

**THE CONFEDERATED TRIBES OF THE GRAND RONDE COMMUNITY  
OF OREGON**



**Recommendations for Amendments to the Fish and Wildlife Program  
Of the Northwest Power and Conservation Council**

**September 13, 2013**



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## **CONFEDERATED TRIBES OF THE GRAND RONDE COMMUNITY OF OREGON**

### **Recommendations to the Northwest Power & Conservation Council's Fish and Wildlife Program**

#### **A INTRODUCTION—THE CONFEDERATED TRIBES OF GRAND RONDE**

##### **A.1 Grand Ronde Tribal History**

In order to fully understand some of the recommendations to the Northwest Power and Conservation Council (NPCC or “Council”) submitted by the Confederated Tribes of the Grand Ronde Community of Oregon (“Tribe” or “Confederated Tribes of Grand Ronde”) here, one must put them in the proper context. In order to put them in the proper context, one should bear in mind the history and background of the Tribe known as Grand Ronde. Following is a very brief history of the Tribe and its people, intended to increase the reader’s understanding of the comments and recommendations the Tribe submits here.

##### **A.2 Pre-treaty history and culture**

Prior to European contact, the 27 antecedent tribes and bands of the Confederated Tribes of Grand Ronde inhabited a large area of the Northwest. Their homelands ranged from north of the Columbia in southwest Washington, to the southern banks of the Columbia in northwest Oregon, to the Willamette Valley and its tributary watersheds, to the Umpqua and Rogue River Basins in southwest Oregon. These 27 tribes and bands had differing cultures and customs, spoke different tongues from five major language groups, and although they traded with each other extensively, had unique identities. But one major trait they had in common was that they all relied on rivers and streams, as well as the fish and wildlife associated with them, for their livelihood and survival.

Because of the abundance of fish and wildlife, these tribes and bands thrived and carried on trade with their neighbors as well as distant tribes. This was the case until Euro-American trappers and traders introduced diseases to the tribal people. As a result, the populations of the tribes and bands diminished by an estimated 60 to 98 percent, depending on the tribe. These epidemics caused some tribal villages to vanish entirely.

##### **A.3 Treaties and forced relocation to Reservation**

It was in this weakened, reduced state that the first American settlers encountered these antecedent tribes and bands. Still, the rapid influx of settlers coupled with the

survivors' unwillingness to leave their homelands led to increased conflicts, and in the 1850's Congress decided to "solve the problem" by entering into treaties of cessation with the Northwest tribes. Anson Dart negotiated treaties with several of the 27 tribes and bands, which gave them reservations within their homelands and full rights of hunting, fishing, and gathering in their ceded lands. However, Congress refused to ratify these treaties, evidencing a desire to "clear the way" for American homesteaders, especially in the Willamette Valley which by then had become famous for its favorable climate and fertile soils.

Enter Joel Palmer, the Indian Agent for Oregon who quickly negotiated treaties with the antecedent tribes and bands that were much less favorable from the tribal point of view. These treaties involved the tribes and bands ceding their homelands and being relocated to a "temporary Reservation" on the far fringes of tribal homelands until a permanent Reservation could be created. Many of the tribal negotiators resisted signing these treaties even after long negotiations, but when it was made clear that they and their people would be killed if they did not sign (by angry settlers if not by the Army), they signed. Thus treaties were entered into and ratified with the 27 tribes and bands, except for those tribes in southwest Washington and on the northern Oregon coast. People from all 27 tribes and bands were relocated, some temporarily to the Table Rock and Umpqua Reservations in southern Oregon, some to private lands in places such as Scappoose and Dayton, Oregon, and all eventually to the "temporary" reservation in the Yamhill River Subbasin of the Willamette Basin which in 1857 became the permanent Grand Ronde Reservation.

#### A.4 Termination

The original Grand Ronde Reservation was the official "home" of the Tribes for almost a hundred years, from 1857 to 1954. As with most Northwest reservations, some tribal members moved off-Reservation, either to cities like Salem or Portland for work, or back to their homelands to live amongst the "whites" in those areas. No matter where they lived, however, tribal members maintained their connections with the land, the rivers and streams, and the fish and wildlife, a connection that lives on to this day. With the passage of the Termination Acts in 1954, the Grand Ronde Tribal members lost their federal recognition and their Reservation. The Tribe continued its customs, traditions and culture as best it could; however, with no federal recognition it lost its "voice" in legislative and regulatory matters. This became especially important in the 1960's, 70's, and early 80's, as most of the environmental legislation we know today (including the Northwest Power Act) came into being in those decades.

#### A.5 Restoration

After long legal battles in the 1970's and early 80's, the Confederated Tribes of the Grand Ronde Community of Oregon regained federal recognition in 1983. By this time, the Northwest tribes that had survived the Termination Acts had begun establishing



relationships and asserting their rights under environmental regulations, either individually or as intertribal organizations. The Confederated Tribes of Grand Ronde, on the other hand, while celebrating its restoration, had a long road ahead of it before it could realistically turn its eye toward natural and cultural resource rights on its ceded lands (see subsection A.6 below).

#### A.6 Present-day growth and concerns

With a very small staff and a newly-retained Reservation, the Tribe focused its efforts in the 1980's and 90's on managing the Grand Ronde Reservation and building infrastructure in the Tribal organization as well as the community of Grand Ronde. By 2000 the Tribe had enough resources in place to commit staff part-time to the McCormick & Baxter Superfund cleanup at Portland Harbor. However, this was only one of hundreds of projects in the Tribe's ceded lands area that required environmental representation.

The Tribe is currently taking steps to increase its representation for its natural and cultural resources throughout the ceded lands area. For example, the Tribe's Land and Culture Department has a Cultural Protection Program and a Ceded Lands Program; the two programs currently total 8 full-time employees. But there is still much ground to be gained before the Tribe can say it has full and proper representation on all issues across its ceded lands.

#### A.7 Tribal Natural Resources

The Tribal people were the original stewards of natural resources in their homelands in the Columbia Basin. They had to be good stewards, or else they would not have been able to live in balance with their environment for 10,000 plus years. Today, the Tribe is actively involved with and practicing good stewardship of natural resources on the Reservation and on the Tribe's ceded lands (see subsection A.8 below).

Salmon and steelhead - As is the case with most Northwest tribes, salmon and steelhead historically were and continue to be an important food source for Tribal members. But their significance to the Tribe goes beyond merely providing food.

Cultural significance - Salmon and steelhead are a First Food for many of the tribes and bands that make up the Grand Ronde Tribe. There are many creation stories associated with salmon, and the fish were important trade commodities for some of the tribes and bands. The decline in numbers of salmon and steelhead throughout the Columbia Basin, as well as the listing of the Willamette Spring Chinook and Willamette Steelhead runs on the Threatened and Endangered Species List, is of great concern to the Tribe. The Tribe is dedicated to taking active roles in answering questions about these species, halting their declines, and facilitating their recoveries.

Fisheries and hatchery distributions - A significant percentage of Grand Ronde Tribal members catch fish, including salmon and steelhead, from rivers and streams.<sup>1</sup> Fish hatchery distributions also account for a large portion of the salmon and steelhead eaten by Tribal members. Every year, an average of at least 20,000 pounds of fish from federal and state hatcheries in the Willamette Subbasin are distributed to, and eaten by, Grand Ronde Tribal members. This average of 20,000 pounds of fish from Willamette Subbasin streams is consumed annually by Tribal members, and does not include fish that Tribal members catch themselves.

Lamprey - Pacific lampreys are another significant species to the Tribe. Willamette Falls, the only remaining place in the Northwest where lampreys exist in sufficient numbers to permit Tribal gathering, is within the Grand Ronde Tribe's ceded lands. Historically Willamette Falls was the site of a village of the Clawiwalla band of Chinook, one of the antecedent tribes of Grand Ronde. This was a traditional gathering site that many other tribes used by paying due tribute to the Clawiwalla.

Cultural significance - Historically lampreys were such an important food source because of the relative ease of gathering them at the Falls, and because their meat is so high in the protein and fats essential for survival. Other lamprey products were important for medicines, and the spinal cords were used as a lashing or binding material. Today Tribal members continue to prepare lamprey meat and use its tissues in the traditional way.

Water and habitats - In addition to the species that inhabit the water, water itself is of great cultural significance to the Tribe. In Tribal traditions water is rightly seen as the source of life, not only by way of human consumption, but also through acting as the medium that aquatic species, ecosystems and the food web depend upon.

Eulachon – Also known as ooligan, hooligan, Pacific smelt, and candlefish, the eulachon run of the Lower Columbia River has historically been a very important food source, particularly for the Wahlalla (Cascades) band of Chinook, one of the antecedent tribes of Grand Ronde, inhabiting the banks of the Lower Columbia from modern-day Cascade Locks downstream to around modern-day Portland. Eulachon is very rich in oil, which has dozens of uses from a food (often mixed with berries) to a wood preservative.

Sturgeon – The Clackamas band of Chinook, one of the antecedent tribes of Grand Ronde, historically fished for sturgeon at the confluence of the Willamette and Columbia Rivers, and also further up the Willamette all the way to the modern-day Lake Oswego area. Sturgeon is another very important food source for the Tribe.

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<sup>1</sup> 2000 Socio-economic Survey, Confederated Tribes of Grand Ronde.

## A.8 Tribal Ceded Lands

The Tribe's connection to the Columbia Basin, other than the fact that the Grand Ronde Reservation is within the Willamette Subbasin, is its ceded lands. Ceded lands are the Tribal homelands that were ceded to the U.S. government by treaty, in exchange for certain rights and benefits to Grand Ronde.

Willamette Treaty of 1855 - On January 22, 1855 at Dayton, Oregon several chiefs and headmen of the tribes and bands in the Willamette Valley signed the "Treaty with the Kalapuya, Mollala, etc." known today as the Willamette Treaty. Under this treaty, the tribes ceded a vast area of land including the entire Willamette Subbasin. The northern boundary of this treaty was the Columbia River, so chosen because it was the Oregon territorial boundary, and Joel Palmer did not have authority to negotiate treaties in Washington Territory at the time. For the tribes the Columbia was not a boundary, but rather a gathering place, a highway, and a grocery store. The Tribe's homelands have always included the Columbia and have always been greatly affected by its conditions and dynamics.

Other treaties - The other treaties of the Tribe's antecedent tribes and bands are the Umpqua & Kalapuya, Molalla, Rogue River, and Chasta Costa treaties, all entered into between 1853 and 1855. The Tribe considers all of its treaties restored upon the restoration of the Tribe, and considers them effective in reserving rights to cultural and natural resources for the Tribe on its ceded lands.



# FISH AND WILDLIFE PROGRAM RECOMMENDATIONS

## B AMENDMENTS TO INTRODUCTION

### B.1 Amendments to Program Framework

**Recommendation 1** - The Program should integrate with ESA. Maintain the current language under Program Framework, page 4, expressed in the 2009 Program with modifications:

*"...That is, the Council's Program is designed to link to and accommodate the needs of other programs in the basin that affect fish and wildlife. This includes meeting the needs of the ESA by ~~describing the kinds of ecological change needed to improve the survival and productivity of the diverse fish and wildlife populations in the basin.~~ implementing the Program to be consistent with ESA regulatory findings in biological opinions and rulemakings; incorporating ESA recovery criteria into Program biological objectives; and incorporating ESA recovery plans, including implementation plans, into Basin-wide and subbasin management plans and multi-year action plans."*

Rationale: The purpose of the Endangered Species Act is to conserve the ecosystems upon which endangered species and threatened species depend and to provide a program for the conservation of such species. Furthermore, the ESA states that it is a policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species. The ESA's purpose and policies are complementary to the Council's mandate to develop a program to protect, mitigate and enhance fish and wildlife, included related spawning grounds and habitat, on the Columbia River and its tributaries.

