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July 2, 2013

## MEMORANDUM

**TO:** Fish and Wildlife Committee members

**FROM:** Nancy Leonard, Fish, Wildlife and Ecosystem Monitoring & Evaluation Manager  
Patty O'Toole, Program Implementation Manager  
Laura Robinson, Program Implementation and Liaison Specialist

**SUBJECT:** F&W Program Amendment Process

- Discussion Topic #2a, Monitoring, Evaluation, Research, Reporting and Information Management
- Discussion Topic #2b, Program Biological Objectives

In preparation for the Fish and Wildlife Program (Program) amendment process, the Council recently discussed the legal framework for the Program, and the Fish and Wildlife Committee reviewed and discussed the current Program framework with Council staff. Preparation for the amendment process will continue at the July Fish and Wildlife Committee meeting with an opportunity for the Committee to review and discuss the Program's guidance for monitoring, evaluation, research, reporting and information management, and Program-level objectives.

With this memo, the staff presents background information for topic 2a and 2b. The background information on topic 2a provides a summary of draft monitoring and research and focuses on the risk-uncertainty matrix guidance. The background information for topic 2b provides an overview of objectives and relevant parts of the Northwest Power Act. Additional information about the evolution of program objectives is provided in a chronological manner in attachment 1. At the July Committee meeting, staff will highlight some important aspects related to these topics and the Committee will have an opportunity to ask questions and discuss.

Additional topics for discussion for future meetings that may be of interest to Committee members include: the Program's artificial production strategy; how the Program integrates with the various biological opinions and fish Accords/MOA's; and the Program's adaptive management history and principles. At the July meeting, staff will inquire about the Committee's interest in scheduling discussions for these topics.

As a reminder, recommendations for amending the Council's Fish and Wildlife Program are due September 17<sup>th</sup>, 2013. More information about the amendment process and information on how to submit recommendations can be found at <http://www.nwcouncil.org/fw/program/2013amend/>.

## **BACKGROUND ON THE PROGRAM'S MONITORING, EVALUATION, RESEARCH AND REPORTING**

The 2009 Fish and Wildlife Program (Program) focus is on performance, with a continued emphasis on periodic scientific review of new and ongoing actions. The Program also stresses reporting of results and accountability, adaptive management and quantitative objectives. Finally the Program calls for periodic and systematic exchanges of science and policy information and expanding the monitoring and evaluation framework with a commitment to use the information to make better decisions and report frequently on Program progress

In response to this direction staff has been developing guidance over the past few years on these topics, requesting public input, and revising as appropriate (see <http://www.nwcouncil.org/fw/merr/home/> for all versions). The intent was that the content or subset of the content found in this guidance could be incorporated in the 2014 Program amendment if it was supported by the region's federal and state fish and wildlife agencies and tribes. The first draft of this document, a draft monitoring, evaluation, research and reporting plan (MERR) was presented by staff in March 2010. This first draft described the syntheses and reports that would inform adaptive management of the Program and support assessing Program progress, including, high level indicators. The content of the 2010 draft MERR Plan was based on Program needs and the ongoing work of many others in the Columbia River Basin. Public comments received generally supported the content of the draft MERR Plan and provided good insight on how to strengthen the next versions. Subsequent versions of the draft MERR Plan were released in July 2010 and November 2010. In March 2012, following Council direction, a more succinct policy focused draft document was produced from this previous work and posted for public comments. In November 2012 a revised draft was posted that aimed to address the received from the ISAB/ISRP and three agencies: NOAA, Washington Department of Fish and Wildlife, and Idaho Department of Fish and Game. In February 2013, per Council request, staff produced a shorter version of the November 2012 MERR, separating out its content into two documents:

- Draft Guidance for a Balance Approach to Monitoring and Research
  - <http://www.nwcouncil.org/media/5426191/2013-02-Draft-Guidance-for-a-Balance-Approach-to-Monitoring-and-Research.docx>.
- Draft Guidance for Information Management, Evaluation and Reporting
  - <http://www.nwcouncil.org/media/5426194/2013-02-Draft-Guidance-for-Information-Management-Evaluation-and-Reporting.docx>

One aspect of particular interest to the Council members is the concept portrayed by the Risk-Uncertainty matrix in the Draft Guidance for a Balance Approach to Monitoring and Research document's section "Determining the Appropriate Level of Effort":

*The Council will rely on a preponderance of evidence<sup>1</sup> to base its decisions when the 95 percent level of certainty traditionally applied by scientific investigators is not available.*

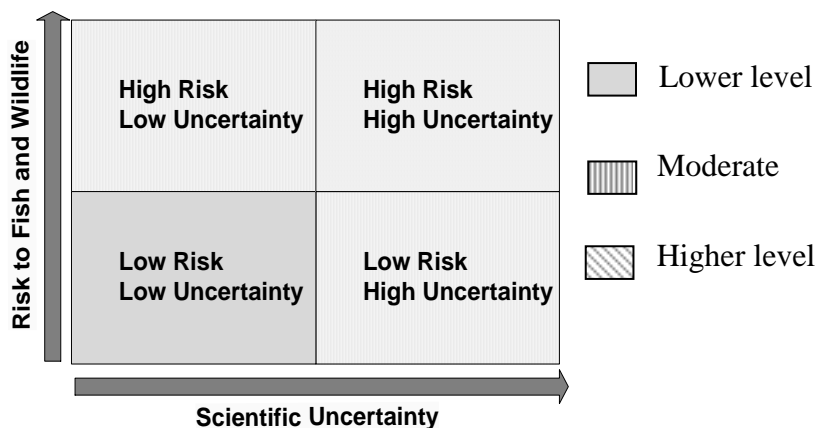
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<sup>1</sup> Preponderance of evidence relates to the legal term described as: the greater weight of the evidence required in a civil (non-criminal) lawsuit for the trier of fact (jury or judge without a jury) to decide in favor of one side or the other. This preponderance is based on the more convincing evidence and its probable truth or accuracy, and not on the amount of evidence (Source Law.Com).

