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September 15, 2013

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

Dear Chairman Bradbury:

On behalf of the Governor's Salmon Recovery Office (GSRO), I appreciate the opportunity to comment on amendments to the Northwest Power and Conservation Council's *Fish and Wildlife Management Program in the Columbia River Basin*. The Columbia Basin is an incredibly rich, vital, and critical environment within the Pacific Northwest.

State law gives the GSRO responsibility to support the integration of all salmon recovery efforts throughout Washington State. We also are charged with coordinating the development, implementation, and revision of regional salmon recovery plans. In the Columbia Basin, we do this by working with four salmon recovery regional organizations: three upstream and one downstream of Bonneville Dam. Specifically, these organizations are the Upper Columbia Salmon Recovery Board, Yakima Basin Fish and Wildlife Recovery Board, Snake River Salmon Recovery Board, and Lower Columbia Fish Recovery Board. Each is charged with implementing a separate federally-approved salmon recovery plan in the Columbia Basin, and each has successfully supported salmon recovery for over a decade.

The attached document provides the GSRO's to several priority categories in the Columbia River Basin Fish and Wildlife Program amendment process. We have organized our response in the following attachment noting the program area, rationale, recommendation, and citation. Our recommendations address a wide variety of topics relevant to salmon recovery, including but not limited to, adaptive management, monitoring, integrated recovery, aquatic invasive species, climate change, and recovery plan abundance targets.

Please note that most of our recommendations are identical to those in the *Columbia River Basin Fish and Wildlife Manager's Draft Reference for Developing 2014 Fish and Wildlife Program Amendment Recommendations*. This document was a collaborative effort among the Columbia Basin fish and wildlife managers to find common language for the recommendations. The GSRO supports and applauds this type of cooperation and information sharing.

The recommendations from GSRO also reflect those provided by the Washington Department of Fish and Wildlife, Upper Columbia Fish Recovery Board, and the Washington Invasive Species Council. We have reviewed their recommendations, and fully support them.

Since 1999, the State of Washington, through the Salmon Recovery Funding Board, has invested heavily in salmon recovery projects, regional organizations, and a monitoring program. We hope that the program amendment process will result in complementary approaches to monitoring, along with mutual support for the vital role and utility of regional organizations.

Thank you for the opportunity to provide the attached recommendations to protect fish, wildlife, and native plant communities in the Columbia River Basin. Please do not hesitate to contact our office for additional information or clarification.

Sincerely,



Brian Abbott
Executive Coordinator
Governor's Salmon Recovery Office

cc:

Tom Karier, Northwest Power and Conservation Council
Phil Rockefeller, Northwest Power and Conservation Council

Attachment

Recommendations for amending the Columbia Basin Fish and Wildlife Program

Note: The term “measure” generally refers to actions or activities that should be funded by BPA; while the term “recommendation” was used to refer to edits to the language in the Fish and Wildlife Program or actions or activities that the Council should undertake.

Role of the Council and the Fish and Wildlife Program

Background

The Council and its Fish and Wildlife Program have served admirably over the last thirty years as a significant partner in protecting the viability of salmon populations in the Columbia Basin. The Program continues to provide guidance for many of the fish and wildlife activities that occur throughout the Columbia Basin. The GSRO would like to encourage the Fish and Wildlife Program to target resources for the regional recovery organizations in Washington that are implementing ESA recovery work in the Columbia Basin. These organizations have considerable experience and proven success in organizing local partners and leveraging support for community-based salmon recovery to implement federally approved salmon recovery plans.

Additionally the increased number of “programmatic” projects coming under review and subsequent approval has also proven to complement the efforts and investments. This continued programmatic approach will generate better synergy between mitigation and recovery efforts across the Columbia Basin. Continuing this particular strategic direction, the Council can thus assist and support the salmon recovery regions and their partners in securing and leveraging the support they need for on-going and broad scale implementation of integrated recovery actions.

Recommendations

The Governor’s Salmon Recovery Office recommends general measures to the Council that would complement, support, and enhance Washington State’s salmon recovery effort.

1. Invest in regional organizations by providing ongoing stable funding so that they can continue implementation of federally-approved salmon recovery plans.
2. Coordinate with statewide salmon recovery monitoring efforts. Coordination of monitoring protocols, programs, and resources for the benefit of all organizations that have invested in salmon recovery will exhibit economies of scale and increase the ability of partners to secure other funds. Further, coordination will provide more accessible data for decision making, and increase transparency to the public.

3. Support the adaptive management approaches as exhibited by regions, and incorporate the findings in existing and future Research, Monitoring and Evaluation (RME) programs.

Restructure the program to support implementation of adaptive management

page 3- Program framework and throughout

Background:

An essential element of adaptively managing Washington's regional salmon recovery plans is the collection of sufficient data, analysis, and resulting information at appropriate temporal and spatial scales that can be evaluated by the regional technical teams. In order for this information to be most useful it must be collaboratively developed and be readily available in a variety of formats, from raw data to summaries. Data must be collected in a way that allows the results to be scalable to the tributary or assessment unit (the planning scale), and have relevant results that are available in a short time frame (<5 years).

