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October 25, 2012

MEMORANDUM

TO: Fish and Wildlife Committee

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

SUBJECT: Summary of MERR comments received and MERR's next steps

BACKGROUND:

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

In response to this direction, staff prepared a draft monitoring, evaluation, research and reporting plan ([draft MERR Plan](#)) in March 2010 that described the syntheses and reports that would inform adaptive management of the Program and support assessing Program progress, including high level indicators. The content of the 2010 draft MERR Plan was based on Program needs and the ongoing work of many others in the Columbia River Basin. Public comments received generally supported the content of the draft MERR Plan and provided good insight on how to strengthen the next versions. Subsequent versions of the draft MERR Plan were released in July 2010 and November 2010. In March 2012, following Council directions, a more succinct policy focused draft document was produced from this previous work and posted for public comments.

Three entities submitted public comments about the March 2012 draft Monitoring, Evaluation, Research, Reporting, and Data Access Framework (draft MERR Framework) document: National Ocean and Atmospheric Administration, Washington Department of Fish and Wildlife, and Idaho Department of Fish and Game. The comments provided useful information on needed clarifications, additional information to include, information to exclude, organization of the

document, and minor edits. The comments also restated the need to ensure coordination with regional work and to provide acknowledgement of these products.

Earlier in 2012, ISAB and ISRP also provided comments on the March 2012 draft MERR Framework document. They assessed that the overall content of the draft Framework is good. They determined that the document does convey the message that the Council is requesting more organized and consistent data collection and monitoring to assist in its decision making. They thought that the MERR information, however, may need to be presented at several different levels of details given that there appears to be several intended audiences, but a separate holistic document may not be necessary if the details can be described in supporting documents accessible through live web-links. They also found that the organization of the current draft caused the ISAB some difficulty in conducting a scientific review and this would benefit from reorganization. Several aspects of the draft would benefit from clarification, such as the risk-uncertainty matrix and the specific strategies and guiding principles. Lastly, time frames are missing from the framework. Without some stipulation of when reporting or evaluation should occur, it might be difficult to use this framework. Clarification on what is to be done, by who, by when and for which audience would also be beneficial.

Staff have revised the draft MERR Framework based on the public comments submitted and the comments received from the ISAB during May 2012. Staff have addressed all comments consistent with the Council's direction to produce a short policy document to inform discussions during the 2014 Program amendment process about improving the content of the 2009 Fish and Wildlife Program's Monitoring, Evaluation, Research, and Reporting Strategies (section D, page 24).

The latest, November 2012 draft MERR Framework is a succinct guidance document targeting the Council as its main audience. This draft MERR Framework relies on a web interface to link to documents that contribute to its implementation. These include documents produced by the Council, Bonneville, and the region, such as the Coordinated Assessment for Salmon and Steelhead and the implementation strategies and synthesis produced by managers. The web-interface will remain in the pilot phase pending the outcome of the 2014 Program amendment process which will determine whether the content of the draft MERR Framework.

The revised November 2012 draft MERR Framework is attached to this memo.

ACTION:

