



## PNAMP Integrated Status & Trends Monitoring Demonstration Project Worksession NOTES

July 7, 2009

1:00 p.m. - 4:30 p.m

**Location:** BPA Ross Complex, 5411 NE Hwy 99 Vancouver, WA 98663; DOB Building, Rm 112 ([map of complex](#))

**Phone Bridge:** Call 703.648.4848; enter code 68826#.

**WebEx meeting link** <https://usgs.webex.com/usgs/j.php?ED=123326157&UID=0>

**Distribution** - April Cameron, Andreas Krause, Allan Whiting, Al Doelker, Aaron Borisenko, **Bob Cusimano**, Bernadette Graham Hudson, Bruce Schmidt, Brian Staab, **Bruce Crawford**, Catherine Corbett, Chris Jordan, Dan Rawding, Emmit Taylor, Erin Gilbert, Gary Johnson, Glenn Merritt, **Gretchen Hayslip**, Greg Sieglitz, **Jeannie Sifneos**, Jeff Breckel, **Jeff Rodgers**, Jason Karnezis, **Jim Geiselman**, John Arterburn, **Karen Adams**, Ken Dzinbal, Ken MacDonald, **Kirk Krueger**, Keith Wolf, Krista Jones, **Mara Zimmerman**, **Phil Larsen**, Phil Trask, Phil, Kauffman, Darcy Pickard, Pete Hassemmer, Keith Wolf, Bob Hughes, Dale McCullough, Erik Neatherlin, Dave Price, Phil Roger, **Russell Scranton**, Si Simenstad, **Steve Lanigan**, **Steve Leider**, Steve Waste, **Steve Rentmeester**, **Tim Counihan**, Tom Rien, Todd Reeve, Tracy Hillman, Tracy Yerxa, **Clif Johnson**, Lisa Madsen, Don Stevens, Michael Newsom, Pete Rand, Ian Waite, **John Piccicinni**, Jen Bayer, Sean Quigley, **Jacque Schei**

### **ACTION ITEMS**

**X WG** is asked to review new overview report and send feedback to Steve Leider by July 28.

**X** Small workgroup will provide input during OSU tool development as requests for input are sent by OSU.

**X WG** is asked to review fish proposal and send feedback on objectives 1 - 3 to Dan Rawding by July 14.

**X** Dan Rawding and Jeff Rodgers will formulate budget for objectives 1 – 3 from fish proposal by July 31 in order to start the BPA process to use FY09 funds.

**X** Jen will follow up with mainstem/estuary aspect

**X** Small group will develop first draft of proposal for habitat work by end of July

### **NOTES**

#### **1. Background on PNAM ISTM Project**

##### Background:

The PNAMP Integrated Status and Trend Monitoring (ISTM) project is intended to demonstrate an approach and utility of an integrated design framework for the collection of information to address multi-scale questions about the status and trends of physical, chemical, and biological attributes in stream networks. The ISTM approach will apply a region-wide “master sample design” concept to the selection of sampling locations. The demonstration will be performed in the bi-state lower Columbia area via a collaborative approach involving PNAMP members and other local partners. In general, anticipated PNAMP products include: (1) development of design, analysis and implementation tools, (2) coordination to integrate actions into planning and implementation of efforts addressing salmon recovery and watershed health in the demonstration area, and (2) summary products characterizing the approaches, tools, guidance, and results from the demonstration project for possible use in other parts of the Pacific Northwest. The master sample design approach has broad applicability to monitoring the

status and trends of habitat and fish attributes along linear stream networks, as well for area-based approaches to address status and trends questions in estuarine and nearshore marine areas.

This work is the result of two years of collaborative interaction with state and federal partners responsible for monitoring in the lower Columbia River ESU. The workgroup produced a progress report ([link below](#)) in 2008 and has recently drafted a 2009 report, intended to inform the PNAMP's interest in developing a strategic action plan (or roadmap) for implementation in the demonstration area and possibly beyond ([link below](#)). The ISTM workgroup has identified two critical elements needed to support this project: development of a web-based master sample (MS) tracking tool and providing analytical support for the MS development and future use of the MS, help integrating existing monitoring with the MS, help integrating non-probabilistic based monitoring with MS-based monitoring, etc. Bonneville Power Administration has contracted with Oregon State University for these tasks. Don Stevens is the lead for this work.

