Northwest **Power** and **Conservation** Council

February 5, 2019

MEMORANDUM

TO: **Council Members**

FROM: **Leslie Bach and John Shurts**

SUBJECT: **Briefing on history of the Council's Fish and Wildlife Program regarding mainstem flow and spill**

BACKGROUND:

Presenters: John Shurts and Leslie Bach

Summary: John and Leslie will provide an overview of the history of mainstem strategies in the Fish and Wildlife Programs followed by a summary of the current Program Amendment recommendations on the mainstem strategy.

Relevance: Mainstem hydrosystem flow and passage operations are addressed as a sub-strategy of the Ecosystem Function strategy in the 2014 Program (see page 60). System operations have direct effects on fish passage and survival, and mitigation for those effects are a critical portion of the program. The Northwest Power Act specifically calls for the Council to include Program measures that provide for improved survival of anadromous fish at hydroelectric facilities located on the Columbia River system. The Council has invested significant efforts in identifying and supporting mainstem water management and passage improvements. Mainstem passage and survival projects are currently going through science review as part of the Mainstem/Program Support category review.

More Info: See attached outline on the history of the mainstem elements of the Program.

See attached summary of mainstem recommendations for the Program amendment.

851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348
www.nwcouncil.org

Steve Crow
Executive Director

503-222-5161
800-452-5161
Fax: 503-820-2370

Council's Fish and Wildlife Program
History of mainstem element of program

Northwest Power Act

4(h)(6) The Council shall include in the program measures which it determines, on the basis set forth in paragraph (5), will-- ***

(E) in the case of anadromous fish--

(i) provide for improved survival of such fish at hydroelectric facilities located on the Columbia River system; and

(ii) 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.

4(h)(2) The Council shall request, in writing ... recommendations for-- ***

(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....

- Legislative history (in region) – example of such an operational objective was fish passage at the a mainstem dam

Fish and Wildlife Program mainstem history: A tale in two acts

1. From **1982 up through 1994-95**, the main emphasis in the program, and the heavy focus of Council and staff time, was on mainstem hydrosystem improvements to benefit fish -- water management and passage.

- Developed all the basic categories:
  - Identification of FCRPS storage volumes to be used in spring and summer to the benefit of juvenile fish migration (water budget)
  - High priority on refill
  - Identification of additional amounts of water that may be available in the Upper Snake basin to augment migration flows
  - Eventually, spring and summer flow objectives
  - Use of reservoir storage (esp Dworshak) for temperature control in late summer for juvenile and adult migrants
  - Hanford reach fall chinook protections – Vernita Bar operation
  - Beginnings of upriver storage reservoir measures and objectives designed to benefit resident fish, especially at Hungry Horse and Libby (biological rules curves, integrated rule curves, Libby surgeon flows; VAR-Q); also Lake Pend Oreille lake-level experiments; also first incorporation (1995) of Grand Coulee retention time/reservoir level measures for resident fish
  - Run-of-the-river reservoir operations (MOP during migration timing)
  - Ramp rate limits at run-of-the-river projects
  - Improve turbine efficiencies – both operationally and through upgrades
  - Screens and extended-length screens
  - Bypass systems, including outfalls
  - Surface collectors as improvements for bypass system operations
  - Spill program
  - Operational changes and dam modifications to improve spill survival and efficiency and reduce gas (modifications include spillway deflectors (flip lips), stilling basins, surface collectors, spillways weirs)
  - Continued support for juvenile transportation program
  - Integration of “spread-the-risk” approach to juvenile passage approach; normative river approach too
  - “Fish passage efficiency” and associated passage objectives; lots of research, monitoring and evaluation
  - Predator control measures, esp pikeminnow and shad
  - Adult passage improvements – both operational and dam modifications
  - Parallel if less detailed provisions for non-federal FERC projects, especially mid-Columbia PUD dams
  - Creation of technical infrastructure to help annual planning, in season management, and annual review (Fish Passage Center, smolt monitoring program)
  - Implementation efforts/conflicts mostly at federal agencies, but development of staff and policy-level coordination efforts, especially (by mid 1990s) FOEC - Fish Operations Executive Committee

- First efforts to evaluate drawdown/dam removal concepts; Lower Granite drawdown test

- Mostly focused on salmon and steelhead (and esp spring chinook), true, but Council's program was also a place to lodge concerns and recommend measures to benefit resident fish, too – upriver/downriver tussle

