



Pacific Fishery Management Council

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Brigadier General D. Peter Helmlinger
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Mr. Elliot Mainzer, Administrator
Bonneville Power Administration
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Ms. Lorri Gray Region 9 Director
Bureau of Reclamation
1150 N Curtis Rd, Suite 100
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Re: Columbia River System Operations Draft Environmental Impact Statement

Dear General Helmlinger, Administrator Mainzer, and Regional Director Gray:

The Pacific Fishery Management Council (Council) has reviewed the Columbia River System Operations (CRSO) Draft Environmental Impact Statement (DEIS) prepared by the Action Agencies (Agencies), and appreciates the opportunity to comment.

The purpose of the DEIS is to update the management of the CRSO in light of changed conditions since the 2002 EIS. The CRSO must improve conditions for spawning, rearing, passage, and survival of species listed under the Endangered Species Act (ESA) throughout the affected environment.

As emphasized in the 2016 U.S. District Court decisions and acknowledged in the DEIS, the DEIS must ensure that CRSO management will not jeopardize the continued existence of ESA-listed species or adversely affect designated critical habitat. Additionally, the DEIS must strive to improve the survival of juvenile and adult salmon in the main Columbia/Snake migration corridor, such that positive trends for these fish populations are established (National Wildlife Fed'n v. National Marine Fisheries Service, 184 F. Supp. 3d 861 (D. Or. 2016)).

Council Authority

The Council is one of eight fishery management councils established by the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The Council has jurisdiction over the U.S. West Coast Exclusive Economic Zone (3-200 miles offshore). The Council manages commercial, recreational, and tribal fisheries for about 119 species of salmon, groundfish, coastal pelagic species, and highly migratory species in Federal waters.

The MSA requires fishery management councils to describe, identify, conserve, and enhance essential fish habitat (EFH) for managed species that are under a Federal fishery management plan, and requires the Council to identify and comment on any activity that, in the Council's view, is likely to substantially affect the habitat, including essential fish habitat, of an anadromous fishery resource under its authority [Section 305 (b)(3)(B)].

As defined in the MSA, "essential fish habitat" means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting this definition of EFH, "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery.

The Council's Pacific Coast Salmon Fishery Management Plan (PFMC, 2014) identifies and describes EFH for Chinook salmon, coho salmon, and Puget Sound pink salmon. EFH for Pacific Coast salmon includes all waters that are currently occupied by Council-managed salmon, as well as most of the habitats that were historically occupied by those stocks. The Columbia River and most of its tributaries downstream of Chief Joseph Dam and the Snake River, and most of its tributaries downstream of the Hells Canyon Dam, are designated as EFH for Chinook and coho salmon.

Council Concerns

In accordance with the Council's authorities, the Council has considered the DEIS and the preferred alternative in the context of sustainable fisheries and salmon EFH. The DEIS analysis and preferred alternative are of particular relevance and concern, as the allowable ocean harvest rate of Council-managed fisheries must meet MSA- and ESA- required conservation objectives for multiple stocks, including wild Snake River fall Chinook.

Mortalities of ESA-listed populations can impose limitations on Council-area fisheries, even when catch rates of particular ESA-listed fish (fall and spring Chinook salmon) are not substantial. For example, in past years, fisheries have been constrained by the allowable exploitation rate on Snake River wild fall Chinook. The Council is undergoing review of its fisheries with respect to the southern resident killer whale (SRKW) to ensure that conduct of Council salmon fisheries does not adversely affect SRKW via reduction of their primary prey, Chinook salmon. This issue is relevant to the DEIS, as many Columbia River basin Chinook

salmon stocks are considered among the “priority” Chinook salmon stocks for increasing abundance to help SRKW recovery.

Based on the Council’s review, we find a number of deficiencies with the DEIS analysis and the selection of the preferred alternative. These are noted here and further discussed below by section.

1. The DEIS does not incorporate the Council’s scoping recommendations
2. The DEIS does not include an “anadromous fish-focused” alternative in the range of alternatives
3. The DEIS analysis does not sufficiently account for the impacts of climate change or avoid and mitigate increased water temperatures
4. The DEIS does not include an equitable economic analysis of recreational, commercial, and tribal fisheries
5. The DEIS alternatives analysis is insufficient in assessing the benefits of configurations and operations that restore or improve EFH for salmonids
6. The DEIS preferred alternative is not a sufficient improvement over the No Action Alternative and, therefore, fails to meet a number of regional requirements, goals, and objectives for salmon (e.g., Endangered Species Act, Northwest Power Act, Northwest Power and Conservation Council Fish and Wildlife Program Recovery and Harvest Goals, Columbia Basin Partnership Task Force Goals, and state water quality standards).