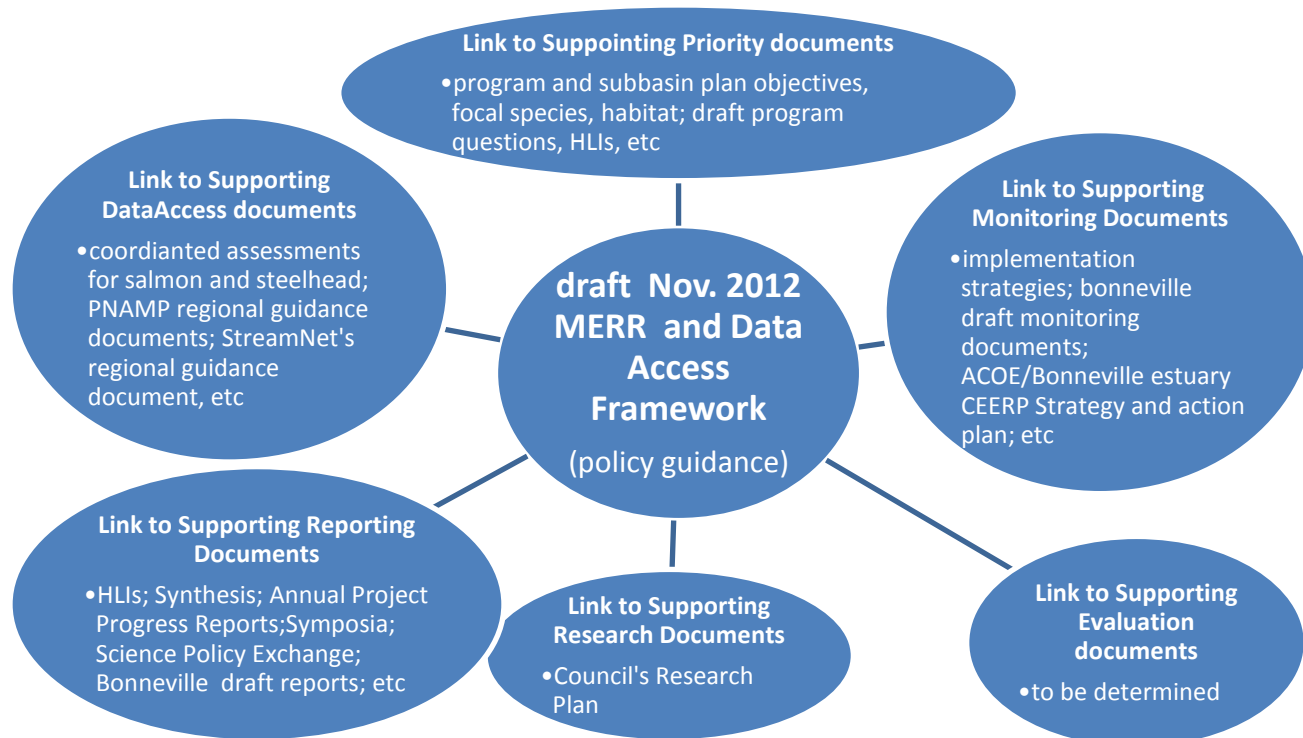
Include the revised November 2012 draft MERR Framework as part of the Program amendment packet for the region to consider incorporating either in its entirety or subcomponents within the 2014 Fish and Wildlife Program.

Cover Letter - Purpose of this Document

The November 2012 draft Monitoring, Evaluation, Research, Reporting, and Data Access Framework (draft MERR Framework) is a policy level guidance document for improving the Fish and Wildlife Program's (Program) Monitoring, Evaluation, Research and Reporting Strategy. The main audience for this document is the Council.

This draft MERR Framework builds upon the [March 2012 draft](#), which reflected comments received during [2010](#), and guidance from the Council. This current draft aims to address the [2012 comments](#) received from the ISAB and three agencies: NOAA, Washington Department of Fish and Wildlife, and Idaho Department of Fish and Game.

If during the 2013-2014 Fish and Wildlife Program amendment process, aspects of this draft MERR Framework are recommended for incorporation within the 2014 Fish and Wildlife Program, then more details on how this guidance is implemented will be provided through a web-interface on the Council's website (pilot version: <http://www.nwcouncil.org/melissa/theme/merr.php>). This web-interface will provide more explicit details from the Council, based on previous drafts of this document and public comment received and supporting Council documents (such as the Research Plan and biological objectives). Web-links to supporting regional products from the Columbia River Basin that were developed with manager input and that contribute to implementing this guidance will also be provided, such as Synthesis reports developed by the managers, the Coordinated Assessments for Salmon and Steelhead, the MERR monitoring implementation strategies for resident fish, wildlife, and anadromous fish, PNAMP guidance documents, NOAA guidance documents, and Bonneville guidance documents (see figure 1 for a diagram of these linkages).



