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Managing Water in the West

A Reclamation Perspective on Organizing Science for Large Scale River Restoration

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Outline of Presentation

- How the 16 restoration programs are organizing and utilizing science
- Share two PN Region experiences in meeting challenges to organizing science
- Summary and Conclusions

How do the river restoration programs accomplish review of their science?

- Internal program/project review processes

  "The internal technical committee is expected to ensure that program tasks reflect the best and most recent science"

- Periodical inter-governmental project review

  "Periodically, we schedule workshops to cover particularly vexing topics"

- Review by standing committees

  "…project level scientific review for biological benefits by the Regional Technical Team"

How do the river restoration programs accomplish review of their science? (cont.)

- Presentations at professional society meetings

  "Results are presented at professional meetings…Other workshops are conducted…"

- Independent science review

  "Specific issues are sent to… Independent Scientific Advisory Board"

How has science been used and managed to improve restoration actions or objectives?

- Improves management techniques

  "Results of investigations are then used to refine management strategies and/or develop new experiments"

- Helps set management priorities

  "…monitoring and research data have been used to make modifications to several conservation measures"

- Develops explanatory tools like models

  "Models are under development to help with adaptive management"

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How has science been used and managed to improve restoration actions or objectives? (cont.)

- Affects program objectives and project designs

  "The project is a science-based effort, which incorporates adaptive management to ensure project objectives are met

- Validates restoration decisions

  "will test a hypothesis by implementing a specific management action…the response of the target species, the management action will then be evaluated, assessed, and adjusted"

What are some of the challenges in management of science?

- Coping with the deliberative pace of science process

  "Landowners, permitting agencies, and partners would like more immediate certainty of success prior to supporting the project with significant resources."

- Including science in consensus decision processes

  "…debating how to use the results of independent peer review, how they will be prioritized, implemented, agreed upon, etc., and how to capture the decision making discussions and outcomes."

What are some of the challenges in management of science? (cont.)

- Doing data management usefully

  "…little time or expertise available to conduct the necessary analyses and synthesize existing data…to feed back into future restoration designs."

- Frustration with permitting timelines

  "difficulty of obtaining…regulatory permits which would be required before starting the project."

- Insufficient Funding

  Identifying post-project funding for science endeavors."

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What are we doing institutionally?

- Using project operational flexibility
- Re-designing projects
- ➢ Performing off-project habitat improvements to mitigate dam structural and operational effects
- Prioritizing based on benefits, willing partners, cost-share
- ➢ Doing more communication and coordination
- Dealing with scope issues, nearly impossible tasks, by adopting long-term planning horizons
- ➢ Doing research, monitoring and evaluation to measure benefits and do adaptive management
- Looking nationally and internationally for guidance through working examples

A Regional Approach to Challenges

- ✓ Pacific Northwest Aquatic Monitoring Partnership
  - PNAMP Partners Signed Charter in 2004
  - Partnership of Partnerships: Puget Sound, Columbia River, Trinity River, Oregon Coast, IMWs, etc.
  - Very Large Collaboration of Science Program Managers (Federal, State, Tribal, NGOs): http://www.pnamp.org/
  - Coordination of Multiple Agency Programs/Projects
  - Focus on innovative and Standardized Regional Products

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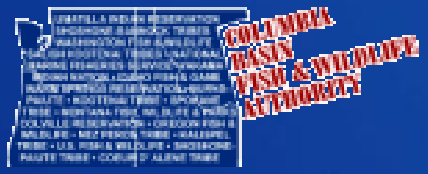
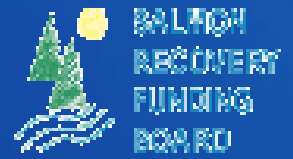
PNAMP Partners

