

**Supplemental Information for Research, Monitoring and Evaluation Proposals for the
FY 07-09 Fish and Wildlife Program Project Solicitation Process
12/2/05**

This document provides supplemental information to sponsors of Research, Monitoring and Evaluation (RM&E) projects for the FY 07-09 project solicitation process for the Columbia Basin Fish and Wildlife Program, as referenced in the parent document “Additional Information and Responses to FAQ’s For FY07-09 Solicitation Participants.” This guidance is intended to help facilitate both the development of proposals and the selection of projects for implementation. It presents a general framework, consistent with regional RM&E coordination efforts, to provide a standard structure to assist the organization, development and prioritization of proposals. Through this framework, key management information that is needed for the successful achievement of the objectives of the Fish and Wildlife Program and the Endangered Species Act are identified to help focus proposals on areas of greatest need. This guidance is also intended to contribute to regional coordination efforts developing standardized, programmatic approaches to RM&E that will allow development of comparable data, better networking and sharing of information across all regional RM&E programs of the federal, state, and tribal entities. Similarly, the guidance is intended to assist prospective sponsors in coordinating with ongoing activities, achieving economies-of-scale and reducing and/or eliminating duplicate efforts.

BPA is requesting proposal sponsors to help advance the regional coordination of monitoring efforts, to facilitate the efficient organization, sequencing, and selection of projects, and to advance cost sharing agreements that are needed to meet shared regional RM&E needs and responsibilities. Towards these objectives, project sponsors are requested to:

- Develop their proposals to fit within the general framework for RM&E projects that is described here in.
- Use or plan to use standard monitoring design, sampling and data management protocols that have been identified or will be identified over the next year in ongoing coordination processes.
- Identify and pursue cost sharing support for projects that target RM&E needs that are shared by regional federal, state, and tribal agencies.

A General Framework for RM&E

The following framework for RM&E is consistent with regional coordination efforts, plans, guidance, and strategies that have been developed and continue to be advanced through the Northwest Power Planning Research Plan, Federal Biological Opinions and Salmon Recovery Planning, the Pacific Northwest Aquatic Monitoring Partnership (PNAMP), the Northwest Environmental Data-Network, and the Independent Scientific Review Panel. *Project proposals should be developed to fit within this basic framework.* This framework consists of:

1. Standard definitions of the primary types of RM&E projects.

2. Management questions and the information needs supporting these management questions.
3. Identification of regional agency-level primary and secondary funding responsibilities for information needs that should be considered for cost sharing and project prioritization.
4. A matrix structure that organizes the management questions and information needs by the type of monitoring or research, the habitat management area of emphasis, and the categories of agencies with shared regional responsibilities for the information.

Standard Definitions of the Types of RM&E Projects

The following definitions of types of research, monitoring and evaluation are consistent with ongoing RM&E planning and coordination processes and will be used within the PISCES database structure for submittal of proposals and subsequent management of selected projects:

1. Fish/Wildlife Population and/or Environmental Status and Trend Monitoring – census or statistically designed monitoring of fish or wildlife population and/or environmental conditions (i.e. watershed conditions) to assess the current status or change (trend) over time. This is sometimes referred to as an observational study (ISRP, 2005). These monitoring data may also be used to correlate fish performance with environmental conditions.
 - Ecosystem/Landscape level, broad-scale, periodic monitoring (referred to as Tier 1 Monitoring)
 - Geographically localized, frequent monitoring (referred to as Tier 2 Monitoring)
2. Action Effectiveness Research – research to determine the effects of an action or suite of actions on fish survival, productivity and/or habitat conditions (referred to as Tier 3 monitoring). This is a manipulative experiment that statistically assesses the effect of a treatment (action) condition relative to a control or reference condition. Action effectiveness research can be performed for a localized effect (project or stream reach level effect) or for a watershed level effect (intensively monitored effect). Localized (project level) effects most commonly identify changes in habitat conditions associated with the action, while fish or biological responses may require a watershed level (intensively monitored approach) to capture a broader area in which a biological response is expressed.
3. Uncertainties Research – research to resolve scientific uncertainties regarding the relationships between fish or wildlife health, population performance (abundance, survival, productivity, distribution, diversity), habitat conditions, life history and/or genetic conditions (e.g., the existence and causes of delayed mortality, hatchery spawner reproductive success relative to wild populations, etc.). This is a manipulative experiment where variables are manipulated to infer or demonstrate cause and effect relationships using statistical-designed hypothesis testing. Uncertainties research does not include experimental research and monitoring specifically targeting the effect of a

mitigation or restoration action (this is Action Effectiveness Research). It also does not include monitoring (observational studies) of fish or habitat conditions with inferences from statistical correlation assessments (this is Status and Trend Monitoring).

