

Via e-mail and regular mail

August 27, 2018

Governor Jay Inslee
Office of the Governor
P.O. Box 40002
Olympia, WA 98504

Ms. Stephanie Solien, Co-Chair
Mr. Thomas (Les) Purce, Co-Chair
Southern Resident Killer Whale Task Force
c/o Puget Sound Partnership
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Dear Governor Inslee, Co-Chairs Solien and Purce, and Members of the Southern Resident Orca Task Force:

We are writing as salmon scientists with decades of experience and considerable familiarity with the science concerning the protection and restoration of healthy, self-sustaining wild salmon populations in the Columbia and Snake River Basins. We are not marine mammal scientists but we understand that one of the issues before your Task Force is identifying and considering the most effective steps to increase the abundance of Chinook salmon in the ecosystems that support the remaining endangered Southern Resident Killer Whales or Orcas.

We also understand that, in that context, increasing the number of adult Chinook salmon from the Columbia and Snake Rivers is important to the short and long-term future of our remaining orcas. We believe we have the appropriate experience and scientific expertise to recommend two key measures to increase Chinook abundance from the Columbia/Snake system.

Recommendation for an Immediate Measure to Increase Columbia/Snake River Chinook Abundance

First, as many of us have written before, in the short-term, increasing the amount of water voluntarily spilled at the lower Snake and lower Columbia River dams will increase downstream juvenile survival and fitness, and consequently improve adult returns. More specifically, we believe the States of Washington and Oregon should modify their water quality standard waivers at these eight dams to allow total dissolved gas (TDG) levels up to 125% of saturation in the tailrace of each dam (without a forebay TDG limit). The evidence is compelling that the increase in spill that could occur with this level of dissolved gas will benefit salmon survival without any significant adverse impacts either to salmonids or other aquatic biota. Of course, spill at this level would need to be carefully implemented by the relevant fish and dam managers to avoid unintended adverse consequences.

Let us explain the scientific basis for this recommendation, much of which is also described in a letter many scientists sent to Northwest Policy Makers in 2017. A copy of that letter is attached for your reference. Briefly, development of the Federal Columbia River Power System (FCRPS) transformed a free-flowing river into a series of reservoirs and dams, dramatically impacting native salmon and steelhead. (ISG 1999; Williams 2006). The developed Columbia River ecosystem bears little resemblance to a natural river, and juvenile salmon and steelhead face obstacles of reduced water velocity, dangerously warm water in reservoirs, increased predation, migration delays, mortality, injury and stresses during dam passage. In many cases, additional stresses are introduced by handling and collection of juveniles for transportation. These factors directly and indirectly reduce survival rates during seaward migration and increase mortality in later life-cycle phases. (e.g., Budy et al. 2002, Scheuerell et al. 2009, Van Gaest et al. 2011).

The Northwest Power and Conservation Council, in its Fish and Wildlife Program (NPCC 2014) has established a goal of achieving consistent smolt-to-adult return rates (SARs) of 2% to 6% (2% to 4% for survival and above 4% for recovery) to rebuild listed Snake and Columbia River salmon and steelhead. In other words, 2 to 6 of every 100 juvenile salmon that outmigrate past the dams must return as adults. Since the late 1990s SARs have averaged less than 1% for Snake River wild spring/summer Chinook and only 1.6% for Snake River wild steelhead trout. (McCann et al. 2016). Collecting and transporting (barging) juvenile salmon and steelhead around dams has also failed to compensate for the impacts of the FCRPS (McCann et al. 2016), despite implementing this strategy for decades.

Peer-reviewed literature indicates that life-cycle survival of Snake River spring/summer Chinook salmon and steelhead trout is related to both freshwater juvenile passage conditions and ocean conditions (Schaller and Petrosky 2007, Petrosky and Schaller 2010, Haeseker et al. 2012, Schaller et al. 2014). Freshwater passage variables that positively influence survival include high water velocity (low water transit time) and higher spill, which helps smolts avoid dam powerhouses and bypass systems. With all eight existing federal dams in place, spill offers the best potential to improve life-cycle survival. Only removal of the Lower Snake River dams offers greater benefits for salmon. Fishery biologists widely accept that providing more natural habitat conditions (e.g., a “normative river,” ISG 1999; Williams 2006) is essential to restoring salmon and steelhead in the Snake and Columbia rivers. Factors in restoring more “normative” passage conditions would include reducing the time required for juveniles to reach saltwater, passing more juveniles over dam spillways, speeding passage through reservoirs, and reducing juvenile collection and transportation (barging). Spill significantly contributes to a “normative river” by reducing the amount of time it takes fish to pass each dam and by reducing the handling and other stresses from dam bypass systems and barging.

