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Introduction

The State of Oregon, by and through its Departments of Environmental Quality, Fish and Wildlife, Energy, Water Resources and Agriculture, reviewed and analyzed the draft Environmental Impact Statement ("Draft EIS") to ensure it provides a full and fair disclosure of the significant environmental impacts of the proposed Columbia Rivers System Operations (the "Project"). Unfortunately, Oregon finds that this draft EIS fails in several respects to meet the requirements of the National Environmental Policy Act ("NEPA"). It bears repeating that the purpose of this Columbia River System Operations ("CRSO") court-ordered NEPA process was "to force the consideration of environmental impacts in the decision-making process. * * * [T]o consider more aggressive changes to the [CRSO] to save the imperiled listed species."\(^1\) In the court’s mandate it cited the benefits of the required NEPA analysis as potentially allowing the "agencies, public, and public officials” to evaluate system alterations – even those outside of the statutory authority of the action agencies – to “finally be able to break through any bureaucratic logjam that maintains the status quo.”\(^2\) The Draft EIS fails to meet this court-ordered mandate, and fails to meet NEPA requirements. Remedy is still possible. The errors made in this Draft EIS can be corrected and the legal deficiencies can be remedied. The public, agencies, and all decisionmakers are better served by a Final EIS that is comprehensive, accurate, objective, and transparent in its identification and disclosure of CRSO environmental impacts and a reasonable range of alternatives to that action. The State provides the following comments and recommendations in hopes that the action agencies correct these deficiencies in the Final EIS, and consequently, stop the endless cycle of litigation.

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\(^1\) *NWF v. NMFS*, 184 F. Supp. 3d 861, 941-48 (D. Or. 2016).
\(^2\) *Id.* at 947–48
1. Final EIS Must Include a Dam Breach Alternative Without Inclusion of Other Measures that Obscure Beneficial Impacts to Listed Species

The Ninth Circuit has explained: “The touchstone for our inquiry is whether an EIS's selection and discussion of alternatives fosters informed decision-making and informed public participation.” Here, the action agencies’ choice to combine measures (e.g., structural components and operations of the CRSO) in each alternative that have opposing effects on the environment prevent informed decision-making by masking the environmental impacts of individual measures, effectively undermining any ability of decisionmakers or the public to discern the environmental benefits or adverse impacts of particular measures. For example, each alternative is a combination of measures with differing objectives, with consequent opposing effects on the human environment. In short, the action agencies’ process of screening alternatives and recombination of measures into multiple objective alternatives has sacrificed the ability to discern the environmental impacts of key measures in comparative form – resulting in complete masking of benefits of certain measures. This choice has eliminated the opportunity to discern each measure’s, and consequently, each alternative’s comparative merit.

In addition, the Ninth Circuit has also clarified that “[t]he existence of a viable but unexamined alternative renders an environmental impact statement inadequate.” Oregon urges the action agencies to review and consider the proffered reasonable alternative for inclusion in the Final EIS. The public and public officials deserve to understand the environmental consequences of all reasonable alternatives, including the adverse impacts associated with the status quo as well the potential benefits of “innovative solutions” that may be outside of the action agencies’ existing authority. As the Ninth Circuit has warned, “[i]t is precisely this sort of ‘uncritical[]’ privileging of one form of use over another that we have held violates NEPA.”

Lastly, Oregon urges the action agencies to comply with NEPA’s requirement to consider whether it can carry out its proposed action in a less environmentally damaging manner, and to