Considerable investments of resources have been made in gathering regional fish and habitat data. The science has been spread out amongst different entities, and guided by different research and management questions. Monitoring has been fairly disconnected from Recovery Plan implementation and adaptive management (as noted in the recent ISRP comments on the current Upper Columbia Fish & Wildlife Habitat Proposal). Regional science and communication programs (e.g. science outreach, reporting, and science conferences and workshops) are attempting to remedy the gaps created by disparate exercises. If the program was focused more on communication of analysis and information rather than raw data (as also noted in the 2013 ISAB comments) greater utility of this information should be realized.

Few partners in the regions have either the capability or the capacity to use the available data to answer their regional management questions. No local entities are funded to summarize and interpret data from different sources at appropriate temporal and spatial scales. Overall, monitoring, research, and evaluation programs have not provided adequate information at the necessary spatial and temporal scale to inform local decisions about projects or programs. There are very few instances where the available data and information lines up with the local needs.

Recommendations

Recommendation 1: The Council should take the lead in articulating a minimum set of data for specific types of projects, and to have those data analyzed and reported in a consistent manner at the appropriate scale. The Council can work with local partners to develop and evaluate High Level Indicators (HLI) that will be routinely monitored, updated, and presented to stakeholders. These HLIs should directly relate to quantitative objectives to track progress across management regimes (see below), and inform future actions and investments.

They could also be used in outreach and reporting efforts for a variety of audiences.

The most important regional information, analysis, and tools are: 1) status and trends of listed populations and their habitat; 2) modeling tools (e.g. Life Cycle Models) that can be used to inform “All-H” recovery scenarios; 3) abundance, survival, growth, and life history of freshwater life stages; and 4) tributary-scale productivity and carrying capacity.

We encourage the Council to work with partners to develop models that are informed by various monitoring results (e.g. Life Cycle Models) and are scalable. Partners could focus on identifying and filling data gaps in these models, and on testing the assumptions and outputs of the models. Several of these types of models are under development in the context of the AMIP process, but lack coordination at the regional level to ensure consistency and applicability.

The Council can also ensure fish monitoring programs are more integrated, transparent, and adaptive to regional needs with more emphasis on short-term, small-scale, applicable results that can be used to evaluate progress and success. A regional effort in planning, collaboration, and coordination on RM&E needs could result in greater returns on those necessary investments.

Recommendation 2: Restructure the Fish and Wildlife Program to contain or have provisions to explicitly develop or track the following essential adaptive management steps:

- 1) Update the current status and trends of the fish and wildlife resources the Program is intended to protect, mitigate, and enhance;
- 2) Adopt biological objectives and document the current gaps between Program objectives and status for the fish and wildlife resources identified in step 1;
- 3) Quantify the limiting factors and threats, in terms of their relationship to the biological objectives with associated assumptions, hypotheses and critical unknowns;
- 4) Adopt strategies and measures linked to limiting factors and threats with a quantification of expected outcomes toward filling of the gaps identified in step 2;
- 5) Develop and maintain Research, Monitoring, and Evaluation Plans that will track the status and trends of focal species and their threats and limiting factors, collect the information necessary to test assumptions and hypotheses, address critical uncertainties, and evaluate the implementation of measures;
- 6) Share through reports, web tools, and other sources the accumulated monitoring and research data and information which will be used to carry out steps 7 and 8;
- 7) Develop an evaluation process that deliberately contemplates the information from steps 1–6 to verify or adjust assumptions and hypotheses, adjusts biological objectives, and adjusts strategies and measures; and,
- 8) Establish a process for adjusting the Program implementation to align with Step 7.

Rationale:

Adaptive management is built on the principle of learning by doing. Natural resource management is not an exact science. Therefore, the premise of this Program should be to state hypotheses then implement measures contained therein and monitor, report, and evaluate outcomes to provide a clear sequential structure to decisions required in the continuing evolution and implementation of the Program. Together, these steps will provide accountability for the Fish and Wildlife Program and are likely to increase the realized benefits for the region's overall investment in fish and wildlife restoration.

Coordinated Assessments Monitoring and Reporting

Pages 24-26, Monitoring, Evaluation, Research, and Reporting Strategies

Background

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.

Recommendation

The Council should continue its monitoring approach and look for ways to more closely coordinate with regional monitoring entities to share protocol, resources, and results. The Program also should expand the CA process to develop data sharing standards for resident fish and wildlife data.

The Salmon Recovery Funding Board (SRFB) has developed a comprehensive effectiveness monitoring program and Intensively Monitored Watershed (IMW) approach. These efforts could benefit from additional resources and larger sample-candidate pools, thereby enjoying economies of scale. Please consider opportunities for sharing resources. The SRFB also is completing a comprehensive review of its monitoring program. The review will be completed in December and any new program adoption or direction will begin in 2014.

Measure 1: The Council should adopt and BPA should fund full implementation of 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.

Measure 2: BPA should fund expansion of the Coordinated Assessments project to include indicators for resident fish and wildlife.