The intensity of monitoring associated with an action, environmental condition, and/or population characteristic will align with the perceived risk to fish, wildlife and habitat and the level of certainty associated with the impact of the actions, environmental conditions, and population characteristics. This conceptual concept of how risk and uncertainty relates to each other and informs monitoring intensity is illustrated in the risk-uncertainty matrix (Figure 1). The perceived level of risk pertains to the potential undesirable impact of a given action on, or of having an undesirable change in the biological status of, fish, wildlife, and habitat. The uncertainty level pertains to the certainty of outcome associated with a given action or a biological status based on the scientific support as described in the Council document [2000-12](#) with number 1 being the highest level of certainty:

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

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



**Figure 1:** Risk-uncertainty matrix guiding level of monitoring efforts for a given action (e.g., hatchery, hydrosystem, and habitat action), and biological status

In the Council’s letter for the 2013-2014 Program amendment call for recommendations, the Council included suggestions for potential areas of specific feedback on the 2009 Program. These included the Program’s Monitoring, Evaluation, Reporting, Research and Data Management:

**Guidance for monitoring activities, research efforts and for information management, evaluation, and reporting.** Under the directive of the 2009 program, Council staff and program partners have strived for a balanced and coordinated regional approach to monitoring and evaluation. Recommending parties should consider how these concepts may be appropriately included in the program.

## **BACKGROUND ON THE PROGRAM OBJECTIVES**

*(This version may be updated over time)*

The 2009 Fish and Wildlife Program directed the region that within one year of these 2009 Program amendments, the Council will initiate a process to work with federal and state fish and wildlife agencies and tribes, Bonneville, and others to assess the value for the Program of quantitative biological objectives at the basinwide level, or at any level above the subbasin and population level. If determined to be useful in certain categories, the Council will work with these partners to develop a set of quantitative objectives for amendment into the Program.

The desire to have useful biological objectives for the Program is not a new one. As one looks at past Programs various attempts have been made to identify and include objectives. These have sometimes been referred to as goals, objectives and performance standards, but regardless of the term used they were intended to provide a target towards which progress could be assessed.

The inclusion of objectives in the Program arose directly and indirectly from the guidance provided by the Northwest Power Act. Directly, because the Act requests that recommendations provided by the region's should include objectives for the hydroelectricity projects; indirectly, because the Act asks for recommendations to protect, mitigate, and enhance fish and wildlife which implies having an understanding of what are the objectives, goals, performance standards that need to be attained to accomplish this task.

### ***What the Act says about objectives?***

Section 4(h)(2) of the **1980** Northwest Power Act (Act) directed the Council to develop the program by first requesting recommendations from the region's federal and state fish and wildlife agencies, appropriate tribes, and other interested parties. This section of the Act provides some guidance related to objectives:

- a. Section 4(h)(2)(b) - establishing objectives for the development and operation of such projects on the Columbia River and its tributaries in a manner designed to protect, mitigate, and enhance fish and wildlife.

The Act, under section 4(h)(6), also has guidance about objectives to guide the Council in determining which program measures to include:

- a. Section 4(h)(6)(C) - utilize, where equally effective alternative means of achieving the same sound biological objective exist, the alternative with the minimum economic cost;
- b. Section 4(h)(6)(E)(ii) - in the case of anadromous fish- [...] provide flows of sufficient quality and quantity between such facilities to improve production, migration, and survival of such fish as necessary to meet sound biological objectives.

### ***How does the Act define Objectives?***

A full discussion about the meaning of biological objectives is found in the 1994/1995 Program amendment findings (<http://www.nwcouncil.org/media/26541/sec15.pdf> ). Below we provide excerpts from this discussion.

*The Act itself does not define the terms “objectives” or “biological objectives.” Nowhere in the Act is the Council directly instructed to develop a comprehensive set of distinct, quantified “biological objectives” to support the whole of the program. Instead, the Act’s circumscribed use of the term “objectives” (in one provision) and “biological objectives” (in two provisions) indicates a more focused relationship between objectives and the development and operation of the hydroelectric projects and a much less specific or technical meaning for the general term biological objective.*

*[...]*

*From this analysis, two critical points are clear: **First**, the only “objectives” actually called for in the recommendations process are objectives narrowly tied to hydropower project development and operations. If program development must be tied closely to the recommendations process, it is too great a leap to read the rest of the Act as containing a mandate to the Council to develop, independently, a more comprehensive set of separate, distinct, quantifiable biological objectives. **Second**, all recommendations, for objectives and for measures, must be biologically based, that is, have a “biological objective” in the common sense meaning of the term, even if not expressly stated in the language of the measure or operational objective. The recommending party and the Council must be able to identify this biological objective or purpose and evaluate whether the recommended measure actually serves this purpose (and, as will be discussed below, whether some other measure serves it better or at a lower cost).*

*[...]*

*Thus the Act indicates that the Council should expect to receive and consider recommendations for biologically-based objectives for hydroelectric project operations and development, instead of an elaborate and comprehensive quantified biological framework for the whole program. All recommendations and measures must be biologically based, that is, have a biological objective, but that biological objective may be qualitative or narrative in nature and may be implicit in the measure. The recommending entities are free, of course, to recommend more comprehensive, distinct numerical objectives. The Act does not require the Council to hold off from adopting measures to protect, mitigate and enhance fish and wildlife until it receives such a set of objectives.*

*[...]*

### ***Program Objectives and Relationship to Recommendation process***

- As directed by the Act, the Council crafts the program from recommendations received during the amendment process. This direction is strongly enforced by *NRIC v. Northwest Power Planning Council* court decision in 1994.
- This direction makes it harder to generate and include program objectives that are deemed important, useful, and necessary for the program, but that are not submitted as recommendations during the amendment process.