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3 Calif. v. Block, 690 F.2d 753, 767 (9th Cir.1982); see also 'Ilio'ulaokalani Coal. v. Rumsfeld, 464 F.3d 1083, 1094 (9th Cir. 2006) (“We make a pragmatic judgment whether the [Environmental Impact Statement's] form, content and preparation foster both informed decision-making and informed public participation.”) (quoting City of Carmel–By–The–Sea v. U.S. Dep’t of Transp., 123 F.3d 1142, 1150–51 (9th Cir.1997) (internal quotation marks omitted)).
4 Morongo, 161 F.3d at 575 (internal quotations and citations omitted).
5 See United Neighbors United, Inc. v. Jewell, 831 F.3d 564, 577 (D.C. Cir. 2016) (holding failure to examine an alternative that results in less take of endangered species was error because it would better inform public by “sharply defining the issues and providing a clear basis for choice among options”) (quoting 40 C.F.R. § 1502.14).
6 NWF v. NMFS, 184 F. Supp. 3d 861, 947-48 (D. Or. 2016) (“One of the benefits of a NEPA analysis, which requires that all reasonable alternatives be analyzed, is that it allows innovative solutions to be considered and may finally be able to break through any bureaucratic logjam that maintains the status quo.”).
7 See Oregon Nat. Desert Ass’n v. BLM, 625 F.3d 1092, 1124 (9th Cir. 2010) (quoting California v. Block, 690 F.2d 753, 767 (9th Cir. 1982)
select an environmentally-preferred alternative. NEPA’s purpose is undermined where, as here, the action agencies refuse to abandon strict adherence to its existing statutory authorities. This causes two issues. First, it led the action agencies to propose a preferred alternative that merely adds a few modifications to its existing operations, which result only in a slight improvement in environmental benefits. This error is compounded by failure to include analysis of single objectives, and instead, the Draft EIS analysis includes description of alternatives that include multiple objectives that once combined prevent informed decision-making. Second, the action agencies include in their purpose and need statement fulfillment of statutory authorizations, which directly results in exclusion of any alternative that may require additional authority from Congress. For example, NEPA requires analysis of even those alternatives outside of the authority of the action agencies. The record of decision must identify all alternatives considered and specify the alternatives considered environmentally preferable. While an agency may discuss a preferred alternative in light of its statutory missions (or even economic considerations), what the agencies have done here is preclude selection of a reasonable alternative by having its purpose and need statement include carrying out its existing statutory authorizations.

Oregon urges the Final EIS to correct the purpose and need statement as well as to incorporate throughout analysis of the proffered feasible, reasonable alternative, as an environmentally-preferred alternative. Significantly, if a supplemental Draft EIS is issued that corrects these errors, Oregon is not stating that the action agencies must select the environmentally-preferred alternative nor that this alternative cannot be eliminated as the preferred alternative for potentially-legally sound reasons (example, required delay in ability to implement). Oregon is requesting only adherence to NEPA to adequately and fairly disclose and discuss all reasonable alternatives to inform the public and decision-makers of their environmental consequences. Oregon rejects the Draft EIS’s attempt to obscure and distort the environmental effects of breaching the lower Snake River dams, or otherwise, its omission of an option with more beneficial outcomes for imperiled species. Even if that reasonable alternative is not the eventually chosen preferred alternative, the region deserves an objective, complete analysis of the actual environmental impacts of breaching one or more of the lower Snake River dams.

2. Analysis in Draft EIS is Inadequate, Inaccurate (Errors and Omissions), Evidences Bias, and Lacks Scientific Rigor

NEPA requires that the Action Agencies utilize “high quality” information and accurate scientific analysis, and ensure “professional integrity, including scientific integrity, of the discussions and analyses” within an EIS. Oregon state agencies have identified numerous errors and deficient analysis in the Draft EIS, as specifically set forth below, which the action agencies must address in the Final EIS to appropriately disclose and objectively analyze potential

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8 See 40 C.F.R. § 1505.2(b).
9 See 40 C.F.R. § 1500.1(b).
significant environmental impacts to comply with that mandate. Further, Oregon urges the action agencies to consider removing the extraneous discussions as indicated below, as well as discussion of socioeconomic effects unrelated to environmental impacts of the CRSO. An EIS’s purpose is to disclose environmental impacts of the proposed action and reasonable alternatives to that action. The action agencies go to great lengths to instead discuss socioeconomic impacts on the region as a result of changes in proposed operations of the hydrosystem in contrast to the short shrift given to the proposed operations’ impacts on “the natural and physical environment and the relationship of people with that environment.” This appears to be the reverse situation than that discussed in Metro Edison, where here, the action agencies – instead of plaintiffs – attempt to utilize the Draft EIS to “air [its] policy objections” to reasonable alternatives involving changes in CRSO structures and operations. But the U.S. Supreme Court’s statement is equally applicable that “[t]he political process, and not NEPA provides the appropriate forum in which to air policy disagreements.” The Final EIS should eliminate this evidence of bias. Instead, the action agencies – using objective, scientific rigor – must allow the public and decision-makers to assess comparative merit of alternatives in light of their environmental impacts.