Rationale: Several million dollars are spent annually on anadromous monitoring in the Columbia Basin. 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, sub-basin, province, major population, DPS/ESU, or Columbia Basin scales. In addition, there are many possible indicators that could be used for reporting.

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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 Coordinated Assessments process to develop data sharing standards for resident fish and wildlife data.

Data Management

Pages 24-26, Monitoring, Evaluation, Research, and Reporting Strategies

Recommendation

Measure 1: BPA should fund adequate data management projects with the agencies and tribes to support regional reporting requirements for evaluation of Program activities that are additional to the agencies' and tribes' routine data management activities. There are data specifically collected, managed, and analyzed due to the existence and operation of the Federal Columbia River Power System (FCRPS) and its impact on fish and wildlife.

Measure 2: BPA should fund adequate reporting at the Council level to provide annual and periodic reporting of Program action effectiveness that supports Program scale adaptive management.

Rationale: 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 can rectify this oversight:

- Restructure and simplify the Program to provide Goals, Measurable Objectives, Strategies and Measures at the Basin-wide, Province and Sub-basin scales. All measures should be linked back to specific measurable objectives. The goals and objectives should then guide the development of a data management framework to support specific annual, bi-annual, and five year reporting requirements;
- Use a Regional Coordination forum including BPA, Council, tribal, state, and federal resource managers, and data management leaders to develop and review regional restoration progress reports, discuss options to improve reporting, and provide policy guidance for data management efforts;
- Provide support for the increased utilization of the Habitat Work Schedule (HWS) that is proven to be an effective tracking salmon recovery efforts state-wide from all funding sources. The Recreation and Conservation Office have continued to upgrade the efficiencies and utility of this program, that offer increased potential and opportunity to be more of a state-wide process in its support of the State of the Salmon biennial report.
- Dedicate resources towards an investigation of the potential for Miradi and the Open Standards for Conservation in the Columbia basin. This decision –tree and logic-chain model of habitat stressors and threats is being implemented in Puget Sound with partners.
- 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) 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.

Integrated Recovery (All-H)

Background

The effect of different management actions or strategies on the survival of different life stages of salmonids are critical uncertainties in regional recovery plans. Actions in freshwater tributary habitat alone will likely not be enough to reach recovery, and should not be the sole focus of recovery efforts. An integrated approach across each of the management regimes (including harvest, hatcheries, hydropower, and habitat) will produce lasting results. However, decision making in each sector generally occurs in isolated venues.

It is unclear how actions and strategies implemented across each management regime will interact and contribute to recovery in any of the Columbia River salmon recovery regions. Integrated recovery is of critical importance to the recovery of all Columbia stocks, which pass through ocean, in-river, and tributary fisheries. The complexity of regulatory and policy issues surrounding each of these management sectors emphasizes the difficulty in addressing the steps required in tracking changes and progress toward recovery. The trade-off in costs to natural populations and their recovery remains poorly understood. Multiple objectives of management programs are complex and any trade-offs in outcomes need to be explicitly analyzed and discussed. Some information (such as hydropower impacts) is more accessible. Harvest and hatchery information regarding impacts on abundance and productivity is relatively unavailable.

Recommendation

Specific to hatchery programs, the Council should work with all partners to assess the carrying capacity that will influence recommendations for artificial production strategies. As noted in the 2013 ISAB review, there are many critical uncertainties related to the cumulative impacts of artificial production on natural production and ecosystem processes at population, sub-basin, and basin scales. Given the number of tributary hatchery programs in the region, and the limited ability to control hatchery fish on the spawning grounds, hatchery production may have a major impact on naturally spawning populations. Support in this area is critical.

Tools such as food- web and relative reproduction models can be used in concert with Life Cycle Models. When combined with habitat, hatchery, hydropower, harvest, and full life-stage

recruitment information, this information can further refine the impacts various programs are having on overall population productivity at a sub-basin scale. Monitoring and evaluation in the sectors (all H's) is extensive, but to evaluate program effectiveness and progress toward recovery from a regional perspective, a more comprehensive analysis is needed. This analysis needs to be done in relation to well-defined biological objectives for each of the management sectors. Monitoring measurable biological objectives will help clarify the role of artificial production.

Guidance on the Use of Large Woody Material (LWD)

Background

Perhaps no other component of the river environment is as important to salmon as large wood. A key function of wood in rivers is that it contributes to what biologists refer to as “habitat complexity”; basically, the more complex a system is – the better for the fish. Wood shapes and maintains features such as pools, channels, gravel bars, and islands, and helps trap and store important gravel and food for fish. Wood also helps stabilize stream banks and maintain riparian forest. Wood creates premium habitat for fish because it provides shelter from predators, pools for fish to rest in, and plenty of food for small fish.

The question of who owns and has responsibility for maintaining large wood structures has not yet been completely resolved. Because wood structures are designed and implemented to re-create natural conditions and processes or to provide riverine features that may have existed naturally, there has been some indication that after a period of time the structures should be considered to be part of the natural environment. On the other hand, project designers, implementers, and funders all recognize that even when they are built to mimic natural processes, large wood structures are artificial constructions and may require maintenance over time to ensure continued safety and function.