In anticipation of ESA recovery plans, co-managers, including NOAA Fisheries, worked with the Council and subbasin planners to ensure that subbasin plans provided a good foundation for ESA recovery. Thus, as ESA recovery plans emerged, they were built on the foundation of the subbasin plans. The recovery plans were developed by local stakeholder groups including the fishery agencies and tribes, states, local governments and other federal agencies. The final plans include ESA goals as well as broad sense goals, priority limiting factors, priority actions and costs. These recovery plans provide important context and guidance for the Council's Fish and Wildlife Program and they should be explicitly incorporated into the Program.

### B.2 Amendments to Implementation and Performance

**Recommendation 2:** Update the current language under Implementation and Performance, page 5, expressed in the 2009 Program with modifications shown here:  
*"The Council comprehensively revised the Program in 2000 with the addition of the current program framework, added specific measures and objectives for the mainstem in 2003, and then developed and adopted the subbasin management plans into the Program in 2004-05. Together, these elements provide a coordinated and integrated*

*plan for fish and wildlife actions across the basin. The federal, state, and tribal governments have been working since then with local partners to expand the subbasin plans into ESA recovery plans for areas of the basin that include ESA-listed populations. ~~The Council is planning a subsequent amendment process in 2009-2010 to update the subbasin management plans and Program objectives to reflect these and other recent planning developments.~~ Many ESA recovery plans for salmon and steelhead are now complete. Those recovery plans used the 2004-05 subbasin plans and this cycle should continue, so the subbasin plans should now incorporate the final ESA recovery plans."*

Rationale: Recovery plans provide delisting and broad sense recovery criteria for listed populations. This is a first step that can be used to inform wild production objectives per core population or ESU. This only includes wild production and additional research and effort is needed to develop long-term performance targets for hatchery fish per given Subbasin.

**Recommendation 3** – The last paragraph on page 5 states that “The focus of the Program and the Council now turns to performance”. Adaptive management principles increase effectiveness and efficiencies. 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 the 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 implementation of the Program to align with the changes identified in step 7.



Each of these eight steps is required to support a transparent, accountable, and effective planning, implementation and evaluation process. In this process, *measures* are the actions, or prescriptions for actions. They implement strategies to address the limiting factors that create the gaps in biological productivity of the focal populations.

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.

## C AMENDMENTS TO BASINWIDE PROVISIONS

### C.1 Amendments to Vision for the Columbia River Basin

**Recommendation 4** - 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.*

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.

### C.2 Amendments to Scientific Foundation and Principles

**Recommendation 5** – Add language to scientific principles on page 9 and 10: The Columbia River ecosystem includes upland, tributary, mainstem, estuary, plume, and near shore ocean environments.

Rationale: Habitat restoration should be kept in the context of ecosystem restoration. The habitats are connective and are instrumental in the diversity and complexity of native species.

**Recommendation 6** – Add language to scientific principles on page 9 and 10: Salmon and steelhead 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).

Rationale: Diversity is a major biological objective that usually is overshadowed by productivity and abundance.



### C.3 Amendments to Biological Objectives

**Recommendation 7** - Insert new second paragraph under *Anadromous Fish Losses* on Page 11 as follows: No comparable analysis exists for Pacific lamprey; however, it is apparent that losses have been substantial. The Council recognizes and supports efforts to restore Pacific lamprey numbers, including the Tribal Pacific Lamprey Restoration Plan for the Columbia River Basin and the USFWS Pacific Lamprey Conservation Agreement. Restoration of Pacific lamprey numbers and mitigation for lamprey losses should incorporate actions recommended in these plans.

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.

**Recommendation 8** – (NPCC 2009 Program, Page 11: C. Biological Objectives/ 1. Basin-level Biological Objectives) The program should maintain the current basinwide biological objectives expressed in the 2009 Program with the following modifications:

- *Halt declining trends in Columbia River Basin salmon and steelhead populations, ~~especially those that originate above Bonneville Dam.~~ Significantly improve the smolt-to-adult 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. ~~Continue restoration of lamprey populations.~~ (Add new objective or improve on existing biological objective specific for lamprey).*

Rationale: These are basinwide objectives; therefore, any reference to emphasize on smaller scales should not be included.

- *“Restore the widest possible set of healthy naturally reproducing populations of salmon and steelhead in each relevant province. Healthy populations are defined as having an 80 percent probability of maintaining themselves for 200 years at a level that can support harvest rates of at least 30 percent, so long as ESA recovery objectives can be met and there is no contribution to further ESA listings.”*

Rationale: The underscored language appears to have been omitted from the 2009 Program. This language should be incorporated back into the Program as the language emphasizes the long-term sustainability of harvestable resources.

- *“Significantly increase the total adult salmon and steelhead runs in the Columbia Basin, ~~especially those that originate above Bonneville Dam~~, in a manner that supports tribal and non-tribal harvest and complements regional harvest management agreements, such as the Columbia River Compact, the U.S. v Oregon Management Agreement, and the Pacific Salmon Treaty. Efforts to increase abundance must also be consistent with achieving recovery of ESA-listed populations and preventing additional ESA listings of species. 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.”*

*Rationale: These are basinwide objectives; therefore, any reference to emphasize on smaller scales should not be included.*

- *Add new basinwide biological objective specific for lamprey. Continue restoration of Pacific lamprey by (1) restoring lamprey passage and habitat in the mainstem and in tributaries that historically supported spawning lamprey populations, (2) continuing efforts to translocate adult Pacific lamprey to appropriate areas to reduce upstream passage losses, and (3) evaluating artificial propagation as a way to mitigate for lost lamprey production when passage and habitat improvements alone are insufficient. Attain self-sustaining and harvestable populations of lamprey throughout their historic range and mitigate for lost lamprey production in areas where restoration of habitat or passage is not feasible.*

*Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.*

**Recommendation 9** – Restate the existing quantitative goal (NPCC 2009 Program, Page 11: C. Biological Objectives/ 1. Basin-level Biological Objectives);

*The Program continues to include a set of quantitative goals and related timelines for anadromous fish. These include, among others, increasing total adult salmon and steelhead runs to an average of 5 million annually by 2025 in a manner that emphasizes the populations that originate above Bonneville Dam and supports tribal and non-tribal harvest, and 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.*



Rationale: This is a good interim goal until scientifically sound, quantitative biological objectives are developed at the Subbasin and Provincial level.

**Recommendation 10** – Restate the mitigation responsibility for areas where Anadromous fish have been extirpated (NPCC 2009 Program, Page 12: C. Biological Objectives/ 1. Basin-level Biological Objectives). The Program should maintain the four bulleted principals that guide mitigation requirements for anadromous fish losses in all blocked areas resulting from development and operation of hydroelectric facilities.

Rationale: These principals provide a solid basis for mitigation in the blocked area and should not be lost or weakened in the amendment process.

**Recommendation 11:** Under Section 2. “Further Development of Biological Objectives” on page 13, the NPCC should consider the following in developing quantitative Biological Objectives:

- Adopt the ISAB’s recommendation to make the Basin-wide objective of 5 million salmon and steelhead by 2025 more specific with respect to wild and hatchery fish. Develop provincial biological objectives including population targets in the Lower Columbia Province.
- Adopt the ISAB’s recommendation to develop productivity objectives that reflect differences among species and populations. Incorporate ESA recovery productivity objectives.
- Adopt the ISAB’s recommendation to establish quantitative biodiversity objectives for focal species and habitats. Incorporate ESA biodiversity objectives.
- Add language that states: *“The Council’s Program incorporates the quantitative recovery criteria from ESA recovery plans. It also incorporates the more qualitative broad sense goals in some recovery plans that go beyond ESA delisting. The Program also recognizes that these goals do not reflect hatchery production goals for harvest, and such hatchery production targets will need to be determined.”*

Rationale: There is a need to develop quantitative biological objectives that can be regularly monitored and evaluated to determine whether the Program is on target or in need of change. These recommendations encourage the Council to incorporate ESA goals and objectives for recovery and delisting of threatened and endangered species into the Fish and Wildlife Program. In most cases, ESA delisting is not an ultimate goal and Fish and Wildlife Program goals should exceed and be broader than achieving ESA delisting. However, for listed species, ESA delisting should be an intermediate step towards the Fish and Wildlife Program goals. At any rate, the Council should clarify that a) ESA recovery and delisting is consistent with Fish and Wildlife program goals and b) actions to achieve Fish and Wildlife Program goals should not impede ESA delisting.

**Recommendation 12** - Revise second bullet under *Objectives for Environmental Characteristics* on Page 13 to read: *Protect, enhance, restore, and connect freshwater habitat in the Columbia River mainstem and tributaries for the life history stages of naturally spawning anadromous and resident salmonids and Pacific lamprey.*

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.

#### C.4 Amendments to Basinwide Provisions / D. Basinwide Strategies

**Recommendation 13** – (NPCC Program, Page 14: D. Basinwide Strategies / 1. Habitat Strategies). Revise fourth paragraph under Habitat Strategies on Page 14 to read: *For example, passage through the hydrosystem causes loss to salmon, steelhead, lamprey and resident fish. Measures at the dams can and should be taken to reduce this loss. As an offset for hydrosystem-caused losses, the Program ~~may also~~ calls for improvements in spawning and rearing habitats in tributaries, the lower river, and estuary. By restoring these habitats, which were not damaged by the hydrosystem, the Program helps to compensate for the existence of the hydrosystem.*

Rationale: The continued existence of the federal power system will have negative effects on native fish and wildlife species that cannot be compensated for on site. The program should require off site mitigation to fully address losses that cannot be attained on site.

**Recommendation 14** – (NPCC Program, Page 19: D. Basinwide Strategies / 1. Artificial Production Strategies). Insert new section g. *Pacific Lamprey Production* on Page 19:

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

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

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

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.

**Recommendation 15** - (NPCC 2009 Program, Page 22: D. Basinwide Strategies/ 6. Wildlife Strategies) – BPA should fund the agencies and tribes to complete wildlife operational impact assessments using methods that provide a systematic approach to characterize active physical and biological processes in watersheds and describes spatial distributions, histories and linkages among important ecosystem components. A framework for assessing operational impacts shall be in place by 2015 with assessments initiated that same year.

Rationale: Hydropower operational impact assessments are needed to determine the extent and directions of ecological alterations and to institute a standard, rigorous, transferable, and regionally accepted assessment methodology to describe and quantify ecological losses attributable to the FCRPS. The 2009 Program stated that the Council, with F&W managers and BPA, will assess the value of committing program resources on direct operational impacts on wildlife habitat. The Council should use its Wildlife Advisory Committee to convene the wildlife managers and BPA to develop protocols for assessing operational impacts. The WAC should develop/review accepted methods to assess impacts from operations (i.e., functional impairments from lost peak flows, erosion, trophic impacts, changes in species composition, and other impacts identified by Forum). Possible sources for information include recent ISRP reviews and the pilot project nearing completion in the Kootenai Subbasin. The goal of the forum should be to have regionally accepted protocols by 2015 and completed operational loss assessments by the completion of this 5-year Program.

