April 10, 2020

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RE: Comments, Conclusions and Recommendations on the Columbia River System Operations Draft Environmental Impact Statement (CRSO-DEIS) distributed on February 28, 2020

These comments, conclusions and recommendations are submitted by the Great Old Broads for Wilderness, which is a national grassroots organization founded in 1989 on the 25th anniversary of the Wilderness Act. Our organization's mission is to engage and inspire activism to preserve and protect wilderness and wild lands. The Great Old Broads have chapters throughout the United States, including multiple chapters in Oregon, Idaho and Washington. In 2017, the Great Old Broads designated the recovery of Snake River Basin salmon and steelhead a National Priority. Our 8,000-member national organization and local Idaho, Oregon and Washington local chapters have invested considerable time in researching and learning the history and present plight of Snake Basin salmon and steelhead. Chapter groups have visited lower Snake River hydroelectric projects and learned from presentations and visits with multiple scientists

about the Snake Basin and its anadromous fish life cycles, habitats, historical-to-present-day numbers, and reasons for what are now widely acknowledged declines in their numbers. Our members include retired science professionals, including fish biologists with considerable knowledge of matters relating to Snake Basin anadromous fish. Our members have hosted and attended educational events focused on the salmon/steelhead issue at the confluence of the Clearwater and Snake rivers, also known as the Lower Granite Dam Reservoir, and participated in discussions and hearings throughout the Northwest about Snake Basin anadromous fish and also about Southern Resident orcas whose key prey is chinook salmon. Additionally, our members have visited with Northwest state and national policymakers to exchange information and urge meaningful action on behalf of Snake Basin salmon and steelhead.

Conclusion Regarding the CRSO-DEIS and its Preferred Alternative

Overall, the 2020 CRSO-DEIS is a flawed document for several reasons delineated herein. It supports continuation of a failed, incremental, status quo management approach that will not only not recover Snake Basin anadromous fish runs to the needed 4% SAR ratio, but actually includes measures that most likely will expedite the extinction of Snake Basin anadromous fish. In its attempt to "balance" resources/uses in favor of lower Snake nonessential hydropower production, limited freight transportation, and the resolvable issues related to use of one reservoir for irrigation, the Preferred Alternative, in effect, guarantees that Snake Basin anadromous fish will continue to decline in numbers to the point of extinction. The Preferred Alternative does not meet the mandate of the Court and is entirely inadequate to the task of recovering Snake River Basin salmon and steelhead. What these fish need is a free-flowing lower Snake River.

Recommendation Regarding the CRSO-DEIS Alternatives

For reasons carefully detailed herein, CRSO-DEIS Alternative 3 (MO3) combined with 125% Total Dissolved Gas (TDG) spill at the lower Columbia River dams provides the soundest, science-based, boldest actions to bring Snake Basin salmon and steelhead back to a 4% SARS level and to prevent their extinction. Breaching of the four lower Snake River dams must happen, and soon. Please read on.

Fish and Aquatic Resources

The Columbia-Snake River Watershed was once one of the top salmon producing ecosystems in the world. Nearly 50% of the Columbia River's legendary runs of wild salmon and steelhead historically came from the Snake River and its tributaries. In 2017 only 250 pairs of wild Middle Fork Salmon River Chinook returned to over 600 miles of Idaho habitat, some of the best in the lower 48 states. The 2019 returns of adult fish were near record lows for steelhead, sockeye and Chinook salmon. These important stocks are at immediate risk of extinction.

From the 1930s to the mid-1970s, the U.S. Army Corps of Engineers (USACE) built 14 dams throughout the Columbia Basin and its tributaries, along with several private entities that also built large dams. The primary purpose was hydroelectric power, with other purposes for transportation of goods such as wood products and grains, and water for irrigation on adjacent lands. Unfortunately, the dams and associated reservoirs created in the Columbia Basin and particularly the four Lower Snake River dams have led to a long downward spiral in anadromous salmon and steelhead, and many are near the brink of extinction[1]. With steadily declining runs, Snake River salmon and steelhead runs were listed as threatened or endangered under the Endangered Species Act (ESA) by the early 1990s[2]. For the past 30 years, numerous mechanistic fixes have been tried including fish hatcheries, barging, predator control, endless fish-passage "improvements", and many more. The CRSO-DEIS basically proposes more of the same mechanistic fixes. With a changing climate and warmer and drier future, the proposed CRSO-DEIS and selected "Preferred Alternative" will most likely lead to extinction of our region's iconic anadromous fish species.

1. The Snake River Dams Cumulatively Impact Anadromous Fish Populations

A. General Cumulative Impacts and Historic and Current Abundance of Anadromous Fish

The Columbia and Snake River Dams impact rivers, streams and aquatic habitats by altering natural flows, water quality and nutrients; trapping sediments, gravel, and woody material; and impeding and delaying fish passage and migrations. This was acknowledged in the CRSO-DEIS with the comment "In general, large dams have an influence on the riverine ecosystem downstream of the structure. Dams alter flow regime, temperature, oxygen dynamics, sediment dynamics, and channel geomorphology (shape and function)" (CRSO-DEIS, p. 3-232). In addition, the four lower Snake River dams inundated 140 miles of the lower Snake River, much of which was fall Chinook spawning habitat. Including the slackwater above Lower Granite Dam, fish are limited to the lower 247 miles of the Snake River up to Hells Canyon Dam, the lowest of three privately owned hydropower dams with no fish passage.

[1] Nemeth, D.K. and R.B. Kiefer. 1999. Snake River spring and summer Chinook salmon-The choice for recovery. Fisheries 24(10):16-23.

[2] Fish Passage Center. 2018. Fish passage center 2017 annual report. BPA Contract # 74404. BPA Project #1994-033-00. 1641 pp.

Dams also cause high temperatures in the pools behind dams, increase predation, inundate spawning and rearing habitat, and increase mortality from stress and disease. The Columbia and Snake Rivers were changed from free-flowing rivers to a series of dams, with slow moving reservoirs that delay downstream migrating juveniles. Pools behind the dams become too hot for migrating salmon and steelhead, and have abundant predators such as northern pikeminnow and smallmouth bass. Fish from the Snake River must traverse eight large dams both upstream and downstream during their migration. With the completion of the four lower Snake River dams in the mid-1970s, anadromous fish have declined precipitously and are near extinction. For example, during years of low flows or excessive water withdrawal, smolts on the upper Snake River can now take up to 39 days to reach the ocean, compared with less than three days in the pre-dam environment[3].

The Snake River, where anadromous species once measured in the hundreds of thousands or millions, is now home to remnant populations of four ESA-listed species of anadromous fish: spring/summer Chinook, fall Chinook, sockeye and steelhead. The following table summarizes how few fish are left of each of the four ESA-listed species of anadromous fish compared to historic abundance (Table 1)[4].

Table 1. Lower Snake River ESA-listed Salmonids Historic and Projected Current Abundances.

Species	Historic Abundance	2019 Wild Abundance	2019 Total Abundance (Wild & Hatchery)
Spring/summer Chinook	1,000,000	6,130	31,831
Fall Chinook	500,000	5,435	15,451
Sockeye	84,000	43	129
Steelhead	602,000	17,614	60,700

Other ocean-going fish include coho salmon and Pacific lamprey. Coho were extirpated from the Snake River in the mid-1980s with only a reintroduced population from a fish hatchery fish program remaining. Pacific lamprey also exist at extreme low abundance, with their status as critically imperiled, possibly extinct, and presumed extinct in different reaches of the Snake River and its main tributaries above the four lower Snake River dams, with trends in abundance severely declining[5]. Like salmon, Pacific lamprey are severely impacted by the lower Snake River

[3] McCully, P. 2001. Silenced rivers: The ecology and politics of large dams (2nd ed). London: Zed Books.
[4] Kramer Consulting et al. 2020. Lower Snake River dams stakeholder engagement report. Final Draft, March 6, 2020. Prepared by Kramer Consulting, Ross Strategic, White Bluffs Consulting. 178 pp.
[5] McIlraith, B., A. Jackson, G. James, C. Baker, R. Lampman, B. Rose. 2017. Synthesis of threats, critical uncertainties, and limiting factors in relation to past, present, and future priority restoration actions for Pacific Lamprey in the Columbia River Basin. Response to the Independent Scientific Advisory Board. Review of "Synopsis of Lamprey-Related Projects Funded through the Columbia River Basin Fish and Wildlife Program". ISAB 2012-3. Columbia River Inter-Tribal Fish Commission. 159 pp.

Dams. Adult passage at these dams ranged from 41%-65%[6]. Downstream migrating juveniles and larvae, too are very susceptible to entrainment and impingement by hydropower dams[7].

Returning wild fish estimates have been masked, especially recently, by the increasing number of returning hatchery produced fish. Hatchery fish were intended as a temporary mitigation measure for producing harvestable fish due to anticipated losses from the construction of the dams and reservoirs. The native wild runs remain at dangerously low levels, and continue to decline.

B. Fish Passage

Anadromous adult and juvenile fish passage over the eight dams to and from the Snake River are both problematic, with cumulative impacts on fish survival. The CRSO-DEIS acknowledges that adult fish experience cumulative mortality in their return to the Snake River: "The 10-year average (2008 to 2017) minimum survival estimate for hatchery and natural origin adult Snake River spring/summer-run Chinook salmon from Bonneville to McNary Dam is 89%, with a range of 83 - 100%, and from Bonneville to Lower Granite Dam is 84%, with range of 77 - 94% (NMFS 2019). These survival estimates account for total losses from the dams and reservoirs, as well as any losses in these reaches that result from flow effects, temperature, disease, or other natural causes (NMFS 2019)" (CRSO-DEIS p. 3-383-384). Another issue is that fish ladders are fragile systems prone to disruption; these disruptions will increase as the dam infrastructure continues to age[8]. Two of the four lower Snake River dams have only one fish ladder. If the ladder is not functional due to mechanical or other difficulties it significantly impacts or even prevents fish migration.

Downstream migrating juvenile losses are generally higher than upstream migrating adults. The following is a summary of impacts as juvenile fish pass through each dam: "Physical injury, including brain damage, resulting from impacts with spillway structures and turbines, as well as hydraulic forces associated with spill and sudden depth changes are some of the main hazards associated with hydropower-related passage. Studies of the effect of exposure to severe hydraulic events on juvenile salmon have found a variety of adverse effects caused by strike, shear, pressure gradients, and disorientation. Recent studies have found that fish exposed to high shear and turbulence are subject to direct injury and are more susceptible to bird and fish predation than migrating salmon that have non-turbulent passage. Some of these detrimental

[6]Stevens, P., I. Courter, C. C. Caudill, and C. Peery. 2016. Evaluation of adult Pacific Lamprey passage at lower Snake River dams. 2015 Final Report to U. S. Army Corps of Engineers, April 2016.

[7]McIlraith, B., A. Jackson, G. James, C. Baker, R. Lampman, B. Rose. 2017. Synthesis of threats, critical uncertainties, and limiting factors in relation to past, present, and future priority restoration actions for Pacific Lamprey in the Columbia River Basin. Response to the Independent Scientific Advisory Board. Review of "Synopsis of Lamprey-Related Projects Funded through the Columbia River Basin Fish and Wildlife Program". ISAB 2012-3. Columbia River Inter-Tribal Fish Commission. 159 pp.

[8] Kramer Consulting et al. 2020. Lower Snake River dams stakeholder engagement report. Final Draft, March 6, 2020. Prepared by Kramer Consulting, Ross Strategic, White Bluffs Consulting. 178 pp.

effects are realized as delayed mortality, mortality that occurs after fish pass Bonneville Dam as juveniles that would not occur if the federal hydro system did not exist"[9].

The USACE asserts that downstream migrating spring/summer Chinook smolts survived at a per-dam rate of approximately 95%. In fact, Figures ES-4 (CRSO Executive Summary p. 19) and Figure 3-113 (p. 3-302) both assert very high rates of passage of juveniles through each of the lower Snake River and Columbia mainstem dams. However, these figures specifically refer to "performance standard" testing at projects in 2010-2014. They also fail to account for losses in the dams' reservoirs. For example, "Widener et al. (2018) estimated that juvenile Snake River spring-run/summer Chinook salmon survival rates (wild and hatchery combined) from Lower Granite to Bonneville Dam averaged 53% (ranging from 44 - 64%) for the same time period. These survival rates incorporate multiple sources of mortality such as passage mortality, natural mortality, and predation (NMFS 2019)" (CRSO-DEIS, p. 3-383). Further losses are due to "delayed mortality" or "ocean latent mortality" which result from stress and harm that juvenile fish suffer as they pass through the eight dam and reservoir complexes. These losses further diminish juvenile fish survival in the estuary and after reaching the Pacific Ocean. Similar losses of cumulative survival through all eight dams, ranging from approximately 42% - 57%, are also noted for Snake River steelhead (CRSO-DEIS, p. 3-384). Delayed latent mortality further diminishes survival in the estuary and the ocean.

A better measure of survival to evaluate the entire life cycle of anadromous salmon and steelhead are "smolt to adult ratios" or "SARs." SARs are the gold standard for measuring survival since these ratios measure survival from the out-bound smolt stage to the returning adult stage. SARs encompasses most of the salmon life cycle. A SAR of 2% - 6% is needed to assure the survival of a fish species, but Snake River fish typically have SARs less than 2%, hence the continued downward spiral[10]. Anadromous fish that pass through fewer hydroelectric dams on the Columbia River system have higher SARS and higher levels of survival (Figures 1 and 2).

[9] Christianson, C., Grace, S., and J. Waddell. 2015. The case for breaching the four lower Snake River dams to recover wild Snake River salmon. https://www.orcanetwork.org/Main/PDF/Snake%20River%20Endangered%20Salmon%20White%20Paper%2011%204%2015.pdf. 15 pp.

[10] Fish Passage Center. 2018. Fish passage center 2017 annual report. BPA Contract # 74404. BPA Project #1994-033-00. 1641 pp.

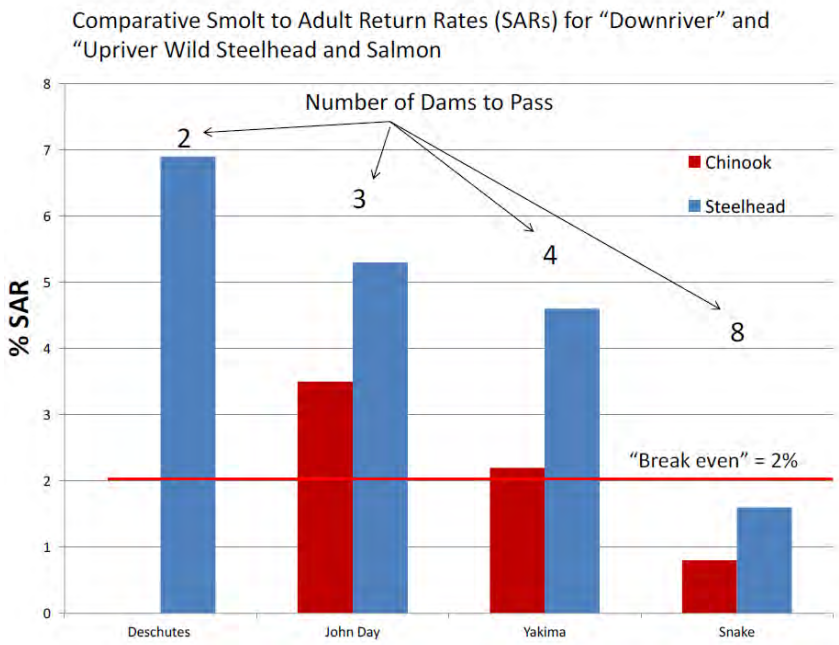

Figure 1. Comparison of Smolt to Adult Return Rates (SARs) for wild Chinook and Steelhead for the Deschutes, John Day, Yakima and Snake Rivers. Note more dams equates to lower survival and SARs[11].

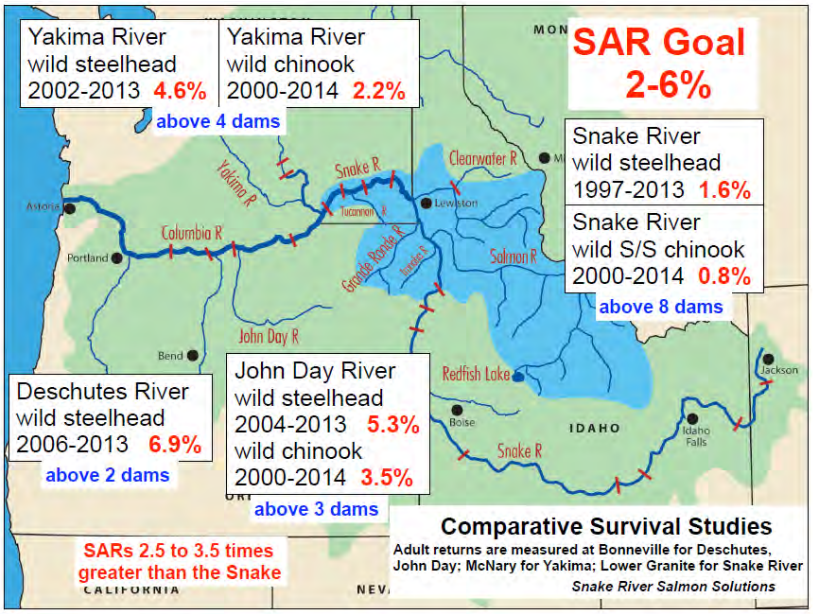

Figure 2. Comparative Survival Studies for Adult Returns of Anadromous Fish to the Deschutes, John, Day, Yakima and Lower Granite Dam on the Snake River[12].

[11] Save Our Wild Salmon. 2018. Comparison of smolt-to-adult ratios (SARs) upriver and downriver of lower Snake River dams (2018). https://www.wildsalmon.org/images/factsheets-and-reports/2018.Comparitive.SARS.Upriver.Downriver.pdf.

[12] Save Our Wild Salmon. 2017. Smolt-to-adult ratio (SAR) for the Columbia-Snake River Basin. https://www.wildsalmon.org/factsheets-and-reports/.

The listed species of salmonids that inhabit the Columbia/Snake River system are a very long way from meeting regional recovery goals that the Northwest Power and Conservation Council (NPCC) have stated. The NPCC asserted that "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 achieves smolt-to-adult return rates in the 2% – 6% range (minimum 2%; average 4%) for listed Snake River and upper Columbia salmon and steelhead."[13]

It is apparent from present salmon returns that 50% juvenile survival of Snake River salmon to below Bonneville Dam is insufficient to meet regional 2% - 6% SAR goals. Like Snake River coho, Chinook, sockeye and steelhead are doomed to extinction unless strong measures of a combination of dam breaching of the four lower Snake River dams, and the highest spill levels of 125% TDG at the remaining dams on the lower Columbia mainstem river, are implemented.

C. Water Quality

High water temperatures caused by Snake River and Columbia mainstem dams and reservoirs that have stagnant water flows, as well as discharges and climate change, are deadly to migrating fish like salmon. Anything above 68^0F/20^0C makes it extremely difficult for fish to migrate upstream to spawn. High temperatures affect adult salmon migration by direct mortality, migration delay, and may deplete energy through delay and increased respiration, reduced gamete viability, and increased rates of disease[14].

The Fish Passage Center analyzed how temperatures in the Bonneville forebay cause long travel times for upriver steelhead as water temperatures increase. They observed that both Snake River and Upper Columbia steelhead rarely had travel times of greater than 50 days until Bonneville temperatures reached 19–20^oC/66.2-68^0C[15].

In the hotter and drier than normal summer of 2015, approximately 96% of returning Snake River sockeye salmon run died prematurely in the Columbia and Lower Snake rivers (approximately 250,00 fish). The reservoirs, together with record high air temperature and low flows, caused the water to become excessively warm. Most Snake River sockeye failed to reach the Snake River in 2015 having died in the Columbia River. As noted above, Snake River sockeye are an ESA-listed endangered species. The year 2015 is a harbinger for future effects of climate

[13] National Power and Conservation Council (NPCC). 2014. Columbia River Basin fish and wildlife program. Nwcouncil.org/fw/program document 2014-12. October 2014. 334 pp.
[14] Cannemela, D. 2019. On behalf of 55 fisheries and natural resource scientists. Science-based solutions are needed to address increasingly lethal water temperatures in the lower Snake River. Letter to Northwest Policymakers – Governors and Members of Congress. October 22, 2019. 12 pp.
[15] Fish Passage Center. 2016. The effect of water temperature on steelhead upstream passage. https://www.fpc.org/documents/memos/56-16.pdf. G:\STAFF\DOCUMENT\2016_Documents\2016_Files\56-16.docx. October 31, 2016 memo. 17 pp.

change impacts to water temperature and flow conditions. Events similar to those in 2015 are likely to become more frequent as climate change intensifies.

Schultz and Johnson (2017) used a water temperature model to demonstrate that a free-flowing Lower Snake River would have remained cooler than 68°F/20^{0}C during most of the summer of 2015[16]. By comparison, water temperatures in reaches of the lower Snake River that are dammed, most particularly the three downstream reservoirs, reached 68°F/20^{0}C in mid to late June and remained near or above 68°F/20°C until September. The Snake River at Ice Harbor Dam reached 70°F/21°C by the beginning of July and stayed at least that warm until late August (Figure 3).

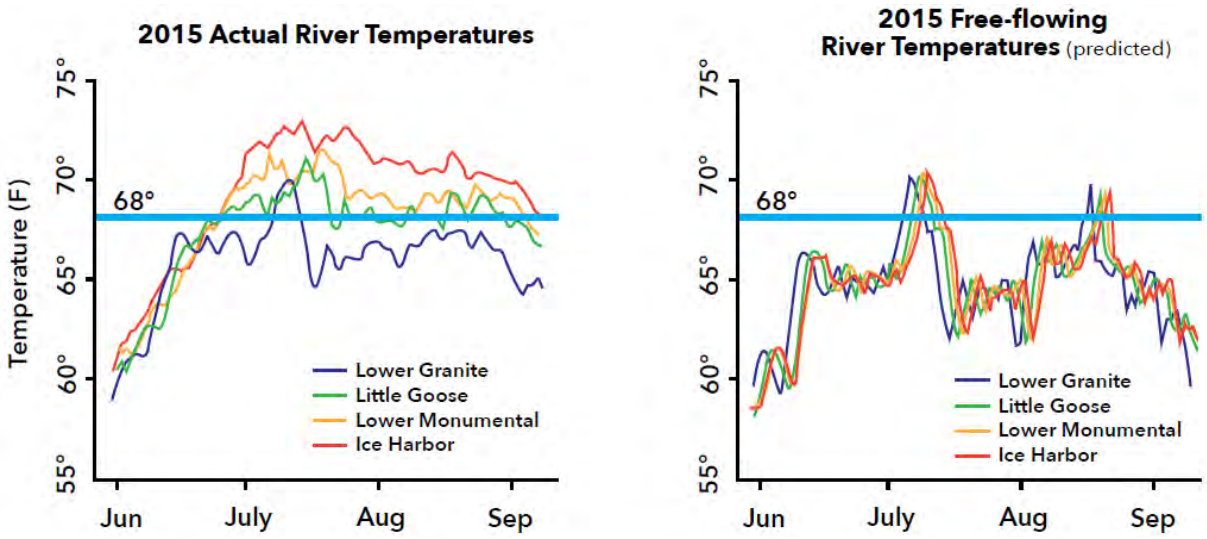

Figure 3. Comparison of 2015 summer water temperatures between the actual, dammed Lower Snake River (left) and a modeled, free-flowing Lower Snake River (right).

Figure 3 shows the cumulative effect on temperature as the water moves slowly downstream through the four Lower Snake reservoirs, with each reservoir increasing the river temperature by about 2°F/1.1°C. Rising temperatures were absent from a simulated free-flowing Snake River. Without the dams, water temperatures in the lower Snake River would warm a relatively minor amount as it flowed across eastern Washington.

The results by Schultz and Johnson (2017) validate the Environmental Protection Agency's (EPA) previous finding that each Lower Snake River reservoir can raise the water temperature by roughly 2-4°F/1.1-2.2°C[17]. Schultz and Johnson also demonstrated that "pulses" of hot water move past each dam over time, caused by hot weather or low flows upstream. The simulation showed that a pulse of hot water took approximately two weeks to pass through the dammed lower Snake River, while in the absence of the dams that same hot pulse would pass through

[16] Schultz and Johnson. 2017. Computer modeling shows that Lower Snake River dams caused dangerously hot water for salmon in 2015. Columbia Riverkeeper White Paper. 12 pp.
[17] U.S. Environmental Protection Agency (EPA). 2003. Columbia/Snake rivers preliminary draft temperature TMDL. July 2003. 79 pp.

the free-flowing river in a few days. The simulation model clearly established that despite the dangerously hot air temperatures and low flows that occurred in 2015, the Lower Snake would have remained sufficiently cool for salmon to migrate in the absence of the four lower Snake River dams. Essentially, a free-flowing lower Snake River could remain sustainable salmon habitat from a water temperature perspective, despite climate change. Their results demonstrated that a free-flowing lower Snake River would have temporarily exceeded 68^0F/20^0C on two occasions in 2015. The simulation modeling also indicated that a free-flowing lower Snake would have returned to temperatures that salmon can migrate in within a few days. The dammed lower Snake downstream of Lower Monumental Dam consistently exceeded 68^0F/20^0C from late June to early September, and caused sustained, cumulative exposure to water above 68^0F/20^0C that resulted in the adult salmon mortality observed in 2015.

Warm water harms salmon not just in the lower Snake River, but throughout the entire river system from the Snake River tributaries in central Idaho to the Columbia River estuary. Most of the 2015 Snake River sockeye run died from warm water before reaching the lower Snake River. Of the few that passed Lower Granite Dam in 2015, a very small number survived the rest of their migration to Idaho's headwater streams in the Sawtooth Valley. Problems with temperatures and low flows in the Columbia and Snake rivers will intensify as the effects of climate change increase. The only options to ensure survival and avoid extinction of Snake River anadromous fish is to have a free-flowing lower Snake River.

Excessively high water temperatures, above 20°C/68°F, are now normal for extended periods in July, August, and September[18]. EPA (2003) reported that a free-flowing lower Snake River would, on average, be 3.5°C/6.3°F cooler in late summer and early fall when measured at the site-potential for John Day Dam. EPA modeling also demonstrated that the combined four lower Snake Dams could affect temperatures up to a potential maximum of 6.8°C/12.2°F. Without breaching these dams, water temperatures will remain lethal for migrating salmon and will worsen as the climate continues to warm. The report by Cannemela (2019) representing 55 scientists concluded that "restoring the lower Snake River by removing its four federal dams will significantly reduce mainstem water temperatures on a long-term basis, and is likely the only action that can do so, substantially lowering the risk of extinction for salmon and steelhead here."[19]

[18] Cannemela, D. 2019. On behalf of 55 fisheries and natural resource scientists. Science-based solutions are needed to address increasingly lethal water temperatures in the lower Snake River. Letter to Northwest Policymakers – Governors and Members of Congress. October 22, 2019. 12 pp.

[19] Cannemela, D. 2019. On behalf of 55 fisheries and natural resource scientists. Science-based solutions are needed to address increasingly lethal water temperatures in the lower Snake River. Letter to Northwest Policymakers – Governors and Members of Congress. October 22, 2019. 12 pp.

2. The CRSO-DEIS Proposes Continuation of the Status Quo

A. The Preferred Alternative is Worse Than the Status Quo

From an operational standpoint, the Preferred Alternative is essentially the same as the 2020 Flex Spill Agreement[20]. The Flex Spill operation involves hourly changes in spill, where higher spill levels are provided for 16 hours and lower "performance spill" levels are provided for 8 hours. Both higher and lower spill levels are provided during daytime and night time hours. When considering the Comparative Survival Study (CSS) analyses of the Preferred Alternative done by the Fish Passage Center, and specifically estimates of powerhouse passage by juvenile fish, the estimates are likely an underestimate of fish passage through the powerhouse. The CSS analyses of CRSO-EIS alternatives are based on the 80-year water record datasets generated by the federal agencies. The datasets present the Preferred Alternative in terms of daily average flow and spill, although the Preferred Alternative is implemented on an hourly, not daily average time step. Therefore, the estimates of juvenile powerhouse passage generated on the basis of the federal dataset does not reflect the higher powerhouse encounters that occur from implementing lower performance standard spill during evening and night time hours.

The Fish Passage Center reported that the Preferred Alternative did not meet the regional 4% SAR goal, and the lower end of the predicted SAR ranges were well below 1% which indicate a high risk of further population decline. For all fish survival metrics, the Preferred Alternative resulted in only slightly better performance than the No Action Alternative and the MO1 Alternative, and had lower performance than both MO3 (dam breach) and MO4 (spill to 125% TDG).

The discussion of the Preferred Alternative and other operation alternatives does not include any specific numerical identification of benefit to ESA-listed salmon and steelhead (CRSO-DEIS Executive Summary, p.32). The goal is only generally described as "improving juvenile salmon and improving adult salmon." The Northwest Power and Conservation Council (NWPCC) established regional SAR goals of 4% (on average) for recovery of listed populations, but none of the DEIS's alternatives achieve that goal except for MO3 (dam removal).