Recognizing the potential for this to stall large-scale habitat implementation, largely funded under the programmatic projects in the Upper Columbia, the UCSRB began working with partners in 2010 to find a solution. In a short while, the UCSRB quickly acknowledged that this was an issue much larger than one region, and much larger than any one type of project. Therefore, after 3 years of working with partners and leaders at the state level, the Washington State Legislature passed an amendment to the Salmon Recovery Act (RCW 77.85.050) specifically limiting future liability for landowners who voluntarily agree to participate in habitat restoration efforts. The amended law takes effect July 27, 2013.

Recommendations

The Council's program extends across multiple jurisdictional boundaries. The issues of liability and the role of wood in future salmon viability knows no boundaries. The Council is in an important leadership position to:

- Develop standards or guidance on the use of wood in habitat complexity (ISRP or ISAB);
- Increase awareness of the importance of wood in our implementation framework across the Columbia Basin; and

- Invest in efforts that address functioning ecosystem processes across an entire watershed

Support Stewardship and Long-Term Maintenance of Investments in Habitat

Background

In spite of an enormous public investment of money, time, and effort in the restoration and protection of salmon and steelhead populations through actions across multiple management regimes, there are not sufficient mechanisms in place to fund or conduct long-term stewardship and maintenance of those actions. This is particularly true for habitat restoration, where there is a particular emphasis on the installation of restoration projects and less emphasis on the care and feeding of those projects after initial implementation. Many programs only fund capital activities, not operations and maintenance.

Recommendations

The Council should take the lead in setting a new precedent for long-term stewardship of its significant habitat improvement investments. Turning to the local infrastructure that is in place to develop a mechanism for stewardship investment will ensure accountability and foster collaborative partnerships. Council investments in stewardship will facilitate adaptive management on previous investments, and will inform the F&W Program in its future habitat restoration investments.

Certain strategic directions and processes have been identified, particularly in the Lower Columbia region, with a specific emphasis on certain restoration treatments requiring additional support in the area of Intensively Monitored Watershed (IMWs). The Abernathy/Germany Creek complex in this region has been identified as a critical basin study. Its location below Bonneville makes it a unique IMW relative to those regions and sub-basins upstream. However, there is a critical need to implement the appropriate restoration treatments in order to appropriately establish how best the other state investments are having an effect with the various treatments in this IMW. PSFMC funds are supporting the IMW monitoring efforts in the Asotin sub-basin of the Snake region upstream, but these funds are leveraged against BPA restoration funding. PSFMC funds are also declining and support a Lower Columbia initiative for monitoring.

With support the Lower Columbia Region is poised to implement restoration actions and other recommendations the IMW Technical Oversight Committee have identified as being appropriate and timely. Support in IMW restoration treatments in the region would in turn support the already considerable investment which is compromised by upstream impacts and activities.

Prevent Establishment of Aquatic Invasive Species

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 direct the Bonneville Power Administration (BPA) to provide proportionate funding for prevention 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. Funding should be equally provided through the Program and Operations and Maintenance budgets from Power Operations within BPA. 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 regional leadership 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: The Council must shift its current BPA funds from population control research to infestation prevention. 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, zebra and quagga mussels, etc.. Our recommendations relate to increased funding for enhanced inspection and decontamination efforts in the region, stronger measures to prevent the inadvertent spread of invasive species resulting from habitat research and restoration activities, and maintaining the Council's leadership role as the key convener and coordinator in the Columbia Basin for science, policy and outreach.

Better Integrate climate change and anticipated climate change impacts

page 51,52 Climate change planning considerations

Measure: Develop a comprehensive strategic plan to address the potential impacts of climate change on the entire system, including the estuary and the ocean and develop a suite of strategies within the amended Program and fund implementation of strategies. (ISAB 2013-1)

Recommendation: Review current restoration or habitat projects to ensure their resiliency under predicted future climate scenarios to ensure that investments are effective into the future.

Recommendation: Require project proposals and management plans to consider the potential impact on project outcomes of climate change and its associated variability and uncertainty. (ISAB Program Review, March 7, 2013)

Recommendation: We recommend amending the Program to include ISAB recommendations for addressing climate change (p 16, Independent Science Advisory Board (ISAB) Review of the 2009 Columbia River Basin Fish and Wildlife Program. (2013 -1; March 7, 2013).

Rationale: 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).

An additional element of monitoring that appears to be challenged with limited resources is the continuation of operation and maintenance support from stream gages that have provided a wealth of data, some for decades. Certain gages installed for water quality and quantity purposes basin-wide (and state-wide) are being considered for de-commissioning in the near term. While fiscal constraints do put certain pressures on the costs of infrastructure in this particular medium, in the wake of climate change and subsequent lessening of snowpack and increased rain-on-snow vents, this information is too valuable to be put at risk. Support for these at-risk gages, as prioritized by the salmon recovery regions is strongly recommended.