The ecological impacts to wildlife populations due to the loss of fish and the losses caused by the operations of the hydro system have not been assessed. The fish and wildlife resources of the Columbia Basin have been deprived of marine-derived nutrients associated with the return of adult anadromous fish. The implications of this impact, while not yet clearly defined or quantified in terms of wildlife, must be mitigated and the 2009 Program increases this emphasis. Given the vision of this program, the strong scientific case for a more comprehensive, ecosystem-based approach, and the shift to implementation of this program through provincial and subbasin plans; wildlife mitigation projects should complement fish mitigation projects to the extent practical.

Ecosystem management should maintain or recover the biological integrity of the system. Determining the extent to which ecological systems are experiencing



anthropogenic disturbance and change in structure and function is critical for long-term conservation or restoration of biotic diversity in the face of changing and compromised landscapes and land use. To determine parameters needed to address ecological integrity, the Council, wildlife managers, and BPA will adopt a framework that can: (1) identify and isolate operational impacts from other basin changes, (2) assess operations-based influences on downstream physical processes, (3) link physical, biological, and ecological processes (4) account for natural floodplain dynamics, and (5) be used in a predictive capacity.

BPA should fund assessments of ecological impacts to wildlife from the reduction or loss of anadromous fish as part of the operational loss assessment. The assessments need to evaluate an array of core ecological parameters (e.g., biological/biotic and physical/abiotic) with the understanding that habitats, communities, and processes are ecologically linked. The results of these assessments will be the basis for quantification of operational impacts and subsequent mitigation obligation. Existing and future habitat actions implemented to benefit anadromous fish may be suitable mitigation for some of these impacts.

**Recommendation 16** – Under section g. Mitigation Crediting Forum on page 22, the Program should maintain the four bulleted criteria for a project to be credited against construction and inundation losses. BPA shall fund existing projects at levels adequate to implement wildlife area management plans.

Rationale: Funding needs to continue to maintain the base level of habitat and credits accomplished to date. BPA will fund existing wildlife projects at levels determined to be consistent with the project management plans. Funding must be sufficient for habitat maintenance and enhancement, and appropriate monitoring as agreed upon in the management plans. Where management plans are not in place, BPA will provide interim funding to manage the wildlife projects and complete the management plans.

**Recommendation 17** – Under section b. Resident Fish Mitigation Settlement Agreements on page 23, the Program should reflect the following: *BPA should fund the Agencies and Tribes to develop a methodology and complete resident fish loss assessments. The selection of a method should be at the discretion of the entities involved in performing the survey; however, to standardize the process and ensure a consistent level of accuracy across the basin the Council should form a workgroup of resident fish managers to address this issue. A framework for assessing resident fish losses shall be in place by 2015 with assessments initiated that same year.*

Rationale: The Northwest Power and Conservation Council's (Council) amended Fish and Wildlife Program (Program) provides for resident fish mitigation "where construction and inundation losses have been assessed and quantified by the appropriate agencies and tribes, mitigation should occur through the acquisition of appropriate interests in real property at a minimum ratio of 1:1 mitigation to lost distance or area." Despite the

mitigation provisions, the Program does not prescribe specific methodology for the calculation of lost resident fish habitat due to construction and inundation. Because of this omission, resident fish managers (i.e., Columbia Basin Fish and Wildlife Authority's (CBFWA) members and non-members) in the Columbia River Basin, working through the CBFWA Resident Fish Advisory Committee (RFAC), developed a methodology to allow for the consistent quantification of inundated resident fish habitat (CBFWA Members Action Notes, October 7, 2009).

The CBFWA sent a letter on October 8, 2009 to the Council suggesting a recommended methodology to calculate the amount of resident fish habitat that has been inundated by the construction of the Federal Columbia River Power System. The inundation methodology could serve as the foundation for future identification of operational losses. The Council should develop and adopt a standard methodology through a public process that includes independent science review and the participation of the resident fish managers throughout the Columbia River Basin.

**Recommendation 18** – The High-Level Indicators paragraph on page 26 of the current Program should continue to expand to include reporting high level indicators in the Lower Columbia Province, as well as develop indicators for resident fish, pacific lamprey, and eulachon. The recently constructed Minto Adult Collection Facility in the Willamette Subbasin on the North Santiam River is a significant hydrosystem investment funded by the tax and rate payer. The data collected at this facility is an optimal metric for wild and hatchery steelhead and salmon species and should be incorporated as a High Level Indicator.

**Rationale:** In accordance to the 2008 Upper Willamette Biological Opinion, significant tax and rate payer investments have been made and are expected to continue to recover listed fish directly affected by the hydrosystem. Utilizing data from at least one collection facility in the Willamette Subbasin would be an excellent metric to gauge mitigation success.

**Recommendation 19** – High Level Indicators on page 26 need to be developed for quantitative biological objectives developed at the provincial scale. These include:

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 as called for. The Program should restate the call to assess the value of quantitative biological objectives and to 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 that 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.

## D AMENDMENTS TO OCEAN

### D.1 Amendments to Primary Strategy

**Recommendation 20:** Add sentence to opening paragraph for *Primary Strategy* on Page 31 as follows: *Identify the effects of ocean conditions on anadromous fish survival and use this information to evaluate and adjust inland actions. This should include evaluating the effects of ocean harvest on Pacific lamprey food resources.*

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.

**Recommendation 21:** To Primary strategy on page 31, add: *It is important to continue basic monitoring over time to increase understanding of the 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.*

-AND-

**Recommendation 22:** Add Ocean Strategy 3 on page 31, Identify the effects of ocean conditions on anadromous fish survival and use this information to evaluate and adjust inland management actions.



Rationale: 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.

#### D.2. Amendments to Ocean Strategies

**Recommendation 23:** Revise *Manage for Variability* on Page 31 to include Pacific Lamprey in the text.

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.

### E AMENDMENTS TO LOWER COLUMBIA RIVER ESTUARY

#### E.1 Amendments to Estuary Strategies

**Recommendation 24:** Revise third bullet under *Estuary Strategies* on Page 32 to include Pacific Lamprey.

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.

### F AMENDMENTS TO MAINSTEM PLAN

#### F.1 Amendments to Vision of the Mainstem Plan

**Recommendation 25:** Revise first paragraph under *Vision of the Mainstem Plan* on page 35 as follows: ...especially spawning, rearing, resting, migration, and over-wintering habitats for salmon, steelhead, lamprey, sturgeon, and resident fish populations.

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant. Pacific lamprey adults have repeatedly been observed over-wintering in tributary streams.

## F.2 Amendments to Biological Objectives (Mainstem Plan)

**Recommendation 26:** Revise second bullet under 2. *Specific Objectives...* on Page 36 to read: *Protect, enhance, restore and connect freshwater habitat in the mainstem for the life history stages of naturally spawning anadromous and resident salmonids and lamprey. Protect and enhance ecological connectivity between aquatic areas, riparian zones, floodplains, and uplands in the mainstem.*

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.

**Recommendation 27:** Revise third bullet under “*Migration and passage conditions for anadromous fish*” on Page 38 as follows: *The Council will consult with ...to determine the possibility of adopting hydrosystem survival performance standards for non-listed populations of anadromous fish including lamprey. Efforts should be implemented to adopt an interim passage standard for adult Pacific lamprey of 80% per mainstem dam to be accomplished within 10 years and to improve passage further in subsequent years.*

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.

## F.3 Amendments to Strategies in Specific Areas

**Recommendation 28** – Under Water Quality on page 43-44, the program should include as a bullet under the WQ Plan as follows: *BPA should fund a programmatic review and assessment of how hydropower projects exacerbate any problems associated with the effects of toxic substances and if any such correlation exists, the Council shall identify opportunities for operational changes or other activities to help mitigate these impacts and reduce toxic contamination. Determine how seasonal anoxia in dam reservoirs controls the release of toxics and other pollutants from the sediments to the water column and how the uptake and transfer of these toxics and pollutants transfer up the food web and negatively impact fish. Evaluate how environmental toxicants impact the reproductive fitness of fish that are impounded behind dams.*

Rationale: Fishery resources are clearly affected by the development and operation of the federal hydropower system. Dam presence can be associated with the accumulation of contaminated sediment (Colas et al., 2013) and the presence of reservoirs and their operations can be a controlling factor on the chemical conditions such as anoxia which impact the distribution and bioavailability of toxics in the system.

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

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

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

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



**Recommendation 29** – Under Water Quality on page 43-44, the program should include as a bullet under the WQ Plan as follows: Fund studies to determine which toxic contaminants most limit the restoration success of anadromous and resident fish and in particular determine how contaminants interfere with the reproduction and/or rearing success of key species such as white sturgeon and Pacific lamprey that are known to be vulnerable to bioaccumulation of toxins. The footprint of existing contamination and the location of known toxic discharges should be mapped in relationship to fish and wildlife populations and habitat restoration efforts and monitored as part of a basin-wide monitoring program. Assess foodweb transfer, sediment transport, and biological effects of emerging and legacy organic contaminants under current management regimes, and how those processes affect key Columbia River species and the success of restoration projects within the basin.

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

The USGS Columbia River Contaminants and Habitat Characterization (ConHab) project investigated transport pathways, chemical fate and effects of endocrine disrupting chemicals in the foodweb in the lower Columbia River and found that biomagnification of multiple contaminants occurred in resident fish and osprey eggs, environmental quality benchmarks were exceeded in some cases, and reproductive parameters showed impairment at some sites and were significantly negatively correlated with various contaminant concentrations (Nilsen et al., in press; Nilsen and Morace, in press). In some species of vertebrates, these chemicals alter thyroid function, reduce sperm counts, and delay sperm maturation (Kuriyama et al., 2005) among other impacts. NOAA researchers found from studies on juvenile chinook salmon that exposure to urban contaminants was linked to an increase in disease susceptibility (Arkoosh et al., 1998). Better understanding of these effects on key first foods species is needed.

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

- Chemicals of emerging concern (CECs) levels of concern to the health of key species including Pacific lamprey, white sturgeon, and salmonids.
- Impacts of CECs on the carrying capacity of the Columbia River ecosystem for juvenile salmonids and other key species.
- Impacts of contamination on habitat restoration success: Contaminants of concern should be assessed and monitored as part of current and future river restoration programs.

- Role of contamination in reduced rearing success of white sturgeon in impounded pools: Impacts of contaminants on sturgeon reproduction and rearing success within areas of known high productivity. Comparison of potential contaminant impacts on impounded versus unimpounded populations.
- Role of contamination on Pacific lamprey declines compared to threats by dam passage, etc. Assess levels of concern and effects of chemical mixtures.
- Investigate impacts of different hydrologic scenarios and management actions on contaminant distributions and foodweb transfer.
- Distributions, levels, and spatial patterns of contaminants of emerging concern (CECs) in the Columbia River basin including the estuary and coastal ocean.

