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February 23, 2012

MEMORANDUM

TO: Fish and Wildlife Committee

FROM: Nancy Leonard, Fish, Wildlife and Ecosystem Monitoring & Evaluation Manager

SUBJECT: Discussion of MERR draft framework language

The 2009 Fish and Wildlife Program (Program) focus is on performance, with a continued emphasis on periodic scientific review of new and ongoing actions. The Program also stresses reporting of results and accountability, adaptive management and quantitative objectives. Finally the Program calls for periodic and systematic exchanges of science and policy information and expanding the monitoring and evaluation framework with a commitment to use the information to make better decisions and report frequently on Program progress

Staff prepared a draft monitoring and evaluation framework in March 2010 which also described the syntheses and reports that would support assessing Program progress and adaptive management, including, high level indicators. This draft monitoring, evaluation, research and reporting plan ([draft MERR Plan](#)) was based on Program needs and the ongoing work of many others in the Columbia River Basin. Public comments were requested and received that generally supported the framework of the draft MERR Plan and provided good insight on how to strengthen the next version. The second and third versions of the draft MERR Plan were released in July 2010 and November 2010, along with a description of how 'placeholder' sections would be addressed in a systematic manner based on comments received.

The latest version is entitled Draft Monitoring, Evaluation, Research, Reporting and Data Access Framework (draft Framework) and differs in format by being a more succinct guidance document. The draft Framework represents a substantial step forward as the Council prepares to amend the Fish and Wildlife Program in 2013. This iteration provides draft policy level guidance to the region. Many of the placeholders from the November 2010 have been filled in, specifically the guidance related to prioritization and the reporting needs for Program implementation and evaluating progress. The remaining November 2010 placeholders, pertaining to biological objectives and the Council's research plan, will be addressed later in 2012.

Following the direction in the Program, the current draft Framework emphasizes the need to more strongly develop the evaluation and reporting components of the Program. The draft Framework also stresses the importance to have the appropriate data management and access as this information will inform on Program progress and facilitate its adaptive management. Assessing Program action effects and effectiveness is stressed.

Two parallel efforts described in the draft Framework concerning [high level indicators](#) (HLIs) and the research monitoring and evaluation (RME) [implementation strategies](#) are progressing. The HLIs have been in-development since 2008. Three HLIs were adopted by the Council in October 2009. A draft web-based HLI report has been developed and it will be presented at the March 2012 Fish and Wildlife Committee meeting. Furthermore, some of the fish and wildlife agencies and tribes have developed draft RME implementation strategies which aim to provide a clear description of ongoing RME, including its coordination, identification of gaps, and links to the Council's draft management questions and high level indicators.

The draft Framework components and concepts will be made available for review by the fish and wildlife agencies and tribes and interested others between now and the beginning of the 2014 Fish and Wildlife Program amendment process. The intention is to consider these concepts and components for inclusion in the 2014 Program, as envisioned in the 2009 Program. The proposed staff draft Monitoring, Evaluation, Research, Reporting and Data Access Framework is attached to this memo

Staff is seeking support from the Fish and Wildlife Committee to post the attached version of the draft Framework on the Council's website and to solicit public comment.

DRAFT BASINWIDE MONITORING, RESEARCH, EVALUATION, REPORTING AND DATA ACCESS FRAMEWORK

A. Primary Strategies¹

- 1) This Program is primarily habitat-based, depending on actions in the basin intended to protect or improve habitat characteristics as the means to achieve Program goals. The Program also relies on artificial production as a key tool. It is therefore critical that the effectiveness of habitat actions for improving habitat and population characteristics, as well as the effects and effectiveness of artificial production, are evaluated at the appropriate and efficient scale.
- 2) The Program has not focused as much on evaluation and reporting, especially at the sub-regional and regional scale, however, it is critical for the Program's progress to learn from the implementation of evaluation and reporting by incorporating this information into an adaptive management process. Thus, it is critical that data collected through the Program be evaluated and reported in a timely manner to inform decisions, Program amendments and implementation, assessing and communicating on Program priorities, and reporting needs and overall progress.

B. Evaluation, Reporting and Data Access

Evaluation and reporting on data collected at a broad scale synthesis, such as basin-wide or Program-level, has not been a strong Program focus in past years. Strengthening this focus will increase the data's usefulness to the Program. It is equally important to ensure that this valuable data resource receives the attention needed for its proper management to ensure its integrity and to maximize its impact by facilitating sharing. Guidance that is more detailed is provided below for properly managing data, and for effectively contributing to Program progress assessments and Program implementation improvements.