3. Draft EIS Fails to Include Identification or Adequate Analysis of Proposed Mitigation

The U.S. Supreme Court has stated that “omission of a reasonably complete discussion of possible mitigation measures [] undermine[s] the ‘action-forcing’ function of NEPA. Without such a discussion, neither the agency nor other interested groups and individuals can properly evaluate the severity of the adverse effects.” The Draft EIS includes a mere listing of potential mitigation without information or discussion regarding why such measures will be effective. NEPA requires that “mitigation must be developed where it is feasible to do so,” including identification of “[a]ll relevant, reasonable mitigation measures.” This Draft EIS falls far short

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11 See 40 C.F.R. § 1502.2(f).
12 See 40 C.F.R. § 1508.14 (defining “human environment” as used in NEPA, stating: “When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then [the EIS] will discuss all of these effects on human environment.”).
14 Id.
16 See 40 C.F.R. §§ 1502.14(f); 1502.16(h); see also Council on Environmental Quality, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18026 (Mar. 23, 1981), Questions 19a and 19b (requiring disclosure of “full spectrum of appropriate mitigation”) (“All relevant, reasonable mitigation measures that could improve the project are to be identified, even if they are outside of the jurisdiction of the lead agency or the cooperating agencies, and thus would not be committed as part of the RODs of these agencies. This will serve to alert agencies or officials who can implement these extra measures, and will encourage them to do so. Because the EIS is the most comprehensive environmental document, it
of meeting these requirements as described more specifically below, especially with respect to mitigation necessary to offset impacts to listed species.

If proposed mitigation measures are unenforceable, or lack monitoring commitments or sufficient resources to assure performance, the action agencies have no reasonable basis to conclude that such measures will effectively reduce environmental impacts of the CRSO. As identified in the specific state agency comments that follow, the action agencies have not sufficiently identified or analyzed possible mitigation measures to support a conclusion that environmental impacts have been reduced to less-than-significant levels. Oregon agencies have identified those that should and must be included to adhere to NEPA mandate that federal agencies “[i]nclude appropriate mitigation measures not already in the proposed action or alternatives.”

4. Action Agencies Violate NEPA By Providing an Insufficient Comment Period

Given the existing public health emergency that constitutes extraordinary circumstances, Oregon finds the minimum 45-day public comment period does not comport with NEPA as it does not provide for adequate disclosure. Given this fact in addition to the numerous errors and omission in this Draft EIS, including but not limited to the missing reasonable alternative, Oregon requests that the action agencies circulate a supplemental Draft EIS once it has addressed all cited deficiencies in order to provide for meaningful consideration by the public and decisionmakers. The proposed reasonable alternative is not qualitatively within the spectrum of existing alternatives, and absent its inclusion, the action agencies risk not only violating NEPA but to directly contravene the court’s order that required this analysis in the first instance.

is an ideal vehicle in which to lay out not only the full range of environmental impacts but also the full spectrum of appropriate mitigation.”

17 See 40 C.F.R. §§ 1505.2(c), 1508.25(b).
18 40 C.F.R. § 1502.14(f).
20 See State of Cal. v. Block, 690 F.2d 753, 770 (9th Cir. 1982) (explaining that if a proposed action ultimately “differs so dramatically from the alternatives canvassed in the draft EIS as to preclude meaningful consideration by the public,” the action agencies must circulate a supplement).
21 See Dubois v. U.S. Dept. of Agriculture, 102 F.3d 1273, 1292 (1st Cir. 1996).
22 See NWF v. NMFS, 184 F. Supp. 3d 861, 942-43 (D. Or. 2016) (explaining that it was “doubtful the Action Agencies could demonstrate that breaching, bypassing, or removing one or more of the Snake River dams” was not a reasonable alternative under NEPA).
Oregon Water Resources Department Comments

City of Arlington in Gilliam County has a Columbia River Surface Water Right

The Oregon Water Resources Department (WRD) notes that with respect to water use in north central Oregon (Chapter 3.12, Region D) the Draft EIS does not indicate that the City of Arlington in Gilliam County has a Columbia River surface water right, not currently in use. It appears that the Action Agencies did not consider this water supply use in its analysis. WRD has identified this error previously. The Final EIS should explain whether this omission is because the right is still under development and more a future water use? If this is the case, the Department disagrees, but the EIS should make this clarification.