**Recommendation 30:** Revise final bullet under *Water Quality* on Page 44 as follows: *Implementing actions to reduce toxic contaminants in the water to meet state, tribal and federal water quality standards. The federal action agencies should partner with and support federal, tribal, state, and regional agencies' efforts to monitor toxic contaminants in the mainstem Columbia and Snake rivers and evaluate whether these toxic contaminants adversely affect anadromous or resident fish important to this Program. If so, implement actions to reduce these toxic contaminants or their effects if doing so will provide survival benefits for fish in mitigation of adverse effects caused by the hydropower system. In particular, investigate whether exposure to toxics in the mainstem, combined with the stress associated with dam passage, leave juvenile salmon and adult and juvenile lamprey more susceptible to disease and result in increased mortality or reduced productivity.*

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.

**Recommendation 31** – Insert the following as the last paragraph under *Water Quality* on Page 44: BPA should fund collaborative partnerships through a forum where governmental entities and co-managers can discuss and develop regional toxic-reduction strategies. In addition to whatever priorities are identified at this forum, components of the strategy should include:

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



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

**Recommendation 32:** On page 44, the second bullet under “Juvenile and adult passage, in general”, the current program seems to downplay high priority projects funded under the Willamette Biological Opinion. The bullet should state: *The Council recognizes that NOAA Fisheries’ Willamette River Biological opinion requires additional capital improvements at the Willamette projects operated by the Corps. Priority work at the Columbia River and Snake dams funded through the Columbia River Fish Mitigation Program (CRFM) should not go unfunded because the diversion of CRFM funds to implement the Willamette Biological Opinion—of competing priorities between districts of the US Army Corps. If necessary, the Council encourages the Corps to seek alternative funding for Willamette Biological Opinion implementation—secure, and award sufficient funding to meet the priorities of the Willamette and Columbia River Biological Opinions.*

Rationale: The current program seems to set a lower priority for RPA’s listed in the Willamette Biological Opinion. During the 2009 Program Amendment Process, the Tribe made it very clear to the NPCC that funding under the FW Program and CRFM is heavily skewed to Subbasin east of the Cascade Mountains. Given both the significant impacts the hydropower system has on FW resources in the Willamette and considering the poor allocation of mitigation funds, it is essential for the program to recognize that hydropower mitigation priorities in the Willamette are at minimum equal to, if not greater than, those mitigation needs on the Columbia and Snake River dams.

**Recommendation 33:** On page 46 under “Juvenile bypass systems”, add a fifth sub-bullet that states: *In the Willamette, make the necessary at dam modifications or build new juvenile fish collection, handling and transport facilities to increase survival standards that support broad sense recovery goals at the projects named in the Willamette Biological Opinion. The Council urges that the agencies fully fund the long-term operation and maintenance needs of these facilities.*

Rationale: Juvenile fish passage is essential in the recovery of upper Willamette River stocks of salmon and steelhead. Much of the highly productive spawning habitat is located upstream of the hydrosystem and fish production upstream must have a safe viable passage around or through the hydrosystem. Construction of a collection facility is a significant investment and is expected to be operated and maintained into the future

to benefit salmon, steelhead, and lamprey. The inability to operate these facilities in the future due to lack of OM funds is inexcusable. In times of shortfalls in appropriations, the NPCC FW Program should back its goals, objectives and guiding principles and fund the OM of these facilities.

**Recommendation 34:** On page 47 under “Ault fish passage”, edit the fifth sub-bullet to state: *In the Willamette, upgrade existing or build new adult fish collection, handling and transport facilities to assist adult passage or correct adult passage problems at the projects named in the “Willamette Biological Opinion. The Council urges that the agencies fully fund the long-term operation and maintenance needs of these facilities.*

Rationale: Adult fish passage is essential in the recovery of upper Willamette River stocks of salmon and steelhead. Much of the highly productive spawning habitat is located upstream of the hydrosystem projects and these fish must have access to these habitats. Construction of a collection facility is a significant investment and is expected to be operated and maintained into the future to benefit salmon, steelhead, and lamprey. The inability to operate these facilities in the future due to lack of OM funds is inexcusable. In times of shortfalls in appropriations, the NPCC FW Program should back its goals, objectives and guiding principles and fund the OM of these facilities.

**Recommendation 35:** Revise introductory text under *Lamprey and Sturgeon Passage*, a. Lamprey, on Page 47 to read: *In recent years awareness of the effects of the hydrosystem on lamprey has increased, and the need for substantial additional effort addressing lamprey has become an emerging issue. In the Columbia River Basin....* (retain entire existing paragraph).

*It is likely that artificial propagation may need to be evaluated as a potential tool for restoring lamprey and mitigating for losses. Development of life-cycle and bioenergetics models will help identify critical limiting factors and prioritize recovery actions. Budgets and staffing must be adequate to monitor the effects of actions taken to address lamprey issues.*

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.

**Recommendation 36:** Revise/add bullets under *Lamprey* on Page 47 as follows: *Bonneville and the Corps, in coordination with federal, state, and tribal fish managers and the Council, should identify, develop, implement, and monitor measures to help restore Pacific lamprey including:*

- *Specific fish passage structures for adult and juvenile lamprey*



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

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.

**Recommendation 37** – Update sturgeon passage and mitigation strategies on Page 47 with the following: BPA should adequately fund sturgeon recovery and the recommendations from the Draft 2013 Framework. The Program should consolidate measures intended to address white sturgeon and green sturgeon restoration into set of strategies in the Mainstem Plan. Incorporate recommendations of Oregon’s White Sturgeon Conservation Plan and the White Sturgeon Framework Plan into the Program. The Framework should be identified as a Program appendix on White Sturgeon. Rationale - White sturgeon are widely recognized as iconic mainstem fish species severely affected by construction and operation of the hydrosystem (ISAB 2013, Draft framework 2013, ISAB programmatic review, Kootenai and select Zone 6 sturgeon reports 1995 and 2012). About “4% (\$9.5 million) of annual direct Fish and Wildlife Program expenditures of \$246 million in 2012 were dedicated to white sturgeon. Kootenai sturgeon projects account for the majority of sturgeon-related expenditures (\$6.5 million). The remainder is distributed among one general and six accord projects”



(Daft Framework 2013). The Council's Fish and Wildlife Program accounts for just a portion of total expenditures within the basin to restore white sturgeon populations. Four non-FCRPS hydropower entities, Idaho Power Company, Grant PUD, Chelan PUD, and Douglas PUD, fund substantial white sturgeon restoration programs within the reaches impacted by their hydropower projects.

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

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

**Recommendation 38:** Insert the following text into the Mainstem Plan as Strategies for White Sturgeon:

- *Operate the FCRPS to provide flows consistent with normative river conditions, including increased spring and summer spill. Recruitment in many impounded areas has been positively correlated with high annual discharge April—July. Sturgeon are expected to benefit from court-ordered dam operational measures being implemented for salmon and steelhead.*
- *Continue to utilize and adaptively manage conservation hatchery programs as interim measures to avoid extinction of unique sturgeon populations.*
- *Hatchery production of sturgeon can be an appropriate mitigation strategy to supplement populations where natural recruitment is currently limited. This strategy should: (1) Be conservative and responsible in establishing protocols for source populations and numbers of hatchery fish released; (2) Build on knowledge gained from ongoing hatchery efforts in other areas; (3) Utilize experimental hatchery releases and monitoring to assess ecological factors and population productivity limitations; and (4) Optimize hatchery production and practices consistent with monitoring natural production and environmental carrying capacity which will most effectively be identified using an experimentally adaptive approach.*

- *Some opportunities for sturgeon passage improvements exist but benefits are likely to be limited by habitat-related natural recruitment problems in most areas. Passage strategies for white sturgeon should include: (1) Detailed evaluations of costs, benefits and risks of passage improvements relative to other potential strategies; (2) Consideration of opportunities to incorporate sturgeon-friendly features in existing fish ladders during future ladder designs and planned modification where consistent with sturgeon population goals and objectives; (3) Opportunities for non-volitional passage by taking advantage of fish trapped in dewater draft tubes or fish ladders during maintenance; and (4) Continued review of protocols used to prevent fish stranding/mortality during planned maintenance activities at passage facilities.*
- *Investigate the use of site-specific habitat measures such as substrate enhancement and channel restoration as viable alternatives for improving natural recruitment in some areas.*
- *Support fishery monitoring and management in combination with the suite of other restoration options to mitigate for lost productivity and contribute to population rebuilding efforts in areas where harvest is warranted, but where natural recruitment is currently limited and the subpopulation does not represent a unique component of the historical diversity.*
- *Manage marine mammals to reduce predation of white sturgeon downstream of Bonneville Dam.*
- *Operate the hydrosystem to reduce mortality on white sturgeon. Block access to turbine draft tubes during turbine dewatering and other maintenance operations to minimize white sturgeon entrainment and mortality.*
- *Conduct dredging operations in a manner minimizing operation-related mortality on white sturgeon.*
- *Conduct research that addresses critical white sturgeon uncertainties identified in the Columbia Basin White Sturgeon Planning Framework.*
- *Monitor and evaluate mitigative white sturgeon restoration actions, and population responses to environmental condition consistent with the Columbia Basin White Sturgeon Planning Framework.”*

**Recommendation 39:** Update language on Page 52 under section a. “Piscivorous predator control” to reflect current actions: *BPA should continue to implement annually the base piscivorous predator-control program and expand pikeminnow (*Ptychocheilus oregonensis*) removals to other mainstem dams in the lower Columbia River, i.e., expand the program to include northern pikeminnow removals at McNary and Bonneville dams. The action agencies should evaluate the effectiveness of focused pikeminnow removals for these expanded efforts and implement as warranted.*

**Rationale:** The construction and operation of the hydrosystem has altered historical habitats and created habitats more suitable for native and non-native piscivorous fish species. Disoriented salmonids that pass over or through the hydrosystem are easy prey for native northern pikeminnow in dam tailraces. The northern pikeminnow angler reward program has been successful in reducing the prey rates on native salmonids,

but public access in boat restricted zones at hydropower projects is not feasible. The Predator Control Program's dam angling effort by contracted fishers should be expanded in all tailraces where elevated northern pikeminnow predation rates are known to occur.

- Predation by northern pikeminnow and their relative abundance are assessed annually throughout the lower Columbia and Snake rivers and continue to remain lower than those observed prior to the implementation of the Predator Control program
- To date, it is not evident that compensation in predation, growth, or reproduction by surviving northern pikeminnow, or by other resident fish predators have occurred system-wide in response to Predator Control program fisheries, however, continued implementation emphasizes the need for continued evaluation efforts to monitor piscivore community dynamics and locally occurring compensatory mechanisms.
- Relative abundance of smallmouth bass have nearly doubled in areas of John Day Reservoir in recent years and may indirectly influence juvenile salmonid predation. Competitive interactions with northern pikeminnow, which may shift their diets and habitat selection in the presence of smallmouth bass, could exacerbate juvenile salmonid predation
- From 1990-2012, Predator Control fisheries have harvested more than 4 million northern pikeminnow, with annual exploitation for fish  $\geq 250$  mm averaging 13.7% (range: 8.5–19.5%) since 1991. The minimum goal of 10% exploitation has been exceeded every year since 1998 with a mean of 17.2%. Modeling efforts to describe northern pikeminnow annual exploitation, while assuming all other variables are constant, suggest a reduction in median percent predation by northern pikeminnow on juvenile salmon of 28% to 40%, as compared to pre-program levels since 1996. On average, the reduction of slightly over 5 million consumption events (minimum, 1.6 million; maximum, 8.5 million) annually could be attributed to predator removals.