References:

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- Mantua, N. I Tohver and A. Hamlet. 2009. Impacts of climate change on key aspects of freshwater salmon habitat in Washington State. Chapter 6 In: *Washington Climate Change Impacts Assessment: Evaluating Washington's future in a changing climate*.
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Habitat Restoration Monitoring

Recommendation: Council continues to develop and fund new approaches to determine effectiveness of salmon habitat restoration projects. Council should continue to articulate that the most central question is: "What is the population response to salmon habitat restoration?"

Action effectiveness monitoring is a cost effective way to deliver unbiased information about project effectiveness at the site scale, but does not provide information about population level response, and is therefore an incomplete answer to the question.

Project effectiveness monitoring information should lead to project selection that benefits target species and life stages, but the most critical gap in project prioritization is identifying which life stages limit recovery and this requires a new monitoring approach. Population response monitoring should occur year-round with PIT technology and smolt traps, and at spatial scales that are relevant for quantifying population dynamics (e.g., assessment units). These population-scale monitoring data provide also framework for populating life-cycle models that identify survival bottlenecks and evaluate population-level responses to restoration actions.

Additionally, initiating riverscape surveys of aquatic habitat and fish would provide critical information for identifying restoration areas, quantifying changes in fish distribution associated with restoration actions and climate change, and population-specific data to develop fish-habitat relationships for modeling. Council should support the leveraging of existing projects and funding to ensure coordination between life cycle models, habitat restoration, and fish monitoring data including fish in/fish out data.

Measure: BPA should fund empirical studies of carrying capacity for watersheds with hatchery supplementation per ISRP recommendation

Rationale: The Council and BPA have made, and continue to make, substantial investments in salmon habitat restoration. The Council must provide sufficient funding to monitor the effects of habitat actions and artificial propagation on listed populations. The current level of funding for evaluating population-response to habitat restoration is inadequate and, although hatchery-related monitoring is complementary, additional monitoring is needed. In order to understand population response, continued investments in fish in/fish out monitoring, site scale project effectiveness monitoring and intensively monitoring watersheds are critical. The Council should use emerging life cycle models to understand life stage specific bottlenecks and then direct effort to address those bottlenecks while monitoring for a response. Council needs to direct funds to fill data gaps that limit the effectiveness of the life cycle models. Existing fish and habitat monitoring programs could be improved so that their products are directly applicable to multiple aspects of recovery and mitigation (e.g., habitat restoration, artificial propagation, life-cycle models, etc.).

The utility of monitoring programs that do not contribute to the evaluation, adaptive management, or prioritization of habitat or other actions that may benefit populations is minimal. New programs that are capable of answering many questions simultaneously at scales that are relevant for recovery, and are scalable should be prioritized.

These long-term commitments are essential to understanding the overall and continuing value of investments made by BPA and regional partners.

Sub-basin plans and review/ update

Each sub-basin plan has its own particular nuances and characteristics. Certain initiatives associated with each sub-basin defines the appropriate level and scale as well as the investment required for updating.

While a majority of the cited recommendations are relevant, and can both be implemented and incorporated through-out the entirety of the Columbia basin, specific sub-basin issues could necessitate and thus benefit from a more comprehensive review of the sub-basin plans. The Council is in a position to provide leadership, along with the resources to support local capacity. Specific regional-based program amendment recommendations by definition would need to engage the specific stakeholders in order to review and subsequently revise the local planning documents, which could include but not be limited to: updating sub-basin level goals and objectives; conducting local climate models; setting data management and reporting standards; verifying and aligning the data; analyzing the amount of data that has not been thoroughly vetted; along with other regionally specific endeavors.

Such a comprehensive strategy of sub-basin review should aim to include sub-basins above and below Bonneville, and as well as the estuary, plume and near-shore areas under the influenc.

Biological Objectives in the Program - Recovery Plan Abundance and Targets

GSRO believes certain abundance and productivity numbers should be used as interim targets.

Pages 11-14, Biological Objectives, and Page 63, Program Reporting

Recommendations:

The Council should follow through on the existing language in the 2009 Program, page 11, to initiate a science based process to inform policy choices on biological objectives as supported by the ISAB. However, until that time:

- Maintain the existing language from the 2009 Program listed below with modifications shown in bold. These are important general targets for highest level Program evaluation and should be maintained. Existing Program language is in *italics* and suggested revisions are in **bold**.
 - *“Increase total adult salmon and steelhead runs, in a manner consistent with achieving recovery of ESA listed populations and prevents additional listings of listed species, above Bonneville Dam by 2025 to an average of 5 million annually in a manner that supports tribal and non-tribal harvest, achieving smolt-to-adult return rates in the 2-6 percent range (minimum 2 percent; average 4 percent) for listed Snake River and upper Columbia salmon and steelhead. **Increase total adult runs for listed lower Columbia salmon and steelhead to achieve 75 percent of recovery goals (NOAA 2013) by 2025.**”*
 - *“Within 100 years achieve population characteristics that, while fluctuating due to natural variability, represent on average full mitigation for losses of anadromous fish caused by development and operation of hydroelectric facilities in the Columbia Basin.”*
- Maintain the current basin-wide biological objectives expressed in the 2009 Program with modifications shown here in bold (to represent a 10-year implementation plan for these recommendations):
 - *“**Halt declining trends in Columbia River Basin salmon and steelhead populations by 2024,***
 - *Significantly improve the smolt-to-adult return rates (SARs) for Columbia River Basin salmon and steelhead, resulting in productivity well into the range of positive population replacement.*
 - ***Restore healthy characteristics of lamprey, sturgeon, and eulachon populations.***
 - *“Restore the widest possible set of healthy, naturally reproducing and sustaining populations of salmon and steelhead in each province **by 2024.**”*
- Continue to recognize productivity objectives for salmon and steelhead:
 - *“**As an interim goal, contribute to achieving smolt-to-adult survival rates (SARs) in the 2-6 percent range (minimum 2 percent; average 4 percent) for listed Snake River and upper Columbia salmon and steelhead.**”*