Need for Mitigation

Draft EIS should identify and discuss mitigation for all impacts – The Action Agencies concluded that the Preferred Alternative is unlikely to impact water supply obligations. The Department generally agrees. However, if adjusted in a way that lowers reservoir elevations, lowering water levels may impact intakes of surface water diversions and wells; and the Draft EIS should identify and describe sufficient mitigation of those impacts. It is also important to note that this analysis did not consider impacts on water rights issued but under development (see comment above). Impacts to those rights should also be mitigated.

Oregon Department of Environmental Quality

Water Temperature Analysis

The Oregon Department of Environmental Quality (DEQ) acknowledges the consideration the co-lead agencies gave to evaluating MO3 stream temperature changes that shows, in comparison to the No Action Alternative (NAA), faster stream temperature response in the lower Snake River to seasonal and diurnal changes in air temperature and solar radiation following dam breaching. Although dam breaching is expected to result in warmer spring water temperature, the overall seasonal thermal regime will become more normative. However, to provide a more complete picture on MO3 impacts on stream temperature, the co-lead agencies should provide clear conclusions in the Final EIS regarding post-breach reduced travel time of water, as faster flow rate, will influence stream temperature.

DEQ suggests further describing why there is a difference between the seasonal, post-breach, lower Snake River water temperature compared with that of the NAA. Adding more detail to this section will help to elucidate why spring water temperature is higher post-breach compared to the NAA, whereas the commonly held assumption is that dam breaching will result in cooler water temperatures. For example, describe how the Snake River in the NAA is a larger body of water, which is slower to warm and slower to cool, and how this contributes to warmer spring stream temperature in comparison to MO3. This is important information for the public and
decisionmakers. Additionally, the Draft EIS refers only to "temperature" and should, instead, expressly clarify, as applicable, water temperature or air temperature. Chapter 4, lines 806-818, is an example of where these issues should be addressed.

**Suspended Sediments**

For MO3, the Draft EIS predicts the release of an extraordinary amount of suspended sediment and turbidity due to dam breaching. The EIS should identify best management practices that could be implemented to mitigate sediment discharges to reduce the short-term impacts associated with sedimentation resulting from dam breaching. Please identify and analyze effect of existing procedures or BMPs that would minimize release of suspended sediment in the Final EIS.

**Oregon Department of Energy Comments**

The Oregon Department of Energy (ODOE) appreciates the tremendous amount of work and effort that went into the analysis of the potential impacts to the power sector in the development of the Draft EIS, as reflected in Section 3.7 and Appendix H, in particular. Impacts to the power sector, as the Draft EIS shows, can be quantified in terms of the cost (or avoided cost) to the power sector of achieving other specific non-power objectives. The preferred alternative results in minimal overall costs to the power sector, especially compared to MO3 and MO4 that would incur significant costs associated with a replacement of energy due to a reduction in hydropower output, a replacement of the capacity contribution necessary to maintain the reliability of the regional power system, and mitigation of potential increased greenhouse gas emissions associated with these replacement power resources. In order to prepare for a long-term solution for salmon recovery that restores the lower Snake River, further analysis is needed to determine how to minimize or mitigate resulting costs to the power sector. This mitigation should be identified, discussed, and thoroughly analyzed in the Final EIS.

ODOE has divided its comments into the following subsections: process for power analysis, power system reliability, power replacement costs, and customer power rate impacts.

**Process for Power Analysis**

The Draft EIS describes the following six-step methodology used to evaluate power and transmission impacts of MO1, MO2, MO3, MO4, and the Preferred Alternative as compared to the No Action Alternative: 23

1) Estimate changes in power generation  
2) Analyze effects on power system reliability  
3) Determine need for potential replacement resources and associated costs  
4) Analyze effects on transmission system reliability, congestion, and the need for infrastructure  
5) Quantify effects on electricity rates  
6) Assess social and economic effects of the changes in power and transmission

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23 Draft EIS at 3-818 to 3-826.
ODOE’s comments below are focused on steps (2), (3), and (5). While ODOE appreciates the amount of analysis that went into evaluating the estimated changes in power generation associated with MO1, MO2, MO3, MO4, and the Preferred Alternative, ODOE believes that that analysis was flawed in several important respects that will be discussed in greater detail below.