### ***What Type of Objectives has the Council included in the Program?***

The guidance from the Power Act related to objectives basically resulted in two types of objectives being included into the Fish and Wildlife Program:

1. Hydroelectric projects development and operations objectives
  - a. Flow and passage objectives submitted during the amendment process

2. Objectives that guide what the program needs to mitigate for: anadromous fish, resident fish and wildlife, and that can inform progress made in mitigation.
  - a. Derived from mitigation obligation and loss assessments plus science insights such as guidance from Return to the River that lead to the new program framework that currently consists of basin-wide and subbasin level biological objectives.

### ***Brief Overview of Inclusion of Objectives in the Program 1982 - 2009***

The **1982** Fish and Wildlife Program included recommendations for improving water flow and anadromous fish migration and passage through the hydrosystem. These established objectives for the development and operation of hydroelectric projects in the Columbia River Basin as called for in the Act. The Council deferred including objectives for anadromous fish, resident fish and wildlife losses associated with the hydrosystem.

The **1987** Program, following the conclusion of the anadromous salmon and steelhead loss assessment in 1985, include the doubling goal for salmon and steelhead.

The **1994/95** Program contained goals for the hydrosystem development and operation, anadromous salmon and steelhead, resident fish, and wildlife:

- Salmon and Steelhead: doubling as an interim goal for salmon and steelhead of increasing existing runs from 2.5million to 5 million; population rebuilding targets
- Wildlife program goal: fully mitigate for wildlife losses from hydropower in the Columbia River Basin
  - Allocate wildlife mitigation expenditures to the various project purposes in accordance with existing accounting procedures (i.e., Habitat Units, HUs).
- Resident fish goal: recover and preserve health of native resident fish injured by hydropower system:
  - Calls for completion of resident fish losses/gains assessment (i.e., completed for Hungry Horse and Libby).
  - Calls for development of other resident fish biological objectives.
- Adopts recommendations for biological and operational objectives for the mainstem and other parts of the program such as: quantitative performance standards for flow and velocity.

The Council adopted the new Program framework during the **2000** Program amendment process following the guidance from the 1996 scientific critique of the Program by the Independent Scientific Group and their publication of the Return to the River. Adoption of this new Program framework led to an expansion of Basin-level Biological Objectives during the 2000 and 2009 Program. These consisted of two types of biological objectives that were intended to be replicated quantitatively and qualitatively, as appropriate, at the subbasin, province, and basin-wide scale:

- environmental characteristics -- as the main target of actions rather than population characteristics, and,
- biological or population performance as a related set of objectives, as what you are trying to achieve by taking actions on the environment.

### ***Where are we now with respect to Program Biological Objectives?***

- The 2009 Program’s basinwide objectives are a mix of narrative, qualitative, environmental characteristics and biological performance objectives. The quantitative total salmon goal and the overall SARs goal are considered performance objectives.
  1. Do we need to improve these objectives?
  2. How useful are they for evaluating and reporting on program progress?
  3. Are they useful for adaptively managing the program?
  
- The 2009 Program’s Mainstem flow and passage objectives address the need for these types of objectives under the Act, and are also found in the FCRPS BiOp.
  1. Do we need to improve these objectives?
  2. Are they adequate to mitigate for the hydrosystem’s negative impact on fish and wildlife?
  
- The objectives in the 2009 Subbasin plans are numerous, and cover a diversity of topics not limited to biological objectives (e.g., cultural objectives).
  1. Do we need to improve these objectives?
  2. How useful are they for evaluating and reporting subbasin level progress?
  3. Are they useful for adaptively managing the work being done within the subbasins and the program?
  
- There are currently no program objectives above the subbasin level.
  1. Do we need to develop and incorporate Province-/ESU-level objectives?
  2. Would they be useful in evaluating and reporting program progress?
  3. Would they be useful for adaptively managing the program?
  4. How critical are these for the program?
  
- ESA/BiOp Objectives were developed for comprehensive analysis/jeopardy analysis and for recovery plan delisting targets.
  1. How useful are these to our mitigation program?
  
- Next steps, to determine what objectives (qualitative, quantitative, topics, etc.) are needed to evaluate, report, and adaptively manage the program to make progress towards the vision and the Council’s responsibility under the Act.



***Attachment 1: More Detailed Discussion of the Program Amendment, Recommendations, and Related Work that Contributed to the Evolution of Objectives, with a Focus on Basinwide Objectives***

In this section we provide an overview of the evolution of objectives within the Program. For each program amendment we briefly summarize the recommendations received from the region related to basinwide/programmatic objectives. We focus on the objectives that best match our current understanding of objectives for the programmatic level. Objectives that best fit subbasin-scale are not included in the below timeline summary, such specifics as hydrosystem operation and maintenance, and population abundance.

In **1982** the Council produced the first Fish and Wildlife Program following the direction provided by the Act. In Section 200 of the 1982 Program, the Program describes the benefit for having Program goals:

*“Reasonable program goals will greatly improve the Council’s ability to achieve the fish and wildlife and power purposes of the Act. Having goals allows a regular and consistent evaluation of the progress of the program and an early identification of any problems that are developing. When unexpectedly slow progress is observed, investigations can be conducted to identify whether the problems are created by the hydroelectric system or by other factors. Moreover, having goals makes those charged with implementing the Program responsible for producing specific results. The Council understands that it does not have authority to cure all of the problems of fish and wildlife on the Columbia River and its tributaries; nevertheless, clearly identifying the results that are expected will substantially increase the likelihood of success.”*

This Program also describes that to establish goals one needs to take into account the system as it exists and identify the mitigation that will be provided to compensate for the losses. The program then provides guidance to lead to the establishment of program goals for:

1. Anadromous Fish:

- Bonneville shall fund a study by the FW agencies and tribes to identify the salmon and steelhead losses that have occurred as a result of the development and operation of the CR hydroelectric system and to develop proposals for anadromous fish goals for this program/ Specific losses and goals will be provided for each stock and each significant river basin
- In designing and conducting this study, the FW agencies and tribes will consult with the federal project operators and regulators, any utility that owns or operates hydroelectric facilities on the CR or its tributaries, appropriate water management agencies, the Council’s fish propagation panel created under Section 704(a)(1) of this program, and the Salmon and Steelhead Advisory Commission created under the Salmon and Steelhead Conservation and Enhancement Act of 1980 (16 USC 3301 et seq)
- The study will determine:
  - Past, present, and potential production
  - The separate potential for wild, naturally spawning, and hatchery propagation
  - Limiting factors, such as disease and genetics
  - Harvest and escapement management implications
  - Areas of emphasis
  - Stocks of emphasis

- Capital costs and operation and maintenance costs
  - A sequence and priority of action
  - The extent and success of past mitigation and enhancement efforts
  - The credit to be given to ratepayers for off-site enhancement activities undertaken pursuant to this program
  - [some text skipped] Following the receipt of the proposals from the fish and wildlife agencies and tribes by April 15, 1984, the Council will take appropriate action to establish goals for the protection, mitigation and enhancement of salmon and steelhead under this program.
2. Resident Fish (Section 202)
    - The Council requires more information before establishing resident fish goals. But the program doesn't indicate a process to obtain that information.
  3. Wildlife (Section 202)
    - The Council awaits results wildlife loss study under Section 1000 before establishing wildlife goals.

The **1982** program provided guidance on how to develop goals for fish and wildlife, which was generally supported by the region. Recommendations for anadromous fish goals received from the region included specific information about base run size for 6 major stocks of salmon and steelhead. Upon further discussion, these goals were clarified as a basis for calculating anadromous fish loss and were representative of the production potential of the river. The pre-McNary numbers were used as interim goals. No recommendations were provided for resident fish and wildlife.

The **1984** Program reiterated the same information as the 1982 Program related to Program goals. Similar recommendations from the 1982 program related to program goals (aka objectives, performance standards) were received from the region.

Between **1985 and 1986** Council staff worked with the region to gather information on the extent and causes of the declining numbers of salmon and steelhead in the basin. This served to respond to the 1982/1984 Program guidance for a study that would inform Program goals for salmon and steelhead. In 1985 and 1986, the public reviewed and debated the nature and limitations of that information. The draft was released in September 1985, revised per oral and written comments, and released as final in December 1985. After compiling information on salmon and steelhead losses, the Council solicited extensive public comment on the contribution of the hydropower system to declines in run sizes. Based on the losses information and on public comment, the Council identified alternative ways to estimate the contribution of the hydropower system to these losses. The results of these efforts have been published in a separate volume entitled, *Compilation of Information on Salmon and Steelhead Losses in the Columbia River Basin* (document number 87-15A.) and [\*Numerical Estimates of Hydropower-Related Losses for Salmon and Steelhead\*](#) (attached as an appendix to the program).

In the **1987** Program, the Council makes no mention of program level goals for resident fish and wildlife, but there is reference to a process to mitigate wildlife losses. The Council does set a salmon and steelhead goal:

- *Set doubling runs as a reasonable interim goal to guide program planning, implementation, measurement and evaluation; increasing the run size from about 2.5 million adult fish to about 5 million, as a result of implementation of this program.*

The total annual Columbia Basin salmon and steelhead adult run size was estimated by adding the number of adults returning to the mouth of the Columbia River plus the number of adults caught in the ocean. This definition was chosen for ease of accounting, not biological reasons. The current run size of about 2.5 million adult fish is defined for this program on the basis of the average run size for the years 1978 to 1981, the period just prior to the adoption of the Council's initial Columbia River Basin Fish and Wildlife Program in 1982. The doubling goal set by the Council was intended to apply to the basin as a whole as it may not be possible or desirable to double populations of all species in all subbasins. Also, the Council chose to not set a target date for achieving the doubling goal until additional information was gathered during the system planning process. The Council also specified that although the doubling is a numerical goal, numbers will not drive the program to the exclusion of other important values such as conservation of genetic resources. The numerical goal was set to guide planning and provide a context for evaluating program progress. As an ambitious, yet realistic goal, it was intended to provide an incentive for innovation in program implementation, improvements in communication and institutional arrangements, and development of management agreements, while signaling that the program is long-term and not amenable to quick fix remedies.

In general the recommendations submitted for the 1987 Program amendment related to program goals, supported the inclusion of the doubling goal. PNUCC and most utilities suggested achieving the goal in 10 to 15 years. Oregon Trout Unlimited and Seattle City Light suggested waiting to set a goal until after subbasin planning is completed because the goal should reflect the potential productivity of the basin. The Council decided to not assign a specific timeline to the doubling goal until the conclusion of the system-wide planning effort. No recommendations were received related to resident fish and wildlife goals.

During the late **1980's-1990's**, discussion resumed about listing salmon and steelhead in the Columbia River Basin, particularly because the runs in the Snake River began to decline precipitously in the late 1980's. Discussions that had begun in the late 1970's about ESA listing salmon and steelhead in the Columbia River Basin had been suspended with the passing of the Northwest Power Act, anticipating that the declining salmon and steelhead runs may be restored through the Council's Fish and Wildlife Program efforts.

The **1990** Salmon Summit convened by the region's governors and Oregon Senator Mark Hatfield provided important groundwork for the salmon rebuilding effort by developing critical short-term measures that were implemented in 1991 to stem further decline. Following the Summit, the governors asked the Council to expand its focus to address all activities that impact salmon, not just the hydroelectric system.