**Recommendation 40:** The Program should amend the second paragraph under section a. Piscivorous predator control on page 52 to read as stated below. This paragraph should be moved from the Mainstem Plan and inserted under Section 2 on page 18 titled Non-Native Species Strategies.

*~~The federal action agencies BPA (and action agencies) should work cooperatively with NOAA Fisheries, USFWS, states, tribes and the Council to review, evaluate, develop and implement basinwide strategies to reduce non-native piscivorous predation on salmon and steelhead, especially by smallmouth bass, channel catfish and walleye native fish in mainstem and in tributary habitats.~~*

Rationale: The current Program language is salmonid centric and should equally consider impacts to native resident fish. The current Program seems to call out or emphasize focus on several non-native species (smallmouth bass, channel catfish and walleye), but this focus should not de-emphasize the need to address other non-native



species in the Basin that have an effect on native fish populations (i.e. northern pike, white crappie, etc...).

- Non-native piscivorous fish have significant impact to native resident fish species
- Northern pike have reduced native fish populations in the Pend Oreille
- Walleye and smallmouth bass have reduced native resident populations in Lake Roosevelt
- White crappie predation on juvenile spring Chinook salmon in Lookout and Hills Creek reservoirs may significantly increase mortality rates.
- Lake trout threaten bull trout and other native trout in areas where lake trout have been introduced into native trout habitat
- The Program should support additional research into the overall magnitude of the impacts of non-native predators including diel and temporal distributions and food web interactions in order to help guide improved management of non-natives.

**Recommendation 41:** The Program should be amended to update the Avian Predator Control strategies on Page 52. Incorporate into the Program management plans that have been developed through USACE and other processes for piscivorous avian species in the Columbia Basin and estuary. Incorporate any management plans that have been developed for double-crested cormorants, Caspian terns, and other avian species in the mid-Columbia River area and prioritize actions for implementation.

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

**Recommendation 42:** Program language should be amended to the Pinniped Predator Control section (Pages 52-53) to establish funding responsibility by replacing the second paragraph on Page 53 with the following:

*“The Corps [or Bonneville] should fund federal, tribal and state agencies to evaluate the extent of pinniped predation on salmonids, sturgeon, and Pacific lamprey in the lower Columbia River from below Bonneville Dam to the mouth of the river.”*

Rationale: The current program identifies a need for a river-wide assessment of pinniped predation, but it does not identify BPA or the Corps as having a funding responsibility. The Bonneville Dam has a direct effect on pinniped predation of native fish species. The Program should implement and fund strategies resulting from evaluation.

**Recommendation 43:** Revise text under *Reintroduction of Anadromous Fish in Blocked Areas* on Page 56 as follows: ....evaluate the feasibility of salmon, steelhead,

*and Pacific lamprey reintroduction, consistent with the objectives in the appropriate subbasin plans.*

Rationale: Pacific lamprey is a culturally significant species. In the focus of anadromous fish, salmon and steelhead tend to receive the spotlight but focus should also be directed to Pacific lamprey given their historic distribution includes a large portion of the Columbia River Basin and the direct effect hydropower has on the species is significant.

**Recommendation 44:** The Program should include under “Reintroduction of anadromous fish in blocked areas”, the following language: *The Action Agencies should develop a document repository that has drafts and final documents of all reintroduction passage studies/reports released by the BPA, ACOE or their contractors, and develop an annotated bibliography updated annually that provides brief information on all studies that have been conducted including title, authors names, date, a short description, study findings, and the specific passage issue the study is addressing. In addition, 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.*

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

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

Reintroduction of anadromous fish is a new concept for the FCRPS, and the process is much different than FERC projects. Reintroduction efforts are currently being investigated in the Willamette Subbasin and lessons learned from these efforts can set the foundation for reintroduction in the Upper Columbia and Snake Rivers. The development of a data and document repository for fish passage studies conducted in the Willamette Subbasin would better inform managers elsewhere in the basin of the FCRPS process, study needs and approach to reintroduction of anadromous fish.



Passage and reintroduction of anadromous fish is a key element of a truly integrated watershed approach to the Columbia River Basin and to the NPCC's Fish and Wildlife Program. For example, at each blocked area of the basin, fish passage restoration would be assessed and if feasible, reintroduction and passage would proceed in an incremental, phased approach (planning and design, testing, construction, evaluation and adaptation), progressing to later phases upon successful conclusions or outcomes from previous phases. We recognize that not all blocked areas of the Columbia River Basin could currently support healthy anadromous populations and that these types of assessments would determine the feasibility of anadromous fish reintroductions, including costs, partnership opportunities among responsible parties and potential timelines for initiation of these programs.

## G AMENDMENTS TO SUBBASINS

### G.1 Amendments to Updating Existing Subbasin Management Plans (Page 58)

**Recommendation 45:** The ISAB points out a concern that the subbasin planning process was a great idea that has been diminished by the lack of support or continued engagement of the original stakeholders in recent years. The ISAB also recommends that the Council reconsider a planning process that utilizes other existing structures and uses salmon and steelhead recovery domains as an example. The Council should implement the ISAB's recommendations for landscape and subbasin planning, including the need to actively encourage and support a mid-scale (perhaps Province-level which is close to the recovery domains) planning process that supports and utilizes and existing partnerships and organizations.

**Rationale:** Many of the stakeholders that convened to develop individual Subbasin plans have not revisited or updated plan goals, objectives, and strategies. Much restoration and recovery efforts have been implemented over the past 10+ years and stakeholders would need to reconvene to keep plans up to date.

**Recommendation 46:** The NPCC should amend the Lower Columbia Subbasin Plan (1 paragraph on Page 2-18) to include more specific objectives and strategies for eulachon. BPA should fund protection, mitigation and enhancement of eulachon through the following measures:

- Develop biological objectives for eulachon that are consistent with recovery.
- Monitor and evaluate eulachon abundance in the Columbia River via annual spawning stock biomass surveys following protocols developed by the Washington Department of Fish and Wildlife and acoustic estimates by NOAA - NWFSC.

- Monitor and evaluate the causal mechanisms and migration/behavior characteristics affecting survival of larval eulachon during their first weeks in the Columbia River estuary, plume, and ocean environments.
- Monitor and evaluate the ecological importance of the tidal freshwater, estuary, plume, and nearshore ocean environments to the viability and recovery of eulachon in the Columbia River Basin.
- Develop an oceanographic indicators ecosystem conditions model to determine the significance of plume and nearshore ocean conditions that affect eulachon survival.
- Adjust the timing, magnitude, and frequency of hydrosystem flows (especially spring freshets) entering the estuary and plume to better reflect the natural hydrologic cycle, improve access to habitats, and provide better transport of coarse sediments and nutrients in the estuary and plume if these are found to be limiting to eulachon life history.

Rationale: The Program currently does not address eulachon, an anadromous fish native to the Columbia River, and a species listed as threatened under the Endangered Species Act. These measures are needed to address uncertainties regarding the effect of changes in the Columbia River hydrograph on survival, productivity and recovery potential of eulachon. As the Northwest Power Act directs the Council to develop a program to protect, mitigate, and enhance fish and wildlife in the basin affected by the development, operation, and management of hydroelectric projects, the Council should update the Program to include eulachon and develop biological objectives for this species. As eulachon are listed as a threatened species under the Endangered Species Act, NOAA is in the process of developing a recovery plan, and has prepared a Federal Recovery Outline for eulachon that includes recovery tasks as part of a preliminary recovery strategy. The recommended measures are consistent with NOAA's Federal Recovery Outline for eulachon. Recovery of ESA-listed species is consistent with the Program's goals and objectives. Furthermore, measures adopted by the Council and funded by BPA to assist in the recovery of listed species affected by the development, operation, and management of hydroelectric projects is consistent with the Northwest Power Act and the Program.

**Recommendation 47:** The NPCC should adopt into the Willamette Subbasin Management Plan:

- The 2008 Willamette Biological Opinion (NMFS 2008)  
[http://www.nwr.noaa.gov/hydropower/willamette\\_opinion/index.html](http://www.nwr.noaa.gov/hydropower/willamette_opinion/index.html)  
The Upper Willamette River Conservation and Recovery Plan (NMFS 2011) for Chinook salmon and steelhead  
[www.nmfs.noaa.gov/pr/pdfs/recovery/chinook\\_steelhead\\_upperwillametteriver.pdf](http://www.nmfs.noaa.gov/pr/pdfs/recovery/chinook_steelhead_upperwillametteriver.pdf)

The Program should adopt ESA delisting goals and broad sense goals of the *Upper Willamette River Conservation and Recovery Plan for Chinook Salmon* (ODFW and NMFS 2011) as Biological Objectives in the Willamette Subbasin Plan.



Table A. Viable Salmonid Population (VSP) scenarios from the Upper Willamette Table X - Conservation and Recovery Plan for Chinook Salmon and Steelhead (Recovery Plan) (ODFW and NMFS 2011). This table summarizes the VSP Extinction Risk for abundance and productivity (A&P), diversity (DIV), and spatial structure (SS) for each population under current conditions, at delisting, and at broad sense recovery. This information is summarized from Tables 6-11 through 6-21 and Table 10-1 in the Recovery Plan. The Recovery Plan also details threat reduction scenarios and ESA threats delisting criteria.

Species and Population	Current VSP Extinction Risk				Desired VSP Extinction Risk at Delisting <sup>1</sup>					Broad Sense Recovery VSP Extinction Risk <sup>2</sup>				
	A&P	DIV	SS	Overall Current Status	A&P	DIV	SS	Overall Status at Delisting	Abundance Target at Delisting	A&P	DIV	SS	Overall Status - Broad Sense	Broad Sense Abundance Target
<b>Chinook</b>														
Clackamas	M	M	L	Moderate	VL	L	L	Very Low	2,314	VL+	L	L	Very Low+	5,618
Molalla	VH	H	H	Very High	H	H-M	L	High	699	VL	L	L	Very Low	2,627
N Santiam	VH	H	H	Very High	L	L	L	Low	5,428	*	*	*	Very Low	*
S Santiam	VH	M	M	Very High	M	M	L	Moderate	3,116	*	*	*	Very Low	*
Calapooia	VH	H	VH	Very High	H	H-M	L	High	598	VL+	L	L	Very Low+	1,815
McKenzie	VL	M	M	Low	VL+	L	L	Very Low+	10,916	VL+	L	L	Very Low+	13,613
MF Willamette	VH	H	H	Very High	L	L	L	Low	5,820	*	*	*	Very Low	*
<b>Steelhead</b>														
Molalla	VL	M	M	Low	VL	L	L	Very Low	3,226	VL+	L	L	Very Low+	19,470
N Santiam	VL	M	H	Low	VL	L	L	Very Low	8,362	VL+	L	L	Very Low+	10,013
S Santiam	VL	M	M	Low	VL	L	L	Very Low	3,912	VL+	L	L	Very Low+	5,371
Calapooia	M	M	VH	Moderate	M	M	M	Moderate	522	VL+	L	L	Very Low+	4,471

- \*specific target not developed
- <sup>1</sup>From the Recovery Plan Chapter 6: Delisting Goals, Criteria and Scenarios
- <sup>2</sup>From the Recovery Plan Chapter 10: Broad Sense Recovery

Rationale: In anticipation of ESA recovery plans, co-managers, including NOAA Fisheries, worked with the Council and subbasin planners to ensure that subbasin plans provided a good foundation for ESA recovery. Thus, as ESA recovery plans emerged, they were built on the foundation of the subbasin plans. The recovery plans were developed by local stakeholder groups including the fishery agencies and tribes, states, local governments and other federal agencies. The final plans include ESA goals as well as broad sense goals, priority limiting factors, priority actions and costs. These recovery plans provide important context and guidance for the Council's Fish and Wildlife Program and they should be explicitly incorporated into the Program.



