American Fisheries Society Oregon Chapter

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April 13, 2020

RE: Comments and Questions regarding Columbia River System Operations Draft Environmental Impact Statement

The Oregon Chapter of the American Fisheries Society (ORAFS) represents over 600 professional scientists and managers employed by the private sector, tribes, federal and state agencies, universities, and non-governmental organizations. Our mission is to improve the conservation and sustainability of Oregon fishery resources and their aquatic ecosystems for long-term public benefit. The new Environmental Impact Statement (EIS) for the operation of the Columbia River power system directly affects sustainable management of fishes in the Columbia River basin and does not include a comprehensive discussion of several points. We summarize our three major areas of concern below.

Opening statement. Recent archaeological research found "a remarkable stability in salmon use" by Native Americans over a period of 7,500 years in the Columbia basin (Campbell and Butler 2011)[1]. However, by 1870, Euro-Americans dominated the salmon fisheries and their management. In a relatively short 150 years, the Euro-American management of the Columbia River's two key resources--salmon and the water-- brought the salmon to the brink of extinction. There are many causes for this, but most are subsumed under one overarching problem, which is clearly shown in the following paragraph from a statement signed by the United States Secretary of the Interior on March 6, 1947:

> *It is, therefore, the conclusion of all concerned that the overall benefits to the Pacific Northwest from a thorough–going development of the Snake and Columbia are such that the present salmon run must be sacrificed. This means that the Department's efforts should be directed toward ameliorating the impact of this development upon the injured interests and not toward a vain attempt to hold still the hands of the clock (Gardner 1947)*[2].

This statement clearly showed a dismissive attitude toward salmon. The salmon were relegated to a much lower priority than economic development in the Columbia basin. The result was catastrophic. The Northwest Power and Conservation Council estimates that, at a minimum, the number of salmon entering the Columbia River prior to economic development was approximately 10 million fish (Northwest Power Planning Council 1986)[3]. The recent average has been around 2 million salmon. So, the lower priority for salmon has created an approximate annual deficit of 8 million fish.

Congress recognized that the higher priority given to economic development relative to salmon was a mistake and tried to correct the error by enacting the Pacific Northwest Electric Power Planning

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[1] Campbell, S. and V. Butler. 2010. Archaeological evidence for resilience of Pacific Northwest salmon populations and the socioecological system over the last ~7,500 years. *Ecology and Society* 15:1 17.

[2] Gardner. W. 1947. Columbia River dams or salmon. Memorandum to Secretary of Interior Krug, that said "…the present salmon run must be sacrificed." The memorandum was approved by the Secretary. Record Group 48, National Archives, Washington, DC.

[3] Northwest Power Planning Council. 1986. Council staff compilation of information on salmon and steelhead losses in the Columbia River Basin. Northwest Power Planning Council, Portland, OR (see Tables 2 and 9).

and Conservation Act of 1980 (Power Act). One of the goals of the Power Act was to attempt to "create parity between fish and electric power production in terms of river management" (McConnaha et al. 2006)[4]. Now, the region is about to adopt a new EIS for the operation of the Columbia River power system. Will the EIS achieve the parity Congress intended between power (economic development) and the great Pacific salmon runs of the Columbia River system? Major topics and questions (underlined) offered in this letter relate to: climate change effects and implications of dam removal; thermal effects of existing Columbia River hydroelectric infrastructure and; the importance of habitat connectivity.

1. Climate Change Effects and Implications. The Columbia River System Operations Draft Environmental Impact Statement (CRSODEIS) Multiple Objective 3 (MO3) evaluates the removal of the Snake River dams. While the CRSODEIS states this alternative "[s]howed the highest predicted potential smolt-to-adult returns (SARs) for Snake River salmon and steelhead among the alternatives", it is rejected based in part citing "[i]ncreases in juvenile salmon and steelhead survival, decreases in travel time, and reductions in powerhouse encounters in MO3 could be reduced or offset by the effects of climate change." The CRSODEIS states this is because "Breaching the lower Snake River dams would require replacement of lost power generation and flexible capacity. Lost power generation could be replaced by gas or renewable sources. Loss of navigation would result in an increase in truck and/or train transport."