The scientific basis for increasing spill above levels allowed by current state water quality standards has been established in recent work by the interagency Comparative Survival Study (CSS) coordinated by the Fish Passage Center. The CSS (2017) took advantage of retrospective analyses of independent data sets which account for both salmon and

steelhead survival rates through freshwater passage conditions and ocean conditions (Petrosky and Schaller 2010, Haeseker et al. 2012, Schaller et al. 2014) and modeled likely responses to alternative future spill scenarios. Key findings include:

- Modeling the effects of increased spill levels (up to 125% TDG on a 24-hour basis) predicts the potential for significant improvement in juvenile fish travel times, in-river survival, ocean/marine survival, SARs and life-cycle survival of Snake River spring/summer Chinook and steelhead trout (CSS 2017).
- Increasing spill for fish passage up to safe limits of 125% TDG has a high probability of increasing SARs to above 2%, and even significantly higher for some runs (within the range of the regional goal of 2-6%). Increased spill is also predicted to lower the probability of extremely low SARs, thus reducing the extinction risk for ESA-listed Chinook populations (CSS 2017) and orcas.
- Historical migration monitoring data demonstrate that spill for fish passage up to the 125% TDG level does not result in adverse conditions for downstream migration of juvenile salmon and steelhead.

The CSS modeling supports immediate implementation of spill for juvenile passage through a large-scale adaptive management spill operation at the eight dams on the lower Snake and lower Columbia Rivers of up to 125% TDG, beginning as soon as possible. The monitoring structure to support this effort is already in place: current fish marking/tagging levels appear sufficient to monitor the effects of experimental spill management on Snake River spring/summer Chinook and steelhead trout (CSS 2017). Regardless of future decisions about dam management, including dam removal, increased spill offers immediate potential to provide substantial survival benefits for Snake and Columbia River Chinook salmon. Spill is, in short, a critical and immediately available measure to increase salmon abundance. We urge the task force to recommend spill to 125% TDG beginning in spring 2019 in its final recommendations to the Governor.

Recommendation for a Permanent Measure to Increase Columbia/Snake River Chinook Abundance

Our second recommendation to you is the most effective measure we know of to permanently increase the sustained abundance of Chinook salmon from the Snake and Columbia Rivers: removing the four federal dams on the lower Snake River and restoring the ecological health of that river corridor. The Snake River Basin now supports 70% of the habitat available for recovery of spring/summer Chinook and steelhead trout in the entire Columbia River watershed. Removing these dams will take some time and careful planning, but a decision to undertake this restoration must be made as soon as possible for dam removal to occur in a timeframe that will make a difference for orcas. The efficacy of dam removal is supported by both considerable scientific analysis and, at least anecdotally, by experience with the removal of large and small dams on other salmon streams.

As with spill, compelling currently available scientific information regarding the benefits of removing the four lower Snake River dams is described in the CSS 2017 analysis and report. This report summarizes historical smolt-to-adult return rates for wild spring/summer Chinook and steelhead trout (above 8 dams) which have averaged only 0.8% and 1.6%, respectively, since the mid-1990s. This is far below the Power Council's goal of 4% average SAR with a range of 2%-6%. For comparison purposes, SARs of wild spring Chinook from the John Day River (now above 3 dams) and Yakima River (above 4 dams) have averaged 4.0% and 2.4%, respectively, since 2000. SARs of wild steelhead trout from the Deschutes River (above 2 dams), John Day River (above 3 dams) and Yakima River (above 4 dams) have averaged 7.5%, 5.3% and 4.6%, respectively, since 2000. Life-cycle survival (from spawner to adult return to the Columbia River) of Snake River spring/summer Chinook has declined to only about 13% of the life-cycle survival prior to FCRPS completion. This decline was much more severe than for John Day spring Chinook (above 3 dams), which declined to 46% of life-cycle survival prior to FCRPS completion.

