PACIFIC NORTHWEST AQUATIC MONITORING PARTNERSHIP

Annual Report for 2010

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Executive Summary

The Pacific Northwest Aquatic Monitoring Partnership (PNAMP) focused on promoting integration of monitoring resources and building tools to support monitoring in 2010. Integration of types of monitoring, of practitioners from a variety of organizations, and of monitoring programs goals and objectives is essential to improving the quality and consistency of monitoring in the region.

PNAMP operates through inter-organizational committees to make progress on a variety of tasks associated with partner needs and PNAMP goals. These committees were largely ad hoc and formed for the specific purpose of working on identified tasks. For each task, the PNAMP coordination staff identified interested Steering Committee (SC) members and subject matter experts to form a leadership team. Leadership teams guided the progress of the tasks. In addition, the teams acted as an intermediate step between the larger group of interested participants and the SC, thus maintaining the concepts of better SC/participant exchange. The PNAMP coordination staff continued to facilitate dialog between experts to move forward with ongoing and new tasks. In addition, the coordination staff continued their efforts to track in kind contributions at meetings, workshops and other PNAMP hosted events.

PNAMP focused on tasks related to these topics in 2010: Data Management, Integrated Status and Trends Monitoring (ISTM) Demonstration Project, Monitoring Methods and Terminology, Effectiveness Monitoring, Coordinated Assessments, and overall development of web resources. PNAMP advanced its coordination goals and objectives for these topics by hosting workshops, work sessions, and meetings. Steering Committee members and technical experts participated in these meetings to exchange information about their own programs, coordinate on existing tasks, and initiate new tasks related to the topics mentioned above, including:

- Supporting overall data management for monitoring,
- planning and co-hosting the first in a series of workshops for coordinating data management and exchange to support improved assessments and reporting in the Columbia River Basin,
- continuing development of a regional data management strategy,
- finalizing a metadata guidance document and work to implement recommendations,
- continuing work to demonstrate a “master sample” based integrated status and trend monitoring project in the Lower Columbia River recovery area,
- redeveloping a monitoring protocol and method library and update of monitoring terminology,
- developing of a community forum to discuss protocol and methods,
- planning and co-hosting a series of work sessions to support coordination of regional effectiveness monitoring programs,
- continuing work to refine the structure of the PNAMP website for better information discovery and delivery, and
- considering additional work related to web tools and resources, such as redevelopment

of the Master Sample prototype tool, development of a tool to support metadata creation, and supporting websites that provide much needed educational guidance about monitoring.

Lastly, in addition to specific tasks, PNAMP continuously strives to emphasize communication as a tool to support collaboration and provides a forum where monitoring practitioners and policy staff can interact and exchange information. PNAMP operates by open, inclusive processes and all meetings and documents are readily accessible to all. PNAMP is in the process of another major update to its website this year and is developing or supporting additional web resources, with the intent that online delivery will allow for easier access to information and better collaboration among participants.

The opportunity provided by the PNAMP forum to allow its partners and participants to collectively focus on issues, results, and future needs related to monitoring increases coordination and collaboration in the near term, and increases effectiveness and efficiency of aquatic resource monitoring on a regional scale in the long term.

Background

Federal, state, tribal, local, and private aquatic monitoring programs in the Pacific Northwest have evolved independently in response to different organizational mandates, jurisdictional needs, issues and questions. Planning and coordination of federal, state and tribal monitoring activities have evolved slowly but steadily over the past ten years. The Pacific Northwest Aquatic Monitoring Partnership (PNAMP) became a formal institution in 2004, charged with providing a forum for coordination of aquatic monitoring efforts in the region. The geographic area of this coordination includes the Pacific Northwest region from Northern California to Canada where participating entities are implementing monitoring efforts. As of 2010, 20 state, tribal, federal, and regional entities signed the PNAMP Charter (Appendix A).

The basis of PNAMP is that monitoring will be improved if: all programs use consistent monitoring approaches and protocols; follow a scientific foundation; support monitoring policy and management objectives; and collect and present information in a manner that can be shared. These goals will require considerable effort and commitment to collaboration by many entities and individuals. PNAMP strives to provide the forum where this collaboration can occur and to facilitate the exchange among technical experts and between technical and policy staff that is necessary to accomplish these goals.

Although we are eager for more participation, we believe PNAMP has a good combination of participants to address these goals. PNAMP's organizational structure includes a Steering Committee, staff to serve as the Coordination Team, and a number of technical working groups that focus on specific projects and tasks. The Steering Committee is composed of representatives from all entities that are signatory to the Charter (link) and technical task leaders, a combination which allows the interface of technical and policy interests. The agency representatives are responsible for communication to PNAMP regarding their respective agencies' work and needs, as well as delivering PNAMP progress and challenges to their agencies. Participants from the technical working groups largely contribute in-kind hours to support PNAMP tasks. In some cases, time is supported by PNAMP funding, usually for a person to serve as a lead for a particular task. PNAMP has found that in some cases it is necessary to secure dedicated time from individuals in order to move forward quickly on tasks.

Over the years, PNAMP has developed a better understanding of how the goals and tasks of each technical working group and individual partners are inherently interdependent. PNAMP has been working on a number of tasks that support the idea of integration, which is important for establishing a regional partnership for aquatic resource monitoring that bridges technical focus areas and individual agencies. There are some core features of all monitoring programs that if well documented and shared, can lead to better integration in the region. These features include monitoring design (including objectives, methods, study design, location, etc.) and data management. In addition, PNAMP has realized that regional monitoring

efforts can be better integrated and coordinated if we document ongoing monitoring and work toward agreement on reporting standards.

All of the concepts can be complex when considering the different mandates driving monitoring and resolution involves collaboration with other regional and national organizations, as well as many individual participants. However, successful coordination and collaboration on these fundamentals could be a first step in the creation of a regional monitoring network.

The PNAMP Steering Committee, Task Leaders and Coordination Team share the responsibility to work across PNAMP to accomplish our goals efficiently and consistently. We encourage those in the region who seek assistance with aquatic resource monitoring issues to contribute to PNAMP. Coordination on complex topics with many partners takes time and hard work. Since PNAMP is a voluntary organization, our progress is directly correlated to participation. Support and open communication are essential for PNAMP to be able to respond to needs of the region; we need to hear from both technical and policy staff what is needed for better coordinated aquatic resource monitoring.