1. The DEIS does not incorporate the Council’s scoping recommendations.

Despite the Council having made extensive recommendations on DEIS scoping (enclosed, PFMC 2016), many of our comments are not incorporated in the DEIS. Among these, the Council called for an equitable analysis of actions that could lead to the recovery of ESA-listed stocks and restore Columbia River salmon populations to sustainable, harvestable levels. The Council also called for emergency response water temperature strategies and measures to improve passage and migration. These are further described below.

2. The DEIS lacks an “anadromous fish-focused” alternative in its range of alternatives.

The CRSO DEIS did not include a set of configurations and operational measures across the spectrum, as recommended by the Council during DEIS scoping, and as ordered by the 2016 U.S. Court decision, to ensure equitable treatment of “anadromous fish-focused” priorities, alongside other DEIS priorities.

An “anadromous fish-focused” alternative would demonstrate the full potential for recovery and increased productivity possible with CRSO modifications that would likely include restoring spawning and rearing habitats in the Snake River and improved fish passage at all Federal Columbia River Power System (FCRPS) dams, but without additional measures to benefit power generation, water supply, and water management that adversely affect salmon and EFH. Such an alternative could include measures that reconnect and restore hundreds of miles of fish habitat throughout the CRS to improve spawning, rearing, passage, and natural migration. This would

likely include a combination of breaching the lower Snake River dams and high spill to 125 percent total dissolved gas (TDG) at the eight FCRPS dams. No such alternative was presented in the DEIS. In fact, the proposed alternatives are biased toward power generation and include measures that simultaneously improve and reduce fish survival.

3. The DEIS analysis does not sufficiently account for the impacts of climate change or avoid and mitigate increased water temperatures.

The DEIS states, “Air temperature is projected to be warmer throughout Region C (Section 4.1.2.1). Warmer air temperature combined with projected reduced summer and fall flow volume (Section 4.1.2.4) will likely lead to increased riverine and reservoir surface water temperature. Periods of higher temperature are projected to occur earlier in the year and last for longer durations than historically.” Under the CRSO operations of the no action alternative, there are 257 temperature exceedance events annually. Under climate change predictions, reduced snowpack, and increased water temperatures and lower summer discharges, the frequency of cumulative daily temperature exceedance events will likely increase.

The DEIS states the preferred alternative will result in additional exceedances of state water quality standards for temperature (68°F). Temperature exceedances are expected to occur between 57 to 71 days, at each of the four Columbia River dams, for a total of 265 exceedance events. The DEIS also states that water temperature violations would occur more frequently during years when river flows are lower than normal and summer ambient temperatures are higher. The DEIS states, “Historical water temperatures have already approached lethal limits for adult steelhead in the upper Snake and middle Columbia Rivers (Wade et. al 2013). Thus, even minor increases in thermal exposure put some of these populations above lethal limits.” This is likely to occur with regularity as the effects of climate change persist in the Columbia Basin. The cumulative effect of increased water temperature is not adequately described in the DEIS, and can be anticipated to result in sub-lethal effects (compromised fitness) or direct lethal mortality. The preferred alternative did not analyze the effects of increased water temperature on fish populations, particularly the effects caused by climate change.

Furthermore, the DEIS does not include a thermal emergency contingency plan. The DEIS must anticipate thermal emergencies and provide a plan to mitigate such events. The Council’s DEIS Scoping comments recommended the DEIS contain a thermal emergency contingency plan and offered sufficient detail for such a plan (see enclosed DEIS scoping letter).

4. The DEIS does not include an equitable economic analysis of recreational, commercial, and tribal fisheries.

The socioeconomic elements of the DEIS fail to address or employ widely accepted professional standards to ensure a thorough, objective and transparent evaluation of the DEIS alternatives. These standards are defined in court interpretations of the National Environmental Policy Act, the Corps’ guidance documents for socioeconomic analyses, and other standards.

Consequently, there are severe, systemic gaps in the socioeconomic analyses of the DEIS. The DEIS fails to:

- Make use of all the available socioeconomic information that is relevant, accurate, and reliable.
- Make a substantial, objective effort at studying, analyzing, and evaluating all the socioeconomic issues relevant to the actions considered.
- Account fully for the socioeconomic importance of ecosystems and ecological risks.
- Consider equally both effects that are monetized and effects that are not monetized.
- Examine the multiple socioeconomic consequences of the preferred alternative and other alternatives.
- Fully disclose all relevant information, and provide full transparency to the decision-making process, to enable the public and decision makers to understand the rationale for selecting the preferred alternative.

The DEIS reports current gross domestic product (GDP) and full-time equivalent (FTE) fishery values for Oregon and Washington. Those numbers reflect the current state and value of salmon fisheries in Oregon and Washington, which are operating under a constraining set of rules that severely limits harvest. Given that other sections of the CRSO DEIS evaluate alternative futures, it is equally warranted to scale fishery economic values to that of a future with healthy salmon populations and what that would mean to the fisheries GDP and FTEs of the states. The Council anticipates that the increased employment and economic value would be substantial.