B. The Preferred Alternative is completely inadequate, and fails to make significant improvements for Snake River salmon and steelhead populations

The Preferred Alternative is worse than adherence and continuation of the status quo because it only mandates flex spill for one year, the last year of the Flex Spill Agreement (CRSO-DEIS p. 7-15, Section 7.4 Summary). After the completion of the spill agreement there is only a "process".

[20] Fish Passage Center 2020a. Chapter 2 of the comparative survival study (CSS) annual report for 2019. \\albatross\currentdata\staff\document\2020_documents\2020_crso\crso-84a.docx. February 28, 2020 memo. 44 pp.

The Flex Spill Agreement was intended to avoid litigation during the time frame that the CRSO-DEIS was being developed. The Preferred Alternative is the current short-term flex spill agreement with modifications that benefit power production revenue and irrigation. There are no improvements for Snake River salmon and steelhead populations included in this alternative. The Preferred Alternative does not include operations for the long term, and only addresses operations for the last year of the Flex Spill Agreement (2021). For future years the Preferred Alternative makes references to an undefined adaptive management process that has no defined objective that could meet the regional 4% average SAR goal, increase spill for fish passage, increase flow for migration, or implement hydro system actions that would increase life cycle survival.

The Preferred Alternative includes measures that will continue to harm salmon and steelhead populations, such as additional irrigation water withdrawals from the Columbia River that total 1.254 million acre-feet. The Preferred Alternative is clearly just a continuation of the status quo. The Preferred Alternative claims to include a "balanced approach," but continuation of the current strategy is what has brought Snake River salmon and steelhead to their present perilous status. There are no assurances in this undefined adaptive management process that conditions for Columbia and Snake River salmon and steelhead populations would improve. The CRSO-DEIS proposes to continue with more mechanistic fixes for salmon and steelhead that have failed to work in the past, thereby most likely assuring the extinction of salmon and steelhead in the Snake River.

The Preferred Alternative proposes to continue to implement the Flex Spill Agreement, but includes measures that are not included in the Flex Spill Agreement such as the decrease of spring and summer flows that would clearly impact spring and summer migrants. In addition, the language of the Flex Spill Agreement clearly states the purpose of the agreement was to avoid litigation for three years while the CRSO-DEIS was being developed. The Flex Spill Agreement states that "no Party makes any concessions regarding the legal validity, scientific validity, or economic cost/benefit of the spill operations contemplated in this Agreement."

A review of the Flex Spill in 2019 demonstrated that downstream survival, juvenile fish powerhouse encounters, and water transit time of juvenile fish was no better and sometimes even worse than the status quo of the 2018 Biological Opinion (BiOP) spill flows. For example, Figures 4 and 5[21] demonstrate that the "new and improved" flex spill for 2019 (orange bars) would result in lower survival compared to the 2018 BiOP flows (blue bars).

[21] Fish Passage Center. 2019c. Review of 2019 flex spill operation. \\albatross\currentdata\staff\document\2019_documents\2019_files\27-19.docx. July 31, 2019 memo. 70 pp.

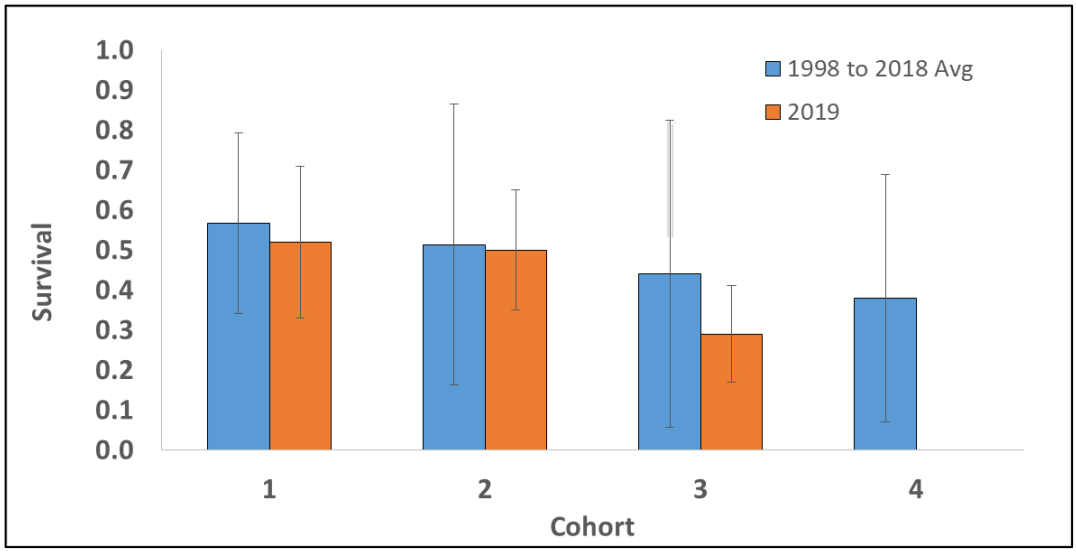

Figure 4. Comparison of 2019 juvenile survival from Lower Granite Dam to Bonneville for steelhead cohorts to the average survival for the same cohorts in the years 1998 to 2018.

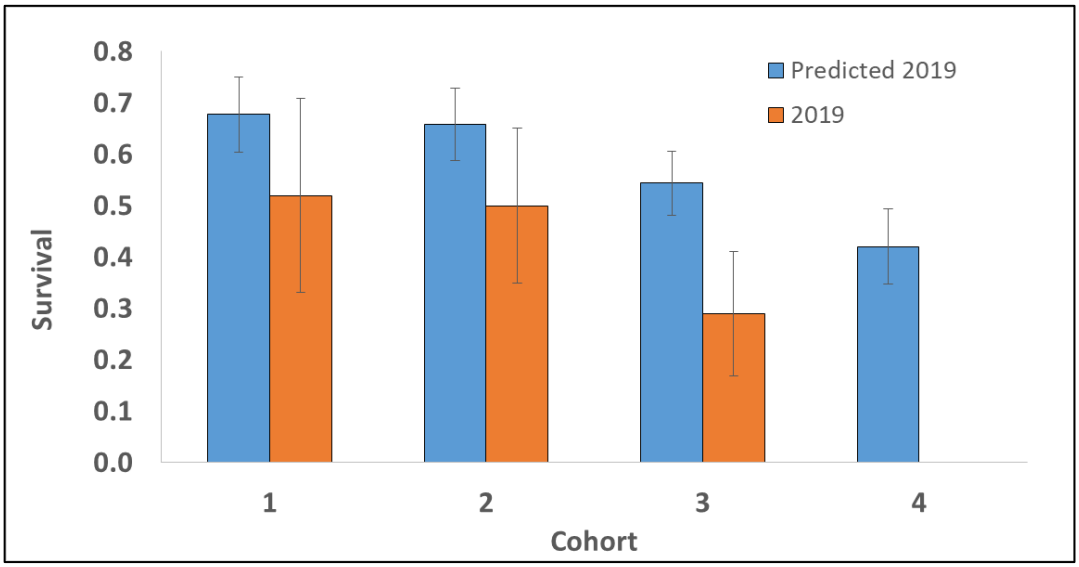

Figure 5. Estimated reach survivals of juvenile steelhead in 2019 versus model predicted survivals, based on powerhouse encounters and water transit time that each cohort experienced in 2019.

The 2019 Flex Spill was intended to improve juvenile survival of downstream migrating fish. The agreement states that fish passage must be better or at least no worse than what would have occurred under the 2018 court ordered injunctive spill order. In 2019 fish passage through powerhouses was worse than the injunctive spill order. More fish went through powerhouses than would have occurred under the injunctive spill order. Flex spill is a multi-year experiment intended to providing higher spill in 2020 and 2021, but results of this experiment will remain unknown until after the 2020 and 2021 spring spill efforts.

There are serious flaws and adverse components of the Flex Spill Agreement. Spill to the higher 125% gas cap level is only provided at four of the eight Columbia and Snake hydroelectric projects. At Bonneville, The Dalles, and John Day dams, spill is capped at 120% TDG, and these projects are allowed to reduce spill for 1/3 of the 24-hour cycle day which decreases fish protection at these projects. It is therefore unlikely that the Columbia/Snake hydropower system will meet the stated purpose of the agreement. Because spill is reduced at the lower river projects, Oregon and Washington stocks from the John Day, Deschutes and Yakima Rivers are likely to have increased powerhouse encounters and decreased survival. Given the obvious weaknesses of the Flex Spill Agreement, from the fish recovery prospective it does not provide a path forward to recovery.

The Fish Passage Center sent a memo to the federal action agencies on January 24, 2020, that clearly demonstrated that the Preferred Alternative is a high risk alternative for Snake River salmon and steelhead.[22] In the lower quartile data range, low SARs and continued population decline (1% SAR) are predicted to occur a significant portion of the time. This is even more likely to occur with changing climate change conditions.

The Preferred Alternative is inadequate because it makes no substantive changes to restore Snake River salmon and steelhead. There are only vague references to "adaptive management processes" which are a continuation of the failed history to restore Snake River anadromous fish. Frankly, Snake River Salmon and steelhead populations are out of time. The Proposed Alternative carries significant risk for ESA-listed salmon and steelhead (particularly in light of climate change), not only that they will not recover but that they will go extinct.

Scientific analyses in the CRSO-EIS leads to the conclusion that breach of the four lower Snake River Dams is the only option that has potential for recovery of Snake River salmon and steelhead. Based upon the data and analyses used to develop the CRSO-DEIS, the Great Old Broads for Wilderness recommend that the Final EIS establish the objective to balance hydropower generation with substantive and meaningful restoration of anadromous fish. This is clearly not the objective of the Preferred Alternative, which places greater emphasis on power production while anadromous fish survival is relegated to "tweaks" of the existing hydro system. Meaningful restoration of salmon and steelhead must include breaching the four lower Snake River dams (MO3 alternative), with plans and a schedule to accomplish that goal. In the meantime, until the dams are breached, the analyses of alternatives clearly demonstrate that spill to the 125% tailrace gas cap (MO4 alternative) at all of the projects, 24 hours per day, must be implemented as an interim measure. Analyses in the CRSO-DEIS show this is the best available option for salmon and steelhead recovery, while still providing sufficient regional energy.

[22] Fish Passage Center 2020b. Comparative survival study (CSS) analysis of CRSO -EIS Operation alternatives including the federal agencies preferred alternative. \\albatross\currentdata\staff\document\2020_documents\2020_crso\crso-78.doc. January 24, 2020 memo. 22 p.

C. The CRSO-DEIS Incorrectly Claims that it is a Collaborative, Adaptive Management Process and Continuation of the Flexible Spill Agreement

One of the more egregious statements in the CRSO-DEIS, and the clearest evidence of the primary failure of the CRSO-DEIS, is the claim of a collaborative, adaptive management process. The CRSO-DEIS stated that "the co-lead agencies are creating an additional opportunity to test the assumptions about the potential for significantly increased salmon survival embedded in the CSS model through the adaptive implementation of a flexible spill operation" (CRSO-DEIS Executive Summary p. 13). This is clearly a continuation of the status quo, a status quo that has been continued for over 30 years at the expense of salmon and steelhead populations of the Snake River Basin. Collaboration and adaptive management will fundamentally perpetuate the status quo at the expense of salmon and steelhead runs which are on the brink of extinction.

Snake River salmon and steelhead have been ESA-listed species for the past 30 years. Unfortunately, ESA listings have not resulted in the actions necessary to recover these iconic salmon populations. The path forward outlined in the CRSO-DEIS is a path that the Pacific Northwest has followed before. The long history of good intentions, collaboration, and broken promises was clearly documented in "Sacrificing the Salmon."[23] Blumm (2013) stated that "The promises to these salmon populations and the industries and people that depend on them, of the Northwest Power Act, The Endangered Species Act, the Clean Water Act to name just a few, have all been broken." Broken promises include a century of hatchery operations which aimed to compensate for habitat loss due to hydroelectric and other developments. These promises, as well as those made by the Northwest Power Act, the Pacific Salmon Treaty, the Endangered Species Act, the Clean Water Act, and the Federal Power Act have demonstrated that the co-lead agencies are unable to reverse the decline of Snake River Basin salmon and steelhead. Instead, collaborative processes and adaptive management have been offered in place of action. The CRSO-DEIS is repeating a failed history, and proposes promises that have already been broken. It is obvious that the Federal hydro system has been developed beyond the point of balance with salmon and steelhead, and that some of the development needs to be undone.

The objective of this CRSO-DEIS appears to be to continue to maintain the status quo hydro system development and configuration. The region has pursued the goal of maintaining the status quo hydro system operation over the past 40 years, investing in considerable effort and funding in fish hatcheries, habitat projects, killing predators, barging juvenile fish, building endless screen systems, bypass systems, forebay contraptions, and forebay nets, attempting everything and anything to "restore" salmon and steelhead. The history is well documented and the approach has not been successful and will not be successful in the future.

[23] Blumm, M. C. 2013. Sacrificing the salmon: A legal and policy history of the decline of Columbia Basin salmon. Vandeplas Publishing. Reprinted edition. 446 pp.

3. The Dam Breach Alternative (MO3) Combined with 125% TDG Spill (MO4) is the Best and Only Chance to Restore Anadromous Fish

In response to requests from the federal agencies, the CSS Oversight Committee applied CSS life cycle and cohort models to evaluate federal CRSO-DEIS operation alternatives (Fish Passage Center, 2020a). The six operational alternatives analyzed included the No Action Alternative, Multi-Objective Alternatives 1-4 (MO1, MO2, MO3, and MO4), and the Preferred Alternative. It did not include a SAR-focused alternative to restore Snake River salmon and steelhead. The Fish Passage Center used the 2017 CSS scenario of breach of the lower Snake River Dams, and spill to the 125% tailrace TDG levels in the Middle Columbia River, as a SAR focused "bookend." To provide this SAR focused "bookend" in the context of the CRSO-DEIS scenarios, the CSS added a seventh alternative (MO34) to these analyses using the 80-year water record. The non-federal MO34 alternative demonstrated the greatest expected improvements across all biological response metrics, compared to all of the other federal CRSO-DEIS alternatives, and exceeded the 4% average SAR regional goal (Fish Passage Center 2002a). Even the lower end of the predicted SAR range for MO34 was above 1% for both Snake River Chinook and steelhead, indicating that further population decline could be avoided.

Among the federal alternatives, MO3 (the four dam breach alternative with spill to the 120% tailrace TDG in the Middle Columbia River) resulted in the highest SARs and in-river survivals, followed by MO4 (the spill to the 125% tailrace TDG alternative). These two alternatives, among the federal alternatives, resulted in the highest likelihood of meeting the 4% average SAR regional goal. The lower end of the predicted SAR range for MO3 was also above 1% for both Chinook and steelhead. However, for MO4 the lower end of the predicted SAR was slightly below 1% indicating a greater risk of further population decline.

The other federal alternatives (No Action, MO1, MO2, and the Preferred Alternative) all failed to meet the regional 4% SAR goal, and the lower end of the predicted SAR ranges were well below 1%, indicating greater risk of further population declines under each of these alternatives. For all fish survival metrics, the Preferred Alternative resulted in only slightly better performance than the No Action and MO1 alternatives, and had lower performance than both MO3 and MO4 alternatives. The Fish Passage Center also noted that the "scenario of 125% TDG spill level at the Lower Columbia projects (McNary to Bonneville) and breach of the Lower Snake River projects was analyzed in the 2017 CSS Annual Report[24] and was found to have the highest benefits in terms of fish performance metrics. However, this promising scenario was not included in the CRSO-DEIS alternatives[25].

Several statements in the CRSO-DEIS acknowledge that improved conditions for salmon and steelhead survival could occur with removal of the four lower Snake River Dams. The CRSO-

[24] Fish Passage Center. 2018. Fish passage center 2017 annual report. BPA Contract # 74404. BPA Project #1994-033-00. 1641 pp.

[25] Fish Passage Center 2020b. Comparative survival study (CSS) analysis of CRSO -EIS Operation alternatives including the federal agencies preferred alternative. \\albatross\currentdata\staff\document\2020_documents\2020_crso\crso-78.doc. January 24, 2020 memo. 22 p.

DEIS states that for MO3 (dam removal) "On the lower Snake River, changes to flow amounts would be minor since the four lower Snake River Dams are run-of-river projects, not storage projects. However, without the reservoirs, the water particle travel time through the reach could be reduced by an order of magnitude" (CRSO-DEIS, Table 3-1, p. 3-5). The CRSO-DEIS further acknowledged that "effects to Snake River anadromous species are expected to be a major beneficial effect after short-term major adverse effects associated with dam removal stabilize. Minor beneficial effects for lamprey are expected" (CRSO-DEIS Table 3-1, p. 3-7). The CRSO-DEIS stated that "Over the long term, MO3 would have moderate to major beneficial effects on water quality in Region C through the restoration of natural, river, and water quality processes; a substantial cooling effect in the fall; greater nighttime cooling and respite from warm water temperature conditions in the summer; and a reduction in overall system TDG" (CRSO-DEIS, p. 3-275). Meanwhile under the CRSO-DEIS with the four dams in place, "The cooling effect in the lower Snake River diminishes at each successive downstream reservoir and the frequency of exceedances above the [temperature] standard increases" CRSO-DEIS, p. 3-238.

For over twenty years federal judges have determined that five consecutive biological opinions for the Columbia-Snake hydropower system are illegal and inadequate in terms of protecting steelhead and salmon. Taxpayers and electricity ratepayers have spent at least $17 billion dollars on fish recovery yet these species continue to decline. Breaching the lower Snake River Dams, as indicated by analyses completed by the Fish Passage Center, could lead to a fourfold increase in Snake River salmon and steelhead numbers, which would allow wild salmon the opportunity to recover to sustainable levels[26].

The Fish Passage Center 2017 Annual Report assessed the potential survival benefits to Snake River spring/summer Chinook as a result of increased spill and dam breach in the lower Snake River. The most significant benefits to in-river survival rates and SARs occurred at the highest TDG limit spill levels (125% TDG), and under dam breached conditions. The authors' results indicate that SARs in the 4 - 6% range occur under most dam breached and spill levels, where the variable juvenile encounters at powerhouses dropped 1.5% and the variable water transit time for fish declined to the 8 - 15 day range. The authors noted that the breached scenario SARs are comparable to the historical SARs of John Day Chinook, which experience five less powerhouses than Snake River Chinook with no dams breached. Historical John Day SARs have been in the 2 - 8% range. Spill and breach scenarios provide a relatively immediate means of increasing life cycle survival, both during in-river migration, and upon ocean entry. If the lower four Snake River Dams are breached and the remaining four lower Columbia River Dams operate at BiOP spill levels, there will be an approximately a 2 -3 fold increase in abundance above that predicted at BiOP spill levels in an impounded system, and up to a 4 fold increase if spill is increased to the 125% TDG limit.

[26] Lessard, R.B. 2017. Life cycle model evaluation of Snake River spring/summer chinook under alternative spill and breach scenarios. Columbia River Inter Tribal Fish Commission. Powerpoint on September 15, 2017. 19 pp.

Dams in the Columbia River hydro system have created slack-water reservoirs, and on the lower Snake River have inundated over 140 river miles of natural habitat. By 1997, all Snake River salmon and steelhead runs had been federally listed as threatened or endangered under the Endangered Species Act (ESA). In recent years, Chinook salmon and summer steelhead returning adults are so low that fisheries officials have mandated fishing closures in most areas of the Snake River basin and its tributaries. These fishing closures have caused terrible economic hardships to fishing-related rural communities, and businesses and angling recreationists.

Breaching the four federal dams on the lower Snake River is the single major step needed to avert extinction of the lower Snake River salmon, and to restore access of salmon and steelhead to 15 million acres of cooler, high-elevation watershed. This would substantially increase access to spawning habitat for lower Snake River Chinook and summer steelhead, as well as assist migrating juvenile fish downstream to the ocean. Major rivers such as the Clearwater and Salmon (and their tributaries) are historic spawning habitat, with watersheds in near-pristine conditions due to protected wilderness status. Chinook and steelhead swim as far as 900 miles to natal headwater streams, and climb some 7,000 vertical feet from the ocean to spawn in central Idaho. The clear cold waters will be increasingly important as the high elevation mountain snowpack in Idaho is more resistant to climate change, and the waters remain cold where other lower, more southerly rivers will likely become too warm and dry for salmonids.

Restoring a free-flowing Snake River will enable protection and restoration of threatened or endangered wild salmon and steelhead facing extinction. Contrary to the statements made in the CRSO-DEIS regarding financial costs of each alternative, American taxpayers and Northwest energy consumers will not be severely impacted by dam removal, and 15,000 acres of prime riverine habitat and agricultural land can be recovered and reinvigorated. Recovery of Chinook salmon and steelhead populations will restore fishing opportunities for anglers and other recreationists and restore rural communities.

The CRSO-DEIS claims that the document is “balanced”, “collaborative”, and “adaptive” are frankly untrue. The only substantive measures that restore salmon are the combination of breaching the four lower Snake River Dams, and running spill operations at the four mainstem Columbia dams at 125%. The CRSO-DEIS is once again putting power generation and ancillary benefits over restoration of fish. The document is not “balanced”, “collaborative”, or “adaptive” in any way.

The idea of dam breaching and removal is not new or radical. In the past 100 years, over 1,700 dams have been removed around the United States, sometimes to restore fish passage, sometimes to remove a safety risk, and sometimes to avoid reconstructing costly

infrastructure.[27] A record 90 dams were breached in 2019 alone. Decades of removing old, obsolete dams has restored native fish runs that have been lost or suppressed for centuries. Recent examples include dam removals on the Hood River, White Salmon River and Elwha River in the Pacific Northwest. In each case, there have been astonishing signs of native fish species returning in abundant numbers.

For example, after almost 100 years the Condit Dam on the White Salmon River in Washington was removed in the fall of 2011. Within two years, fish that had been extirpated from this river (Chinook, coho and steelhead), or at a very high risk of extinction (fall Chinook), had moved up above the dam and dramatically increased in abundance and distribution. Similarly, the Elwha and Glines Canyon Dams in Washington, built over 100 years ago, had 12 species of anadromous fish that immediately traveled above the dams upon removal, and increased in abundance and distribution. Dramatic increases in marine and wildlife species were also noted with the restoration of the Elwha River delta. The removal of the two dams on the Elwha River in 2012 and 2014 provided salmon access to an additional 71 miles of upstream habitat. Research showed that the fish migrated farther into the river and its tributaries following removal, with 58 Chinook nests identified above the dam removal sites in 2016, two years after dam removal.

4. Without Restoration of ESA- Listed Species the Co-Lead Agencies Increase the Risk of Extinction

The ESA requires the federal government to recover these salmon species[28]. For the Snake River in particular, both old and new research shows that dams are a major cause of decline of the salmon runs. Both fall and spring-run Chinook (which had collapsed to near extinction) were listed as threatened in 1992. Snake River steelhead were listed as threatened in 1997.

Wild salmon are a part of nature's trust which governmental agencies have a special management obligation to protect under the long-standing public trust doctrine. Federal and State agencies have an obligation to maintain the wild salmon legacy in good health for citizen beneficiaries of present and future generations. The extensive listing of Pacific salmon stocks under the ESA is a strong signal that the current salmon management paradigm has failed. The USACE is required to review federal dam operations when advisable, and to improve the quality of the environment for the overall public interest (33 U.S.C. § 549a). The Preferred Alternative does not meet the legal test because it fails to restore the viability of salmon and steelhead to the regional recovery goals.

[27] American Rivers. 2019. Twenty years of dam removal successes – and what's up next. https://www.americanrivers.org/2019/06/twenty-years-of-dam-removal-successes-and-whats-up-next/. Retrieved March 25, 2020.

[28] Lichatowich, J., R. Williams, B. Bakke, J Myron, D. Bella, B. McMillan, J. Stanford and D. Montgomery. 2017. Wild Pacific salmon: A threatened legacy. Booklet funded by Fly Fishers International and Wild Fish Conservancy, Bemis Printing, St. Helens, OR. 46 pp.

Fishery managers avoid responsibility for their failure in leadership and stewardship with the excuse that degradation and loss of productivity is the inevitable result of population growth and its attendant demands for development and economic growth. An obvious example are Snake River coho where only one fish was counted in 1985 and 1986 crossing Lower Granite Dam in the Snake River. In 1987 none returned. Federal actions designed to recover listed salmon and steelhead populations have been mired in trying to "balance" the Columbia hydro system. Meanwhile, no salmon or steelhead populations have recovered enough to warrant delisting, and instead are headed toward extinction like the coho salmon.

The Snake River Basin is the major upstream salmon-producing tributary in the Columbia River Basin. The importance of Snake River salmonid production cannot be overstated with respect to life history types and diversity. Declines of Snake River salmon occurred over decades, but population decreases accelerated starting in the 1960s and 1970s with construction of the four lower Snake River Dams. Estimated annual returns of spring/summer Chinook declined from 125,000 fish in 1950-1960 to just 12,000 fish by 1979. By 1994, Chinook run size was estimated at less than 2,000 adults. Snake River fall Chinook numbers fell to 78 fish in 1990, and Snake River sockeye salmon to less than ten adults per year, with only a single fish returning in 1992.

Status reviews of the Columbia River listed salmonids were conducted recently by NOAA Fisheries and released in 2016. The reviews supported continued listing for all Columbia River ESUs. After 26 years from the first listing in the Columbia River, all 13 ESUs remain under ESA protection. The status reviews found that the same suite of causes that led to the decline and listing of the populations continues to impede their recovery. The continuing failure of the federal planning and recovery effort for Pacific Northwest salmon is a result of the chasm that exists between a hydro system trying to maximize power and profit over the salmon and steelhead ecological and life history needs.

We are in an urgent situation. We need to stop looking for short-term fixes and instead invest in improved ecosystem function. Removing the lower Snake River Dams would open up access to the best and most climate-resilient salmon spawning habitat remaining in the continental United State.

5. Modeling of Fish Populations is Incorrectly Described and Fails to State the Most Important Point

A. <u>The Comparative Survival Study Models are Incorrectly Described</u>

The description of Comparative Survival Study (CSS) models in the CRSO-DEIS Executive Summary (p. 12) is inconsistent with descriptions of the CSS models developed by CSS scientists[29]. These descriptions are available to the public. Also, the statement that CSS models make specific assumptions about delayed mortality is false.

[29] Fish Passage Center. 2019a. Comparative survival study (CSS) analysis of CRSO -EIS Operation Alternatives including the federal agencies preferred alternative.

A section of the Executive Summary briefly describes the NOAA COMPASS and LCM modelling and CSS modeling (CRSO-DEIS Executive Summary, p. 12-13). The description clearly highlights the fact that these are two very different modeling approaches. However, the Federal agencies have failed to point out a very important consideration in their discussion which is significant and should be emphasized in the Executive Summary. The CSS models which generate results in Smolt to Adult return rate, and the NOAA model which generates results in terms of arrival time to the estuary/ocean, both converge on the dam breach alternative. Whether in terms of smolt to adult return rate or arrival timing at the estuary, both modeling approaches converge on the dam breach alternative as the best option to affect both arrival time to the estuary and smolt to adult return rate.

The document states the following: "CSS models treat the entire CRS as an aggregate of two routes of passage (number of powerhouses passed vs spilled on average). CSS models make statistical estimations of the effect of the freshwater CRS on latent ocean mortality" (CRSO-DEIS, p. 3-359). The CSS cohort models generate five metrics including SARs, juvenile fish travel time, juvenile fish survival, ocean survival and in water transit time river ratio (Fish Passage Center 2020b). The CSS analyses indicate that the hydro system affects juvenile survival because spill and flow affect ocean survival, juvenile fish travel time, and juvenile fresh water survival. The CSS modeling does not make estimates of latent delayed mortality and the authors corrected observations on latent mortality in a memo[30].

B. The Comparison of the COMPASS and CSS Models Excludes the Most Important Point From Model Results.

The discussion in the CROS-DEIS that compares COMPASS and CSS models excludes the most important point from model results (CRSO-DEIS, p. 3-362). The extensive discussion of comparison of NOAA COMPASS model results and CSS (collaborative agencies and tribes) model results is completely excluded from the discussion of model approaches. Although the CSS models are statistical empirical models based upon historic data, and the COMPASS model has a mechanistic structure, both models converge on one conclusion. The COMPASS model results attribute timing of juvenile fish to the estuary as a primary metric. The CSS model results include several metrics including SAR rates. However, both of these models agree that the most benefit (COMPASS arrival time to estuary and CSS Smolt to adult return rate) would result from breach of the four lower Snake River hydroelectric projects as discussed in MO3. This is the most important point in all of the discussion of model results and model structures, yet the federal action agencies have excluded this from discussion.

\\albatross\currentdata\staff\document\2020_documents\2020_crso\crso-78.doc. January 24, 2020 memo. 22 pp.

