COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

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September 17, 2013

Bill Bradbury, Chairman
Northwest Power and Conservation Council
851 S.W. Sixth Avenue, Suite 1100
Portland, OR 97204-1348

Dear Chairman Bradbury:

The Columbia River Inter-Tribal Fish Commission (CRITFC) appreciates the opportunity to submit its recommendations to amend the Northwest Power and Conservation Council's (NWPCC) Columbia River Basin Fish and Wildlife Program (enclosure). CRITFC has worked to develop recommendations consistent with tribal Treaty rights, guidance of the Northwest Power Act, the *United States v. Oregon* process, the Columbia Basin Fish Accords, and regional and international efforts through the Pacific Salmon Commission.

The CRITFC tribes have developed some of the most comprehensive fishery programs in the country and are highly qualified in contributing to the future direction of the Fish and Wildlife Program. These recommendations are consistent with existing fish management plans and ensure that the fishery resources will be protected, mitigated for and enhanced.

The region lacks a shared vision on the proper role of artificial propagation to achieve our goals of salmon recovery and full rebuilding. There has been a substantial lack of focus on the detrimental effects of mass marking and mark selective fisheries. The response of steelhead to these programs is nothing more than a sad experience of ESA listings and declining returns. With a new sense of objectivity, the Council should support hatchery programs that make progress to recover and rebuild salmon runs, such as supplementation, and question all other programs as a risky foundation for restoration.

Major advances are needed to reduce toxic contamination in our fishery resources. These resources are clearly affected by the development and operation of the federal hydropower system. Dam presence is associated with the accumulation of contaminated sediment and the presence of reservoirs and their operations are a controlling factor on the chemical conditions such as anoxia, which impact the distribution and bioavailability of toxics in the system. An example of a specific impact caused by the dams is to sturgeon; once anadromous, sturgeon are now blocked in reservoirs and subjected to contaminants year-around at contaminant levels exacerbated by the reservoirs.

CRITFC recommends that the Council continue to adopt the measures and actions included in the 2008 Biological Opinion for the FCRPS and 2008 Columbia Basin Fish Accord Memorandum of Agreement between the Three Treaty Tribes and FCRPS Action Agencies. The Council should continue to incorporate and implement both as a part of its Fish and Wildlife Program. CRITFC also joins in the recommendations of the Bonneville Power Administration, except for the language regarding toxics. The additional attached recommendations respond to questions posed by the Council for this Program amendment and provide suggestions for additional technical detail and coordination to improve the current Program. In addition, the comments look to the future beyond the Accords as markers for future program foundation. Where such recommendations would direct BPA to fund in the near term, we understand that the Accords are paramount, and CRITFC and the Accord tribes wish to work with Bonneville and other action agencies, the Council, and the region to accomplish these recommendations within existing funding levels.

Please contact me if you have any questions or comments.

Sincerely,

Babtist Paul Lumley
Executive Director

Enclosure

The Columbia River Inter-Tribal Fish Commission

Recommendations for the 2014 Northwest Power and Conservation Council's Fish and Wildlife Program

September 17, 2013

Table of Contents:

1.0 Role of the Fish and Wildlife Program and the Council

1.1 What is the highest value of the Fish and Wildlife Program given the legal requirements?

The essential mandate of the Fish and Wildlife Program is to protect, mitigate, and enhance fish and wildlife to the extent affected by the development and operation of hydro projects. Legal requirements have not been properly taken into account if they are even mentioned in the context of the request for amendments to the 2009 Fish and Wildlife Program, as well as in any of the ISAB reports and recommendations. These legal requirements include: treaty rights, mitigation programs, harvest agreements and the Endangered Species Act.

CRITFC recommends that the Council continue to adopt the measures and actions included in the 2008 Biological Opinion for the FCRPS and 2008 Columbia Basin Fish Accord Memorandum of Agreement between the Three Treaty Tribes and FCRPS Action Agencies. The Council should continue to incorporate and implement both as a part of its Fish and Wildlife Program. CRITFC also joins in the recommendations of the Bonneville Power Administration, except for the language regarding toxics. The additional attached recommendations respond to questions posed by the Council for this Program amendment and provide suggestions for additional technical detail and coordination to improve the current Program. In addition, the comments look to the future beyond the Accords as markers for future program foundation. Where such recommendations would direct BPA to fund in the near term, we understand that the Accords are paramount, and CRITFC and the Accord tribes wish to work with Bonneville and other action agencies, the Council, and the region to accomplish these recommendations within existing funding levels.

1.2 What should be the focus of the program over the next decade?

Over the next decade, the program should:

- Support and improve the effectiveness of the workforce implementing the Program through information sharing and education.
- Facilitate sharing lessons learned, including successes, in Program implementation.
- Strengthen efforts to share and analyze information to support an effective adaptive management process.
- Develop a flexible framework for adjusting the Program to incorporate impacts and actions to deal with the impacts of climate change on restoration efforts.
- Develop and provide at the basin-wide level knowledge bases, tools and expertise (e.g. in data management, statistical analysis, GIS technology, climate change analysis) that may not be available locally and that subbasin stakeholders can draw upon as needed when developing, updating and implementing fish and wildlife restoration plans and strategies.

Much progress remains to achieve basin-wide goals. The knowledge base of the region has matured and should be updated.

1.3 In what way should the Council exercise its responsibilities to maximize policy and program benefits and minimize process costs?

The Council should:

- Use its resources to synthesize factual information from across the basin.
- Minimize meetings to critical issues and recognize the costs to the basin for participation.
- Produce and distribute annual calendar of priority topics to be discussed at the monthly meetings in order for fish and wildlife co-managers to have the ability to plan their participation for the entire year.
- Send out NPCC's monthly draft agenda at least three weeks before the meeting.

Participation at monthly Council meetings can be burdensome and not cost-effective. The co-manager's often do not have advanced notice of meeting topics and agenda's in order to plan their travel and participation effectively and efficiently. We acknowledge that there are issues that arise and need to be addressed within a short time-frame, however, issues that are on-going or need to be presented to Council, should be done with foresight and in coordination with those co-manager's whose participation is necessary.

1.4 In what way can the Council and the regional program be more effective, efficient and streamlined, and generate more value for the resource investment?

The Council should facilitate, not lead, discussions among resource managers (e.g. tribes, fish and wildlife managers, the Forest Service, BLM, Bureau of Reclamation, U.S. Army Corps of Engineers, state resource agencies) and land use planners (e.g. critical municipal, county and state commissions) every five years to seek ways to coordinate and leverage resource management plans, strategies and actions.

2.0 Program Framework and Basinwide Vision, Scientific Principles, Objectives, and Substantive Strategies

2.1 Basinwide Artificial Production Strategies

Current Program: Page 18-19

Over the past year, the Council has received extensive presentations from the agencies and tribes that operate hatcheries in the Basin, including two presentations given by members of our four CRITFC tribes and our CRITFC Executive Director.

Recommendations:

1. Firmly support the use of artificial production facilities to a) supplement depressed natural stocks, b) reintroduce extirpated stocks, and c) provide alternative fisheries where lost stocks are not amenable to reintroduction due to loss of habitat that cannot be

corrected within the reasonably foreseeable future due to land use or water resources development.

2. Revise the last paragraph on page 19 to the following: ~~The Council will consider adoption of the HSRG recommendations into the Program when completed.~~ The Council will ~~consider, among other things,~~ ensure that artificial production strategies are consistent with ~~the~~ *U.S. v Oregon* ~~*Management Plan*~~ management agreements, the Pacific Salmon Treaty, tribal trust and treaty rights, and recovery plans ~~in deciding whether~~ **and that they do not discriminate against tribal programs if it decides to** incorporate HSRG recommendations into the Program.
3. Do not fund the HSRG
4. Do not fund mass marking and mark selective fisheries programs until there is a well-documented Columbia River salmon scientific conclusion that these programs do not harm salmon populations and tribal fisheries.

Rationale: Supplementation programs often fulfill several objectives and should not be judged only on whether a population is restored or not. In many cases, the causes for a population's original decline have not yet been fully addressed and the population cannot be fully restored until the underlying problem is rectified.

The region lacks a shared vision on the proper role of artificial propagation to achieve our goals of salmon recovery and full rebuilding. For too long, the Council has supported extensive investigation on tribally sponsored supplementation programs. There has been a substantial lack of focus on the detrimental effects of mass marking and mark selective fisheries. The response of steelhead to these programs is nothing more than a sad experience of ESA listings and declining returns. With a new sense of objectivity, the Council should support hatchery programs that make progress to recover and rebuild salmon runs, such as supplementation, and question all other programs as a risky foundation for restoration. As long as we have dams, we will have hatcheries. We do not have low productivity because of hatcheries. We have hatcheries because of low productivity.

Due to the complexity of ecosystems, differences between areas and the variability in limiting factors across the Basin we should discourage "one size fits all" approaches to addressing problems. This is especially true for the appropriate use of hatchery technology for the HSRG guidelines for what constitutes allowable impacts of artificial production actions relative to naturally reproducing salmon. The HSRG guidelines may provide a starting point for the discussion of hatchery strategies, but they are not an appropriate constraint on the eventual decisions for individual programs. Hatchery strategies and practices should be shaped to meet local needs.

The fishery co-managers have not reached consensus on standards for the genetic management of hatchery supplementation based on the recommendations of the Hatchery Scientific Review Group. As the Council observed at the top of page 18 in the 2009 Program, "The science on this issue is far from settled." It may be less settled now than when those words were written. Recent studies by Ford, et al. (2010) and Williamson, et al. (2010) conclude that much of the difference in the relative reproductive success (a measure of fitness) of hatchery and wild spring chinook in the Wenatchee watershed may be explained by factors unrelated to genetic effects of

hatchery experience. Further, Hess et al. (2012) found no significant fitness loss in a natural spring chinook population supplemented with hatchery fish over two complete generations. Finally, recent presentations by Waters (2012) and Waters, et al. (2013) revealed that virtually no genetic divergence between naturally-produced spring chinook and those reared at the Cle Elum Supplementation and Research Facility has occurred in three generations of hatchery operation. This new information suggests the existence of confounding variables and alternate explanations for the study results used by the HSRG in its models of population responses to PNI management. Accordingly, the measurable benefits of fish production using modern hatchery methods should be given greater consideration than the hypothetical risks of hatchery effects upon which the work of the HSRG was premised, unless empirical evidence demonstrates that hatchery effects have adverse significance to natural populations.