4. **Project Implementation and Compliance Monitoring** – monitoring the execution and outcomes of projects. This type of monitoring does not require environmental response data directly linking restoration actions to physical, chemical, or biological responses.
 - *Project Implementation* monitoring determines whether projects were carried out as planned, through documentation of the type and location of management action, and whether the action was implemented properly or complies with established standards. This is generally carried out as an administrative review and does not require any parameter measurements beyond those specified by the project design requirements. It is usually a low-cost monitoring activity that should be included for all mitigation activities.
 - *Project Compliance* monitoring determines whether specified project criteria are being met, through a post-project auditing of project performance. This type of monitoring would typically not be carried out by the project sponsor, and may require the development of independent, compliance monitoring projects. A limited, statistical-designed sample of projects could be monitored annually for compliance.

The first three types of RM&E (Status, Effectiveness, and Uncertainties) plus Project Compliance monitoring are considered RM&E projects that should be separated and independent from on-the-ground mitigation projects. Project Implementation monitoring is considered part of the project being implemented and should not be separated from on-the-ground work.

Management Questions, Information Needs and Agency Responsibilities

Research and monitoring should be designed to generate the information needed to answer key management questions that are essential to meeting program level objectives track overall plan progress, and inform an adaptive management process. The Program needs RM&E projects that help provide the information and analyses to key management questions that underlie our objectives for implementing the Program and ensuring ESA compliance. Because these high-level management questions reflect regional impacts and concerns, they are not solely, or even primarily, BPA's responsibility to implement. The following high level management questions provide a basis for the needs and priorities of F&W Program RM&E.

1. ***Are we meeting biological and programmatic performance objectives established within the Columbia Basin Fish and Wildlife Program, FCRPS BiOp and ESA Recovery Plans?***
2. ***Where objectives are not being met, what factors are limiting our ability to achieve performance standards or objectives?***
3. ***What mitigation actions are most effective at addressing these limiting factors?***

While some biological and programmatic performance objectives have yet to be finalized or may be in transition at this time, the metrics needed to answer these questions have been identified and should form the basis of regional Status Monitoring (Tier 1 and 2) and Action Effectiveness (Tier 3) information needs. Many of these information needs overlap with objectives, management questions and agency level mandates of other regional federal, state and tribal entities. From these high-level management questions, several more focused or subordinate questions and supporting information needs can be identified and fit within the regional monitoring framework. Additional, more specific RM&E questions, information needs, and shared agency level responsibilities are identified below.

A Matrix Structure for Identifying and Organizing RM&E Needs

The RM&E framework components for Status and Trend Monitoring and for Action Effectiveness and Uncertainties Research can be communicated through a matrix structure that organizes the management questions and information needs by the type of monitoring or research, the management area of emphasis (i.e., Tributary Habitat, Hydrosystem, Hatchery, etc.), and the categories of agencies with shared regional responsibilities for the information. The general template for this matrix is identified in the following table:

Table 1: Template for RME Framework Structure

RM&E Framework Components <i>(organized by habitat management area)</i>	Management Questions	Information Needs	Cost Sharing Agencies
Tributary Habitat RM&E			
<i>Tributary Status and Trend Monitoring</i>			
<i>Tributary Action Effectiveness Research</i>			
<i>Tributary Uncertainties Research</i>			
Hydrosystem RM&E			
<i>Hydrosystem Status and Trend Monitoring</i>			
<i>Hydrosystem Action Effectiveness Research</i>			
<i>Hydrosystem Uncertainties Research</i>			
Estuary RM&E			
<i>Estuary Status and Trend Monitoring</i>			
<i>Estuary Action Effectiveness Research</i>			
<i>Estuary Uncertainties Research</i>			
Harvest RM&E			
<i>Harvest Status and Trend Monitoring</i>			
<i>Harvest Action Effectiveness Research</i>			
<i>Harvest Uncertainties Research</i>			
Hatchery RM&E			
<i>Hatchery Status and Trend Monitoring</i>			
<i>Hatchery Action Effectiveness Research</i>			
<i>Hatchery Uncertainties Research</i>			
Predator RM&E			
<i>Predator Status and Trend Monitoring</i>			
<i>Predator Action Effectiveness Research</i>			
<i>Predator Uncertainties Research</i>			
Wildlife RM&E			
<i>Wildlife Status and Trend Monitoring</i>			

