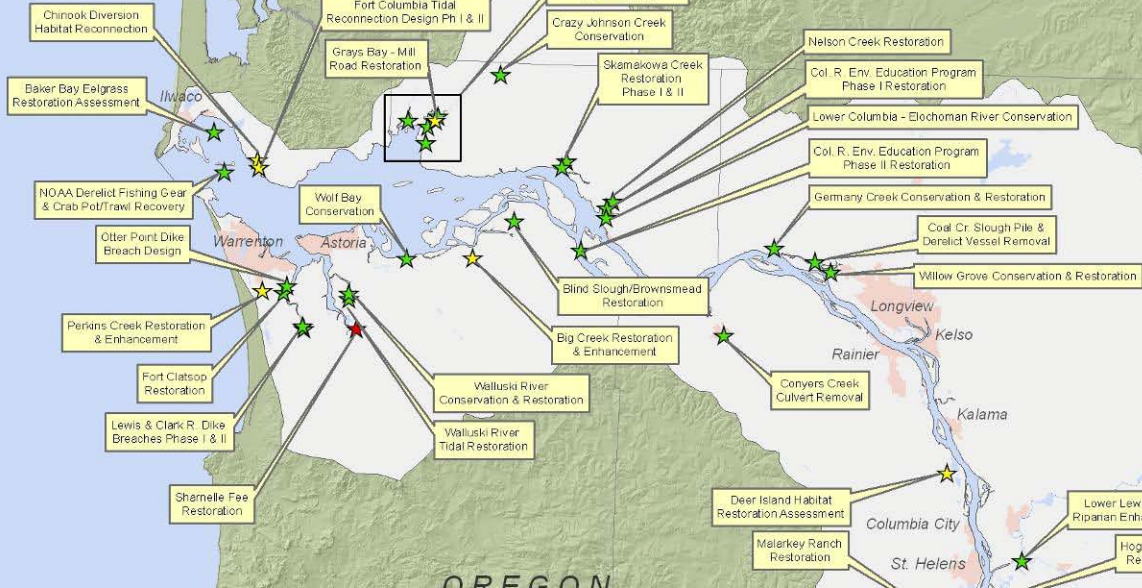
Regional Investment in Restoration

Habitat Restoration Projects Funded By the Estuary Partnership

1999 to 2009

Map Legend

- ★ Completed Project
 - ★ Project Underway
 - ★ Project Delayed
 - City Limits
 - Estuary Partnership Study Area
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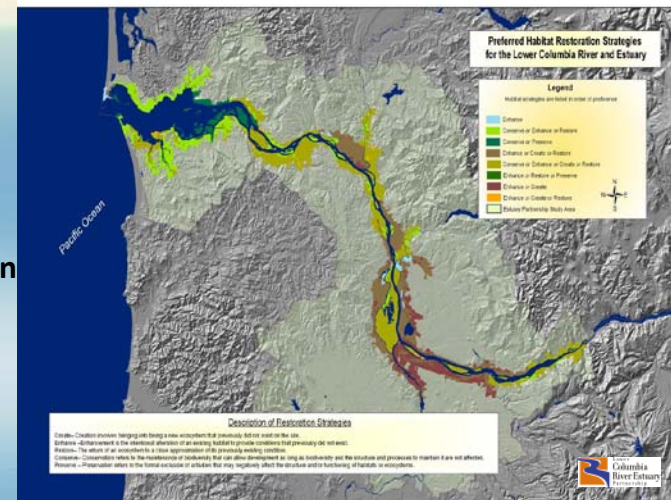
- > 16,235 acres restored since 2003
- > 45 projects with 100+ partners
- Require effectiveness monitoring to evaluate investment

Project Selection Process

- Request for Proposals
- Science Work Group Review
- Site Visits
- Project Review Committee
 - Project Evaluation Criteria
 - Tier 2 Prioritization Framework

Current Habitat Restoration Prioritization

- Two-tiered - Scales from system-wide to project specific
- **Tier 1** uses disturbance model (stressors)
 - provides method for comparing site function and structure at larger scales
 - Focuses on existing data
 - refine by updating/adding new data
- **Tier 2** provides scientific method of comparing specific projects using change in function and likelihood of success



