MEMORANDUM

TO: Fish and Wildlife Committee

FROM: Kris Homel, Leslie Bach, and Patty O’Toole


BACKGROUND:

Presenters: Kris Homel, Leslie Bach, and Patty O’Toole

Summary: Council staff will present a status update on assessing the performance of the Council’s Fish and Wildlife Program. The update will focus on describing the development of the various programs over time, and what is meant by “program performance.” This description is facilitated by using a common set of terms to categorize each program, which can be cross walked to the current 2014 program strategies and associated strategy performance indicators. We will discuss the approach to assessing performance and provide a preview of the kinds of information that are instrumental to upcoming assessment topics. The presentation will be structured as a workshop, with many breaks for discussion, feedback, and input from Committee members. Examples provided in the presentation are drawn from a companion report, in development.

Relevance: Beginning with the first program in 1982, every fish and wildlife program has included references to aspects of program performance. The 2009 and 2014 programs expanded on performance with an emphasis on understanding the outcomes from the investment in fish and wildlife mitigation. The focus on program performance was again reinforced in 2018 by specific direction from Council members to the staff. The 2020 program addendum addresses program performance through (1)
reorganizing and compiling the goals and objectives of the program, which serve as benchmarks for performance, and (2) developing strategy performance indicators.

Background: The Northwest Power and Conservation Council’s Fish and Wildlife Program represents a 40-year effort to mitigate for the effects of the hydropower system on fish and wildlife in the Columbia Basin. The scope and investment in this Program make it one of the largest fish and wildlife mitigation efforts in the world and a significant part of the tapestry of mitigation efforts in the Columbia Basin. The Program is developed by drawing on regional expertise on how best to mitigate for the construction and operation of the hydrosystem. Consequently, there is an expectation that complete implementation of prescribed actions through investment in mitigation will contribute to and achieve established objectives and goals.

It is important to note that implementation of the Fish and Wildlife program occurs against a changing backdrop. Even as substantial effort is applied to mitigate for the impacts of the hydrosystem, other human impacts and natural disturbances in the basin produce environmental degradation that can negatively affect ecosystem function or fish and wildlife populations. Accomplishments of the program must be understood and interpreted in the context of these changing environmental conditions.

To understand what kind of progress has been made, we begin by describing the history of the program (1980-2020) as a way to develop a common understanding that will facilitate a more detailed assessment of program performance. This summary represents part 1 of a five-part assessment. In part 1, we describe the background of the program, including the legal framework and co-occurring events that precipitated the formation of the Council and the Council’s Fish and Wildlife programs. Then we describe how programs were developed over time using a common set of terms to categorize the measures or strategies described in each program. The terms used to categorize programs can all be connected to 2014 strategies and strategy performance indicators (SPIs), such that datasets on outcomes can be linked to the work that was called for in each program over time.

An understanding of history and context are key to future assessments of performance because they set the boundaries on the kinds of work that have been called for, where that work occurred, and when the work was implemented. This translates into a more refined understanding of when outcomes from that work might be observable. In this presentation we will describe the planned approach to parts 2 – 5 of the assessment, which cover the following categories: hydrosystem; habitat; natural production and artificial propagation; and program adaptive management. In each of these parts, we will describe the types of actions and projects that have been implemented over time at the scale of the Columbia River Basin/Fish and Wildlife Program and at the geographic scale of ecological
provinces. We will draw on datasets assembled for the strategy performance indicators as well as other information to characterize relationships between what was called for, what was implemented, and what kinds of changes have occurred.
Assessing performance of the Council’s Fish and Wildlife Program- part 1: a 40-year retrospective of program development

Kris Homel, Leslie Bach, and Patty O’Toole
Take home points

1. Hydrosystem is not one system or one operation in place for a set time period
2. Program not just one document implemented for 40 years
3. Basin is diverse and constantly changing
4. Evaluating performance will require specifically addressing complexity
5. The approach described today sets the stage for our performance work going forward
Columbia Basin: geologically, geographically and hydrologically diverse

- Geological upheaval
  - Earthquakes, volcanoes, Ice Age, epic floods

- Geographically and hydrologically diverse
  - Unique habitats throughout basin

- Multiple species of salmon evolved - each associated with different habitat types