Furthermore, the DEIS does not provide an equitable economic analysis of fisheries as a commodity. Hatchery contributions in the region are significant, but are not considered in the analysis. Both ocean and in-river fisheries that depend on the health of Columbia River salmon stocks provide millions of dollars in economic activity annually. From 2012-2015, Gislason et al. (2017) estimated that commercial and recreational salmon fishing accounted for an annual average of \$1,996 million in GDP and supported 26,700 FTE jobs in the U.S. economy.

Furthermore, recreational fishing is combined with other recreational activities into a single metric in the DEIS socioeconomic analysis of recreational use, and thus provides no measure of the economic impacts of different alternatives on recreational fishing. For the states with fisheries most impacted by CRSO operations, recreational angling for salmon accounted for an annual average \$238 million in GDP and 3,160 FTE (Washington) and \$173 million in GDP and 2,850 FTE (Oregon) (Gislason et al. 2017).

Likewise, the DEIS lacks an economic analysis of river and ocean commercial fisheries and tribal fisheries. Commercial salmon harvest accounted for an annual average \$241 million in GDP and 3,090 FTE (Washington) and \$55 million in GDP and 910 FTE (Oregon) (Gislason et al. 2017).

Beyond economic activity, salmon are profoundly important for the native peoples of the Northwest. As co-managers of the salmon resource, tribal interests must be an integral part of this discussion.

As stated previously, Council fisheries can be further constrained by listed species, depending on the actions proposed in the alternatives. Given the significant contributions of commercial,

recreational and tribal fisheries to regional economies, a fishery-specific economic analysis should be given equal weight with other commodity-specific analyses in the DEIS.

5. The DEIS alternatives analysis is insufficient in assessing the benefits of configurations and operations that restore or improve EFH for salmonids.

The Council has long supported the Northwest Power and Conservation Council's (NPCC) Fish and Wildlife Program goals and objectives for listed and unlisted populations. The NPCC recovery goal for ESA-listed Snake River and upper Columbia River salmonids is a smolt-to-adult return (SAR) rate of 2-6 percent, with an average of 4 percent. Below two percent, the population is at risk of decline. The NPCC objectives for unlisted populations or ESA-listed populations downstream of the Snake River and Upper Columbia River basins are to "significantly improve the smolt-to-adult return rates (SARs) for Columbia River Basin salmon and steelhead, resulting in productivity well into the range of positive population replacement."

The DEIS used two analytical models (the Northwest Fisheries Science Center [NWFSC] life cycle model [LCM] and Comparative Survival Study [CSS] model) for estimating fish survival under the alternatives (Figure 1). However, only four evolutionarily significant units were analyzed quantitatively; the following comments focused on the Snake River spring/summer Chinook evolutionarily significant unit for illustrative purposes. The CSS models accounts for the effects of powerhouse encounter rates, spill, water transit time, migration timing, and ocean conditions on juvenile survival (latent mortality), while the LCM model assumes there is little effect of the outmigration experience (other than estuary arrival time) on ocean survival and primarily attributes survival to ocean conditions. The disparity between the models underscores the shortcomings of the DEIS analysis. Nevertheless, the models generally agree that MO3 is best for fish, and that the preferred alternative is similar (LCM) or slightly better (CSS) than the No Action Alternative; however, there is so little variation in the LCM results (without assuming decreases in latent mortality) that they could be described as functionally the same. These results informed the Council's review of the alternatives, which is focused on the preferred alternative and on alternatives that provide substantial benefits to salmon (MO3 and MO4).