Again, the ISAB recommendation about the risks of hatchery programs are not quantified, are not made in the context of all the risks facing salmon across their life-cycle and are too broad to be applied to every situation. If the Council limits or reduces the artificial production program funded under the Fish and Wildlife Program, it does not address the primary source of any impacts and also prevents the tribes from implementing their treaty-reserved rights.

References:

1. Ford, M.J., A.R. Murdoch, T.W. Maitland. 2010. Monitoring the reproductive success of naturally spawning hatchery and natural spring Chinook salmon in the Wenatchee River. *Prepared for:* Bonneville Power Administration project number 2003-039-00
2. Williamson, K.S., A.R. Murdoch, T.N. Pearson, E.J. Ward, and M.J. Ford. 2010. Factors influencing the relative fitness of hatchery and wild spring Chinook salmon in the Wenatchee River, Washington, USA. Can. J. Fish. Aquat. Sci. 67:1840-1851.
3. Hess, M.A., C.D. Rabe, J.L. Vogel, J.L. Stephenson, D.D. Nelson, and S.R. Narum. 2012. Supportive breeding boosts natural population abundance with minimal negative impacts on fitness of a wild population of Chinook salmon. Molecular Ecology 21:5236-5250.
4. Waters, C. 2012. Reducing genetic risks to wild populations: Evaluating the degree of genetic change in an integrated hatchery population compared to a segregated line. http://ykfp.org/par12/html/waters/siframes.html
5. Waters, C., M. Brieuc, C., Knutsen, D. Fast, J. Hard, K. Warheit, and K. Naish. 2013. Evaluating the effectiveness of managed gene flow to reduce adaptation to captivity in supportive breeding programs. http://ykfp.org/par13/html/Waters/siframes.html

2.2 Harvest Strategies

Current Program: Page 20

The current program calls on the Council to consider adopting the HSRG recommendations on harvest and hatchery practices into the Program.

Recommendation: Delete the references to the HSRG recommendations and replace it with "The Council will consider adopting the Hatchery Genetic Monitoring Plans (HGMP) as they 1) agreed upon by the fishery co-managers into the Program and 2) are approved by NOAA Fisheries (for listed populations)."

The Council should clarify in these sections that any Council decisions would only follow a comprehensive review and consultation with the fishery co-managers to ensure that decisions are consistent with applicable laws and obligations associated with hatchery management.

Rationale: The HSRG recommendations can be useful as general guidelines but should not be used to set standards for the operation of individual programs or projects. The HSRG recommendations were developed based upon data and model results at a point in time. The analyses used broad assumptions and available data that did not account for differences between populations and programs.

The Council proposes in subsection "a" to adopt HSRG harvest recommendations that discriminate against non-selective tribal fisheries, while in subsection "b" it proposes that harvest augmentation hatchery programs created pursuant to HSRG guidelines should be cut if the production of adults cannot be fully harvested. We object to these proposals. HSRG recommendations for the mass-marking of hatchery fish and the mark-selective, catch-and-release fisheries intended to target them are contrary to traditional tribal perspectives and the management policies that derive from them. To the extent the FWP should accommodate the ownership interests of all the fishery co-managers, the Council should take no position on harvest approaches that are more properly the subject of *U.S. v Oregon* policy review. Similarly, the Council's 2009 HSRG-inspired opinion that hatchery programs should be scaled to the ability of fisheries to fully harvest them leads to a downward spiral in hatchery programs that are both legally mandated and contribute harvestable fish to tribal fisheries. Non-selective fisheries catch only a small fraction of returning hatchery fish due to fishery constraints adopted for the protection and conservation of commingled wild fish. Selective hook-and-line fisheries seldom have the fishing power to harvest more than a moderate percentage of available hatchery fish, particularly if they are also constrained by the incidental catch of wild fish. Ultimately, the HSRG recommendations should be considered on a case-by-case basis by the fishery co-managers and not as the generally-applicable policy statements given in the 2009 program.

2.3 Food Web Concepts

The ISAB's report has emphasized how much the physical changes in the basin have altered the food sources and food webs that fish and wildlife depend on. A fundamental concept in the program is that protecting and improving the habitat conditions that key species depend on will also result, over time, in reestablishing the necessary food sources and food webs. The stakeholders have been asked how best to integrate food web concepts into the program. Any action on the recommendations of this report must be well planned, have clear quantitative objectives, be implemented in a coordinated fashion, and the results must be appropriately monitored.

The Council should be careful in incorporating any of the recommendations of this report directly into the Fish and Wildlife Program. For instance, the ISAB cautions about the uncertainty surrounding the aggregate carrying capacity of the Columbia River system. Understanding these possible limits will require a multi-species, multi-area assessment of the mainstem fish food productivity and abundance over time. Using this uncertainty to limit or

reduce anadromous fish production projects under the Fish and Wildlife Program will have little impact on the real issue, which involves all risks across the salmon life cycle.

Recommendation: The Council shall consider incorporating food web concepts and ecosystem management within the Fish and Wildlife Program. The first steps may include investigations of species and topics where current knowledge is limited, such as freshwater mussels, lamprey, sturgeon and toxics.

Rationale: The ISAB recognizes that their recommendations "could be nested within the existing Fish and Wildlife Program," in the monitoring, habitat, production, and research areas. They also agree with this recommendation that actions in response to the report need to be well integrated and coordinated with complementary research and management activities of the tribal, state and federal agencies.

Carrying capacity at this point in time is artificially constrained by all the other impacts to the salmon's life cycle, which is why we will always need artificial production. Unless and until the Council and the ISRP and ISAB fully accept and explicitly state this fundamental reality, the program will always be fatally flawed. The tribes' view the issue of carrying capacity as unacceptable because the tribes' have treaties that guaranteed more and the Fish and Wildlife Program must be consistent.

2.4 Council's Comprehensive Review of the Program's Monitoring and Evaluation

The Program should:

1. Support implementation and maintenance of the PNAMP "Strategy For Coordinating Monitoring of Aquatic Environments In The Pacific Northwest."
2. Continue the CHaMP program for three more years to allow proper evaluation of its results, then incorporate its recommendations into an overall habitat monitoring program.
3. Integrate the monitoring recommendations of the ISAB Food Web report into the overall monitoring program.
4. Produce inventory of existing projects, what they are collecting, what results they expect to provide, and when**.**

Environmental monitoring is expensive and has often been done in an uncoordinated project-by-project, agency-by-agency manner. Even in that piecemeal manner, it has been difficult to sustain monitoring programs for more than one or two salmon life cycles (3 – 10 years). The Council's current process relies heavily on ISRP reviews of projects, which virtually always recommend more monitoring and evaluation. Instead, the focus should be on assimilating existing efforts.

The most feasible way to show this progress, given the very limited resources available for the task, is to coordinate monitoring efforts and data sharing among agencies and programs. The PNAMP report on "Strategy for Coordinating Monitoring of Aquatic Environments In The

Pacific Northwest" is the most realistic method available to achieve the necessary coordination of monitoring among resource managers. This plan calls for coordinating the statistical design of monitoring programs and can be modified as necessary to incorporate the measures listed above.

2.5 Fish Tagging Forum Recommendations on Coded Wire Tag (CWT) Funding

Current Program: Page 20, Harvest Strategies, Monitoring and Reporting, 4th bullet, and Page 31, Ocean Strategies, Distinguish Ocean Effects from Other Effects

Recommendation: The Council should continue to support monitoring of all life cycle impacts, including harvest, through shared responsibility for funding the CWT program, particularly where no other technology is capable of providing the age and stock specific exploitation rates that are key to providing annual estimates of catch and survival and long term estimates of stock productivity, which are needed to separate the survival impacts of Council actions from the confounding impacts of harvest. Funding of the CWT program is not precluded by "in lieu" funding considerations.

Rationale: The Council routinely revisits the question of whether and to what degree is should share responsibility for funding the CWT program. The current language in Harvest Strategies is open to the interpretation that the Program just recommends that the co-managers continue to adequately monitor harvest, rather than implying any shared Council funding responsibility for such monitoring. It recently formed a Fish Tagging Forum to review current tagging technologies and their uses. Regarding CWT program funding, no consensus was reached with BPA and the utilities regarding an appropriate level of funding responsibility. The co-managers have consensus that the CWT program should be funded at least status quo levels, or levels necessary to evaluate program objectives. Since there was no consensus on that FTF recommendation, it would be good to clarify that there is a shared funding responsibility in the F&W amendments. Also, the "in lieu" argument against funding the CWT program is raised periodically.

2.6 Scientific Principles

Current Program: Page 9

Recommendation: Add principles 9 and 10 explaining that 1) salmonid fecundity (productivity) rates evolved over thousands of years in equilibrium with mortality rates that since have been substantially increased by human development of the Columbia Basin. In the near term, fecundity rates that evolved in pristine natural conditions cannot be expected to offset the unnaturally high mortality rates that have been imposed by human disturbance of salmonid ecosystems, and 2) to the extent that these heavily-disturbed ecosystems will take centuries to recover, interim measures are needed to boost rates of population productivity until ecosystem integrity and sustainable mortality schedules are restored.