Draft MERR and Data Framework (version November 2012)

9. Monitoring, Evaluation, Research, and Reporting Strategies

Primary Principles¹

Actions will result in a particular change in physical habitat or ecological conditions and that these changes will affect fish and wildlife populations or communities in a certain way.

Timely evaluation of monitoring and research data ²will inform program performance and enable adaptive management of the Program.

Limitations in available resources dictates a need for making-choices, ensuring what is implemented is done well, and relying on collaborations.

Primary Strategies³

Assessing the effects and effectiveness of habitat actions on ecological conditions and populations characteristics.

Assessing the effects and effectiveness of other actions used to mitigate hydrosystem impacts on fish, wildlife and their habitats.

Conduct, in a timely manner, data evaluation at the levels of syntheses that are most appropriate for informing adaptive management of the Program.

Support research activities that inform uncertainties that may enhance the success of the Program's mitigation efforts.

Program priorities, which are identified by the Program Questions, High Level Indicators, goals and biological objectives described in the Program and its subbasin plans, focal species, and focal habitats, will guide monitoring, evaluation and reporting activities for fish and wildlife in the Columbia River Basin⁴.

Tradeoffs need to be considered when balancing the best monitoring, evaluation, and research design against costs.

In the absence of the 95 percent level of certainty traditionally pursued by investigators, the Council will rely on a preponderance of evidence⁵ to base its decisions.

1 Principle is defined as a comprehensive and fundamental law, doctrine, or assumption (Merriam-Webster online dictionary).

2 Data refers to the measurements or metrics produced by combining or reducing measurements (see the glossary at moniotinrgmethods.org)

3 Strategy is defined as a careful plan or method : a clever **stratagem** (Merriam-Webster online dictionary).

4 Links to the draft Program questions and HLIs are listed on the Council's website relating to the HLI table (<http://www.nwcouncil.org/fw/program/hli/Default.htm>) Goals, biological objectives, focal species, and focal habitats are listed in the Fish and Wildlife Program and its subbasin plans also available on the Council's Fish and Wildlife website www.nwcouncil.org/fw/ and under its Report website <http://www.nwcouncil.org/library/>.

5 Preponderance of evidence relates to the legal term described as: the greater weight of the evidence required in a civil (non-criminal) lawsuit for the trier of fact (jury or judge without a jury) to decide in favor of one side or the

Apply a transparent structured decision process⁶ when choosing or prioritizing what actions, monitoring, evaluation, research and reporting will be done.

All monitoring, evaluation and research activities funded under the Program will undergo science review by the Independent Science Review Panel (ISRP) to ensure the scientific integrity of the work funded through the Program.

Collaboration and partnerships among federal, state, and tribal agencies who are conducting and are engaged in monitoring, evaluation, research and reporting is encouraged by the Council. These efforts can serve to meet a diversity of management and reporting needs, while resulting in efficiencies and increased understanding.

As the Columbia River basin federal and state agencies and tribes collaboratively develop products and guidance that assist in implementing the monitoring, evaluation, research, reporting and data access principles, strategies and guidance in this section, the Council will provide access to these documents on its website. This will serve to support collaborative processes that contribute to Program implementation.

a. Monitoring

Principles

Monitoring is used to assess biological resources such as the abundance of species and their habitat, as well as to assess the success of specific projects to evaluate whether to continue or to develop alternatives through adaptive management⁷.

Monitoring is an important aspect of adaptive management. Information derived from monitoring data serves to inform decisions, assess Program performance, and to report on Program priorities.

Monitoring data from multiple sources may need to be gathered and managed in a compatible manner to facilitate combining the data to inform Program decisions, performance and priorities. Collaborative efforts may enhance this process.

The intensity of monitoring associated with an action, environmental condition, and/or population characteristic will align with the perceived risk to fish, wildlife and habitat and the level of certainty associated with the impact of the actions, environmental conditions, and population characteristics.