1) Evaluation

i. Specific Strategy

All monitoring and research conducted through the Program must clearly outline the details for evaluating data at the appropriate scale. To ensure the evaluation contributes to a Program priority and adequately informs on Program progress, it must be clearly stated how these findings will be made available in an efficient and timely manner to effectively inform the Council needs, including reporting needs and adaptive management process.

ii. Guiding Principles

Program funded research and monitoring information will be evaluated at the relevant scale to inform on Program priorities and progress, and to facilitate adaptive management.

¹Based on draft MERR Plan (version November 2011), Council RME-AP Review Category Decision memo, and 2009 Program;

When feasible, federal, state, and tribal agencies gathering monitoring and research information should collaborate to facilitate broad scale evaluation of their combined data.

Data collected through the Program should contribute to as many of the reporting forums described below when feasible.

2) Reporting

i. *Specific Strategy*

Information derived from monitoring and research activities must be provided at the appropriate scale of synthesis, in an easily accessible and understandable format, to inform the Council, the ISRP, and the region.

ii. *Guiding Principles*

The Program emphasizes the need for improving reporting that synthesizes data in a manner that contributes to understanding Program progress and informing the Program's adaptive management and implementation.

To address this need, the Program identifies four groups of synthesis, (a) through (d), that occur at various scales to inform the Council on emerging information, Program implementation, Program progress, and on the effect and effectiveness of Program actions. These four groups include reports already being produced by the ISRP and project sponsors, encouraging a broader application of project sponsor initiated symposia, formalizing reports requested by the Council since 2009, and new reports that will synthesize information needed at a regional and sub-regional scale to assess the Program.

- (a) Reports Summarizing Best Available Knowledge and Technology for the Program
Science-Policy Exchanges (Exchanges) inform Council decisions by providing an opportunity for Council members to receive transparent and technically sound evaluations of emerging science. These Exchanges also serve to communicate persistent needs, summarize recent research and monitoring findings, and to engage the region in discussions about implications for policy decisions. A diversity of formats may be used including symposia, workshops, panel discussions, and ISAB presentations. The Council will request Exchanges as needed. As appropriate, Council staff will synthesize information from these Exchanges into policy statements for Council consideration.

A Report on the Status of Monitoring and Research Tools and Methods will be requested as needed by Council to be produced by the ISAB and ISRP. This report will consist of a review of current and emerging tools and methods and evaluation of how these can be used to improve monitoring and research implemented under the Program. The Council will collaborate with the region and managers to define these reviews.

- (b) Reporting on Program Implementation

Monitoring and Research Strategies and Synthesis (Strategies) provide a basinwide context for how Program funded research and monitoring activities fit together and are coordinated with non-Program funded activities. These Strategies are a comprehensive description of current research and monitoring approaches for the basin's fish, wildlife

and habitat. Examples are the 2010 regional Anadromous Salmonid Monitoring Strategy and the comprehensive white sturgeon synthesis report. These will be updated as needed to remain current, or as requested by the Council, and will complement existing subbasin plans and implementation work. These Strategies are produced cooperatively by project sponsors and federal, state and tribal agencies for given fish, wildlife, habitat, and geographic areas. Guidance for developing these Strategies includes Program management questions, indicators, biological objectives, and guidance for research and monitoring. Council staff will facilitate the process to develop these Strategies with project sponsors and managers as needed.

Annual Progress Reports are submitted annually by monitoring and research project sponsors electronically to Bonneville, adhering to the Council's and Bonneville's report guidelines. Annual reports should contain information that states clear objectives, describes scientific methods and statistical analyses, summarizes accomplishments of projects overtime including any results and interim findings, states the main conclusions, describes the benefits to fish and wildlife, identifies milestones and end dates, and provides a link to any publications resulting from the work. For research projects, sponsors also will clearly state past and current sets of hypotheses tested and related findings, and identify how they link to critical research uncertainties in the Research Plan. Research project sponsors will also compile and report to Bonneville all relevant information and results within six months of completing a significant phase of a research project or at any time Bonneville requests. The Council will work with the ISRP and Bonneville to update periodically project reporting metrics, protocols, and templates to enhance the accessibility and usefulness of annual and final reports produced by project sponsors.