Rationale: Scientific Principles 1-8 articulate a sound scientific foundation and provide guidance for achieving the vision described on Page 7. However, these principles describe an ecosystem and

ecological processes that once existed in the Columbia Basin, and may again, but are not strictly relevant to current conditions. Limiting the science principles to those that describe a desired future condition draws planning attention and focus to measures that may lead to that future at the cost of overlooking the exigencies of salmon recovery in the present. The Council should add principles that provide guidance for actions that must be taken in the near term until ecosystem conditions presumed in the current eight principles are restored.

2.7 Research Plan

The Council intends to update their 2006 research plan to identify critical uncertainties, which need further research. The following are critical uncertainties that we feel merit further study in order to increase effectiveness of fish and wildlife resource management.

Recommendation 1: The Council should support research to address the critical uncertainties identified in the recommended measures in section 7.2 Reduce Toxic Contamination. The research effort should be collaborative in order to efficiently gain understanding the effects of toxic contamination in achieving the biological objectives of the program. Research proposals should be reviewed and coordinated by a group of regional experts.

Rationale: Toxic contamination can reduce the survival and reproductive capability of fish species. Uncertainties lie in the effects of specific chemicals on individual species. Resident species, such as sturgeon, have a longer exposure to toxic contaminants. Anadromous species are exposed to toxic contaminants during migration, spawning and early life histories.

Research efforts should quantify the amount of toxic contaminants in the system. The amount of each toxic contaminant and exposure to each species should be identified to assess the biological effects on each species. For toxic contaminants, such as mercury, the environmental conditions leading to the formation of more toxic forms should be identified and recommended actions to minimize these effects developed. Research efforts should also include identifying the source of the toxic contaminants, where possible.

Recommendation 2: *The tribes do not support mass marking and mark selective fisheries as a general practice.* The Council should support*, only to the extent necessary*, collaborative efforts to address critical uncertainties and measure the impacts of mass marking and mark selective fisheries on obtaining the biological goals of the Fish and Wildlife Program. Efforts should emphasize the impacts of releasing unmarked fish on achieving spawning escapement objectives for naturally spawning populations. The release mortality rate is a key uncertainty and quantifying release mortality assumption through data collection will provide an understanding of the effects of mark selective fishing on reaching biological objectives. Studies to quantify release mortalities shall be reviewed and implemented by the state agencies and tribes.

Rationale: Mass marking of hatchery fish clipping the adipose fish provides a way for fishermen to visually identify hatchery fish during fishing seasons. Mark selective fisheries theoretically allow fishermen to access abundant marked hatchery fish while minimizing harvest impacts on unmarked naturally spawning fish. The implementation of mark selective fisheries expanded significantly after the listing of salmon populations for protection under the Endangered Species

Act. The number of released fish has increased substantially and the effects of release mortality on escapement are uncertain. This uncertainty casts doubt on the central theory of minimal impacts on umarked naturally spawning fish.

Release mortality rates vary due to a number of factors. Each fishery has a different set of factors to consider in determining the release mortality rate. Some species are more tolerant of handling during mark selective fisheries. Type of fishing gear is another factor, as is the experience of the fishermen. Environmental factors, such as water temperatures, can also contribute to the release mortality rate. A better understanding of the release mortality rate by fishery will help fishery managers adjust fisheries to assist in reaching biological objectives.

2.8 The Independent Scientific Advisory Board and their Review of the 2009 Columbia River Basin Fish and Wildlife Program.

Recommendation: The ISAB should not stray beyond their scientific expertise and into the areas of policy in providing reports and project reviews. If policy issues are reviewed and reported, the Council should independently verify the relevance of the issue or provide its own independent assessment.

Rationale: The ISAB was established to provide "independent scientific advice to the region with the intent to avoid gridlock over scientific uncertainty, circumvent unnecessary scientific research, and resolve conflicting advice and opinions on recovery issues and measures (pg. 66)."

3.0 Program Performance Objectives

3.1 Coordinated Assessments Monitoring and Reporting

Current Program: Pages 24-26, Monitoring, Evaluation, Research, and Reporting Strategies

The Council should support the Coordinated Assessments project to **report** on the indicators of natural origin spawners (NOR), smolt to adult return (SAR), adult to adult recruitment (AAR), and juveniles per spawner (JpS) for Columbia River salmon and steelhead populations.

Approximately 78 million dollars are spent annually on anadromous monitoring in the Columbia Basin. We need to find funding efficiencies through better coordinated efforts. This information is used to determine a population status and trend, effectiveness of habitat restoration, and for many other purposes. A variety of anadromous population data has been collected across various life stages and is reported by individual project sponsors in their annual reports. While this reporting is valuable at the project reporting scale, it is difficult to synthesize for reporting at the larger geographic scales such as the population, subbasin, province, major population, DPS/ESU, or Columbia Basin scales. In addition, there are many possible indicators that could be used for reporting. In 2010, fisheries agencies and tribes started the Coordinated Assessments

(CA) project to standardize indicators for reporting across spatial scales and a data exchange standard to facilitate the associated data sharing. This was followed up with a pilot project that successfully demonstrated the proof of concept for this project. The CA project has now moved to the implementation phase, which includes modifying and developing new agency databases for storing raw and summarized data, analysis tools, and reporting databases. The agreed upon CA indicators track specific life stage survival and/or abundance of salmon and steelhead to provide the information needed for adaptive management process in the Columbia Basin and provide the necessary data for the FCRPS BiOp. These are the key indicators used for population status and trend analysis and for NOAA to determine population status under the ESA. The Program should continue to support this successful effort and expand the CA process to develop data sharing standards for resident fish and wildlife data.

3.2 Data Management

Current Program: Pages 24-26, Monitoring, Evaluation, Research, and Reporting Strategies

The Council, tribal, state and federal natural resource managers agree that an information feedback process is required to inform management decisions about the use of fish and wildlife resources. Often this feedback process is characterized as "Adaptive Management," but this activity has not been funded or implemented.

A clear set of measurable biological objectives at various scales within the Program (high level indicators) could provide a top-down monitoring framework with which to guide data management infrastructure. A plan and process for reporting against those objectives could serve as an adaptive management tool for evaluating success of strategies and actions within the Program at each level.

A critical part of an adaptive management process is the collection, storage and analysis, and presentation of information about natural resources in a way that is useful to decision makers. Yet this critical activity has received little recognition and even less support in the Fish and Wildlife Program. The following actions are needed to rectify this oversight:

- Use the StreamNet and Pacific Northwest Aquatic Monitoring Partnership (PNAMP) forums for development of the technical issues and tools necessary for coordinated data management. Extend this forum over time to include wildlife and terrestrial habitat data and other key sources of fish and wildlife related data sources (especially the Corps and LSRCP, but others such as the USFS, BLM, BOR, NRCPs, etc.);
- Use the updated F&W Program as the starting point for developing a coordinated data management system based on explicit reporting requirements adopted by the Council.
- Expand the Coordinated Assessment Project effort (under StreamNet and PNAMP) to develop data standards and sharing processes for derived data to support ESA and Fish and Wildlife Program reporting needs;
- Incorporate concepts consistent with the Council staff Draft Guidance for Information Management, Evaluation and Reporting; and
- Incorporate concepts consistent with the Council staff Draft Guidance for a Balanced and Coordinated Approach for Conducting Monitoring and Research Activities.

As genetic knowledge and analytic power increases, potential applications become more apparent. A coast-wide database for microsatellite data (GAPS) was developed with NOAA support. However, NOAA is discontinuing its support for the maintenance of this system. In recent years SNP genetic data have been developed and are being used for a wide array of analyses, including Parentage-Based Tagging of various steelhead and salmon populations. The IDFG is developing a framework for storing and sharing SNP data, but it needs to be integrated with regional data sharing efforts and systems and there is no funding for management of this database over time.

PNAMP should convene a small work group of involved geneticists and policy representatives to design needed structures and processes to manage, share and apply fish and wildlife genetic data to programs under its Fish and Wildlife Program.

A work group should be formed of data analysts (e.g. from the NOAA AMIP process and the *U.S. v Oregon* Technical Advisory Committee) and policy-level data users to review the existing and expanded data management efforts and recommend actions to coordinate and improve the efficiency of data sharing efforts to meet management needs. A system developed to meet the needs of these higher-level data users will be more likely to improve resource management than one designed by data managers who are often not part of decision processes. Implementation of a true adaptive management process will require the coordinated management, sharing and interpretation of more types of data than are presently available. Presently, the Coordinated Assessment project is working with StreamNet to provide access to some of the VSP indicators for natural and hatchery salmon and steelhead populations. However, development of data streams to support the Council's High Level Indicators will require additional data on habitat conditions, fish genetics, resident fish and wildlife populations. Additional resource management agencies (e.g. Corps of Engineers, Forest Service, Fish and Wildlife Service, Bureau of Reclamation, Bureau of Land Management, Natural Resource Conservation Service, and others) should also be engaged. A system to share this information will be more expensive to manage and less effective in sharing data if it is done piecemeal and without an overall unifying vision of how the pieces should fit together.

3.3 Hatchery Effectiveness Monitoring

Current Program: Pages 18-19, Artificial Production Strategies, and Pages 24-26, Monitoring, Evaluation, Research, and Reporting Strategies

Recommendation: Insert a new bullet under *Artificial Production Strategies* (page 19), or under *Reporting and Data Management* (page 25) as follows:

"Hatchery Effectiveness Monitoring: The minimum reporting indicators for successful hatcheries to meet the Council's Artificial Production Review are: 1) the number of juveniles released by life stage, and 2) the components of total adult hatchery production, which include the number of hatchery adults returning to the hatchery, spawning in rivers, and caught in fisheries. These indicators can be used to assess whether facilities are meeting their mitigation requirements, as well as conservation and/or harvest benefits common of all hatchery programs."