US Army Corps of Engineers





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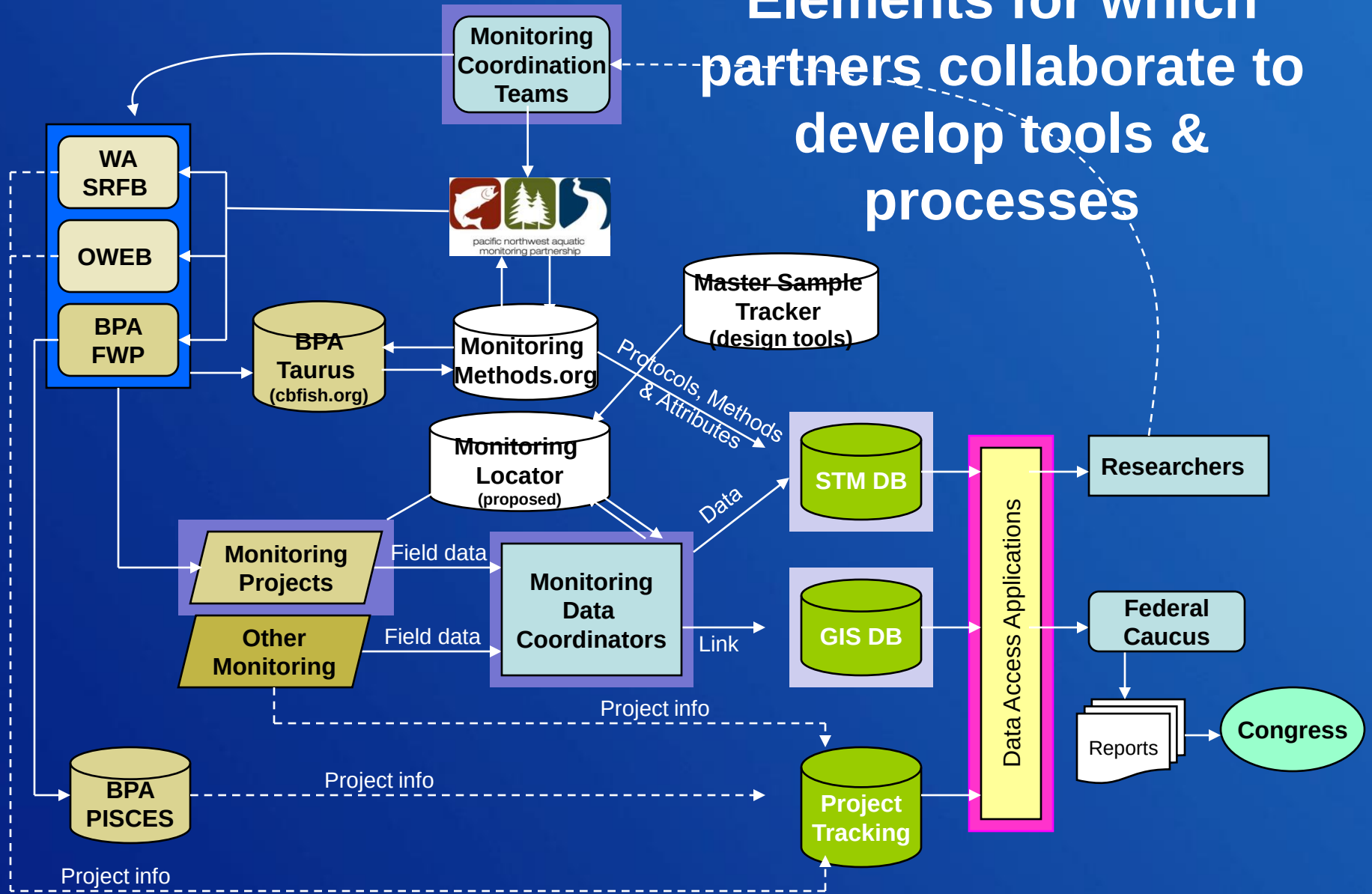
Elements for which partners collaborate to develop tools & processes



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Meeting challenges in PNAMP

- **Deliberative science process sometimes frustrates the desire for more immediate certainty of project success**
- **Example: PNAMP struggled for 5 years waiting on publication of a sponsored test of field protocols**
- **Overcoming the Challenge - Full Speed Ahead**
  - **Continue to Field Test Protocols**
  - **Develop Protocol and Methods Database**
  - **Encourage Partners to Use the Database to Document**