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Coordination Staff Activities

The PNAMP Coordination Staff includes the Coordinator (Jennifer Bayer), Assistant Coordinator (Jacque Schei), and a new role stemming from the original Data Steward role. Coordination Staff are employees of the U.S. Geological Survey, Northwest Area Regional Executive Office.

After departure of the previous Data Steward, PNAMP evaluated the duties of that position and decided that while the skills of a data steward were helpful to the PNAMP team, additional coordination and facilitation skills were necessary for this role. Thus, PNAMP created the Information Management Liaison position and filled it in October of 2010 with the addition of Kathryn Thomas.

The Coordination Staff's goals are to facilitate the transfer of information within PNAMP and across all relevant organizations, work to support relationships between science and monitoring and to promote communication among organizations to help assure that monitoring plans and information are coordinated across the Pacific Northwest. The Coordination Staff works to initiate and facilitate the development, presentation, and distribution of products aimed at heightening understanding of PNAMP issues, successes, and problems and to serve as a clearinghouse for PNAMP activities and products.

The Coordination Staff is responsible for administrative requirements of PNAMP activities (e.g. meeting logistical support,

record keeping, and maintenance of participant information). In addition, the Information Management Liaison chairs the Data Management Leadership Team and is responsible for moving specific data management tasks forward, such as the regional strategy for data management.

Organizational support was provided to PNAMP by developing and negotiating fiscal support with government and non-government entities and managing budgets and associated contracts with those entities. Required progress reporting regarding the Coordination Staff's activities (within PNAMP) and PNAMP activities to interested external parties was completed. PNAMP was represented by the Coordination Staff at several meetings, workshops, and conferences in 2010. In addition, the Coordinator conducted briefings at meetings, for individual agencies, executives, etc. throughout the region as requested regarding PNAMP's activities.

The Coordination Staff continues to seek appropriate outlets for communicating PNAMP's work beyond required progress reporting. In 2010, PNAMP sought expertise from a Cooperative Ecosystem Studies Unit (CESU) to provide technical assistance in support of science delivery and technology transfer to increase the availability of biological and natural resources information at the regional and national level through the development and enhancement of our website (www.pnamp.org). PNAMP signed an agreement with Montana State University - Big Sky Institute (BSI) to fund staff support to evaluate and recommend changes to the current website in order to improve ways of integrating, displaying, and accessing critical information about biological and environmental monitoring and other information for scientific and decision making processes by researchers and managers. In addition, BSI will explore options for connecting with other similar websites to provide a network of information. Ultimately, the working collaboration between PNAMP and BSI will help each organization, their partners, other stakeholders, and the public address a variety of resource issues at multiple scales.

At the end of 2010, the new version of the website was still under development and not public. We anticipate converting to the redeveloped site in early 2011. The University of Washington, Columbia Basin Research Group continues to host the site on a University of Washington (UW) server. PNAMP will revisit the hosting agreement again in 2011 and make changes as necessary.

In addition to the main PNAMP site, the Coordination Staff also managed a site that is currently being developed for the Monitoring Methods Project. The group also discussed and made plans to host additional sites in 2011. Those sites include a new site, to be developed, that will house the Master Sample Tool prototype and be the location for redevelopment (see more in the Workgroup and Subcommittee Activities section below), and the Salmon Monitoring Advisor (SMA) (https://salmonmonitoringadvisor.org/). PNAMP, working in partnership with the State of the Salmon Project, was asked to consider assuming ownership and maintenance of the SMA website. The idea was proposed to the

Steering Committee at the end of 2010. Finally, the Coordination Staff foresees additional web resources for tools yet to be developed, such as a metadata builder. We believe PNAMP is uniquely poised to bring together a number of web-based resources to create a network of information and tools to support many facets of monitoring. In 2010, we began to thoughtfully consider how to integrate our existing resources and plan for the future support of these important collaboration and coordination tools. We expect that better integration between these tools and additional systems in the region will advance in 2011.

Coordination Staff Activities: Organizational Development

PNAMP is a dynamic, growing association of state, federal, and tribal partners, with projects and tasks almost entirely supported by in-kind contributions from these entities' staff. While managing projects in this volunteer-based environment is challenging, the results are very rewarding. One concern is our ability to account for these in-kind contributions from participants. Over the years, the Coordination Staff has tried various ways to track in-kind contributions. We have found it to be relatively easy to track meeting hours and assign in-kind contributions based on attendance at PNAMP meetings and an estimate of meeting prep or driving time (Table 1, 2). The Coordination Staff has attempted to track time participants spent working on PNAMP tasks outside of meetings, but this is a very challenging task because it requires input directly from participants. It has been difficult to get a comprehensive tally for the year from participants and task leads. Requests have been made to participants asking them to track hours spent on PNAMP activities during the year; however, relatively few participants actually do. Since we were not able to come up with an accurate assessment of these hours in 2010, we are not reporting any estimates here. The Coordination Staff plans to continue requesting in-kind estimates from participants in 2011, with the anticipation that participants will gradually become accustomed to tracking and reporting their own time.

Table 1. Estimated hours contributed by entities to PNAMP meetings. Hours were assigned to each meeting attendee for every PNAMP meeting from January 1 to December 31, 2010. Meeting times were assigned at time and a half to account for travel and prep times. For example, if a meeting lasted 6 hours, participants were assigned 9 hours. Teleconference times were counted as recorded. In These estimates assign the full meeting time to each meeting attendee, regardless of if they attended the whole meeting or not. Note: Contractors/consultants were assigned to the funding agency where possible (noted in entity name). The rest of the contractors/consultants were grouped as one entity.