Rationale: Currently, approximately 26 million dollars are spent annually on hatcheries in the Columbia Basin to mitigate for losses cause by the FCRPS and it is important for the Council to track the effectiveness of hatchery programs. Hatcheries and individual hatchery programs in the Columbia River have been reviewed by NOAA through the Columbia Basin Hatchery Environmental Impact Statement and Hatchery Genetic Management Plans, the Hatchery Science Review Group, and the Independent Science Review Panel. In addition, the Council has developed an Artificial Production Review (ARP) Process (NPCC 1999). The NPCC (2004) judged a hatchery program to be successful if it met the following conditions: 1) it must produce a healthy and viable hatchery population; 2) it must make a sustainable contribution of adult returns to conservation and/or harvest; 3) its potential effects on wild and native populations and the environment must be understood, and 4) it must collect, record, evaluate, and disseminate information pertaining to the first three conditions so that decision-makers may be informed about the benefits and risks of the program relative to other means of achieving similar conservation and harvest goals. In addition to these conditions, a primary concern of the tribes is the mitigation requirement under the FCRPS that pertains to treaty rights. While it is the responsibility of hatchery operators and funders to develop specific hatchery goals, the purpose of this amendment is to develop interim indicators that provide measures hatchery performance for the Council's role in hatchery oversight and to meet its reporting requirements. The minimum reporting indicators for successful hatcheries are 1) the number of juveniles released by life stage, and 2) the components of total adult hatchery production, which include the number of hatchery adults returning to the hatchery, spawning in rivers, and caught in fisheries as these can be used to assess the conservation and harvest benefits of all hatchery programs. In addition to compiling this information in a report (see Roler 2012 for an example of total adult production report), we recommend a reporting database for these hatchery indicators be funded possibly through StreamNet.

References cited:

Northwest Power Planning Council. 1999. Artificial Production Review. Council document 99-15, Northwest Power Planning Council, Portland, OR.

Northwest Power Planning Council. 2004. Artificial Production Review: Final Basin Level Report. Council document 2004-17, Northwest Power Planning Council, Portland, OR.

Roler, R., and E. Olk. 2012. Annual Coded-Wire-Tag Program, Washington: missing production groups annual report for 2010. Washington Department of Fish and Wildlife. Prepared for Bonneville Power Administration. Project No. 1982-013-04, Contract No. 55548.

4.0 Species Focused Recommendations

4.1 Integration with Endangered Species Act

Current Program: Pages 3-4, The Program Framework, and throughout

Recommendation: The Program should reflect the principles of Secretarial Order 3206 "American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act (June 5, 1997)" to harmonize the Endangered Species Act with tribal rights and interests.

Rationale: This Order is issued by the Secretary of the Interior and the Secretary of Commerce (Secretaries) pursuant to the Endangered Species Act of 1973, 16 U.S.C. 1531, as amended (the Act), the federal-tribal trust relationship, and other federal law. Specifically, this Order clarifies the responsibilities of the component agencies, bureaus and offices of the Department of the Interior and the Department of Commerce (Departments), when actions taken under authority of the Act and associated implementing regulations affect, or may affect, Indian lands, tribal trust resources, or the exercise of American Indian tribal rights, as defined in this Order. This Order further acknowledges the trust responsibility and treaty obligations of the United States toward Indian tribes and tribal members and its government-to-government relationship in dealing with tribes. Accordingly, the Departments will carry out their responsibilities under the Act in a manner that harmonizes the Federal trust responsibility to tribes, tribal sovereignty, and statutory missions of the Departments, and that **strives to ensure that Indian tribes do not bear a disproportionate burden for the conservation of listed species**, so as to avoid or minimize the potential for conflict and confrontation.

4.2 Lamprey

Current Program: various sections

Recommendation 1: Edit third bullet under *Habitat* on Page 7 to read: "*Ocean conditions should be considered in evaluating freshwater habitat management and to understand all stages of the salmon, steelhead* ***and Pacific lamprey*** *life cycles.*"

Recommendation 2: Insert new second paragraph under *Anadromous Fish Losses* on Page 11 as follows: "***No comparable analysis exists for Pacific lamprey; however, it is apparent that losses have been substantial. The Council recognizes and supports efforts to restore Pacific lamprey numbers, including adoption of the Tribal Pacific Lamprey Restoration Plan for the Columbia River Basin and the USFWS Pacific Lamprey Conservation Agreement into the Fish and Wildlife Program. Restoration of Pacific lamprey numbers and directed mitigation for hydrosystem lamprey losses should incorporate actions recommended in these plans."***

Recommendation 3: Insert new bullet under *Anadromous Fish Losses* on Page 11as follows: ***"Continue restoration of Pacific lamprey by (1) restoring lamprey passage and habitat in the mainstem and in tributaries that historically supported spawning lamprey populations, (2) continuing efforts to translocate adult Pacific lamprey to appropriate areas to reduce upstream passage losses, and (3) evaluating artificial propagation as a way to mitigate for lost lamprey production when passage and habitat improvements alone are insufficient. Attain self-sustaining and harvestable populations of lamprey throughout their historic range."***

Recommendation 4: Revise second bullet under *Objectives for Environmental Characteristics* on Page 13 to read: "*Protect, enhance, restore, and connect freshwater habitat in the Columbia River mainstem and tributaries for the life history stages of naturally spawning anadromous and resident salmonids* ***and Pacific lamprey****."*

Recommendation 5: Revise fourth paragraph under *Habitat Strategies* on Page 14 to read: "*For example, passage through the hydrosystem causes loss to salmon, steelhead, lamprey and resident fish. Measures at the dams can and should be taken to reduce this loss. As an offset for hydrosystem-caused losses, the Program* ***~~may also~~ calls*** *for improvements in spawning and rearing habitats in tributaries, the lower river, and estuary. By restoring these habitats, which were not damaged by the hydrosystem, the Program helps to compensate for the existence of the hydrosystem.****"***

Recommendation 6: Insert new section ***g. Pacific Lamprey Production*** on Page 19:
"The Council recognizes progress in the development of a Framework for Pacific Lamprey Supplementation Research in the Columbia River Basin. Translocation efforts have been successful at increasing adult spawning activity, larval recruitment, and larval distribution and have provided important Pacific lamprey life history information. Current and future translocation actions should be guided by the lessons learned from ongoing efforts.

It is not likely that fragmented, isolated or non-existent lamprey groups within the Columbia River Basin will naturally recolonize the upper portions of their range given the paucity of adult returns and numerous threats, including the existing mainstem environment. Therefore, the long-term restoration of Columbia River Basin lamprey may require the structured release of artificially propagated lamprey in priority areas to achieve a variety of management and conservation objectives.

- ***Continue development and implementation of lamprey translocation in accordance with tribal guidelines as a component of a regional recovery plan***
- ***Evaluate the role of lamprey artificial propagation as a research tool and for supplementation of local groups"***

Recommendation 7: Add sentence to opening paragraph for *Primary Strategy* on Page 31 as follows: "*Identify the effects of ocean conditions on anadromous fish survival and use this information to evaluate and adjust inland actions.* ***This should include evaluating the effects of ocean harvest on Pacific lamprey food resources.***"

Recommendation 8: Revise *Manage for Variability* on Page 31 to include Pacific Lamprey in the text.

Recommendation 9: Revise third bullet under *Estuary Strategies* on Page 32 to include Pacific Lamprey.

Recommendation 10: Revise first paragraph under *Vision of the Mainstem Plan* on page 35 as follows: "…*especially spawning, rearing, resting, migration,* ***and over-wintering habitats*** *for salmon, steelhead, lamprey, sturgeon, and resident fish populations."*

Recommendation 11: Revise second bullet under *2. Specific Objectives*… on Page 36 to read: "*Protect, enhance, restore and connect freshwater habitat in the mainstem for the life history stages of naturally spawning anadromous and resident salmonids* ***and lamprey****. Protect and enhance ecological connectivity between aquatic areas, riparian zones, floodplains, and uplands in the mainstem."*

Recommendation 12: Revise third bullet under "*Migration and passage conditions for anadromous fish*" on Page 38 as follows: "*The Council will consult with ...to determine the possibility of adopting hydrosystem survival performance standards for non-listed populations of anadromous fish including lamprey.* ***Efforts should be implemented to adopt an interim passage standard for adult Pacific lamprey of 80% per mainstem dam to be accomplished within 10 years and to improve passage further in subsequent years."***

Recommendation 13: Revise final bullet under *Water Quality* on Page 44 as follows: "*Implementing actions to reduce toxic contaminants in the water to meet state, tribal and federal water quality standards. The federal action agencies should partner with and support federal, tribal, state, and regional agencies' efforts to monitor toxic contaminants in the mainstem Columbia and Snake rivers and evaluate whether these toxic contaminants adversely affect anadromous or resident fish important to this Program. If so, implement actions to reduce these toxic contaminants or their effects if doing so will provide survival benefits for fish in mitigation of adverse effects caused by the hydropower system. In particular, investigate whether exposure to toxics in the mainstem, combined with the stress associated with dam passage, leave juvenile salmon* ***and adult and juvenile lamprey*** *more susceptible to disease and result in increased mortality or reduced productivity."*

Recommendation 14: Revise introductory text under *Lamprey and Sturgeon Passage*, *a. Lamprey*, on Page 47 to read: "***In recent years awareness of the effects of the hydrosystem on lamprey has increased, and the need for substantial additional effort addressing lamprey has become an emerging issue.*** *In the Columbia River Basin…. (retain entire existing paragraph).*

Artificial propagation needs to be evaluated as a tool for restoring lamprey and mitigating for losses. Development of life-cycle and bioenergetics models will help identify critical limiting factors and prioritize recovery actions. Budgets and staffing must be adequate to monitor the effects of actions taken to address lamprey issues."