**Power System Reliability**

Step 2 of the methodology for power and transmission analysis considers effects on power system reliability from the alternatives evaluated. Maintaining a reliable power system is a cornerstone of our daily lives and the health of the regional economy. Federal hydropower resources have made incredibly significant contributions to maintaining this reliability in the Northwest for much of the last century.

That said, maintaining overall power system reliability in the Northwest is complex and multi-jurisdictional, involving not only BPA, but several large investor-owned utilities, consumer-owned utilities, and multiple state regulators. The Northwest Power and Conservation Council (NWPCC) provides the region’s most comprehensive regular assessment of the adequacy of the Northwest power system to maintain reliability into the future. Many of the region’s electric utilities rely upon the annual resource adequacy assessment developed by the NWPCC to inform their own planning for capacity resources to maintain system reliability. Particularly as the retirements of coal units accelerate, these assessments are more critical than ever, and a complete analysis of the problem requires detailed probabilistic analysis of how the regional power system is likely to perform under a range of future scenarios and conditions. In addition, an emerging effort led by the Northwest Power Pool (NWPP), which includes BPA, is developing a proposal for the establishment of a formalized regional resource adequacy program to maintain power system reliability in the Northwest. Significant new details around this proposal are due to be released in 2020, with the prospect of a new regional program being established within the next couple of years.

ODOE raises these issues here as important context for the analysis that is provided within the Draft EIS related to regional power system reliability. The overall reliability of the regional power system should not be the focus of the analysis within the Draft EIS. While we acknowledge the substantial contributions that federal hydropower resources have made and will continue to make toward maintenance of overall regional power system reliability, these issues are much broader than the scope of the Draft EIS and are already being addressed in more appropriate venues.

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24 Draft EIS at 3-819.  
26 For more information, see Northwest Power Pool, Resource Adequacy Program. [https://www.nwpp.org/about/workgroups/12](https://www.nwpp.org/about/workgroups/12)  
27 Harms discussed in an EIS must “have a sufficiently close connection to the physical environment.” See Metropolitan Edison Co. v. People Against Nuclear Energy, 460 U.S. 766 (1983).
Specifically, we do not believe that the Draft EIS is the appropriate vehicle to speculate about the potential for future coal plant retirements,\(^{28}\) although we do not dispute that significant evidence suggests that more coal capacity is likely to retire. The likelihood of those retirements occurring is not impacted by the proposed action discussed in the Draft EIS, and any challenges that those retirements present for the regional power system will need to be assessed and dealt with irrespective of CRSO operations. A more robust analysis of the impact of these potential coal retirements requires a broader set of tools and scope of analysis than what the Draft EIS provides.

That said, Table 3-147\(^{29}\) summarizes the impact to power system reliability (as measured by Loss of Load Probability, the metric employed by the NWPCC in its regional resource adequacy assessment) from MO2 compared to the No Action Alternative under three different coal scenarios: Base Case (4,246 MW of coal remains operational); Limited Coal Capacity (1,741 MW of coal remains operational); No Coal Capacity (0 MW of coal remains operational).

As reflected in the table, the LOLP under the No Coal Capacity scenario would be a staggering 63\% (compared to the region’s stated standard of 5.0\% LOLP). In short, this means that even under the No Action Alternative there would be insufficient power supply available to meet electric demand at least once per year in more than 6 out of every 10 years. Power system reliability impacts of this type would be severe and historically unprecedented in the Northwest. Participants in the existing regional efforts described above are acutely aware of these potential future challenges to power system reliability and are actively working to develop robust solutions to address them. Incorporating an analysis of these speculative future challenges is not appropriate in the context of the Draft or Final EIS because: (1) this process lacks the necessary tools and regional scope; and (2) this process is intended to compare environmental impacts of multiple alternatives for Columbia River System Operations against a No Action Alternative which reflects the status quo (not a speculative version of the future).

**Specific Recommendation:** Delete section or revise text in the Final EIS to reflect that the analysis of multiple potential future coal retirement scenarios is incomplete, beyond the scope of this process, and requires a more robust regional analysis to fully evaluate potential reliability impacts.