[30] Fish Passage Center. 2019b. Response to questions on latent mortality for lower Snake River dams engagement report. https://www.fpc.org/documents/memos/51-19.pdf. December 16, 2019 memo. 8 pp.

6. Alternatives are Confounded, Cryptic and the Range of Alternative is Inadequate

A. The Development of Alternatives are Confounded and Difficult to Compare

The "Development of Alternatives" is confounded and difficult to compare (CRSO-DEIS Executive Summary, p. 15). The co-lead agencies chose to develop alternatives that each had a different combination of proposed measures. Therefore the comparison of alternatives with each other is not possible. As an example, the Preferred Alternative is discussed as a continuation of the present Flex Spill Agreement, but it includes measures that are not part of the Flex Spill agreement such as draft of reservoirs below flood control elevations in the winter months, and additional irrigation water withdrawals from the Columbia River that total 1.254 million acre-feet.

There is no common foundation to compare alternatives. The co-lead agencies chose "Multiple Objective Alternatives" (CRSO-DEIS, p. 2-2). These multiple objective alternatives include a myriad of actions, some designed to be beneficial to power production and irrigation to the detriment of objectives to recovery salmon and steelhead. Because each of these alternatives is a combination of many actions, there is no common foundation upon which to compare alternative actions to each other or to recover listed salmon and steelhead.

B. The Stated Anadromous Fish Goals are Cryptic

The stated goals for salmon and steelhead are broad meaningless statements about improvement, and do not reflect the regionally established goal of a 4% average Smolt to Adult Return rate with a range of 2% - 6%. For example, Objective 1 is to "Improve ESA-listed anadromous salmonid juvenile fish rearing, passage, and survival within the CRSO project area through actions including but not limited to project configuration, flow management, spill operations, and water quality management" (CRSO-DEIS, p. 2-3). The regionally established SAR goals are clear, easy to understand and based on decades of scientific data and analyses. Cryptic, vague goals such as "improvement" will simply continue the status quo.

The alternatives are a mixture of varying measures making meaningful comparison of alternatives difficult (CRSO-DEIS p. 2-3 to 2-4). The Preferred Alternative illustrates the problem of multiple and varying measures within alternatives. Although couched in terms of the present limited flex spill agreement, the Preferred Alternative includes actions that represent a decrease in protection for listed stocks from previous biological opinions. As a result, the Preferred Alternative does not actually represent the current flex spill agreement. Individual adverse actions to salmon and steelhead are included in some alternatives but not all alternatives, such as shifting flow from spring to winter by allowing additional reservoir draft below flood control elevations in winter at Grand Coulee, Libby and Dworshak reservoirs. The Preferred Alternative includes new additional irrigation withdrawals totaling 1.254 million acre-feet in the upper Columbia which would reduce summer flows for migrating fall Chinook during the summer. It is important to note that NOAA BiOP summer flow targets are almost never

met, so this proposal in the Preferred Alternative would adversely impact critical summer flows for fall Chinook.

These examples of the Preferred Alternative illustrate that a more reasonable approach is needed, one that would compare all alternative actions based on the likelihood of recovering ESA-listed salmon and steelhead against the present hydro system operation. Providing a common foundation for comparison of proposed actions to recover listed salmon and steelhead is critical. Once a proposal to recover salmon and steelhead is identified, increasing the efficiency of dam operation for power and irrigation, power replacement, alternative port developments can be considered. The NEPA process is not invoked here to save the power system generation profits.

B. The Range of Alternatives is Inadequate

The scope of alternatives considered by the action agencies is inadequate (CRSO-DEIs, p. 2-5). Although the federal agencies selected a power production focused alternative in the range of alternatives (MO2), the federal agencies did not consider a salmon and steelhead focused alternative. The 2017 CSS Annual Report was presented to the co-lead agencies by the Fish Passage Center, and provided a range of 24 operations alternatives.[31] The authors evaluated various BiOP spills of 115% forebay/120% tailrace, 120% tailrace, 125% tailrace, and each of these alternatives was compared with and without breach of the four lower Snake River Dams. These alternatives were considered based on present hydro system and reservoir operations. One of these alternatives was breach of the four lower Snake River Dams, and spill to the 125% tailrace TDG limit, 24 hours per day at the middle Columbia projects (Bonneville, The Dalles, John Day, and McNary Dams). This alternative should have been considered in the Draft CRSO-EIS but was not.

7. There are Many Misleading and False Statements in the CRSO-DEIS; Only Four Examples are Presented Below but There are Many More

A. Downstream Juvenile Dam Survival Estimates in the CRSO-DEIS are Misleading.

The co-lead federal action agencies should refrain from misleading statements about dam passage and survival. For example dam survival estimates are disingenuous (CRSO-DEIS, Executive Summary, p. 19). Figure Executive Summary ES-4 (the same Figure 3-113, p. 3- 302) is designed to mislead the public and fails to explain that dam survival is multiplicative.; that is, total survival through the hydro system from the Snake River to below Bonneville Dam is typically around 50%.

Data on juvenile fish survival through the Snake and Columbia Rivers are easily accessible and available to the public for specific populations of salmon and steelhead. The representation in

[31] Fish Passage Center. 2018. Fish passage center 2017 annual report. BPA Contract # 74404. BPA Project #1994-033-00. 1641 pp.

Figure ES-4 and Figure 3-113 specifically refers to "performance standard" testing at projects in 2010-2014. The inadequacies and issues associated with those performance standard tests affecting the validity of results are a matter of public record. As an example, using the chinook numbers in Figure ES-4 and assuming 98% survival for Ice Harbor Dam would imply that survival through the Lower Granite and Ice Harbor reaches would be 96%. However, juvenile survival through this river reach averages 72%. The performance standard concept and approach is fatally flawed because it does not account for decreased estuary and ocean survival resulting from powerhouse passage of juvenile salmon and steelhead. The actual reach survival rates are available, and should be incorporated into the Final EIS rather than giving false information.

Similarly, the CRSO-DEIS claims that "To aid the downstream passage of juvenile salmon and steelhead, the co-lead agencies have worked to improve passage and survival past the dams and through the reservoirs of the CR" (CRSO-DEIS, p. 3-301). This figure gives overly optimist estimates of fish survival since it fails to show systemwide or latent effects on migrating fish.

The CRSO-DEIS states that "In general, bypass and spillway routes are associated with relatively higher juvenile salmon survival than turbines routes. Spill levels, spill patterns, and turbine priorities also have significant effects on the survival rates of migrating juveniles via their influence on tailrace hydraulics and the formation of eddies" (CRSO-DEIS, p. 3-370). As a result, alternatives that route more fish through turbines would be associated with lower juvenile survival. Currently, between 48% - 82% percent of all juvenile salmon pass dams via spillway routes.[32] Studies to evaluate route specific survival show that survival rates from spillway routes ranged from 96% to 100%.

The CRSO-DEIS also states that "The adverse impact of past Columbia River System operations has been reduced over time, and multiple mitigation actions have improved habitat, hatchery operations, and predator management, thus increasing survival rates of individuals in these ESUs, reducing extinction risk, and thereby contributing to improvements in the likelihood of recovery" (p. 3-304). Data show that survival rate increases are miniscule, and still average 50% from Lower Granite to Bonneville. There are also latent effects of the hydro system that further diminish survival to often less than 20% by the time juvenile fish reach the ocean. These data are reflected in the SARs which show that Snake River anadromous fish generally have less than 1% SARs, and are continuing to slide toward extinction. Statements in the DEIS like the above demonstrate that tweaking the system over and over again has failed to make substantive changes in SARs, and that Snake River salmon and steelhead are likely headed towards extinction unless measures such as dam removal are implemented within the next five years.

[32] Ploskey GR, MA Weiland, and TJ Carlson. 2012. Route-specific passage proportions and survival rates for fish passing through John Day Dam, The Dalles Dam, and Bonneville Dam in 2010 and 2011. PNNL-21442, Interim Report, Pacific Northwest National Laboratory, Richland, Washington.

B. The Preferred Alternative Overstates the Benefits of the Preferred Alternative.

Descriptions of benefits from the Preferred Alternative are extremely misleading and overstate the potential benefit of the Preferred Alternative (CRSO-DEIS, Executive Summary, p. 33). The discussion of the Preferred Alternative includes discussion of Comparative Survival Study model results of alternatives, stating a 35% and 28% benefit to Chinook and steelhead SARs respectively. The discussion is disingenuous and extremely misleading to the public reader of this draft EIS. A Fish Passage Center memo to the federal co-lead agencies presented the results of CSS model analyses of DEIS alternatives including the Preferred Alternative[33]. A review of the data tables in the numerous appendices of this memorandum revealed that the percent benefit described in the Executive Summary is derived from Comparative Survival Study (CSS) model analysis of the Preferred Alternative. The authors divided the average SAR predicted for the Preferred Alternative by the average SAR predicted for the No Action Alternative, and this resulted in the 35% and 28% benefit from the Preferred Alternative. This is a *relative* benefit and should be identified as such. A 35% relative increase of a small number still results in a small number.

Most importantly, the same tables in the same memo to the co-lead agencies showed that neither the Preferred Alternative nor the No Action Alternative meet the regional 4% average SAR regional goal for recovery. The average Chinook SAR predicted for the No Action Alternative is 2%, while the average under the Preferred Alternative is 2.7%. Both results are far from the goal of a 4% regional average. More disturbing is that the Executive Summary fails to discuss that the same CSS analyses of the Preferred Alternative shows that at the lower quartile range, the prediction in this analysis is less than 1% SAR, well below the SAR needed for salmon and steelhead population replacement. Under increasing climate change conditions the lower quartile of the range represents poor ocean conditions and poor flow conditions that will occur more often. In other words, populations are likely to decline and go extinct under both the No Action and Preferred Alternatives.

C. Adult Migration Delays Due to Spill Claims are Unfounded

The CRSO-DEIS claims that adult migration delays occur due to higher spill conditions (CRSO Executive Summary, p. 33O) are unfounded. The CRSO-DEIS claims that “In general, higher flows and higher spill levels lead to longer migration timing and can contribute to site specific delays for adult salmonids through the CRS projects” (CRSO-DEIS p.3-371). The Preferred Alternative increases spill at the four lower Snake River Dams for only 16 hours per day. The largest factor affecting upstream adult migration success and delay is the juvenile smolt transportation program. Upstream migration delay and success should be improved by eliminating the juvenile smolt transportation program. Also, the CRSO-DEIS fails to address the improvement in adult upstream migration that would occur as a result of dam breaching.

[33] Fish Passage Center 2020b. Comparative survival study (CSS) analysis of CRSO -EIS Operation alternatives including the federal agencies preferred alternative. \\albatross\currentdata\staff\document\2020_documents\2020_crso\crso-78.doc. January 24, 2020 memo. 22 p.

D. Combined Annual Salmon and Steelhead Returns (all species) to Bonneville Dam from 1938-2019 Mispresents Anadromous Fish Population Abundance

The Figure 3-111 (CRSO-DEIS, p. 3-300) is misleading to the public (Figure 6). In this figure all species and all populations are combined into total counts at Bonneville Dam, and the discussion relative to this figure refers to NOAA's status of stock evaluations. This figure should be eliminated and replaced with figures of smolt to adult return rates for individual species and populations such as Snake River sockeye, Snake River steelhead, Snake River spring/summer Chinook and Snake River fall Chinook. Also, wild population data should be shown separately and not added to hatchery data. Increasing numbers of hatchery fish reared and added to the river can mask effects on wild populations.

Populations of wild salmon and steelhead from the John Day and Yakima Rivers pass only three and four dams, respectively, and their SARs meet the regional 4% average most of the time. These populations, as well as populations of salmon and steelhead from other middle Columbia tributaries and major middle Columbia hatchery programs, are combined with poor adult returns to the Snake River and Upper Columbia rivers in the Bonneville Dam counts in Figure 6 (Figure 3-111 in the CRSO-DEIS). Mixing of these data hides the true impact of dams on Snake River ESA-listed salmon and steelhead.

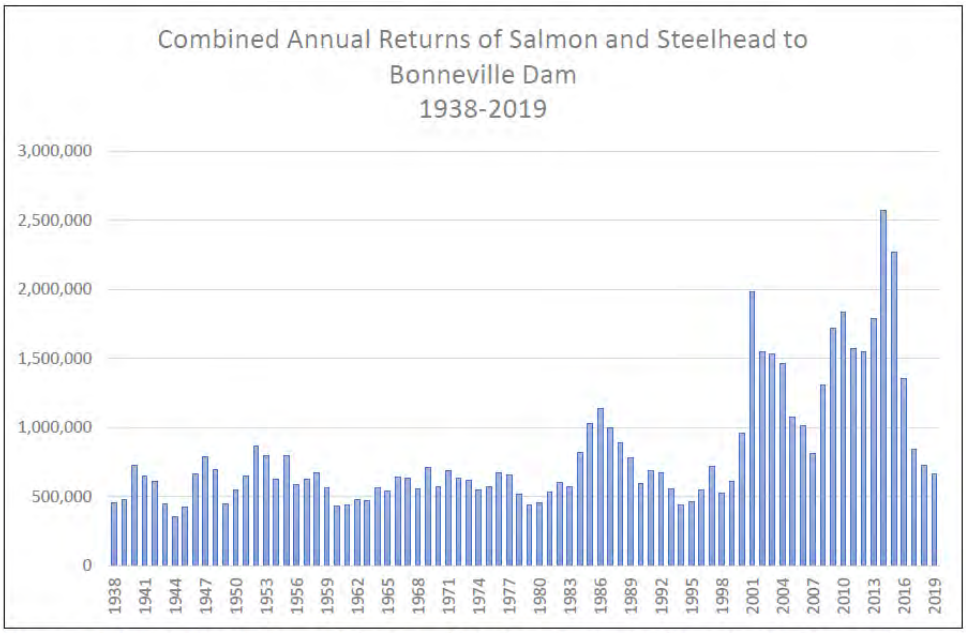

Figure 3-111. Combined Annual Salmon and Steelhead Returns (all species) to Bonneville Dam from 1938-2019.

Figure 6. Figure 3-111 in the CRSO-DEIS of Adult Returns of all Salmon and Steelhead Species to Bonneville Dam from 1938 to 2019; includes combined hatchery and natural origin fish. (Data Source: University of Washington) (CRSO-DEIS, p. 300).

The graph above implies to the public that salmon and steelhead are doing well and have not been impacted by the Columbia and Snake River dams. The following three graphs tell the real

story about declines in salmon and steelhead in the Snake River with severely declining abundance of Snake River Adult Returns for wild Spring/Summer Chinook salmon, sockeye salmon and steelhead: 1950s to 2019 (Figures 7-9)[34]. Wild stocks of Chinook and sockeye salmon and steelhead are declining dramatically and urgent substantive action is needed to reduce their risk of extinction and restore their abundance to sustainable levels.

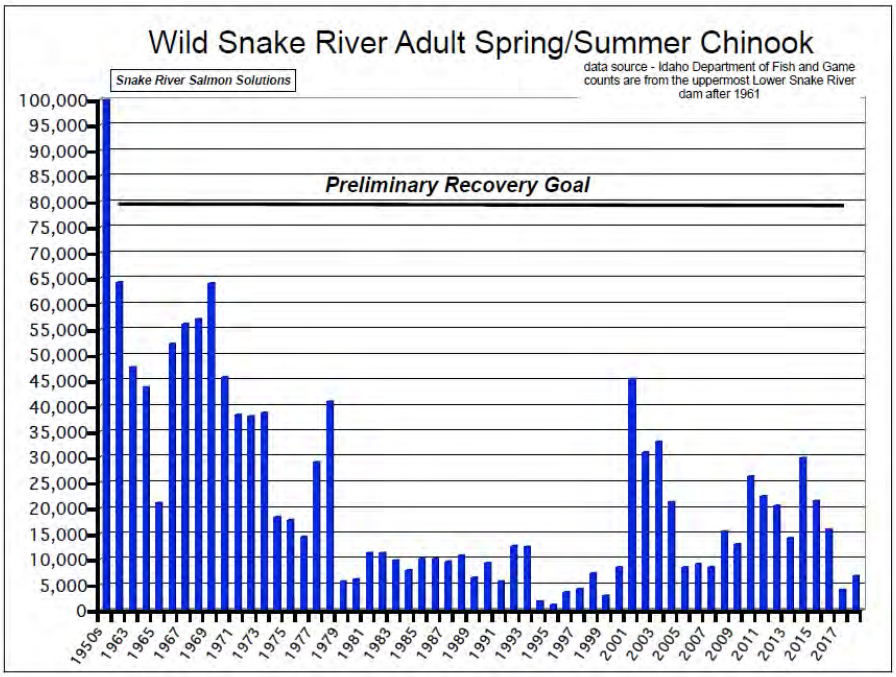

Figure 7. Wild Snake River Spring/Summer Chinook adult returns from 1954 to 2019. Historic annual Spring-Summer Chinook returns to the Snake River Basin were 2 million fish. Snake River Spring/Summer Chinook were ESA-listed in 1992.

[34] Save Our Wild Salmon. 2019. Graphs: Snake River wild salmon and steelhead returns from 1954 – 2019. https://www.wildsalmon.org/images/factsheets-and-reports/Snake.River.Salmon.Returns.1954-2019.pdf.

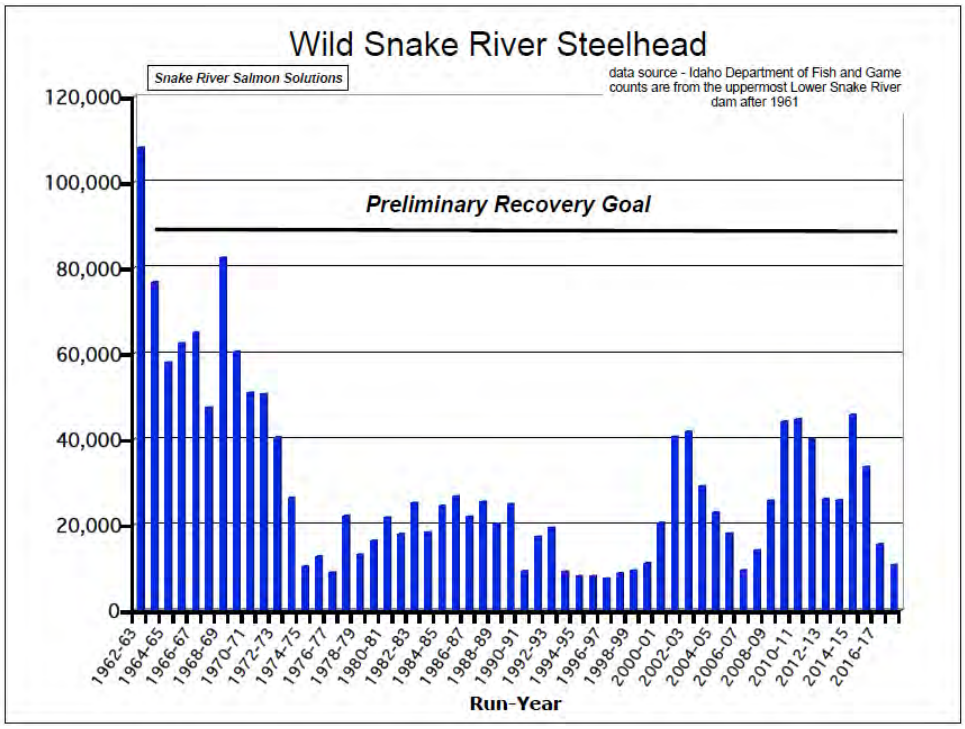

Figure 8. Wild Snake River steelhead adult returns 1962 to 2017. Historic annual ateelhead returns to the Snake River Basin were 1 million adults. Snake River steelhead were ESA listed in 1997.

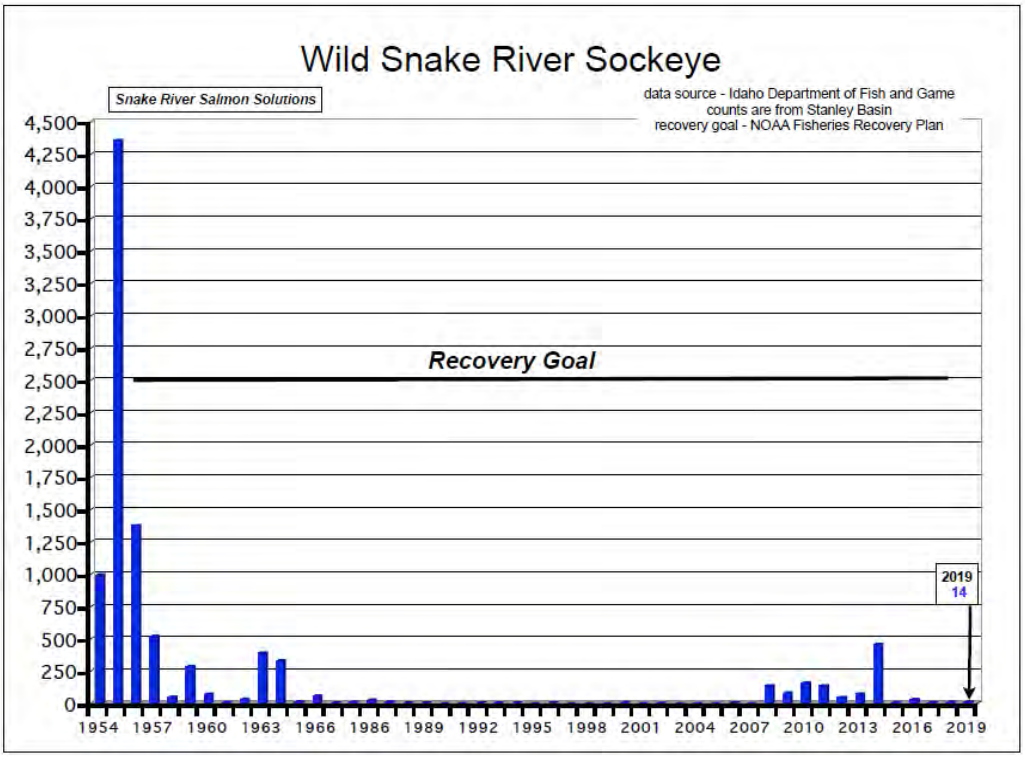

Figure 9. Wild Snake River sockeye from 1954 to 2019. Historic annual sockeye salmon returns to the Snake River Basin were greater than 100,000 fish to Central Idaho's high mountain lakes. Snake River sockeye was listed in 1991.

E. The CRSO-DEIS fails to Acknowledge the Importance of Restoration of Historic Spawning Habitat, Wetlands and Floodplains from Dam Breaching.

The CRSO-DEIS states that "In Region C [which includes the Snake River], vegetation, habitat, and wildlife along the existing shorelines would either be lost or change how wildlife utilize the area. The CRSO-DEIS claims that new vegetation and habitat types along new shoreline would be added with dam breaching, resulting in negligible beneficial effects and major negative effects. Negligible effects on floodplains in Regions A, B, and D, with major beneficial effects in Region C below Dworshak Dam" (CRSO-DEIS, Table 3-1, p. 3-8). The CRSO-DEIS fails to acknowledge the importance of restoring fall Chinook spawning habitat and 15,000 acres of prime riverine habitat and agricultural land that is inundated by the lower Snake River dams.

F. The CRSO=DEIS Misleads the Public by Claiming that the Historical River Temperatures in the Snake River Exceeded the 68°F (20°C) Standard

The CRSO-DEIS states that: "Historical temperatures in the lower Snake River Basin prior to the construction of the lower Snake River Dams and the Hells Canyon Complex show that temperatures in the free-flowing lower Snake River often exceeded 68°F/20°C in July and August and occasionally exceeded 77°F/25°C. These measurements were taken near the mouth of the Snake River from 1955 to 1958 (Peery and Bjornn 2002)" (CRSO-DEIS p. 3-238). The CRSO-DEIS does not discuss that this area had already been largely impacted by upstream USACOE dams and other dams that affect water temperatures. The Fish Passage Center reported that "The construction of the hydropower system dramatically increased the cross - sectional area of the river, greatly slowing water velocity and slowing fish downstream travel time." This is a critical omission in this paragraph because one of the major benefits of breaching the four lower Snake River Dams is that water velocity would be much faster after breach. As a result, fish travel time would be much faster which would mean that juvenile fish would arrive at the estuary much earlier"[35]. EPA modeling showed that, when considered collectively, the four lower Snake River Dams can affect temperatures up to a potential maximum of 6.8°C/12.2°F[36]. More recent analyses clearly demonstrate the benefits of dam removal on lowering temperatures by changing backwater reservoirs from wide, slow-moving reaches to a free-flowing river[37]. Schultz and Johnson's analyses showed that each dam of the four increased water temperatures by 2-4°F /1.1-2.2°C.

[35] Fish Passage Center. 2019c. Review of 2019 flex spill operation. \\albatross\currentdata\staff\document\2019_documents\2019_files\27-19.docx. July 31, 2019 memo. 70 pp.
[36] U.S. Environmental Protection Agency (EPA). 2003. Columbia/Snake rivers preliminary draft temperature TMDL. July 2003. 79 pp.
[37] Schultz and Johnson. 2017. Computer modeling shows that Lower Snake River dams caused dangerously hot water for salmon in 2015. Columbia Riverkeeper White Paper. 12 pp.

G. The CRSO-DEIS Misleads the Public by Claiming that Breaching will Causes Severe Short-Term Impacts

The CRSO-DEIS claims that "Short term effects include high sediment and low oxygen concentrations that would likely lead to the loss of most of the fish in this reach during breaching, reduced forage and productivity for 2 to 7 years following breaching, and potential migration barriers at tributaries that may become perched during reservoir drawdown"(CRSO-DEIS, p. 3-586). This has not been borne out by the many dams removed across the nation, including many that were 100 - 200 years old and had accumulated large amounts of sediment and toxins. Done carefully and at the correct time, dam removals have repeatedly demonstrated success in restoration of anadromous fish on the East and West coasts of this country.

8. Climate Change is Causing and Will Continue to Increase the Risk of Extinction of Snake River Anadromous Fish

Although the discussion of impacts of climate change is extensive, the Federal agencies have not included results of model analyses regarding climate change conditions and smolt to adult returns (CRSO-DEIS, Chapter 4, p. 4-1 to 4-82). The chapter on climate change discusses expected changes to reservoirs and outflows due to climate change, but fails to discuss and even dismisses CSS analyses submitted to the Federal action agencies on January 24, 2020[38]. The Fish Passage Center data show predicted SARs in the lower quartile results, which represent poor ocean conditions and low flows which will occur more often than has occurred in the historic data time series. These analyses indicate that under climate change conditions, only the dam breach options predict SARs above 1% to avoid population decline. It is obvious that under climate change conditions, maximum spill and dam breach are required to increase juvenile survival and decrease delayed mortality. Although there is much discussion of climate change on hydro power production, there is no quantitative discussion of the impact of climate change on Snake River salmon and steelhead. The CSS results indicate that dam breaching is the only alternative that has the potential to maintain Snake River salmon and steelhead populations under poor ocean and flow conditions expected with climate change.

In a letter to the West Coast Regional NOAA Fisheries Manager[39] it was reported that the Northwest Power Council's Independent Science Advisory Board (ISAB) warned over a decade ago, in its report "Climate Change Impacts on Columbia Basin Fish and Wildlife,"[40] that the impacts of climate change on Columbia Basin salmon would be profound. Even in 2007, these

[38] Fish Passage Center 2020b. Comparative survival study (CSS) analysis of CRSO -EIS Operation alternatives including the federal agencies preferred alternative. \\albatross\currentdata\staff\document\2020_documents\2020_crso\crso-78.doc. January 24, 2020 memo. 22 p.
[39] Sando et al. 2015. Sando, R., et al., Letter to Stelle from eight scientists re climate change impacts on Columbia Basin salmon, 10/27/15. http://www.damsense.org/wpcontent/uploads/2015/10/Scientists.to_.W.Stelle.climate.change.
[40] Independent Scientific Advisory Board (ISAB). 2007. Climate change impacts on Columbia River Basin fish and wildlife. ISAB Climate Change Report. ISAB-2. May 11, 2007. 146 pp.

impacts were not obscure or unknown – warming water temperature, alterations in river and stream flows, and reduced ocean productivity were all effects that had been identified and documented. Indeed, many of the scientific studies of these effects cited in the ISAB's 2007 review date back to the 1990s.

Climate change further compounds the need for additional substantive measures for native anadromous fish restoration in the Snake River and its tributaries. Climate change will affect river and stream flow and water temperatures in the coming decades. Climate change affects on hydrology will include decreased snowpack, earlier snowmelt, earlier runoff, and potentially slightly more precipitation. Peak flows will be higher and summer low flows lower compared to existing conditions.