The first ESA listing occurred in **1991** with Snake River sockeye. This was followed by the listing of Snake River fall Chinook and combined spring/summer Chinook in 1992. In response to the Snake River salmon listings, in January 1992 the National Marine Fisheries Service (now NOAA), which implements the ESA for salmon and steelhead, appointed the Snake River Salmon Recovery Team to make recommendations for recovery. The Recovery Team's 1993 recommendations included a number of short- and long-term actions to assist salmon toward recovery. This was followed by NOAA issuing a series of biological opinions from 1993 to 1998.

During **1992**, the Council produced a Salmon Strategy that represented an intensified focus within the Columbia River Basin Fish and Wildlife Program based on the entire life cycle of salmon. This program amendment took up where the Salmon Summit left off in the spring of 1991. This program amendment restated that the principle goal is to double Columbia River Basin adult salmon populations without losing the biological diversity that existed then. This document also established numerical targets for rapidly rebuilding Chinook salmon runs in the Snake River Basin that had recently become listed:

<u>Salmon runs</u>	<u>Rebuilding target</u>
Snake River spring Chinook	50,000 adult salmon returning to the Snake Basin
Snake River summer Chinook	20, 000 adults
Fall Chinook	1,000 fish

The recommendations submitted for the 1992 Program amendment related to program goals (aka objectives, performance standards) included a wide and sometimes divergent range of possible goals and objectives, including, recommending full mitigation and compensation ..., and restoration of productive fisheries; addressing the general lack of resource information; and system-level cost effectiveness; setting general goals and leave implementers flexibility to identify appropriate measures. The Commenters also varied in their support of the doubling goal, some saying that it was: appropriate but could be improved by additional definition; arbitrary and provides no way to measure progress; objectionable because it gives priority to numbers over biology. In response, the Council kept the doubling goal and included the recommended rebuilding targets into the 1992 Program.

**1994**, environmental groups, industries, and an Indian tribe challenged the 1992 Salmon Strategy in the Ninth Circuit Court of Appeal, resulting in the court remanding the Strategy for Salmon. Thus, during the Council's 1994/95 Program amendment process the recommendations received during 1991 were reconsidered along with the 1995 recommendations.

The Council, during **1994/95**, amended the Program. This program continued to call for resident fish losses/gains assessments and for the development of resident fish biological objectives. The wildlife program goals was described as fully mitigating for wildlife losses from hydropower in the Columbia River Basin, allocating wildlife mitigation expenditures to the various project purposes in accordance with existing accounting procedures. This program maintained previous goal and rebuilding targets for salmon and steelhead: the principle goal is to double Columbia River Basin adult salmon populations without losing the biological diversity that now exists and numerical targets for rapidly rebuilding salmon runs in the Snake River Basin.

The Council, in amending the 1994/1995 Program, considered the recommendations received both in 1991 and 1994. The recommendations considered for the 1994/95 Program amendment related to program goals (aka objectives, performance standards) were similar to those described for the 1992 Program, such as recommendations for additions and revisions to the Doubling Goal. The Council did not receive a more comprehensive set of distinct, quantified biological objectives for all or large parts of the program. Thus the Council kept the same goals and rebuilding targets for the 1994 Program.

In **1996** the Independent Scientific Group (ISG) produced the Return to the River publication (document 96-6, later replaced by the 2000 Return to the River report). This publication responded to a Council request for the (ISG) to develop a conceptual foundation for the fish and wildlife program, to provide an overall set of scientific principles and assumptions on which the program and fish and wildlife management activities basinwide could be based and against which they could be evaluated. In their report, the ISG stated the Fish and Wildlife Program lacked a structure for:

*“selecting or prioritizing measures based on a framework of overall goals and objectives. While the Council has identified general goals and priorities for the FWP, their level of generality is such that they provide little guidance or rationale for subsequent selection or prioritization of measures.”*

Thus the ISG recommended that the Fish and Wildlife Program incorporate:

*“an integrated approach to ecosystem management that is based on an overall, scientifically credible conceptual foundation. This would lead to a rational structure of goals and objectives and provide a standard for evaluation of measures based on general properties of the salmon bearing ecosystem. It also would provide the Council with an objective, explicit structure around which to shape a scientifically based program.”*

In **1997** the Council produced the document *An Integrated Framework for Fish and Wildlife Management in the Columbia River Basin* (document 97-2). This document describes the elements and structure of a common, scientifically based framework for regional fish and wildlife recovery in the Columbia River Basin. This framework included a description of ecological objectives needed to achieve goals that would be based on the scientific information in the conceptual foundation. These objectives should relate to the organisms themselves (life history diversity, abundance, survival rate, productivity), associated physical conditions (temperatures, flow, sediment) and ecological conditions (habitat connectivity, species assemblages, ecological integrity). Ecological objectives can be arrayed on a time line to provide performance benchmarks. However, ecological objectives must go through the conceptual foundation to ensure a firm linkage to the goals and a scientific basis. It is important to distinguish goals from the ecological objectives. The goals drive the framework and are the sources from which other elements of the framework are derived. Objectives emerge from the conceptual foundation as a description of a needed ecological condition. Strategies are designed to achieve ecological objectives. A related concept is that of performance indicators. These are readily measurable indices of the ecological objectives. Parameters used as ecological objectives may be difficult to measure or respond slowly to strategies and actions. Performance indicators can be used to provide timely indications of change or to indicate problems. In any event, performance indicators relate directly to the ecological objectives.

In **1997** Upper Columbia River steelhead and Snake River Basin steelhead were listed. These listings were then followed in 1999 by Lower Columbia River Chinook, Upper Willamette River Chinook, Upper Columbia River Chinook, Columbia River chum salmon, Lower Columbia River steelhead, Upper Willamette River steelhead, and Middle Columbia River steelhead. Following these ESA listings and work being done in the region to develop recovery plans the Council and the region wanted to ensure that the Council's and NOAA's objectives for these salmon and steelhead be aligned and not result in duplicative effort.