## H AMENDMENTS TO IMPLEMENTATION PROVISIONS

### H.1 Amendments to Implementation Measures Recommended for 2008-2018.

**Recommendation 48** – On page 59 of the Program, the Confederated Tribes of Grand Ronde would like to incorporate Tribal specific program measures listed in Table B as Implementing Measures Recommended for 2008 – 2018.

Rationale: The Tribe has identified several implementation measures that are of high priority that are not being addressed. These measures need to be adopted into the 10 Year Plan.

**Recommendation 49:** Priority actions identified in the Upper Willamette River Conservation and Recovery Plan for Chinook Salmon and Steelhead to address priority limiting factors should be identified as measures to be funded under the Program. In addition, these measures should consider and address the limiting factors for Pacific lamprey. Adopt the following high priority **measures** as an update to the Council's Willamette Subbasin Plan: The tables below (Tables C – G) represent actions from the Upper Willamette River Conservation and Recovery Plan for Chinook Salmon and Steelhead (ODFW and NMFS 2011) that are considered high priority to implement (fully or in part) in the Willamette Basin within the term of the Northwest Power and Conservation Council's Columbia River Basin Fish and Wildlife Program. The tables also include a reference to the associated Willamette Project Biological Opinion (WP BiOp) RPA, if appropriate, as many of the high priority Recovery Plan actions area also included in the WP BiOp. The Recovery Plan also includes numerous other actions that should be adopted into the Fish and Wildlife Program as recommended in Section 5.2, of the Columbia River Basin Fish and Wildlife Manager's Reference for Developing 2014 Fish and Wildlife Program Amendment Recommendations.

Rationale: The Willamette Biological Opinion and the Upper Willamette River Conservation and Recovery Plan outlined priority actions for the hydropower projects in the Willamette that are essential in recovering self-sustaining populations of spring Chinook and winter steelhead. These actions need to be included as measures in the Program.

TABLE B - 2008 - 2018 CTGR High Priority FW Program Implementation Measures for the Willamette Subbasin Plan

Proposal #	Proposal Title	Org	Province	Subbasin	Category	Duration	Description and/or Expected Benefits	Where described in Subbasin Plans
New	Pacific Lamprey Reintroduction Pilot Project	CTGR	Lower Columbia	Willamette	Lamprey	10 Years	Determine if anadromous salmonid passage alternatives are suitable for lamprey passage. Reintroduce lamprey into areas blocked by the hydrosystem.	Section 3.2.4.6 Pacific Lamprey; Section 5.2.2.1 Deal with the Dams; Table 5.3 Aquatic Strategies (Connect Favorable Habitats)
New	Evaluate the Effects of Hydro-Operations have on Spawning and Rearing Pacific Lamprey	CTGR	Lower Columbia	Willamette	Lamprey/RME	4 years	Determine the extent of lamprey spawning habitat downstream of hydrosystem projects and determine the effects operation has on spawning, incubating and rearing lamprey.	Section 3.2.4.6 Pacific Lamprey
New	Evaluate the Option of Re-programming Anadromous Production in the Westside Tributaries	CTGR	Lower Columbia	Willamette	Artificial Production	6 years	Determine if a portion of summer steelhead artificial production can successfully be reprogrammed to Westside tributaries as a viable option to reduce pHOS and competition effects on native winter steelhead.	Section 3.2.4.7 Aquatic Introductions, Artificial Production, and Captive Breeding Programs; Section 3.3.1.7 Hatcheries
200902500	Grand Ronde Coordination	CTGR	Basinwide	Basinwide	Coordination	Long-term	Continue tribal participation in the implementation of the NPCC Fish and Wildlife Program.	Section 5.5 Institutional Strategies
New	Reintroduce Anadromous Fish into Blocked Habitat	CTGR	Lower Columbia	Willamette	Resident Fish Substitution	30 years	Determine the feasibility of reintroducing anadromous fish above the following federal hydropower facilities: Dexter Dam, Lookout Dam, Hills Creek Dam, Foster Dam, Green Peter Dam, Big Cliff Dam, and Detroit Dam.	Section 5.2.2.1 Deal with the Dams; Table 5.3 Aquatic Strategies (Connect Favorable Habitats)

Table C. High priority recovery actions for the South Santiam subbasin from the Upper Willamette River Conservation and Recovery Plan for Chinook Salmon and Steelhead (ODFW and NMFS 2011), **as well as Pacific lamprey**. The table summarizes the recovery plan action, including potential subactions, listing factor and limiting factor addressed, strategy and VSP objective, and also references the associated Willamette Project Biological Opinion RPA (NMFS 2008).

Action ID and Priority	Recovery Action	Sub Action or Task	Associated BiOp RPA Measure
183 - SUB -SSA	Improve downstream passage through Foster reservoir and dam for juveniles and kelts.	1. Implement WP-RPA's 2.8 and 2.10) to evaluate the Foster Dam Spring Spill window for improved passage of CHS and STW.	2.8
		1.1. based on these studies, implement WP-RPA 4.8 requiring interim downstream fish passage measures	2.10
		1.2. if more extensive improvements are needed, WP BiOp Action Agencies will proceed with evaluation through COP process, described in WP-RPA 4.13 (COP studies)	4.8
			4.13
199 - SUB -SSA	(WP BiOp WQ RPA's) Release flows from Foster/Green Peter dams to meet flow targets in the South Santiam River that protect spawning, incubation, rearing and migration of salmonids <b>and lamprey</b> .	1. Operate facilities to minimize adverse effects of ramping on fish stranding, redd desiccation, and loss of habitat.	2.1
			2.3
			9
			2.4
			2.5
			2.6
			2.7
201 - SUB -SSA	Evaluate feasibility and effectiveness of interim operational temperature control at Foster and Green Peter dams.	1. Consider temperature control structure at most appropriate dam in next term of the WP BiOp, if not effective at restoring normative conditions or reducing the LFT.	5.1
		1.1. resolve potential conflicts between meeting TMDL temperature targets downstream of dams and operating dams to maximize benefits to Chinook and steelhead	5.1.2
			5.1.3
202 - SUB -SSA	Manage current CHS Harvest Mitigation Hatchery Program (HMP) facilities and broodstock to meet mitigation goals, but do so in a manner that the genetic and demographic impacts of program do not pose unacceptable risk to extant NOR fish populations or compromise long term productivity of a reintroduction stock that would preclude success of conservation reintroduction/supplementation program above Foster Dam.	1. In the long term the VSP CHS diversity target is to maintain an average total basin pHS rate <30%, which is coupled with improvements in access and passage and other LFT's affecting capacity and productivity.	6.1.1
		1.1. promote a short and long term conservation hatchery strategy that will lead to a viable naturally-produced population	6.2.2
		2. In the short term, implement actions and associated RME below Foster facility that will reduce genetic and demographic risk to extant NOR population:	6.1.2
		2.1. improving trap attraction, operation, and sorting at new Foster facility	6.1.3
		2.2. minimize the recycling of HOR fish entering trap, maximize the recycling of "true" NOR fish	6.2.2
		2.3. adjust juvenile rearing and release strategies as feasible	6.2.4
		2.4. modifying other hatchery rearing practices	
		2.5. increase harvest of HOR fish while minimizing risk to NOR fish	
		2.6. maintain HOR tagging efforts and CHS spawning surveys to support above efforts	
		2.7 adopt new ODFW recommendations for level of integration of NOR broodstock and look for annual	



	opportunities to "outplant" NOR fish to other locales in lower subbasin	4.3
	<p>3. Over long term, increase NOR production below Foster through WP BiOp RPA water quality/quantity improvements and other actions addressing LFT's. Further develop a conservation supplementation (reintroduction) program (CSP) or set of strategies to be implemented above Foster and Green Peter dams.</p> <p>3.1. adopt as template the new ODFW recommendations for reintroduction and modify as needed based on results of scientific review of program type</p>	6.2.3
	4. After Recovery Plan is adopted, develop a new HGMP with conservation details.	6.1.1

Table D. High priority recovery actions for the North Santiam subbasin from the Upper Willamette River Conservation and Recovery Plan for Chinook Salmon and Steelhead (ODFW and NMFS 2011), **as well as Pacific lamprey**. The table summarizes the recovery plan action, including potential subactions, listing factor and limiting factor addressed, strategy and VSP objective, and also references the associated Willamette Project Biological Opinion RPA (NMFS 2008).

Action ID and Priority	Recovery Action	Sub Action or Task	Associated BiOp RPA Measure
157 - SUB -NS	Implement WP-RPA's 4.12.3 and 4.13 to provide safe and effective downstream passage through Detroit reservoir and Detroit and Big Cliff dams for juveniles and kelts.	1: Study conceptual alternatives for downstream passage through dam complex and fish distribution in reservoir(s). 1.1. based on studies and design alternatives, construct and operate new downstream fish passage facility by 2023 or sooner	4.8
			4.10
			4.11
			4.12.3 (relation to RPA 5.2)
167 - SUB -NS	(see LFT 2b for handling actions) Resolve uncertainty of any remaining pre-spawn mortality not associated with injury and stress associated with Minto Collection facility.	1: Improve water quality in subbasin below Big Cliff Dam by implementing the WP RPA's 5.1, 5.2 and 5.3 for water quality to meet adult fish needs by resolving inadequacies of temperature and TDG profiles. 1.1. build temperature control structure at Detroit Dam; WP- RPA 5.2.	5.1
			5.1.1
			5.1.2
			5.1.3
			5.1.4
			5.1.5
173 - SUB -NS	(WP BiOp Water Quality RPA's) Release flows from Detroit/Big Cliff dams to meet flow targets in the North Santiam River that protect spawning, incubation, rearing and migration of salmonids and <b>Pacific lamprey</b> .	2: Monitor metrics of fish health at different times and locations above Willamette Falls to further delineate whether the problem is solely related to Flood Control/hydropower effects, or is exacerbated by other issues that impact fish condition and maturity (i. e. disease, toxins).	no RPA measure
			2.1
		1. Operate facilities to minimize adverse effects of ramping on fish stranding, redd desiccation, and loss of habitat.	2.3 9
			2.4
			2.5
			2.6
			2.7
			2.10