The ISRP's *Project Review* and *Program Retrospectives* reports are produced on a regular basis. Description of these reports is provided in Section VIII Implementation Provisions of the Program. *Program Retrospective* reports should leverage the information from Project Sponsor's *Annual Progress Reports* and focus their assessments on a subset of critical Program elements each year. The Council will work with Bonneville and the ISRP to identify the information needed to produce this critical element assessment. An explanation of how this information can be obtained from *Annual Progress Reports* will be made. Alternative means for obtaining this information will be evaluated, including whether the information required would best be obtained by a Council requested synthesis that would be produced through collaborative efforts among individual project sponsors, sub-regional projects, or a regional project.

(c) Reporting on Program Progress

Symposia are an important element of the Program's regional coordination. These symposia will occur approximately every 2 years. They provide a forum for interactive learning exchanges among sponsors working in the same subbasin(s) or on the same fish, wildlife, habitat, and actions. These also serve to inform the ISRP and Council by providing regular progress updates. The Council will develop guidelines to ensure issues of interest are adequately and comprehensively covered. *Symposia* will be convened by sponsors, or by Bonneville and the Council.

Provincial Status Reports are to be produced for each ecological province², with a different province reporting each year by building upon the information compiled from past Symposia, described above, and by organizing a provincial level symposium with proceedings being used for the *Provincial Status Report*. These reports are an important element of the Program's regional coordination, and serve to inform Program progress by describing the status and trends of a Province's limiting factors, focal fish and wildlife, and their habitat at a scale larger than the subbasin level. The Council will work with federal, state, and tribal agencies in the province and the independent science panels to refine this reporting process.

A *High level Indicators (HLI)*³ report will be produced at least every 2 years by the Council to convey and track the current status of Program implementation, assess progress in achieving Program vision, and to depict the status and trends of the Basin's fish, wildlife, and habitat to Congress, governors, and the public. The Council will use, as relevant, the information provided by all reports described in this section in addition to other available information to inform the HLI report, as well as working with Bonneville to ensure HLI and supporting Fish and Wildlife Program Indicators are compiled and reported as needed. The HLI's and associated Program management questions are dynamic and will evolve with Council reporting needs, ISAB guidance, and available information.

(d) Reporting on Effectiveness and Effects of Program Actions

Report on the Effectiveness and Effects of Actions will be produced every 2 years by Bonneville on a rotating subset of actions. This report to the Council will assess the status of evidence for the effectiveness of each action-category⁴ implemented under the Program in altering physical habitat characteristics, as well as evaluating whether a category of action or a suite of different actions result in life-stage, life-cycle, or watershed changes. This will be conducted either through a synthesis of published literature, synthesis of existing project findings, by conducting retrospective effectiveness monitoring of implemented actions, findings from an independent project tasked with this purpose, or a combination of the above. One or more category of actions may be addressed per report. The Council may seek science review and may recommend changes in effectiveness monitoring efforts for an action based on the preponderance of evidence criterion, described below in the Monitoring Section.

3) Data Access

i. *Specific Strategy*

Monitoring and research data are an important underlying component for ensuring Program progress. Proper data management and effective data sharing, in an agreed-upon

² By combining the Columbia Gorge and Estuary Provinces, the entire Columbia River Basin will be reported upon each decade.

³ The Council adopted two lists of indicators, High Level Indicators and Fish and Wildlife Program Indicators, during October 2009. Available <http://www.nwcouncil.org/fw/program/hli/Default.htm> (January 2010).

⁴ Action-category refers to groups of identical actions implemented under the Program, such as hatchery releases, riparian plantings, invasive species removal, and in-stream large wood-debris additions.

format, is necessary to inform decisions and to improve the Program and its implementation.

ii. *Guiding Principles*

The Program is funded by public funds, requiring that all data and information be made easily accessible to the public in a timely manner, in an electronic format, and containing all relevant supporting material. If complex analysis is required to make the data usable, then the methodologies applied must be documented and made publically available.