Entity	Total Hours	Hours for Steering Committee Only
Bonneville Power Administration and contractors	432.50	122.25
Burns Paiute Tribe	15.75	

Columbia Basin Fish & Wildlife Authority	82.00	66.25
Colville Confederated Tribes	26.25	
Columbia River Inter-Tribal Fish Commission	130.50	45.00
Confederated Tribes of the Umatilla Indian Reservation	45.00	
Confederated Tribes of the Warm Springs	42.00	
Consultants (grouped)	291.75	
Ecotrust	26.25	
Environmental Protection Agency	36.25	9.00
Fish Passage Center	42.00	
Governor's Salmon Recovery Office (WA)	104.25	
Idaho Department of Fish & Game	61.50	
Independent Scientific Review Panel	15.75	
Lower Columbia River Estuary Partnership	17.25	
Lower Columbia River Fish Recovery Board	120.00	
National Environmental Information Exchange Network	9.00	
Nez Perce Tribe	131.25	
NOAA Fisheries	161.25	62.25
Northwest Habitat Institute	17.50	
Northwest Power and Conservation Council	112.00	79.75
North Fork John Day Watershed Council	22.50	
Oregon Department of Environmental Quality	38.25	
Oregon Department of Fish & Wildlife	261.25	
Oregon State University	15.75	
Oregon Watershed Enhancement Board	30.00	10.50
Pacific States Marine Fisheries Commission	132.25	58.00
Puget Sound Partnership	9.00	
Shoshone-Bannock Tribes of Fort Hall	15.75	
Snake River Salmon Recovery Board	1.50	
University of Alaska (Alaska Sea Grant)	17.25	
University of Idaho	15.75	
University of Washington	31.50	
U.S. Army Corps of Engineers	50.25	39.75
U.S. Bureau of Reclamation	134.25	61.50
U.S. Forest Service	18.00	
U.S. Geological Survey	122.25	45.75
Upper Columbia Salmon Recovery Board	50.25	
Washington Department of Ecology	100.75	38.50
Washington Department of Fish & Wildlife	239.25	58.50

Washington Recreation and Conservation Office	54.75	54.75
Yakama Nation	56.25	
Yakima Basin Fish & Wildlife Recovery Board	21.00	

Table 2. Estimated hours contributed by topical category to PNAMP meetings. Hours were assigned to each meeting attendee for every PNAMP meeting from January 1 to December 31, 2010. Meeting times were assigned at time and a half to account for travel time and prep times for the meeting. For example, if a meeting lasted 6 hours, participants were assigned 9 hours for that meeting. This was only done for on-site meetings. Teleconference times were counted as recorded. In addition, these estimates assign the full meeting time to each meeting attendee, regardless of if they attended the whole meeting or not.

Topical Category	Total Hours
Data Management Topics (Leadership Team, Coordinated Assessments, Metadata)	1597.00
Monitoring Methods	84.00
Integrated Status and Trends Monitoring Demonstration Project	892.75
Project Effectiveness Monitoring	859.25
Steering Committee	299.25

Workgroup and Subcommittee Activities

Traditionally, there have been a number of technical workgroups (WGs) and subcommittees in PNAMP that would meet on a regular basis to exchange information and/or work on tasks. PNAMP has maintained these workgroups for a number of years, but has seen many tasks that apply to multiple workgroups. For a few years now, PNAMP started to move away from the typical WG meeting structure to a more task driven meeting approach, allowing for better information distribution among participants in cases where a topic/theme cuts across multiple WGs. PNAMP continued this trend in 2010 and feels this is the way we should continue in the future. Regularly scheduled WG meetings are no longer planned so that we can make the best use of everyone's time. Using a task focused meeting structure, PNAMP is able to gather interested Steering Committee (SC) members and technical experts to form a leadership team. This leadership team guides the progress of the task and acts as an intermediate step between the larger workgroup and the SC. We have found that this structure allows better SC/workgroup exchange without asking every SC member to track every activity. It also maintains the concept of garnering support from a larger forum of technical experts that are able to contribute to an open, inclusive process if they choose. We see relatively few technical experts actively engage in work tasks. The idea here is to more clearly recognize the smaller working group while maintaining the notion of a larger forum around them so we

don't give the impression that participation is limited in any way.

In addition, PNAMP has found that it is important to have a dedicated task lead for all tasks, whether it is someone from the Coordination Team, a SC member, or subject matter experts that participate in PNAMP. In the absence of a lead that can dedicate time to moving things along, PNAMP has found that final products are significantly delayed, much to the frustration of interested parties. In cases where no lead has been identified, PNAMP has begun distributing funds, as the budget allows, supporting time for a lead, in order to secure dedicated time from that person.

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PNAMP meetings and work sessions in 2010 focused on tasks related to these main topics: Data Management, Integrated Status and Trends Monitoring Demonstration Project, Monitoring Design, Effectiveness Monitoring, and web tools. Several smaller working groups comprised of SC members and technical experts met regularly to work on specific tasks related to these main topics. Further details about tasks related to these topics can be found below. Other topics or tasks mentioned in previous PNAMP annual reports are still being tracked and accounted for, but largely did not make much progress in 2010. These topics and tasks, and plans for the future, are described briefly at the end of this section.

Data Management

In recent years, there has been significant attention on advancing data management in the region. PNAMP has recognized the importance of data management to regional monitoring activities and the highly technical nature of data management discussions. To facilitate dialog between PNAMP technical workgroups, regional information management groups, and regional application development teams, PNAMP continues to support a member of the Coordination Team to help guide and move these tasks along. In 2010, a new role was developed to replace the Data Steward. The PNAMP Information Management Liaison is responsible for support to specific projects; coordinating and facilitating meetings related to regional data management efforts; providing recommendations to the PNAMP Coordinator and Steering Committee on regional data management issues, tools, and procedures; communicating with monitoring practitioners to identify needs; and communicating user requirements to development teams. (PNAMP Data Management webpage)

PNAMP Data Management Leadership Team

Many groups throughout the region are discussing and working on data management and it has been difficult for PNAMP Steering Committee members and PNAMP Partners to stay informed on details of these discussions and activities. PNAMP formed the Data

Management Leadership Team (DMLT) to discuss and initiate data management tasks specific to PNAMP's needs. The DMLT met five times in 2010. Meetings were infrequent after the Data Steward resigned in the spring and didn't pick up until the new Information Management Liaison came on board in the fall. Focus of these meetings was related to tasks described below in addition to other regional data management issues. The Data Steward initiated a draft regional data management implementation roadmap which the Information Management Liaison will continue in 2011. The protocol library task has been passed to a new lead (described in a subsequent section in this report). The DMLT will continue to meet on a regular basis in 2011 to address regional data management needs.

Regional Metadata Guidance

Metadata are descriptors of the content, quality, condition, and other characteristics of data. Most commonly, metadata are used to enhance searching and discovery of data sets and to facilitate understanding of the meaning and proper use of datasets. For organizations that collect data, metadata help enhance the quality, usability and value of data for internal and external users. Organizations should view metadata creation as integral to their workflow and metadata as integral to datasets.