The *2000 Fish* and Wildlife Program established a broad framework for fish and wildlife mitigation and recovery within the Columbia River Basin. The framework included a vision for the Columbia River, which is intended to define the expected basin-wide outcomes of the Fish and Wildlife Program, and a scientific foundation, which is a set of scientific principles that are intended to broadly summarize current scientific knowledge concerning ecosystem attributes, processes, and functions that are applicable to fish and wildlife mitigation and recovery within the Basin. In order to achieve the vision, the Program called for development of biological objectives that describe physical and biological changes needed to achieve the vision and that consist of two components:

- (1) Overarching objectives
- (2) Basin level biological objectives
  - a. Objectives for biological performance: describing population responses to habitat conditions; and
  - b. Objectives for environmental characteristics: describing the environmental changes that are needed to achieve the desired population responses

The overarching objectives and the basin-level biological performance objectives were developed and incorporated in the 2000 Fish and Wildlife Program. These basin-wide biological performance objectives were developed for anadromous fish losses, substitution for anadromous fish losses, resident fish losses, and wildlife. The 5 million doubling goal was kept as one of the anadromous fish losses basin-level biological performance objectives. The rebuilding targets for Snake River chinook are absent. The basin-level environmental characteristics objectives were included in an Appendix of this program pending review by the ISAB. Biological objectives for the provinces and subbasins levels were intended to be developed subsequently, with subbasin-level biological objectives having been developed as part of the subbasin plans. Province-level biological objectives have yet to be developed.

The recommendations submitted for the 2000 Program amendment related to program goals (aka objectives, performance standards) included comments on the Council's strawman biological objectives, such as recommending that: the role of the biological objectives be specified such as how they would direct the Program to achieve certain goals; the concepts in the strawman and the objectives statements be revised/refined to improve their consistency and coherence, reorganize the objectives; alternate habitat strategies and standards as well as alternate production strategies and standards be considered such as those submitted; the biological objectives and performance standards be aligned with those developed by NMFS; additional topics such as water quality be included, et cetera. The Council addressed these recommendations resulting in the biological objectives included in the 2000 Program.

The *2001* ISAB review ([2001-6](#)) of the Biological Objectives in the 2000 Program provided several suggestions for improving the basin-level biological objectives that warrant consideration as the Council works with the region to discuss further development of the Program's biological objectives. A subset of the ISAB suggestions consists of:

- Improving the linkage of the basin-level objectives with the Program's vision and scientific principles,
- Having a consistent level of specificity among the basin-level biological objectives, and,
- Modifying the biological objectives so that they are more similar in approach to the environmental characteristic biological objectives, as these were deemed to be more

appropriate as basin-wide objectives than the biological performance biological objectives.

The **2002** version of [A Multi-Species Framework](#) Approach for the Columbia River Basin discusses how the Council can use EDT-model to evaluate subbasin plans for their contribution to the larger scale (province and basin) vision and biological objectives. AS well as how the Council could develop biological objectives using the EDT model to describe the amount of environmental change needed within a province or subbasin to meet the overall vision. Subbasin plans would then detail the strategies and actions needed to make this amount of change across the province. In this approach, it is suggested that biological objectives could be based on three characterizations of the environment: (1) the Current Potential condition, (2) the adopted resource management program, and (3) the Historic Potential condition. The Current and Historic Potential conditions are based on information gathered at the 6-HUC level. The characterization of the future conditions could be based on the increase in performance desired and the change in quantity and quality of attributes required to achieve the desired performance. EDT can be used to determine the amount of change from current conditions to achieve a desired condition. Thus, EDT can be used to help set the biological objectives for conditions in the basin by helping to determine what is possible. Biological objectives would be established for aquatic and terrestrial habitat and biological performance. Candidate biological objectives include changes in the 45 environmental modeled amounts of habitat, fish survival rates, and modeled parameters such fish productivity, life history diversity and abundance.

In **2003**, the Council finished the Mainstem Amendment whose overarching objectives aligned with the 2000 Program objectives. Specific objectives and performance standards for habitat characteristics and for population performance were amended including the 2-6 percent SAR range (minimum 2 percent; average 4 percent) for listed Snake River and upper Columbia salmon and steelhead. The recommendations submitted for the 2003 Mainstem amendment related to program goals (aka objectives, performance standards) included: incorporating into the program the objectives and measures in the biological opinions; calling for additional or different measures based on a conclusion that the biological opinions did not prescribe sufficient flow, spill and passage operations to benefit listed (as well as non-listed) salmon and steelhead; calling for supplemental measures based on a conclusion that the operations specified in the biological opinions are not optimal or sufficient to protect, enhance or mitigate for the adverse effects of the hydrosystem on resident fish; calling for scaled-back flow and spill operations based on the conclusion that the biological opinions exceeded what is necessary in terms of flows and spill to benefit listed fish, to the unreasonable detriment of the power supply and other uses of the river, et cetera.

In **2005**, Council staff presented a plan for developing and adding biological objectives of this type to the program. The plan proposes two phases for this work: 1) a period to organize and integrate recent information on populations and habitat conditions, and 2) a policy process to develop the objectives and amend them into the program.

In **2006**, building upon staff work from 2005, a proposal for adding Province-level objectives was developed ([document 2006-15](#)) for review by the ISAB and the region. These objectives aimed to express in quantitative terms the nature of the changes the program seeks to achieve in key fish and wildlife populations and their habitats in the different ecological provinces of the basin. Objectives of this type would add significantly to the Council's ability to guide program

expenditures in the most efficient direction and evaluate the success of the program's activities over time.