With climate change trending towards warmer and drier conditions in the Pacific Northwest, "Summer base flows will be lower, and the network of perennially flowing streams in a drainage system will shrink during the summer dry period, forcing fish into smaller wetted channels and less diverse habitats"[41]. An independent climate expert from the Climate Change Resource Center[42] and the ISAB[43] predicted that "Trout and salmon within the interior Columbia River Basin may be especially sensitive to climate change... Although the intensity of the effects will vary spatially, climate change will alter virtually all streams and rivers in the basin. Current predictions suggest that temperature increases alone will render 2% - 7% of headwater trout habitat in the Pacific Northwest unsuitable by 2030, 5% - 20% by 2060, and 8% - 33% by 2090." ESA-listed fish species are already at risk due to cumulative impacts from dam and reservoir passage mortality and thermal regimes that cause chronic and acute mortality. With declining flow and warmer temperatures predicted in the coming decades, the Preferred Alternative largely ignores probable climate change impacts on fish in the Columbia and Snake River Basins.

Extreme climate events such as drought, and ecological disturbances such as flooding, wildfire, and insect outbreaks are expected to increase. The ISAB reported that the evidence includes increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level. Further, the ISAB predicts that salmon habitat loss would be most severe in Oregon and Idaho with potential losses exceeding 40% by 2090. However, recent research indicates that climate change is accelerating faster than earlier predictions from the ISAB (Figure 10)[44].

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[41] Battin, J., M.W. Wiley, M.H. Ruckelshaus, R.N. Palmer, E. Korb, K.K. Bartz, and H. Imaki.. 2007. Projected impacts of climate change on salmon habitat restoration. Proceedings of the National Academy of Sciences. vol. 104 No. 16: 6720–6725.

[42] Bisson, Pete. 2008. Salmon and trout in the Pacific Northwest and climate change. (June 16, 2008). U.S. Department of Agriculture, Forest Service, Climate Change Resource Center. Website: www.fs.fed.us/ccrc/topics/aquatic-ecosystems/salmon-trout.shtml.

[43] Independent Scientific Advisory Board (ISAB). 2007. Climate change impacts on Columbia River Basin fish and wildlife. ISAB Climate Change Report. ISAB-2. May 11, 2007. 146 pp.

[44] The Climate Reality Project. 2017. How is the climate crisis affecting the Pacific Northwest? https://www.climaterealityproject.org/blog/how-climate-crisis-affecting-pacific-northwest. Retrieved March 29, 2020.

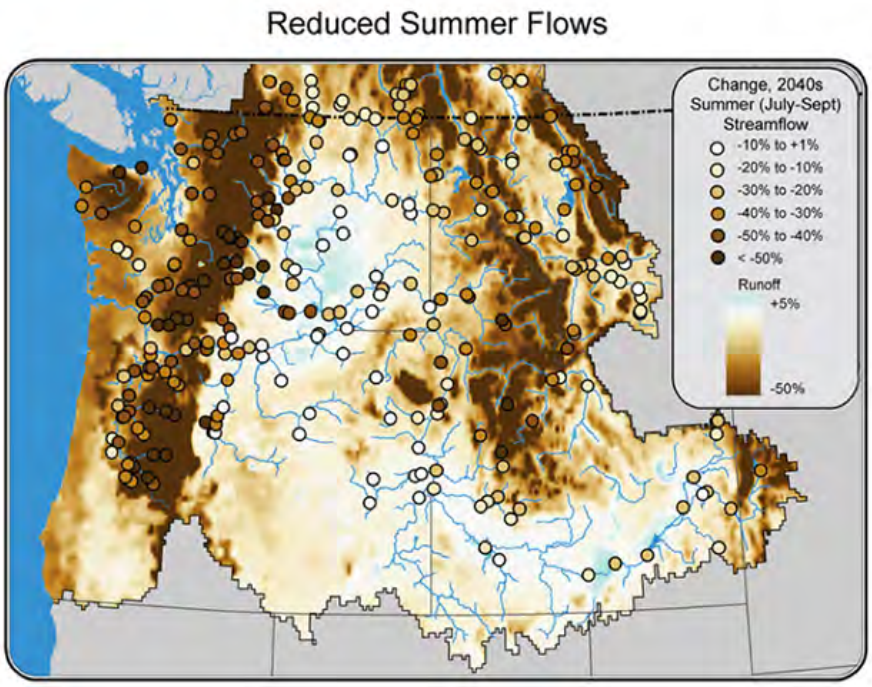

Figure 10. Projected changes in water runoff and streamflow for 2040, as compared to 1915–2006 from the Climate Reality Project.

Experts on climate change evaluated the vulnerability of salmon and steelhead stocks on the West Coast[45] and reported that "geographical patterns indicated a potential range contraction toward the coast for anadromous life histories unless access to higher-elevation habitats is restored and habitat quality in rearing areas and migration corridors is improved." The authors reported that Interior Columbia Chinook salmon had the highest vulnerability scores, and also face the largest percentage loss of snow-dominated habitat. The authors stated that reducing anthropogenic stressors would greatly improve responses to climate change by improving the overall status of these species in terms of abundance, productivity, spatial structure, and diversity. They also stated that reconnection of habitats blocked by artificial barriers, either longitudinally or laterally (floodplains), has been successful in expanding the effective climate space of a watershed. The authors recommended improvement of temperature or flow constraints to help reduce climate stresses. They suggested dam removals can be effective, and cited dam removals in recent years where salmon abundance and distribution (e.g., in the Elwha, Rogue, White Salmon, Sandy, and Carmel Rivers) has responded even more rapidly when multiple dams were removed (such as in the Rogue, Sandy and Elwha River basins).

Climate experts on salmon and steelhead vulnerability also state that "Hatchery supplementation can reduce fitness in wild salmon populations both through introducing

[45] Crozier L.G., McClure M.M., Beechie T., Bograd S.J., Boughton D.A., Carr M., et al. 2019. Climate vulnerability assessment for Pacific salmon and steelhead in the California Current Large Marine Ecosystem. PLoS ONE 14(7): e0217711. https://doi.org/10.1371/journal.pone.0217711.

maladaptive genotypes and reducing the effective population size of wild populations. Therefore, reducing the number of hatchery-origin fish in general can be expected to improve the adaptive capacity of wild populations in the face of increasing exposure to climate change." They acknowledge that in highly endangered populations (such as Snake River sockeye) hatcheries can provide a temporary buffer from extinction risks. The authors very specifically stated where dams block passage and interrupt ecological and physical processes, dam removals will likely result in habitat that diverges less from those seen historically and reduce impacts of climate change for fish at all life stages. They noted that recent dam removals and restoration activities had demonstrated reconnected floodplains, and that physical and ecological responses can be rapid and effectively reduce habitat constraints.

9. Summary of Fish and Aquatic Concerns

In summary, the Great Old Broads for Wilderness support the MO3 Alternative (breaching the four lower Snake River Dams) in combination with the MO4 Alternative (125% TDG) spill at the remaining dams on the Columbia River. The four lower Snake River Dams must be breached immediately to provide wild salmon runs on the Snake River the best chance to recover.

Millions of dollars are spent by the federal agencies annually on salmon recovery measures. Yet all the experimentation with fish passage, barging, massive hatchery programs, and more have not worked. All options have been explored, and there are no solutions for the four deadly slack water reservoirs behind the Snake River Dams. Dam breaching makes both economic and ecological sense. It provides wild salmon and steelhead the best opportunity to survive and recover, and will bring back to health the ecosystem that depends on these keystone species. The past decades have shown that throwing money at the dams in the hope that wild salmon will recover does not produce results and is a waste of tax and rate payers' money. It's time to truly balance fish recovery with other hydro system benefits. It's time to remove the lower Snake River Dams and initiate high levels of spill at the remaining Columbia River Dams.

Southern Resident Killer Whales

The Southern Resident Killer Whales (SRKWs) are an extended family of orcas, noted for their intelligence, bonds and importance of matriarchs. As a group founded by older women who value conservation, many of whom are grandmothers themselves, the Great Old Broads for Wilderness' members have a special connection with SRKWs. Many individual Broads enjoy experiencing the SRKWs live or vicariously, and avidly follow the SRKWs' individuals and families. NOAA itself states "The endangered Southern Resident is an icon of the Pacific Northwest and inspires widespread public interest, curiosity, and awe around the globe."[46]

1. The CRSO-DEIS's Findings and Conclusion on Sensitive Species Effects of MO3 and Its Biological Assessment for Southern Resident Killer Whales are Flawed, as They Rely on Erroneous and Outdated Data and Speculative Mitigation Measures and Fail to Use Current and Best Available Science.

Unfortunately, the DEIS fails to recognize the worldwide interest and irreplaceable value of these unique sea mammals, nor does it use current scientific data that are crucial to preserving this small, unique, ESA-listed Distinct Population Segment (DPS) The CRSO-DEIS's findings and conclusion about the impact of MO3 on the Southern Resident Killer Whale (SRKW) DPS are incorrect. Table 3-106, Sensitive Species Analysis for MO3 (p.3-759) states, "Prey Availability: Minor effect. The Snake River spring/summer Chinook salmon is a negligible portion of their overall diet." These findings ignore the important nutritional role of Snake River chinook salmon runs during critical winter and spring feeding times for SRKWs, as discussed in more detail below.

Similarly, the conclusion that MO3 would have a "minor effect" on SRKWs is wrong. The CRSO-DEIS states as support for this conclusion: "The food available to Southern Resident killer whales from the lower Snake River population is only a small percentage of their overall diet. Changes to food availability may change the whale's foraging behavior patterns slightly but will not change their overall condition or population dynamics." That statement is inaccurate according to the best available science discussed below. It fails to take into account how a substantially increased supply of nutritious, large Snake River chinook salmon is literally a matter of life and death for these starving, critically-endangered orcas."

Similarly flawed is the Action Agencies' Biological Assessment (BA) (found in Appendix V, Section 3.5.1.2, pgs. 3-598-3-600). After reviewing the status, habitat and foraging of SRKWs, the BA concludes,"Any remaining Chinook mortality attributable to the Proposed Action is only a subset of the total mortality from all sources within the mainstem migratory corridor. Therefore, the Action Agencies have determined that management of the CRS may affect, but is not likely to adversely affect, the SRKW species or designated critical habitat."

[46] https://www.fisheries.noaa.gov/species/killer-whale#spotlight

This determination ignores the critically endangered status of the SRKWS, their reliance on dwindling Chinook salmon runs, and need for more food, especially the more nutritious and larger wild Chinook. SRKWs engage in crucial foraging in and around the mouth of the Columbia River in winter and spring, which are particularly key times for their health and reproductive success.

NOAA lists the SRKWs as one of its nine "species in the spotlight," which it defines as "among the most at risk of extinction in the near future."[47] Furthermore, NOAA states that for species in the spotlight such as SRKWs "their populations are declining, and they are considered a recovery priority #1. A recovery priority #1 species is one whose extinction is almost certain in the immediate future because of rapid population decline or habitat destruction."

Southern Resident Killer Whales are starving. This starvation causes them to metabolize stored fat, which releases toxins into their system, impacting their own health, and causing high rates of reproductive failures. Chinook salmon are over 80% of their diet, and they aren't getting enough to eat. Transient killer whales that are found in the same range as the SRKWs are healthy, enjoying great reproductive success and increasing their numbers because they have plenty of prey—seals and other marine mammals.[48]

2. The Biological Assessment Fails to Accurately Assess the Proposed Action's Impacts on the Critically Endangered SRKWs Requiring a Recovery Priority #1.

The BA contains several notable factual errors. One erroneous statement is that the SRKWs population is estimated at 73. (pg. 3-598). The BA's citation is from the Center for Whale Research (CWR) population data as of Sept. 6, 2019. However, well prior to the issuance of the DEIS on February 28, 2020, CWR reported on January 24, 2020 that L-41 Mega was missing from a sighting of his other family members and was presumed dead.[49]

Lynda Mapes of the *Seattle Times* reported on January 28, 2020, about the presumed death of L-41, bringing the population of Southern Resident orcas to only 72, the lowest in 45 years.[50] His death was noted as particularly significant because "L41 was an important whale in the southern resident families. He and one other whale, J1, fathered most of the calves born to the pods since 1990."

In this critically endangered SRKW population, the death of even one more member, especially a mature breeding male, is potentially devastating to further recovery. This key fact should

[47] https://www.fisheries.noaa.gov/topic/endangered-species-conservation#species-in-the-spotlight

[48] Shields, Monika W., and Scott Veirs. 2019,"Status and trends for West Coast Transient (Bigg's) killer whales in the Salish Sea." Encyclopedia of Puget Sound.

[49] https://www.whaleresearch.com/2020-2 .

[50] https://www.seattletimes.com/seattle-news/environment/another-southern-resident-orca-feared-dead/

have been reflected accurately in the BA, as their diminishing population is a crucial fact and compelling concern.

At the time of their 2005 ESA listing, the SRKWs numbered 88. Fundamentally, an "endangered" listing means that the responsible agencies should be managing the species for recovery. In the SRKWs' case, the responsible federal agency, NOAA, established a recovery goal for down-listing of 2.3% increase annually, based on historic growth rates from 1984-1996 for the species.[51]

This 2.3%, recovery rate yields a projected increase of SRKWs at about 20+ per decade. Accordingly, based on NOAA's projections for recovery, there should be around 120 SRKWs by 2020. But instead of a healthy increase, the SRKWs have tragically decreased to just 72 now, with their prospects for recovery poor unless immediate, meaningful action is taken to save them.

NOAA's recent findings recognize that the main obstacle to SRKW recovery is a severe shortage of their preferred food, Chinook salmon.[52]

3. The BA Makes Misleading and Overly Broad Assertions about the SRKWs.

The BA says that in the spring, summer, and fall, the SRKW are found in the inland waters of Puget Sound, the Northwest Straights [sic] and southern Georgia Strait." [This area is commonly referred to as the Salish Sea]. But this broad assertion ignores both the historical evidence that SRKWs range over half the year away from the Salish Sea, and recent patterns where they've been absent from the Salish Sea during summer months, likely due to not enough prey being available. Both of these topics are described in more detail below.

Historically, as noted in a recent scientific report by a group of distinguished killer whale scientists, "Southern Resident Killer Whales & Columbia/Snake River Chinook: A Review of the Available Scientific Evidence, February 2020,"[53] (hereafter "2020 SRKW Scientists Report"), the SRKWs' geographic range is not confined to the Salish Sea for over half the year:

> "The Southern "Resident" killer whales got their name because they used to be seen annually (i.e. "resident") in the inland waters of the Salish Sea/Puget Sound during the late spring through early fall months. Even historically, however, this genetically distinct population of killer whales has spent more than half their time swimming back and forth throughout their known range as far south as

[51] NOAA 2008 Recovery Plan, pg. IV-9, document available at https://repository.library.noaa.gov/view/noaa/15975

[52] See 84 Fed. Reg. at 49,215; National Marine Fisheries Service, West Coast Region, Proposed Revision of the Critical Habitat Designation for Southern Resident Killer Whales, Draft Biological Report at 28 (Sept. 2019).

[53] Bain et al. Feb. 2020

> Monterey, CA and as far north as Southeast Alaska. Their visits to the coastal waters off Westport, Washington and the mouth of the Columbia River coincide with high concentrations of spring Chinook salmon."[54]

Moreover, in the past few years, the SRKWs have not consistently been in their "resident areas" of the Salish Sea during the warmer months, but instead have been off the Pacific Coast. This pattern indicates that their foraging patterns are changing, likely due to the lack of Chinook salmon in the Salish Sea.[55]

4. The BA Discounts the Importance of Chinook Salmon Runs from the Columbia/Snake Basins to the SKRWs, Pointing Instead to Puget Sound and Fraser River Stocks.

To a starving creature, every meal is important, and the Columbia/Snake runs are particularly so. The 2020 Scientists' Report provides a clear picture of the importance of Columbia/Snake River runs of Chinook salmon to the SRKWs:

> "The best available science indicates that the whales are likely to be especially reliant on the Columbia/Snake River watershed's early spring, nutrient-rich Chinook salmon runs. Indeed, the mouth of the Columbia Basin is one of the Southern Resident orcas' favorite places to fish. Data compiled from tagged whales, dedicated surveys, and passive acoustic monitoring indicates the Southern Residents spend significant time in the winter and spring off the mouth of the Columbia and have been present there thirty-five times more often than would be expected by chance. Analysis of fish scale and Southern Resident fecal samples collected on the outer coast indicate that, as is the case in inland waters of the Salish Sea/Puget Sound, Chinook are the primary species consumed on the outer coast and that over half the Chinook consumed by the Southern Residents are from the Columbia River Basin….
>
> In partnership with the Washington Department of Fish and Wildlife (WDFW), NOAA created a preliminary priority list of West Coast Chinook salmon stocks important to the Southern Resident orcas' recovery. Of the top fifteen priority stocks, seven are from the Columbia Basin, including both fall and spring Chinook"[56]

The link between the depleted Chinook salmon runs in the Columbia/Snake system and the depleted status of the SRKWs is clear.

> "The current depleted level of adult Chinook returns to the Columbia is a critical component of the prey scarcity these whales face. This shortage is compounded by the

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[54] 2020 Scientists' Report, pgs. 8-9, citations omitted.

[55] See Shields, Monika W., Jimmie Lindell, and Julie Woodruff. 2018. "Declining spring usage of core habitat by endangered fish-eating killer whales reflects decreased availability of their primary prey." *Pacific Conservation Biology* https://doi.org/10.1071/PC17041

[56] 2020 SKRW Scientists' Report, pgs. 9-10, citations omitted

> fact that adult Chinook returns, especially hatchery stocks that comprise most of these returns, consist of an increasing number of younger – and hence smaller – fish than in the past. This fact means that these whales must expend far more energy today to obtain the same caloric value of prey with the net effect of less nourishment. The claim that maintaining the continued low adult salmon returns to the Columbia does not harm these critically endangered whales is not scientifically supported"[57]

5. CRSO-DEIS Co-agencies Use of Old Data, Speculation and Optimism Fails to Ensure Snake River Basin Salmon and Southern Resident Orca Survival and Recovery.

The CRSO-DEIS BA is relying on an outdated 2008 determination that found that the Columbia River system management was based on expected status improvements for prey originating from the Columbia as a result of three key factors: (1) previous modifications to system operations and configuration to benefit salmonids; (2) ongoing artificial production programs in the Columbia River Basis; and (3) implementation of the 2008 BiOp's RPA actions, with further improvements to mainstem migration conditions, spawning and rearing habitat, predator management, and hatchery reforms.

This determination was speculative in 2008, and with the benefit of hindsight, far too optimistic. The 2008 "expected status improvements" are not working for salmon or SRKWs, as shown by the alarming decrease in populations of these species. Moreover, as pointed out in the 2020 SRKW Scientists' Report, hatchery fish are inferior to wild salmon to fulfill the SRKWs' nutritional needs.

Conclusion Regarding Southern Resident Orca Survival

Breaching the four Lower Snake River Dams (LSRDs), according to the CSS modeling, would result in an estimated four times increase in the return of Chinook salmon within a few years. Consequently, independent SRKW scientists have concluded that breaching the four LSRDs is the best, and likely only, way to recover SRKWs.

> "When all of this evidence is taken into account, we believe that, as a matter of scientific evidence, it is clear that lower Snake River restoration, including dam removal, is the single biggest and most effective step we can take to restore these two important species. The evidence of continued decline for both orcas and Snake River Chinook also highlights the great urgency to take this action as soon as possible."[58]

Accordingly, the Co-agencies should revise the BA to determine that the Preferred Alternative will adversely affect the SRKWs, and instead implement a combination of LSRD breaching under MO3, plus 125% TDG spill at the 4 lower Columbia dams under MO4. This is the best and likely

[57] 2020 SRKW Scientists' Report, pg.11, citations omitted.
[58] 2020 SRKW Scientists Report at pg. 12:

only ecological option that offers a near-term, meaningful route to recover this critically endangered species.

Balancing "Uses" Against "Resources," *aka* "Natural Resources"

As pointed out in the 2020 CRSO-DEIS Executive Summary, the Opinion and Order from the U.S. District Court for the District of Oregon[59] states that the EIS should evaluate how to ensure that the prospective management of the CRS is not likely to jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of designated critical habitat.

Regarding operation of hydroelectric dams on the Columbia and Snake Rivers, in its 2000 Biological Opinion, NOAA Fisheries concluded, "breaching the four lower Snake River dams would provide more certainty of long-term survival and recovery [of salmon and steelhead] than would other measures."[60]

Yet, beyond the status quo, the overall approach of the agencies in preparing the 2020 CRSO-DEIS diffuses any focus on **ensuring** species survival, while instead belaboring *complexity* and a need for *balancing uses*. In doing so, the CRSO-DEIS functions as a diversion from the Court's mandate and fails to meet the expectations of the Court Order. The CRSO-DEIS's Preferred Alternative (PA) dismisses the scientifically soundest means of ensuring the continued existence of the Snake River Basin's endangered and threatened species –breaching of the 4 lower Snake River dams.

About Alternative 3 (MO3), including breaching, the CRSO-DEIS Executive Summary (ES) (page 24) states that MO3 "predicts the highest benefit for several of the ESA-listed juvenile and adult salmon." In light of Snake River salmon species' slide toward extinction, that statement *alone* satisfies the court mandate and leads to an obvious conclusion: MO3 ought to be the "preferred alternative." Yet, in denying MO3 "preferred" status, the Executive Summary (p.29) notes, "...this alternative was not identified as the Preferred Alternative due to the adverse impacts to other resources such as transportation, power reliability and affordability, and greenhouse gas emissions." Today, calling transportation, power reliability and affordability, and greenhouse gas emissions "resources" amounts to basing CRSO-DEIS conclusions on a misnamed and nearly empty box.

Let's first understand first that these are not "resources." Transportation and power production are *uses of resources*, and greenhouse gas emissions are a societal *problem*, not a resource. Resources related to the DEIS are water, habitat and fish. The court order mandates a *protective focus*, in decision-making, upon these "resources."

Removal of the 4 lower Snake dams, plus a TDG of 125% saturation at the tailraces of the 4 lower Columbia dams, preceded by an interim 125% TDG at all 8 dams, would be the best-

[59] National Wildlife Federation, et al. v. National Marine Fisheries Service (NMFS), et al., 184 F. Supp. 3d 861 (D Or.2016)
[60] 2000 BiOp, NOAA Fisheries

action toward that focus. Further, that action would allow the co-agencies to meet their "Major Conclusion" of meeting "the congressionally authorized purposes of the system (ES, p.35), since all remaining hydropower dams in "the system" would remain intact, functional, and able to meet the Pacific Northwest's energy demand.

1. CRSO-DEIS Preferred Alternative Considerations of "Use" Values Do Not Economically, Socially, Legally, or Environmentally Justify Salmon and Steelhead Extinctions.

As detailed within this comment document, the CRSO-DEIS arguments against Alternative 3 (MO3), particularly its arguments related to transportation and power reliability, are very weak, and growing weaker by the year. Further, suggestions that choosing MO3 would necessarily and irresolvably increase greenhouse gas emissions is at best flimsy.

The Executive Summary (page 24) states, "…breaching the dams would not allow the co-lead agencies to operate and maintain the dams for their congressionally authorized, not mandated, purposes of navigation, hydropower, envisioned recreational benefits, and water supply for irrigation purposes." Speaking of *balance*, we suggest first that the co-agencies "envision" free-flowing river recreational benefits equal to or surpassing reservoir recreation benefits, and also the social and economic effects of river recreation benefits. Second, we suggest that you jar yourselves out of the time period when the co-lead agencies were first congressionally authorized – **not mandated** – to operate and maintain the dams and lift yourselves into the present day – a much less positive-looking day for lower Snake River navigation and hydropower and a devastating day for salmon … and, in turn, for Southern Resident orcas.

The CRSO-DEIS promotes improving the same or similar fish passage conditions that, in 2020, the agencies, the public and our policymakers clearly *know* have failed. Just visit nearly fish-less natal streams during spawning season, drop a line into the Clearwater River to catch no fish, or read local/regional newspaper coverage, such as *Lewiston Tribune* coverage of the salmon/steelhead decline issue and its painful effects on local people and communities.
The agencies have asked the public and our policymakers to dismiss the scientifically validated soundest solution and to ignore a visible upriver scarcity of salmon, in favor of sustaining waning values, such as lower Snake waterway freight transportation, and an aging, unjustifiably costly, no longer essential lower Snake hydropower system. The agencies speak of "water supply" as if a free-flowing river is not itself a source of water – reservoir not required.

2. The CRSO-DEIS's Weighing of "Social Welfare" Costs is Imbalanced and Incomplete.

To develop the PA, "the co-lead agencies selected a combination of suites of measures…based on how well the measures met the Purpose and Need Statement and EIS objectives, with consideration of environmental, economic and social effects." (ES, p..32) Yet, the co-agencies ask the public to favor, even sanction, the needs of fewer than two dozen irrigators all located on just one of the four reservoirs, the Ice Harbor Reservoir. The Executive Summary (p. 28) "assumes," were the dams breached, that 47,926 acres would no longer be irrigated at a social welfare cost of $458 million." That assumption is false on the face of it, since the river itself

would remain available for irrigation. A one-time expense of aid to farmers to upgrade pumps and lengthen water lines could ensure sections of the 47,926 acres could be irrigated post-breaching. At the same time that it expresses concern for irrigators, the CRSO-DEIS circles widely around and/or disregards the needs of Oregon, Washington and north central Idaho fishing-related communities, which right now are suffering a severe "social welfare" cost due to the loss of thriving salmon and steelhead runs. The CRSO-DEIS disregards the individuals and businesses (largely small businesses) that create jobs in those communities and the significant positive impact of fishing on the overall economies of Washington, Oregon and Idaho.

> *"Sport fishing in Idaho generates hundreds of millions of dollars of spending every year, bringing much needed dollars to rural areas while adding millions in tax revenue to state coffers. Sport fishing in the state is a tremendous economic engine…"* – IDFG 2001 Survey: Fishing Has Major Impact on Idaho Economy[61]

In 2019, the Idaho Department of Labor's economist for Region 2 (north central Idaho) reported that salmon and steelhead fishing contribute an estimated $8.61 million *per month* to the region.[62]

That significant, indeed vital, economic impact by far exceeds the $2-$3 million per year Port of Clarkston, Washington's Manager Wanda Keefer estimates is the impact of her port's cruise ship traffic on her community. The cruise ship passengers, incidentally, buy their trips from non-local cruise ship companies; are dined, wined and lodged on-board; and passengers' tips go mostly to non-local cruise ship staff.

It is not difficult to assume that, were tourist cruise ships no longer able to use the Port of Clarkston due to lower Snake dam breaching, very few businesses in the Clarkston community would suffer. None would close. However, with the ongoing dramatic decline (and likely extinction) of salmon and steelhead runs, in the three states' rural fishing-related communities, nearly every business is negatively impacted, dropping some into suspension or closure, and even drawing a few whole communities to the brink of economic collapse.

The CRSO-DEIS, however, fails to emphasize these fish-decline economic or social welfare impacts. In fact, while analyzing the economic impacts of each alternative – including water supply, irrigation, navigation, and hydropower impacts, the co-agencies ignored the sports fishing economy and its estimated $2 billion region-wide economic contribution. The co-agencies neglected to use publicly available data sources that quantify the devastating economic impacts of declining salmon and steelhead population to the Northwest's rural communities.

In 2005, Don C. Reading, Ph.D., presented the results of a study titled "The Potential Economic Impact of Restored Salmon and Steelhead Fishing in Idaho." Reading concluded, "The recovery

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[61] "Survey: Fishing Has Major Impact on Idaho Economy" (2001); published 2003). Available at: https://idfg.idaho.gov/press/survey-fishing-has-major-impact-idaho-economy

[62] "Steelhead Fishing Closure Hammers Idaho Economy," *Lewiston Morning Tribune*, October 11, 2019.

of Snake River Basin salmon and steelhead runs would provide a truly renewable resource that brings substantial economic benefit to Idaho." The study states that a restored salmon and steelhead fishery could reap annual direct and indirect economic benefits of $544 million. In today's dollars, that level of impact would exceed an annual $700 million.[63]

3. As Has Been the Multi-decade Pattern of the Co-agencies, the CRSO-DEIS's "Temporal Scope" a) Neglects the fact that Snake River Salmon and Steelhead Populations Have Been Severely Affected by the Lower Snake Dams So That Today the Extinction of the ESA-Listed Salmon and Steelhead Looms *Close in Time*, and b) Ignores the Law.

In view of the above dollar figures, keep in mind, too, that over the last thirty or so years, taxpayers and electricity ratepayers have spent a well-publicized $16.8 billion attempting to recover thirteen threatened or endangered salmon and steelhead in the Columbia River Basin. None of the thirteen is on a path to recovery.

In view of the above span of thirty years of failed effort, consider that in the CRSO-DEIS Executive Summary," (p.8) the agencies state that the "temporal scope of the EIS is assumed to be 25 years from the signing of the records of decision (RODs)… However, the socioeconomic analysis uses a 50-year period [which]… provides a long-term perspective that enables the co-lead agencies to distinguish between short-term socioeconomic impacts that may occur during the implementation of alternatives and long-term effects that would occur after implementation is completed."