Project Evaluation Criteria

Ecosystem Criteria:

- **Habitat Connectivity**
- **Areas of Historic Habitat Type Loss**
- **Improvement in Ecosystem Function**
- **Adequate Size and Shape**
- **Level of Complexity**
- **Accessibility For Target Species**

Implementation Criteria:

- **Use Natural Processes over Habitat Creation**
- **Community Support & Participation**
- **Potential for Success & Self Maintenance**
- **Potential for Improving Ecosystem Function while avoiding impacts to Healthy & Functioning Ecosystems**
- **Avoid Sites Where Irreversible Change has occurred**
- **Capacity of Sponsor/Partnership**
- **Project Context within Broader Management & Planning Objectives**

Monitoring Criteria:

- **Monitoring & Evaluation with Relationship to Stated Goals and Objectives**
- **Displays linkages to Reference Site(s)**
- **Transferability of Results**

Action Effectiveness Monitoring (AEM)

- Research to determine effects of restoration actions on fish performance and/or habitat conditions
- Assess ecosystem benefits and uncertainties affecting restoration success
- Support adaptive management of restoration by regional partners



Coordinated Regional Effort

AEM for individual restoration projects:

- CREST, Columbia Land Trust , Scappoose Bay Watershed Council, Ash Creek Forest Management, NOAA Fisheries
- Estuary Partnership coordinates to ensure comparable data collection methods, quality data across sites and time

Cumulative Effects Study

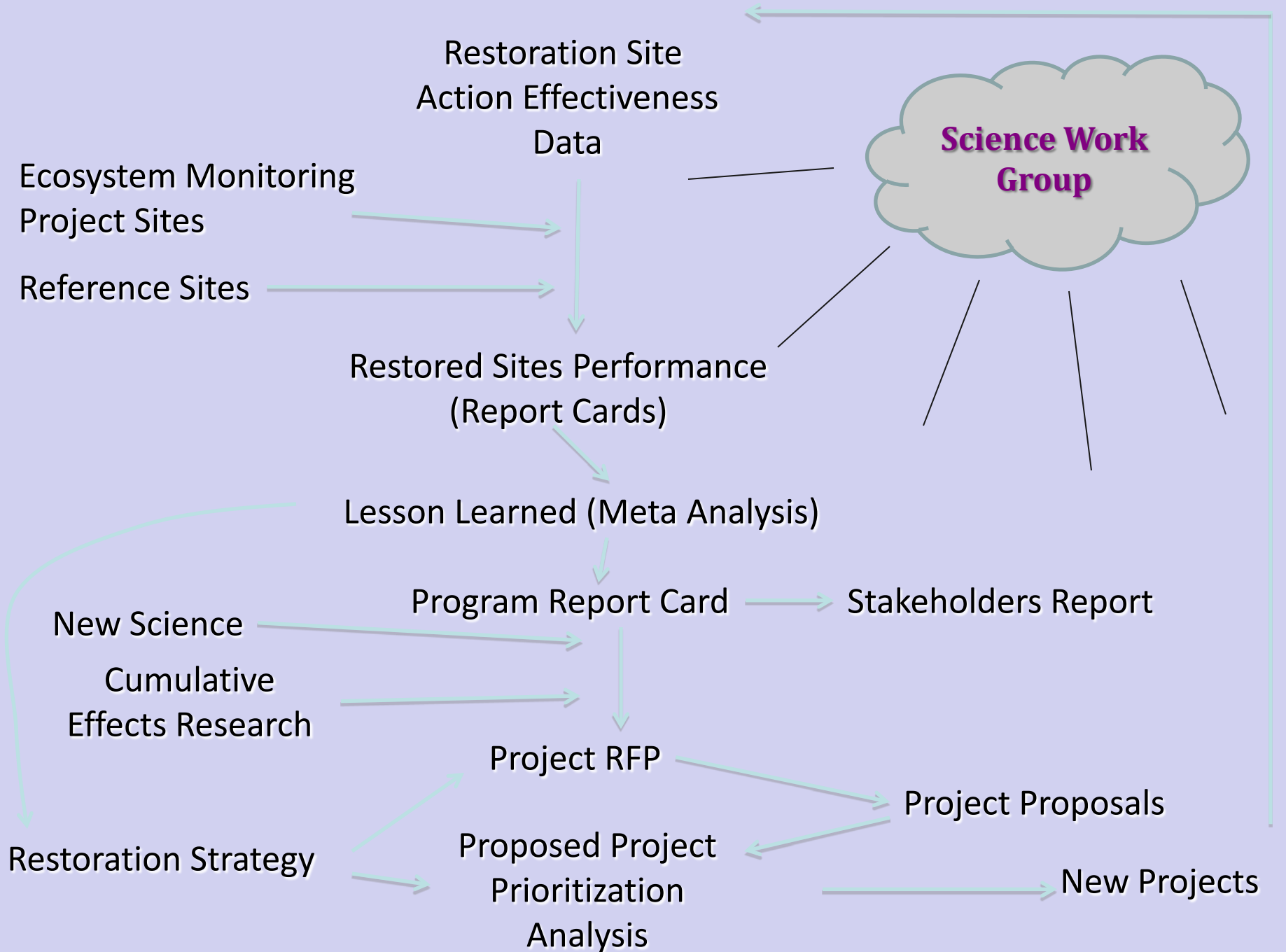
- USACE w/NOAA, PNNL
- Measuring hydrology, channel morphology, vegetation, fish presence and community structure, and flux of nutrients and organic matter
- Develop monitoring protocols for AEM (Roegner et al. 2008)