In **2007** Council staff led a forum with the region to discuss the Program objectives. During this process, representatives of public utilities, federal and state agencies, and tribes discussed the current 2000 Fish and Wildlife Program's Biological Objectives in terms of their limitation and their ideal future state. This forum produced a subset of consensus topics, including:

- Collective Statements on the Ideal Future State of Objectives— what would appropriate biological objectives look like? (i) There would be regional agreement and the objectives would support the scope and goals of the Program; (ii) BPA's responsibilities would be clearly defined, the FCRPS priorities would be defined, we would have metrics measuring biological responses and progress could be measured; (iii) The Program would affect integrated progress, provide balance across the hydro, harvest, hatchery, habitat, and ESU obligations and changing nature are integrated; (iv) Strategies and measures would be biologically prioritized; and, (v) The Fish and Wildlife Program budget would reflect biological objectives that maximize biological value for every dollar spent
- Criteria for consideration of potential objectives: (i) Measureable and in real time; (ii) Currently measured; (iii) Have indicators that management actions can affect; (iv) Can demonstrate outcomes of projects relative to objectives; (v) Would guide decision making; (vi) Understandable to the general public; (vii) Can define FCRPS obligations; (viii) Can encourage partnerships with other ongoing actions; (ix) There is ownership; (x) They span hydro, harvest, hatchery, and habitat (the 4-Hs); (xi) Possible kinds of objectives include abundance (based on the 4 Hs), productivity of habitat and artificial production, performance indicators and change in environmental parameters
- Next Steps may include
  - o Test conceptual objectives with some sample provinces
  - o Expand description of conceptual objectives
  - o Define some desired outcomes, such as using these for budget allocations, transparency in decision making, FCRPS responsibility, and how to measure progress over time.
  - o Describe application to resident fish and wildlife

The **2009** Fish and Wildlife Program maintained the status quo for its Overall and Basin-wide objectives. It maintained the 5 million fish doubling goal and moved from the Mainstem amendment section a Basin-wide objectives for anadromous fish losses the 2-6 percent SAR range (minimum 2 percent; average 4 percent) for listed Snake River and upper Columbia salmon and steelhead. This program also provides guidance for the further development of the biological objectives for the Program. This guidance consists of:

- Initiating a process to work with agencies and tribes to assess the value of the Program with quantitative biological objectives at the basinwide level, or at any level above the subbasin and population level. If determined to be useful in certain categories, the Council will work with these partners to develop a set of quantitative objectives for amendment into the Program.
- Describing characteristics for biological objectives, such as having benchmarks and informing revisions of the Program's basinwide strategies overtime.
- Suggesting potential categories of biological objectives, such as population characteristics and species habitat potential.



The recommendations submitted for the 2009 Program amendment related to program goals (aka objectives, performance standards) included: questioning the continued validity of the few quantitative objectives at the basinwide level, salmon and steelhead abundance and SAR objectives; retaining and to some extent updating those quantitative objectives; suggesting a few quantitative objectives for ecological provinces, that would entail largely rolling-up abundance targets for salmon and steelhead in those provinces based on subbasin summary tables; adding a basinwide biological performance objective for lamprey; moving into the main text and editing for clarity, brevity, and consistency the basinwide environmental objectives; support for the biological objectives for resident fish in the program; adding the objectives for biological performance about the nature of the FCRPS mitigation responsibility.

Below we include the objectives as currently in the **2009** Program:

a. Objectives for Biological Performance

Anadromous Fish Losses

Mitigating for losses of anadromous fish caused by the development and operation of the hydrosystem is at the core of the Council's Program. The "Compilation of Salmon and Steelhead Losses in the Columbia River Basin" and the "Numerical Estimates of Hydropower related Losses" (included in the Appendix), are a starting place for understanding the magnitude of these losses. The biological objectives at the basinwide level describe the broad changes that need to occur in the environment and the resulting changes needed in biological performance to address these losses. The following objectives address anadromous fish losses:

- Halt declining trends in Columbia River Basin salmon and steelhead populations, especially those that originate above Bonneville Dam. Significantly improve the smolt-to-adult return rates (SARs) for Columbia River Basin salmon and steelhead, resulting in productivity well into the range of positive population replacement. Continue restoration of lamprey populations.
- Restore the widest possible set of healthy, naturally reproducing and sustaining populations of salmon and steelhead in each relevant ecological province.
- Significantly increase the total adult salmon and steelhead runs in the Columbia River 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.
- Restore lamprey passage and habitat in the mainstem and in tributaries that historically supported spawning lamprey populations. Attain self-sustaining and harvestable populations of lamprey throughout their historical range. Mitigate for lost lamprey production in areas where restoration of habitat or passage is not feasible.

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. The ability of the region to achieve these goals will depend on the coordinated actions of many parties to improve fish habitat and passage, improve hatchery operations, and limit harvest of potential spawners.

#### Substitution for Anadromous Fish Losses

Where some anadromous fish losses occur in blocked areas, mitigation for these losses must also occur in these blocked areas pursuant to the Program's resident fish substitution policy. The "Compilation of Salmon and Steelhead Losses in the Columbia River Basin" and the "Numerical Estimates of Hydropower-related Losses," first adopted in the Council's 1987 Fish and Wildlife Program (included in Appendix D), are the starting points for the Council's approach regarding substitution.

The following principles guide mitigation requirements for anadromous fish losses in all blocked areas resulting from development and operation of hydroelectric facilities:

- Investigate reintroduction of anadromous fish into blocked areas.
- Restore and increase the abundance of native resident fish species throughout their historic ranges when original habitat conditions exist or can be feasibly restored or improved.
- Develop and increase opportunities for consumptive and non-consumptive resident fisheries for native, introduced, wild, and hatchery-reared stocks that are compatible with the continued persistence of native resident fish species and their restoration to near their historic abundance.
- When full mitigation by improving the abundance of native fish species is not feasible, manage nonnative fish to maximize use of available existing and improved habitats, while complementing state and local regulations, in order to provide a subsistence and sport-fishing resource, without adversely affecting native fish populations.