Such a temporal span of 25-50 years is, as noted above, ***known*** by the river-using public, the newspaper-reading public, and by scientists and policymakers to be a scope that will ensure not salmon and steelhead recovery, but their extinction. We suspect the CRSO-DEIS co-agencies also ***know***. Without designating Alternative 3 (MO3), breaching, as the preferred alternative, the DIES does nothing more than foretell and facilitate a natural resource tragedy.

Documentation of the above characterization exists in three decades of court opinions that have rejected dam management plans for their failure to be science- based, law-based, or genuine in their intentions. For example (emphases added):

> In his 1993 court decision, Judge F. Marsh wrote: "NMFS {National Marine Fisheries Service} has clearly made an effort … But the process is seriously, 'significantly,' flawed because it is **too heavily geared towards the status quo** that has allowed all forms of river activity to proceed in a deficit situation – that is, relatively small steps, minor improvements and adjustments **when the situation literally cries out for a major overhaul**. Instead of looking for what can be done to protect the species from jeopardy,

[63] Reading, D.C. (2005, February). "The Potential Economic Impact of Restored Salmon and Steelhead Fishing in Idaho. Report prepared for Idaho Rivers United by Ben Johnson Associates, In. Available at: http://www.idahorivers.org/pdf/FishingEconReport.05.pdf

NMFS and the action agencies have narrowly focused their attention on what the establishment is capable of handling with minimal disruption."

In 2000, Judge Redden ruled that the 2000 BiOp was "**arbitrary and capricious** because it relied on 1) federal mitigation actions that were not subject to the consultation process that is required under the Endangered Species Act and 2) non-federal mitigation actions that were not shown to be reasonably certain to occur." The judge ordered a new BiOp be written by 2004.[64]

By 2004, more populations of Columbia and Snake River salmon and steelhead had become listed as endangered or threatened, and Judge Redden **rejected** the federal government's 2004 BiOp.[65]

In 2005 – "The government's inaction appears to some parties to be a strategy intended to avoid making hard choices and offending those who **favor the status quo. Without real action** from the Action Agencies, the result will be the loss of the wild salmon."[66]

The 2008 **BiOp was also rejected**. – "**Under this approach, a listed species could be gradually destroyed, so long as each step on the path to destruction is sufficiently modest**. **This type of slow slide into oblivion is one of the very ills the ESA [Endangered Species Act] seeks to prevent."[67]**

In 2011 – "The history of the Federal Defendants' lack of, or at best, **marginal compliance with the procedural and substantive requirements of the ESA** [Endangered Species Act] … has been laid out in prior Opinions and Orders in this case and is repeated here only where relevant. The court went on to call the federal defendants' plan "**neither a reasonable, nor a prudent, course of action**."[68]

In his 2011 decision, Judge Redden also wrote: "Instead of following this court's instructions, NOAA Fisheries abandoned the 2000 BiOp and altered its analytical framework to avoid the need for any …reasonable and prudent alternatives. **As the parties are well aware, the resulting BiOp was a cynical and transparent attempt to avoid responsibility for the decline of listed Columbia and Snake River salmon and steelhead**. …there is ample evidence in the record that indicates that the operation of the FCRPS causes substantial harm to listed salmonids.... **NOAA Fisheries acknowledges that the existence and operation of the dams accounts for most of the mortality of juveniles migrating through the FCRPS**. As in the past, I find that **irreparable harm will**

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[64] National Wildlife Federation v. National Marine Fisheries Service, 5/04/16 available here: https://earthjustice.org/sites/default/files/files/1404%202065%20Opinion%20and%20Order.pdf

[65] National Wildlife Federation v. National Marine Fisheries Service, 5/04/16 available here: https://earthjustice.org/sites/default/files/files/1404%202065%20Opinion%20and%20Order.pdf

[66] National Wildlife Federation v. National Marine Fisheries Service, cv-01-640-RE (Oct. 7, 2005) (Opinion and Order of Remand) at 8

[67] National Wildlife Federation v. National Marine Fisheries Service, 524 F.3d 917, 930 (9th Cir. 2008)

[68] National Wildlife Federation v. National Marine Fisheries Service, 839 F.Supp.2d 1117 (D.Or. 2011)

result to listed species as a result of the operation of the FCRPS." Judge Redden ordered a new biological opinion by 2014.[69]

In 2014, "the Court ruled that federal action agencies adopting a record of decision implementing a biological opinion **must prepare an environmental impact statement** when the relevant provisions of the National Environmental Policy Act have been triggered.… that the federal action agencies (here, the Corps , BPA and BOR) prepare a comprehensive environmental impact statement that evaluates a broad range of alternatives **that may finally break the decades-long cycle of court-invalidated biological opinions that identify essentially the same narrow approach to the critical task** of saving these dangerously imperiled species. The federal consulting and action agencies must do what Congress has directed them to do."

In 2016 – Judge Simon wrote, "The Ninth Circuit has already cautioned that the **Endangered Species Act prohibits any federal agency action from allowing a species to have a 'slow slide into oblivion' and that agency action may not 'tip a species from a state of precarious survival into a state of likely extinction.'** "

Yet that "slow slide" is exactly what the government agencies have set in motion, so that today the salmonids are indeed in a state of critical precariousness.

NOAA Fisheries' Consultation Handbook recognizes that 'the longer a species remains at low population levels, the greater the probability of extinction from chance events, inbreeding depression, or additional environmental disturbance."[70]

We are inclined to believe NOAA Fisheries should have added, …*or the probability of extinction from a deceptive lack of meaningful action by federal agencies*. Throughout these 3 decades the agencies seem hellbent on not only driving Snake River salmonids into extinction, but in the process to also drive the Endangered Species Act into nonexistence. And yes, we believe the 2020 DEIS co-agencies have set out to render the ESA powerless, simply by ignoring it.

Today, with respect to the above mentioned "additional environmental disturbance," global warming rises to the top. In 2015, as widely known, Snake Basin fish suffered severely from reservoir temperatures exceeding 68º, and at times and in some locations, such as reservoirs and the mouths of tributaries that ordinarily would provide refuge, water temperatures reached a lethal-for-salmon 72 degrees. Warm water temperatures, especially since 2015, have continued to threaten fish survival, and that trend is, of course, predicted by scientists worldwide to continue. In a January 2020 "climate emergency" warning, 11,000 scientists in

[69] National Wildlife Federation v. National Marine Fisheries Service, 5/04/16; https://earthjustice.org/sites/default/files/files/1404%202065%20Opinion%20and%20Order.pdf
[70] National Wildlife Federation v. National Marine Fisheries Service, 5/04/16; https://earthjustice.org/sites/default/files/files/1404%202065%20Opinion%20and%20Order.pdf

153 countries said, ”The climate crisis has arrived and is accelerating faster than most scientists expected.” [71]

On October 27, 2015, eight former fish biologists and government fisheries department officials sent a letter to Will Stelle, Regional Administrator, West Coast Region, of the National Marine Fisheries Service (NOAA) regarding NOAA’s climate change research and lack of application of that research to significant losses of Columbia and Snake Basin anadromous fish that occur (as in 2015) due to warm water temperatures. The letter speaks of NOAA’s “unfortunate failure to take aggressive and necessary steps to address the effects of climate change on the freshwater habitat of threatened and endangered salmon and steelhead in the Columbia River Basin. This failure is not new; it has accumulated over nearly two decades of inadequate and ineffective action. … If the dead salmon up and down these rivers this summer [2015] did nothing else, they gave us a clear and unmistakable warning that continued reliance on the kinds of small steps and minimalist measures we have taken since Snake River sockeye were first listed under the Endangered Species Act over twenty years ago will not work.“[72]

The temperature issue related to anadromous fish survival in the Columbia and Snake River basins is of such great import that on December 20, 2019, a 9th Circuit Court of Appeals panel ruled that the Environmental Protection Agency had failed to develop temperature limits [Total Maximum Daily Load (TMDL) required under the Clean Water Act. “Rising temperatures caused by dams that stagnate water flows, as well as discharges and climate change, are deadly to migrating fish like salmon. Anything above 68 degrees Fahrenheit makes it nearly impossible for fish to migrate upstream to spawn.”[73] The EPA petitioned for a rehearing of the case, but on March 30, 2020, a federal appeals court denied the EPA’s petition.[74]

Clearly, for the past twenty-seven years, the agencies have been stuck on ‘repeat.’ The 2020 Preferred Alternative’s phrase “additional combination of measures” has exhausted itself. It’s time the CRSO-DEIS co-agencies explain their malfeasance – to the public, the policymakers, and to the court. The agencies’ stagnant approach to saving Snake River salmon and steelhead from extinction has way too long been mired in agency muck.

Mr. Mainzer, General Helmlinger, Ms. Gray, and Mr. Mabe, you and we all know that the 2020 DEIS Preferred Alternative will also be castigated by the court. We all know the PA is designed to fail to recover Columbia Basin salmon and steelhead populations and is totally inadequate. We all know what these fish need for recovery. As so aptly put by Idaho’s Representative Mike Simpson during a budget request hearing before a U.S. House of Representatives’ subcommittee on Energy and Water Development on March 10, 2020, in Washington D.C.:

> “I noticed you all mentioned hydropower, irrigation and transportation and how important those are. Nobody mentioned fish. Nobody mentioned salmon that

[71] Biosci. 70: 8, 2020.
[72] Appendix: October 27, 2017, Letter to Will Stelle
[73] “Court Says EPA Must Regulate River Temperatures for Fish, Jeremy P. Jacobs, E&E News, December 20, 2019.
[74] “Court Won’t Revisit Ruling on River Temperature Limits,” Jeremy P. Jacobs, E&E News, March 30, 2020.

> come back to Idaho, that in the next 15 years, if something isn't done, they will be extinct. There is no doubt about that, they will be extinct.… Any plan we come up with, **any EIS had better recover salmon**."
>
> Simpson added that the region has several options to replace the benefits of the dams, but the fish have only one option. "Those dams produce 3,000 megawatts of power.* You can put small modular reactors or other things in there. You can produce [power] differently. Everything we do, we can do differently. **Salmon need one thing – they need a river**."[75] (Emphases added.)
>
> *While the four LSR dams have a nameplate capacity of 3033 aMW, they actually only produce an average of 1000 Megawatts. Over the last forty-eight years, the four dams, combined, have produced power to full nameplate capacity only on forty-six days. For the past nineteen years, their annual average has been 963 Megawatts.[76]

The submitted comments to the Army Corps of Engineers in late 2016 and early 2017 of approximately 400,000 members of the public, foretold the public's agreement with Rep. Simpson's March 2020 statements. A large majority of those comments urged the Corps to breach or remove the four lower Snake River dams in order to restore healthy populations of wild salmon and steelhead.

4. The CRSO-DEIS Fails to Sufficiently Analyze and Factor into the Economics Picture the Steep Decline in Lower Snake River Transportation Waterway Freight Shipments.

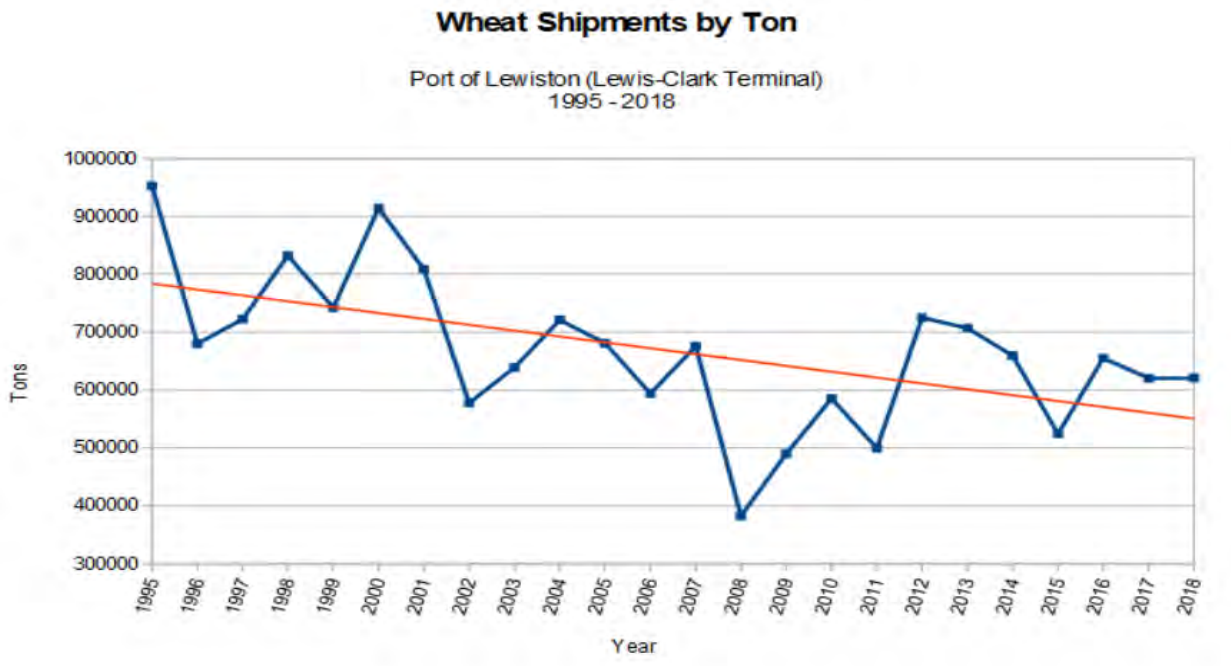
Continuing to ignore the above input with this current DEIS, the co-agencies find every excuse, every diversion from the fact that we humans have multiple options: like using other means of producing power – say, wind and solar, already existing and rapidly expanding in the Northwest and dramatically changing the Northwest energy scene. We also have options for replacing waterway transportation for cruise ships – say, buses and river tour boats with lodging/dining in Clarkston hotels and restaurants. We have options, too, for east/west freight. In fact, while in year 2000, the Port of Lewiston barged 17,590 TEUs of containerized freight, by 2017, container-on-barge shipping stood at zero. This steep decline began long before the Port of Portland closed its container operations in 2015 and was driven by the region's producers themselves. See Graph A below, Snake River Container Shipments by TEU, 2000-2017.

[75] The 2-hour hearing is available for listening at: http://bit.ly/39KMicW
[76] -*Dataquery 2.0,* U.S. Army Corps of Engineers, http://www.nwd-wc.usace.army.mil/dd/common/dataquery/www/ (Calculating longer term average for Lower Snake River Dams).

Graph A[77]

In 1995, the Port of Lewiston (POL) shipped 952,599 tons of wheat via the lower Snake River. By 2018, wheat volume had decreased by 332,013 tons, a drop of 35%. Today all wheat at the Lewiston port is shipped by the private corporation Lewis-Clark Terminal and over its own docks, not by the taxpayer-supported Port of Lewiston. See Graph B below displaying the wheat shipping decrease.

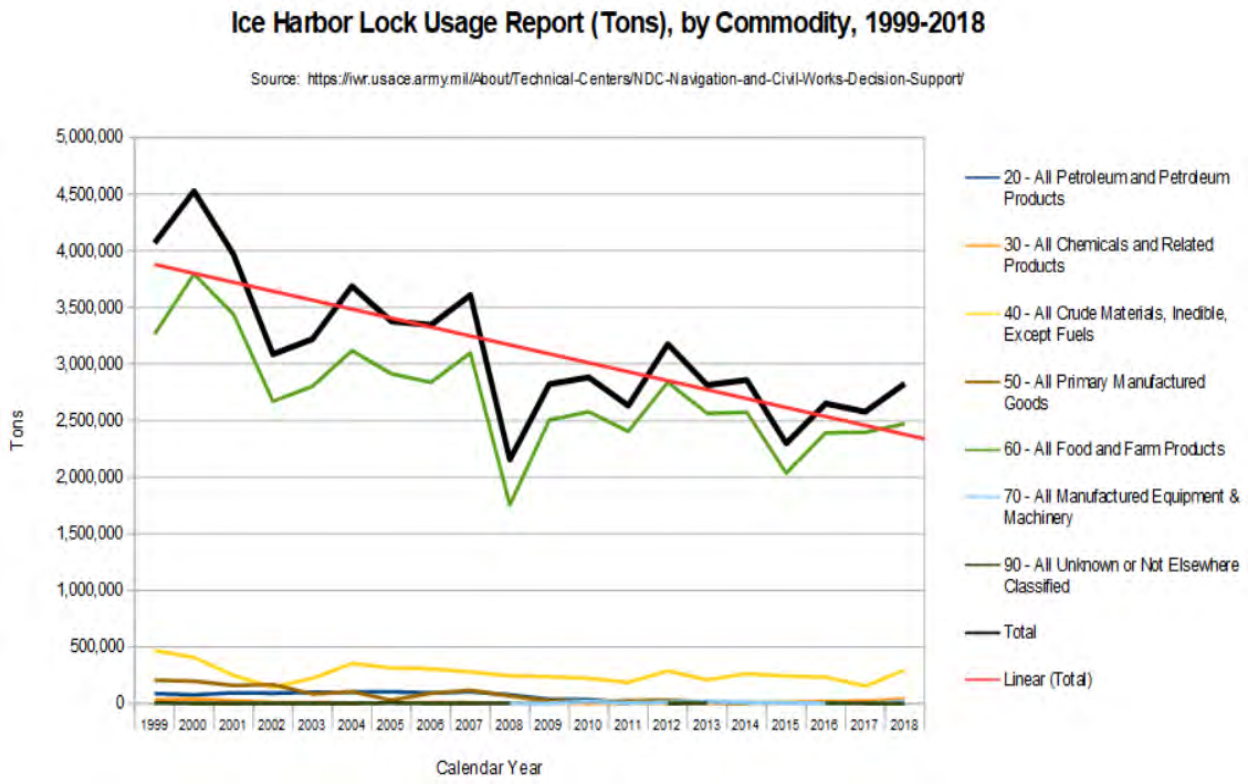
[77] *Historical Reports – Container Shipments by TEUS*, Shipping Reports, Port of Lewiston (accessed January 31, 2019), https://portoflewiston.com/media-room/shipping-reports/#1510871654465-320fe0dc-55eb
Supporting information:
POL Container Shipment Volumes: Explanation, Shipping Reports, Port of Lewiston (accessed January 31, 2019)



Graph B[78]

Total lower Snake River freight volume 2015-2018 averaged 2.64 million tons, a 40% decline since 2000. Paper, pulp, petroleum, pulse, logs and lumber are no longer shipped on the lower Snake – either by choice of the producers or, in the case of pulse, because containers are no longer shipped out of Port of Lewiston by barge. Grain shipping, too, has dropped as increasing numbers of grain growers shift to rail transport. The cooperatively operated McCoy Grain Loader on the Palouse Prairie serves as testimony to this fact. Of all freight shipped on the lower Snake today, 90% of it is grain, but, as you can see in Graph C below, volume of grain shipped has been in steady decline.

[78]Compiled graph informed by:
-*Public Lock Commodity Report Calendar Years 1999-2017*, US Army Corps of Engineers (Updated Aug. 1, 2018), https://publibrary.planusace.us/#/series/Lock%20Performance%20Monitoring%20System%20(LPMS)
--*POL Container Shipment Volumes: Explanation,* Shipping Reports, Port of Lewiston (accessed Jan. 31, 2019), https://portoflewiston.com/media-room/shipping-reports/#1510871654465-320fe0dc-55eb
-*Historical Reports – Container Shipments by TEUS*, Shipping Reports, Port of Lewiston (accessed Jan. 31, 2019), https://portoflewiston.com/media-room/shipping-reports/#1510871654465-320fe0dc-55eb

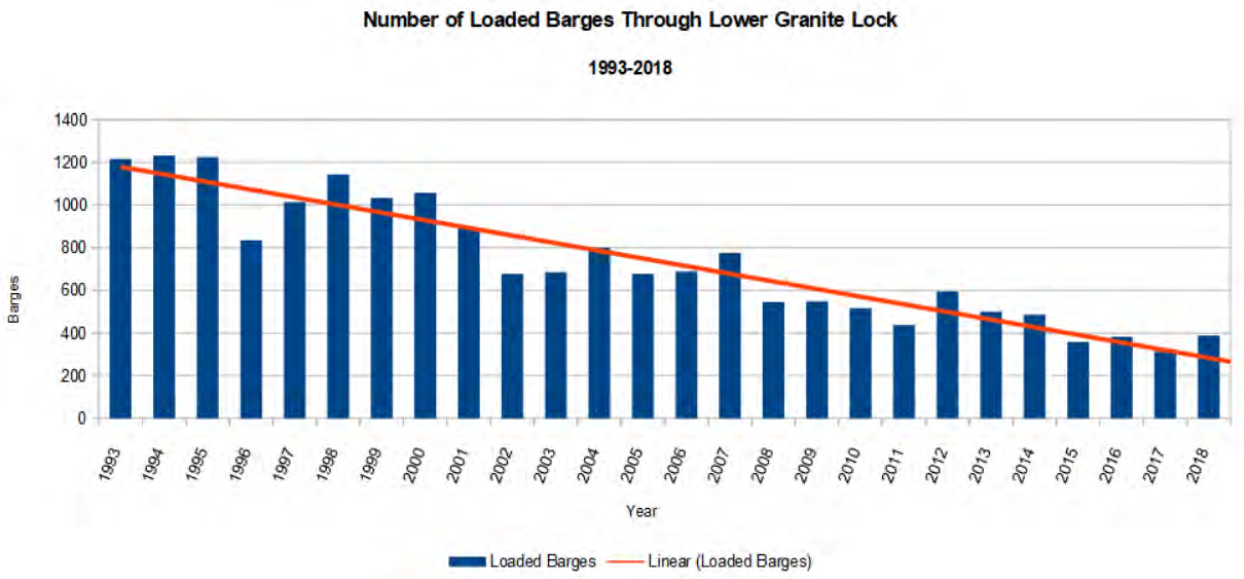


Graph C[79]

Regarding Graph C, note that freight locked through Ice Harbor Dam provides the most accurate measure of freight volume on the Lower Snake River Project (the 4 dams and their respective reservoirs). Freight shipped upriver on the Columbia River to the Port of Pasco, notably petroleum, travels a short distance on the Snake River but does not lock through any lower Snake dam.

All waterborne freight to and from Lewiston, Idaho, passes through the lock at Lower Granite Dam. In 1994, 1,233 loaded barges were locked through Lower Granite. In 2017, just 314 were locked through – a decline of 75%. See below Graph D, Number of Loaded Barges through Lower Granite Lock, 1993-2018.

[79]Compiled graph informed by:
-*Domestic Traffic for Selected U.S. Inland Waterways in 2017*, The U.S. Waterway System 2017 Transportation Facts & Information, Navigation and Civil Works Decision Support Center, U.S. Army Corps of Engineers (Nov. 2018)
-*Inland Marine Transportation System Levels of Service Update,* U.S. Army Corps of Engineers (Aug. 13, 2013), https://www.iwr.usace.army.mil/Portals/70/docs/IWUB/board_meetings/meeting69/IWUB_meeting_69_Level_of_service_update_jeff_mckee_081313.pdf
-*Domestic Traffic for Selected U.S. Inland Waterways in 2017*, The U.S. Waterway System 2017 Transportation Facts & Information, Navigation and Civil Works Decision Support Center, U.S. Army Corps of Engineers (Nov. 2018)



Graph D[80]

As the agencies know, the Corps classifies rivers by the number of ton-miles of freight (one ton of freight traveling one mile) a river carries each year.

Annually:

High use rivers transport 3+ billion ton-miles.
Moderate use rivers transport 1-3 billion ton-miles.
Low use rivers transport less than 1 billion ton-miles.

The lower Snake River dams and reservoirs transport the next to the lowest freight volume among seventeen rivers in the Inland Waterways System. In 2014-2016, the annual average freight volume on the lower Snake totaled 0.28 billion ton-miles. If that volume tripled, the river would still be classified as a *low use* river. The truth is that compared to waterways throughout the United States, the lower Snake's importance as a transportation waterway is negligible. The Snake River transportation waterway, to take this reality further, does not compare in any meaningful way to the importance of thriving anadromous fish populations to people, to rural economies, and to natural environments throughout the Snake River Basin.

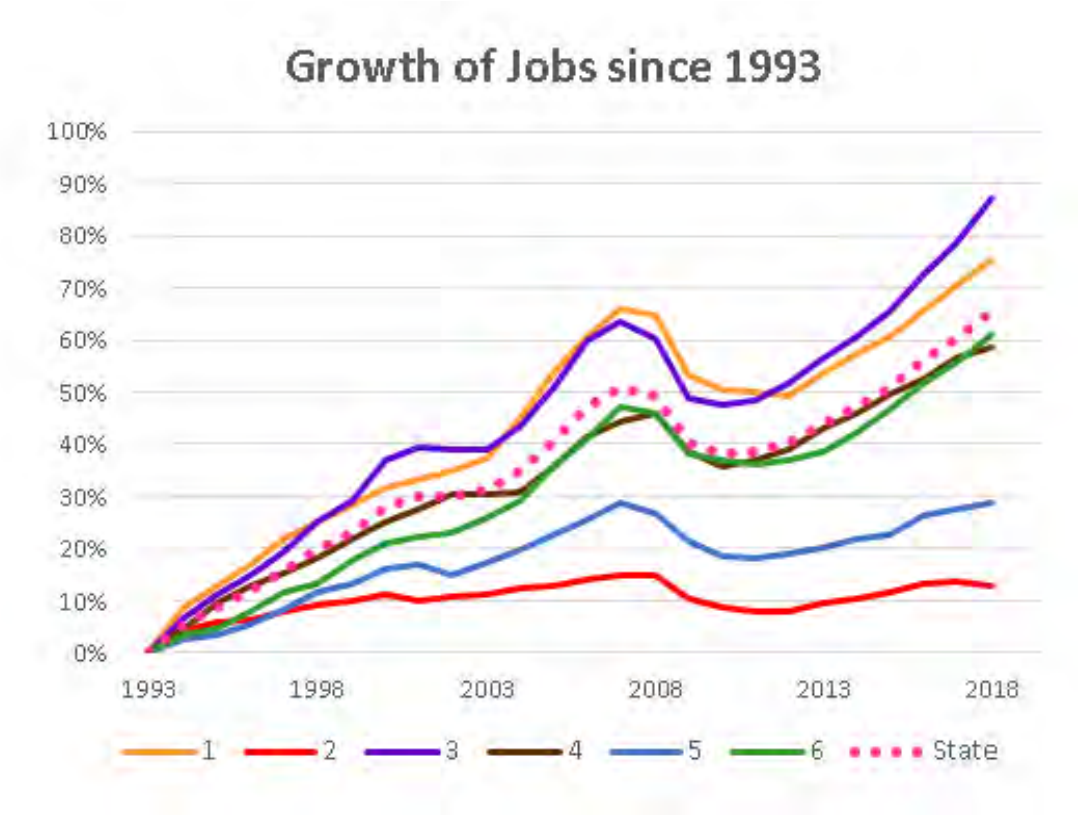
As of 2020, the probability of container shipping's return to the lower Snake River is zero. Freight transportation trends in the lower Snake River region make clear that the probability of the number of loaded barges increasing through Lower Granite locks is small. Thus, using lower

[80] Compiled graph informed by:
-*Public Lock Usage Report files, Calendar Years 1993-2017,* US Army Corps of Engineers (Updated Aug. 1, 2018), available at https://publibrary.planusace.us/#/series/Lock%20Performance%20Monitoring%20System%20(LPMS)

Snake freight transportation as an excuse for allowing salmon and steelhead to go extinct is a false, unjustifiably expensive, and deeply amoral excuse.

Were freight transportation via the lower Snake River a driver of prosperity in north central Idaho, as promised by the agencies and politicians when the four dams were first proposed in the 20th century, or were freight volume increasing rather than steeply declining in the lower Snake waterway, the DEIS co-agencies may have valid reason to tout the necessity of these dams. However, prosperity and increasing freight shipments have not and are not happening. See Graph E below, Growth of Jobs Since 1993.

Mid-20th Century, agency and politician promises of prosperity due to dams was a false promise. Today it is a false premise upon which to base a decision to not breach the lower Snake River dams. … and a false premise upon which to not save Snake River Basin salmon and steelhead from extinction.



Graph E[81]

[81]Compiled graph informed by:
-*Covered Employment by Region*, Idaho Department of Labor, *sent by* Kathryn Tacke (received Feb. 6, 2019)
-*Mission Statement*, About, Port of Lewiston (accessed Jan. 31, 2019), https://portoflewiston.com/about/
-*Workforce Trends,* North Central Idaho, Idaho Dept. of Labor (Jan. 2019), https://lmi.idaho.gov/Portals/0/2018/WorkforceTrends/NorthCentral.pdf

Spanning 1993-2018, Idaho's job growth overall was 66%; but in Region 2, north central Idaho, job growth was 13%. In 2008, Region 2 averaged 42,645 employed workers. Ten years later, it averaged 41,858, a net loss of 787 jobs. Region 2 is the only region in Idaho that has not recovered from the 2008 great recession. Very likely, the decline in anadromous fish and concurrent fishing opportunities in north central Idaho are part of the reason for the region's inability to rebound. Any mid-20th-century forecast that Region2's "Inland Seaport," the Port of Lewiston, would usher in lasting prosperity was a disingenuous and false forecast.

