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PNAMP Integrated Status and Trend Monitoring Project: Overview of Progress

Pacific Northwest Aquatic Monitoring Partnership

Prepared by the PNAMP Integrated Status and Trends Monitoring Workgroup

Executive Summary

The 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 questions on the **status and trends of physical, chemical, and biological attributes** in stream networks. The approach will apply a statewide or region-wide "master sample" concept to the selection of sampling locations. The project will be performed in the bi-state lower Columbia area via a collaborative approach involving Pacific Northwest Aquatic Monitoring Partnership (PNAMP) members and other local partners. Anticipated PNAMP products include: (1) incorporation of ISTM recommendations and actions into planning and implementation efforts addressing salmon recovery and watershed condition in the area, and (2) products characterizing the approaches, guidance, and results from the demonstration project for possible use in other parts of the Pacific Northwest.

To date progress has involved PNAMP workshops and work sessions with local partners to scope and refine the project, to begin to compile information and begin analyses related to use of the master sample concept, consideration of available information and gaps, and identification of implications associated with implementation of the approach.

Background

Each year state and federal government agencies, tribal organizations, and non-governmental organizations in the Pacific Northwest spend millions of dollars monitoring to address various questions about the **status and trends** of natural resources. PNAMP emerged in the early 2000s in response to the increasing need for broadly coordinated monitoring strategies that maximize the efficiency and effectiveness and better leverage ongoing and new efforts and funding.

Typically, status and trend monitoring in streams is rarely integrated among agency efforts, even when the agencies have common interests. A number of factors have contributed to this, including: (1) real or perceived differences in the questions that need to be addressed by the monitoring programs; (2) different jurisdictions or spatial extents; (3) comporting with the legacy of data and investments in past monitoring programs; (4) differing levels of desired scientific rigor; and (5) differing and variable levels of available support and funding.

Although some monitoring questions and needs are unique to particular agencies and organizations, many commonalities exist. One such common need identified by PNAMP that presents considerable opportunities for improvement is a system for the efficient collection of data on the status and trend of fish and the habitat that supports them (PNAMP 2005). This demonstration project is intended to demonstrate an approach for and practical utility of using an integrated design framework for the collection of information on the status and trends of physical, chemical, and biological attributes in stream networks by applying the "master sample" concept for the selection of sampling locations. It will also illustrate how samples can be "densified" to

address questions at smaller scales, and how that information can be "rolled-up" to address similar questions at larger scales.

It is important to note that integrated status and trend monitoring designs for fish and habitat have been developed and implemented in other areas (e.g., Upper Columbia, Oregon Coast). The distinction between those efforts and this project is that the former were not originally developed within the context of an overarching statewide or region-wide "master sample".

Demonstration Area

After considering various options, PNAMP selected the bi-state geographic area in the Lower Columbia River (Figure 1) for the ISTM demonstration project. This complex area is within the jurisdiction of two states (Oregon and Washington) and numerous federal, tribal, watershed council, county, and municipal entities. Individual state and bi-state recovery planning and implementation efforts for four ESA-listed anadromous salmonid species (coho, chum, Chinook, and steelhead) and bull trout occur there; and it faces diverse land use and increasing human population pressures.

Various entities are currently conducting or planning status and trend monitoring in the area, making it an attractive practical opportunity for coordination. For example, in Washington a statewide master sample for status and trend monitoring has been developed (Cusimano et al. 2006) but it has not yet been broadly implemented (but note initial design refinement and implementation work may soon begin in Puget Sound and coastal areas). In contrast, Oregon has developed and implemented status and trend monitoring in some parts of the state, including the Lower Columbia, but not yet in the context of a statewide master sample.

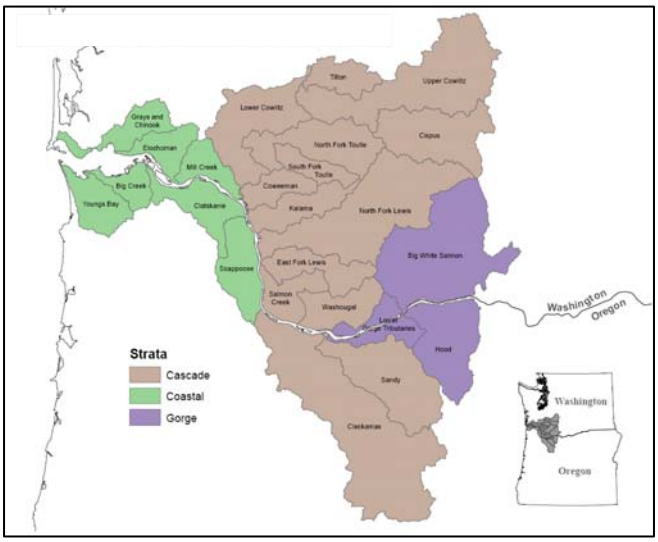

Figure 1. Lower Columbia River demonstration area

In addition, the U.S. Forest Service has been monitoring watershed condition status and trends on federal lands in the area under the Aquatic and Riparian Effectiveness Monitoring Program (AREMP) for over 10-years using a similar but different design approach (Gallo et al. 2005). Collectively, these activities provide an excellent opportunity to learn, explore options for improvement, and demonstrate how a master sample approach can be used to respond to multiple needs.