Recommendation 15: Revise/add bullets under *Lamprey* on Page 47 as follows: "*Bonneville and the Corps, in coordination with federal, state, and tribal fish managers and the Council, should* ***~~implement the following measures to improve adult and juvenile Pacific lamprey passage survival and reduce delays in migration~~ identify, develop, implement, and monitor measures to help restore Pacific lamprey including****:*

- ***~~Identify~~*** *Specific fish passage structures* ***for adult and juvenile lamprey***
- ***Regional approaches to evaluate passage, abundance, distribution, and population structure, including the mainstem Columbia, Snake and Willamette rivers***
- ***Develop tags suitable for adult and juvenile lamprey and a regional lamprey tagging forum***

- ***Develop a regional strategy for monitoring passage into tributaries to better understand differences in counts of adult lamprey between dams***
- ***Increase knowledge regarding the use of the mainstem as spawning habitat***
- *Identify operations at mainstem hydropower dams* ***such as ramping rates and water elevation changes*** *that delay, obstruct, or kill migrating* ***adult and juvenile*** *lamprey*
- ***Monitor and address effects of hydrosystem operations on juvenile lamprey residing in reservoirs***
- *Develop and implement* ~~***lamprey***~~ *passage aids* ***for adult and juvenile lamprey*** *at known passage obstacles*
- *Monitor lamprey passage at mainstem hydropower dams to evaluate passage improvement actions and to identify additional passage problem areas,*
- *Assess lamprey passage efficiency, direct mortality, and/or other metrics relating to migratory success of lamprey*~~***, and***~~
- *Determine predation on* ***adult and juvenile*** *lamprey during* ~~***mainstem passage***~~ ***migration***
- ***Determine the potential effects of climate change on lampreys, including the effects of increasing water temperatures and changing runoff regimes on lamprey energetics and performance. Develop adaptation strategies to address these affects, and***
- ***Support the USFWS Pacific Lamprey Conservation Agreement through collaborative development and management of data."***

Recommendation 16: Revise text under *Reintroduction of Anadromous Fish in Blocked Areas* on Page 56 as follows: "*....evaluate the feasibility of salmon, steelhead,* ***and Pacific lamprey*** *reintroduction, consistent with the objectives in the appropriate subbasin plans."*

Recommendation 17: Revise first paragraph under *Updating Existing Subbasin Management Plans* on Page 58 as follows: "*The Council recognizes that work has continued in some subbasins to refine and update management plans. The Council also recognizes that work has continued outside the Program, such as recovery planning, and the* ***Tribal Pacific Lamprey Restoration Plan****, that will influence implementation of the Council's Program at the subbasin level. The Council recognizes the objectives and recommended actions of the Tribal Pacific Lamprey Restoration Plan as updates to subbasin plans."*

Reference: Fish and Wildlife Co-Manager Reference #5.3

4.3 White Sturgeon

Current Program: Page 12, 39, 41, 43, 47-49, 53, and 55

Measure: The Council should build a sturgeon program of short-term and long-term measures based on the recommendations from the Draft 2013 Framework, "Columbia River Basin White Sturgeon Planning Framework."

Recommendation 1: The Program should consolidate measures intended to address sturgeon restoration.

Rationale: White sturgeon are widely recognized as iconic mainstem fish species severely affected by construction and operation of the hydrosystem (ISAB 2013, Draft framework 2013, ISAB programmatic review, Kootenai and select Zone 6 sturgeon reports 1995 and 2012). About "4% ($9.5 million) of annual direct Fish and Wildlife Program expenditures of $246 million in 2012 were dedicated to white sturgeon. Kootenai sturgeon projects account for the majority of sturgeon-related expenditures ($6.5 million). The remainder is distributed among one general and six accord projects" (Draft Framework 2013). The Council's Fish and Wildlife Program accounts for just a portion of total expenditures within the basin to restore white sturgeon populations. Four non-FCRPS hydropower entities, Idaho Power Company, Grant PUD, Chelan PUD, and Douglas PUD, fund substantial white sturgeon restoration programs within the reaches impacted by their hydropower projects.

"Of all fish species in the Basin, the status of white sturgeon is most strongly tied to conditions in the mainstem, which are directly affected by the hydrosystem. The white sturgeon has declined greatly in abundance throughout most of the Columbia Basin. Only the population segment below Bonneville Dam still shows substantial natural recruitment, despite the fact that it is affected by hydrosystem operations at all dams upstream. It is anticipated that diminished natural recruitment will be a major factor influencing sturgeon status and the sustainability of harvest fisheries. Natural recruitment of sturgeon is potentially affected by hydrosystem operations directly, through blocked passage or inundation of preferred spawning areas, and indirectly, through the effects of water flow and sediment release on spawning success. In addition, recently documented predation on adult sturgeon by Steller sea lions just below the Bonneville Dam may threaten that population (ISAB 2013)"

In response to a Council request, sturgeon project sponsors recently completed a basin-wide framework plan for white sturgeon that synthesizes existing information and recommends actions to address limiting factors and information gaps. Strategic recommendations should be incorporated in to the mainstem plan as a sturgeon chapter. After ISRP review, the framework should be adopted into the Program.

4.4 Eulachon

Current Program: Lower Columbia Subbasin Plan (1 paragraph on Page 2-18)

The Program currently does not address eulachon, an anadromous fish native to the Columbia River, and a species listed as threatened under the Endangered Species Act. This species has been heavily impacted by changes to the lower mainstem and estuary caused by construction and operation of the hydropower system. Substantial changes to flow, sediment delivery and the food web in the lower river have been well documented.

Measures are needed to address uncertainties regarding the effect of changes in the Columbia River hydrograph on survival, productivity and recovery potential of eulachon. As the Northwest Power Act directs the Council to develop a program to protect, mitigate, and enhance fish and wildlife in the basin affected by the development, operation, and management of hydroelectric projects, the Council should update the Program to include eulachon and develop biological objectives for this species. As eulachon are listed as a threatened species under the

Endangered Species Act, NOAA is in the process of developing a recovery plan, and has prepared a Federal Recovery Outline for eulachon that includes recovery tasks as part of a preliminary recovery strategy. The recommended measures are consistent with NOAA's Federal Recovery Outline for eulachon. Recovery of ESA-listed species is consistent with the Program's goals and objectives.

4.5 Freshwater Mussels

Current Program: Freshwater Mussels not included

Recommendation: Include language in the Fish and Wildlife Program to recognize the importance of freshwater mussels regarding ecosystem diversity, function, and traditional cultural opportunities in the basin:

Rationale: Freshwater mussels are critically endangered world-wide. In western North America (genera Anodonta, Margaritifera, and Gonidea) are notoriously understudied, although they have historically been a major component of the biomass in western aquatic systems and likely have a disproportionately large impact on ecological stability and processes in these systems. Freshwater mussels were historically abundant in the Columbia Basin and can provide a myriad of ecosystem services that benefit other aquatic species, including salmonids. Recent studies suggest that freshwater mussels also benefit Pacific lamprey populations, in part by retaining organic matter in the system. Freshwater mussels have been harvested for food and shell material by Native Americans for over 10,000 years and are considered an important cultural resource.

Recently BPA and CTUIR have funded pioneering work on the genetic composition, taxonomy, host fish, physiology and habitat associations of western freshwater mussels. Now that some of the basic questions (e.g., genetics, host fish) regarding western freshwater mussels have been answered, applied pilot actions and research can be appropriately designed and implemented to begin reintroduction and restoration efforts. Such studies and pilot efforts are critical for effective monitoring, conservation, and informing expanded restoration programs.

Measures: The pilot freshwater mussel project should continue and move from a research phase into a restoration and monitoring phase that will provide critical information regarding reintroduction and restoration that can be later applied to a larger scale.

5.0 Habitat

5.1 Address Toxic Contaminants

Current Program: Page 42-44, Water Quality

Both the Independent Scientific Advisory Board (2013) and the Independent Scientific Review Panel (2013) recommend that the Program take a more active role in ensuring that toxic

contamination be addressed. BPA and other federal agencies should act on these recommendations and take the following actions to mitigate for the effects of toxic contamination on fishery resources that are exacerbated in a river system heavily altered by the federal hydropower system:

Recommendation: Insert the following language into the Fish and Wildlife Program that recognizes fishery resources are clearly affected by toxics that have accumulated due to the development and operation of the federal hydropower system:

"Fishery resources are clearly affected by the development and operation of the federal hydropower system. Dam presence is associated with the accumulation of contaminated sediment (Colas et al., 2013) and the presence of reservoirs and their operations are a controlling factor on the chemical conditions such as anoxia, which impact the distribution and bioavailability of toxics in the system. An example of a specific impact caused by the dams is to sturgeon; once anadromous, sturgeon are now blocked in reservoirs and subjected to contaminants year-around at contaminant levels exacerbated by the reservoirs."

Measure 1: The U.S. Army Corps of Engineers, in coordination with BPA, should fund and implement a programmatic review and assessment of how hydropower projects affect problems associated with the effects of toxic substances in the mainstem Snake and Columbia Rivers and opportunities for operational changes or other actions to help mitigate these impacts and reduce toxic contamination. Determine how seasonal anoxia in dam reservoirs controls the release of toxics and other pollutants from the sediments to the water column and how the uptake and transfer of these toxics and pollutants transfer up the food web and negatively impact fish. Evaluate how environmental toxicants impact the reproductive fitness of fish that are impounded behind dams.

Rationale: Feist et al. (2005) evaluated whether evidence of reproductive endocrine disruption could be correlated to specific areas within the Columbia River system and found that fish residing in the reservoirs behind the oldest dams had the highest contaminant loads and incidence of reproductive abnormalities. Their data suggest that endocrine-disrupting chemicals may be accumulating behind dams over time and that the exposure of fish to these chemicals may be affecting the growth and reproductive physiology of fish in impounded areas of the Columbia River.