<i>Wildlife Action Effectiveness Research</i>			
<i>Wildlife Uncertainties Research</i>			

Using this general structure, a draft matrix of RM&E Management Questions, Information Needs, and Cost Sharing Agencies is provided as Appendix A to this document. This matrix identifies priority management questions and information needs, along with agencies having primary and secondary responsibilities for this information, to inform the solicitation of RM&E projects. Additional work on the elements of this matrix will be coordinated with regional entities over the next couple of months to further inform the proposal comment and selection process. Proposal sponsors should identify which type of RM&E, management question and information needs their proposed project will address. If their proposal addresses a management question and information need that is not currently within the matrix, they should provide the information that would be needed to fill in a separate row of the matrix, along with a justification for why this management question and RM&E should be considered for prioritization and selection. They should also address cost sharing plans or opportunities relative to agencies sharing responsibility for this RM&E need.

Most of the management questions and information needs identified in this matrix are taken from or are consistent with those identified within the Federal RM&E Plan for the 2000 FCRPS BiOp (September, 2003) and the more recent Updated Proposed Action (UPA) for the 2004 FCRPS BiOp (November 2004, pages 88-103), the 2005-2007 Implementation Plan for the UPA (May 2005, pages 39-63), the Council’s Draft Research Plan (November 2005), and the PNAMP coordination efforts. Additional information on research and monitoring priorities may be obtained through these references. The most specific information regarding ESA BiOp priorities is identified in the IP. It should be noted that the Federal RM&E Plan is being updated over the next year to include identification of federal fish recovery planning needs for RM&E as well as potential changes due to the ongoing litigation process for the NOAA FCRPS BiOp.

Steps for the Solicitation and Selection of RM&E Projects

The completion of the following key steps is intended to effectively allocate limited Fish and Wildlife Program funding to implement needed RM&E in concert with other regional RM&E programs with common objectives.

1. Identify the suite of management questions that need answered to effectively meet the objectives of the Fish and Wildlife Program.
2. Identify RM&E needed to address these management questions.
3. Solicit project proposals to meet these RM&E needs.
4. Obtain ISRP review of project proposals.
5. Complete an inventory of what, where, when, and who for existing regional RM&E projects and programs to assess current coverage, areas where coordination is needed, and cost sharing opportunities across existing federal, state, and tribal agency programs. (Note: This inventory is expected to be completed during the ISRP review of proposals)

6. Overlay F&W Program solicitation proposals with the inventory of existing RM&E programs.
7. Develop project selection criteria.
8. Use the regional inventory of existing and proposed RM&E projects, management information needs and priority criteria to perform a gap and prioritization assessment.
9. Identify cost sharing opportunities and responsibilities of other regional entities.
10. Allocate funding to high priority projects and gaps within allocated funding levels.
11. Develop targeted requests for proposals to fill remaining high priority gaps.

Steps 1 – 3 are currently in process.

Standard Sampling Designs and Protocols for Tributary Habitat Monitoring

RM&E across multiple geographic and temporal scales requires standardized approaches and programmatic, long-term commitments and interconnections for effectively combining information and answering program management questions.

The objectives and management questions of the Fish and Wildlife Program overlap with those of other regional state, federal and tribal agencies. The costs of the monitoring and research needed to adequately address these common management questions are more than BPA or any one program can afford to cover alone. Only through the combined efforts of multiple entities can an adequate level of information be developed to guide these regionally shared resource management decisions. Only through coordinated, standardized and programmatic approaches to monitoring can this information be combined across multiple agencies and monitoring programs.

This coordination is the purpose and vision of the recently chartered Pacific Northwest Aquatic Monitoring Partnership (PNAMP) and the Northwest Environmental Data-Network (NED). As members of these coordination groups, the Council and BPA are working to implement the Fish and Wildlife Program within a regional network of monitoring programs so that the shared monitoring needs and objectives of the program can be achieved and data can be managed in more consistent and standardized ways.

Through the solicitation, recommendation, and funding processes, the Council and BPA intend to prioritize and implement standard RM&E protocols. These protocols will cover monitoring designs, sampling, and data management. These protocols form the foundation that will enable coordinated and integrated monitoring and assessment programs across the Pacific Northwest.

Currently recommendations on standard protocols for fish population and watershed condition monitoring, a universal status monitoring design template, and a standard data dictionary for documenting data collection protocols and meta data are being developed through PNAMP and the RM&E pilot projects. Most of the standards are expected to be available for use in FY 07

projects and sponsors should therefore plan to comply with these protocols and standard data formats to the greatest extent practicable as they become available. One standard that is currently endorsed by PNAMP is the use of EMAP-GRTS (Generalized Random –Tessellation Stratified) design (see Stevens and Olsen 2004) for fish population and/or environmental status monitoring projects where statistical sampling is used in place of census monitoring.