Approach

A basic assumption is that it is not practical or cost effective to measure all desirable attributes at all locations. However, the same or similar status and trends questions occur within and across various scales (e.g., sub-basins to state-wide and beyond), for targeted fish species and/or for stream physical or chemical habitat attributes. In response, this demonstration will apply the concept of a sample survey by which representative locations will be identified and sampled.

Inferences will then be able to be made to broader area(s) based on data collected at the sample of sites. The preferred technique to be used in this demonstration is to select sites using a Generalized Randomized-Tessellation Stratified (GRTS) design (Stevens and Olsen 2004).

The master sample allows users to select sites easily to meet particular needs in such a way that data sharing meets key design requirements to achieve status and trends monitoring goals. In other words, in using the master sample to identify sites for sampling, the resulting information can be aggregated and effectively integrated with other similarly obtained data to address key status and trends questions.

This project will work in collaboration with organizations that are monitoring or plan to monitor stream networks in the lower Columbia. The project will facilitate site selection processes using the master sample for the area. This project is NOT intended to be a stand-alone monitoring effort. It is intended to assist in the site selection process, identify common indicators, encourage the use of comparable protocols (or cross-walks) for those indicators, and address analytical issues. Data sharing would be encouraged through the use of appropriate data portals (avenues by which an agency could retrieve data from another agency).

Anticipated PNAMP products from the project include: (1) incorporation of ISTM recommendations and guidance into planning and implementation efforts addressing salmon recovery and watershed condition in the demonstration area, and (2) documentation characterizing approaches, guidance, and results from the demonstration project for consideration in other areas.

Progress and Next Steps

To date, PNAMP has sponsored two workshops (September 2006 and February 2007) bringing together persons interested in seeing the general idea of integrated status and trend monitoring move forward. The first workshop proposed a 10-year vision of what an integrated monitoring framework might look like, identified a variety of issues, and proposed development of a pilot/demonstration study to show how the many questions posed during the workshop might be addressed. The second workshop wrestled with how to get from the general idea to a specific demonstration example. An outcome of the second workshop was a decision to proceed with the demonstration project in the Lower Columbia outlined here.

Subsequent to the two workshops, an ISTM demonstration workgroup was formed with participation from organizations that are or are planning to monitor or coordinate status and trends efforts in the lower Columbia. The ISTM group has worked to refine the project scope, compile available information (e.g., AREMP, Oregon, Washington) and begin analyses related to use of the master sample concept, identify gaps and implications associated with master sample implementation (e.g., legacy programs, common indicators, consistent protocols, analyses, data sharing).

Project partners are currently working to identify and resolve parameters of the project, including current monitoring efforts/designs, cost/budget, protocols, needs, and questions, and to develop a hierarchical set of questions to help guide further project development, including project timelines and potential cost considerations. Not all partners will be interested in all questions, but the process will identify commonalities and gaps. Once these common questions and needs have been identified, survey designs and protocols currently used by partners will be explored to identify commonalities or areas where “crosswalks” are possible.

Organization

The PNAMP ISTM workgroup will serve as the core technical body for the project. Participants to date have included Steve Lanigan (AREMP), Phil Larsen (Pacific States Marine Fisheries Commission), Jeff Rodgers and Erin Gilbert (Oregon Department of Fish and Wildlife), Steve Leider (Washington Governor's Salmon Recovery Office), Chris Jordan (Northwest Fisheries Science Center), Russell Scranton (National Marine Fisheries Service), Steve Waste (Northwest Power and Conservation Council), Jeff Breckel, Steve Manlow and Ray Beamesderfer (Lower Columbia Fish Recovery Board), and facilitators Jen Bayer and Jacque Schei (PNAMP).

The larger PNAMP integrated status and trend monitoring advisory group has included a broader range of interested parties (e.g., agencies, organizations, workshop participants). It will provide an outreach mechanism to share development of the concept and obtain feedback on project progress, and implementation implications and concerns.

Additional information on the PNAMP ISTM demonstration project can be obtained from Jen Bayer, PNAMP Coordinator (503.201.4179, jbayer@usgs.gov), or from the PNAMP website (www.pnamp.org).

References

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