Downriver, in terms of a stoppage of barging, since Tri-Cities area farmers and others ship by barge on the lower Columbia River, their barging would be uninterrupted. Also, upriver-bound lower Columbia shipments of petroleum to Pasco would be unaffected by lower Snake breaching. Keep in mind, too, that about half of eastern Washington wheat growers already ship by rail. Also, an improved rail system from Lewiston downstream would further reduce (not expand) truck miles. New facilities needed for increased rail shipping could total $25-50 million, but this would be a one-time cost. Compare that figure to a yearly ongoing subsidy for barging of at least $25 million. Or to put it more simply: a subsidy *per barge* of at least $25,000.

Northeast Oregon's local economies have suffered similar blows as Idaho's Region 2 related to declining anadromous fish runs. Greater Hells Canyon Council (GHCC) reports that in 2008, a sample year, fishers spent $12 million on fishing trips in Wallowa, Union and Baker counties. Salmon and steelhead were the target species for 110,000 fishing trips in eastern Oregon that year. Today local Oregon outfitters report significant declines in fishing business over the last fifteen years as runs continue their downward spiral. GHCC reports that at least sixty well-paying rural northeast Oregon careers in watershed and fisheries management depend upon anadromous fish. Rural fishing-related economies are so vital to northeast Oregon that state and federal agencies funded 612 habitat restoration projects between 1995-2017, a taxpayer investment of more than $46 million.[82]

Yet now, the CRSO-DEIS co-agencies, through their Preferred Alternative are telling north central Idahoans, Oregonians, and Washingtonians engaged in fishing-related economies that their most abundant and continually renewable resource – salmon and steelhead – isn't worth saving. Northwesterners like us do not accept that position. The economic health of our rural fishing-related economies must be considered in any and all CRSO management alternatives. If considered, the weight of opinion will surely go to CRSO-DEIS Alternative 3 (MO3).

5. The co-agencies Fail in Their Analyses to Acknowledge and Heed the Needs and Call of the People.

The CRSO-DEIS speaks to the economic needs of farmers, barging companies, ports, and hydropower facilities, but ignores the above noted Idaho, Oregon and also Washington fishing-related businesses and communities. Despite the availability of existing, publicly available data detailing elements of rural economies, in considering all system management alternatives and

[82] "Quick Facts for Northeast Oregon Re: Our Fish & the Snake River Dams," Greater Hells Canyon Council, February 2020.

designating the preferred alternative, the co-agencies, astonishingly, did not account for the economies of recreation and fishing – guides, outfitters, motels/hotels, boat shops, restaurants, gas stations, license fees, convenience stores, grocery stores, pubs. Further, the co-agencies treat the costs to taxpayers of subsidizing barge shipments, supporting the non-shipping Port of Lewiston, and sustaining the aging, increasingly moot lower Snake River dams as inevitable far into a future that the co-agencies do not admit salmon and steelhead will not live to see – and fishing-related communities will not see – if the Preferred Alternative stands.

The CRSO-DEIS also doesn't speak to the economic benefits of opening thousands of acres of riverside real estate for agricultural and other commercial, private, and community development. It doesn't speak of the economic benefits of dozens of riverbank habitat restoration jobs created due to breaching. Nor does the CRSO-DEIS speak of and ascribe value to the significant positive social welfare effects and just plain joy such habitat restoration would bring to Pacific Northwest Native Americans and thousands, if not millions, of other Americans.

The above people's argument against the 2020 CRSO-DEIS Preferred Alternative is exemplified in a February 24, 2020, letter "written by leaders of small communities up and down the Clearwater and Salmon rivers that depend on salmon and steelhead fishing to fuel their economies.[83] Directed at Idaho Gov. Brad Little and all four members of the Idaho Congressional delegation, it pleaded for the leaders to "stop the downward trend of Idaho's salmon and steelhead toward extinction."[84]

Also early 2020, PNW utility companies, conservation groups and even Port of Lewiston Manager David Doeringsfeld, wrote to the governors of Washington, Oregon, Idaho and Montana pleading for leadership. The coalition signers acknowledged that "Many Columbia Basin salmon and steelhead runs remain at risk of extinction and other fish and wildlife are threatened. The wellbeing of salmon is critical to our entire Pacific Northwest ecosystem, from the inland forests to ocean species," In their letter, they identified four shared goals – the first goal: "Abundant and harvestable fish originating in the Columbia River Basin are recovered."[85]

Clearly, it's time for the co-agencies to see beyond cement obstacles, aging turbines, barges, sediment removal, extraordinary fish mitigation costs which the co-agencies seem to carry as a banner of honor. This is the people's mandate to the co-agencies: Pacific Northwesterners demand a reversal of the devastation of our iconic, *valuable* resource: salmon and steelhead. To survive, these fish do not need barges and locks, cement and turbines. **They need a river**.

In recent years, it has also come to light that the Southern Resident orcas of the Salish Sea swim on the brink of extinction. Several factors play a role in their decline, but scientists have agreed, they're in decline primarily because of the loss of their key prey, Chinook salmon. Among

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[83] "Leaders from 12 Idaho Communities Urge Swift Action to Recover Salmon Before It's too Late," Rocky Barker, Idaho Statesman, March 15, 2020.

[84] "Groups Call for Action on Fish," Eric Barker, Lewiston Morning Tribune, February 24, 2020.

[85] "An Open Letter to Our Elected Officials," available here: https://medium.com/@pnwenergyandsalmon/an-open-letter-to-our-elected-officials-70bf64800f7a

Chinook runs vital to these endangered orcas are Snake River Basin Chinook. In fact, the decline in Chinook populations resulting in a simultaneous decline in Southern Resident orca viability moved Washington Governor Jay Inslee to request state funding for a "Lower Snake River Stakeholder Process." Recognizing the peril of both orcas and Chinook, on February 19, 2020, forty-two Washington legislators sent a letter to Gov. Inslee in support of dedicating $750,000 for two years of funding for the stakeholder process.[86]

In February 2020, five scientists sent Northwest governors and Congressional delegations a document titled, "Southern Resident Killer Whales and Columbia/Snake River Chinook: A Review of the Available Scientific Evidence." In this document, the scientists state and demonstrate that "… substantial scientific evidence has highlighted the important relationship between salmon from the Columbia Basin, particularly Snake River Chinook, and the future survival of our critically endangered Southern Resident Killer Whales (SRKW or orcas). Restoring healthy, abundant salmon to the Snake River is critical if we are going to provide a more adequate prey base for orcas."[87]

On August 27, 2018, fifty-five "salmon scientists with decades of experience" wrote to to Governor Inslee and his Southern Resident Killer Whale Task Force co-chairs, Stephanie Solien and Thomas "les" Purce, to recommend "an Immediate Measure to Increase Columbia/Snake River chinook abundance." (acknowledging that the Southern Resident orcas' key prey is chinook salmon) They recommended "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…will benefit salmon survival…" The scientists went on to recommend a "Permanent Measure … 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."[88]

On February 11, 2020, Oregon Governor Kate Brown sent a letter to Gov. Inslee expressing support for exploring all possible solutions, including dam breaching, to the orca and Chinook survival crisis. In her letter she expressed "her support to remove the earthen portions from the four concrete lower Snake River dams." She stated the science was clear — "removal is the most probable answer to salmon and steelhead population recovery in the Columbia River Basin, which could aid orcas in their forage for fatty spring Chinook salmon off the mouth of the Columbia in late winter each year."[89]

In April 2019, Idaho Governor Brad Little convened the "Governor's Salmon Workgroup" tasked to "Develop policy recommendations for Governor Little through a collaborative, consensus

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[86] See APPENDIX: A. Letter to The Honorable Jay Inslee

[87] "Southern Resident Killer Whales and Columbia/Snake River Chinook: A Review of the Available Scientific Evidence," Debora A. Giles, PH.D., David Bain, Ph.D., Margaret J. Filardo, Ph.D., Howard Shaller, Ph.D., Rich Williams, Ph.D., February 2020. Available here: https://www.orcaconservancy.org/southern-resident-killer-whales-columbia-snake-river-chinook-a-review-of-the-available-scientific-evidence-white-paper-february-20-2020/

[88] Letter to WA Gov. Jay Inslee and the Co-Chairs of the Southern Resident Killer Whales, 8/27/18. Available here: https://assets.documentcloud.org/documents/5002680/Orca-Scientists-Letter-10-15-18-Final.pdf

[89] "Oregon Looks Upstream to the Lower Snake River," Jessica Pollard, East Oregonian, Feb. 22, 2020. Also see APPENDIX.

driven, public process to restore abundant, sustainable, and well distributed populations of salmon and steelhead in Idaho for present and future generations, while recognizing diverse interests throughout the State."[90] A group of Idaho elected and appointed officials, Chambers of Commerce, businesses and organizations wrote to Gov. Little and to Idaho's Congressional delegation members "to implore [their] immediate leadership to stop the downward trend of Idaho''s salmon and steelhead toward extinction. Once one of the largest migrations of anadromous fish in the world," they wrote, "Idaho's iconic fish are vanishing on our watch."[91]

In other words, all three states and regional scientists are crying out for the recovery of their Northwest salmon and steelhead runs, a cry to which the CRSO-DEIS co-agencies remain deaf. The question arises: Why are the CRSO-DEIS co-agencies so dismally far behind the public, including scientists, on the salmon/steelhead issue? Why have the co-agencies not caught up with local-to-state Pacific Northwest officials who recognize that the *'status quo'* Preferred Alternative is the wrong alternative for saving salmon and steelhead from extinction?

6. Several CRSO-DEIS Statements and Implications Mislead and Misinform the Public.

For example, let's remember that although the co-agencies and special interests speak of the "Columbia-Snake System" as single unit, and as if breaching the 4 dams would shut down all freight transportation in "the system," below Ice Harbor Dam, all waterway transportation and irrigation would continue as usual. This fact needs to be publicly stated. Let's also remember that grain and other products emanating from Idaho's Region 2 can be shipped via truck-rail, and negotiated agreements can be made to set ceilings on rail transportation costs, or the rail line from Lewiston to Ayer Junction (near Pasco), where it connects with the Union Pacific or BNSF rail lines, could be purchased. Such rail line purchases have occurred before in Washington, where the state bought three short lines under the Washington Department of Transportation's Grain Train Program. In other words, these are not unsolvable problems … nor is salmon/steelhead survival endangerment an unsolvable problem. The co-agencies already have the solution in their hands: Alternative 3, breaching of the four lower Snake River dams, combined with a TDG level of 125% saturation at lower Columbia dam tailraces.

One other distinction that needs to be made between the lower Snake's four dams and "the system's" other dams has to do with flood risk and management. In several places, the DEIS notes the importance of the system's dams for flood management. Quoting from the Executive Summary (p. 16) (Development and Comparison of Alternatives; Purpose and Need for Action): "The U.S. Congress authorized the Corps and [Bureau of] Reclamation to construct, operate, and maintain the system projects to meet multiple specified purposes, including flood control (also referred to as flood risk management)… though not every project is authorized for every one of these purposes." The ES states that the PA "…ensures that human life and safety can be protected through flood risk management." However, in the case of the lower Snake River, we

[90] Governor's Salmon Workgroup, Idaho Governor's Office of Species Conservation. https://species.idaho.gov/governors-salmon-workgroup/

[91] https://idahowildlife.org/news/central-idaho-towns-demand-action-to-save-fish-and-communities?fbclid=IwAR0cvFYWHHMOQjJ5AMsE8JCsPEof-Gt4UM2KdqCY0wZmWJZCTRUp85UwC0U

are not talking about dams designed for flood control. The four lower Snake dams are run-of-the-river dams with little reservoir space for fluctuating water levels and with virtually no storage capacity, excepting perhaps a few hours of storage during peak flow. In fact, in Lewiston, Idaho, at the confluence of the Snake and Clearwater rivers, a levee exists to prevent overflooding from the *reservoir*. A few years ago, Lewistonians raised a ruckus over the possibility that the city's already imposing levee would need to be built higher due to possible reservoir overflow caused by sediment buildup at the Clearwater–Snake confluence. Indeed, build-up of sediment at the confluence is a continuous and costly problem that creates – as the rivers rise –flood risk for Lewiston. In 2012, for example, the prospect of needing a 3-foot higher levee created a community controversy in which community leaders strongly opposed raising the levee, one of whom said, "higher levees would further cut off Lewiston from its historic waterfront." "[Then] Lewiston Mayor Kevin Poole said dredging should be the first tool used to alleviate flood worries, and other actions should be favored over levee raising. 'Lewiston and Clarkston both always had a connection to the river,' he said. 'To put that barrier [a higher levee] there to me just doesn't make sense when there are some other things that they can do engineering-wise to handle the flood hydraulics.'" [92]

In response to the controversy, the U.S. Army Corps of Engineers opted to not raise the levee, but to "guard against long-term flood risks caused by the accumulation of sediment in the slackwater of the Snake River. The agency's 1000-page Programmatic Sediment Management Plan and environmental impact statement called for dredging at the ports of Lewiston and Clarkston and in the shipping channel of the lower Snake and Clearwater rivers."[93] Just to prepare the plan, the Corps spent more than 8 years and $16 million. Additional costs (also in the millions) accrued during the public review and final writing and adoption of the plan. In an April 8, 2013 interview with Boise State Public Radio reporter Aaron Kunz, the principal Corps spokesperson for the sediment management plan, Bruce Hendrickson, stated that the Corps needed $39 million from Congress before the Corps could begin work on the dredging project, as that was the cost of what the Corps planned to do.[94]

The bottom-line regarding flood risk and control is that the four lower Snake dams do nothing to prevent flooding at Lewiston-Clarkston or downstream but do create flood risk. With the Lewiston levee already built, landscaped and maintained, breaching of the lower Snake Dams would gradually yet relatively quickly eliminate sediment buildup, flood risk at Lewiston-Clarkston, and the costs of continuously needing sediment dredging.

In 2015, the actual cost to dredge 400,000 cubic yards of sediment from the navigation channel alone in the Lower Snake and Clearwater rivers near Lewiston-Clarkston (partly due to delay)

[92] "Corps Wants to Dredge Valley Channel;" Plan aimed at dealing with sediment buildup in slackwater doesn't call for raising local levees." Eric Barker, Lewiston Morning Tribune, December 14, 2012.
[93] Lower Snake River Programmatic Sediment Management Plan Draft Environmental Impact Statement, U.S. Army Corps of Engineers, December 2012,
[94] Aaron Kunz interview with Bruce Henderson, Boise State Public Radio, April 8, 2013.

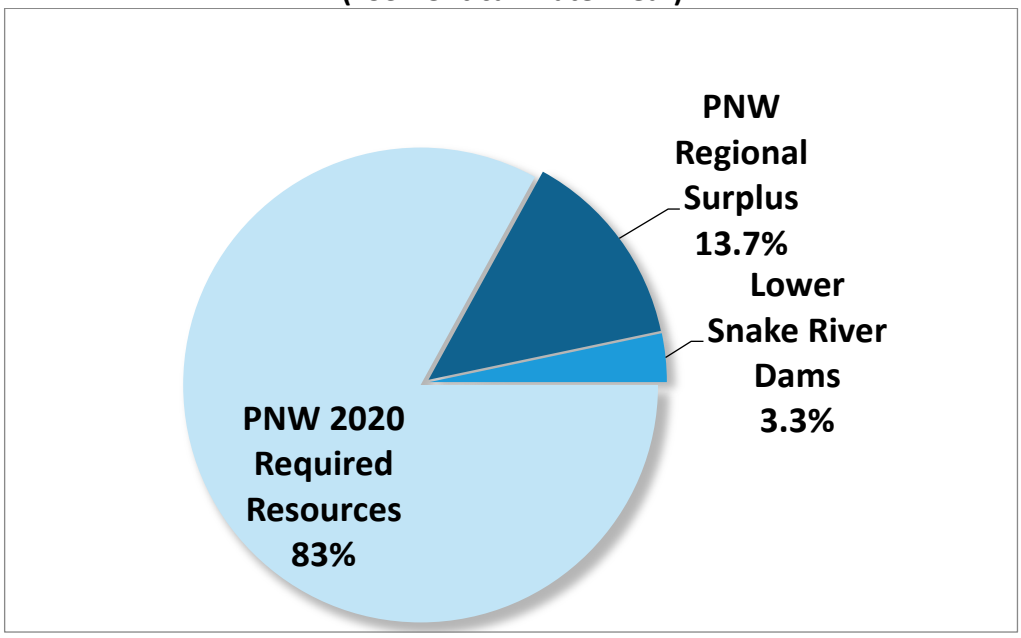
was $9.9 million.[95] As the saying goes, "If you find yourself in a hole – particularly if it's filled with disappearing money, stop digging."

Yet the Corps intends, at taxpayer expense and (currently) an invalid rationale, to keep on digging. The Great Old Broads for Wilderness urges the Corps of Engineers to toss its flawed rationale, and by doing so, save taxpayer money and reduce flood risk. It's time to "prefer" CRSO-DEIS Alternative 3, preferably combined with a TDG level of 125% saturation at the 4 lower Columbia dams.

7. The CRSO-DEIS Fails to Take a Panoramic View of the PNW's Fast-Changing Energy Scene and to Account for an Increasing *Lack of Need* for lower Snake Dam Energy Production.

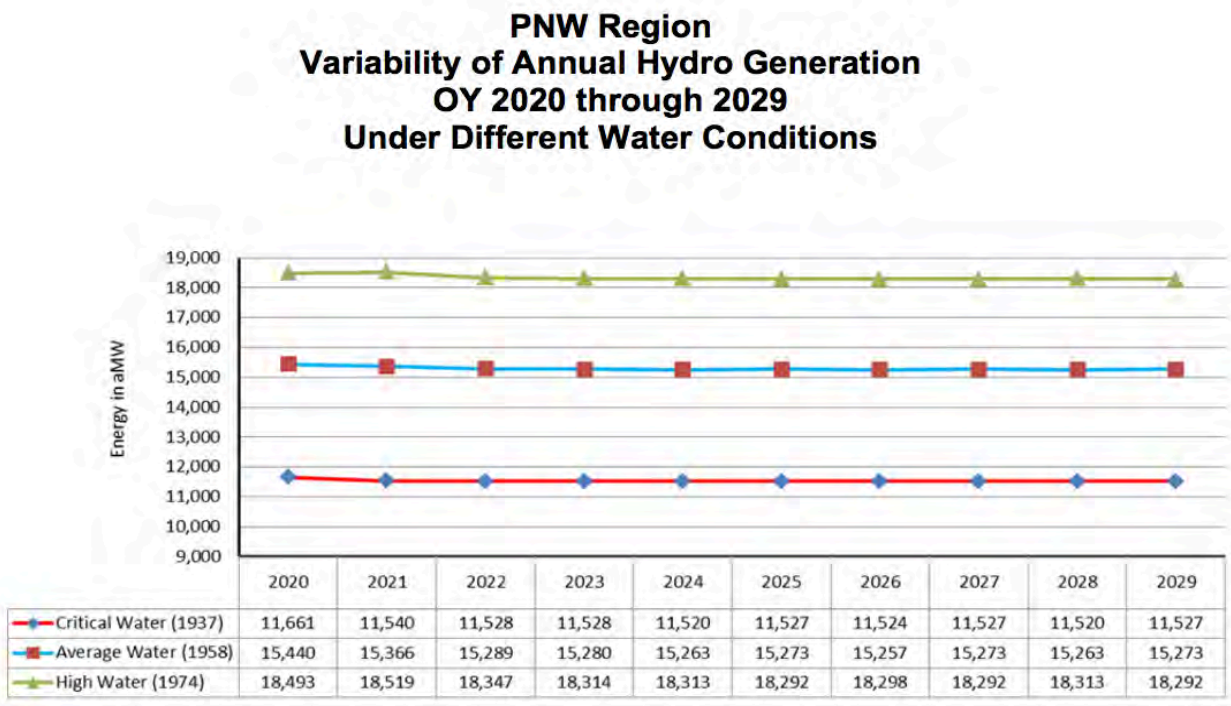
The fast-changing Pacific Northwest (PNW) energy scene also leads us to that same conclusion. As shown in Graph F below, the four lower Snake dams, combined, produce 3.3% of the PNW's power supply, and the PNW regional power surplus – with breaching of the lower Snake dams – would be 13.7%. For 2020, the projected regional load is 23,906 average Megawatts (aMW). Under critical water conditions, the projected generation in 2020 is 28,820 aMW, which leaves a surplus of 3,950 aMW – four times the average lower Snake production. In other words, were all four lower Snake dams breached, the PNW region would still have an energy surplus.

Pacific Northwest Surplus Energy Relative to LSR Dams
(1937 Critical Water Year)



Graph F[96]

[95] "High Cost for Dredging Snake, Clearwater Roils Waters," Eric Barker, Lewiston Morning Tribune, Dec. 10, 2015.
[96] *PNW Region Firm Regional Loads by Customer Class,* 2018 Pacific Northwest Loads and Resources Study, BPA White Book, 2018, OY 2020, Table 3-1, pg. 26, Bonneville Power Administration, https://www.bpa.gov/p/Generation/White-Book/wb/2018-WBK-Loads-and-Resources-Summary-20190403.pdf



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Critical Water (1937)	11,661	11,540	11,528	11,528	11,520	11,527	11,524	11,527	11,520	11,527
Average Water (1958)	15,440	15,366	15,289	15,280	15,263	15,273	15,257	15,273	15,263	15,273
High Water (1974)	18,493	18,519	18,347	18,314	18,313	18,292	18,298	18,292	18,313	18,292

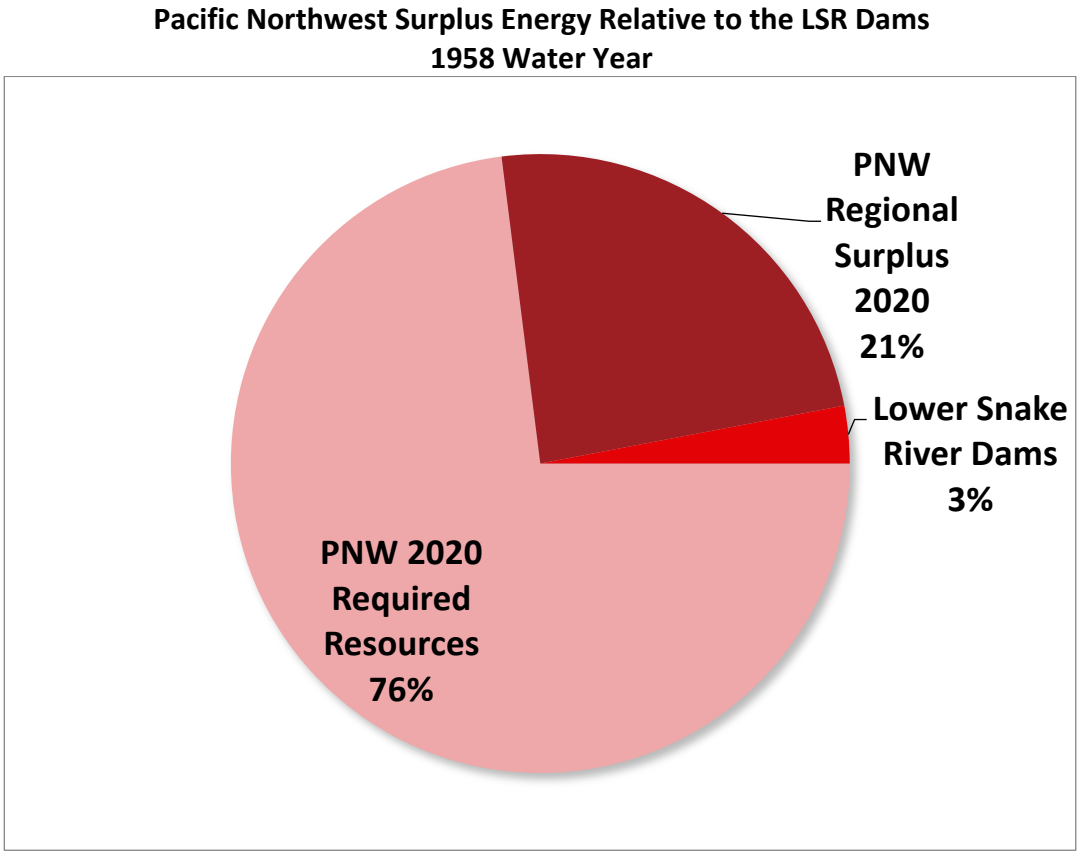
Graph G[97]

Although the DEIS Executive Summary states that "Significant quantities of replacement resources would have to be built to maintain regional power reliability" or "the region would face the likelihood of a loss of load event, e.g. a power blackout, nearly one in every seven years in MO3…," Graphs G above and H below suggest otherwise. First, the lower Snake power output is not particularly significant, nor are blackouts under any circumstances related to lower Snake output likely. This is especially true if one considers the already occurring energy efficiency gains, spoken of further below. Additionally, BPA's Strategic Plan calls for the export of surplus power. However, for that disappearing power too, there is a solution: don't export surplus power. Also, at the pace energy innovations are happening today, such as battery storage innovations, brownouts and blackouts will become even more rare.

Graph F further informed by:
-*PNW Region Generation by Resource Type*, 2018 Pacific Northwest Loads and Resources Study, BPA White Book 2018, OY 2020, Table 3-2, pg. 27, https://www.bpa.gov/p/Generation/White-Book/wb/2018-WBK-Loads-and-Resources-Summary-20190403.pdf (total resources available calculated by adding the annual energy from each resource).
-*Dataquery 2.0,* U.S. Army Corps of Engineers, http://www.nwd-wc.usace.army.mil/dd/common/dataquery/www/ (Calculating longer term average for Lower Snake River Dams).

[97]*PNW Region Variability of Annual Hydro Generation,* 2018 Pacific Northwest Loads and Resources Study, BPA White Book, 2018, OY 2020 through 2029, Table 3-3, pg. 28, Bonneville Power Administration, https://www.bpa.gov/p/Generation/White-Book/wb/2018-WBK-Loads-and-Resources-Summary-20190403.pdf
Graph G further informed by:
2018 Pacific Northwest Loads and Resources Study, BPA White Book, 2018, pg. 8; 28, Bonneville Power Administration, https://www.bpa.gov/p/Generation/White-Book/wb/2018-WBK-Loads-and-Resources-Summary-20190403.pdf

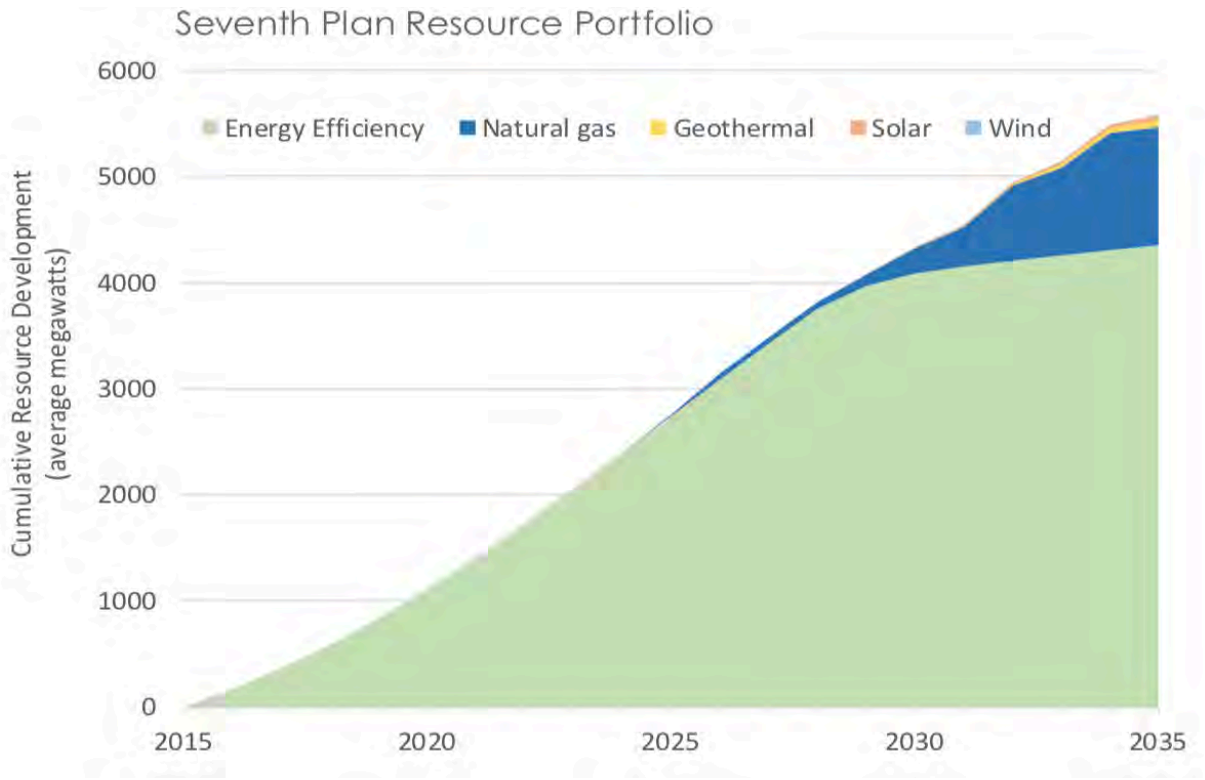
The 1937 "critical water year" represents the lowest recorded river flow; 1958 the "average water year;" and 1974 the "high water year." The amount of hydropower generated in any given operating year depends upon the volume of available water in the rivers. Bonneville Power Administration uses 1937 water levels in its energy forecast – understating, in effect, the volume of surplus power that will likely be available much of the year. But Graph G above shows variability in annual hydro generation projections for operating year 2020 through 2029 under different water conditions. That variability can alter the amount of PNW energy surplus, as shown in Graph H below.