The CSS's integrated, empirical, life-cycle model for spring/summer Chinook salmon populations from the Snake basin, developed by Dr. Robert Lessard, builds upon and incorporates results from several empirical statistical models, integrating decades of data on tributary adult spawners, tributary smolts, in-river survival estimates, ocean survival estimates, smolt-to-adult return estimates, and harvest estimates in order to predict the relative survival and recovery benefits of different management actions in the tributaries and in the FCRPS. The modeled scenarios include increased voluntary spill as discussed above, and also examine lower Snake River dam removal combined with various levels of voluntary spill at lower Columbia River dams. The results of this modelling show:

- Up to four times as many salmon would return if the four lower Snake River dams were breached and spill at the four lower Columbia River dams was increased to 125% TDG. Figure 2.10 in the 2017 CSS Annual Report projects SARs for Snake River Spring/Summer Chinook under Lower Snake River dam removal and 125% TDG spill at the lower Columbia River dams could be as high as 6% or more (a 148% increase).
- Dam removal with lower levels of spill at the remaining projects would result in lower, but still significant, increases in salmon abundance while allowing increased flexibility for power generation at the remaining dams. For example, breaching the four Lower Snake River dams and holding spill at the much lower levels allowed by the 2014 BiOp could produce up to two and a half times as many salmon which, while lower than dam removal with spill at 125% TDG, would still be a very significant survival increase.
- In this modeling exercise, harvest rates increase according to the *U.S. v. Oregon* harvest management framework as return abundance increases. There also are a number of potential benefits from dam removal that this model does not incorporate, including reduced water temperatures in a free-flowing lower Snake River and decreased predation rates (as compared to reservoir predation) in a free-flowing river.

To be clear, the CSS 2017 Annual Report is not the only analysis to identify the benefits for salmon survival of removing the four lower Snake River dams. As long ago as 1996, many salmon scientists, including a number of those on this letter, produced a report, *Return to the River*, that recommended a goal of restoring more normative river conditions in the Snake and Columbia as the most effective way to ensure the survival and recovery of salmon and steelhead populations in these rivers and their tributaries. Among the recommendations in this report was that removal of the four lower Snake River dams would be the most significant step available to improve the circumstances of these species.

Similarly, NOAA Fisheries in its 2000 Biological Opinion for FCRPS operations recognized that removal of the four lower Snake River dams had the greatest potential to improve survival of Snake River salmon, including spring/summer and fall Chinook. As NOAA stated then: “breaching the four lower Snake River dams would provide more certainty of long-term survival and recovery than would other measures.” 2000 BiOp at 9-5. The U.S. Fish and Wildlife Service reached the same conclusion in a report to the U.S. Army Corps of Engineers in 2002, stating that: “the USFWS concludes that the benefits to fish and wildlife from the Dam Breaching alternative exceed the benefits provided by the other alternatives,” 2002 Corps EIS, App. M at M11-1 (“all available science (synthesized in Budy, 2001) appears to suggest that dam breaching has the greatest biological potential for recovering Snake River salmon and steelhead” *Id.*, App. M, at M10-1).

Nonetheless, at that time (and since) the federal agencies involved in operating these dams have chosen to take other approaches to restoring Columbia and Snake River salmon, approaches that consistently have been rejected by the courts as legally inadequate. We too believe these past efforts demonstrate that the focus on nursery habitat restoration and other measures short of dam removal cannot deliver sufficient survival benefits for salmon and steelhead, and that Lower Snake dam removal remains the most effective and available action to increase Snake River salmon abundance in the long-term. It is not a stand-alone action for salmon recovery, but it is the single largest step we can take to increase salmon abundance for orcas at critical times of the year. For that reason, we recommend that your Task Force include this measure in its recommendations to the Governor.

We hope you find these two recommendations useful in the important work you and the Task Force are doing to address threats facing Southern Resident Killer Whales. **If you have questions regarding these recommendations or require additional information, please feel free to contact David Montgomery 206-618-9220, or Dave Cannamela 208-890-1319.**

Sincerely,

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