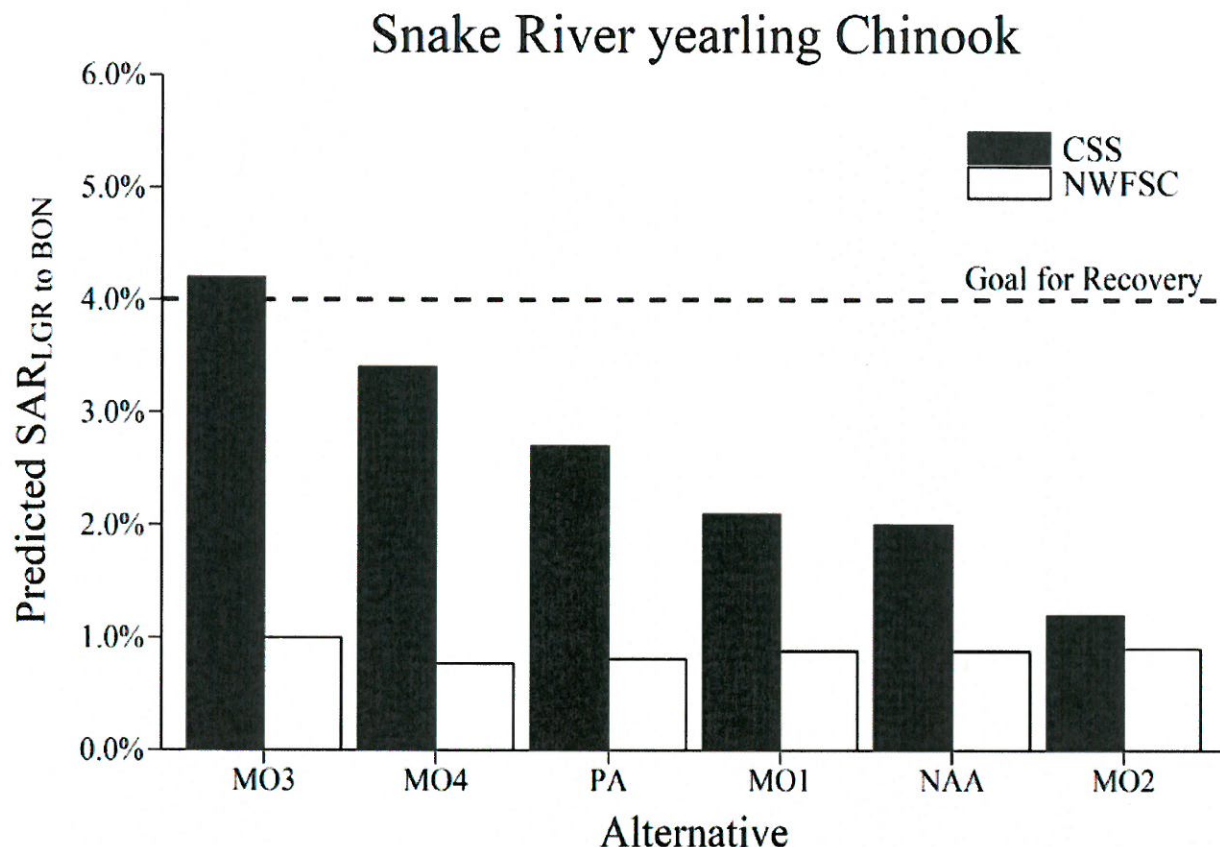


Figure 1. LCM¹ and CSS model results² of predicted SAR for Snake River juvenile Chinook for DEIS alternatives. The LCM results displayed assume 0% decrease in latent mortality.

MO3 (breach of the lower Snake River dams)

The DEIS concludes that MO3 will have long-term beneficial effects for juveniles of all anadromous fish stocks, and major increases in Snake River fall Chinook spawning habitat. The DEIS also concludes long-term benefits from MO3 for anadromous adults in the Lower Snake and Columbia Rivers. MO3 is an aggressive reconfiguration of long-standing structure and operations that would improve conditions for migration and full life-cycle survival of anadromous species in the Columbia River. It is the only alternative that both models predict as an improvement over the no action alternative. MO3 consistently achieves SAR levels that lead to recovery; however, neither model accounts for the multitude of EFH benefits of a naturally-functioning river on salmon populations such as Snake River fall Chinook and coho salmon, or potential reductions in predation from non-native warm water fish species.

¹ The footnote from Table 7-25 states in full: “1 / NMFS LCM does not factor latent mortality due to the System into the SARs or abundance outputs. For discussion purposes, potential decreases in latent mortality of 10 percent, 25 percent, and 50 percent are shown. The value for 0 percent is the actual model output, the 10 percent, 25 percent, and 50 percent values represent scenarios of what SARs or abundance hypothetically could be under the increased ocean survival scenario if changes in the alternative were to decrease latent mortality by that much.”

² The data for the PA- Preferred Alternative and the NAA- No Action Alternative are in Chapter 7, table 7-27 page 7-102. The data for the other Multi-Objective Alternatives are in Appendix E, Table 3-22 page E-3-21.

Key habitat benefits that were not quantitatively analyzed in the DEIS are:

- Restoring approximately 140 river miles of spawning and rearing habitat currently inundated by the four lower Snake river reservoirs, with potential increase of up to 70 percent in spawning habitat for fall Chinook salmon (USACE 2002a)
- Decreased summer and early fall average daily water temperatures through the lower Snake river and possibly into the lower Columbia river and downstream of McNary Dam
- Restoration of natural riverine habitat from its current reservoir habitat, which would reduce non-native predatory fish such as smallmouth bass and walleye, and favor native species that co-evolved (i.e., salmon, steelhead, white sturgeon, Pacific lamprey, native trout)
- Major long-term benefits for ecosystem recovery, including wetlands, floodplains, vegetation, and wildlife that collectively benefit fish

These habitat benefits can lead to improved survival of endangered fish stocks, which could have additional downstream effects, including potential delisting.