175 - SUB -NS	Construct, operate, and evaluate a temperature control structure at Detroit Dam to release water that more closely resembles normative water temperatures, reduces TDG exceedences, and meets TMDL temperature targets downstream of NS dams and operating dams to maximize benefits to Chinook, steelhead, and <b>Pacific lamprey</b> .	1. Resolve any potential conflicts between meeting TMDL temperature targets downstream of dams and operating dams to maximize benefits to steelhead.	5.2
177 - SUB -NS	Manage current CHS Harvest Mitigation Hatchery Program (HMP) facilities and broodstock to meet mitigation goals, but do so in a manner that the genetic and demographic impacts of program do not pose unacceptable risk to extant NOR fish populations or compromise long term productivity of a reintroduction stock that would preclude success of conservation reintroduction/supplementation program above Detroit Dam.	1. In the long term the VSP diversity target is to maintain an average total basin pHOS rate <10%, which is coupled with improvements in access and passage and other LFT's affecting capacity and productivity. 1.1. promote a short and long term conservation hatchery strategy that will lead to a viable naturally-produced population.	6.1.1
			6.2.2
		2. In the short term, implement actions and associated RME below Minto facility that will reduce genetic and demographic risk to extant NOR population 2.1. improve trap attraction, operation, and sorting at new Minto facility; (open earlier and longer) 2.2. modify hatchery fish recycling program (end sooner)? 2.3. acclimate, release, or evaluate other rearing strategy modifications 2.4 modify other hatchery rearing practices 2.5. encourage greater harvest of hatchery fish above Upper Bennett Dam 2.6. maintain HOR tagging efforts and CHS spawning surveys to support above efforts 2.7. adopt new ODFW recommendations for level of integration of NOR broodstock 2.8. look for annual opportunities to "outplant" NOR fish to other locales in lower subbasin	6.1.2
			6.1.3
			6.2.2
			6.2.4
			4.3
		3. Over long term, increase NOR production below Minto through WP BiOp RPA water quality/quantity improvements at Detroit, and other actions addressing LFT's. 3.1. further develop a conservation supplementation (reintroduction) program (CSP) or set of strategies to be implemented above Detroit dam 3.2. adopt as template the new ODFW recommendations for reintroduction and modify as needed based on results of scientific review of program type	6.2.3
		4: If above actions and WP BiOp RPA actions related to access, temperature, and flow do not get pHOS to acceptable levels below Minto, and after a period of 2 life cycles (depending on ocean conditions) install and operate sorter at Upper and Lower Bennett Dams and modify angling regulations accordingly.	no RPA measure
		5: After Recovery Plan is adopted, develop a new HGMP with conservation details.	6.1.1



Table E. High priority recovery actions for the McKenzie subbasin from the Upper Willamette River Conservation and Recovery Plan for Chinook Salmon and Steelhead (ODFW and NMFS 2011), **as well as Pacific lamprey**. The table summarizes the recovery plan action, including potential subactions, listing factor and limiting factor addressed, strategy and VSP objective, and also references the associated Willamette Project Biological Opinion RPA (NMFS 2008).

Action ID and Priority	Recovery Action	Sub Action or Task	Associated BiOp RPA Measure
212 - SUB -MK	Restore adult access of natural origin fish to historic habitat blocked by large dams.	3. Since the new trap below Cougar Dam has been constructed, implement WP-RPA's 4.3, 4.4, and 4.5 to improve handling and transport protocols.	4.5
		4. Implement WP-RPA 4.7 to improve and increase the number of suitable "outplanting=release" sites above Cougar Dam.	4.7
		5. Continue to provide appropriate temperatures to attract adults into the SF McKenzie River.	5.4
215 - SUB -MK	Provide safe and effective downstream passage through Cougar reservoir and dam.	1. Implement WP-RPA 4.12.1 that studies and reports on conceptual alternatives for downstream passage through dam complex and fish distribution in Cougar Reservoir. 1.1. based on studies and design alternatives, construct and operate a new downstream fish passage facility	4.12.1
219 - SUB -MK	Increase retention and sourcing of gravels and other materials below USACE facilities with a combination of habitat improvements, targeted flows, and augmentation.	1. Improve channel complexity below dams with existing habitat restoration and enhancement program on USACE lands.	7.2
		2. Augment depleted areas below dams with most appropriate source and size composition. 2.1. provide appropriate channel complexity to retain material.	no RPA measure
		3. Prioritize some projects within the comprehensive habitat restoration program to include projects that improve incubation habitat.	7.1.2
		4. Implement to collect large wood in USACE reservoirs, and strategically promote placement of this wood in areas below dams that promote sourcing of incubation gravels.	7.3
		5. To the extent that restoration at revetment sites implemented through WP RPA 7.4 leads to greater interaction and movement of floodplain substrates, fund as high priority projects those that produce incubation gravels.	7.4
		6. Couple these improvements with Environmental Flow opportunities as described in RPA 2.7. to distribute gravel and other materials.	2.7
228 - SUB -MK	Operate McKenzie subbasin WP flood control/hydropower projects to mimic natural temperature regime, while at the same time complementing the downstream passage benefits of spilling, and minimizing exceedence of TDG (total dissolve gas) below projects, and managing ramping rates to minimize stranding of early Chinook life stages.	1. Temperature control is now possible at Cougar Dam with the Selective Withdrawal Tower installed in 2005 1.1. use RME under WP RPA 5.4 to evaluate the effects of the Cougar temperature structure operation on TDG 1.2. resolve remaining issues with ODEQ regarding TMDL temperature targets 1.3. evaluate whether temperature control at other WP facilities in the subbasin are needed in the future	5.4
		2: Monitor TDG below each large dam to identify the operating and background conditions causing high TDG. 2.1. based on monitoring TDG, design structural and/or operational modifications to dams to reduce project-related TDG exceedences	5.4

230 - SUB -MK	Manage current CHS Harvest Mitigation Hatchery Program (HMP) facilities and broodstock to meet mitigation goals, but do so in a manner that the genetic and demographic impacts of program do not pose unacceptable risks to the remaining wild fish population	<p>1. In the long term the VSP diversity target is to maintain an average total basin pHOS rate &lt;10%, which is coupled with improvements in access and passage and other LFT's affecting capacity and productivity. To achieve this, promote a wild fish management zone for the subbasin above Leaburg Dam that has a feasible pHOS target of &lt;5%.</p> <p>2.1. adopt new ODFW recommendations for lower level of integration of NOR broodstock, and pass only NOR fish above Leaburg Dam.</p> <p>2.2. improve attraction flows and entry to McKenzie Hatchery</p> <p>2.3. modify Leaburg Hatchery ladder facility to assist in removing HOR CHS and collecting NOR CHS for passage above Leaburg</p> <p>2.4. minimize the recycling of HOR adults entering traps at Leaburg ladder and the hatcheries</p> <p>2.5. increase harvest of HOR fish below Leaburg dam while minimizing risk to NOR fish</p> <p>2.6. evaluate pHOS reduction effectiveness of the on-going partial program relocation (SAFE)</p> <p>2.7. explore opportunities/feasibility of acclimating and releasing juvenile CHS at sites in lower McKenzie subbasin; modify harvest regulation zones as needed to shift fishery effort to those areas.</p> <p>2.8. resolve technical/feasibility issues of upgrading Leaburg Dam EWEB facility with engineering subgroup to achieve better sorting and handling of wild fish, resolve any funding uncertainties with BPA</p> <p>2.9. maintain HOR tagging efforts and CHS spawning surveys to support above efforts</p> <p>3. Over long term, increase NOR fish production below and above Leaburg through WP BiOp RPA water quality/quantity improvements and other actions addressing LFT's.</p> <p>3.1. once adult and juvenile passage issues are resolved at Cougar Dam through WP BiOp RPA's, develop a conservation strategy and allocation schedule where it is defined under what demographic conditions and passage improvement conditions the HOR outplants above Cougar Dam could be phase out and replaced with reintroduction of NOR fish that enter the South Fork McKenzie River.</p>	6.1.1
			6.2
			6.1.4
			6.1.3
			6.2.2
			6.2.4
			4.3
			6.2.3

Table F. High priority recovery actions for the Middle Fork Willamette subbasin from the Upper Willamette River Conservation and Recovery Plan for Chinook Salmon and Steelhead (ODFW and NMFS 2011), **as well as Pacific lamprey**. The table summarizes the recovery plan action, including potential subactions, listing factor and limiting factor addressed, strategy and VSP objective, and also references the associated Willamette Project Biological Opinion RPA (NMFS 2008).

Action ID and Priority	Recovery Action	Sub Action or Task	Associated BiOp RPA Measure
236 - SUB -MF	Provide safe and effective downstream passage through the Dexter/Lookout Point flood Control/hydropower complex to benefit all size classes of juvenile migrants produced above Lookout Pt. Dam.	1. Manage reservoir levels for more normative flows (pre-dam flows) to pass inflow year round, except during flood control operations. Alternatives to be considered in the WP BiOp 2008 are: 1.1. WP-RPA 4.8: Evaluates interim measures to improve downstream passage within Project constraints, within COP process. Measures could include partial or full reservoir drawdown, and use of spillway. Includes evaluating dam & facility constraints on how far down the reservoirs could be dropped. Need to assess cost/benefits of this action, relative to authorizations, storage loss for flow augmentation, and pollution abatement. Therefore it is unclear that a drawdown alternative will be chosen method to aid downstream migrants and that WP-RPA 4.8 will result in meaningful improvements.	4.8
		2. Build, evaluate, and report on effectiveness of Head of Reservoir (HOR) prototype above Lookout Pt. Dam. Permanent HOR does not occur if not effective at increasing overall productivity above Lookout Point.	4.9
		3. Supporting studies to evaluate passage improvement alternatives through Lookout Pt/Dexter reservoirs and dams	4.10
			4.11
237 - SUB -MF	Provide safe and effective downstream passage through Fall Creek reservoir and dam.	4. Investigate feasibility of fish passage at Lookout Pt. Dam. Based on studies and design alternatives, construct new downstream fish passage facility by 2021. - does not secure guarantee structural downstream passage improvements at Lookout Pt. Dam	4.12.2
		1. Implement WP-RPA 4.8.1 to drawdown in autumn as an operational measure to reduce smolt injury, supported by effectiveness RME. 1.1. WP BiOp entities clarify timeline and standard for evaluating this drawdown option.	4.8.1
		2. If drawdown is deemed insufficient to provide safe and effective passage, evaluate other operational measures through WP-RPA 4.8 and WP-RPA 4.13 (COP process). 2.1. study conceptual alternatives for downstream passage through dam complex based on fish distribution in the reservoir. 2.2. based on COP studies and design alternatives, consider construction and operation of structural protections and/or fish bypass facilities	4.8
238 - SUB -MF	Provide safe and effective downstream passage through Hills Creek reservoir and dam.		4.13
		1. Within WP-RPA's 4.10 and 4.11, assess passage through Hills Creek reservoir and dam.	4.8
			4.10