Graph H[98]

[98] *Compiled Graph H informed by:*
-NW Region Firm Regional Loads by Customer Class, 2018 Pacific Northwest Loads and Resources Study, BPA White Book, 2018, OY 2020, Table 3-1, pg. 26, Bonneville Power Administration, https://www.bpa.gov/p/Generation/White-Book/wb/2018-WBK-Loads-and-Resources-Summary-20190403.pdf
-PNW Region Variability of Annual Hydro Generation, 2018 Pacific Northwest Loads and Resources Study, BPA White Book, 2018, OY 2020 through 2029, Table 3-3, pg. 28, Bonneville Power Administration, https://www.bpa.gov/p/Generation/White-Book/wb/2018-WBK-Loads-and-Resources-Summary-20190403.pdf (Calculating additional hydro in average water year)
-PNW Region Generation by Resource Type, 2018 Pacific Northwest Loads and Resources Study, BPA White Book 2018, OY 2020, Table 3-2, pg. 27, https://www.bpa.gov/p/Generation/White-Book/wb/2018-WBK-Loads-and-Resources-Summary-20190403.pdf (total resources available calculated by adding the annual energy from each resource).

During an *average* water year, PNW surplus energy increases by an estimated 3,779 aMW, nearly four times the average output of all four lower Snake dams, combined. A *high* water year would produce an additional 3,127 aMW, more than three times the average output of all four dams, combined. In other words, the use of the critical water year, 1937, for power projections consistently underestimates the amount of surplus energy in the Pacific Northwest. According to the Corps of Engineers' Data Query website, the lower Snake dams 2004-2019 average annual Megawatt production was a mere 963 aMW.[99] Thus, we reiterate: Were all four lower Snake dams breached, the PNW region would still have a more than sufficient energy surplus. There would be no cause to fear any of the special-interest hyped power "blackouts."



Graph I[100]

In fact, the PNW could see that surplus grow higher due to *efficiency gains*. As shown in Graph I above, the Northwest Power and Conservation Council (NWPCC) projects additional power resulting solely from efficiency gains in 2020 will be 1000 aMW, slightly more than the above 2004-2019 annual output of the four lower Snake dams. In the DEIS Executive Summary (p.25),

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-*Dataquery 2.0,* U.S. Army Corps of Engineers, http://www.nwd-wc.usace.army.mil/dd/common/dataquery/www/ (Calculating longer term average for Lower Snake River Dams).

[99] U.S. Army Corps of Engineers, Data Query website, https://www.nwd-wc.usace.army.mil/dd/common/dataquery/www/

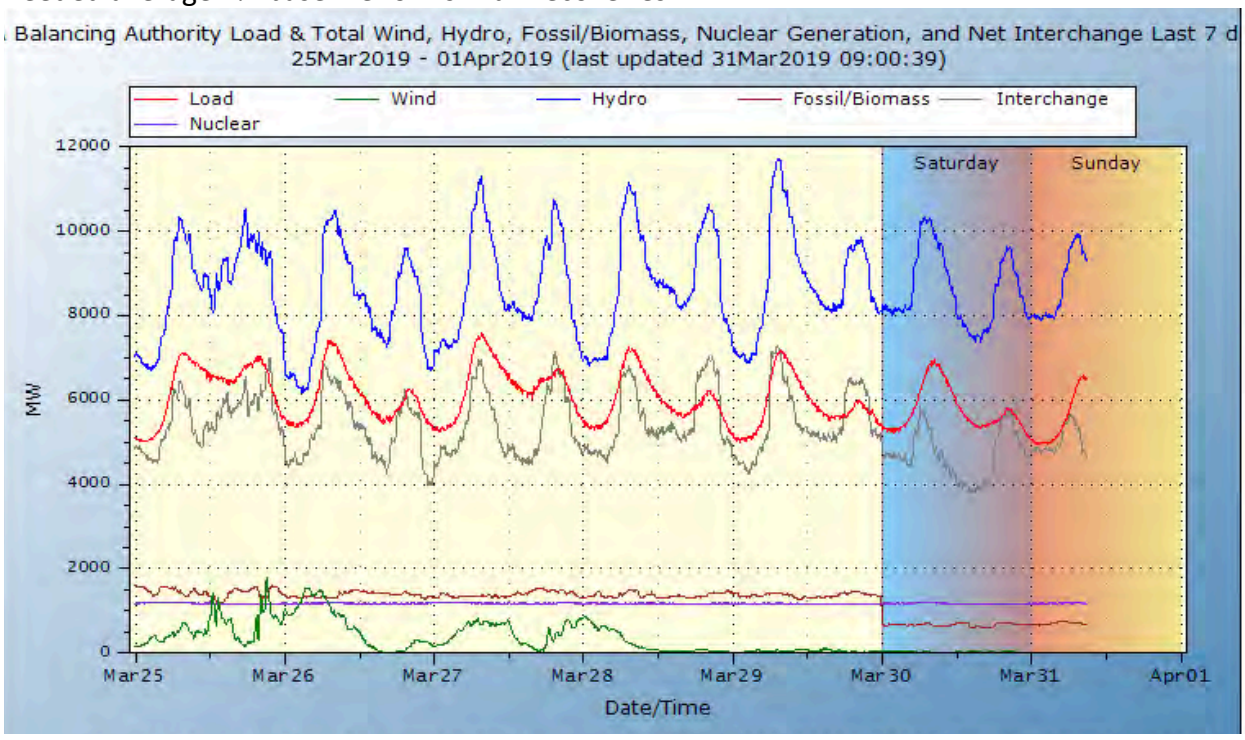
[100] *Figure 1-1: Seventh Plan Resource Portfolio*, Seventh Northwest Conservation and Electric Power Plan, pg. 1-2, document 2016-02, Northwest Power and Conservation Council (Feb. 25, 2016)

the co-agencies state that Alternative 3 (MO3) “would not meet the objective to Provide a Reliable and Economic Power Supply. Under MO3, hydropower generation would decrease by 1,100 aMW under average water conditions, and 730 aMW under low water conditions compared to the No Action Alternative.”

However, if the NWPCC efficiency-gain projection above is correct, as we believe it will be, Alternative 3, including breaching, would meet the DEIS systemwide objective: Provide a Reliable and Economic Power Supply. It follows, too, that efficiency gains will diminish the role the dams play in maintaining reliability, flexibility and dispatchability, and diminish their effect on the region’s risk of power shortages compared to the No Action Alternative. Efficiency gains would also then lessen any need for “significant quantities of replacement resources,” and thereby, also save taxpayer dollars.

The entire notion of a need for “significant quantities of replacement resources” with regards to power is dubious since that “need” is so minimal … or nil … and is, importantly, an already underway solvable “replacement” problem.

The CRSO-DEIS Preferred Alternative fails on both the fish and power fronts. That is, it fails to ensure achievement of a needed average of 4% or higher smolt-to-adult return ratio (SARS) for run recoveries and fails to include PNW power surplus and power savings projected to be accomplished by increasing power usage efficiency, both of which render the four lower Snake dams moot. The PA’s goal of ensuring “adequate, affordable and reliable power” (ES, p.32) will be fully met by Alternative 3; that is, breaching of the 4 lower Snake dams will not unhinge the meeting of that goal. Only Alternative 3, including breaching, will ensure an SAR of at least the needed average 4% baseline for fish run recoveries.



March 2019, 7-day BPA Power Generation

Graph J[101] From top:

BLUE – hydropower	GREEN – wind
RED – load demand	COBALT – nuclear
GRAY – surplus	BROWN – fossil/biomas

Historically, BPA's revenue stream relied in part upon the sale of surplus energy. Today, however, due to fast-paced development of other energy sources in places such as California to which BPA previously sold surplus at a profit, BPA's surplus power is no longer in high demand. BPA now is, in fact, compelled at times to sell the Northwest's surplus power at negative prices. There are times today, too, such as during spring run-off, when surplus power significantly increases, and that increase causes BPA to reduce or shut down wind and other power sources as per its "Oversupply Management Protocol." Indeed, at times, as shown in Graph J above, BPA's combined power generation reaches a level approximately twice as great as its contracted power demand.

Currently, around the world, many developments in the arena of power generation lean toward power storage capability. Yet, the 2020 CRSO DEIS co-agencies apparently remain blind to the possibility that researching or creating and building storage facilities for surplus power and/or oversupply would be a more innovative, much less expensive, more consistently reliable, and finally, for the planet's sake, more resource friendly investment than continuing taxpayer-funded expenditures in support of the four aged and no longer essential lower Snake River dams. We suggest that the co-agencies designate Alternative 3, including breaching plus a 125% TDG spill at the lower Columbia tailraces, as the "preferred alternative" and add a "power storage development" component to that alternative.

Indeed, lower Snake dam breaching itself could leave infrastructure in place that may provide a foundation for an up-to-date power-savvy approach, such as development of a power storage facility. According to Wood Mackenzie, the global energy storage business will have a record year in 2020, with 12.6 gigawatts of battery storage to come online.[102] The CRSO-DEIS co-agencies could become a party to that growth. Both breaching and storage development would create needed new jobs.

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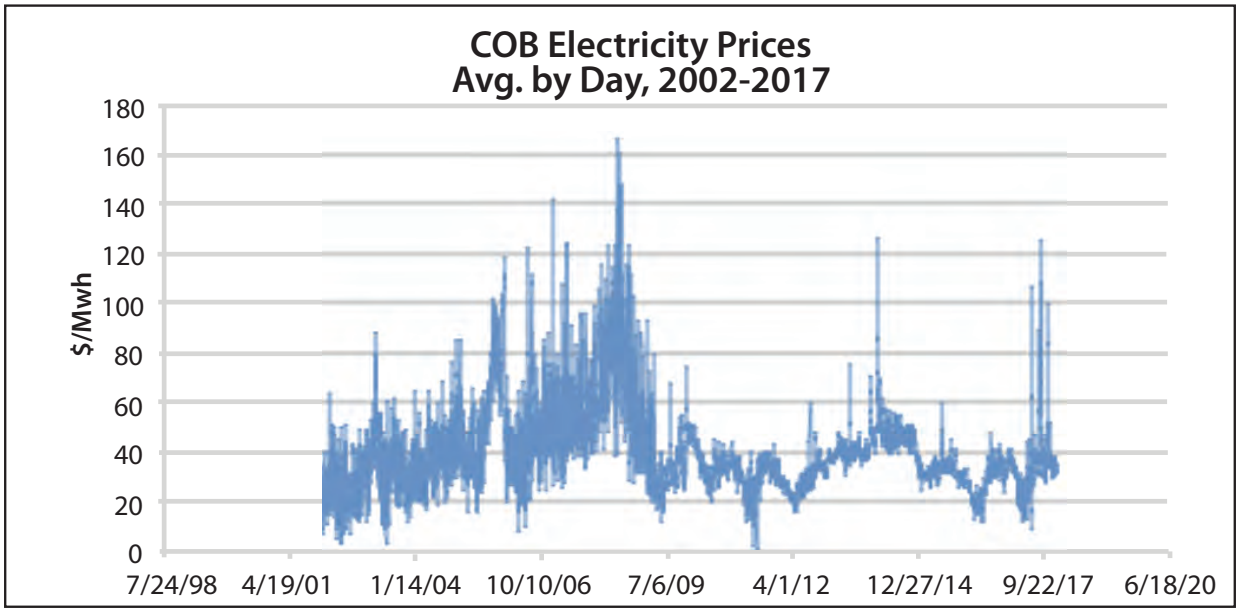
[101] *BPA Balancing Authority Load and Total Wind, Hydro, Fossil/Biomass, Nuclear Generation, and Net Interchange, Near-Real-Time,* Bonneville Power Administration (updated Mar. 31, 2019), https://transmission.bpa.gov/Business/Operations/Wind/baltwg3.aspx
Graph J further informed by:
Oversupply, Bonneville Power Administration (Accessed Apr. 29, 2019).

[102] https://www.woodmac.com/press-releases/coronavirus-could-derail-energy-storage-growth-in-2020/

Consider too that, since the federal government owns the dams and transmission lines, the government is competing with private enterprise, which discourages, rather than encourages, development of new sources of PNW energy. For example, with wind projects, farmers benefit by leasing land to wind projects; local government and state taxes are paid; and wind project developments create both short-term (construction) and long-term (operation) jobs. The co-agencies have an opportunity right now to leap to the forefront of the power storage or power production frontier with a "Pacific Northwest Breach-and-Build Power Project." **For the fish, "right now" is all the time they – and we – have**.

> "We've taken huge hits in the secondary revenues market, with cheap gas, low load growth, and the oversupply conditions. It's been a bloodbath for folks in the wholesale market." – Elliot Mainzer, Administrator, Bonneville Power Admin.

We believe the above Elliot Mainzer statement, and we believe it's time to eliminate the lower Snake dams from BPA's wholesale market. Prior to 2009, the price of surplus power averaged about $60 per Megawatt hour (MWh). Since 2009, the average price for surplus power has been about $22 per MWh. As reflected in Graph K below, when surplus power sold for about $60 MWh, power from the lower Snake dams had an annual market value of $506 million. In today's surplus market, that power would earn $186 million – a drop in revenue of $320 million.

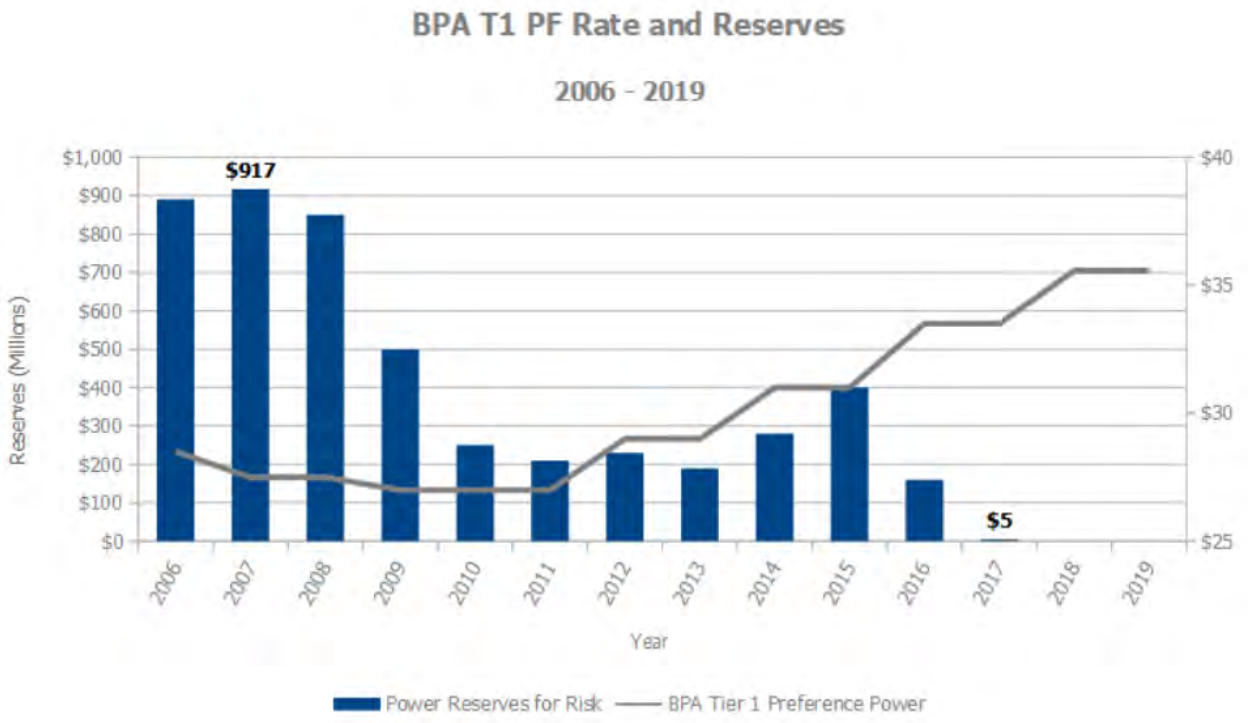


Graph K[103] (COB = California-Oregon Border)

[103] Graph K informed by:

- http://oasis.caiso.com/mrioasis/logon.do, The Bonneville Power Administration 2018: Threatened, Endangered, or on the Brink of Extinction?, Rocky Mountain Econometrics, pg. 1 (May 2018), http://www.rmecon.com/examples/BonnevillePower%20May%202018.pdf

In fact, the ongoing decline in prices for surplus PNW energy has created a fiscal crisis for BPA, as BPA Administrator Elliott Mainzer has publicly acknowledged. As shown in Graph L below, beginning in 2008, in reaction to its loss of revenues, BPA drew down its fiscal reserves from $917 million in 2007 to a fragile $5 million in 2017. BPA's own documents show that BPA needs $300 million for six weeks operating capital.[104] In 2011, as shown in Graph L below, BPA began raising the price of power for its contracted Tier 1 customers. Over a period of eight years, price increases totaled 30%. There were no winners – not BPA, not Tier 1 ratepaying customers, and not taxpayers. Yet, here we have another solvable crisis. Alternative 3 could usher all three of the *injured* –and the Pacific Northwest's iconic anadromous fish – back into flow.



Graph L[105]

BPA's surplus energy revenue losses forced BPA to raise its price, so that its 2018-2023 strategic plan calls for selling more surplus power at higher prices into a falling market. See Graph M below.

-John Harrison, *New Era, New Challenges,* Northwest Power and Conservation Council (Mar. 15, 2018), https://www.nwcouncil.org/news/new-era-new-challenges

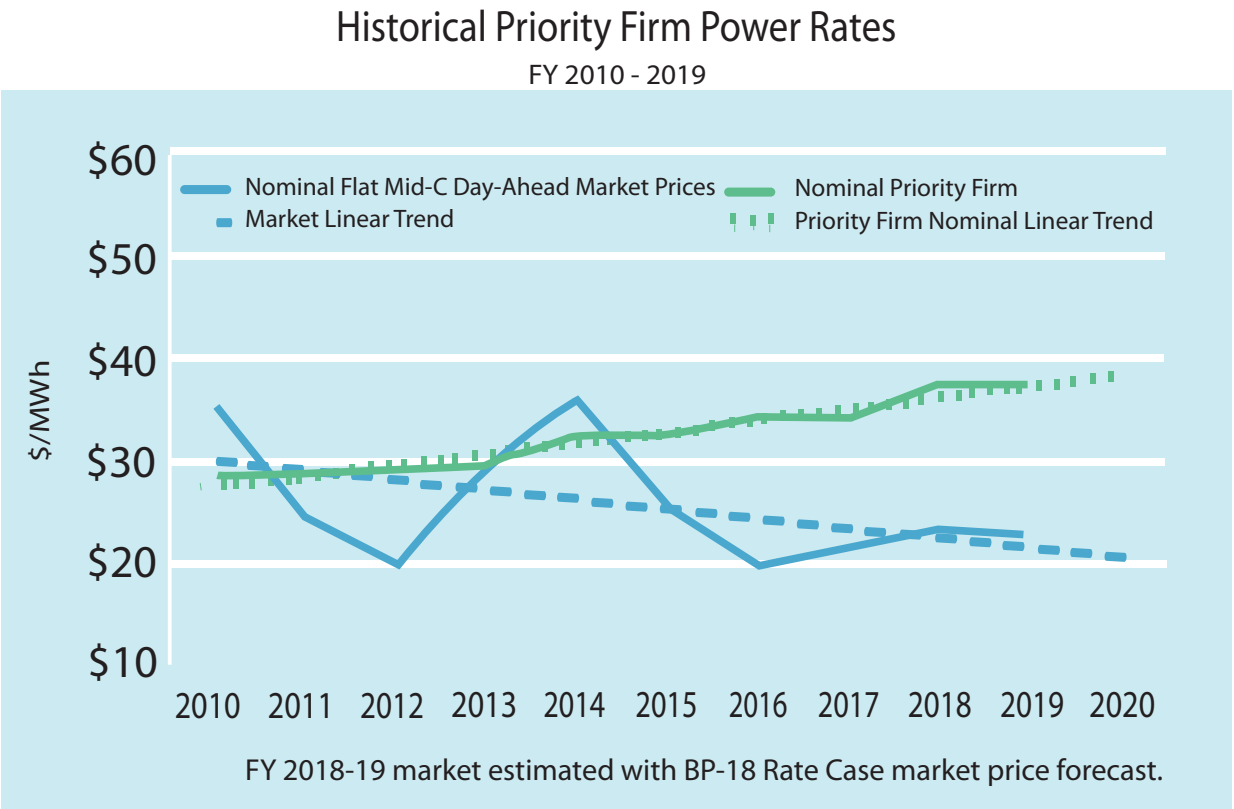
[104] BPA 2018-2023 Strategic Plan. Available here: https://www.bpa.gov/StrategicPlan/Pages/Strategic-Plan.aspx

[105] *BPA Rates Have Climbed Substantially Power Business Line Cash Reserves are Depleted, BPA T1 PF Rate and Reserves 2006-2019,* Northwest Power and Conservation Council, Cowlitz PUD Perspectives on BPA Market Position, pg. 2 (Feb. 6, 2018), https://www.nwcouncil.org/sites/default/files/5_156.pdf

So what's the outlook?

Public Utility Districts (PUDs) that purchase BPA power are under contract until 2028. BPA currently charges them $35.57 per Megawatt-hour (MWh) for firm (guaranteed) power. If BPA is unable to offer power at a competitive price, PUDs will reduce their power purchases from BPA or simply not renew their contracts. For BPA, that is not a good outlook.

So is BPA going to be able to offer power at a competitive price?



Source: BPA 2018-2023 Strategic Plan

Graph M[106]

[106] *Historical Priority Firm Power Rates FY 2010-2019,* BPA Strategic Plan 2018-2023, pg. 35, Bonneville Power Administration (January 2018), https://www.bpa.gov/StrategicPlan/StrategicPlan/2018-Strategic-Plan.pdf

Additional information:
-*Objective 3a: Increase power revenues through new market opportunities for clean capacity,* BPA Strategic Plan 2018-2023, pg. 36, Bonneville Power Administration (January 2018), https://www.bpa.gov/StrategicPlan/StrategicPlan/2018-Strategic-Plan.pdf
-John Harrison, *New Era, New Challenges,* Northwest Power and Conservation Council (Mar. 15, 2019), https://www.nwcouncil.org/news/new-era-new-challenges

Pacific Northwest wind power plants produce nearly three times the output of the four lower Snake dams, combined. In Montana, new wind power projects are predicted by 2030 to produce up to 5000 aMW targeted for export to the Pacific West Coast states. Near Pendleton, Oregon, the Wheatridge project will include 292 turbines with a peak capacity of 500 aMW and includes wind, solar and battery backup to offer firm power at competitive pricing. As shown in Graph N below, wind power costs have, since 2010, fallen and become cost competitive with BPA's rate for firm contracted power.

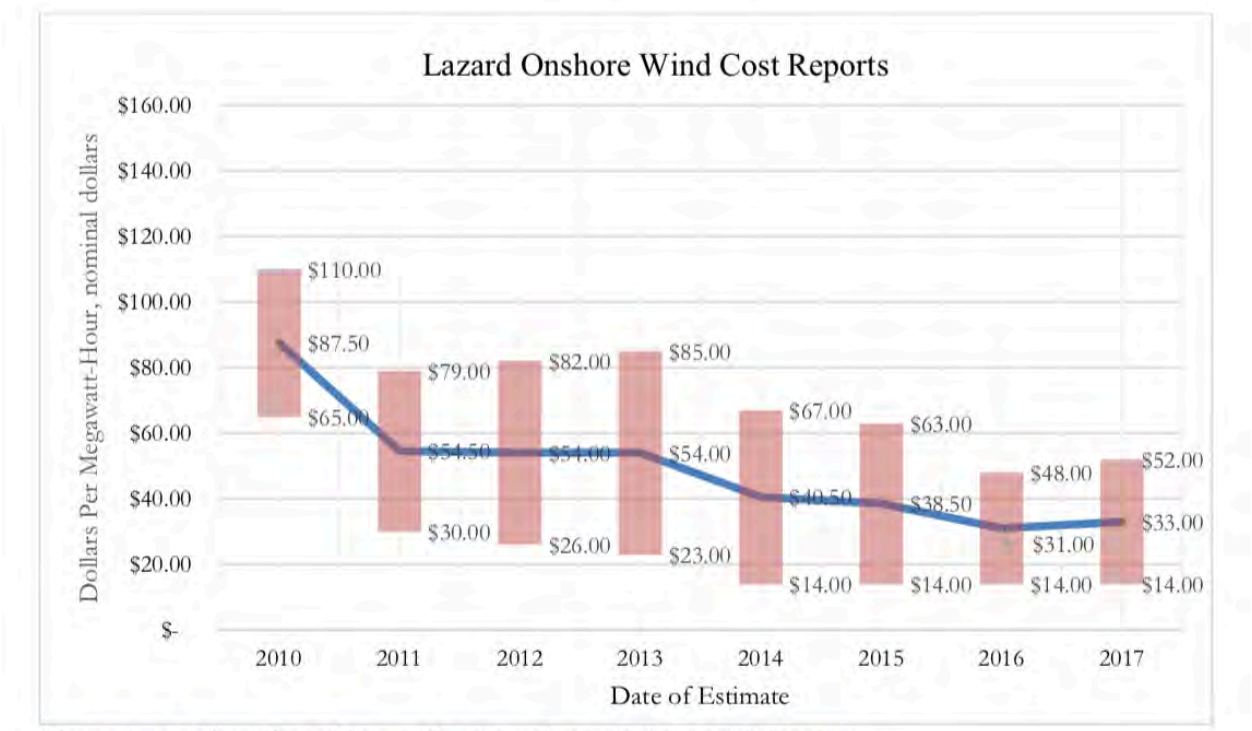


Figure 2: Levelized Cost of Energy for Wind (Lazard Historical Estimates)

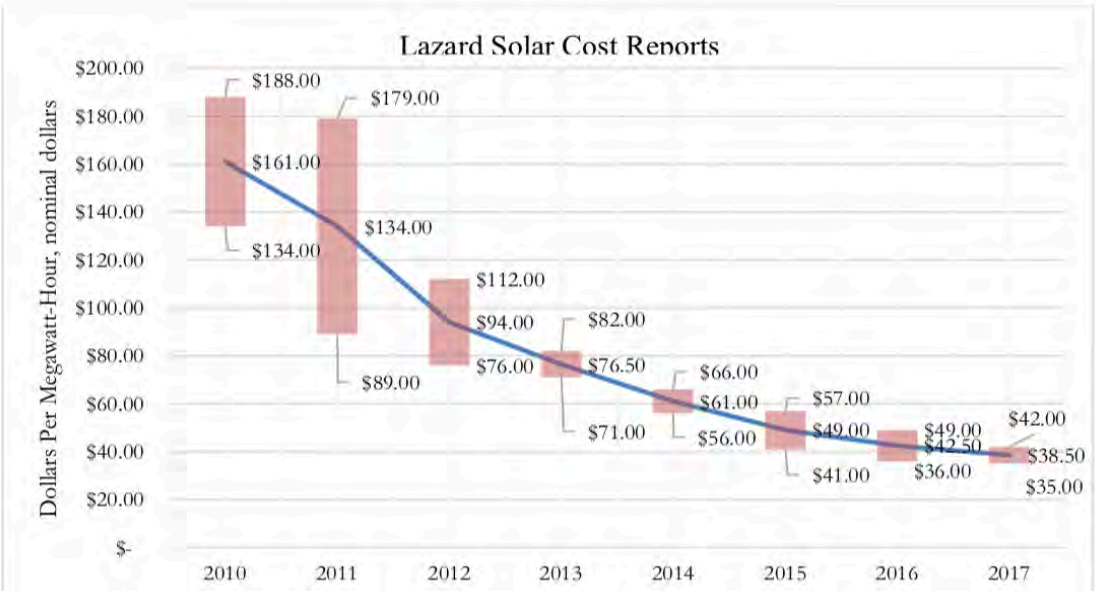
Graph N[107]

[107]Robert McCullough, *Figure 2: Levelized Cost of Energy for Wind (Lazard Historical Estimates),* McCullough Research, pg. 4 (Nov. 21, 2017), https://d3n8a8pro7vhmx.cloudfront.net/oregonpsrorg/pages/1220/attachments/original/1511978571/20171121_Updating_Bonneville's_Strategic_Plan_-_Final.pdf?1511978571

Additional information:
-*Wind,* Montana State University (accessed Apr. 29, 2019), http://www.montana.edu/energy/wind.html

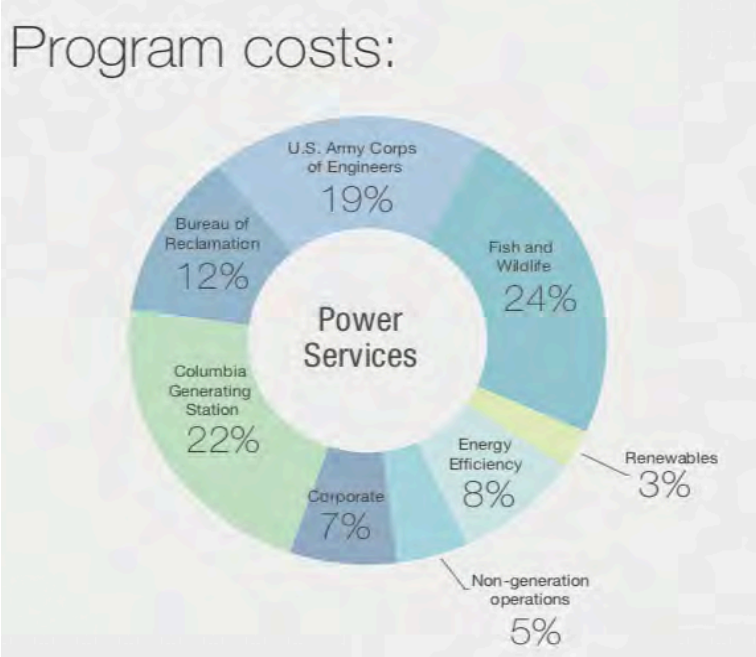
-*Wheatridge Wind Energy Facility Request for Amendment 2: Draft Proposed Order,* Oregon Energy Facility Siting Council, pg. 1 (Sept. 21, 2018), https://www.oregon.gov/energy/facilities-safety/facilities/Facilities%20library/2018-09-21-WRW-AMD2-DPO-RFA.pdf
-*Historical Energy Production,* Northwest Power and Conservation Council (accessed May 9, 2019), https://app.nwcouncil.org/energy/powersupply/home/

As Graph O below shows, from 2010 to 2017, the average solar energy price declined by 76% to $38.50 per MWh. Between 2018 and 2023, California, once a major buyer of BPA's surplus power, intends to add 14,037 aMW of new solar energy to its own energy portfolio.
Again, is BPA going to be able to offer power at a competitive price? Is keeping the aging lower Snake River's four dams going to sustain and/or bolster BPA's viability? From a taxpayer perspective, is it worth continuing to pay the costs associated with the lower Snake's four dams and the costs of mitigating their negative effects on anadromous fish survival?



