

Staff summary of Issues & Recommendations

Fish Habitat Protection and Improvement

*Preliminary draft, please refer to full recommendations for complete review

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2009 Fish and Wildlife Program Sections:

Section II.D.1. Habitat Strategies (pages 14-16)

Overview

Several of the agencies and tribes recommend that the following topics be incorporated into the Program habitat strategy: protect infrastructure investments, encourage long term funding agreements, use ecosystem concepts, work with local organizations, rehabilitate Mainstem habitat, fully incorporate the estuary, plume and near-shore ocean, reduce toxic contaminants, integrate climate change, implement predator control, address large woody debris, prioritize habitat restoration work, develop an understanding of risks associated with habitat restoration work and consider how hatcheries integrate with habitat efforts. Many of the recommendations covered here and in other summaries support the Program to continue to focus on the ecosystem perspective.

I. Summary

1. Operation and Maintenance of Infrastructure Investments

These recommendations urge increased allocation of operation and maintenance funding to preserve the value of past and future investments in fish screens, habitat, hatcheries and wildlife lands.

2. Permanent or Long Term Funding Agreements and Conservation Easements

Recommendations that encourage recognition and further use of long term agreements, accords and conservation agreements to facilitate habitat work and to protect existing land before cost rise too much in the future. This could be a conscious strategy to acquire land and later restore their full habitat potential.

3. Planning for Climate Change

Several recommendations focused on how habitat work should be evaluated in the context of future climate change induced alterations to restored, existing and future habitats. Flood plain function [bank storage] was cited as a particularly effective means of buffering the ecosystem and habitat investments against climate change effects. Also, perpetual land purchases or conservation easements were recommended as means to mitigate climate change effects. Consideration for the full life cycle of fish would identify where the fish was most vulnerable to changing climate conditions.

4. Use Ecosystem Approaches and Focus

Several recommenders suggest the Council make more use of strategies and consideration of ecosystem processes when deliberating on habitat issues and projects. Note was made of the need to think beyond the local conditions that may affect fish survival and to consider the ecosystem at a range of scales.

5. Encourage local organizations to promote habitat restoration

Recommenders encourage the Council to make more use of local habitat restoration organizations and to even work to find funding for those local groups.

6. Increase emphasis for habitat work in the Lower Columbia river and its' tributaries

Recommendation to not overlook the importance of the lower river and tributaries as both migration corridors and refugia for fish from the upper part of the basin. Also advised was a need to recognize more fully the value of those fish endemic to the lower river, its' tributaries and the estuary.

7. Improve habitat in the Mainstem

Much habitat work occurs in tributaries, but several recommenders encourage the Council to value more highly the Mainstem habitat potential, either as increased passage efficiency or as spawning and rearing habitat.

8. Large Woody Debris

Recommendations to encourage to Council to establish standards, methods and liability criteria for the use of large woody debris, which is commonly used in habitat restoration work throughout the Columbia Basin.

9. Habitat work should be consistent with biological and program objectives

The Council should ensure that habitat work is consistent with, and supportive of, biological and program objectives. One recommender proposed for consideration of adoption region-wide, a systematic way to ensure habitat work is consistent with objectives.

10. Assess the condition of habitat to prioritize restoration efforts

Some recommendations to the Council to assess the existing value and potential value of habitat for fish and wildlife basin wide or in particular habitat areas above Grand Coulee dams, currently designated a blocked area. One recommender promotes the use of CHAP, a tool considered for use in the Willamette.

11. Habitat restoration risks, threats and opportunities

Recommendations in this group ask the Council to consider that habitat work has some inherent risks and endures some threats, particularly from toxics. One recommender suggested the Council consider how to expand the potential habitat 'value' of lands, that have low commercial value.

12. Habitat and hatcheries

Recommendations asking the Council to consider hatcheries within a larger habitat context and to develop an understanding of how habitat restoration efforts may conflict with or support hatchery programs in the same area.

13. Other Habitat comments

Recommendations encouraging the Council to promote habitat restoration and prevent further degradation.

14. ISAB Recommendations

The ISAB recommendations to the Council for freshwater habitat based on their review of the 2009 Fish and wildlife program are included.