The CRSODEIS contention that "[l]ost power generation could be replaced by gas or renewable sources. Loss of navigation would result in an increase in truck and/or train transport" relies heavily on the status quo. The analysis does not consider potential savings from conservation measures such as energy efficient buildings or increasing home solar units. The CRSODEIS assumes the extra trucks and train engines will use traditional diesel fuel rather than biodiesel. <u>For consistency in assessment, the Preferred Alternative as well as MO3 must respond to the evaluation criterion: "Minimize Greenhouse Gas Emissions from Power Production in the Northwest by Generating Carbon Free Power Through a Combination of Hydropower and Integration of Other Renewables". In the current CRSODEIS, the Preferred Alternative is not fully evaluated on this criterion.</u>

The ORAFS considers climate change to be a dire threat to native fishes of the Pacific Northwest. Climate change and its associated ocean acidification from increased levels of CO2 in the atmosphere are also serious threats to marine shellfish and finfish including migratory salmon, steelhead, smelt, lamprey and sturgeon that depend on the ocean for part of their lives. Climate change, ocean acidification, and alternative means of generating and conserving electricity to reduce greenhouse gas emissions are not as new to ORAFS as to many entities. The ORAFS has been addressing the climate change issue for over 30 years and in 1990 presented an Award of Merit to Sam Sadler of the Oregon Department of Energy for his leadership in compiling the "Oregon Task Force on Global Warming: Report to the Governor and Legislature. Part One: Possible Impacts on Oregon from Global Warming. Part Two: State Agency Recommendations and Proposed Actions. June 1990." This involvement has made ORAFS very familiar with alternative ways that have been implemented to generate and conserve electricity in the Pacific Northwest and with new alternatives being developed, such as wave energy buoys off the Oregon Coast.

[4] McConnaha, W., R. Wiliams, and J. Lichatowich. 2006. Introduction and Background of the Columbia River Salmon Problem. In R. Williams, editor, Return to the River: restoring Salmon to the Columbia River. Elsevier Academic Press. New York, NY.

The CRSODEIS contends there may be an increase in greenhouse gasses from the removal of the Snake River dams. However, much of the presumed increase is speculative. In contrast, benefits to Pacific salmon, steelhead, and Pacific lamprey, as well as other native fishes in the Columbia River basin will be direct, immediate, and undeniable. The CRSODEIS needs to respond to the question of how greenhouse gasses from removing the Snake River dams can be compared with improved fish passage, water quality, spawning habitat, as well as the "[m]ajor long-term beneficial effects to wetlands, floodplains, fish, wildlife, and vegetation in the Lower Snake River." (CRSODEIS).

2. Thermal Effects. Salmonid migrations are delayed by excessive temperatures, resulting in increased pre-spawn mortality of adults (Sherwood 2015)[5] as well as increased morbidity and decreased production of juveniles and smolts (Hughes & Davis 1996)[6]. As indicated in the decision of U.S. Ninth Circuit Court of Appeals in Columbia Riverkeeper vs. Wheeler (2019)[7], the Washington Department of Ecology had failed to issue temperature TMDLs (total maximum daily loads) for the Lower Snake River. USEPA (2020)[8] listed a 20 C 1-day maximum for the Lower Snake River. Oregon Department of Environmental Quality 7-day average maximum temperature criteria for salmonid spawning, rearing, and migrating salmon are 13 C, 18 C, and 18 C, respectively (DEQ 2008)[9]. These criteria indicate that the Lower Snake River (as well as most of the Columbia River in the USA) is in violation of existing Oregon DEQ temperature criteria throughout most of its length (USEPA 2018)[10]. Those excessive temperatures are largely driven by the dam/reservoir projects because the reservoirs' large surface areas and slower flows result in warmer water (USEPA 2018). Temperatures are further increased by warm tributary waters, irrigated agriculture return flows, and city and industrial point-source discharges. Continued climate change is expected to further warm the water and decrease the flows (USEPA 2018). How the breaching of the Lower Snake River dams would reduce the primary source of warming in that reach must be addressed in the CRSODEIS.

Thermal issues in the Columbia and Snake rivers are exacerbated by abnormally warm temperatures resulting from climate change. For example, in 2015, a combination of a heat wave, drought, and malfunction in temperature monitoring stations at Dworshak Dam lead to decreased flow releases in the Columbia River during peak upstream migration of Snake River Sockeye Salmon. As a result, Columbia River temperatures at some stations were reported in excess of 25 C (NOAA)[11] and NOAA estimates that only 8% of the returning Sockeye Salmon survived passage between Bonneville Dam and Lower Granite Dam, compared to a 5-year average survival rate of 64%. In addition, Nelson (2019)[12] estimates that migration rate slowed significantly as a result of elevated stream temperatures, with migrations taking an extra 10 days to complete. These low flow/high

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[5] Sherwood, C. 2015. Thousands of salmon die in hotter-than-usual Northwest rivers. Available at: https://www.reuters.com/article/us-usa-oregon-salmon/thousands-of-salmon-die-in-hotter-than-usual-northwest-rivers-idUSKCN0Q203P20150728

[6] Hughes, R.M., and G.E. Davis. 1986. Production of coexisting juvenile coho salmon and steelhead trout in heated model stream communities. Pages 322-337 in J. Cairns, Jr., ed., Community Toxicity Testing, ASTM STP 920. Philadelphia: American Society for Testing and Materials

[7] Columbia Riverkeeper v. Wheeler. 2019. United States Court of Appeals for the Ninth Circuit. Available at: https://www.columbiariverkeeper.org/sites/default/files/2019-12/TMDL.pdf