Several F&W Program pilot studies in the Upper Columbia, John Day, Upper Salmon and Columbia Estuary are testing status and trend monitoring, and action effectiveness research approaches. These pilot projects are in various stages of development and implementation at this time. The CBFWA Collaborative Systemwide Monitoring and Evaluation Project (CSMEP) is also evaluating and developing standard design approaches for status and trend monitoring, and action effectiveness research. Results from the RM&E Pilot Projects and CSMEP will help inform the standardization of key monitoring attributes and appropriate design approaches. This information should provide additional support for fish and habitat monitoring projects over the coming months and during the FY07 to FY09 project selection process.

Until further support is provided from the products of PNAMP, the Pilot Projects, and CSMEP, it is recommended that sponsors use several existing documents to help standardize status and trend monitoring and action effectiveness research projects. More detailed information on designing monitoring projects can be found in the following publications:

- The Upper Columbia Monitoring Strategy (Hillman, 2003)
- Monitoring stream and watershed restoration (Roni, 2005)
- Spatially balanced sampling of natural resources (Stevens and Olsen, 2004)
- Field sampling protocols for effectiveness monitoring of habitat restoration and acquisition projects (Crawford, 2004 Draft)

Proposals with RM&E Work Elements

To facilitate a more coordinated and programmatic development of the RM&E framework and consistency in the evaluation and selection of projects, it is recommended (but not a process requirement) that project sponsors develop Status and Trend Monitoring, Action Effectiveness Research, Uncertainty Research and Compliance Monitoring as separate projects from on-the-ground mitigation work. Proposals that do not have these RME components separated as stand alone projects will still have RM&E work elements of the proposal evaluated separately for our development of comments to the Council and for project funding decisions. Project Implementation monitoring will continue to be combined and reviewed with their associated projects. The Council staff proposes to use a threshold of five percent of the project costs as a standard for most types of project level implementation monitoring. Proposals with implementation monitoring costs in excess of 5% should provide detailed explanation of why they need more than the threshold amount.

Resources Relied Upon

Several RM&E planning documents support this guidance document. The source documents include:

1. Implementation Plan for the FCRPS UPA (pages 39-63) – *Action Agencies May 2005*

2. Updated Proposed Action for the FCRPS Biological Opinion Remand (pages 88-103) - *Action Agencies November 2004*
3. Research, Monitoring, and Evaluation (RME) Plan for the NOAA Fisheries 2000 Federal Columbia River Power System (FCRPS) Biological Opinion - *Action Agencies and NOAA September 2003Draft*
4. Monitoring Strategy for the Upper Columbia Basin – *Hillman 2003 for the UC RTT*
5. Plan for Research, Monitoring and Evaluation of Salmon in the Columbia River Estuary – *PNNL, COE, BPA, NOAA August 2004*
6. Monitoring Section of ISRP’s Retrospective Report – *NPCC 2005*
7. Draft Research Plan for the Columbia River Basin – *NPCC 2005*
8. Strategy for Coordinating Monitoring of Aquatic Environments in the Pacific Northwest – *PNAMP 2005*
9. Conservation of Columbia Basin Fish; Final Basinwide Salmon Recovery Strategy - *Federal Caucus 2000*
10. Proposed Design and Evaluation of Preliminary Design Templates – *CSMEP 2004*
11. Scope of Work for Implementation of the Northwest Environmental Data Network Project - *Northwest Environmental Data Network 2005*
12. Crawford, B. A. 2004. Field sampling protocols for effectiveness monitoring of habitat restoration and acquisition projects. Draft Report. Washington Salmon Recovery Funding Board, Olympia, WA.
13. Roni, P., editor. 2005. Monitoring stream and watershed restoration. American Fisheries Society, Bethesda, Maryland.
14. Stevens, D. L., Jr. and A. R. Olsen. 2004. Spatially balanced sampling of natural resources. *Journal of the American Statistical Association* 99:262-278.
15. USFWS 2002 Biological Opinion: Effects to Listed Species from Operation of Federal Columbia River Power System
16. USFWS 2002 Bull Trout Recovery Plan
17. USFWS 1999 Recovery Plan for the White Sturgeon: Kootenai River Population
18. Scientific Applications International Corporation. Recommendations for A Comprehensive and Cooperative Columbia River Information Management System. May 2003 Submitted to the NPCC.