Monitoring activities need to be clearly aligned with objectives and hypothesis and report regularly on progress made and implication on the monitored actions, environmental conditions, and/or population characteristics.

other. This preponderance is based on the more convincing evidence and its probable truth or accuracy, and not on the amount of evidence (Source Law.Com).

⁶ 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.

⁷ The 2000 Return to the River (Council document 2000-12) discusses the two perspectives on monitoring and evaluation in the Fish and Wildlife Program in the section entitled Perspectives on Monitoring and evaluation (p. 415; <http://www.nwcouncil.org/library/return/ch11.pdf>).

Monitoring is also a legal requirement of the amended Northwest Power Act which directs the Independent Science Review Panel to review projects⁸

Strategies

The Program funds three types of monitoring that are employed depending on the question posed. Implementation and Compliance Monitoring is used to assess if actions and projects were implemented according to contractual agreement, appropriate design requirements and standards, and when relevant, whether it achieved its assumed functional lifespan. To assess status over time of fish, wildlife and habitat that informs Program evaluation and reporting needs, the Program relies on data gathered through Status and Trend Monitoring. To determine, by correlation or causation, if a Program funded action achieved the intended detectable change in environmental conditions or population characteristics the Program relies on Effectiveness Monitoring.

To facilitate the sharing of data to inform broader evaluation needs, several aspects will be considered when conducting monitoring activities including, standardization of measurements, metrics and/or the derived indicators⁹ that are agreed upon by the multiple entities gathering this information¹⁰; using Council approved methods and protocols which are periodically updated¹¹ based on the outcome of regional Columbia River Basin processes and reviewed by the ISAB and ISRP for their scientific merit¹²; and, documentation of methods, protocols, and statistical design in a publicly accessible manner that is associated with the monitoring data collected, such as achieved by the Bonneville Power Administration's supported MonitoringMethods.org.

To determine the level of monitoring appropriate for a given Program priority, whether assessing an action and/or species status, conceptual consideration will be given to the associated risk and level of certainty. The risk-uncertainty matrix depicts how these two components, risk and certainty level, results in a recommended level of monitoring (Figure 1). The perceived level of

⁸ Projects are those funded through the Program and assigned a project number. Projects may have multiple subcomponents and actions.

⁹ The terms measurement, metrics and indicators are used as defined in the glossary of monitoringmethods.org. Measurement is a value resulting from a data collection event at a specific site and temporal unit. Measurements can be used to produce metrics using a Response Design. Metric is a value resulting from the reduction or processing of Measurements taken at a site and temporal unit at one or more times during the study period based on the procedures defined by the Response Design. Metrics can be used to estimate an Indicator using an Inference Design. Note that a variety of Metrics can be derived from original Measurements. Indicator is defined as a value resulting from the data reduction of Metrics across sites and temporal periods based on applying the procedures in the Inference Design. A reported value used to indicate the status, condition, or trend of a resource or ecological process; intended to answer questions posed by the Objectives of the Protocol.

¹⁰ The Coordinated Assessment for Salmon and Steelhead, conducted as follow-up to the Anadromous Salmonid Monitoring Strategy, is an example of a process to achieve standardization of terminology needed for the derivation of indicators using data collected through multiple sources (see <http://www.nwcouncil.org/fw/merr/Default.asp> and <http://www.pnamp.org/project/3129>).

¹¹ Protocols 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).

¹² The Council has adopted the [2007 Best Practices for Reporting Location and Time Related Data](#), the [2007 Methods for Collection and Analysis of Benthic Macroinvertebrate Assemblages in Wadeable Streams of the Pacific Northwest](#), and the [2007 Salmonid Field Protocols Handbook: Techniques for Assessing Status and Trends in Salmon and Trout Populations](#).

risk pertains to the potential undesirable impact of a given action on, or of having an undesirable change in the biological status of, fish, wildlife, and habitat. The uncertainty level pertains to the certainty of outcome associated with a given action or a biological status based on the scientific support as described in the Council document [2000-12](#) with number 1 being the highest level of certainty:

1. Thoroughly established, generally accepted, good peer-reviewed empirical evidence in its favor.
2. Strong weight of evidence in support but not fully conclusive.
3. Theoretical support with some evidence from experiments or observations.
4. Speculative, little empirical support.
5. Misleading or demonstrably wrong, based on good evidence to the contrary.