MO4 (spring-summer spill to 125 percent TDG at all eight FCRPS projects)

MO4 provides for spring-summer spill to 125 percent TDG at all eight FCRPS projects and would improve EFH conditions and salmon survival (including juvenile survival, ocean survival and smolt-to-adult survival) for most fish in the Columbia River system. In addition, it is expected to reduce juvenile passage delays and result in increased productivity of harvestable stocks.

6. The DEIS preferred alternative is not sufficiently improved over the no action alternative and, therefore, fails to meet a number of regional requirements, goals and objectives for salmon.

The DEIS fails to recognize that both models predict that the preferred alternative will not achieve the NPCC recovery goal for Snake River Chinook. In fact, relative to the no action alternative, the preferred alternative will not sufficiently improve survival enough to recover listed stocks or increase healthy and harvestable populations.

The actual survival benefit of the Flex Spill Agreement, which is fundamental to the preferred alternative, may overestimate survival benefits due to higher nighttime powerhouse encounter rates that are not accounted for in DEIS modeling. The CSS analysis further indicates a high (63 percent) probability that the preferred alternative will fall below the minimum SAR (2 percent), the rate at which the population is at risk for decline (McCann et al 2019). This is particularly problematic during low water years, which are expected to occur with greater frequency as climate change continues to manifest in the region in the form of reduced snowpack, earlier spring discharge peaks, and warmer temperatures nearly annually.

The preferred alternative includes several structural measures that further threaten salmon survival:

- High capacity turbines: The preferred alternative (and other alternatives) includes installation of new high-capacity turbines (termed “fish-friendly” in the DEIS) at several FCRPS dams which will increase powerhouse flow. These new turbines require higher water volume than existing turbines, and will divert a greater proportion of flow, and therefore fish, away from the spillways and toward the powerhouses. Powerhouse passage is associated with stress, injury, direct mortality and delayed mortality. The cumulative effect of high-capacity turbines installed at multiple dams will likely further reduce SARs. Given that the benefits to a fish passing via a high capacity turbine are yet unproven, it is impossible to determine if that benefit can compensate for the proven detriments of increased powerhouse encounters. Therefore, it is premature to install high-capacity turbines until scientifically vetted.
- Structural measures: All but four of the twenty-two structural measures in the preferred alternative are either measures retained from the no action alternative or new measures developed to increase power production, increase water supply for municipal or irrigation, or to benefit lamprey. The only structural measures included in the preferred alternative to mitigate for reductions in salmonid survival are the Lower Granite Trap Modifications and the Bonneville Ladder Serpentine Weir Modifications. Both of these modifications have been reduced in scope to only include trap gate modifications, which will greatly reduce anticipated benefits. Taken as whole, the structural measures in the preferred alternative will have an overall adverse impact on salmonid survival as compared to those in the no action alternative.
- Removal of fish screens: Fish screens have played an active role in diverting smolts away from turbines. The preferred alternative proposes to remove fish screens at several dams, which could increase turbine passage and result in increased injury and mortality.

For the reasons described above, the preferred alternative fails to meet regulatory requirements for the recovery of listed species under ESA and water temperature requirements of the Clean Water Act, and fails to meet regional goals of the NPCC (2014) and Columbia Basin Partnership Task Force (2019) for the recovery of ESA-listed salmonids and sustainable, harvestable abundances of salmonid populations in the Columbia Basin. Furthermore, the preferred alternative does not improve or restore ESA-designated critical habitat and MSA-designated EFH for salmon in the Basin.

In Summary

We appreciate the hard work by Federal agency staff on the draft EIS. However, for the reasons listed above, and recognizing the Council’s responsibility for managing sustainable fisheries, we find the DEIS (and the preferred alternative in particular) insufficient to provide the recovery actions necessary for ESA-listed stocks, or to provide healthy and harvestable Columbia Basin salmon populations necessary to support sustainable commercial, recreational, and tribal fisheries that the Council’s constituencies depend on. We also recognize there is an urgent need for stakeholders to come to long-term solutions that provides reasonable certainty to the objectives of all interests.

Sincerely,



Charles A. Tracy
Executive Director

JDG:kma

Enclosure: PFMC DEIS Scoping Letter, December 2016

Cc: Mr. Chris Oliver
Council Members
Habitat Committee
Salmon Advisory Subpanel

References

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Re: National Environmental Policy Act (NEPA) Scoping for the Columbia River System
Operations and Configuration Environmental Impact Statement

Dear General Spellmon, Administrator Mainzer, and Regional Director Lee:

The Pacific Fishery Management Council (Council) is in receipt of the Action Agencies' letter and *Federal Register* Notice of September 30, 2016, inviting scoping comments on the Columbia River System Operations and Configuration (CRSOC) environmental impact statement (EIS).