Recent activities include a worksession focused on discussion of area-based application of GRTS-based monitoring designs, including presentation of examples of current use of this design in the San Francisco Bay monitoring program ([link below to worksession docs & presentations](#)). Also, there has been considerable interest in exploration of how this work might intersect and support fish monitoring needs in the Lower Columbia (see item #2 below).

Goal Today: Present background information on ISTM project in general: where are we & how did we get here?

Links:

- 2008 report: PNAMP Integrated Status and Trend Monitoring Project: Overview of Progress ([link](#))
- NEW Overview Document: Integrating Aquatic Ecosystem and Fish Status and Trend Monitoring in the Lower Columbia River: Overview ([link](#))
- 2009 (draft) report: Integrating Aquatic Ecosystem and Fish Status and Trend Monitoring in the Lower Columbia River: Using the Master Sample Concept ([link](#))
- February 19, 2009 ISTM Estuary/mainstem Worksession – notes & presentations ([link](#))
- [Link](#) to background presentation from Jeff Rodgers

Discussion today:

- Want to wrap up reports so they can be shared outside this group
  - Need to wait a bit longer to see what happens and update the habitat piece
- Think about making fish proposal into third piece of the group of papers
- **X Group asked to review overview report (see link above - 2<sup>nd</sup> bullet) and send feedback to Steve Leider by July 28.**

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## **2. Presentation of recent progress on sub-tasks**

- Statistical Support and Web Development for a Web-based Master Sample Management System (Lisa Madsen, OSU)

This project will develop a prototype of a web based master sample management system. This system would allow users to know who else has selected sites from the master sample covering stream networks in their domains; to design individual or integrated monitoring programs; to know how existing sites relate to a common master sample; and to know what is being collected at the site over time. In conjunction with the development and use of the web-based master sample management tool, there is a need for dedicated analytical support for design and utilization of results of the monitoring design based on the master sample. The SOW (see link below) describes the steps to develop the

prototype master sample management tool using the Lower Columbia region as a demonstration area and to provide the necessary statistical support.

### **SPECIFIC INFO FOR CONSIDERATION TODAY**

We are looking for volunteers to assist OSU. It will be necessary to explore with the web developer the various web based systems and options to meet the desired capabilities. A small workgroup will be established to define the details of the prototype. The work group will consist of a statistician, a web developer, and representatives from several federal agencies (e.g., PNAMP, EPA, NOAA) and other interested parties (e.g., ODFW, WA ECY, LCREP). The group will define operational attributes of the master sample management system. As the project develops, continual interaction with the web developer will be necessary to evaluate progress, explore the draft web-based capabilities, and ensure that the project is proceeding in a desired direction.

- Link to Statement of Work from Pisces, reflects 2 year period of work: Statistical Support and Web Development for a Web-based Master Sample Management System for Integrating Aquatic Ecosystem Status and Trend Monitoring ([link](#))
- [Link](#) to presentation from Lisa Madsen

### Discussion today:

- The group identified a small workgroup(s) to provide input during tool development – attributes of points, functionality of site (end user), existing pieces of work that might be informative to this process
  - Steve Rentmeester
  - Bob Cusimano
  - Sean Quigley
  - Phil Larsen
  - Russell Scranton
  - Phil Roger/ Henry Franzoni (need to check with CRITFC)
  - Jeff Rodgers
  - Bernadette Graham Hudson
  - Chris Jordan

- Lisa will send requests for more specific tasks as we move forward - **X Small workgroup will provide input during OSU tool development as requests are sent.**
- OSU will create website with limited functionality by July 15 to modify as discussions with workgroup continue
- How do you deal with modifications? Will need to do adjustments based on site evaluation, etc. Combining data will not be routine to start off with.
- Mapping feature – not highest priority at this point, but idea is to eventually do that.
- Capitalize on existing elements that could be combined with this – ISEMP, WA ECY? Send any appropriate info to Lisa.
- Group was asked to think about things that are outside of current scope that could be funded in the future.
- Incorporate GIS layers – need to decide if they will be part of the database or not