Meeting challenges in PNAMP

- **Difficulties incorporating independent science review into consensus-based decision processes**
- **<u>Example</u>: PNAMP struggles with making consensus-based recommendations for monitoring methods**
- **<u>Overcoming the Challenge – Move On</u>**
  - **Use workshops, seminars, conferences to inform the decision process with independent science**
  - **Cultivate consensus with formal science review**
  - **Rely on leadership**

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Meeting challenges in PNAMP

- **Finding time and dollars to do data management usefully**
- **<u>Example</u>: Partners do data management reluctantly, mostly on spreadsheets**
- **<u>Overcoming the Challenge – Get Real</u>**
  - **Recognize Data Management as Fundamental – organizing science is all about sharing managed data**
  - **Formed data management leadership team**
  - **Developed processes for standardizing data**
  - **Developing data sharing networks**

Intensively Monitored Watershed: A Local Approach to Challenges

- Where did the idea originate?
  - Federal Columbia River Power System Biological Opinion requirements to quantify river restoration benefits
  - Northwest Power and Conservation Council desire to allocate restoration dollars effectively
  - PNAMP state partners need to report progress toward salmon recovery for federal funding
  - Independent Science Advisory Board synthesizing the available science and recommending more focused monitoring

Intensively Monitored Watershed (cont.)

- What is an IMW?
  - Designed to tease out various environmental controls on listed fish production with dense monitoring
  - Large multiple agency monitoring teams
  - Major experiments to discover underlying river mechanisms affecting species of concern
  - Extensive treatments and monitoring
  - Development of analytical tools to analyze treatments in non-IMWs

Intensively Monitored Watershed (cont.)

- What are the advantages of an IMW?
  - Organizes science at the ground level
  - Quickly moves science from planning to implementation, facilitating learning
  - Saves dollars by coordinating monitoring methods, sharing data and labor
  - Test tools and concepts developed in PNAMP, then exports results to other basins
  - Provides quantitative information to focus river restoration on largest controls

Methow River IMW: Many Partners

- Reclamation implementing Federal Columbia River Power System Biological Opinion objectives
- U.S. Geological Survey and Univ. of Idaho implementing science for Reclamation
- Reclamation's Technical Service Center doing climate change modeling
- WA. Dept. of Fish & Wildlife monitoring wild and hatchery fish production
- Douglas Public Utility District providing funding to implement a Habitat Conservation Plan
- Yakama Nation reintroducing coho; studying nutrient treatment

Methow River IMW Partners (cont.)

- U.S. Forest Service performing habitat assessments
- U.S. Fish & Wildlife Service studying hatchery reforms
- Bonneville Power Administration funding habitat status and trend monitoring
- WA. Dept. of Ecology monitoring water quality
- Bonneville Environmental Foundation performing habitat surveys, doing outreach
- Upper Columbia Salmon Recovery Board funding data management, monitoring