As you know, the Pacific Council is one of eight Regional Fishery Management Councils established by the Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1976, and recommends management actions for Federal fisheries off Washington, Oregon, and California. The MSA includes provisions to identify, conserve and enhance essential fish habitat (EFH) for species regulated under a Federal fishery management plan. As defined in the MSA, the term "essential fish habitat" means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting this definition of EFH, "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery

and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10).

EFH for Pacific Coast salmon, as designated by the Council, includes all waters that are currently occupied by stocks of salmon managed by the Council, as well as most of the habitats that were historically occupied by those stocks. Accordingly, the Columbia River and most of its tributaries downstream of Chief Joseph Dam and the Snake River and most of its tributaries downstream of the Hells Canyon Dam are designated as EFH for Chinook salmon and coho salmon.

The MSA authorizes the Council to comment on any Federal or state activity that may affect the habitat, including EFH, of a fishery resource under its authority. Furthermore, the Council is obligated to provide comments and recommendations for activities that the Council believes are likely to substantially affect the habitat of an anadromous fishery resource under its authority. The regulatory guidance that implements the EFH provisions of the MSA (50 CFR Part 600) defines an "adverse effect" as any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH.

The scoping letter and Notice indicate the Action Agencies are seeking comments to "help define the issues, concerns, and the scope of alternatives to be addressed in the environmental impact statement (EIS)." Accordingly, we offer the following general comments followed by several specific recommendations.

The heart of the process for preparing an EIS is the development of a full range of reasonable alternatives. The 1990s-era Columbia River System Operations Review EIS, which is indicated in your scoping Notice as having guided Columbia River system operations for nearly twenty years, has been the basis for a series of biological opinions the courts have rejected as inadequate to avoid jeopardy to Columbia basin salmon and steelhead listed as threatened or endangered under the Endangered Species Act (ESA). Given this history and the importance of Columbia Basin salmon and steelhead populations, it is of the greatest urgency that the Action Agencies develop a full range of alternatives.

These alternatives must be analyzed for their ability to contribute to the recovery of ESA-listed stocks and restore Columbia River salmon populations to harvestable levels that sustain sport, commercial, and tribal communities. They should be wide-ranging, and should consider ways to improve the conditions or practices governing all "H's" – habitat, hydrosystem, harvest, and hatcheries – as well as predation from native and non-native species. We suggest that different alternatives examine approaches with varying emphases on different H's, but all with an eye toward addressing the recent court opinion, which is concerned with increasing juvenile and adult survival in the main Columbia/Snake migration corridor, reversing negative trends for stocks such as upper Columbia River spring chinook, and accelerating and more firmly establishing positive trends for other stocks.

The broad scope of the CRSOC also allows for consideration of actions that will improve the status of non-ESA-listed stocks and meet mitigation responsibilities, and actions that may benefit

economic sectors such as sport and commercial fishing as well as salmon. On a river governed by numerous processes that are not always closely coordinated, the CRSOC is a rare opportunity for the whole region to consider creative and integrated solutions to long-running controversies. This is an opportunity to consider the true costs and benefits of a range of alternatives needed for the recovery of ESA-listed salmon on the Columbia River system and its fisheries amidst the changes confronting the region in the 21st century.

Alternatives analyzed should include, among other measures, steps to improve river flows and temperatures, increased spill at mainstem dams, and other altered dam operations to benefit juvenile survival. As strongly suggested by the recent court opinion, they should also examine removal of the four lower Snake River dams.

It is important that the alternatives ensure compliance with current mitigation obligations. Since the inception of hydropower facilities in the Northwest, hatchery and habitat programs have been used to mitigate the impacts of dams on lost spawning and rearing habitat. As long as the dams remain in place, the mitigation obligations for lost habitat remain.

To assure a transparent and more broadly accepted EIS, we urge you to make the framework against which the alternatives will be assessed transparent and available for public review as soon as possible. We believe it is appropriate to seek scientific review of this framework by qualified, independent third parties.

The alternatives you develop and consider in the CRSOC EIS must account for the foreseeable effects of climate change on both the freshwater and ocean ecosystems on which Columbia Basin salmon depend. These alternatives should include both an analysis of the extent to which climate change may affect (e.g., erode the effectiveness of) any proposed mitigation measures, and specific actions to address the additive effects of climate change on these fishes. Scientific understanding of the impacts of climate change on Columbia basin salmonids has advanced rapidly and provides an extensive basis for both developing and evaluating proposed action and alternatives.