II. Habitat protection and Improvement Recommendations

1. Operation and Maintenance of Infrastructure Investments

- a. IDFG (1) advises and recommends fish screens, fishways, and fish diversions are critical components of the Council's Fish and Wildlife Program and provide clear and immediate benefit to anadromous salmonids as well as other resident fish species. As the inventory of new installations grows and as the current inventory of installations ages, O&M funding (which has remained static) has not kept pace with basic O&M needs. Idaho recommends the Council take a leadership position on this matter and bolster language in the Program to highlight the importance of addressing this Regional concern.
- b. WDFW (4) recommends the Council should direct funding for replacement and repair beyond current operation and maintenance to ensure the continued value of existing infrastructure investment in fish passage, hatcheries and wildlife areas.
- c. The Kootenai Tribe of Idaho (24) recommends BPA shall provide sufficient operations and maintenance and funding to support full implementation of the Tribe's integrated fish and wildlife program. Specifically, BPA shall provide sufficient operations and maintenance funding to support efficient day-to-day implementation of the Tribe's integrated fish and wildlife program and to implement the individual project strategies articulated through six projects that make up the Tribe's integrated program (i.e., project numbers 1988-064-00, 1994-049-00, 2002-002-00, 2002-008-00, 2002-011-00, and 1992-061-05). BPA shall provide sufficient operations and maintenance funding to fully support the good faith efforts of the Kootenai Tribe to achieve the collective goals and objectives of the Tribe's integrated fish and wildlife program.

2. Permanent or Long Term Funding Agreements and Conservation Easements

- a. MDFWP (2) advises and recommends permanent or long-term funding agreements should remain a priority for completing this work including all the key points outlined in the current program, and funding should be tied to approved loss statements or settlement agreements. The Council should maintain conservation easements and fee title acquisitions as opportunities to protect and restore habitat for fish and wildlife. Once habitat is secured, the focus should shift to habitat restoration. Habitat protection for fish and wildlife would benefit if Council encouraged greater emphasis on partnerships (as mentioned on p. 7 of the 2009 Program) to expand conservation benefits and reduce mitigation costs to the ratepayers. Council should encourage cost-share partnerships and build flexibility

into the program necessary to partner with other conservation programs that prioritize both habitat conservation and working landscapes operating under best management practices. To minimize long-term ratepayer costs, the Council should strive to implement habitat measures as rapidly as possible given revenue constraints. We recommend that a program similar to the “Secure and Protect” project in the Flathead Basin (CSKT and MFWP) be established in the Kootenai Subbasin.

- b. BPA (35) advises and recommends The Program should continue to use habitat protection and improvement in appropriate circumstances as a means to achieve off-site protection and mitigation objectives. This includes large-scale, biologically targeted habitat improvement projects, such as those reflected in the Accords and wildlife settlement agreements.

3. Planning for Climate Change

- a. WDFW (4) recommends the Council develop a comprehensive strategic plan, built upon existing planning documents, 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)
- b. WDFW (4) recommends the Council review current restoration, fish passage barrier removal, or habitat projects to ensure their resiliency under predicted future climate scenarios to ensure that investments made today are effective into the future.
- c. WDFW (4) recommends the Council 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)
- d. WDFW (4) recommends the Council amend the Program to include the 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).
- e. CRITFC (14) supports 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.
- f. The Confederated Salish Kootenai Tribes (16) recommend BPA should fund perpetual land protection which includes conservation easements, land purchases, or other long term measures to combat climate change impacts on resident fish.
- g. The Cowlitz Tribe (22) recommend the Council and program 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.

- h. The USRTF (28) advises and recommends recovery plans are also a source for actions that address climate change and toxics. Maintain the current language under Emerging Habitat Issues, page 16, expressed in the 2009 Program with modifications shown here in bold: “...**Specific measures to deal with these emerging issues are included in the mainstem plan, recovery plans, and in many of the subbasin plans.**”