The ecological risk of mercury toxicity is directly related to the production of the bio-accumulative and toxic organic form, methylmercury, which is driven by specific biogeochemical parameters. Importantly, many of those parameters are directly linked to factors associated with water management activities such as water inundation and wetting and drying cycles, organic carbon and nutrient cycling and inputs from upland terrestrial habitats. Reservoirs are among the most common managed hydrological features on the western landscape with a high likelihood for enhancing methylmercury production, transport, bioaccumulation, and risk to fish, wildlife, and human health. Thus, a better understanding of linkages between reservoir management and mercury risk is needed in order to develop approaches to minimize the environmental risks due to mercury while still meeting critical water needs in the Columbia River Basin.

Although it is generally well documented that mercury concentrations in some organisms in aquatic ecosystems and reservoirs of the Columbia River Basin exceed those considered safe for ecosystem and human health, little is still known about which factors are most important in driving variation in mercury concentrations among reservoirs, and what management options present the most effective opportunities for controlling mercury risk. Therefore, a research focus that addresses the following items will better inform resource managers and facilitate future amelioration opportunities:

- Levels of mercury and variation in bio-indicator taxa across reservoirs in the Columbia River Basin.
- Influence of seasonal drawdown and flood-up patterns on methylmercury cycling and bioaccumulation in Columbia River Basin reservoirs.
- Influence of lake stratification, dissolved oxygen, and primary production on mercury cycling and bioaccumulation in Columbia River Basin reservoirs.
- The influence of fish growth, condition, and energetics on mercury bioaccumulation rates and fish mercury concentrations in Columbia River Basin reservoirs.
- The influence of food quality and energy content on mercury bioaccumulation rates and fish mercury concentrations in Columbia River Basin reservoirs.
- The role that variation in littoral versus pelagic foraging reliance plays in driving mercury bioaccumulation pathways in Columbia River Basin reservoirs.
- The influence of prey/forage fish community structure and species assemblages on mercury exposure in top predator fishes in Columbia River Basin reservoirs.
- Biochemical, behavioral, and reproductive effects of mercury in fishes and aquatic dependent wildlife in Columbia River Basin reservoirs.

Measure 2: BPA should help fund collaborative partnerships through a forum where governmental entities and co-managers can discuss and develop regional toxic-reduction strategies. In addition to whatever priorities are identified at this forum, components of the strategy should include:

- Identification of the principal sources of toxic substances that impact the Basin;
- A coordinated process for identifying emerging contaminants of concern; and
- A 30-year implementation schedule to achieve toxic reduction objectives, with decadal benchmarks, that could be used to inform a state or federal legislative response.

Rationale: Toxic contamination is a complex issue, and a coordinated, common approach by all co-managers is needed to mitigate the threat to fishery resources. The Council is in a position to provide leadership on this issue and to collaborate with ongoing efforts to reduce toxics in the Columbia River Basin. In September 2010, EPA and the Columbia River Basin Toxics Reduction Working Group released the Columbia River Basin Toxics Reduction Action Plan with 5 initiatives and 61 actions to reduce toxics in the Columbia River Basin (EPA, 2010). Collaboration in the past has produced significant advancements in toxics monitoring of fishery resources. In 2007, BPA, the Lower Columbia Estuary Partnership, NOAA Fisheries, and USGS produced the only robust sampling of toxics in juvenile salmon in the Columbia Basin (LCREP, 2007).

Measure 3: The Program should fund studies to determine which toxic contaminants most limit the restoration success of anadromous and resident fish and in particular determine how contaminants interfere with the reproduction and/or rearing success of key species such as white sturgeon and Pacific lamprey, as well as threatened and endangered salmonids, that are known to be vulnerable to bioaccumulation of toxins. The footprint of existing contamination and the location of known toxic discharges should be mapped in relationship to fish and wildlife populations and habitat restoration efforts and monitored as part of a basin-wide monitoring program. Assess foodweb transfer, sediment transport, and biological effects of emerging and legacy organic contaminants under current management regimes, and how those processes affect key Columbia River species and the success of restoration projects within the basin.

Rationale: Various stressors threaten native fishes and other wildlife in the Columbia River basin. Urbanized large aquatic ecosystems are experiencing increasing contamination of water and sediment and ultimately foodwebs. Contaminants of concern include both legacy compounds such as DDT and PCBs that are still present in the system, as well as chemicals of emerging concern (CECs) such as pharmaceuticals and personal care products. Use and release into the environment of CECs is increasing, although little is known about their harmful levels and effects. Several interdisciplinary studies have been carried out in recent years to assess impacts of different classes of contaminants in several levels of the foodweb in the Columbia River.

The USGS Columbia River Contaminants and Habitat Characterization (ConHab) project investigated transport pathways, chemical fate and effects of endocrine disrupting chemicals in the foodweb in the lower Columbia River and found that bio-magnification of multiple contaminants occurred in resident fish and osprey eggs, environmental quality benchmarks were exceeded in some cases, and reproductive parameters showed impairment at some sites and were significantly negatively correlated with various contaminant concentrations (Nilsen et al., in press; Nilsen and Morace, in press). In some species of vertebrates, these chemicals alter thyroid function, reduce sperm counts, and delay sperm maturation (Kuriyama et al., 2005) among other impacts. NOAA researchers have found multiple contaminants, including polycyclic aromatic hydrocarbons, PCBs, and DDTs in several stocks of Columbia River juvenile Chinook salmon (Yanagida et al. 2012; Johnson et al. 2013), often at concentrations associated with increased disease susceptibility (Arkoosh et al., 1998) and altered growth and metabolism (Meador et al. 2002, 2008). Juvenile salmon are also exposed to chemicals of emerging concern (CECs), such as environmental estrogens and the endocrine-disrupting flame retardants, polybrominated diphenyl ethers (PBDEs; LCREP 2007; Sloan et al. 2011). Better understanding of these effects on key first foods species is needed.

In addition to understanding bioaccumulation and exposure pathways though food webs, there is a need to assess the indirect food-web mediated effects of contaminants on key species. Modern insecticides, metals, and other contaminants are highly toxic to the insects and crustaceans that constitute the prey base for salmon and other fish species. This raises the possibility that insecticides and other contaminants are compromising the biological integrity of critical foraging habitats for ESA-listed species, and putting these stocks at risk by reduced prey quality and quantity (Macneale et al. 2010). New research is needed to better understand how water quality improvements will enhance aquatic community diversity and abundance, as well as prey quality.

Critical uncertainties in understanding impacts of contaminants on key species and foodwebs in the Columbia River basin include:

- Chemicals of emerging concern (CECs) levels of concern to the health of key species including Pacific lamprey, white sturgeon, and salmonids.
- Impacts of CECs on the carrying capacity of the Columbia River ecosystem for juvenile salmonids and other key species.
- Impacts of contamination on habitat restoration success: Contaminants of concern should be assessed and monitored as part of current and future river restoration programs.
- Role of contamination in reduced rearing success of white sturgeon in impounded pools: Impacts of contaminants on sturgeon reproduction and rearing success within areas of known high productivity. Comparison of potential contaminant impacts on impounded versus unimpounded populations.
- Role of contamination on Pacific lamprey declines compared to threats from hydropower operations, such as dam passage. Assess levels of concern and effects of chemical mixtures.
- Investigate impacts of different hydrologic scenarios and management actions on contaminant distributions and foodweb transfer.
- Distributions, levels, and spatial patterns of contaminants of emerging concern (CECs) in the Columbia River basin including the estuary and coastal ocean.
- Impacts of contamination from abandoned vessels: Abandoned vessels should be inventoried and mapped in relation to potential impacts to aquatic species.

Measure 4: The Program should fund investigations of the cumulative and/or synergistic effects of multiple toxic contaminants particularly pesticides on riparian insects and other organisms that impact the carrying capacity of the Columbia River ecosystem, as well as interactions between these chemicals and non-chemical stressors.

Rationale: Mixtures of organophospate and carbamate pesticides are commonly detected in fresh water habitat that supports key species of interest to the Fish and Wildlife program. These pesticides interfere with behaviors that are essential for salmon survival. Some pesticides interact to produce synergistic toxicity in salmon (Laetz et al., 2009) and showed greater degree of synergism at higher exposure concentrations. Several combinations of organophosphates were lethal at concentrations that were sublethal in single-chemical trials. Single chemical risk assessments are likely to underestimate the impacts of insecticides in river systems where mixtures occur.

Measure 5: The Program should support actions that prevent toxic contamination from entering the Columbia River Basin.

Rationale: The fish and wildlife actions identified in the Columbia Basin Toxics Reduction Action Plan (2010) stresses that measures, which include pollution prevention and green chemistry, need to be supported to achieve a reduction of toxic contaminants in the Columbia River watershed. Pollution prevention measures are less expensive and more effective, efficient and reliable than treating, recycling, or cleaning up pollutants after use. Toxics reduction efforts will contribute to the survival of key species, will complement other activities underway to restore stocks, and will enhance the effectiveness of habitat restoration efforts.

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5.2 Integrate Climate Change

Current Program: Page 51 – 52, Climate change planning considerations

We support maintaining funding emphasis on habitat projects, which enhance floodplain function and review current restoration, or habitat projects to ensure their resiliency under predicted future climate scenarios to ensure that investments made today are effective into the future.

Considerable efforts have been made in the Columbia Basin to develop, implement and evaluate strategies to protect and restore populations of salmon, Pacific lamprey, and resident fish and wildlife, but most of these efforts have generally not addressed climate change impacts and adaptation to these impacts. Climate change is expected to significantly alter the ecology and economy of the Pacific Northwest during the 21st century (Mantua et al. 2009; Schnorbus et al. 2011). Rising air temperatures and erratic changes in precipitation patterns are expected to decrease snowfall and increase rainfall during the winter months, leading to shifts in the timing and quantity of runoff, including increased flooding during the winter when water is already in ample supply, and decreased flows during the summer when water demands are high. These changes will have significant impacts for freshwater and marine fisheries, hydropower production, flood risk management and water supply for agriculture and municipal uses. The impacts from climate change affect fish and wildlife in a number of ways. Some examples include migration patterns being altered, spawning and rearing grounds degraded, dramatic increases in poor habitat and loss of water quality and the increase of predators, aquatic contaminants and invasive species (Mantua et al. 2010). Any of these factors could, if not addressed, lead to species extinction.