[8] USEPA-Region 10. 2020. Temperature water quality standards for the Columbia, Lower Columbia and Lower Snake Rivers. Available at: https://www.epa.gov/sites/production/files/2018-05/documents/columbia-snake-tmdl-applicable-wqs-february-2018.pdf

[9] DEQ (Oregon Department of Environmental Quality). 2008. Temperature water quality standard implementation. Available at: https://www.oregon.gov/deq/Filtered%20Library/IMDTemperature.pdf

[10] USEPA. 2018. Managing water temperatures in the Columbia and Lower Snake Rivers. Available at: https://www.epa.gov/sites/production/files/2018-04/documents/columbia-snake-tmdl-fact-sheet-april-2018.pdf

[11] NOAA reference: https://archive.fisheries.noaa.gov/wcr/publications/hydropower/fcrps/2015_adult_sockeye_salmon_passage_report.pdf

[12] Nelson, B. J. 2019. Increasing water temperatures from changing climate and their effects on the survival of adult sockeye salmon, (Oncorhynchus nerka) on Snake River in the Columbia Basin. Masters Thesis, Royal Roads University. 71pages. https://viurrspace.ca/bitstream/handle/10613/16025/Nelson_royalroads_1313O_10637.pdf?sequence=1&isAllowed=y

temperature events are predicted to be more common and extreme as the climate warms. Surviving these events requires a combination of (1) rapid migration not impeded by dams or reservoirs, and (2) cold-water refugia where fish can hold during migration.

3. Habitat Connectivity. The critical role of connected rivers for the long-term persistence of native migratory fishes has been alluded to earlier in this letter. Hydroelectric facilities affect fish passage as well as daily and seasonal patterns of river flow and temperature (Poff et al. 1997)[13]. Whereas the focus of mitigation at dams often focuses on passage, generally for highly mobile fishes, the impacts on the overall pattern of river flow can affect the timing of life stage progression of native fishes (Waples et al. 2009)[14]. Migratory fishes are adapted to predictable patterns of discharge and temperature that cue transition between life stages. Water storage and non-ecologically driven river discharge patterns associated with anthropogenic needs for hydropower and municipal/agricultural water at best complicate, and at worst negate life stage completion for native fishes.

Dam removal facilitates the return of natural flow regimes and seasonal patterns of available river flow that are critical for native fishes and floodplain ecosystems. Persistence of imperiled salmonids relies on access to habitat for juvenile, smolt and adult life stages. While passage improvement has reduced mortality through Columbia River dams, the alteration to the hydrograph and river habitats has not been effectively mediated through dam management actions. In fact, alterations in flow and temperature associated with hydroelectric dam construction has already dramatically altered the environment (Arismendi et al. 2012)[15]. How the Preferred Alternative and MO3 address the issue of altered flow regimes needs to be addressed in the CRSODEIS in order to evaluate the different alternatives with respect to fish life history completion.

In Conclusion. The Northwest Power and Conservation Council's Fish and Wildlife Plan, created in response to the Power Act, has spent 30 plus years and more than 17 billion dollars and has failed to reach its modest goal of just 5 million salmon returning to the Columbia River. The program is largely based on the status quo that employs hatcheries as a substitute for conservation (i.e., mitigation). The EIS must recognize the status quo has failed and that parity is now more important than ever. As the Independent Scientific Advisory Board stated "[i]f the region is serious in its desire to restore wild Pacific salmon the status quo is not an option." (Williams et al. 1999)[16].

Sincerely,

The Legislative Committee of the Oregon Chapter of the American Fisheries Society

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[13] Poff, N.L., J.D. Allen, M.B. Bain, J.R. Karr, et al. 1997. The Natural Flow Regime. BioScience 47: 769-784.

[14] Waples, R.S., T. Beechie, G.R. Pess. 2009. Evolutionary history, habitat disturbance regime,s and anthropogenic changes: what do these mean for resilience of Pacific Salmon populations? Ecology and Society 14: 3 (online) URL: http://www.ecologyandsociety.org/vol14/iss1/art3/

[15] Arismendi, I, S.L. Johnson, J.B. Dunham, R. Haggerty, D. Hockman-Wert. 2012. The paradox of cooling streams in a warming world: Regional climate trends do not parallel variable local trends in stream temperature in the Pacific continental United States. Geophysical Research Letters 39: L10401 (online). DOI: 10.1029/2012GL051448

[16] Williams, R., P. Bisson, D. Bottom, L. Calvin, C. Coutant, M. Erho, C. Frissell, J. Lichatowich, W. Liss, W. McConnaha, P. Mundy, J. Stanford, and R. Whitney. 1999. Scientific issues in the restoration of salmonid fishers in the Columbia River. *Fisheries*, 24:3 10-19.