- Diversity of other resident and migratory fish and wildlife

- Collectively form rich ecosystem
Development of hydrosystem

Major Canadian storage projects not shown
Development of hydrosystem

[Graph showing the number of in-service years of hydrosystem-related dams, with two lines indicating 'All hydroelectric dams' and 'Dams with nameplate capacity ≥ 5 MW'. The graph spans from 1890 to 2010 on the x-axis.]
Hydrosystem effects on fish and wildlife

- **Individual effects:**
  - Construction (fragmentation, blocked areas)
  - Inundation (habitat loss)
  - Operation

- **System wide effects**

- **Losses:**
  - Salmon, Steelhead
  - Other anadromous fish
  - Resident fish
  - Wildlife

Figure source NPPC 1987
Multiple land use and resource use effects on fish and wildlife
Effects are not static - continued changes

Key point: program implemented against changing backdrop

Fire perimeters 1984 to 2020
Power Act definition of mitigation responsibility

1. Mitigation responsibility includes all hydroelectric facilities in the U.S. portion of the Columbia Basin regardless of ownership (federal, non-federal [e.g., PUDs or other local entities and regulated by FERC]), location, size, or minimum power generation \([4(h)(1)(A); \ 4(h)(2)(A)]\)

2. Second, mitigation is achieved through a combination of onsite actions and offsite mitigation \([4(h)(1)(A); \ 4(h)(6)(E); \ 4(h)(8)(A)]\)

3. The Fish and Wildlife Program must treat the “river and its tributaries as a system” \([4(h)(1)(A)]\)

4. BPA to use its fund and authorities to protect, mitigate, and enhance fish and wildlife in a manner consistent with the Council’s program \([4(h)(1)(A)]\)

5. BPA and federal action agencies must take into account Council’s program in decision making “to the fullest extent practicable” while treating fish and wildlife equitably with other authorized purposes of the dams \([4(h)(11)(A)]\)
Components of mitigation

Goal (e.g., 5 million salmon and steelhead)

In-kind, in-place (e.g., hydrosystem modifications)

Replacement (e.g., artificial propagation)

Offsite (e.g., tributary habitat restoration)

Key point: program is responsible for protection and mitigation for all species affected by hydrosystem, regardless of whether they are ESA-listed.
Fish and Wildlife Program: background

Described in 20 comprehensive or minor program amendments and addendums

Key points:
• program not static over time
• substantial advances and development of comprehensive strategies
Program development and implementation

**Key development roles:**

- Recommendations for measures and objectives provided to Council, especially from federal and state fish and wildlife agencies and Columbia Basin tribes
- Council organizes into principles and strategies that treat basin as a system
- Public review
- Council adoption

**Key implementation roles:**

- Requirements (of action agencies- BPA, COE, BOR, FERC)
- Projects (funded by BPA)
- Other actions (by Council)
Program funding

BPAs Reimbursable Program

- Reimbursable Operations and Maintenance Expenditures

BPAs Direct Program

- Columbia River Fish and Wildlife Program
  - Program includes: NMFS and USFWS Biological Opinions for Salmon, Steelhead, Kootenai River White Sturgeon, Bull Trout
  - CRSO and EIS costs
  - BPAs overhead costs 50% of NPCC budget

Army Corps of Engineers

- Columbia River Fish Mitigation Program (CRFM):
  - Capital construction and research projects for mainstem dam fish passage improvements

- Operations and maintenance:
  - Dam Facility O&M
  - Wildlife Mitigation
  - Hatcheries: Dworshak, John Day Mitigation, Willamette Mitigation

- Anadromous Fish Evaluation Program (AFEP)

Fish and Wildlife Service

- Lower Snake River Compensation Plan Hatcheries

Bureau of Reclamation

- Leavenworth Hatchery Complex

Council program also includes required actions (e.g., hydrosystem operations [COE and BOR] and relicensing considerations and protections [FERC]) and other work not funded by BPA
Questions on background?
Focus on performance

• Aspects of performance in every program

• In 2014/2020 Program increased focus toward understanding outcomes from 40 years of investment

• Forms the basis for current efforts on “program performance”
Performance: results (or progress) relative to expectations (or benchmarks)