To facilitate better metadata documentation in the region, PNAMP's Metadata Working Group (WG) coordinated with Environmental Data Services in 2009, to write a regional guidance document on metadata standards for ecological data. The guidance document received final approval from the PNAMP Steering Committee in early 2010 (link to final report).

In late 2010, PNAMP again contracted with Environmental Data Services to work with the Metadata WG to scope requirements for one or more of the implementation recommendations identified in the guidance document. The group met once before the end of the year to review recommendations from the guidance document, evaluate several approaches for improving implementation, and evaluate potential software tools to support metadata creation and distribution. Based on the results of the evaluation, the group will meet as needed in 2011 to develop one or more requirements documents for developing software to support metadata creation.
PNAMP Metadata webpage

Regional Data Management Strategy

Before departing, the Data Steward served as lead and editor for a task to draft a document about regional coordination of data management needs for monitoring. This effort was based previous efforts, benefiting the recent Columbia River Fish and Wildlife Program efforts to coordinate anadromous fish monitoring, which recognized that data management coordination is an essential element of improving monitoring. PNAMP and the Columbia Basin Fish & Wildlife Authority (CBFWA) were identified in that forum to assist with developing a regional data management strategy. The Information Management Liaison was assigned this task in late 2010 and will continue developing the document with CBFWA and others in 2011.

Coordinated Assessments Project & Workshop

As described in the Columbia River Basin Anadromous Salmonid Monitoring Strategy (ASMS), the Federal Columbia River Power System (FCRPS) Action Agencies and fishery co-managers have agreed to the monitoring necessary monitoring to provide data to answer key management questions related to Viable Salmonid Population (VSP) parameters and began the discussion for key habitat and hatchery effectiveness assessments. Performing these assessments and reporting answers to these management questions on an ongoing basis is needed to support 1) federal reporting for the Federal Power System Biological Opinion (BiOp), 2) federal recovery group reporting for the Endangered Species Act (ESA), 3) state agency mandated reporting, and 4) tribe Accord reporting needs.

In 2010, PNAMP and CBFWA initiated a collaborative effort to gather co-managers and other key agencies within the sub-regions of the ASMS to develop assessment and data sharing strategies for meeting regional reporting requirements (link to work plan). The effort was also intended to identify gaps in data management and sharing capacities currently limiting the efficiency and effectiveness of data reporting, and establish strategies to close these gaps**.** PNAMP contracted with Ross & Associates to provide facilitation expertise during this effort in collaboration with the support of the PNAMP Information Management Liaison. A Coordinated Assessments planning team was convened to guide the implementation of the project.

During 2010, efforts to identify and obtain priority datasets in the Lower Columbia region were led by Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife (WDFW). These efforts were initially funded by Bonneville Power Administration (BPA) to support PNAMP's Integrated Status and Trends Monitoring Demo Project, but because the tasks support and align with the Coordinated Assessments goals, the results may be used in this project as well. Please see the Integrated Status and Trend Monitoring Demonstration Project, Data Management subsection below for details about progress on this task. In addition, PNAMP's Monitoring Methods project will be used to support methods documentation in the Coordinated Assessments effort.

In October 2010, PNAMP and CBFWA hosted a workshop to present the Phase I efforts of the project and to initiate efforts for Phase II of the project. These efforts included the development of a draft data exchange template through the efforts of PNAMP partners, Ross and Associates, and sub-contractors Tetra Tech. The draft data exchange template (DET), which supports data reporting for three high-level Viable Salmonid Population (VSP) indicators for salmon and steelhead populations, had been reviewed prior to the workshop by a number of PNAMP partner biologists. The VSP indicators of focus in Phase I were natural spawner abundance, adult to adult return rate (later modified to recruit per spawner ratio in phase II of the project), and smolt to adult return ratio.

Phase II of the Coordinated Assessments effort was initiated after the workshop. Phase II consists of extended efforts to refine the DET,

develop data analysis flow diagrams, and assess the data management gaps, needs and priorities of the state agencies and tribes participating in the effort. The DET was revised based on feedback from Phase I review and additional comments provided during and after the workshop. At the end of the year, ten technicians were being hired to work with each of the 11 state and tribal locations where biologists are situated. Working with the CA planning team, the technicians will facilitate collection of information to further refine the DET, develop data analysis flow diagrams, and begin the assessment of data management business needs to accomplish coordinated assessments.

The planning team will continue to meet in 2011 to guide the Phase II efforts, develop the next workshop agenda and materials, tentatively scheduled for April 2011, and structure the final report which will make recommendations for implementing these coordinated assessments for the Columbia Basin. Coordinated Assessments webpage


USFS

Integrated Status and Trends Monitoring Demonstration Project

The Integrated Status and Trends Monitoring Demonstration Project (ISTM demo project) has been developed over the past several years with collaborative effort involving PNAMP partners and other local partners in the Lower Columbia River (LCR). The ISTM demo 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.

After many discussions to scope and refine the project, the group decided to conduct a demonstration project in the LCR recovery area. The ISTM demo project will provide entities tasked with monitoring fish populations and aquatic habitat in the Pacific Northwest with a roadmap for integration of scientifically sound monitoring programs intended to meet the needs of decision-makers and managers. Specifically, it will apply this approach and develop recommendations for integrated monitoring plans (based on monitoring conducted by the Oregon Department of Fish and Wildlife (ODFW), the U.S. Forest Service (USFS), NOAA Fisheries (NOAA), the Lower Columbia Fish Recovery Board (LCFRB), the Washington Department of Fish and Wildlife (WDFW), and the Washington Department of Ecology (WDOE)) for salmon, steelhead, and potentially bull trout populations listed under the Endangered Species Act (ESA), and their habitats in the LCR.

Among the many monitoring components, key features of this effort are improved understanding of the extent and qualities of existing information, key gaps, and how a region-wide "master sample" concept can be applied to select sampling locations where appropriate. Generic objectives in the ISTM demo project for both habitat and fish are:

1. Identify and prioritize management decisions, questions, and objectives.
2. Evaluate the extent to which existing programs align with these management decisions, questions, and objectives.
3. Identify the most appropriate monitoring design(s) to inform priority management decisions, questions, and objectives.
4. Use trade-off analysis to develop specific recommendations for monitoring based on outcomes of objectives 1-3.
5. Recommend implementation and reporting mechanisms.