Graph O

Graph P below shows the distribution of BPA's hydropower system program costs.



Graph P[108]

From 2008 to 2017, BPA's cost for fish and wildlife mitigation in the Columbia Basin averaged $727 million per year, or about 24% of BPA's annual budget. Since 2001, the Corps of Engineers has spent at least $1.8 billion on "structural improvements" to lower Snake and lower Columbia dams in an attempt to increase juvenile fish survival. After 20-plus years and a cost of over $15 billion, no Columbia or Snake River threatened or endangered salmon or steelhead species is on a path to recovery. Some swim on the brink of extinction.

With the 2020 DEIS Preferred Alternative, the co-agencies are unconscionably proposing to continue their failed "structural improvements" routine well into the future. Despite BPA's predictable lack of fiscal reprieve, the ongoing downward trend of hydropower load demand, the significant loss and high expense of lower Snake waterway barging, and the agonizing continual decline of anadromous Snake Basin fish runs, "structural improvements" is all the DEIS offers … a bottom-rung, least effective effort. Also, we must note that the recent agreement to increase spill to 125% total dissolved gas was intended to be a temporary lifeline for the fish, not a long-term fix.

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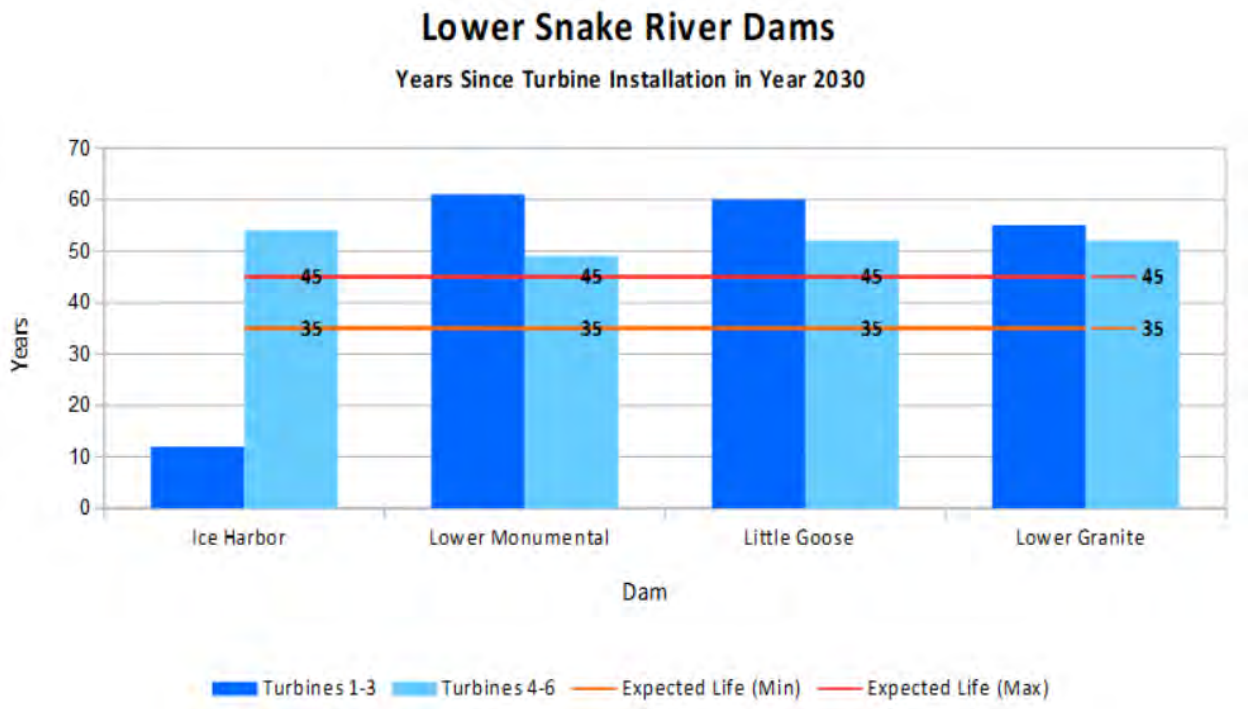
[108]*Program Costs,* BPA Strategic Plan 2018-2023, pg. 13, Bonneville Power Administration (January 2018), https://www.bpa.gov/StrategicPlan/StrategicPlan/2018-Strategic-Plan.pdf
Additional Information
-Letter from Elliot E. Mainzer, Administrator and Chief Executive Officer of Bonneville Power Administration, Received by Congresswoman Cathy McMorris Rodgers, 5 June 2017.
-*Juvenile salmon and steelhead pass the dams through many different routes,* Federal Caucus (accessed May 1, 2019), https://www.salmonrecovery.gov/Hydro/StructuralImprovements.aspx
-*Salmon Species Listed Under the Federal Endangered Species Act,* Washington State Recreation and Conservation Office (July 2009), https://www.rco.wa.gov/salmon_recovery/listed_species.shtml

The dams' structures themselves add to the taxpayer burden of keeping the lower Snake dammed, rendering the above-noted routine effort even more ridiculous. By 2030, if still in place, nine lower Snake dam turbines will be 60 years of age, and twelve others will be 50-60 years of age. As reflected in Graph Q below, the Corps of Engineers has projected the design-life of each turbine at 35-45 years. In other words, all of these turbines need to be rehabbed. At what cost?

In its FY2016-2030 Hydro Asset Strategy for Large Capital Forecast, BPA is budgeting approximately $42 million per turbine for rehabbing 14 turbines at the McNary Dam on the Columbia River. This same Capital Forecast includes $2.8-$3 million per year for "turbine reliability" at Little Goose, Lower Granite, Lower Monumental, and Ice Harbor dams on the lower Snake. Projected out, the estimated cost of an after-2030 rehab of 21 lower Snake dam turbines exceeds $1 billion. Realistically, current and projected power market conditions make it highly improbable that money will … or ever should … be spent to rehab the lower Snake dam turbines.

In an inappropriately timed March 30,2020, publicly released email (prior to the April 13th public comment deadline), BPA appeared to attempt to preempt public commenters' input. In the release, BPA stated, "…powertrain replacements for the Snake River Dam hydroeclectric assets are not currently forecasted to occur within our 20-year system asset plan." "Currently" seems a sly word, for BPA's management plan is altered at BPA's will, depending upon age and status of assets, like turbines. At Ice Harbor, BPA has already replaced one turbine, is installing a second, and has a third on order. Why? The aged turbines need replacement. Turbines in all four Snake River dams will need to be replaced within a much shorter time than BPA's stated "49-60 years." As stated above, the Corps has projected turbine design-life at 35-45 years. In not stating this fact, BPA's publicly released statement is at best an example of misinformation.



Graph Q[109]

Final Comments

In every respect the 2020 DEIS Preferred Alternative fails. Foremost, the PA fails to ensure an average 4% smolt-to-adult return ratio of threatened and endangered salmon and/or steelhead, which means that the co-agencies have, with the PA, failed to meet the mandate of the court order that precipitated the drafting of the 2020 CRSO-DEIS and failed to establish justification for the court's acceptance of the PA. On the other hand, Alternative 3 (MO3) would succeed to ensure the needed SARS and would justify the court's acceptance.
We repeat: The Opinion and Order from the U.S. District Court for the District of Oregon, states that the EIS should evaluate how to ensure that the prospective management of the CRS is not

[109]*Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement,* Appendix E, Existing Systems and Major System Improvements Engineering, US Army Corps of Engineers Walla Walla District, pg. E-E-43 (Feb. 2002), https://www.nww.usace.army.mil/Portals/28/docs/library/2002%20LSR%20study/Appendix_E.pdf?ver=2019-05-03-141036-473

Additional Information:
Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement, Appendix E, Existing Systems and Major System Improvements Engineering, US Army Corps of Engineers Walla Walla District, pg. E-E-43 (Feb. 2002), https://www.nww.usace.army.mil/Portals/28/docs/library/2002%20LSR%20study/Appendix_E.pdf?ver=2019-05-03-141036-473

likely to jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of designated critical habitat. The 2020 CRSO DEIS Preferred Alternative is inadequate to the task; whereas the 2020 CRSO DEIS Alternative 3 (MO3), including breach, IS adequate to the task and must become the preferred alternative. We advise adding a TDG level of 125% saturation at the 4 lower Columbia dam tailraces to MO3 as a component of what should become the "preferred alternative."

The Executive Summary (page 24) notes, "New congressional authority and funding would be required to implement the dam breaching measures in MO3" Mr. Mainzer, General Helmlinger, Ms. Gray and Mr. Mabe, now is the time to re-balance your analyzes of "resource" values, to calculate the long-term *savings in funding* that would result from Alternative 3, and then to **grab your dam-breaching briefcases and head to the Halls of Congress**.

Respectfully,

Shelley Silbert, Executive Director
Great Old Broads for Wilderness
P.O. Box 2924, Durango CO 81302
Office: 970-385-9577

Amy Stuart
ODFW Fish Biologist (retired) and Leadership Team Member, Central Oregon Bitterbrush Broads, Oregon

Borg Hendrickson
Snake River Anadromous Fish Issue Leader, Palouse Great Old Broads, Idaho

Debra Ellers
Attorney at Law (retired) and Polly Dyer Cascadia Broadband Member, Washington

Laurie Kerr
Broadband Leader, Cascade Volcanoes Broadband, Washington and Oregon

CC: This CRSO-DEIS comment document is being shared with the following:

Idaho Governor Brad Little
Idaho U.S. Representative Mike Simpson
Idaho U.S. Representative Russ Fulcher
Idaho U.S. Senator Mike Crapo
Idaho U.S. Senator James Risch

Oregon Governor Kate Brown
Oregon U.S. Representative Suzanne Bonamici
Oregon U.S. Representative Greg Walden
Oregon U.S. Representative Earl Blumenauer
Oregon U.S. Representative Peter DeFazio
Oregon U.S. Representative Kurt Schrader
Oregon U.S. Senator Ron Wyden
Washington U.S. Senator Jeff Merkley

Washington Governor Jay Inslee
Washington U.S. Representative Suzan DelBene
Washington U.S. Representative Rick Larsen
Washington U.S. Representative Jaime Herrera Beutler
Washington U.S. Representative Dan Newhouse
Washington U.S. Representative Cathy McMorris Rodgers
Washington U.S. Representative Derek Kilmer
Washington U.S. Representative Pramila Jayapal
Washington U.S. Representative Kim Schrier
Washington U.S. Representative Adam Smith
Washington U.S. Representative Dennis Heck
Washington U.S. Senator Patty Murray
Washington U.S. Senator Maria Cantwell

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APPENDIX

A. Letter to WA Gov. Jay Inslee from OR Gov. Kate Brown, 2/11/20

B. Letter to WA Gov. Jay Inslee from 42 WA legislators, 2/19/20

C. Letter to Will Stelle from 8 salmon scientists, 10/27/15

KATE BROWN
Governor

February 11, 2020

The Honorable Jay Inslee
Governor, State of Washington
416 14th Ave. SW
Olympia, WA 98504-0002

Dear Governor Inslee:

I am writing to thank you for your leadership and initiative to restore health to our iconic orcas, and to share with you my perspective on long-term and interim steps necessary to support that effort. The imperilment of Southern Resident Killer Whales is a tragedy shared by all of us in the Pacific Northwest, and Oregon stands with you to boldly address those factors contributing to their demise.

Among the three primary threats (i.e., toxins, noise and lack of food), Oregon's primary opportunity is to enhance the availability of salmon to foraging orcas. The recent draft report from your task force *Lower Snake River Dams Engagement Report* provides a good context for sharing my perspective on long-term and interim steps to enhance the availability of salmon to foraging orcas. Importantly, this can be done while preserving the foundation of the low cost, carbon-free hydropower system that has helped fuel Oregon's economy for the last century, and will help us to integrate more wind and solar to achieve our long-term climate goals.

As you know, Oregon is actively engaged in a long-standing effort to recover salmon and steelhead in the Columbia Basin as a vital part of our ecological, cultural and economic heritage and prosperity. The science is clear that removing the earthen portions of the four lower Snake River dams is the most certain and robust solution to Snake River salmon and steelhead recovery. No other action has the potential to improve overall survival two-to three-fold and simultaneously address both the orca and salmon recovery dilemma while providing certainty in the legal challenge that has complicated operations for decades. This option would likely provide a dramatic increase in salmon available for orca forage, particularly during the late winter when vulnerable gestating orcas may be foraging off the mouth of the Columbia River. This option reduces direct and delayed mortality of wild and hatchery salmon associated with dam and reservoir passage and provides the most resilience to climate change (e.g., reduced thermal loading in the lower Snake and Columbia rivers and better access to and from the alpine headwaters most resilient to shrinking snowpacks).

I believe restoring the lower Snake River must be a key presumption of our long-term solution for salmon and orca recovery, but much must be done before this is accomplished in order to help minimize and mitigate for potential harm to other vital sectors. Among other

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WWW.GOVERNOR.OREGON.GOV

considerations, this includes an affordable, nimble and reliable power system that can help us to integrate renewables to meet our climate goals; continued water supplies for agriculture and municipalities; and efficient and affordable ways to get commodities to market. As identified in your draft report, collaborative, solution-based discussions among stakeholders are needed to facilitate these transitions. Oregon stands ready to be an effective leader and partner in these efforts.

In the interim, I believe there are two important actions that we can take together to address immediate needs of orcas and salmon. First, the Flexible Spill and Power Agreement that we both signed can provide the foundation for an effective bridge to a long-term solution for salmon that also preserves the hydropower system as an important tool in meeting our carbon objectives.

Hopefully we can work together to improve on that agreement, which will enhance survival of juvenile wild and hatchery salmon which translate into additional orca forage only two years later. Second, Oregon has capacity to increase interim hatchery production of salmon important for orca forage. This increased production must be focused in areas with low ecological risk to existing wild salmon populations, such as lower Columbia River off-channel areas and other areas outside the range of historical natural production areas. In recognition of this urgent need for orca forage, Oregon already has fish in the queue that could be available to orcas as soon as 2021. I would like to partner with you to help ensure this initiative is fully funded and sustainable during the necessary interim period while long-term solutions are addressed.

Thank you again for your leadership on orca recovery and for facilitating the thoughtful collaborations that will help secure solutions.

Sincerely,

Kate Brown

Governor Kate Brown

KB:jm,kl

Legislative Building **Washington State Legislature** Olympia, WA 98504-0600

February 19, 2020

The Honorable Jay Inslee
Office of the Governor
P.O. Box 40007
Olympia, Washington 98504

Dear Governor Inslee,

We are writing to express appreciation for your leadership in support of new and more effective policies to confront the urgent plight of Southern Resident orcas and Chinook salmon upon which they depend. These two species are emblematic of our state and revered by both tribal and non-tribal people across the Northwest and nation.

The status of the orca and salmon is also telling us our work is far from done. We supported funding for the Lower Snake River Stakeholder Process in the last legislative session and appreciate your office's hard work on this important initiative. The decisions that we make concerning the lower Snake River and its endangered salmon populations represent an important piece of a larger regional strategy to protect both of these species from extinction. It also gives us an opportunity to address the needs of our communities.

While scientists tell us that restoring the lower Snake is necessary to protect its salmon populations, we recognize the topic is contentious. That's precisely why we supported funding for the stakeholder process. Hard decisions lie ahead and the best outcomes for our salmon, our orca and our communities will come from honest dialogue, true collaboration, and commitment to shared interests.

The legislature funded the stakeholder process with $750,000 over a two-year period. Though difficult, this necessary discussion offers tremendous potential and opportunity for fishing and farming communities, as well as orca and salmon. We support the work by your office this year to advance this conversation. We encourage your continued leadership after the release of the final report.

This is a unique chance to work with stakeholders and to engage regional policymakers to develop solutions that will recover endangered salmon and orca, while protecting all of our communities in the process.

Again, thank you for your strong leadership. Let us know how we can assist you.

Rep Mike Chapman 24th Legislative District

Sen. Patty Kuderer 48th Legislative District

Rep. Eileen Cody 34th Legislative District

Rep. My-Linh Thai 41st Legislative District

Rep. Steve Tharinger 24th Legislative District

Rep. Laurie Dolan 22nd Legislative District

Rep. Mia Gregerson 33rd Legislative District

Rep. Cindy Ryu 32nd Legislative District

Sen. Kevin Van De Wege 24th Legislative District

Rep. Roger Goodman 45th Legislative District

Rep. Christine Kilduff 28th Legislative District

Sen. Derek Stanford 1st Legislative District

Rep. Vandana Slatter 48th Legislative District

Sen. Mona Das 47th Legislative District

Rep. Lillian Ortiz-Self 21st Legislative District

Sen. Liz Lovelett 40th Legislative District

Sen. Jamie Pedersen 43rd Legislative District

Rep. Shelley Kloba 1st Legislative District

Sen. Annette Cleveland 49th Legislative District

Sen. Christine Rolfes 23rd Legislative District

Rep. Davina Duerr 1st Legislative District

Sen. Jesse Salomon 32nd Legislative District

Rep. Tana Senn 41st Legislative District

Rep. Gerry Pollet 46th Legislative District

Rep. Javier Valdez 46th Legislative District

Rep. Joe Fitzgibbon 34th Legislative District

Sen. Mona Das 47th Legislative District

Rep. Strom Peterson 21st Legislative District

Sen. Sam Hunt 22nd Legislative District

Rep. Debra Lekanoff 40th Legislative District

Sen. John McCoy 38th Legislative District

Rep. Amy Walen 48th Legislative District

Sen. Joe Nguyen 34th Legislative District

Rep. Monica Stonier 49th Legislative District

Rep. Jesse Johnson 30th Legislative District

Sen. Karen Keiser 33rd Legislative District

Rep. John Lovick 44th Legislative District

Rep. Alex Ramel 40th Legislative District

Rep. Sherry Appleton 23rd Legislative District

Rep. Nicole Macri 43rd Legislative District

Sen. Bob Hasegawa 11th Legislative District

Sen. Claire Wilson 30th Legislative District

\October 27, 2015

Will Stelle
Regional Administrator, West Coast Region National Marine Fisheries Service – NOAA 7600 Sand Point Way Northeast
Seattle, WA 98115

Dear Mr. Stelle:

We are compelled to respond to your recent column in the Seattle Times, "NOAA Fisheries embraces – not ignores – climate research" (August 29, 2015). Your views omit more than they say and so present a misleading and incomplete picture of your agency's unfortunate failure to take aggressive and necessary steps to address the effects of climate change on the freshwater habitat of threatened and endangered salmon and steelhead in the Columbia River Basin. This failure is not new; it has accumulated over nearly two decades of inadequate and ineffective action.

First, a bit of background that should be familiar to you. As the Northwest Power Council's Independent Science Advisory Board (ISAB) pointed out nearly a decade ago in its report, "Climate Change Impacts on Columbia Basin Fish and Wildlife" (ISAB 2007-2), the impacts of climate change on Columbia Basin salmon will be profound. Moreover, even in 2007, these impacts were not obscure or unknown – warming water temperature, alterations in river and stream flows, and reduced ocean productivity were all effects that had been identified and documented. Indeed, many of the scientific studies of these effects cited in the ISAB's 2007 review date back to the 1990s. Subsequently, in 2008, the ISAB also concluded that even NOAA's worst-case scenario for assessing the potential effects of future warming ocean temperatures was not "sufficiently pessimistic." (ISAB 2008-1 at 3.) To be sure, our

understanding of climate change impacts on salmon has advanced and become more refined over the past five to ten years, but no one – least of all NOAA – can credibly claim that the increasing impacts of climate change on Columbia Basin salmon and steelhead is unforeseen or a surprise.

Second, you are correct that NOAA Fisheries has been a leader in *conducting* climate research and analyses. For example, its scientists have been lead or co-authors of numerous studies examining:

- the physical and biological impacts of climate change in freshwater, e.g., Crozier 2008; Crozier & Zabel 2013 (projecting different decreases in survival for Snake River spring/summer Chinook), Wu, *et al*. (2012) (projecting decreased summer stream flow of nearly 20% in 2020s to over 30% by 2080s and increases in summer stream temperatures from 0.92°C to 2.10°C);
- the shrinking ocean habitat, Abdul-Aziz 2011 (large contraction of 30% to 50% by the 2080s of the summer thermal range suitable for chum, pink, coho, sockeye, and steelhead in the marine environment, with an especially large contraction (86% to 88%) for chinook);

[1] ISAB 2008-1, "Review of the Interior Columbia River Technical Recovery Team's Analyses of Survival Changes Needed to Meet Viability Criteria" (Mar. 7, 2008).

- the effectiveness limitations of various freshwater habitat actions to address climate change,

  Beechie 2012 (only certain kinds of stream habitat restoration like shading and increases in flows can address climate effects); Wade 2013 (habitat protection alone will not save the species); and

- the need to consider whether any potential benefits from habitat restoration actions will be overtaken by the effects of climate change, Battin 2007.

  Third, what NOAA has failed to do – and repeatedly – is actually *apply* the results of its research on climate change and salmon to support the major changes to dam operations that are necessary if we are going to continue to have wild salmon and steelhead in the Columbia and Snake Rivers in a climate change world. The recitation of NOAA's "actions" to address climate change in your column does a good job of highlighting this failure:

(1) You point out that this summer fish managers were engaged in a last minute, *ad hoc* effort to address river temperature problems that we have known about for years, even decades. For example, over a decade ago the U.S. EPA conducted modeling to show that the reservoirs behind the four dams on the lower Snake River are the most significant contributor to increased water temperatures in the lower Snake River that are harmful to salmon. In 2013, we lost over one- third of the returning adult Snake River sockeye because of hot water in the adult fish ladder at Lower Granite Dam. The federal agencies decided then to jerry-rig pumps to get cooler water into the adult ladder but they failed for two years to undertake that work and faced the same problem again this summer. You also point to the cool water releases from Dworshak dam as part of the effort to address warm water this year. What you don't say is that these releases are limited in both quantity and timing, and that they can only cool the River to a small degree and for a short distance. At best, they are a minor band-aid on a major temperature problem. And even then, using this limited cool water earlier this year – which you identify as an appropriate response – exposes later-migrating salmon like Fall Chinook to even greater risks. In short, the measures you identify amount to tinkering around the edges of the water temperature problems salmon face, with a very limited range of options, because we have avoided major change at the dams, changes that should have been made starting years ago.

(2) You also invoke the ISAB's climate recommendations as justification for the habitat restoration and other measures NOAA and other federal agencies are pursuing to address climate impacts. What you don't explain is that the actions in the federal salmon plan you describe are in the plan as an attempt to mitigate for the harmful effects of dam operations – and all of their hoped-for benefits are accounted for to meet this need. They are not there to mitigate for the *additional* impacts of climate change. The benefits of an action – even if they exist – can't be counted twice to address to two different and additive problems. The question isn't whether certain kinds of actions are generally good things to do in the face of climate change. The question is whether the agencies are implementing enough of the right kinds of the actions in the right places, with sufficient benefits to mitigate for *both* the harm from the dams *and* the additive adverse effects of climate change. The federal plan you point to doesn't tackle

this problem at all even though in other plans (like your agency's recent biological opinion for the Central Valley Project in California) NOAA has considered both threats and identified separate and

additive actions to address each. Of course, the ISAB report you cite makes it very clear that climate change impacts are *additive* – they occur independently or on top of other impacts – and it stresses that failing to understand the magnitude of the additional climate impacts and their implications for other mitigation efforts is "like driving down the road looking in the rearview mirror while accelerating."

(3) Likewise, the precautionary 11% to 44% reduction in ocean survival you say NOAA has used as part of a conservative approach to salmon restoration is a reduction only in comparison to the admittedly unreasonable assumption that future river conditions will be like those salmon experienced historically over the last century and more – without climate impacts. The current and future effects of climate change ensure that those days are not returning. NOAA has known (since the ISAB told the agency in 2008) that reduced salmon survival as a result of continuing and expanding climate impacts is likely to be far worse than the 11-44% "mid-range" reduction NOAA assumed. It was unreasonable and untenable for NOAA to assume only this mid-range (and comparatively small) decrease in survival in 2008 in light of the ISAB's clear advice. NOAA's continued reliance on this assumption even in the face of (its own) more recent scientific analyses – some noted above – is hardly grounds for asserting that the agency is pursuing a cautious approach to climate impacts on salmon restoration.

(4) Finally, we agree that protecting wetlands, floodplains and other important salmon habitat is useful and important, but these kinds of actions are simply nowhere near sufficient to mitigate for the harmful effects of dam operations and the slack water reservoirs they create in the Columbia and Snake Rivers. And such actions will be even less effective as the effects of a warming climate continue to increase. We must address the problem Columbia and Snake River salmon and steelhead face at the source: the dams and reservoirs that have had and continue to have such a profound impact on their survival.

Yes, as you say, this has been a tough year for our wild salmon. But all of the best science indicates that the future is likely to bring many more such years and more often. If we are to avoid losing endangered Snake River sockeye or threatened Snake River spring/summer Chinook – or any of the other imperiled species of salmon and steelhead in the Columbia basin – we need to be doing far more than following the processes and going through the motions you describe in your column. If the dead salmon up and down these rivers this summer did nothing else, they gave us a clear and unmistakable warning that continued reliance on the kinds of small steps and minimalist measures we have taken since Snake River sockeye were first listed under the Endangered Species Act over twenty years ago will not work.

Sadly, the loss of salmon this summer is not our first warning. In 1994, federal Judge Malcolm Marsh rejected the first of five subsequent federal plans for dam operations – all but one a failure – because the plan settled for minor adjustments when, in the Court's words, "the situation literally cries out for a major overhaul." We have now lost twenty years of lead time to heed the Judge's warning. And yet the salmon are still waiting for that "major overhaul." Your column does a major disservice to the urgency of the challenge we face. We believe it is imperative to heed the science, change course, and pursue a plan for salmon restoration that squarely faces the need for major changes in both the existence and operation of the federal dams on the Columbia and Snake Rivers.

Sincerely,

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CC:
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Eileen Sobeck, Administrator, National Oceanic Atmospheric Administration Gina McCarthy, Administrator Environmental Protection Agency

Gina McCarthy, Administrator Environmental Protection Agency

Dennis McLerran, Administrator, Region 10, Environmental Protection Agency Jo-Ellen Darcy, Assistant Secretary of the Army (Civil Works)

Elliott Mainzer, Administrator, Bonneville Power Administration _____

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