1. Describe what has been called for in each program (inputs)
2. Summarize the work that has been done to implement programs (outputs)
3. Assess ecological changes resulting from/occurring in parallel with implementation (outcomes)
4. Do so in relation to established benchmarks (goals and objectives or other program priorities)

Key point:
- Assessment focused on ecological changes associated with F&W program
Performance assessment completed in parts

Part 1: Program history, context, and approach to summarizing efforts and accomplishments

Parts 2 – 5: Category assessment [inputs, outputs, and outcomes]

• Hydrosystem
• Habitat
• Natural production and artificial propagation
• Program adaptive management
Addressing complexity in performance assessment

Sources of complexity:

• Basin large and geographically and hydrologically complex
• Impacts (hydrosystem and land use) are different across the landscape and among species
  • Complete loss in blocked areas
• Landscape continues to change
• Program varied over time
• Implementation of program has varied geographically and over time
Program development over time in relation to regional events

• Describe by ~ decade

• Timeline of regional events

• Description of program using a common set of categories and themes to characterize programs in consistent way over time
  • Although not the same as 2014 strategies, they do crosswalk to the strategies

• Showing full detail for 1980s and examples from other decades.
  • Complete details in retrospective document (in prep)
<table>
<thead>
<tr>
<th>Hydrosystem</th>
<th>Natural production and artificial propagation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Flow/ storage reservoir operations</td>
<td>• Facility construction</td>
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<td>• Passage</td>
<td>• Artificial propagation</td>
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<td>• Water quality</td>
<td>• Harvest recommendations</td>
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<td>• RM&amp;E</td>
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<tr>
<th>Habitat</th>
<th>Program adaptive management</th>
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<tbody>
<tr>
<td>• Restoration</td>
<td>• Regional planning</td>
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<td>• Protection</td>
<td>• Data management</td>
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<tr>
<td>• Wildlife</td>
<td>• Science review</td>
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<tr>
<td>• RM&amp;E</td>
<td>• Regional coordination</td>
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<td>• Non-native and invasive species</td>
<td>• Public engagement</td>
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<tr>
<td>• Predator management</td>
<td>• RM&amp;E and reporting</td>
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<td>• O&amp;M for lands</td>
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1970 - 1989

1971 National Environmental Policy Act

1972 Clean Water Act
    Marine Mammal Protection Act

1973 Endangered Species Act

1976 U.S. v. Oregon
    Magnuson-Stevens Fishery Conservation and Management Act
    Lower Snake River Fish and Wildlife Compensation Plan
    Columbia River Salmon and Steelhead Summit

1978 Public utilities Regulatory Policies Act

Northwest Power Act
 Council formed
  1st program
 Fish and Wildlife Committee formed
 Amend 1982 program

1980 Mid-Columbia FERC settlement

1981

1982 Salmon and Steelhead Conservation and Enhancement Act

1984

1985 Pacific Salmon Treaty ratified

2nd program

1987

1988 Vernita Bar Agreement
 Snake River Coho Salmon considered extirpated, but never officially listed under ESA

1989 Amendment program
 Fish Spill MOA
 Formation of the Columbia Basin Fish and Wildlife Authority
## Program development- 1980s

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
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<tbody>
<tr>
<td>1982</td>
<td>1st Program</td>
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<tr>
<td>1984</td>
<td>Minor amendment</td>
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<td>1987</td>
<td>2nd Program</td>
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<tr>
<td>1988</td>
<td>Protected Area Rules</td>
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<tr>
<td>1989</td>
<td>Wildlife Rules</td>
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</table>
Hydrosystem examples

- Flow: Water budget, flows for resident and anadromous fish; drawdown limitations at Libby and Hungry Horse
- Passage: Interim transportation; work on bypass; interim spill until bypass complete
- Water quality: Use storage to maintain temperatures
- RM&E: Numerous studies related to passage, survival, monitoring, and more
Program development- 1980s

**Habitat examples**

- Restoration: specific projects in tributaries and blocked areas
- Protection: water conservation in Yakima Basin; screens; Protected Areas designated, and rules adopted in 1988
- Wildlife: establish criteria for mitigation and review first set of projects; 1989- Wildlife Rules; interim goal for wildlife mitigation (35% of lost HUs in next 10 years)
- Predator management: study methods to control native Northern Pikeminnow