- The Program should also continue to recognize the mitigation responsibility for areas where anadromous fish have been extirpated (see Substitution for Anadromous Fish Losses):
 - Replace existing introductory paragraphs at the top of page 12 with the following:

“Part of the anadromous fish losses has occurred in the blocked areas. A corresponding part of the mitigation for these losses must occur in those areas. The Program has a "Resident Fish Substitution Policy" for areas where anadromous fish have been extirpated. Given the large anadromous fish losses in the blocked areas, these actions have not adequately mitigated these losses. The following objectives address anadromous fish losses and mitigation requirements in all blocked areas:

 - ***Take action to reintroduce anadromous fish into blocked areas, where feasible.***
 - ***Restore and increase the abundance of native resident fish species (subspecies, stocks and populations) throughout their historic ranges when appropriate habitat conditions exist or can be feasibly restored or improved.***
 - ***Administer and increase opportunities for consumptive and non-consumptive resident fisheries for native, introduced, wild, and hatchery-reared stocks that are compatible with the continued persistence of native resident fish species and their restoration to near historic abundance (includes intensive fisheries within closed or isolated systems). ”***
- Add biological objectives that address the reintroduction of extirpated populations in non-blocked areas above Bonneville Dam.
- Expand anadromous goals to the Subbasin and Province levels and add specific and measurable objectives for resident fish and wildlife to support high level indicators.
- The Council should report annually on progress towards achieving the Basin-Level Biological Objectives as presented in the Program. The reporting section of the Program (Section VII.E) should be expanded to include reporting high level indicators that represent the Program’s basin-level biological objectives as reported in Section II.C of the current Program.
- Add explicit measurable biological objectives to support the more general Program goals consistent with ISAB recommendations (ISAB 2013-1). Also refer to Section 5 of this document, Species Focused Recommendations. These should integrate with the current Council high level indicators and would clarify how to report against current biological objectives:
 - Halt declining trends in salmon and steelhead populations

- Graph trends in representative populations' abundance over time and determine whether populations are increasing, decreasing, or stable
- Increase total runs that support tribal and non-tribal harvest
 - Report abundance of fish runs annually
 - Report tribal and non-tribal harvest in all fisheries annually
- Achieve 5 million fish above Bonneville dam and 75 percent of recovery goals for LCR ESUs by 2025
 - Report annually total abundance by ESU for salmon and steelhead populations including harvest and other mortality
- Achieve SARs of 2-6% with an average of 4% for Snake River and Upper Columbia River populations
 - Report annually appropriate dam to dam smolt-to-adult returns (SARs) for representative populations to determine if cumulative hydrosystem actions are achieving the targeted level of survival
- Restore the widest set of salmon and steelhead populations in each province
 - Report population status by province including reintroduction goals
- Restore lamprey, sturgeon and eulachon
 - Create a monitoring framework and report status of lamprey, sturgeon, and eulachon across the Columbia River Basin on a regular basis
- Restore lamprey production, passage and habitat
 - Report passage counts at dams annually and map lamprey distribution every 5 years.

Rationale: The current Program, on page 11, calls for a process to assess the value of these goals. This should be implemented. The Program should re-state the call to assess the value of quantitative biological objectives and develop an updated and scientifically rigorous set of such quantitative objectives. Reviewing and refining the adult fish return and SAR goals is appropriate to assure these are correctly scaled to evaluate the Program.

Measureable objectives provide:

- Quantitative targets to support the Program vision, moving the program from the abstract to the concrete;
- A method to track program progress (a report card); and
- A measure of improvement needed in the program.

The above actions and metrics along with importance, feasibility, and cost components, help inform future funding priorities to achieve specific goals. This contributes to policy discussions to prioritize funding to achieve specific goals. It is currently possible to report progress against the basin-level biological objectives that are stated in the Program. Establishing a consistent, transparent, reliable report using metrics to demonstrate progress of Program implementation is required to support true adaptive management at the basin-wide scale. The data currently exists to report against the objectives; however, the data management capacity and practices are not in place to support efficient, cost effective reporting.

Reference: National Marine Fisheries Service (NMFS). 2013. ESA Recovery Plan for Lower Columbia River Coho Salmon, Lower Columbia River Chinook Salmon, Columbia River Chum Salmon, and Lower Columbia River Steelhead. Prepared by the National Marine Fisheries Service, Northwest Region, June 2013.