- Culmination was 1994-95 programs amendments:
  - 1994 Program (anadromous fish): Section 5 (juvenile salmon migration) and Section 6 (adult salmon migration): 55 pages of detailed hydrosystem measures
  - 1995 Program (resident fish): Sections 10.3, 10.4, 10.6E, in particular – IRCs and other reservoir operations for resident fish/sturgeon. Also revisions to Section 5 (especially FOEC and Fish Passage Center provisions) to integrate resident fish operations

2. From **1995 or so on**, most of the refinement, planning and implementation of hydrosystem operations for the benefit of fish has migrated over to the ESA structure: Biological Opinion RPAs; ESA planning and implementation structure (TMT, SCT, RIOG)

- Swallowed up the foundation developed in Fish and Wildlife Program - essentially all the principles and categories for action now are the same categories as in 1994-95; what has changed are the amounts; where the "dials" are set

- Feds engage directly with states and tribes in these forums, not the regional Council

- For awhile, the Council staff itself still played a major role in the annual and in-season management (e.g., Jim Ruff was the co-chair of SCT for a long time)> This role has diminished over time, in part because the federal government began insisting on only "sovereign" representatives to have active voting roles in these forums, although the Council staff does continue to track and participate in these forums.

- Federal courts have obviously played a big role, too, through the ESA lens

- In the program, the Council has largely recognized these developments as still the baseline measures and objectives for the program, too – integrated set of actions to take to protect fish and improve survival

- Council has engaged mostly to make sure considerations important to non-ESA fish, resident and anadromous, are not lost.
  - Hanford Reach – continuing to insist that Vernita Bar protections for Columbia fall chinook as a priority
  - HH and Libby provisions in 2003 Mainstem amendments – critical part of the effort to integrate the operations developed by MFWP, Salish-Kootenai and Kootenai Tribe to operate HH and Libby to the benefit of sturgeon, bull trout, and other resident fish without undermining lower river benefits. In particular this meant including draft limits in terms of both steady declining outflows rather than active manipulation of releases *and* end-of-season reservoir levels.
  - Grand Coulee alternative operations? Other?

- No reason the Council and its program cannot be more of a forum and focus for future developments in mainstem operations – relevant participants have to decide to bring issues here and have to be able to integrate with ESA review

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

Staff summary of issues and recommendations
2014 Program: Mainstem hydrosystem flow and passage operations

2014 Program Section

Part Three: Basinwide Vision, Scientific Foundation, Goals, Objectives, and Strategies
IV. Strategies
A. Ecosystem Function
8. Mainstem hydrosystem flow and passage operations

Overview

The Council received several recommendations on evaluating mainstem passage to improve conditions for anadromous and resident fish species. Those evaluations ranged from addressing potential blockages from sediment deltas to dam removal.

Several recommendations focus on revamping spill operations and suggest a stronger Council role in helping the region develop future innovative spill operations. This includes evaluating potential changes to spill regimes for biological benefit and potential operational changes to minimize power generation impacts.

Some operations modifications were recommended for Libby and Hungry Horse Dams. The Council also received recommendations supporting Grand Coulee operations, for HCPs for the mid-Columbia projects, and passage at Albeni Falls.

I. Staff summary of issues and recommendations

A. General mainstem

ODFW and WDFW largely recommend retention of the current mainstem language, with the exception of spill (see spill summary). They suggest minor editorial changes to the rest of the mainstem section. They continue to support the principle that the Program is broader than the Endangered Species Act, and that measures should benefit all native species, not just listed salmon and steelhead.

UCSRB recommends that the Program “Identify survival bottlenecks in the federal hydrosystem (dams and reservoirs) from Priest Rapids tailrace to the Columbia River estuary, instead of between McNary forebay to Bonneville tailrace.

CRITFC, YNF and CTUIR recommend a technical work group, led by the Council, to identify and evaluate opportunities to address fish passage and survival impacts at tributary delta/sediment fans in the dam impoundments.

Numerous entities recommend investment to address the effects of hydrosystem operations on lamprey, including investment in mainstem passage improvements (see

lamprey excerpts) (ODFW, WDFW, CRITFC, YNF, CTGR, CTCR, CTUIR, CTWSRO, NPT).

USGS recommends:

- Review Decision Memorandum of the NWPCC Fish Tagging Forum:
- Consider less expensive deployments of JSATS or other active telemetry systems to measure compliance with BiOp performance standards.
- The FWP should seek from the appropriate agencies' assessments of the key components of a sediment budget for the lower Columbia River
- Support for studies that address hydrosystem impacts on sturgeon and lamprey. (see sturgeon and lamprey excerpts)

Chelan PUD recommends that the Council again recognize the HCPs and their role in protection and recovery of listed and unlisted salmon and steelhead while including recognition of the no-net impact achievements that have been realized. They recommend specific language for the new Program.