With actions associated as being riskier and less certain in their outcome being assigned a higher level of monitoring (more intense and/or longer in duration). For status and trend monitoring of species and their habitat, with an increase in the perceived risk of having an undesirable change in the biological status and with decreased the certainty that a biological status will be a given level, the higher the level of monitoring conducted.

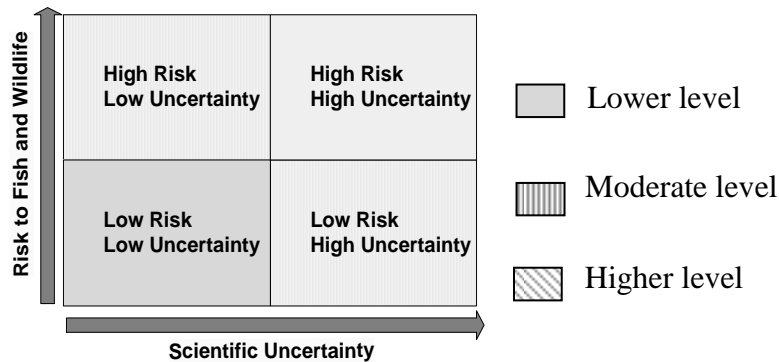


Figure 1: Risk-uncertainty matrix guiding level of monitoring efforts for a given action (e.g., hatchery, hydrosystem, and habitat action), and biological status. For monitoring an action, risk relates to the potential undesirable impact of a given action on fish, wildlife and their habitat. The level of certainty relates to the level of scientific support for expecting a given change when an action is implemented. For monitoring the status of fish, wildlife and habitat, risk relates to an undesirable change in biological status and the certainty level of scientific support for expecting a given change in biological status. When there is a high risk and uncertainty level, the level of monitoring will be higher, meaning more intense in effort and lengthier in its duration.

To ensure monitoring activities align with program priorities and data are available to inform these priorities: clear linkages between project objectives and monitoring tasks must be stated; and, evaluation of data must be provided, at a minimum through annual project progress reports to Bonneville, and include statistical results (e.g. confidence intervals), interim findings, and describing benefits to fish and wildlife¹³.

¹³ See the 2011-06 Council recommendation in section one “Reporting and Use of Project and Program results” for more details (<http://www.nwcouncil.org/library/report.asp?docid=286>).

To ensure monitoring activities address the legal scientific requirements under the Northwest Power Act, these activities will undergo scientific review by the ISRP. During this review, the ISRP will assess how these activities fit in the context of the Council's program and whether they: are based on sound science principles; benefit fish and wildlife; have clearly defined objectives and outcomes; and have provisions for monitoring and evaluation of results (Northwest Power Act [4\(h\)\(10\)\(D\)](#)).

b. Evaluation

Principles

Adaptive management of the Program and its implementation requires that evaluation of data be done regularly, in a timely manner, and that these findings be shared with others.

Collaboration is needed to evaluate data from multiple sources.

Strategies

To ensure that data from monitoring and research activities are synthesized in a timely manner, these activities must include a description of how and when data collected will be statistically analyzed to inform their objectives, hypothesis, and contribute to program priorities. The evaluation details for monitoring and research activities (e.g., statistical analysis, frequency of evaluation, and how these inform broader needs) will be provided, at a minimum, to the ISRP and the Council through project proposal forms and annual project progress reports to Bonneville. The findings from the evaluations will also be reported at a minimum in proposal forms and annual project progress reports.