In addition, particularly in the summer, other human water uses will create intense competition for limited water supply and will thus tax fish populations that are already in a precarious status. Thus, the human dimensions of climate change must be integrated into consideration of climate change impacts and adaptation on basin ecosystem function (Miles et al. 1999).

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5.3 Implement Predator Control

Current Program: Page 52, **Avian predator control**

Measure: The Council should adopt into the Program, and BPA and the action agencies should implement the management plans that have been developed through USACE processes for piscivorous avian species in the Columbia Basin and estuary. Incorporate any management plans that have been developed for double-crested cormorants, Caspian terns, and other avian species in the mid-Columbia River area and prioritize actions for implementation.

Rationale: The 2009 program called for the development of management plans for avian populations that have significant effect to native fish populations. The results of these efforts need to be included in the next iteration of the Program. Avian predators in the basin must be reduced in number and held to a level that promotes a greater survival of listed and non-listed salmonids and Pacific lamprey.

- Annual combined losses of out-migrating juvenile salmonids from Caspian terns and double crested cormorants nesting at East Sand Island have exceeded 15 million smolts since 2009. These losses equate to 15-20% of the basin's entire annual juvenile outmigration.

- East Sand Island is host to the largest colony of Caspian terns in world, despite efforts to reduce the overall size of the colony to a management goal of ~3,355 pairs, the population in 2012 was double this goal.
- Double crested cormorants on East Sand Island form the largest colony in North America. Since 2003 it has exceeded the 1997-2011 average of ~10,000 breeding pairs. Annually since 2010, the colony has consumed a minimum of 19 million smolts.
- A relatively small colony (~300 pairs) of Caspian terns nesting on Goose Island in Potholes Reservoir travel over 30 miles to the Columbia River to prey on out-migrating Upper Columbia steelhead. Impacts in recent years average 10-15% of the entire outmigration.

Reference: Fish and Wildlife Co-Manager Reference #7.4

Current Program: Page 52-53, **Pinniped predator control**

Measure 1: Identify opportunities to reduce fish losses through pinniped predator management.

Pinnipeds residing upstream of Bonneville Dam are of particular concern. Multiple pinnipeds are residing in the Bonneville pool and some of these animals have been in this area for over three years. These animals cannot complete their natural migration to reproduction areas and are severely impacting anadromous fish and fishers. The Corps should take action to improve the exclusion of sea lions at all main adult fish ladder entrances and locks at Bonneville Dam. Action agencies must make pinniped control and removal in areas upstream of Bonneville Dam a priority.

5.4 Prevent Establishment of Aquatic Invasive Species

Current Program: Page 18, Non-Native Species Strategies

Measure: In order to protect the federal Columbia River Power System assets, the Northwest Power and Conservation Council's Fish and Wildlife Program should support activities that are known to be effective at stopping the invasion and spread of zebra and quagga mussels, and invasive aquatic plants such as Eurasian milfoil and flowering rush. These activities include, but are not limited to, inspection and decontamination of boats moored in infested waters and then transported on our roadways in the region.

Recommendation: The Northwest Power and Conservation Council should continue to play a role in coordinating stakeholder groups around the issue of aquatic invasive species, particularly those that pose the greatest risk to the Columbia River Basin ecosystem and industries. In particular, the Fish and Wildlife Program should include specific language supporting the work of the 100th Meridian Initiative Columbia River Basin Team, which is coordinated by the Pacific States Marine Fisheries Commission. This group has provided strong, successful leadership on invasive species prevention efforts in the region. We recommend the Council ask for regular reports from 100th Meridian Initiative Columbia River Basin Team on the following items:

1. Current efforts for inspection and decontamination
2. Research priorities relative to invasive species control and prevention

3. Opportunities for collaboration and lessons learned

Rationale: It is imperative that the Region prevent further degradation of ecosystem function and to ensure protections for species recovery investments, water delivery infrastructure, and hydropower production from the potentially devastating impacts of invasive species, such as the infectious salmon anemia virus, and zebra and quagga mussels. Enhanced inspection and decontamination efforts in the region are important measures to prevent the inadvertent spread of invasive species. The Council should act as a leadership role as the key convener and coordinator in the Columbia Basin for science, policy and outreach.

5.5 Reintroduction of Anadromous Fish into Blocked Areas

Current Program: Page 56, Strategies in Specific areas

The coordinated development and operation of the Columbia River Basin by the U.S. and Canada has directly and indirectly decimated species of anadromous and resident fish and blocked access to substantial portions of their historical range. This outcome similarly decimated the culture, health, economy and spirituality of many Native American tribes. Decisions to block fish passage were made without the prior and informed consent or involvement of the Columbia Basin tribes.

The 2009 Fish & Wildlife Program includes language (page 56) to investigate "Reintroduction of anadromous fish into blocked areas." With innovative passage techniques completed and/or under development and testing throughout the US (e.g., Round Butte on the Deschutes River and several Willamette River Basin projects in Oregon; Howard Hanson Dam and Swift Reservoir, in Washington) it is timely to fully define this aspect of the Council's Program to require more active collaboration of the Bonneville Power Administration with the sovereigns and other responsible partners of hydro projects (investor owned, non-federal, and publically-owned) creating blockages to anadromous fish in the Columbia River Basin, to explore the feasibility of and to develop and implement new programs for the reintroduction of anadromous fish, include passage of adult and juvenile life stages, into these historical but currently blocked habitats.

Passage and reintroduction of anadromous fish is a key element of a truly integrated watershed approach to the Columbia River Basin and to the NPCC's Fish and Wildlife Program. For example, at each blocked area of the basin, reintroduction of anadromous fish would be assessed and if feasible, reintroduction and passage would proceed in an incremental phased approach (planning and design, testing, construction, evaluation and adaptation), progressing to later phases upon successful conclusions or outcomes from previous phases. These types of assessments would determine the feasibility of anadromous fish reintroductions, including costs, partnership opportunities among responsible parties and potential timelines for initiation of these programs.

5.6 Revisit Flood Risk Management

Current Program: Page 40-56

Recommendation 1: Adopt a Flood Risk Management Appendix for Fish and Wildlife program that follows the outline below. Specific reservoir elevations and flow targets to be provided pending modeling and analysis from Columbia River Treaty Review Iteration #3 alternative model runs.

Recommendation 2: Add to Basinwide Strategies - Flood Risk Management pursuant to Columbia River Treaty Review

- U.S. Columbia River Basin Flood Risk Policy Review: The Tribal, Federal, and State Sovereigns will conduct a region-wide public process to review the current level of flood risk management in the Columbia River basin to enhance ecosystem-based function. This will begin in 2013. The Treaty (post-2024 and before 2024 if feasible) should be designed to adapt to any such changes.
- U.S. Flood Plain Reconnection: Reconnect floodplains and wetlands throughout the basin to take advantage of spring peaking flows and as mitigation for damages caused by the implementation of the Treaty. The Tribal, Federal, and State Sovereigns will work with the Northwest Power & Conservation Council Fish and Wildlife Program and NOAA/NMFS Recovery Planning process (particularly estuary actions) to implement flood plain reconnection for the purpose of achieving additional benefits from a of modernized CRT operations.
- Water Supply Allocation: Once ecosystem-based functions have been achieved (including the achievement of the NPCC goals to double salmon runs and meet resident fish and wildlife objectives) and tribal reserved water rights have been addressed, the Pacific Northwest States and Tribes will design and initiate a process for the allocation of unallocated stored water. The Treaty (post-2024 and before 2024 if feasible) should be designed to adapt to any such changes.
- Flood risk management procedures should be modernized to incorporate a coordinated operation plan based on power production, flood risk management, and ecosystem-based function as equal primary drivers under the Columbia River Treaty (Treaty). Flood risk management pursuant to the Treaty should reflect a comprehensive approach that addresses all opportunities to manage high flow events, including floodplain management, additional levees, and strategic levee improvements. If Canada is not willing to amend the Treaty to provide continued coordinated operations, then the post-2024 Treaty flood risk management "called upon" provisions should be structured to provide adequate protection, avoid adverse effects on reservoir and river ecosystem-based function, and reasonably compensate Canada for their flood risk support.
- The Department of State should obtain long-term, coordinated, and assured Canadian storage that provides an adequate level of system flood risk management. Assured Canadian storage operations should be implemented prior to using U.S. “effective use” and “called upon” from Canadian storage.
- Flood risk management pursuant to the Columbia River Treaty should reduce reliance on reservoir storage, address management of peak flows, and increase flood risk management options by moving structures out of the flood plains (e.g. by incorporating conservation easements or by fee acquisition after thorough study and feasibility assessment), reclaiming lost flood plains to enhance ecosystem-based function and flood risk management, and, where necessary, constructing and/or modifying levees.

- U.S. reservoirs/projects should meet their authorized uses consistent with ecosystem-based function, treaties and trust responsibilities to Columbia Basin tribes and their applicable legislation and other U.S. laws such as the Clean Water Act, and Endangered Species Act.
- Flexibility is needed for adapting to changing objectives in the U.S. and Canada and to climate change to avoid additional risks to authorized purposes.
- Develop new storage reservation diagrams (SRDs) for eight system storage reservoirs.
- Reduce flood risk reservoir drafts in all but the highest water years.
- Local flood protection should be the highest priority.
- If the Department of State is not able to negotiate amendments to the CRT to provide continued coordinated operations, then the flood risk management program under the Treaty would need to:
    - Establish a common understanding of methods and procedures for post-2024 "called upon" flood risk management implementation and for reasonable compensation to Canada for economic losses and operating costs associated with that operation.
    - Develop Post-2024 "called upon" operations.
    - Consider "called upon" storage only if Canadian power drafts do not provide sufficient storage in conjunction with use of U.S. system flood storage.
    - Create storage reservation diagrams to incorporate ecosystem-based function.
    - Draft projects according to their future, modified storage reservation diagram (SRDs) consistent with integration of ecosystem-based function.
    - Operate both Canadian and U.S. projects to their expected power objectives and other project purposes, including Canadian local flood control, before making a "called upon" request.
    - Coupled with continued coordinated flood storage in Canada, limit "effective use" flood risk management operation after 2024 to the eight U.S. reservoirs authorized for system flood control – consistent with their meeting authorized purposes.
    - For implementation of the Treaty, the U.S. and Canada should develop and implement improved water forecasting procedures (i.e. establish official weekly or bi-monthly forecasts and increased monitoring capability) using the best available science and use these to coordinate U.S. and Canadian river operations.