#### Resident Fish Losses

The development and operation of the hydrosystem has resulted in losses of native resident fish and resident fish diversity for species such as bull trout, cutthroat trout, kokanee, white sturgeon and other species. The following objectives address resident fish losses:

- Complete the assessments of resident fish losses resulting from the development and operation of the hydrosystem, when and where there is agreement on the appropriate methodology and prioritization of an assessment. As these are available, the Council will consider adopting the loss assessments into the Program.
- Maintain and restore healthy ecosystems and watersheds that preserve functional links among ecosystem elements to ensure the continued persistence, health, and diversity of all species including game fish species, non-game fish species, and other organisms.
- Protect and expand habitat and ecosystem functions in order to increase the abundance, productivity, and life history diversity of resident fish at least to the extent that resident fish have been affected by the development and operation of the hydrosystem.

- Achieve within 100 years population characteristics of resident fish species that represent on average full mitigation for losses of resident fish.

#### Wildlife Losses

Development and operation of the hydrosystem resulted in wildlife losses through construction of dams and inundation of habitat, direct operational losses, and secondary losses. The Program includes measures and implements projects to acquire and protect habitat units as mitigation for construction and inundation losses. The Program maintains a commitment to mitigate for operational and secondary losses that have not been estimated or addressed. The following objectives address wildlife losses more specifically:

- Complete mitigation to address the assessed losses caused by construction of the hydrosystem facilities and the resulting inundation of land. Where appropriate prioritization exists and agreements exist on the methodology, complete wildlife loss assessments for losses caused by operation of the hydropower projects.
- Develop and implement habitat acquisition and enhancement projects to fully mitigate for identified losses.
- Coordinate habitat restoration and acquisition activities throughout the basin with fish mitigation and restoration efforts to promote terrestrial and aquatic area connectivity.
- Maintain the values and characteristics of existing, restored and created habitat.
- Monitor and evaluate habitat and species responses to mitigation actions.

#### b. Objectives for Environmental Characteristics

Basin-level environmental characteristics describe the kinds of environmental changes needed across the Columbia River Basin to achieve the basinwide biological performance objectives. The following objectives address environmental characteristics:

- Identify and protect habitat areas and ecological functions that are relatively productive for spawning, resting, rearing, and migrating salmon and steelhead in the mainstem. Restore and enhance habitat areas that connect to productive areas to support expansion of productive populations and to connect weaker and stronger populations so as to restore more natural population structures.
- Protect, enhance, restore, and connect freshwater habitat in the mainstem and tributaries for the life history stages of naturally spawning anadromous and resident salmonids.
- Protect and enhance ecological connectivity between aquatic areas, riparian zones, floodplains, and uplands. Enhance the connections between rivers and their floodplains, side channels, and riparian zones.
  - Manage mainstem riparian areas to protect aquatic conditions and form a transition to floodplain terrestrial areas and side channels.
  - Identify, protect, enhance, and restore the functions of alluvial river reaches. Where feasible, reconnect protected and enhanced tributary habitats to protected and enhanced habitats, especially in areas with productive populations.
- Allow for biological diversity to increase among and within populations and species to increase ecological resilience to environmental variability.
  - Expand the complexity and range of habitats to allow for greater life history and species diversity.

- Manage human activities to minimize artificial selection or the loss of life history traits.
- Where feasible, support patterns of water flow that more closely approximate natural hydrographic patterns in terms of quantity, quality, and fluctuation. Ensure that any changes in water management are premised upon and proportionate to scientifically demonstrated fish and wildlife benefits.
- Frame habitat restoration in the context of measured trends in water quantity and quality.
- Allow for seasonal fluctuations in flow. Reduce large and rapid short-term fluctuations.
- Decrease the disparity between water temperatures and the naturally occurring regimes of temperatures throughout the basin. To the extent possible, use stored water to manage water temperatures downstream from storage reservoirs where temperature benefits from releases can be shown to provide improved fish survival.
- Identify, protect, enhance, restore, and connect ecosystem functions in the Columbia River estuary and near-shore ocean discharge plume as affected by actions within the Columbia River mainstem. Evaluate flow regulation and changes to estuary-area habitat and biological diversity to better understand the relationship between estuary ecology and near-shore plume characteristics and the productivity, abundance, and diversity of salmon and steelhead populations.

**2010-2013** Staff has been working and discussing potential approaches with the Fish and Wildlife Committee, on how best to tackle the biological objectives task from the 2009 Program since 2010, given past efforts and the challenges of deriving sound numerical program biological objectives. Including:

- 2010, Council staff presents potential steps forward for refining program objectives based on staff brainstorming sessions
- 2011, Council staff presents a potential path involving selecting of objectives topics to reflect program strategies topics and allow program performance tracking that would be developed with the region into SMART objectives
- 2011, Council staff presents an alternative path focused on addressing 2001 ISAB recommendations to improve objectives
- 2012, Council staff recommends defer to program amendment process to refine objectives
- 2013, ISAB Recommend that the vision and biological objectives be reexamined for consistency with the scientific principles

**2013-2014** Program amendment call for recommendation letter included a suggestions for potential areas that stakeholders to provide specific feedback on the 2009 Program. This list of areas included the Program Objectives:

**Program/Province Biological Objectives.** Measuring progress is a critical element of the program's focus on performance and implementation. The basinwide qualitative objectives for population performance and environmental conditions serve well for planning purposes, but are not focused on individual species. The Council would like input on how to set goals that will align with our mission to protect, mitigate, and enhance both listed, as well as non-listed, species.