The Program requires that data be managed following best data management practices that are clearly documented, and encourages electronically sharing information among those who can contribute to providing broad-scale results for Program assessment, such as Program HLI's and biological objectives, and for answering broad-scale management questions such as status of fish, wildlife, and habitat. To ensure appropriate data management and to facilitate sharing, the Program requires:

- Documentation of protocols – For outside data users to assess if or how datasets are compatible for combination, protocols used in collecting and analyzing the data need to be described and associated with the dataset.
- Application of data management best practices and standards — To ensure data integrity, project proponents must describe data management best practices and standards they are following, from field data entry to populating databases and archiving. These are evolving within the region, thus, project sponsors should consult data professionals, such as data coordinators and stewards, and engage in regional forums addressing these needs.
- Use of a data coordinator and steward — the Program promotes the use of a data coordinator and data stewards who will ensure data and metadata persistence as well as participation in regional and sub-regional data-sharing efforts. Sharing data coordinators and stewards among federal, state and tribal agencies should be explored for efficiency and cost-effectiveness.
- Include appropriate metadata with all datasets — To properly convey the content, quality, and context of the collected data, metadata must be developed and associated with the relevant dataset. Different levels of details and specificity may be needed for the metadata associated with monitoring and research data. As a starting point, national standards should be consulted, such as the Content Standard for Digital Geospatial Metadata by the Federal Geographic Data Committee, as well as regional standards for monitoring and research data as these are developed.
- Development of processes for regional data sharing needs — The Program supports efficient efforts to improve data sharing that will support Program progress assessment and reporting. Federal, state, and tribal managers should assist in developing and implementing agreed-upon regional and sub-regional data exchange networks for informing broad scale needs, spatial data maps to identify where data is collected, and

databases that support data sharing. These exchange networks, maps, and databases should allow incorporation of both Program and non-Program funded data. Reliance on web-services to facilitate these exchanges is desirable.

- Development of tools for information sharing — The Program encourages development of online tools and regional guidance that facilitates data sharing. These may include regional data sharing standards, standardized data exchange templates that inform content to be shared within a network exchange, and interactive database or maps that identifies what data is being collected where in the Basin. Federal, state, and tribal managers should optimize the use of and participate as appropriate in the development of these tools that will inform Program priorities, progress, and implementation.

The Council and Bonneville will ensure data will be made available in a timely manner, ideally as close to real-time as feasible, or no later than 1 year after collection.

The Program allows shared databases to use access-permission-levels such as providing access to raw data to managers and researchers and access to derived data to general audiences. The latter is allowable as derived information is generally of more use and interest to the public. However, requests to access raw data from the public must be met.

C. Monitoring and Research

The Program has invested in numerous monitoring and research activities over the past decades, with most monitoring efforts being focused at the project scale and research efforts not necessarily focused on short-term Program needs. To address broader information needs, such as assessing Program progress and improving implementation, monitoring efforts should focus at sub-regional and regional scales. Additionally, research efforts should be closely tailored to inform decisions and develop innovative tools within a reasonable amount of time. Both of these activities can also benefit from additional guidance to improve efficiencies and cost-effectiveness.

Council recommendations on monitoring and research activities and related evaluation and reporting will be guided by the risk and uncertainty associated with an action. The risk-uncertainty matrix depicts how riskier and less certain actions or topics will be subject to more intensive monitoring and research efforts than less risky and more certain actions or topics (Figure 1).

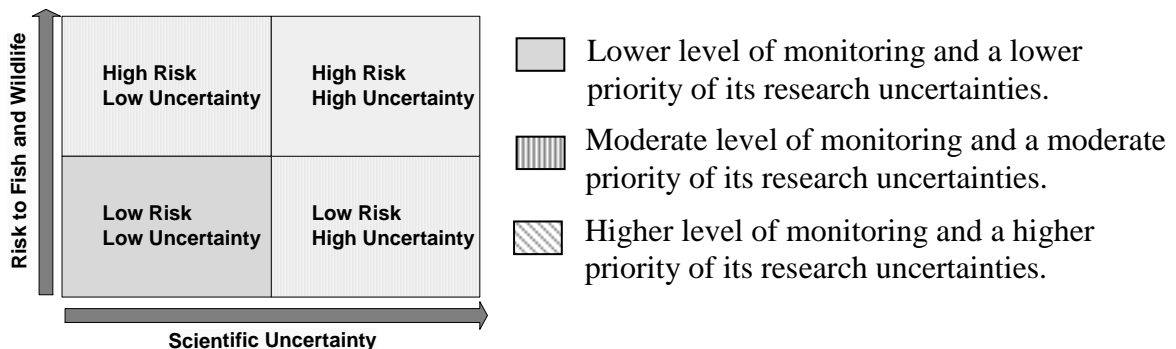


Figure 1: Risk-uncertainty matrix guiding monitoring effort and research prioritization.