Determining when it is timely to conduct a synthesis of these data will depend on the type of monitoring and research question, and the amount of data and time-span required for a meaningful assessment. For example, evaluating the data obtained by monitoring riparian re-growth may be meaningful annual during the initial few years to ensure the riparian vegetation is becoming established. After this initial assessment, it may be appropriate to decrease the frequency of evaluation for these data every 5 years to detect slower occurring biologically significant changes such as canopy cover.

Data from multiple monitoring and research activities may need to be compiled to inform broader evaluation needs for some environmental conditions, population characteristics, and research uncertainties, such as the status of watersheds, status populations, and effects of artificial production. Monitoring and research activities that gather data relevant to these needs, will describe how these data are to be managed to facilitate informing these broader evaluations. Guidance, products, tools and processes produced and occurring primarily within the Columbia River Basin may assist this effort. Engaging in collaborative efforts may also assist this effort, such as those developing the Resident Fish Monitoring Strategy, Wildlife Monitoring Implementation Strategy, and Anadromous Salmonid Monitoring Strategy, and regional forums and processes, such as the Coordinated Assessments for Salmon and Steelhead¹⁴, for evolving an agreed upon approach and the development of tools and guidance.

¹⁴ For more information on these collaborative efforts and regional forums and processes the Council's website on monitoring, evaluation, research and reporting <http://www.nwcouncil.org/fw/merr/Default.asp>

c. Research

Principle

Critical research uncertainties are questions concerning the validity of key assumptions implied or stated in the Program.

Supporting key research activities that inform uncertainties may contribute to enhancing the Program's mitigation efforts. In addition, resolution of uncertainties in a timely-manner, and making these findings accessible, will inform decision-makers and improve the Program's implementation and its progress in attaining its vision.

Innovative research activities serve an important role by improving knowledge, encouraging creative thinking and providing an opportunity to test new methods and technologies that may enhance the efficiency and effectiveness of the Program's implementation.

Strategy

Selection of uncertainties to be resolved will be consistent with the Council's Program and the associated Columbia River Basin Research Plan¹⁵ (Research Plan) that focuses on uncertainties in the Program and provides guidance on prioritization of these uncertainties.

Research activities will produce results in time to inform upcoming program amendment cycles.

A research activity must be feasible to be accomplished given existing constraints both in terms of cost and logistical constraints. For example a research activity may be well designed and address a critical uncertainty, but may be impractical due to the inability to qualify for permits or to acquire needed equipment.

To ensure alignment with the Program and its Research Plan, as well as to ensure accessibility of its findings to maximize contributions from these efforts, Bonneville and the Council will track individual research activities as part of an overall research effort. To facilitate tracking and learning from their findings, each research activity will clearly state their research question and alignment with the Council's Research Plan and/or how its innovative research will contribute to the Program. Annual Project Progress Reports, currently required by Bonneville, will include information needed to inform the Council, including (1) an accounting of past hypotheses tested, conclusions reached, and benefits for fish and wildlife; (2) a clearly defined hypothesis to be tested that links to a critical uncertainty; description of scientific methods and statistical analyses; a timeline for producing results including milestones and end dates; and, (3) progress made towards the current research question(s), relevant environmental, fish, and wildlife data gathered within the previous year, any results, conclusions, benefits for fish and wildlife, and a link to any publications resulting from the work¹⁶.

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

16 See the 2011-06 Council recommendation in section one "Reporting and Use of Project and Program results" and in section six "Research Projects in General" for more details (<http://www.nwcouncil.org/library/report.asp?docid=286>)

Innovative research will also target aspects of the Program that can be enhanced in effectiveness, efficiency, and/or its cost-benefit.

d. Reporting

Principles

Different reports are required to report on the evaluation of actions, projects, biological resources, and the Program.

Understanding the relationship among monitoring and research activities and how these contribute to Program priorities is critical to correctly compile data and information to report on Program progress.

Accessibility to results and lessons learned from monitoring and research activities and the synthesis of these combined results, inform adaptive management of the Program and its implementation.