Detailed Recommendations

Hydrosystem Configuration and Operation

The development, configuration, and operation of the hydrosystem have negatively impacted juvenile and adult salmon migration and survival in numerous ways. Hydrosystem impacts contribute to the threatened and endangered status of seven Interior Columbia Evolutionarily Significant Units (ESUs) and Distinct Population Segments. These well-documented impacts include protracted and impeded juvenile outmigration resulting in increased or extended exposure to diminished water quality (including temperature, contaminants, and pathogens), prolonged exposure to predators, injury and direct mortality during turbine passage or during juvenile bypass, increased energetic costs, and poorly-timed estuary entry relative to a smolt's physiological state. For smolts that do not experience direct freshwater mortality, delayed mortality upon entering the estuary and ocean due to previous hydrosystem experience continues to occur. Impacts to returning adults include their previous juvenile hydrosystem migration experience. Upon returning to freshwater, migration delays expose adults to threats (water quality, predators, delay at fishways, and fallback after passage) resulting in direct mortality, as well as increased energetic expenditure

(energy that could otherwise be allocated to reproduction). In the case of contaminants, exposure to sub-lethal effects likely further contributes to diminished reproductive potential.

Alternatives prepared for the EIS should consider innovative changes to the configuration and operations that will improve conditions for in-river fish passage and address inadequate water quality caused or aggravated by the hydrosystem.

Recommendations: This EIS should consider a full suite of hydrosystem configurations and operations to assess conditions against a standard that will allow delisting and recovery of Columbia River salmon ESUs. Alternatives to evaluate should encompass aggressive reconfiguration of long-standing operations that improve migration conditions and would lead to improvements in the full life-cycle survival of anadromous species in the Columbia River up to and including additional drawdown of reservoirs, breaching of the four lowermost dams on the Snake River, and seasonal flow augmentation.

Metrics to assess alternative hydrosystem operations and configuration

Bypass fish passage operations are known to increase latent, or delayed, mortality associated with the hydrosystem. The EIS should use Smolt-to-Adult Returns (SARs) as the most comprehensive analytical metric for assessing alternative hydrosystem operations and configuration. The Northwest Power and Conservation Council continues to endorse an SAR goal of 2-6 percent (average 4 percent), and it would be appropriate to consider the probability of achieving the regional goal as part of each alternative's evaluation.

Recommendation: The EIS should assess the probability of achieving these regional SAR goals when assessing alternative hydrosystem operations and configuration.

Assess operations that increase spill and are intended to improve Smolt-to-Adult Return rates

Spill is known to be the best route of passage past dams for juvenile salmon and for enhancing life-cycle survival benefits (Muir et al. 2001, Petrosky and Schaller 2010, Haeseker et al. 2012, Tuomikoski et al. 2013, Schaller et al. 2014, ISAB 2014). The region needs to better understand the opportunities, costs, and benefits of providing system-wide Federal Columbia River Power System (FCRPS) operations at various total dissolved gas (TDG) spill caps in order to optimize juvenile fish survival during passage. The term "spill cap" means the maximum project spill level that meets, but does not exceed, the TDG cap. This definition of spill cap is consistent with the Corps definition of the term in the 2016 Fish Operation Plan.

Current state waivers limiting total dissolved gas levels are a primary constraint to voluntarily increasing spill to levels known to benefit fish survival. However, given recent findings on life-cycle fish survival benefits (Haeseker et al. 2012, Marmorek et al. 2013, Schaller et al. 2014), review of existing rules and waivers to allow higher dissolved gas levels as a measure to improve life-cycle fish survival has merit. The EIS should assess the benefits of potential future rule changes and evaluate opportunities, costs, and benefits of maximizing voluntary spill at TDG spill caps of 120 percent and 125 percent of saturation levels if regulations and waivers are revised. The EIS should evaluate a suite of FCRPS operations intended to maximize spill for juvenile fish

survival throughout the FCRPS. This will allow the region to evaluate the efficacy of spill in increasing adult returns to the Columbia Basin.

Recommendation: The Action Agencies should assess the opportunities, costs and benefits of providing spill for juvenile fish passage by maximizing voluntary spill at TDG spill caps under current TDG rules as well as spill caps of 120 percent and 125 percent TDG.

Transportation should be de-emphasized as a fish mitigation measure in favor of increased spill operations and an improved in-river migration environment

Emerging evidence on the effectiveness of transportation continues to show this operation provides only limited benefits for fish survival under very specific circumstances. It exacerbates straying rates that increase the proportion of hatchery fish on natural spawning areas and the out-of-basin straying rates of natural-origin fish. It can also delay adult migration, extending adults' exposure to poor water quality conditions. While there are many examples of these negative effects, none is more vivid than the 2015 temperature emergency. As noted by NOAA's 2015 sockeye salmon passage report, adult Snake River sockeye salmon that are transported as juveniles seem to have an impaired homing ability compared to those that migrate inriver. In 2015, this resulted in delays in upstream passage and increased exposure to elevated temperatures, and likely contributed to the large disparity in estimated survival between Bonneville and Lower Granite dams for smolts that were transported (0 percent survival) and those that migrated inriver as juveniles (8 percent) (NOAA 2015).