The certainty associated with an action will also indicate the appropriate levels of monitoring and research implemented through the Program. This certainty level will be assessed per the following criteria: (1) whether existing information for guiding a decision is thoroughly established, (2) generally accepted, (3) has peer-reviewed empirical evidence in its favor, (4) has a strong weight of evidence in support of research certainties, even if not fully conclusive, and (5) is not misleading or demonstrably wrong. The Council refers to a certainty level that is adequate to inform decisions as meeting the preponderance of evidence criterion. Scientific review of actions can require a higher level of certainty.

Investigation of research uncertainties and innovative tools will focus on areas critical to informing decisions and improving Program progress and its implementation that can be achieved within a reasonable amount of time.

1) Monitoring

i. *Specific strategies*

All projects must provide required implementation monitoring data.

Status and trend monitoring data for populations, sub-regional, and regional assessments should be collected collaboratively or through an independent project at the regional or sub-regional scale.

Effectiveness monitoring of Program actions should occur at the highest scale feasible to inform Program priorities, performance, and the Program's assumed relationship between habitat actions and improvements in fish populations.

ii. *Guiding Principles*

The Program intends that all actions have the appropriate level of monitoring and may assess the risk and uncertainty (figure 1) associated with an action in making this determination.

All monitoring activities assessing actions, fish, wildlife, and habitat will be clearly described in a document that explains their consistency with the Program guidance. This document will be submitted to the Council and reviewed by the ISRP.

Monitoring implemented through the Program will fit within one or more of the below monitoring⁵ types. Monitoring should be conducted at the relevant scale (*e.g.* regional) and use an efficient approach (*e.g.* collaboratively). Monitoring data should contribute to informing Program priorities, reporting needs, and assessing Program implementation and progress.

- (a) Implementation Monitoring —assesses if every action was implemented according to appropriate design requirements and standards, was fully described and documented, and

⁵ Where appropriate, definitions of the monitoring types are copied from the glossary of monitoringmethods.org

when relevant, whether it achieved its assumed functional lifespan. The spatial scale is narrowly focused on the action that is being assessed.

Assessment of Program implementation is best done by the individual project sponsors at the project scale. This doesn't preclude a group of project sponsors from having an independent party collect and evaluate data for all their projects.

- (b) Status and Trend Monitoring — provides estimates of fish, wildlife, and habitat status over time. Status and trend data may inform the effectiveness assessments described next. This monitoring can occur at different spatial scales. Assessing the effectiveness of actions and Program progress is better informed at a larger scale to provide a basinwide and ecological context. At a smaller scale, status and trend data can assess unique types of actions and projects. Status and trend assessment should occur at the highest scale feasible in an efficient and cost-effective manner.

Program priorities related to regional and sub-regional (*e.g.*, populations) status and trend of fish, wildlife, and habitat should involve collaboration among federal, state and tribal agencies that collect data that can contribute to this assessment. At times it may be more efficient and cost-effective to have an independent party work with project sponsors to collect and evaluate the data or have an independent project perform the work.

- (c) Effectiveness Monitoring — determines if Program funded actions are achieving a given outcome, *i.e.* are they effective. Effectiveness can be assessed by determining cause-and-effect or be informed by correlated relationships between fish, wildlife, habitat, and actions. Assessing the effectiveness of actions is addressed at multiple scales reflecting the question being asked. Determining whether a unique and localized action results in the desired physical change may best be addressed at the project scale. Assessing the effectiveness of an action-category⁶ in altering physical habitat characteristics and for evaluating whether a category of action or a suite of different actions result in life-stage, life cycle, or watershed changes may be best addressed by an independent project implemented at the regional or sub-regional scale. Alternatively, regional or sub-regional collaboration among project sponsors, with or without an independent party, may also assist in action-category effectiveness assessments. Effectiveness of actions should be assessed at the highest scale feasible in an efficient and cost-effective manner.

To facilitate informing Program priorities and assessing Program performance and action effectiveness, the Program recommends a collaborative approach to monitoring for status and trend assessment and effectiveness monitoring that relies on compatible or standardized protocols and methods to facilitate data sharing. This approach is especially relevant for assessing habitat action effectiveness and for monitoring the effectiveness and effects of artificial production, which are critical components for the Program's success⁷, and involve a diversity of state and tribal and federal agencies.

⁶ Action-category refers to groups of identical actions implemented under the Program, such as hatchery releases, riparian plantings, invasive species removal, and in-stream large wood debris additions.