Development of the ISTM project has been facilitated by the PNAMP Coordination Team as part of PNAMP activities in conjunction with other PNAMP tasks in order to fully capitalize on partners' in-kind contributions of staff time. In-kind contributions have largely been the primary mechanism to advance this work to date, but in 2010, several specific tasks were awarded funding by Bonneville Power Administration (BPA) in order to complete the work in the absence of a technical lead.

Progress on the project has been broken out into sections and detailed below. Each component is in a different state of maturity, but the Coordination Team facilitated progress to ensure that all were linked as necessary to benefit the project as a whole. ISTM webpage

Overview of Project Progress

To date, the ISTM workgroup has held several workshops and drafted several progress reports. This project has been reviewed and critiqued by the PNAMP Steering Committee throughout its history and has benefited from input of many technical experts around the region as well as past and ongoing monitoring projects. In 2010, PNAMP submitted a proposal to BPA's Research, Monitoring, and Evaluation Categorical Review for funding for fiscal years (FY) 2012-2014. The proposal outlined the history and background of the ISTM demo project, progress through 2010, and anticipated tasks for FY2012-2014. Submission of the proposal resulted in a review of all components of the project with by the ISRP (Independent Scientific Review Panel). The final ISRP rating in December 2010, was that the project 'meets scientific review criteria' and the proposal was then submitted to the Northwest Power and Conservation Council for funding review.

Oregon State University (OSU) Master Sample Tracking Tool

(Task leads: Don Stevens, Clif Johnson, Lisa Madsen, Phil Larsen)

The purpose of this component is to develop a prototype master sample management tool using the LCR region and to provide the necessary statistical support for the development. The management tool will be a web-based master sample tracking and management system to support sample selection from the population domain. The

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 what they are collecting at the site over time. In conjunction with the development and use of the web-based master sample management tool a need is anticipated for dedicated analytical support for design and utilization of results of the monitoring design based on master sample. This need was identified in the proposal that was submitted.

Bonneville Power Administration funded the development of the tool in July of 2009. At the end of 2010, a prototype was completed by OSU, along with a draft user guide. The tool currently has the capability to select sites based on county, salmon recovery region, United States Geological Survey (USGS) hydrologic code, or WRIA (Water Resource Inventory Area). Preliminary search results then can be further refined by imposing additional criteria, e.g., owner type. In addition, an interface to the R language has been developed to select a sample of specified size from the subset of sites that meet screening criteria, create panels if desired, and provide stratification and variable probability options. A preliminary interface to the analysis tools was implemented and reviewed/tested by the advisory workgroup. In addition, the WDFW working with OSU used the prototype to develop a generalized random tessellation stratified (GRTS) sampling design to estimate adult Coho salmon abundance in the fall of 2010.

Based on user feedback, PNAMP plans to use the prototype tool as a base to develop a more robust tool that encompasses master samples for the whole region and address the remaining concerns over the statistical and analysis tools. The plan is to start this work in 2011 and have redevelopment complete by 2012, depending on availability of funding.

Fish Monitoring Component
(Task leads: Dan Rawding, Jeff Rodgers, Bernadette Graham Hudson)

The specific goal of the fish sub-workgroup of the ISTM project is to develop a coordinated Viable Salmonid Population (VSP) monitoring program that addresses key regional (priority) monitoring questions and develops study designs of sufficient quality and quantity to determine status and trend of LCR salmon and steelhead. This will provide entities tasked with monitoring salmon and steelhead populations in the Pacific Northwest with a roadmap of the steps needed to develop an integrated, scientifically sound monitoring program that meets the needs of regional decision-makers and managers. The intent is to apply this approach to develop a specific monitoring plan for ESA listed salmon and steelhead populations in the LCR, concentrating on the monitoring of VSP parameters. It is anticipated that this project will ultimately lead to a transparent, scientifically credible, and cost-effective fish monitoring program in the LCR, which can be used as a model for the remainder of the Columbia Basin.

In 2010, staff from ODFW, WDFW, and the LCFRB led an effort to host a series of

workshops with monitoring program managers, ISTM participants, and the Joint Salmon Science Team (JSST) to prioritize fish monitoring needs. Task leads used the information gathered at the workshops to identify and prioritize management decisions, questions, and objectives for integrated status and trend monitoring of salmon and steelhead populations in the LCR planning domain. In addition, work related to the Data Management component of ISTM supported this task (see the Data Management Section below for more details). Details of this work that completed Objective 1 for the fish component can be found in the final report (link to Objective 1 report).

WDFW has initiated work on a spawning distribution model for Chinook, coho, and chum salmon along with steelhead (Objective 3). Draft Chinook and coho distribution models have been completed. The Chinook model was used by NOAA to assess Tule fall Chinook recovery actions in 2010 and the coho model was used by WDFW to develop the sampling frame needed for the adult coho salmon GRST sampling described above. The remainder of the tasks indentified in Objectives 2-5 are planned to be completed in 2011.

Data Management Component

Both ODFW and WDFW were funded in 2010 to complete data management tasks to support ISTM. These tasks also support the Coordinated Assessments effort, described above in the Data Management Workgroup section.

Since ODFW and WDFW are primary conductors of status and trends monitoring of salmon and steelhead in LCR, it is critical for them to catalog, manage and share monitoring data in order to support ESA status determinations and to evaluate the response of fish populations to the implementation of the 2008 FCRPS Biological Opinion. The ISTM data management effort has a goal to support Objective 2 of the fish monitoring component by pursuing completion of the data management development steps for one of the three Viable Salmonid Population (VSP) parameters - adult abundance. The data management development steps are:

1. Finalize and prioritize existing monitoring data
2. Create data analysis flow diagrams (DAFD) and develop metadata for each existing priority data collection effort
3. Obtain priority monitoring data
4. Develop standards for terminology (a data dictionary), and
5. Develop systems to capture existing priority data

During this reporting period, ODFW has identified 286 inventory records from 31 individual datasets, and distributed the inventory for review to determine if it is complete. Of the 31 datasets, 18 are in hand

representing 127 inventory records, and contacts have been made to acquire the data from most of the remaining data collectors. An "inventory" level metadata format has been developed and is close to being finalized. This format will be useful in populating the Coordinated Assessments' Data Exchange Templates as well as inform the efforts of the PNAMP Metadata Workgroup. Seventeen draft flow analysis diagrams have been created. Finalization of flow diagrams has been slowed by efforts to coordinate and align with the needs of the Coordinated Assessments effort. Talks with other data stewards in the region, as well as coordinating with other efforts desiring terminology standardization also occurred.