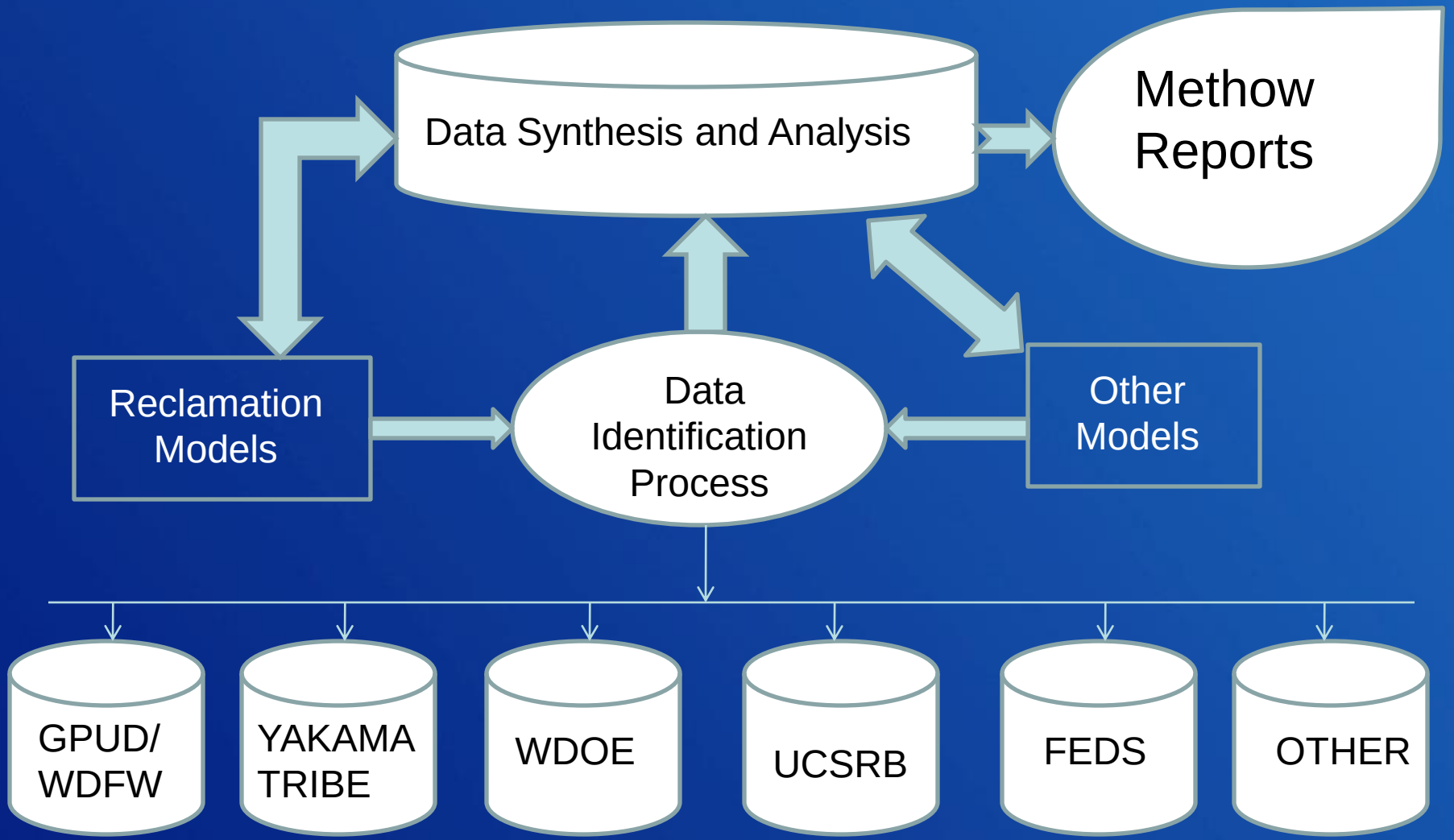
Some IMW Challenges

- Large habitat treatments with a significant measurable fish population response are difficult to implement
- Past treatments or unexpected new treatments must be taken into account
- Using data from new mark/recapture techniques for production estimates requires sophisticated statistical analysis
- Most fish biologist collect data, then analyze; seldom do they develop theory to guide data collection
- Often data is not readily available; not standardized; not analyzed

Steps to Addressing IMW Challenges

- Develop theory to guide data collection
- Make analytical services available to the monitoring partners
- Develop study designs for experiments; test designs with models
- Organize the collective monitoring data in normalized databases
- Develop tools for gathering and synthesizing data from different sources
- Coordinate monitoring with treatments

Methow Monitoring Framework



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Summary Remarks

- **Organizing Science Ain't Easy**
  - **Complex Scientific Problems**
  - **Many Institutional Management and Policy Issues**
- **Organizing Science is Worth the Effort**
  - **Results are More Effective Programs/Projects**
  - **Opportunities to Reduce Science Costs Through Collaboration**

Summary Remarks

- **Organize Science to Learn**
  - **Start with Theory**
  - **Designs Experiments to Test Theory**
  - **Question Theory**
- **Look for Opportunities to Learn**
  - **Planned Experiments are Best**
  - **Unplanned Treatments can be Opportunities**
  - **Collaborate on Experiments for Buy-in**

THE END

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What organization science themes have been particularly successful?

- Integrated restoration and monitoring activities
- Integrated monitoring and research plans across disciplines
- Hiring science program and coordination staff
- Large adaptive management experiments for learning
- Incorporation of adaptive management experimental results into annual planning
- Documentation of actions, results and reviews, particularly if readily accessible, on-line results