⁷ Council's Final Decision on the Review of Research, Monitoring and Evaluation and Artificial Production available: http://www.nwcouncil.org/fw/budget/2010/rmeap/2011_06decision.pdf

To facilitate assessing Program performance, including changes in fish, wildlife, and habitat status and action effectiveness, the Council, in collaboration with state and tribal fish and wildlife managers, federal agencies, and other experts, will identify unenhanced, representative sites across the basin to be maintained as reference (*i.e.* control) sites.

Findings from sub-regional and regional projects and collaborative efforts may inform individual project monitoring needs related to regional and sub-regional status and trends, as well as action effectiveness. When these findings are used to adaptively manage a project this process by which this will be accomplished needs to be described.

Periodically, the Council will adopt or update relevant monitoring and evaluation methods and protocols⁸ for the Program that are identified through regional processes and reviewed by the ISAB and ISRP for their scientific merit⁹.

2) Research

i. *Specific Strategy*

Investigations of uncertainties in scientific knowledge and best available technologies provide insight and tools that can enhance the Program's success. The Program prioritizes research of topics where results are likely to inform decisions, or the development of innovative tools, within a reasonable amount of time and at a reasonable cost to better inform decisions.

ii. *Guiding Principles*

All research projects funded through the Program must align with Program guidance and be consistent with the Council's Columbia River Basin Research Plan¹⁰ (Research Plan), or in the case of innovative tools, improve the efficiency and cost-effectiveness of Program implemented actions and monitoring.

The Council will periodically update and re-prioritize as necessary, about every 5-years, its Research Plan. The Council will consult with federal, state, and tribal agencies in this review.

The Council, informed by experts, will consider the risks and uncertainties associated with different research uncertainty topics to determine whether a research project reflects a lower, moderate, or higher priority level (see Figure 1). This assessment will inform the Council's recommendations and will ensure that research with the greatest benefit to the Program is addressed first.

⁸Protocols are defined as a detailed plan that explains how data are to be collected, managed, analyzed, and reported, and is a key component of quality assurance for natural resource monitoring programs (Oakley et al. 2003; consult www.monitoringmethods.org for more details).

⁹ The Council has adopted the Northwest Environmental Data Network's Best Practices for Reporting Location and Time Related Data, Pacific Northwest Aquatic Monitoring Partnership's (PNAMP) Methods for Collection and Analysis of Benthic Macroinvertebrate Assemblages in Wadeable Streams of the Pacific Northwest, and PNAMP's Salmonid Field Protocol Handbook.

¹⁰ The latest version of the Columbia River Basin Research Plan is available <http://www.nwcouncil.org/library/2006/2006-3.htm>

To facilitate communicating the importance of research funded through the Program, the Council recommends that Bonneville, working with the Council, as well as federal, state, and tribal agencies, identify, organize and track all research projects as part of an overall research effort. When projects include research, monitoring and evaluation elements, the research components should be tracked as part of the overall research efforts.

D. Overarching Guidance¹¹

The Council needs monitoring and research information to inform decisions, assess Program performance, and facilitate reporting on Program progress at relevant scales. The Program's priorities are described through its management questions, goals, biological objectives, high level indicators, and research needs. These guide the implementation of a comprehensive, integrated, efficient, and cost-effective approach to monitoring, research, evaluation, and reporting.

The Council, Bonneville, regional collaborative efforts, and project sponsors will employ a transparent structured decision process¹² when prioritizing. Prioritization is essential to maximize available resources for implementing monitoring, research, evaluation, and reporting efforts and Program actions and thus, needs to occur at all scales, from basin wide to individual projects¹³.

The Council recognizes in the Program that there are numerous federal, state, and tribal agencies conducting and coordinating research, monitoring, evaluation, and reporting that can serve to meet a diversity of needs. It is important to continue the collaboration and partnerships that have been developed. Efficiencies may come from these partnerships and is encouraged.

As conducted in the past and described in the Program, all monitoring and research funded under the Program will undergo science review and meet statutory standards.

¹¹ **NOTE:** Who is responsible to ensure sharing, coordination, collaboration, evaluation, reporting etc is done may need to be made explicit if this guidance is supported by the region for inclusion in the 2014 program.

¹² Implementation of a structured decision process (see ISRP documents 2011-25 and 2008-4; ISAB document 2003-2) provides transparency of the assumptions and information used to refine priorities.

¹³ Projects are those funded through the Program and assigned a project number. Projects may have multiple subcomponents and actions.