American Rivers recommends the Council consider all options and innovations for future spill operations in the basin. They encourage the Council to place priority on the completion of the assessment and mapping work of coldwater thermal refuges along the mainstem Columbia and tributaries and develop a robust plan to mitigate against gaps in these refuges.

Sierra Club et al. recommend that the 2019 Program include the following actions:

- Support a permanent modification of the Oregon and Washington water quality standards for total dissolved gas to eliminate any forebay total dissolved gas (TDG) standard and allow TDG levels of up to 125% in the tailrace of each dam on the lower Snake and lower Columbia Rivers.
- Review and describe the biological benefits to juvenile salmon survival from voluntary spring and summer spill.
- Review the biological benefits to salmon survival from breaching or removal of the four lower Snake River dams and detail a course of action to implement dam removal.
- Evaluate the biological benefits to fish and wildlife resources of other structural modifications of the lower Snake and lower Columbia River dams and reservoirs and detail a course of action to implement such measures.
- Identify and analyze actions to reduce state temperature water quality standard violations in the lower Snake and lower Columbia Rivers, including dam and reservoir modifications (*e.g.*, drawdown of John Day reservoir) and removal of the four lower Snake River dams.

Kintama recommends that the Program evaluate the feasibility of attaining the current 2-6% SAR target.

Michael Ogle recommends that the Council encourage Pacific Power to provide passage over Newport dam in Bend, Oregon.

B. Mainstem spill

ODFW, WDFW and NPT recommend that the Council support and facilitate regional collaboration to develop (future) innovative spill operations aimed to increase anadromous salmonid smolt to adult return rates to reach regional recovery goals in the 2-6% range. Key elements include:

- Establish a suite of survival performance metrics
- Advocate for more flexible state total dissolved gas standards
- Modify or design additional surface passage alternatives
- Monitor outcomes utilizing Comparative Survival Study life-cycle modeling
- Fund additional passive integrated transponder (PIT) tagging
- Use results to inform future operations

CRITFC, CTUIR and AR recommend that the Program support the regional alignment that has resulted from collaborative efforts on mainstem spill and encourage further innovations.

NOAA recommends that the Council support the development of monitoring and evaluation programs to assess the efficacy of higher spill levels and support a forum to discuss, review and evaluate alternative means of assessing predicted benefits, the number of years such evaluations would likely need to be implemented, and results from ongoing studies.

Sierra Club et al. recommends that the Council:

- Review and describe the biological benefits to juvenile salmon survival from voluntary spring spill of up to 125% TDG on a 24-hour basis at all eight lower Snake and lower Columbia River dams.
- Review and describe the biological benefits to juvenile salmon survival from voluntary spring spill of up to 125% TDG on one or more flexible bases that would take advantage of power pricing opportunities in the Northwest and elsewhere.
- Establish a level of voluntary spring spill that maximizes salmonid survival and protects fish and wildlife resources.

C. Libby and Hungry Horse Operations:

MFW&P and KTOI recommend:

- Adjusting the summer draft targets more gradually when inflow forecasts are close to the driest 20-percentile threshold to smooth transitions as inflow forecasts vary.
- Setting reservoir draft and refill targets using project-specific inflow forecasts, rather than water supply forecasts for the mainstem Columbia River at The Dalles.
- Adjusting the Storage Reservoir Diagrams that decrease reservoir drawdowns during dry water years.
- Improving operations at Libby Dam by meshing variable flow (VarQ) flood management with the White Sturgeon tiered-flow strategy. This can be accomplished by revising the mandatory discharge protocol for VarQ flood management, so that reservoir drawdown targets anticipate the volume that must be released for white sturgeon each year.
- Investigate opportunities to expand VarQ-like operations to other storage projects to accommodate water variability among subbasins, improve our ability to monitor changing trends in snowpack and better manage unforeseen rain storms and drought.
- Incorporate new knowledge from ongoing work to inform hydrosystem operations that promote ecosystem function.

D. Upstream Passage at Albeni Falls

The Kalispel Tribe recommends that the Action Agencies shall restore upstream fish passage at Albeni Falls Dam no later than the end of this amendment period (2024). The recommendations include the Action agencies submitting a schedule for upstream fish passage to the Council, and interim operational changes to protect native fish (bull trout). They also call for habitat enhancement actions to improve water temperature conditions.

E. Grand Coulee Dam Operations

STI recommends that the language in the 2014 Program Appendix I be maintained and implemented

II. Excerpts of the recommendations

View the document linked here for the excerpts of the recommendations referring to the 2014 Program: Mainstem hydrosystem flow and passage operations.