4. Use Ecosystem Approaches and Focus

- a. WAGSRO (5) and the UCSRB (7) recommends the Council and program invest in efforts that address functioning ecosystem processes across an entire watershed.
- b. The Cowlitz Tribe (22) recommends the Council recognize the Columbia River ecosystem includes the estuary, plume, and near shore ocean environments.
- c. The RFEGC (63) advises and recommends the Council recognize riparian zones serve as biologically rich areas which create diverse and resilient components of the landscape, both terrestrial and aquatic. While salmon recovery stakeholders recognize the ecosystem values of riparian areas, it remains difficult to receive funding for riparian restoration and maintenance. More often than not funders will select highly engineered, and costly, habitat enhancements to receive “credit”, rather than the cost effective process-based restoration including riparian rehabilitation. We recommend a balanced funding approach to creating habitat for short term benefits and restoring the long term process that create and maintain critical habitats.
- d. NOAA Fisheries (30) recommends the Council add a strategy to...”Focus on watershed processes that are likely responsible for habitat protection and degradation, not just symptoms that are observed at stream or reach scales”

5. Encourage local organizations to promote habitat restoration

- a. WAGSRO (5) advises and recommends 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.
- b. The UCSRFB (7) recommends the Council should take the lead in setting a new precedent for long-term stewardship of its significant habitat improvement investments. The Council can do this by setting aside a small percentage of the existing investment in each Province (e.g. 5% annually) to be managed locally (i.e. watershed councils, region, state - depending on the infrastructure) for long-term monitoring and maintenance needs.
- c. The Burns Paiute Tribe (12) recommends BPA should collaborate with other responsible partners and managers of hydropower projects (investor owned, non-federal, and publically-owned) to explore the feasibility of and development of new

programs for reintroduction of salmon, including passage of adult and juvenile life stages, into historical but currently blocked habitat.

- d. NOAA Fisheries (30) recommends the Council, through the program, use a strategic multi-scale framework for prioritizing tributary habitat actions....” And to develop and establish this strategy in coordination with scientists, managers and stakeholders prior to the next cycle of project solicitations. Where recovery plans are complete, incorporate their strategic prioritization frameworks that include viability criteria, limiting factors and priority actions. This framework should be accompanied by a basin-wide multi-scale tributary habitat monitoring framework. Furthermore, BPA’s project solicitation process should be updated so that solicitations specifically target priority limiting factors and actions.
 - e. The Bureau of Reclamation (36) recommends the Council and the Program continue to recognize the value of social engagement, local participation, partnerships and community support for habitat improvement projects and continue to encourage locally-led efforts that build Program objectives from the ground up. Recent experience has only reinforced the significant contribution of partners in the subbasins.
 - f. The Native Fish Society (60) recommends the Council require that subbasin and fish recovery plans would include an agreement between fish management agencies and land and water management agencies and private land owners in each area affecting salmonid life cycle requirements to develop plans that effectively support salmon life history requirements. Monitoring and evaluation would be required to determine whether the investment in habitat improvement provided the target life cycle benefits, increased smolt production and increased abundance of wild salmonids.
- 6. Increase emphasis for habitat work in the Lower Columbia river and its’ tributaries**
- a. The Lower Columbia Fish Recovery Board (6) recommends the Council and the program place greater emphasis on protection, mitigation, and enhancement of Lower Columbia salmon and steelhead populations, including the restoration of Lower Columbia tributary habitat; amend the F&W program and associated implementation measures to provide for restoration of Lower Columbia tributary habitat as an appropriate off site mitigation strategy for the estuary impacts on Lower Columbia Chinook, Coho, Chum and Steelhead; and, amend the F&W program and associated implementation measures to provide for restoration of Lower Columbia tributary habitat as an appropriate mitigation strategy for the impact of the Columbia hydropower system on Coho populations across the Basin.
- 7. Improve habitat in the Mainstem**
- a. The Colville Tribes (15) recommend the Council and the program continue to identify, protect and restore habitat areas and ecological functions that are associated with productive spawning, resting, rearing, and migrating salmon and steelhead, white sturgeon, and other native fish in the Columbia River mainstem, including the Okanogan, Methow, Entiat, Wenatchee and the blocked area, as supported by the existing Accord. Continue to protect, enhance, and connect freshwater habitat in the mainstem Columbia River for the life history stages of anadromous and resident fishes.