6.0 Implementation Provisions

6.1 Review Implementation of Program Measures

Current Program: Page 63, Program Reporting

Recommendation: The Council should work with fish and wildlife managers and land and water management entities to identify opportunities to coordinate BPA project funding with other funding sources as appropriate to accomplish shared goals. Fish and Wildlife Program funds could leverage shared investments that support implementation of subbasin plans, recovery plans, salmon strongholds, and other mitigation and conservation strategies. The Fish and Wildlife Program and Council should:

- Create a liaison position to assist project sponsors in identifying complimentary (cost-share) grants, and
- Develop complimentary or shared grant application formats to standardize and simplify proposal development and submission. Standard formats would also facilitate proposal review and consideration by local watershed partnerships.

Rationale: The ISAB Report "Using a Comprehensive Landscape Approach for More Effective Conservation and Restoration" provides several case histories of programs that that employ socioeconomic engagement, a landscape perspective, governance and collaboration to work across traditional boundaries, leverage limited resources, and foster adaptive management (ISAB 2011-4). Among the reported lessons learned is that local organizations can be challenged to identify and generate funds needed to sustain investments, subbasin social engagement, integrated collaborative science and governance, and adaptive management. Tasking Council staff to reach out and coordinate with local watershed partnerships to help identify additional grant opportunities could better leverage BPA investments. Simplified or standardized formats for on the ground work could allow sponsors to efficiently and effectively communicate integrated project objectives and strategies to granting entities and facilitate proposal review by local watershed partnerships.

6.2 Re-Establish a Regional Coordination Forum

Current Program: Page 64, Program Coordination

Recommendation: Council should continue as a regional convener of issues related to the Columbia Basin mitigation. Council should create an annual forum for states, tribes and partners to coordinate and discuss annual work priorities. The forum would result in the creation of an annual work plan to ensure that we are collectively engaged in discussions on what is most important to the Council and the region. Through the five years of this program, we recommend the following priority topics, as others as they arise, for Council engagement:

- Monitoring and Evaluation – In order to get a handle on M&E costs within the Program, specific information needs at each level of Program reporting should be clearly identified and incorporated to ensure cost effective and efficient data collection, data management, and data sharing.

- Research - What are the critical questions we need to answer? How do we improve reporting and integration into decision making? How can we improve funding mechanisms such that research projects are finished and new projects are identified?
- Wildlife Mitigation – moving into the future, how do we ensure continued value of BPA investments?
- Zebra and Quagga Mussels – focus on prevention.
- Habitat Restoration – How can we leverage existing projects to understand effectiveness of habitat restoration on populations?
- Science/Policy forums – variety of topics including climate change, toxics, eulachon
- BPA funded assets – What are the long term challenges of maintaining BPA funded infrastructure and how can we begin addressing them?
- Non-native species – suppression and eradication; where successful, where not: need to keep lines of communication open
- Coordinated Assessments – identify additional species for process
- Predation – initiate focused efforts on reducing and where possible, eliminating predation impacts from avian, piscivorous, and marine mammals that have demonstrated impacts to salmonid restoration and recovery.

Rationale:

- The role of the Council has evolved over time to meet the needs of the Basin and to address endangered species listings in concert with BPA.
- The disbanding of CBFWA leaves a gap in regional coordination as no one state or tribe can play a regional coordinating role, with the consequence that States and Tribes work more directly with Council Members.
- As such, it falls to the Council and Council staff to play a greater coordinating role that meets the needs of all regional partners in serving and informing Council decisions.
- An annual work plan would provide sufficient advance notice to improve preparation and participation, ensuring that all parties benefit fully from the exchanges.

6.3 Streamline ISRP Scientific Review

Current Program: P 65-66, Independent Scientific Review Panel

Recommendation: Modify the current language in the Program as follows:

- First bullet at the top of p. 65, add "new" to read, *"Review **new** projects proposed for Bonneville funding to implement the Council's Program."*
- Add a second bullet: ***"The Council, Action Agencies, and co-managers should jointly develop a new ISRP review process for mature projects, long-term projects, and Fish Accords projects."***
- Additionally, the Program should continue to support the existing strategic frameworks developed by the umbrella projects that have developed review processes for selection, prioritization and technical and science review of projects in coordination with local stakeholders, tribes and agencies.

Rationale: The existing ISRP review process is inefficient, labor-intensive, needlessly duplicative, and extremely frustrating for all involved. In the absence of clear guidance by the Council, the ISRP has been left to develop or modify its review process. The proposed recommendation would put process development under policy guidance and would allow the relevant parties to develop new review protocols that 1) keep the ISRP focused on what is necessary by law, 2) allow the parties to develop alternative review processes that take advantage of annual science and management conferences, and 3) could result in reviews that add value to proposed and ongoing projects.

For ongoing projects, consider an entirely different review regime that would make the reviewers partners in the local basins (as opposed to distant adversaries) with the mutual goal of improving subbasin programs and making them more successful. For example, four (or more) regional review panels – one each for the upper Columbia, Snake, mid-Columbia, and lower Columbia - might be composed of two at-large members nominated by the subbasin co-managers, one or two representatives from NOAA-Fisheries, a tribal representative, and maybe two members assigned to the subbasin by the ISRP. Members of these regional review panels would be required to attend project review conferences to thoroughly understand the sub-basins, co-manager objectives, and the existing spectrum of implementation projects. Following the annual conference, a day would be dedicated to address concerns, discuss progress and ideas for making the program better, review recovery implementation issues, etc. Action items and a formal record would be kept and would become part of the review the following year. This type of review could be used to satisfy all of the legal review requirements for ongoing projects, including ESA permit compliance. A review panel so constituted would have a baseline understanding of local basin issues, advance knowledge of their respective concerns, and could come to reviews prepared to ask the questions needing answers. This informed dialogue would eliminate misunderstandings and the lost time that goes into the back-and-forth of the present review response loop.

Reference: Fish and Wildlife Co-Manager Reference #8.4

7.0 Incorporate Other Planning Efforts

The Fish and Wildlife program is only one of many programs that affect the condition of anadromous populations and their habitats. Just as restoration actions are likely to fail unless they are taken with an understanding of the entire life cycles, so they are likely to fail if they are taken without an understanding of, and coordination with, at least the other major programs that affect habitat conditions. Programs, plans and actions by the Bureau of Reclamation, Bureau of Land Management, the U.S. Forest Service, the Department of Agriculture, the Corps of Engineers, individual state and county zoning and land use decisions, and local climate change adaptation plans, individually or together, have the ability to thwart or overwhelm any efforts or progress of Fish and Wildlife program projects.

Measure: The Council should develop a system for tracking the activities of, and similarities and differences between plans and actions of the above agencies in individual subbasins.

Rationale: The F&WP does not affect a majority of anadromous fish habitats in most subbasins. Unless the Council's projects are coordinated with other major land use plans and activities in each subbasin, they have a significant risk of failure or of not achieving their full potential. The proposed measure is necessary to meet the Council's responsibility to ensure its actions are cost effective and use the available resources effectively.

This coordination is also needed to coordinate the Council's projects with multidisciplinary climate change adaptation plans. The ISAB recognized these problems when it called for broadening the F&WP to more explicitly include socioeconomic issues and for strengthening regional partnerships.

8.0 Protected Areas

Recommendation: The Council should update and strengthen its Protected Areas Policy to address areas where anadromous fish passage has been restored and assure the efficient protection of salmon resources.

Rationale: In 1988, the Council established approximately 44,000 miles of rivers and streams as Protected Areas in order to protect the most sensitive fish and wildlife habitat throughout the Pacific Northwest from the significant impacts of hydropower development. The Council conducted extensive research into which areas should be designated as Protected, with an eye towards preserving those rivers and streams where hydropower development would have major negative impacts that could not be reversed, and instead to direct developers to less sensitive areas. Protected Areas were also established to save time, energy and resources due to the controversy involved in siting hydropower projects in these sensitive areas.

Protected Areas were established outside of the Columbia River Basin to "help minimize the expense and controversy involved in [hydropower] development, help guide development toward environmentally benign projects, and protect critical fish and wildlife resources." Additionally, the Council concluded that Protected Areas outside of the Columbia Basin helped to meet U.S.-Canada treaty commitments to rebuild salmon and steelhead stocks, and help avoid disproportionate harvest pressure on fish and wildlife in the Basin.

The Protected Areas program continues to meet its goals, and is an important part of mitigating the impacts to and rebuilding the populations of fish and wildlife that have been damaged by hydroelectric development throughout Idaho, Montana, Oregon and Washington. To date, the Federal Energy Regulatory Commission (FERC), charged with issuing hydropower permits and licenses to utilities and private developers, has followed the recommendation of the Council and has declined to issue a single hydropower license for a project located within a Protected Area. FERC has recognized the unique nature of the Council as it balances fish and wildlife needs with energy needs, and recognized the Council's 2010 Sixth Northwest Conservation and Electric Power Plan as a regional comprehensive plan that reflects this balance.

References:
American Whitewater recommendations to the 2009 Fish and Wildlife Program.