Based on the completion of ISTM Objective 1, WDWF has finalized the priority monitoring data to be collected and have identified four internal and two external databases needed for the storage of this monitoring data (data management objective 1). The external databases are the PIT Tag Information System (PTAGIS) and the Regional Information Mark System (RMIS). These are both regional databases that provide tagging and recovery data for PIT and CWT tags, respectively. These tagging databases updated by WDFW and queries for tagging analyses for harvest, distribution, timing, and other analysis needed by managers.

The internal databases developed by WDFW are the spawning ground survey (SGS), the age and scales database (A&S), and the juvenile migrant (JMX) databases; these have data dictionaries and a design for the storage system to capture this essential monitoring data (data management objectives 4 and 5). The SGS stores spatial/temporal adult salmon and steelhead data such as fish, carcass, and redd counts by reach and date, along with survey conditions. Data from SGS such as peak counts, and periodic redd or fish counts are used to estimate abundance using count expansion factors, redd, or Area-Under-the Curve (AUC) surveys. Historically, all salmon surveys were recorded on stream survey cards, and WDFW has entered surveys from the 1940's through 2009 into SGS. The primary task completed with ISTM funding has been the entering of steelhead redd surveys from 1994 to 2009 into SGS, which consist of many thousands of records. A component of SGS is a redd location section, which stores redd location (GPS coordinates) and redd status (visible or not visible). Redd locations for steelhead in all LCR streams from 2007-10 have been entered and Chinook salmon in the EF Lewis and Coweeman where redd location are recorded have also been entered. Many thousands of GPS locations for redds are now entered in SGS.

The A&S database consists of biological data (scales, age, length, and sex,) collected from spawning ground surveys and hatchery returns. The chum salmon database is complete from the first entry in 1981 to 2009. The Chinook salmon database is complete from 1990 to 2009. Many thousands of records have been added to the A&S database. There is limited coho salmon and steelhead data, which are collected mostly at adult traps or through mark-recapture programs. Our approach with these other species has been to standardize trap and mark-recapture data in flat file then move into individual trap databases such as Kalama,

Toutle, Wind, and Cedar. Adult trap and mark-recapture data need to be integrated into an existing A&S or SGS databases or a new database needs to be developed for this data type.

The JMX is a work in progress, with the completion schedule slipping to late 2011. The purpose of this database is to store juvenile outmigrant trapping data used to make "smolt" estimates. A data diagram, data dictionary, and access JMX template have been developed and meetings with a contractor are underway to complete the database. Washington initiated smolt trapping in the LCR in 1995. Data from 14 sites were stored on flat files (Excel spreadsheets). Different project leaders had different formats and there was format and code creep. In anticipation of the completion of the JMX format, flat files and databases for each project are being standardized.

Standardization of the monitoring data and storage has facilitated the development of DAFD for major monitoring programs for chum, steelhead, and Chinook salmon (data management objective 2). Completion of the data management steps, detailed above, has improved our ability to complete DETs, which document the measurements, metrics, and analysis to estimate the abuhndance of natural spawner, spawner to spawner recruitment, and spawner to smolt ratio indicators for the Coordinated Data Assessments project in the LCR.

Tributary Habitat Monitoring Component
(Task leads: Jeff Rodgers, Bernadette Graham Hudson)

In response to ESA listings for salmon and steelhead, federal and state agencies, local governments, private industry, and the tribes have invested substantial resources to restore and protect the ecological function of rivers and streams in the Pacific Northwest. One of the important salmon recovery needs is the ability to describe, with known certainty, the current status and long-term trends of the habitat conditions (physical, chemical, and biological conditions) of these aquatic resources. The goal of this component is to develop a coordinated habitat monitoring program for the Lower Columbia River ESU (Evolutionarily Significant Unit) that meets these information needs and ultimately answers the question: "Are the primary habitat factors limiting the viability of the salmon and steelhead populations and ESU increasing, decreasing, or stable?"

In 2010, the tributary habitat monitoring working group began working on the tasks outlined in the original proposal to complete the ISTM objectives. BPA provided support via a technical contractor to coordinate the group and move this effort forward. The group determined that in order to complete Objective 1 (priorities), they would need to complete Objective 2 first (review existing programs). To that end, they created a conceptual framework with clearly defined terminology for organizing the information gathering components of a monitoring program in order to compare existing programs. After identifying the framework, a database was developed to store the information for habitat monitoring programs. At the end of 2010, the group was still in the process of gathering information about the five

existing or proposed monitoring programs in the LCR. Once all information is input in the database, the group will complete Objectives 1 and 2 and use the results to complete the remaining three objectives in 2011.

Estuary Component

Similar to what is proposed for tributary habitat in the LCR, the inclusion of a component to demonstrate what is needed to implement an integrated monitoring program for estuaries and non-wadeable streams and rivers would be beneficial. Co-locating this work in the area proposed for the ISTM demo has advantages; similar to what has been described in this report for tributary streams. There are multiple jurisdictions that could be involved and multiple existing monitoring efforts that could be integrated. There have also been efforts to standardize sampling protocols and preliminary efforts to develop a master sample for the lower Columbia River and estuary.

Although there has been some interest in including estuary monitoring needs in the ISTM demo project process, there has not been resolution among entities conducting monitoring in the Columbia River estuary to participate in the PNAMP ISTM demo project. There is interest by the USGS to align and integrate the master sample they have created for the mainstem Columbia and Snake Rivers with the PNAMP master sample tracking tool. This will provide the opportunity for PNAMP to consider how the master sample tracking tool can support integration of monitoring results from linear-based master samples (tributaries) with area-based master sample (non-wadeable rivers).