- b. The CTUIR (19) and the Nez Perce Tribe (25) recommend the Council amend the program in the following manner: 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 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.
- c. The Cowlitz Tribe (22) recommends 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.
- d. The US Fish and Wildlife Service (33) recommends the Council revise the fifth bullet under c. Resident fish and wildlife, page 39 to provide mainstem conditions that help to protect and enhance bull trout habitat and thus help to restore the abundance and productivity of bull trout populations that use the mainstem as they migrate into and out of tributary streams. The U.S. Fish and Wildlife Service's 2000 and 2006 biological opinions concerning hydrosystem operations that affect listed bull trout populations include objectives for that species, which are adopted here. Additionally, on September 30, 2010, the U.S. Fish and Wildlife Service designated critical habitat for bull trout throughout their U.S. range. This listing included the entire mainstem reaches of the Columbia and lower Snake Rivers. The Council's Program and this mainstem plan recognize the importance of this critical habitat for bull trout and support needed efforts to maintain and/or improve this critical habitat where needed.
- e. The US Fish and Wildlife Service (33) recommends the Council add the following bullet after the revised bullet in Recommendation 4 (page 39): Evaluate mainstem project specific impacts to migrating bull trout.
- f. The US Fish and Wildlife Service (33) recommends the Council revise the first bullet on page 43 with the following: In addition, the Council expects the federal operating agencies, in conjunction with the relevant state and federal fish and wildlife agencies and tribes to identify the importance of protecting or improving the critical mainstem habitat for recovering bull trout populations. The Council expects the relevant state and federal fish and wildlife agencies to conduct the necessary research and report the analysis to the Council at the earliest possible date.
- g. The US Fish and Wildlife Service (33) recommends the Council add the following bullet after the revised bullet in Recommendation 6 (page 43): Evaluate reservoir conditions and operations on foraging, overwintering, and migrating bull trout. The Program should continue to support the creation of shallow-water habitat in reservoirs for use by native fishes, and should provide additional support for

monitoring and evaluation of use especially by Chinook salmon in the Snake River Basin.

- h. The Native Fish Society (60) recommends the Habitat protection and restoration investments would be designed to maintain the chain of habitat requirements for each species of wild salmon and steelhead to complete their life history requirements in freshwater. This would include structure, temperature, flow and retention of gravel and nutrients. To be effective this would include the entire habitat utilized by salmonids from headwater stream protection, mainstem tributaries, mainstem Columbia River, estuary and near-shore ocean habitats.
- i. The Native Fish Society (60) recommends the Council identify and protect thermal refuge areas in the main stem Columbia and tributaries. Protection would include both the refuge areas and the sources of cool water that feed them. Develop a plan for controlling fishing in refuge areas especially during periods of high water temperatures in excess of 68 degrees F.

8. Large Woody Debris

- a. WAGSRO (5) and the Upper Columbia Salmon Recovery Board (7) advises and recommends 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.

9. Habitat work should be consistent with biological and program objectives

- a. The Salish Kootenai Tribes (16) recommend the Council maintain the current language under Habitat Protection and Improvement Activities to Address Biological Objectives, page 16, expressed in the 2009 Program with modifications shown here: "Habitat work is intended to be consistent with the Program's biological objectives and also with measures contained in subbasin plans and ESA recovery plans."
- b. The Yakama Nation (17) describe and endorse for general use the protocol developed by the Yakama Nation for selecting habitat project priorities in the Upper Columbia River tributaries.
Rationale: In implementing the ambitious habitat program undertaken by the Yakama Nation in its Fish Accord with the Action Agencies, the tribe recognized early on that simply protecting existing habitat would not achieve the biological objectives assumed in the FCRPS BiOp; a program was needed to protect functioning habitat, restore poorly-functioning habitats, and construct new habitat to replace that which has been irretrievably lost. Corollary to this approach was the need for a systematic process to identify priority stream reaches and habitat needs based on expert opinion on primary limiting factors. Projects expected to deliver high biological effectiveness could then be developed in consultation with regional experts and affected landowners to secure necessary permissions. This protocol is intended to move away from the tendency to construct habitat projects where there is a willing landowner - so-called "targets of opportunity" - but questionable

biological effectiveness and toward site selection that is fully rationalized on the basis of regional consensus on the biological effectiveness of the project.