Fully Incorporate Estuary, Plume and Nearshore Ocean in Program

Current Program: various sections

Recommendation 1: Add language to the *Scientific Principles*, pages 9 and 10:

- *The Columbia River ecosystem includes the estuary, plume, and near shore ocean environments.*
- *Salmon, steelhead, lamprey, sturgeon and eulachon accommodate ocean mortality and environmental variability by having life histories that have a sufficient level of productivity and a wide range of biological diversity (i.e., resiliency).*

Recommendation 2: Add language to *Plume and Nearshore Ocean Strategies*, page 31.

Retain the *Ocean strategies* and add:

- To Primary strategy, *“It is important to continue basic monitoring over time to increase understanding of the estuary, plume and nearshore ocean’s role in anadromous fish survival and to have both baseline and real time information that can assist inland management decisions.”*
- Add *“Ocean Strategy 3 - Identify the effects of ocean conditions on anadromous fish survival and use this information to evaluate and adjust inland management actions.”*

Recommendation 3: Insert the following language into the Fish and Wildlife Program:

“Management of the Columbia River Basin hydropower system directly affects the ocean environment primarily in two ways: 1) it changes the natural hydrograph by development of the hydro-system, and changes estuary and plume habitats along with the timing and quantity of natural flows; and 2) the releases of large numbers of hatchery fish from Columbia River hatcheries may trigger density dependent effects in the estuary, plume and ocean.”

Measure 1: Fund a collaborative forum of scientists and managers to: 1) identify key management questions related to the estuary, plume, and nearshore ocean environments; 2) identify what research and monitoring has already been done that addresses these management questions; 3) identify ongoing baseline monitoring and research priorities; 4) identify opportunities for information sharing between scientists and managers and 5) recommend to the Council ways to improve the utility and in-river freshwater resource management benefits of both ongoing and proposed ocean, estuary and plume research conducted under the Program.

Rationale: Regional coordination between researchers and Columbia Basin managers is necessary for sharing information and for developing scientifically sound recommendations on monitoring and research priorities that can inform management actions. This forum can help with addressing the following additional measures.

Measure 2: Consider the complete anadromous fish life cycle and critical habitat needs, including the estuary, plume and nearshore ocean when making management decisions. Integrate the effects of future climate change into these decisions and develop adaptation strategies to address these effects.

Rationale: It is important to have a basic understanding of ocean survival in order to better understand freshwater survival and eventual adult returns. Understanding how, where and which anadromous fish experience both growth and mortality in the ocean can provide insights to freshwater management and can test commonly held assumptions about the river conditions for fish. For example, if a particular stock is demonstrating strong abundance, is it due to freshwater habitat restoration actions or specific ocean conditions? A thorough evaluation of the success of freshwater management actions (e.g., freshwater habitat improvements) requires that we know the effects of the ocean on Columbia River anadromous fish. This is consistent with the first Fish and Wildlife Program principle mentioned above; i.e., that the Council views the Columbia River ecosystem to include the estuary, plume, and nearshore ocean environments.

Measure 3: Optimize forecasts of adult returns.

Rationale: Through ocean research, project sponsors have begun to use ocean data to improve forecasting of adult returns. Fisheries managers have several methods for forecasting adult returns (e.g., age structure models, stock-recruit models, ocean indicators). Research has demonstrated that ocean condition indicators can provide helpful information that can be utilized to improve run forecasting accuracy. Forecasting of adult returns can be utilized to trigger conservation actions, set broodstock collection expectations and harvest seasons. In river forecasters typically use a sibling regression for forecasting annual adult returns. Until about ten years ago, this methodology was reasonably accurate for Chinook salmon. Recently, however, this methodology has not been very reliable. Researchers believe that changes in the age structure (age at maturation) of Chinook salmon may be behind the change. Managers are beginning to utilize other methods, often in combination, to more accurately predict adult run size. The NOAA and DFO ocean indicators (stop light chart and multivariate analysis), developed and populated with data from the two ocean research projects, are being used to further salmon run forecasting.

Measure 4: Explore and implement adaptive management experiments to improve survival of anadromous fish.

Rationale: The Council has been interested for some time in ways in which managers can use the results of the ocean research to change/alter freshwater habitat and production management to improve overall survival. It has been suggested that there may be applications such as changing the timing of hatchery releases or changing migration methods (transport and in-river) to take advantage of optimal plume or ocean conditions and subsequently, to improve survival for these fish. Presently hatchery fish release timing is set by hatchery managers that are considering water temperature, readiness of the fish to migrate and to take advantage of in river flow. It is unclear, however, if potential management strategies are realistic or practical and if the potential survival benefits would outweigh other risks. Further discussions are warranted between researchers and

freshwater fisheries and hatchery managers to explore the practical potential of these concepts. There are specific experiments that can be conducted using individual hatcheries that are already investigating variable release timing. Stock-specific information about growth and survival in the ocean should be better linked to stock management in the freshwater.