### **Discussion of potential for integration of elements to support fish population monitoring with ISTM project (Dan Rawding, WDFW)**

#### **GENERAL BACKGROUND INFO - DRAFT TEXT FROM THE 2009 OVERVIEW REPORT**

#### **Monitoring Fish Using GRTS-based Designs**

Information on the status and trends of juvenile and adult salmonids and other fish species has historically come from multiple sources using a wide variety of survey design and sampling methods.

A few examples of these methods include total counts at fish migration barriers; direct observations of fish or redds using on-the-ground foot, aerial, or snorkeling surveys; mark-recapture estimates at index sites; trap-based estimates, and inferences from harvest information. These and many other approaches typically originated to meet the requirements of harvest management. The sources are increasingly being adapted to also to meet the informational needs of species recovery (e.g., information on Viable Salmonid Population (VSP) parameters). Each source has different strengths (e.g., feasibility, length of time series) and weaknesses (e.g., unknown estimation errors). Spawner abundance estimates are comprehensively available for some species and much less for others (and including juveniles). Sampling opportunities have often been constrained by feasibility and cost (e.g., leading to convenience-based sampling that may not be representative). Because of the biological differences among fish species and their life histories, and challenges of sampling small population sizes, approaches that are viable for one species may not be practical for another (e.g., different designs and methods are used to determine juvenile and spawner abundance estimates for Chinook vs. chum). Given this complex context, coupled with institutional demands and cost constraints, development and use of overarching design approaches and methods having known statistical properties (e.g., known accuracy, precision and variances, power to detect change), are typically rare.

In contrast, GRTS-based designs that provide estimates of monitored parameters with a stated level of precision were originally developed and applied to the collection of information on the status of fish communities and other biota (Bailey et al. 1998; Larsen et al. 1994; Gallo et al. 2005; Larsen et al. 2007). Subsequently, numerous designs have been developed and implemented for the specific purpose of monitoring juvenile and adult salmon and steelhead populations (e.g., for Oregon Coho as outlined in Appendix B; Nelle et al. 2006; Stevens 2002; Suring et al. 2006). The use of GRTS-based designs for monitoring the status and trends of salmonid populations is growing. With the exception of Oregon however, widespread use of GRTS-based approaches for fish population attributes is still fairly limited in the Pacific Northwest.

The PNAMP ISTM effort began by focusing on watershed health/habitat in linear stream networks. The ISTM is poised to expand this effort to also include tools needed to assess status and trends of fish populations in the Lower Columbia, in coordination with the watershed health/habitat and potential estuary components. The scope and details of this work remain to be developed. Focused attention is needed to clearly delineate the appropriate fish status and trend monitoring questions, species, scales, life history stages, and attributes (e.g., VSP parameters) of interest. Importantly, the ISTM effort will also respond to the need for development of methods for relating or combining data from non-probability monitoring (e.g., index sites) with data from GRTS-based monitoring. Smith (1983) identified the inferential issues involved. Several authors have proposed approaches (Overton et al. 1993; Brus and De Gruijter 2003).

### **SPECIFIC INFO FOR CONSIDERATION TODAY**

Goal Today: Discuss interest and support for development of a task(s) related to fish population monitoring.