- c. The Yakama Nation (17) recommends the Council should engage Columbia Basin fish and forest managers to develop approaches to stream habitat restoration that meet objectives for both forest health and stream restoration simultaneously.
- d. The Cowlitz Tribe (22) and the USRT Foundation (28) recommend the Council revise the program language under Habitat Strategies, pages 14-15, to add a strategy to “Establish and implement a consistent process for prioritizing habitat actions.” And to maintain the current language under Habitat Protection and Improvement Activities to address Biological Objectives, page 16, expressed in the 2009 Program with modifications shown here: “Habitat work is intended to be consistent with the Program’s biological objectives and also with measures contained in subbasin plans and ESA recovery plans.”
- e. NOAA Fisheries (30) recommends the Program should add a strategy to develop a multi-scale strategic framework for tributary habitat actions. This framework would provide important context for: linking the ESU/DPS, subbasin, watershed, and population scales; sequencing actions across the scales; and gauging appropriate levels of effort.
- f. NOAA Fisheries (30) recommends the Program should add a strategy that requires habitat actions to be based on empirical limiting factors' analyses that build upon and refine those in recovery plans. Funding opportunities and project solicitations should target specified work types by geography reflecting the limiting factors and biological needs to be addressed (e.g., not just based on opportunity and willing project sponsors).
- g. NOAA Fisheries (30) recommends the Council implement the ISAB's Program Review recommendations for freshwater habitat restoration requirements.
- h. NOAA Fisheries (30) recommends the Council continue refinement and implementation of a multi-scale framework for tributary habitat monitoring and evaluation in accordance with the Independent Scientific Review Panel's (ISRP) recommendations in its 2013 Geographic Review.
- i. The Native Fish Society (60) recommends the Council would develop a conservation requirement for each subbasin for each species and race of wild salmonids using it. The conservation requirement is based on an estimate of habitat capacity and managed for a spawning population that fully utilizes that habitat. Monitoring, evaluation and research refinements are used to improve management objectives related to harvest, achievement of spawner abundance objectives, life history and genetic diversity, productivity and distribution objectives in each subbasin.
- j. The Native Fish Society (66) recommends the Council establishes a nutrient enrichment standard based on the available scientific research for each watershed that is supported by naturally spawning wild salmonids and other fish species. The

nutrient enrichment standard is evaluated through monitoring to maximize stream productivity. Habitat improvement projects would be designed to retain nutrients in watersheds and evaluated. Since salmon derived nutrients are important for wildlife species and riparian vegetation, improvements for wildlife breeding, food resources and thermal cover should be included in evaluation and assessment of benefits. It is likely that as nutrient input from naturally spawning salmon carcasses increases, density dependent limitations on production would decrease, expanding the productivity of watersheds to produce wild salmonids.

10. Assess the condition of habitat to prioritize restoration efforts

- a. The Spokane Tribe (26) advises the Council and recommends the Northwest Power and Conservation Council's Fish and Wildlife Program has referred to the area above Grand Coulee Dams as the "blocked area." The Spokane Tribe of Indians recommends reference to this area be changed to "Habitats above Grand Coulee Dams." Bonneville Power Administration will provide funding within 180 days of the adoption and implementation of the 2014 program for Phase I studies in the period covered by this Program to investigate the quality and capacity of habitat in the upper basin. [Conduct] habitat surveys within the usual and accustomed area of the Spokane Tribe of Indians. [Conduct] feasibility studies for the reintroduction of anadromous in habitats above Grand Coulee Dam. [Recommend the] Council will direct the Administrator, the Bureau of Reclamation, the Army Corps of Engineers and any other appropriate Federal agencies to restore native resident fish species (subspecies, stocks and populations) to near historic abundance throughout their historic ranges where original habitat conditions exist and where habitats can be feasibly restored.
- b. The Grand Ronde Tribe (18) recommends the Council 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.
- c. The Nez Perce Tribe (25) recommends the Council add a strategy, "Establish and implement a consistent process for prioritizing habitat actions."
- d. NOAA Fisheries (30) recommends the Council add a strategy to "Use a strategic multi-scale framework for prioritizing tributary habitat actions...."
- e. BPA (35) recommends the Program should continue to encourage and support the Action Agencies in their efforts to further define the relationship between fish populations and habitat, and determine the most effective types of habitat improvement actions suitable to watershed conditions.
- f. The BOR (36) recommends the Program continue to encourage and support the Action Agencies in their efforts to further define the relationship between fish populations and habitat, and determine the most effective types of habitat improvement actions suitable to watershed conditions. The Program should also continue to update limiting factors based on the best available science and use the limiting factors to prioritize restoration actions and support processes.