![Northern Pikeminnow](Photo from pikeminnow.org)
Development of hydrosystem
Protected Areas
Program development- 1980s

*Natural production and artificial propagation examples*

• Artificial propagation: supplement naturally spawning stocks with hatchery stocks; production of resident species; resident fish substitution; production in upper portion of basin

• Facility construction: design and construction of new facilities for anadromous and resident species

• Harvest recommendations: harvest must be adequately controlled and consistent with program objectives; known-stock fishery demonstration programs

• RM&E: improve natural production through flows and restoration; artificial propagation methods for various species; supplementation techniques, disease issues
Program development- 1980s

Program adaptive management examples

• Regional planning: loss assessments; interim double-the-run goal established; calls for system and subbasin planning and 5-year action plan

• Data management: Establish Coordinated Information System; establish Fish Passage Center; other databases

• Science review: creation of Scientific Review Group

• RM&E and reporting: effects of oceanographic factors in plume on juvenile salmonids
Salmon and steelhead losses and goal

Estimates of the range of historical returns and losses from NPPC 1986

* Other estimates of historical returns range from ~6 million (ISAB 2015) to 35 million (BPA 1984)
Program development- 1980s

Other key topics and accomplishments

• Program's flow, reservoir and passage measures are to be considered hard constraint on hydrosystem operations and on power planning
• Emphasis on boosting weak stocks to prevent ESA-listing
• First programs set road map for next 40 years
• Broad regional collaboration (created a table that engaged all fish and wildlife managers)
• First programs also ambitious and pioneered new approaches and technology
• Tremendous regional investment of time and expertise into programs and associated analyses
Questions on 1980s?
1990 - 1999

3rd Program: part 1
3rd Program: part 2
3rd Program: part 3
3rd Program: part 4

Parts 2 and 3 = Strategy for Salmon

4th Program

Amend 1994 program

Power Act Amendment
Formation of ISRP/ project review

1991
ESAs listing: Snake River Sockeye Salmon Summit

1992
ESAs listings:
- Snake River Fall Chinook
- Snake River Spring/ Summer Chinook
- BiOp on ocean and river fisheries

1993
FCRPS BiOp (revised 1992 FCRPS BiOp)
ESAs listing: Oregon Chub

1994
Idaho v NMFS (invalidated FCRPS 'no jeopardy' decision)
ESAs listing: Kootenai River White Sturgeon
Northwest Forest Plan

1995
FCRPS BiOp (supersedes 1994 BiOp)
Columbia System Operations Review (NEPA)
National Academy of Sciences releases "Upstream: Salmon and society in the Pacific Northwest"

1996
ISG review of 1994 program "Return to the River"

1997
ESAs listings:
- Upper Columbia Steelhead
- Snake River Steelhead

1998
Supplemental FCRPS BiOp
ESAs listing: Lower Columbia Steelhead

1999
ESAs listings:
- Lower Columbia Chinook
- Lower Columbia Chum
- Mid-Columbia Steelhead
- Upper Columbia Spring Chinook
- Upper Willamette Steelhead
- Bull Trout
## Program development- 1990s

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<tr>
<td>1991-1993</td>
<td>3rd Program</td>
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<td>Part 1: Highest priority production and habitat actions</td>
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<td>Part 2: Mainstem survival and harvest</td>
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<td>Part 3: System integration</td>
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<td>Part 4: Resident fish and wildlife</td>
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<tr>
<td>1994</td>
<td>4th Program</td>
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Resident fish losses and goal

Libby Dam inundated 239.8 km

Hungry Horse Dam inundated 115.3 km and blocked access to 526.9 km

Losses included:
- Westslope Cutthroat Trout,
- Rainbow Trout,
- Bull Trout,
- Mountain Whitefish,
- Kokanee Salmon,
- Sturgeon

Goals:
- Libby: by 2028 protect or restore 175.4 km of Kootenai River and 64.4 km of tributaries, make accessible 96.6 km of previously blocked streams
- Hungry Horse: by 2024, restore and protect 721 km of habitat in Flathead River watershed equivalent to habitat blocked and inundated
Wildlife losses and goals

Construction and inundation losses
- 274,918 habitat units
- 173,117 acres

Operational losses
- 65,549 acres (partially assessed)
Questions on 1990s?