Reference Site Study

- Measuring hydrology, channel morphology, vegetation, elevation profiles, and sediment accretion

Coordination to ensure:

- ✓ **Data are comparable across sites and time for similar types of actions and habitats**
- ✓ **Results are scalable**



Estuary Partnership

Habitat Programmatic Adaptive Management

- 1999 – Reactive: solicitation through RFP
- 2001: Regional Project Evaluation Criteria, 100 scientists
- 1999-2010: developing new science
 - Columbia River Estuary Ecosystem Classification
 - Data sets
 - Shoreline Inventory
 - Restoration Prioritization
 - Effectiveness Monitoring
 - Reference Sites
 - Cumulative Effects

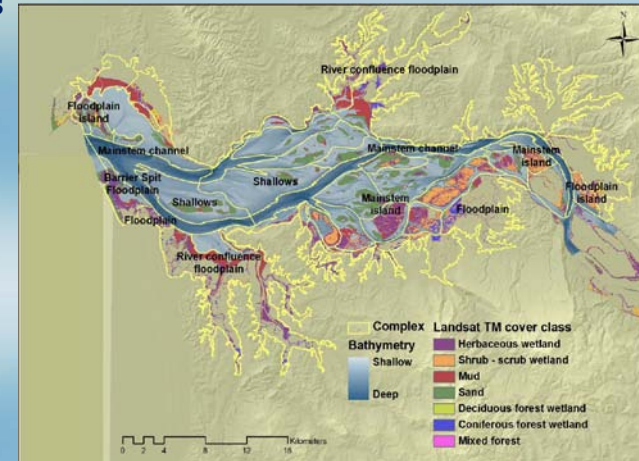
- 2005: Case studies
- 2005, 2007, 2008: Refined Project Evaluation Criteria
- 2003, 2005, 2007, 2009??? Technical conferences
- 2008 & 2009: Forums assessing successes & challenges ahead
 - Proactive project development using data, lack of ready projects, technical capacity, funding more phases, land owner and community needs
- 2009: Proactive Targeted Solicitation
- 2009: Updated restoration goal to 19,000 acres
 - 16,000 acres original goal achieved
- 2009-2010: BPA funding project development & technical capacity

Next Phases

- Develop and *continue to refine* restoration strategy
 - Support recovery plans
 - Use best available data
 - Support multi-species
 - Improve water quality and reduce toxics
- Coordinated project development
- Increase capacity of project sponsors
- Improve efficiencies to increase quantity and quality of projects

CRE Ecosystem Classification

- Applications:
- Prioritizing habitats for protection and restoration
 - Using landscape metrics
 - Number of patches
 - Types of patches
 - Edge density
 - Fragstats
 - McGarigal, K., S. A. Cushman, M. C. Neel, and E. Ene. 2002. Available from UMASS



From Burke et al. 2005 presentation @ ERF



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