Succinctly conveying progress on achieving the Program's vision and status of its implementation is critical for conveying Program performance to a wide range of audiences.

The ISRP access findings from monitoring and research activities when conducting project reviews and retrospective review as fulfillment of their duties under the Northwest Power Act.

Strategies

In addition, to reports produced by the ISAB and ISRP, 3 different groups will be responsible to produce reports on the evaluation of actions, projects, biological resources, and the Program. These 3 groups are Project Sponsors, Bonneville and the Council.

Project Sponsors

Monitoring, Evaluation and Research Synthesis Reports will consist of formally establishing a report that will merge reoccurring information requests from the Council and the ISRP. This consists of requests for informing broad Program evaluation needs for a given priority topic as identified by the ISRP and the Council, such as the [2012 Ocean Synthesis report](#) and the draft [monitoring strategies](#) for anadromous fish, resident fish and wildlife. These reports will provide information to the Council on (i) how activities in the basin are coordinated and complement each other, (ii) describe how these activities link to Program priorities, (iii) describe the status and trends of applicable limiting factors, focal fish and wildlife, and their habitat at the highest appropriate scale of synthesis, and (iv) provide a synthesis and evaluation of data from multiple monitoring and/or research activities informing the priority topic¹⁷. These will be reviewed by the ISRP.

Annual Project Progress Reports requested by Bonneville will continue to be produced by Project Sponsors. These Annual Project Progress Reports will evolve to improve their organization and content to enhance their comprehensiveness and accessibility to address

¹⁷ See the 2011-06 Council recommendation for more details (<http://www.nwcouncil.org/library/report.asp?docid=286>)

Bonneville, Council, and ISRP information needs, such as the ISRP's project reviews and the ISRP's Program retrospective reports. Project sponsors will provide these reports electronically to Bonneville, and these will comprise of the content¹⁸ and be in the format requested by Bonneville.

Bonneville

To specifically address the Program's need to assess the effectiveness and effects of its actions, Bonneville will produce one-year prior to the start of each Program amendment process a report to assess the status of evidence for the effectiveness of actions in altering physical habitat conditions. This report will be compiled in collaboration with managers and project sponsors to analyze their data. Each report will focus on a subset of action-categories¹⁹ implemented under the Program. This **Effectiveness and Effect Report** will also synthesize whether a category of action or a suite of different actions result in a detectable change in population characteristics.

Council

To provide a succinct overview of the Program's progress, managers will assist the Council in developing indicators informed by current monitoring data to produce high-level summary of the status and trend of Council priorities. The succinct overview of Program's progress will continue to rely on **High Level Indicators (HLI)**²⁰ to convey this information. The Council will report on and update the Council's HLIs at least once prior to each Program amendment process.

Furthermore, the Council will take advantage of the number of successful **Symposia**²¹ organized by project sponsors in the basin to keep informed on project progress and encourage the ISRP to do the same. The Council encourages the use of this approach for communicating project findings and for providing a forum for interactive learning and exchanges among project sponsors. Ideally, these would be organized by managers working in the same subbasin(s) or on the same fish, wildlife, habitat, and actions, every 2-years.

To inform the Council on emerging information and innovative tools that may have Program policy implications the Council relies on **Science-Policy Exchanges**. The Council convenes these Exchanges to assist the region with development of policy in matters related to science, technology, and international issues in key policy areas.

18 Content of annual project progress reports to Bonneville will be determined by Bonneville. Reports for monitoring and research activities, will include as a minimum: clear objectives and hypothesis, linkage to Program priorities, description of the any treatments applied, scientific methods including designs and protocols, statistical analysis, statistical results, conclusions, summary of accomplishments to-date, and implications for fish, wildlife and their habitat. An annual project progress report will be a stand-alone, complete document, which does not rely on other documents, such as past annual project progress reports, to provide information needed to assess what has been done.

19 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.

20 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).