- g. The USGS (38) recommends the Council should consider updating the Fish and Wildlife Plan to request that the appropriate agencies support adaptation of the DELFT3d model to a hierarchical habitat classification tool to identify key-recoverable habitats in the lower Columbia River.
- h. NHI (42) recommends the Council continue mapping riparian habitat condition and land cover/use throughout the Columbia River Basin.
- i. The Native Fish Society (60) recommends the Council should request an assessment of the acidification ecological threat to salmonid production by the ISAB and request recommendations for a monitoring program of Northwest rivers including the Columbia River Basin.

11. Habitat restoration risks, threats and opportunities

- a. The Yakama Nation (17) recommends the Council should initiate a regional discussion and outreach program to educate project sponsors, stakeholders, and landowners on the issue of risk associated with habitat restoration projects.
- b. NOAA Fisheries (30) recommends the Council address the ISAB Program Review recommendations to focus on threats to sustainability including: loss of biological diversity, climate change, chemicals and contaminants, food webs, uncertainty about carrying capacity, and the relationship between artificial production and the loss of productivity in natural populations.
- c. The NOAA Fisheries Science Center (31) recommends the Council, through the program, identify interactions between chemicals, and between chemicals and non-chemical habitat factors:
 - i. Investigate the combinatorial impacts of chemical mixtures on salmon and other fish.
 - ii. Investigate interactions between chemical and non-chemical habitat stressors.
- d. The NOAA Fisheries Science Center (31) recommends the Council incorporate toxics into ongoing efforts to restore and improve habitats:
 - i. Avoid the unintended creation of ecological traps, or nuisance habitats.
 - ii. Identify cost-effective pollution control measures and mitigation strategies that work.
- e. The USGS (38) recommends that the Council, over the next five years, develop the capabilities necessary to estimate the carrying capacity of the system. Research is needed to address the uncertainty regarding the types of habitat needed for juvenile salmon survival, the effectiveness of estuarine projects to restore juvenile habitat, and whether these restoration actions contribute to juvenile survival and increased adult returns.

- i. The Council should consider updating the Fish and Wildlife Plan to request that the appropriate agencies assess key components of a sediment budget for the lower Columbia River.
 - ii. The Council should consider updating the Fish and Wildlife Plan to include assessments of how streamflow, sediment, and large woody debris interact under current management regimes. It would be valuable to understand whether and how those geomorphic processes) sustain the success of aquatic and floodplain restoration projects for biological benefits. The lower alluvial segments along the Willamette River and its major salmon bearing tributaries provide one example of a suitable location for a pilot of these assessments because of the many floodplain and aquatic habitat restoration projects in this area.
 - iii. The Council should develop a monitoring plan using unmanned aircraft systems (UAS) technology to assess inundation and water temperature conditions across a range of stream morphology and land-use patterns. These data would ideally be utilized in concert with more traditional data describing sediment transport and occurrence of large wood to provide insight into the habitat-generating processes associated with restoration projects, especially focused in low gradient and unconfined valley segments.
- f. The Methow Conservancy (59) recommends the Program should be amended to recognize the very limited amount of total financial resources that are being made available to project sponsors on the ground for the purpose of habitat protection vs. habitat restoration. We urge the Council to understand and recognize the functional bias against habitat protection that exists in the current funding environment, and ask that you consider the development of policies and/or new dedicated funding programs to ensure that funding opportunities are increased for the protection of habitat and buffers necessary to support the successful recovery and sustainability of our salmon, steelhead, and bull trout in the Methow watershed and in our region as a whole. We encourage the Council to use this amendment of the Program to take a proactive leadership role in advancing the development of one or more new metrics for the valuation of riparian habitat that are not rooted solely in the current model of "development rights" valuation, but rather in the value of the function of the habitat being protected.
- g. NHI (42) recommends employing the Combined Habitat Assessment Protocols or CHAP approach to establish baseline conditions and habitat enhancements to give consistency to compliance monitoring.
- h. The Native Fish Society (60) advises and recommends historically, wild salmonids were supported by abundant spawners providing nutrients to watersheds. Nutrient enrichment requirements need to be developed for each subbasin to support the productivity of salmonid and wildlife habitats.