Monitoring Methods and Glossary

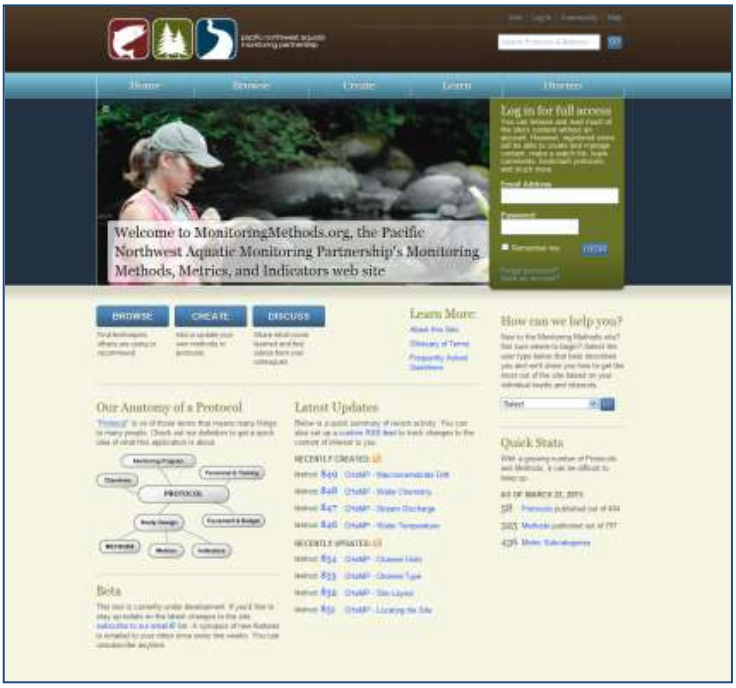
In an effort to move forward with promoting standards development and improved business practice around documentation, PNAMP proposed to redevelop the Protocol Library tool in 2010, with a higher-level data model than was originally implemented. A prototype of the Protocol Library administrative application, built in late 2009/early 2010 successfully demonstrated the value of a central repository of protocols and methods. However, widespread use of the tool was limited by three main factors: 1) lack of existing documented methods 2) lack of incentives for regional scientists and practitioners to start documenting and sharing their methods; 3) insufficient technical framework and tools for managing and sharing methods. The redevelopment proposal focused on the third factor.

In mid-2010, PNAMP began the process of contracting for redevelopment of the application and Sitka Technology Group was awarded a contract for the work. In addition to the original intent of providing a web-based resource where monitoring practitioners can find a catalog of methods, protocols, and definitions of terminology that is important to them, the plan for redevelopment also included a second task to develop an online community forum to promote information exchange and collaboration between regional monitoring practitioners about methods and other topics of interest to this community. State of the Salmon and PNAMP submitted a joint proposal to the Gordon and Betty Moore Foundation to develop a more dynamic and useful version of the Salmonid Field Protocols Handbook (SFPH) using modern internet technology, and

centered around a community of monitoring practitioners in the Pacific Northwest and beyond. Development and review of the SFPH yielded noteworthy advancement of existing methods, yet there is a need for additional review of these topics along with the addition of new ones including habitat survey methods. However, the time needed to organize reviewers and the prohibitive costs of publishing are significant delays to on-the-ground adoption. SoS and PNAMP proposed and were awarded funds to build an online forum that is better suited for managing dynamic content: a user friendly web-based tool that reflects the unique environs driving the formulation, testing, and endorsement of techniques.

A first step in the redevelopment was to combine the Protocol Library and Monitoring Terminology Glossary into a single site - which is now known as MonitoringMethods.org. This site was initially created by building off information from the existing Protocol Library database in order to support method and metric documentation for the Northwest Power and Conservation Council's science review process. Ultimately, it was to BPA's Research, Monitoring, & Evaluation Categorical Review proposal cycle.

Throughout the remainder of the year, we met with the project Leadership Team on a regular basis to get their feedback on each stage of the development. In addition, we wanted to gather information from the team as to how they imagined using such a tool and discuss the potential for organizations to connect to this information to populate their project tracking systems. By the end of 2010, Sitka had developed a fully functional web application that provides key features and functionalities for different users to read, review, add, edit or manage information on salmonid and aquatic monitoring Methods, Protocols, Study Designs, Metrics, and Indicators. A glossary of terms used throughout the site and a list of metrics/indicators and their definitions had also been developed. A few of the features and user tasks that we identified during the redevelopment process were not been incorporated in the site immediately. These are features intended to make the tool more robust, but development will be limited based on available funding. Sitka also started development on the Community Forum. Basic discussion feature were up and running and we had started gathering feedback from users before the end of the year. We will continue development in 2001 and expect that the tool will be a critical piece in BPA's project tracking process.



Project Effectiveness Monitoring

In 2010, the PNAMP Effectiveness Monitoring Workgroup renewed its chartered, strategic efforts to coordinate regional effectiveness monitoring programs. The original task was to inventory and evaluate effectiveness monitoring studies in the region in order to gather information on completed and currently active effectiveness monitoring studies, as well as those under development. The collection and subsequent evaluation of this information would allow for the development of a coordinated effectiveness monitoring network at a regional scale, facilitate potential integration of effectiveness monitoring with status and trend monitoring, and allow creation of tools to facilitate the evaluation of research and monitoring design and methods.

The goals of the renewed 2010 effort were to:

1. integrate and align existing and new monitoring efforts,
2. provide better, more scientifically robust data for use in management decisions, and
3. improve cost efficiency in the implementation of monitoring programs.

The impetus for this renewed effort was that there were several drivers in the Pacific Northwest region that were coinciding to promote opportunities for alignment of monitoring programs that measure the relationships between habitat actions, habitat conditions and fish response, including:

- Bonneville Power Administration (BPA)/Northwest Power and Conservation Council (NPCC) Categorical Review for Research, Monitoring and Evaluation (RM&E) Projects – June 2010
- NOAA ESA Monitoring Guidance Update – May to June 2010
- Washington Forum requirement to adopt protocols for high-level indicators – June 2010

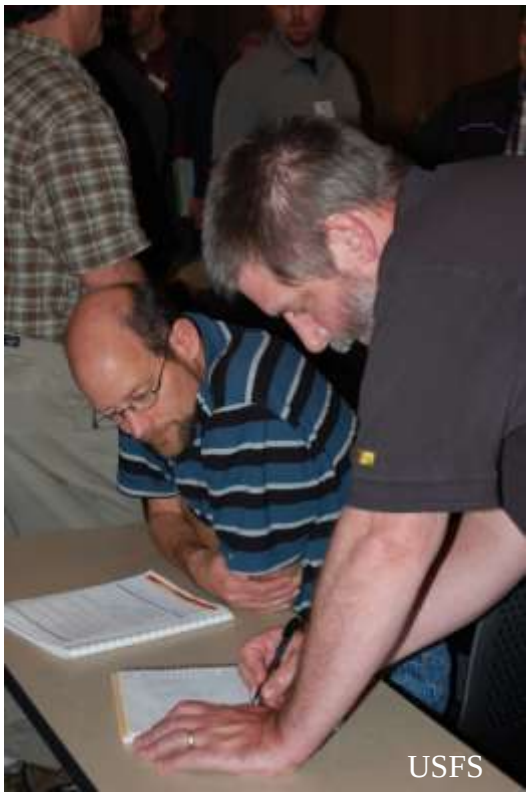
As a first step in the pathway towards achieving objectives, the workgroup planned a series of work sessions to communicate the current state of effectiveness monitoring, map out where we need to go, and how to get there. The Washington Forum on Monitoring, BPA, and PNAMP hosted three multi-agency, multi-state, work sessions to identify, prioritize, and gain concurrence on environmental monitoring needed to evaluate the effectiveness of salmon habitat restoration projects in the Columbia Basin and elsewhere across the Pacific Northwest.