Recommendation: The Action Agencies should consider transportation as a lower priority fish passage option. If barging operations associated with transportation impede or diminish more beneficial spill operations, that alternative must have demonstrated significant, full life cycle survival benefits that exceed in-river migration.

Evaluate the development of a contingency plan that identifies and addresses future high temperature conditions that delay adult migration and threaten adult salmon survival

In 2015, Columbia Basin salmon experienced high water temperature conditions that delayed adult migration and ultimately caused record high mortality among sockeye and summer Chinook salmon. Climate change projections show similar events can be expected with increasing frequency in the future. While the 2015 event was particularly harmful, temperatures in mainstem reaches routinely exceed water quality standards for a portion of the adult passage season.

Progress has been made in cooling adult fishways at some FCRPS facilities, and we are hopeful that similar cooling structures can be provided at other FCRPS locations. However, high water temperatures occur throughout the reservoirs of the FCRPS. Reduced water travel time and increased surface area with exposure to solar radiation are primary contributors to high reservoir temperatures.

Operations to provide cooling need to anticipate annual water and weather conditions that may indicate potential thermal emergencies. Once temperatures exceed water quality standards, the system has little flexibility to provide cool water for fish passage.

Recommendations: The EIS should evaluate alternatives to mitigate high water temperature conditions. One alternative the Council recommends is the development of a thermal emergency contingency plan to include: (a) an explanation of conditions in areas within and outside of tailraces and forebay that will trigger its implementation; (b) a set of mitigation actions to be taken once triggered; and (c) a monitoring program for triggering metrics that incorporates areas outside of and within tailraces, forebays, and fishways. The cooling operations under consideration should include alternative drawdown timing at storage reservoirs in Canada, at Grand Coulee, Libby, and Dworshak dams, and should incorporate scenarios for drawdown at Lower Granite dam.

The role of hydrosystem operations and impoundments on toxics contaminant loads and cycling

There continues to be a lack of comprehensive planning regarding the issue of toxic contamination in the Columbia River basin. Dams contribute to the persistence of chemical loads in reservoir sediments because many pollutants tend to settle in reservoirs. The pesticide DDT and polychlorinated biphenyls (PCBs) have long been banned, but continue to enter the mainstem through runoff and from hazardous waste releases. Other contaminants including arsenic, dioxins, radionuclides, lead, pesticides, industrial chemicals, fire retardants, and newly-emerging contaminants such as pharmaceuticals in wastewater have known, and less well-known, effects on juvenile fish survival and lifetime productivity. The EIS should consider and assess the role of hydrosystem operations and impoundments in aggravating the effects of these contaminants. Reducing pollutants will require a comprehensive, coordinated effort by government and nongovernmental organizations.

Recommendation: The EIS should follow the Independent Scientific Advisory Board (ISAB) recommendation to better account for the impacts of toxic contaminants on populations in the basin to ensure a robust toxics abatement program is implemented.

Transparency and scientific review

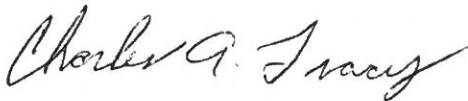
This EIS needs to fully analyze a reasonable range of alternatives that includes action necessary to optimize salmon life cycle benefits and survival in order to assure delisting under the ESA, and to assure that required mitigation measures are met to restore Columbia River salmon populations to harvestable levels that sustain sport, commercial, and tribal communities. In 2013, the White House Council of Environmental Quality (CEQ) issued Principles and Requirements for Federal Investments in Water Resources, which supersede CEQ's 1983 Principles & Guidelines. The new Principles and Requirements went into effect immediately and apply "to a broad range of Federal investments that by purpose, either directly or indirectly, affect water quality or water quantity." The new Principles and Requirements describe a comprehensive approach for evaluating the potential socioeconomic costs and benefits of a proposed course of action. This is especially important for this EIS because the actions and alternatives under consideration will have a complex set of market and nonmarket socioeconomic costs and benefits, including the benefits of restored fisheries to treaty Indian and non-Indian fisheries, all of which should be considered as part of your analysis.

Recommendation: The Action Agencies should make the framework, against which the alternatives in the EIS will be assessed, transparent and available for public review as soon as possible. The Action Agencies should seek scientific review of this framework by well-qualified, independent third parties.

The Council hopes its comments are helpful in the National Environmental Policy Act scoping for the CRSOC EIS. We trust that future draft document comment periods can be scheduled to overlap with Council meetings to allow for Council review and comment, as the success of the next Biological Opinion for the FCRPS is directly linked to the success of Council-managed stocks and the well-being of Northwest fishing communities and the region's broader economy and environment.

Thank you for the opportunity to comment on this important undertaking.

Sincerely,



Charles A. Tracy
Executive Director

Cc: Council members
Sheila Lynch
Habitat Committee
Salmon Advisory Subpanel

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