12. Habitat and hatcheries

- a. American Rivers (49) advises and recommends American Rivers focuses on habitat protection and restoration more than hatchery policy, but it is important that fish managers take advantage of healthier habitat by reducing our dependence on

hatcheries. In other words, functional, restored, occupied habitat for wild, self-sustaining salmon and steelhead populations should mean fewer hatcheries, which is a desirable goal for fisheries health, electricity ratepayers, and taxpayers alike. Hatcheries that do continue to operate should be run in a manner to minimize and ideally eliminate negative effects on wild fish populations.

- b. The Native Fish Society (60) recommends the Council establish “Hatchery Free Zones” watersheds such as Wind River, Asotin Creek, Joseph Creek, John Day River, and Molalla River and implement a monitoring and evaluation of the biological response for wild native salmonid populations in these streams to provide a scientific basis for evaluating the hatchery experiment in the Columbia River Basin. Not all hatchery-free watersheds are being monitored so it is impossible to evaluate the hatchery and wild salmonid production investments in the Columbia River basin. Additional hatchery-free watersheds must be established in the Columbia River basin in each ESU, MPG, DPS, and SMU at a minimum.

13. Other Habitat comments

- a. Hasselgren Gardens (471) advises and recommends Isn't it time we stop destroying our forests and realize without them we are doomed??? We have enough lumber to create whatever we want and we need to begin serious recycling of all the waste paper so our forests, water, air can be clear and clean. Clear cutting isn't forest management. It is for maximizing the profit of lumber companies. Let's begin to take responsibility for our environment by making wise decisions. Not just for the corporations for the people and the creatures who share this world.
- b. Wilderness Facts (426) advises and recommends the program address the need to rehab watershed impacts. Remove dikes & levees. Rehab estuaries.

14. ISAB recommendations

- a. The ISAB made recommendations related to Freshwater habitat requirements:
 - Uncertainties concerning the success of habitat restoration efforts should be addressed. There is a need to view habitat restoration as an experimental process that will require much better sampling designs at multiple scales. The ISRP has commented that the effectiveness of habitat restoration will depend not only the success of a specific action (e.g. planting riparian zones, fencing, floodplain reconnection) but also on how those actions are arranged within a watershed. For example, in many subbasins, actions are implemented through willing landowners, not through a prioritized strategy – and the success of such an opportunistic approach is questionable (ISAB 2011-4).
 - Consider habitat restoration as a long-term effort focused on creating the landscape and ecological conditions that underpin resilience. The Program should encourage project sponsors to recognize that habitat restoration may take a long time to show positive effects, particularly if it is focused appropriately on processes constraining or degrading habitat rather than on the structure or condition of the habitat itself (i.e., the symptoms; ISAB

2011-4). Incorporation of the rules of thumb from the landscape report in the revised Program could help emphasize a broader perspective.

- Establish quantitative objectives and timelines and require detailed evaluations, or formal reviews to evaluate whether habitat restoration efforts are really providing the anticipated benefits. Quantifiable objectives are required to provide clear direction and context. An audit/review process involving experts (such as was done for hatcheries by the HSRG), but with a focus on habitat and landscape restoration, could be used to explore the current state of restoration actions in the Basin. A formal review of the results from ISEMP and CHaMP should be highlighted and shared broadly with all engaged in Program projects.
- Consider the potential for conflict among the diverse efforts at conservation and restoration in the Basin. The Program is not the only habitat restoration program in the Basin, and as pointed out in the ISAB Landscape Report, many other entities have authority over actions that lead to degraded watershed conditions. For example, Program project participants might be removing roads to improve salmon habitat while other stakeholders in the same subbasin might be adding new roads at faster rate (e.g., Forest Service mitigation efforts for fuels). Successful habitat restoration requires integration and collaboration among all actors in the landscape.
- Encourage the sharing of experience and information among programs engaged in similar actions. Innovation and diffusion of ideas, successes, and failures across the Program can strengthen the capacity to adapt and refine restoration actions. By supporting “communities of practice” (Rogers 2006), the integration of information across projects becomes a basic principle of effective habitat protection and restoration activities.