		2. Use these data and results within language of WP-RPA 4.12 to support SLAM modeling to reduce uncertainty regarding need to improve downstream survival in the future - needed to support decisions regarding need to construct and operate new downstream fish passage facility at Hills Creek Dam in next term of the WP BiOp	4.11
			4.12
239 - SUB -MF	(see relation to LFT 2m) Reduce pre-spawn mortality by reducing injury and stress related to fish handling at and above USACE facilities.	1. WP-RPA 4.6 to rebuild, operate, and maintain the Adult Fish Collection and handling facilities below Dexter and Fall Creek dams for expanded and improved sorting and handling of wild and hatchery fish.  2. Support objective of WP-RPA 4.6 by implementing WP-RPA's 4.3, 4.4, and 4.5 to improve and standardize handling and transport protocols, and by implementing WP-RPA 4.7 to improve and increase the number of suitable outplanting sites above Lookout Pt. Dam, Hills Creek Dam, and Fall Creek dams. 2.1. assess through RME whether these show demonstrable improvement	4.6.3 4.6.4 4.3 4.4 4.5 4.7
241 - SUB -MF	(see LFT 2e for handling actions) Resolve uncertainty of any remaining pre-spawn mortality not associated with injury and stress associated with Middle Fork Willamette Collection facilities.	1. Improve water quality in subbasin below MF Willamette dams by implementing WP RPA's 5.1 and 5.2 for water quality to meet adult fish needs by resolving inadequacies of temperature and TDG profiles.  2. Monitor metrics of fish health at different times and locations above Willamette Falls to further delineate whether the problem is solely related to Flood Control/hydropower effects, or is exacerbated by other issues that impact fish condition and maturity (i. e. disease, toxins). - this is not a current WP BiOp RPA)	5.1 5.1.2 5.1.3 5.1.4 5.1.5 5.2 no RPA measure
242 - SUB -MF	(same as for LFT 7c [NS] and 7e [MK]) Increase retention and sourcing of gravels and other materials below USACE facilities with a combination of habitat improvements, targeted flows, and augmentation.	1. Improve channel complexity below dams with existing habitat restoration and enhancement program on USACE lands.  2. Augment depleted areas below dams with most appropriate source and size composition. 2.1. provide appropriate channel complexity to retain material.  3. Prioritize some projects within the comprehensive habitat restoration program to include projects that improve incubation habitat.  4. Implement to collect large wood in USACE reservoirs, and strategically promote placement of this wood in areas below dams that promote sourcing of incubation gravels.  5. To the extent that restoration at revetment sites implemented through WP RPA 7.4 leads to greater interaction and movement of floodplain substrates, fund as high priority projects those that produce incubation gravels.  6. Couple these improvements with Environmental Flow opportunities as described in RPA 2.7. to distribute gravel and other materials.	7.2 no RPA measure 7.1.2 7.3 7.4 2.7
248 - SUB -MF	Operate WP flows in MF subbasin to mimic the natural temperature regime in the fall	'- A water Temperature Control Facility would presumably need to be constructed, which is not a certainty in current term of the WP BiOp	
New Action	(WP BiOp Water Quality RPA's) Release flows from Look Out Pt./Dexter, Fall Creek, and Hills Creek dams to meet flow targets in the Middle Fork Willamette River that protect spawning, incubation, rearing and migration of salmonids <b>and Pacific</b>	1. Operate facilities to minimize adverse effects of ramping on fish stranding, redd desiccation, and loss of habitat.	2.1 2.3 9 2.4 2.5

	lamprey.		2.6
			2.7
			2.1
		1. In the long term the VSP CHS diversity target is to maintain an average total basin pHOS rate <10%, which is coupled with improvements in access and passage and other LFT's affecting capacity and productivity. Promote a short and long term conservation hatchery strategy that will lead to a viable naturally-produced population, focused in the area above MF Willamette dams.	6.1.1
			6.2.2
		2. Actions and goals to control pHOS are modest below Dexter and Falls Creek dams (unless pseudo-isolation becomes an issue) but to minimize further genetic risk impacts for a future reintroduction effort using MF Willamette HMP stock, actions in the short term could include:	6.1.2
		2.1. improve trap attraction, operation, and sorting at new Dexter facility	6.1.3
		2.2. adjust juvenile rearing and release strategies as feasible	6.2.2
		2.3. evaluate and Implement HGTG guidelines for reducing genetic impacts	6.2.4
		2.4. maintain HOR tagging efforts and CHS spawning surveys to support above efforts	
		2.5 adopt new ODFW recommendations for level of integration of NOR broodstock	4.3
		3. Over long term, further develop a conservation supplementation (reintroduction) program (CSP) or set of strategies to be implemented above Fall Creek, Lookout Pt., and Hills Creek dams.	6.2.3
		3.1. improve other LFT's associated with passage and pre-spawn mortality, then commence reintroduction	
		3.2. adopt as template the new ODFW recommendations for reintroduction and modify as needed based on results of scientific review of program type	
		4: After Recovery Plan is adopted, develop a new HGMP with conservation details.	6.1.1
		- Current WP BiOp does not formalize specific passage improvements for Hills Creek Dam, but indicates outplant sites may be established above dam, presumably from collections at new Dexter facility. In support of determining future passage needs in next term of BiOp, implement actions in current WP BiOp:	4.10
		1. As other LFT's improve and NOR abundance increases above Lookout Pt., monitor adult fish movement below Hills Creek dam to determine if large numbers of Chinook congregate below Hills Creek.	
		1.1. if so, evaluate within COP studies the feasibility of a future adult fish facility below the dam, relative to the benefits of continued trap-and-haul from the new Dexter facility	4.11
		1.2. in support of this effort, implement the juvenile downstream passage assessments described in WP-RPA's 4.10 and 4.11	
		2. Use these data and results within language of WP-RPA 4.12 to support BRT SLAM modeling to reduce uncertainty regarding need to improve downstream survival at Hills Creek	
		- needed to support decisions regarding need to construct and operate new downstream fish passage facility at Hills Creek Dam in next term of the WP BiOp	4.12
249 - SUB -MF	Manage current CHS Harvest Mitigation Hatchery Program (HMP) facilities and broodstock to meet mitigation goals, but do so in a manner that the genetic and demographic impacts of program do not pose unacceptable risk to extant NOR fish populations or compromise long term productivity of a reintroduction stock that would preclude success of conservation reintroduction/supplementation program above MF Willamette dams.		
235 - SUB -MF	Within the 2008 BiOp COP process and BRT activities, evaluate further whether eventual reintroduction and production above Hills Creek Dam is a viable alternative to other remedies for improving VSP criteria to meet desired status risk level (Chinook-Low)		

Table G. High priority recovery actions for the Upper Willamette ESU/DPS from the Upper Willamette River Conservation and Recovery Plan for Chinook Salmon and Steelhead (ODFW and NMFS 2011), **as well as Pacific lamprey**. The table summarizes the recovery plan action, including potential subactions, listing factor and limiting factor addressed, strategy and VSP objective, and also references the associated Willamette Project Biological Opinion RPA (NMFS 2008).

Action ID and Priority	Recovery Action	Sub Action or Task	Associated BiOp RPA Measure
102 - FW-ALL	(In coordination with supporting actions for LFT 9a) Increase protection and implementation of appropriate instream flows for UWR salmonids by a) removing barriers to coordinating with relevant management agencies on water withdrawals, b) encouraging BMP's to conserve water and reduce pollution loads, and c) not issuing anymore water rights within subbasins.	1. Designate instream flow targets at the mouth of the tributaries (or other appropriate passage bottleneck) to ensure sufficient water is available for fish. 1.1. Planning Team subgroup to ID priority or problem reaches and future designation of target flows 1.2. ID process to get designation established 1.3. Encourage RME of flow needs for various life stages	2.3 9
		2. OWRD to pass rules to enforce and protect stored water released from USACE reservoirs for fish purposes, and ensure that water is not diverted by water users with natural water rights or by illegal water use.  And	2.9
		6. OWRD to complete conversion of Minimum Perennial Streamflows for stored water (in USACE/USBOR reservoirs) to instream water rights in NS, SSA, MK, and MF subbasins.	3
		5. Revise integrated flow management or water diversion plan to ensure sufficient water remains instream for fish during critical periods. Plan should define coordination among the management agencies and users (USACE, USBOR, OWRD, ODFW, irrigation districts, and local water users). 5.1. ensure future USBOR water service contracts do not reduce instream flow protections. 5.2. USBOR water service contracts should allow for interruption of service during low water years to protect instream flows 5.3. release additional flows from storage dams to meet USBOR water service contracts while still meeting instream flows 5.4. for non USBOR contracts, OWRD stop issuing new live flow rights	3.1
			3.2
			3.3
22 - ESU-ADM	Expand monitoring of populations to track status and trends of VSP metrics and improve understanding of the composition of natural spawners (what type/pHOS? how many? where from? timing?), other life history information, and habitat.	1. Coordinate with WP BiOp monitoring.	no specific RPA
13 – ESU-ADM	Adequately fund and implement RME needed to answer critical uncertainties related to the assumptions under which the recovery plan was developed.	TBD	n/a



23 – ESU-ADM	Determine funding sources and strategies to implement monitoring needed to track progress towards achieving recovery goals.	TBD	n/a
116 – MST-AMO	Protect and restore aquatic habitat function at confluence areas of Willamette River tributaries.	1. Prioritize some BPA funding of the WP BiOp habitat restoration projects (WATER HTT) to these areas. See WP-RPA's 7.1.2 and 7.1.3. 2. Identify other funding or coordination opportunities so that restoration at confluence sites is substantial enough to provide meaningful ecological benefits to anadromous fishes. (see action 37-ESU-PHQ)	7.1.1 7.1.2 7.1.3
120 - MST/SUB-AMO	Evaluate the potential for releasing habitat-forming flows from WP Project storage dams to complement habitat restoration activities in the mainstem Willamette River.	1. WP BiOp RPA 2.7; Work through WATER Flow Management Team to identify opportunities to provide environmental pulse flows that can create new and sustain existing fish habitat in the lower subbasins and the mainstem Willamette River 1.1. these types of flows may not be met in low flow years, so evaluate the likely occurrence and magnitude of these flows. 2. Complete The Nature Conservancy's Sustainable Rivers study process. 2.1. implement and evaluate the study recommendations in Coast Fork and Middle Fork, and conduct similar Nature Conservancy studies in other subbasins where flows have been significantly modified	2.7 7.1.2
110 - MST-ALL	Look for opportunities to remove unnecessary revetments or increasing setbacks in the Mainstem Willamette and in subbasins. Minimize new ones in the future.	1. For sites that were funded or placed by the USACE, the WP BiOp Action Agencies conduct assessment to identify high priority revetment through WP BiOp RPA 7.4, and fund restoration at these sites. 2. Replace revetment segments with bioengineering and natural features such as vegetation, and large wood structures.	7.4
69 – EST-ALL	Manage flow during dry years to maintain and improve habitat conditions for ESA-listed species.	TBD	FCRPS RPA14
111 - MST-ALL	Release flows from WP dams and other storage dams to meet flow targets in mainstem Willamette River for rearing and migration.	1. Ensure sufficient spring flows to allow downstream migration of juveniles, including those in side channels. 2. Coordinate annual flow operations with ODFW and NMFS and other parties to optimize project operations for UWR ESU's, while meeting flood control and other mandatory project purposes.	n/a
113 – MST-AMO	Increase overall channel complexity, floodplain connectivity, and flood storage to the mainstem Willamette River to increase and improve salmonid rearing and migration habitat.	1. Work with regional federal and state entities to resolve larger issues related to future increased channel meandering and the factors that inhibit it now. 2. Use multiple analytical and planning sources to ID the type of projects and reaches where restoration success will be high. 3. Find opportunities within these priority reaches with willing landowners by offering economic incentives, conservation easements, leases, or acquisition. Provide technical assistance and analyses on risks and benefits to landowners.	n/a

## H.2 Amendments to Program Coordination

**Recommendation 50** – As a new paragraph under Program Coordination on Page 64, it should be stated that the 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 have identified several priority topics 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
- Emerging Issues – FW Program Issues not currently identified

### 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 51**– As a new paragraph under Program Coordination on Page 64, we recommend that 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.

NW Power Act. 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.