21 Existing symposia that align with this concept, which may benefit from minor changes to address this reporting need, currently go by a variety of names including Sturgeon Workshops, Lamprey Summit, Comparative Survival Study Annual Meeting, LSRCP reviews, Annual Klickitat & White Salmon Rivers (Columbia Gorge) Fisheries and Watershed Science Conference, Pelton Round Butte Fisheries Workshop, Lake Roosevelt Forum Conference, Columbia River Estuary Conference, and the Yakima Basin Aquatic Science and Management Conference.

e. Data Guidelines

Principles

Successful data management and access considers the infrastructure and the management guidance and tools needed at each of the three levels of data management, and enhances these as needed to support sharing for Program priorities. The three levels consist of: regional-level including Columbia River Basin-wide, subregional-level including provinces, subbasins and state-wide, and project-level.

Data collected and derived through the Program are a valuable resource as these inform status of biological resources, project performance, and on Program progress and its adaptive management. This valuable data resource must be preserve beyond the longevity of the project tasked with its initial collection.

All data collected by program funded projects must be publicly available in accordance with applicable state and federal laws²².

Strategies²³

Data-collecting projects, especially those associated with regional and sub-regional databases, will participate in forums and workshops. These forums and workshops should consist of those primarily occurring within the Columbia River Basin and those that address topics such as data management approaches, sharing, and tools. The data-collecting projects should take advantage of data management and data-sharing guidance and technologies generated by these efforts.

To ensure appropriate data management, longevity of the data, and to facilitate data sharing, each data-collecting project will document best management practices and standards, the protocols used in collecting and analyzing the data, and the metadata. These will be associated with the dataset, and be easily accessible.

Monitoring, research, and data management projects may benefit from employing a data coordinator and data steward who will ensure proper management of data and documentation of metadata, as well as participate in regional and sub-regional data-sharing efforts.

All regional and sub-regional data management projects will publish their data electronically on a regular basis (i.e., not a static PDF or Word document), and consider using a dynamic data-sharing system for providing access to regularly requested data. These regional projects may need to respond to data input in real time for time-sensitive evaluations.

All projects collecting data can provide user-limited access to different levels of synthesized data to ensure appropriate use of data. This allows easy access to more highly synthesized data to a wider array of users (e.g., providing derived indicators through web-services to sub-regional and regional data management projects). Upon request, however, all data and metadata must be made

²² Freedom of Information Act 5 U.S.C. ' 552 (1994 & Supp. II 1996), Data Quality Act (uncodified, as amending the Paperwork Reduction Act 44 U.S.C. 3501 et. seq.), PL 105-277 (Shelby Amendment).

²³ For more details and context consult Council Decision July 10, 2012 Part 3: Data Management Category Review - Issues and Recommendations <http://www.nwcouncil.org/fw/budget/2013/CouncilDecision.pdf>

available to all interested parties.

Data and derived indicators informing Program priorities will be accessible through regional data management projects funded through the Program. These regional data management projects will strive to rely on web-services to access data instead of storing data from multiple sources. Data and derived indicators will not be relegated to static documents, such as PDFs or Word, as this limits its accessibility for informing Program priorities.

Bonneville should add a stipulation in project contracts to ensure, that at a minimum, the following occurs: (1) Program funded data and its metadata are stored and managed in a manner to assure its longevity and usefulness; (2) projects allocate a portion of their funds to addressing data management and infrastructure needs; (3) data and derived indicators informing Program priorities are made accessible to sub regional and regional data management projects preferentially through web-services; and, (4) data are accessibility to the public, such as through the use of web-services, or at a minimum, annually available upon request and within 6-months of project completion or following completion of a significant phase of research. If complex analysis is required to make the data usable, then the methodologies applied must be documented and made publicly available.

f. Consistency with Other Processes and Products

The Council's monitoring, evaluation, research, data management, and reporting efforts will be coordinated with similar efforts described in relevant biological opinions and recovery plans for the Columbia River Basin. Efficiencies that may come from integrating these efforts will be identified and implemented where practical.