Measure 5: Continue to research direct and indirect effects of anthropogenic freshwater management on marine ecological attributes affecting anadromous fish habitat, life histories and productivity.

Rationale: Management of the Columbia River Basin hydropower system directly affects the ocean environment by changes in the natural hydrograph and ecological processes caused by development and operation of the hydro-system, and through changes to the estuary and plume habitats due to the timing, quantity and quality of river flows. There is much more to be learned about how to improve conditions and thus survival for anadromous fish in the estuary and plume.

Measure 6: The Program should address the uncertainty regarding the effectiveness of estuarine restoration projects and different types of habitat and whether they contribute to increased juvenile survival and hence increased adult returns.

Rationale: The primary critical uncertainty regarding estuarine restoration projects and different types of habitat is whether they contribute to increased juvenile survival and hence increased adult returns. Good estimates of residence time in rearing habitat, and the quantity and quality of the habitat that will likely influence survival, are generally lacking. How fish move between rearing habitats, the importance of habitat connectivity and spatial distribution are poorly understood. A general understanding of the quantity of available habitat, quality of fish habitat, how fish use them, and how they are distributed throughout the migration and rearing reaches of the Lower Columbia River and estuary are not well known. Another critical uncertainty is to identify status and trends of the ecosystem processes in the lower Columbia River and estuary to better understand the ecosystems processes and the effects on restoration and mitigation efforts.

Measure 7: Research is needed on forage fish in the lower estuary and nearshore area. The Fish and Wildlife Program should promote projects on forage fish in the lower estuary and nearshore area through the following measures:

- Identify spawning and rearing life history attributes of forage fish in the estuary
- Determine the role of forage fish as alternate prey for birds in the lower estuary
- Elucidate the role eulachon may have as an alternative prey for sea lions
- Determine how restoration projects in the estuary may contribute to reproductive success and rearing of forage fish
- Identify the relation between Columbia River flow and forage fish abundance in the estuary
- Identify role forage fish have in survival of juvenile Chinook salmon, coho, and steelhead
- Determine how climate change, ocean acidification, salinity, estuary turbidity maximum (ETM), and localized hypoxia are likely to affect forage fish in the coming decades

Rationale: The proposed amendment will update the Program to reflect a move toward ecosystem management approach to provide salmon with total life cycle needs including an adequate food web to support growth and improve survival. Forage fish in the lower estuary include a broad group of species including surf smelt, Pacific sand lance, Pacific herring, eulachon, and juvenile American shad. These species have diverse reproductive strategies but all species can occur in the lower estuary during their life histories. For example, surf smelt and Pacific sand lance may use beaches for spawning while Pacific herring may spawn on nearshore macro-algae. Eulachon and American shad are anadromous and can produce large numbers of juveniles that disperse downstream and enter the estuary. The Fish and Wildlife Program places an emphasis on salmon restoration and forage fish are a major link between habitat and environmental conditions and the survival of salmon.

Re-Establish a Regional Coordination Forum

Current Program: Page 64, Program Coordination

Recommendation 1: 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

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.

Recommendation 2: The GSRO recommends the Council continue the inclusion of Fish and Wildlife Program Coordination funding in the updated program amendment process. Program Coordination funding is important to the region's fish and wildlife managers, particularly for the Columbia River Basin's Tribes. The lack of any Columbia River Basin fish and wildlife entity to provide this basis for coordination makes it more critical to provide funding directly to those individual state and tribal managers who can provide their time and expertise. This coordination funding is also important for many of the tribes because it helps build capacity and levels the playing field, particularly for smaller tribes across the basin. It allows for important avenues for participation and travel to meetings, efforts that would not occur without this level of funding support.

Rationale: The current 2009 Council Fish and Wildlife Program describes the need for coordination funding provided by BPA for the purpose of various activities that support Program implementation. Activities range from activities such as data management and reporting, monitoring and evaluation, facilitating and participating in focus workgroups on Program issues, review of technical documents and processes, and information dissemination.

The Council in 2012 reviewed coordination projects and provided a decision on BPA coordination funding. In that decision document the Council included a table of detailed coordination activities appropriate for BPA funding. Those coordination tasks were designated by the Council as meeting priority needs for program coordination for the next two years, FY2013-2014. With this decision the Council indicated that these activities were well suited for program-level regional coordination funding and recognized that they would need the assistance from partners throughout the region. In addition the Council stated that all of the work was intended to be of benefit at a basinwide or regional scale and should inform the Council for policy, program performance evaluation, and implementation decisions. The Council also recommended that this work should be accomplished by the appropriate fish and wildlife agencies and tribes recognized in the program and other entities such as Tribal Consortia that have the experience and capacity to coordinate this work at a basinwide scale.

NPA. Section 839b(h)(2)(C). [The Council shall request...] **fish and wildlife management coordination and research and development (including funding) which, among other things, will assist protections, mitigation, and enhancement of anadromous fish at, and between, the region's hydroelectric dams.**

Thank you for the opportunity to provide comments and recommendations for the Columbia Basin Fish and Wildlife Management Plan.

The Governor's Salmon Recovery Office
Olympia, Washington
September 15, 2013