The work sessions started with a broad assessment of current and emerging efforts, discussion of information quality and gaps, followed by more detailed work on protocols/metrics and coordination of data. The inventory and gap assessment tasks were detailed two separate reports (link to inventory report; link to analysis preliminary results report). An effectiveness monitoring strategy document and a quality assessment rating scale were also drafted and under review at the end of 2010. The intent is to finalize the strategy document and move forward in 2011 with next steps identified at the work sessions.

Other PNAMP Tasks/Topics

As mentioned above, other topics or tasks mentioned in previous PNAMP annual reports

are still being tracked and accounted for, but did not make substantial progress in 2010. We will provide an update on those tasks as they are addressed.



Steering Committee Activities

The PNAMP Steering Committee (SC) provides the science-policy interface between the Executive partners and technical workgroups, guides work of technical workgroups, obtains resources needed to accomplish tasks, and directs the activities of the Coordinator. The SC provides assistance to PNAMP initiatives by participating in the formulation, development, and review of recommendations for activities of PNAMP workgroups and integrating these activities with agency activities. The SC facilitates the transfer of information between PNAMP and their respective agencies. By promoting communication among organizations, the SC strives to assure that monitoring plans and information are coordinated across the Pacific Northwest.

The SC met three times in 2010 for regular meetings. It was concluded in early 2010 that monthly meetings seemed to be too frequent and too much time for the group to commit to each month, so we moved to a quarterly schedule, with meeting times being dependent on group availability. The primary activity at these meetings was tracking the progress of current activities and discussion of new tasks that align with PNAMP's goals. These meetings also facilitated information exchange between SC members and technical task leads. The PNAMP Coordination Team facilitated meetings and prepared notes following the meetings. The SC also continued to discuss priorities for current and new tasks appropriate to advance to BPA for funding. Tasks under discussion include ISTM demo project tasks and data management tasks.

Appendices

Appendix A. Entities signatory to the PNAMP Charter as of December 2010.

PNAMP Partners	PNAMP Steering Committee Rep	PNAMP Executive Network Representative
Bonneville Power Administration	Jim Geiselman	Greg Delwiche VP Environment, Fish and Wildlife
California Department of Fish and Game	Scott Downie	Gary Stacey Northern Regional Manager
Columbia Basin Fish and Wildlife Authority	Tom Iverson	Robert Walton Chair
Columbia River Intertribal Fish Commission	Phil Roger	Paul Lumley Executive Director
Confederated Tribes of the Colville Reservation	John Arterburn	Joe Peone Director, Fish and Wildlife Department
Environmental Protection Agency	Gretchen Hayslip	Michelle Pirzadeh Acting Regional Administrator
NOAA Fisheries	Scott Rumsey	Barry Thom Acting Regional Administrator
Northwest Indian Fisheries Commission	Bruce Jones	Mike Grayum Executive Director
Northwest Power and Conservation Council	Nancy Leonard	Tony Grover Director of Fish and Wildlife Division
Oregon Watershed Enhancement Board	Greg Sieglitz	Tom Byler Executive Director
Pacific States Marine Fisheries Commission	Bruce Schmidt	Randy Fisher Executive Director
U.S. Army Corps of Engineers	David Clugston	Steven R. Miles, P.E. Colonel, U.S. Army Commander and Division Engineer
U.S. Bureau of Land Management	Al Doelker	Edward W. Shepard State Director, Oregon/Washington
U.S. Bureau of Reclamation	Michael Newsom	J. William McDonald Regional Director
U.S. Forest Service	Linda Ulmer	Mary Wagner Regional Forester PNW Region
U.S. Geological Survey	Steve Waste	Leslie Dierauf Northwest Area Executive
Washington Department of Ecology	Bob Cusimano	Josh Baldi Environmental Assessment Program Manager
Washington Department of Fish and Wildlife	Erik Neatherlin	Phil Anderson Director
Washington Governor's Salmon Recovery Office	Ken Dzinbal	Kaleen Cottingham Director, WA RCO
Washington Recreation and Conservation Office	Ken Dzinbal	Kaleen Cottingham Director

Appendix B. List of documents referenced in this report and associated hyperlinks.

Page 3:

- PNAMP Charter http://www.pnamp.org/node/21

Page 9:

- PNAMP Data Management webpage http://www.pnamp.org/datamgt

Page 10:

- PNAMP Regional Metadata Guidance Report http://www.pnamp.org/sites/default/files/PNAMP%202010-001_MetadataGuidance.pdf
- PNAMP Metadata webpage http://www.pnamp.org/metadata

Page 11:

- Columbia River Basin Anadromous Salmonid Monitoring Strategy http://www.cbfwa.org/ams/
- Coordinated Assessments Work Plan http://www.pnamp.org/node/3033

Page 12:

- Coordinated Assessments webpage http://www.pnamp.org/ISTM

Page 13:

- ISTM webpage http://www.pnamp.org/CoordAssessments

Page 15:

- PNAMP ISTM Demo Project - Fish Component Final Report for Objective 1 http://www.pnamp.org/sites/default/files/PNAMP2010-004_ISTM%20Fish%20Obj1_0.pdf

Page 20:

- Effectiveness Monitoring Inventory Report http://www.pnamp.org/sites/default/files/InventorySummaryFinal04192010NoWM.pdf
- Effectiveness Monitoring Gap Analysis Report http://www.pnamp.org/sites/default/files/Inventory%20Analysis052710_0.pdf