#### **Recommendations offered July 2008 from the PNAMP Fish WG leads:**

- 1) Conduct strengths & weakness assessment in Lower Columbia of adult monitoring
- 2) Develop cost effective monitoring designs for implementation
- 3) Use remote sense data & limited sampling to define & monitor species distribution

A bit more detail is offered below as suggestions to start our discussion. Dan Rawding has prepared a strawman proposal to complement the existing ISTM project by identifying tasks specific to fish

population monitoring (based on the items above). This proposed project complements the existing master sampling design by: 1) development of a statistical framework for estimating the sampling frame for all listed salmon and steelhead in the LCR. However it extends the work to address key salmon and steelhead escapement monitoring issues including 2) a review of the current escapement program including providing estimates and variance to be compared with the alternative methods including the GRTS designs, 3) evaluation of accuracy, precision, and cost-effectiveness of different sampling designs which are used to develop specific implementable designs based on agreed upon regional goals and priorities, and 4) a mechanism for the implementation and reporting of monitoring results from these designs. This is proposed as a multiyear project that intended to ultimately lead to a transparent, scientifically credible, and cost-effective escapement monitoring program in the LCR, which can be used as a model for the remainder of the Columbia Basin.

### **1) Conduct strengths & weakness assessment in Lower Columbia of adult monitoring**

Considering that there is uncertainty of the performance of any monitoring approach, and since results can vary by species and locales, we suggest considering implementation of a variety of fish monitoring approaches (i.e. adult surveys, smolt trapping, and juvenile surveys). A broad array of approaches not only can serve as a crosscheck of the veracity of the monitoring, but can help fill in mechanistic blanks as to what is driving the observed abundance and productivity.

- Assessment of the precision and bias of existing monitoring programs compared to the expectations of NOAA guidance or something similar. Could include reporting escapement, origin, age and variances and see how they compare to guidance.
- Also of interest: development of the database infrastructure to feed StreamNet and state databases.

### **2) Develop cost effective monitoring designs for implementation**

-Develop guidance on alternative monitoring designs based on monitoring objectives, funding, and feasibility. Consider trade-offs based on policy input about priority of monitoring primary populations vs. ESU estimate.

-Consider how NCEAS climate change workgroup results may be useful for PNAMP and vice versa.

### **3) Use remote sensing data & limited sampling to define & monitor species distribution**

-Evaluate existing models (& develop new models if needed) to estimate spawning and rearing distribution to describe sampling frame for redd, AUC or other surveys based on determining upper distribution from field work and GIS attributes on gradient, drainage area, valley floor width, etc. using logistic regression or something else.

#### Discussion today:

- Suggestion to take advantage of work that was done in CSMEP – may be able to take advantage of it in the beginning, but there are issues with using it beyond that.
- Prioritization process will be challenging, but we will do it only for the context of this demo project
- Objective 5 will not be fully fleshed out at this point.
- **X Group asked to review fish proposal and send feedback on objectives 1 - 3 to Dan Rawding by July 14.**
- **X Dan Rawding and Jeff Rodgers will formulate budget for objectives 1 – 3 from fish proposal by July 31 in order to start the BPA process to use FY09 funds.**
  - In the beginning of next FY, will start SOW for other elements

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### **3. Next Steps**

Some things are moving along, some need attention, some are just starting out. Bonneville Power Administration has contracted with OSU to develop the prototype master sample management tool. The ISTM 2009 report is nearly complete, pending outcome of today's discussion. We now have a draft proposal to address inclusion of fish monitoring elements yet we have not wrapped up the tributary habitat aspects yet. It is a challenge to be inclusive now and still make progress, despite these different aspects being in different developmental stages.

Goal Today: Identify specific tasks to get to implementation and identify individuals to assist with those tasks and timelines for completion.

Discussion today:

- Next steps:
  - Estuary and LCR mainstem monitoring
    - Interest in this, but will put aside for the moment
    - This group needs to push this effort, help LCREP and USGS along
    - **X Jen will follow up with this aspect**
    - Russell will look at estuary RPAs
  - Develop similar proposal for habitat work (lead entities - ODFW, WDFW, LCFRB, AREMP, WA ECY)
    - Replicate fish proposal process (decisions and questions, sampling frames, review existing programs, trade-off analyses, implementation recommendations), but with respect to habitat
    - Small group to draft proposal (rep from each agency)
      - Bob Cusimano – lead
      - Jeff Rodgers
      - Russell Scranton
      - Steve Lanigan
      - Krik Krueger (note WDFW is only able to review at this point, due to limited time availability)
      - Bernadette Graham Hudson
    - **X Group will develop first draft of proposal for habitat work by end of July**