\(^{28}\) See Draft EIS, Appendix H, Section 2.3 – Sensitivity of LOLP to Assumptions about Coal Capacity, at p. H-2-8 to H-2-10.

\(^{29}\) Draft EIS at 3-887.
Power Replacement Costs

Step 3 of the methodology for power and transmission analysis determines the need to develop new power resources to replace any reduced output from the hydropower system, and the associated costs of developing those resources.\(^{30}\)

ODOE appreciates the detailed and robust analysis that the drafters undertook to analyze the potential need for new power resources to replace any reduced output from the hydropower system. ODOE does not identify here any particular concerns with this step of the analysis, and we appreciate that an effort was made to evaluate both the least-cost portfolio of replacement resources and a zero-carbon portfolio of replacement resources.

ODOE does have concerns, however, with the identification of the estimated costs for potential power replacement resources. The primary concern that ODOE has is with reliance upon the NWPCA’s Seventh Power Plan Midterm Assessment\(^{31}\) (published in February 2019) as the basis for determining the overnight capital cost of building new power resources.\(^{32}\) ODOE recognizes that the Draft EIS adjusted these numbers further to reflect real 2022 dollars, but we do not believe this accurately captures the rapid changes in technology costs occurring within the power sector. The Draft EIS seems to acknowledge this: “Because only the single mid-point was used in the CRSO EIS analysis there are resource cost uncertainties that could result in higher and lower cost outcomes for the MOs.”\(^{33}\) Particularly as it pertains to estimated costs for the zero-carbon portfolios, ODOE is less concerned that actual resource costs could be higher than estimated, but we have significant concerns that actual costs might be lower than estimated. This concern grows the further into the future (e.g., beyond 2022) that any potential power replacement resources would need to be built. For example, Table 2-3 from App. H\(^ {34}\) is reproduced below:

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\(^{30}\) Draft EIS at 3-819.

\(^{31}\) Available online: https://www.nwcouncil.org/sites/default/files/7th%20Plan%20Midterm%20Assessment%20Final%20Cnci%20Doc%20%232019-3.pdf

\(^{32}\) Draft EIS at Footnote 48, p. 3-835 and Appendix H, p. H-2-5.

\(^{33}\) Draft EIS at 4-385.

\(^{34}\) Draft EIS at Appendix H, p. H-2-6.
In particular, ODOE notes the capital cost estimate for solar at $1,350 to $1,500/kW. ODOE does not recommend a specific alternative cost estimate. ODOE is, however, including below a table developed by the National Renewable Energy Laboratory (NREL) for its 2019 Annual Technology Baseline\textsuperscript{35} that projects the future capital cost of solar out to 2050:

\begin{table}[h]
\centering
\caption{Capital Costs of Replacement Resources (2019\$)}
\begin{tabular}{|l|c|}
\hline
Resource Type & Cost (\$/kW) \\
\hline
Solar & $1,350 to $1,500 \\
Wind & $1,500 to $1,700 \\
Combined Cycle Gas & $1,100 to $1,300 \\
Simple Cycle Gas & $500 to $650 \\
Reciprocating Engine & $1,250 to $1,450 \\
Solar Co-Located with DC-Coupled Battery\textsuperscript{1} & $2,568 \\
\hline
\end{tabular}
\end{table}

\textit{Source: Cost based on the NW Council Midterm Assessment, 2018; energy storage costs sourced from three recent IRPs https://www.nwcouncil.org/sites/default/files/2018-10\%20-%20Final\%20Draft\%20for\%20PC\%20-%2007th\%20Plan\%20Mid-Term\%20Assessment.pdf}

Note: The costs have not been scaled up or down for changes in costs for resources that are ten or more times larger than projects contemplated in the Midterm Assessment.

1/Cost from NW Council 'Battery Storage Reference Plan for 2021 Power Plan' presentation by Mike Starrett.

NREL’s forecast of capital costs for solar PV continues to decline significantly in the Low case and moderately in the Mid case. By 2032, for example, it appears that NREL forecasts solar PV

costs could be as low as $500/kW in the Low case, or approximately 60% lower cost than the low estimate provided for solar in the Draft EIS. Even in 2022, it appears that NREL forecasts a cost closer to $1,000/kW in its Low and Mid cases (approximately 25% less than the low estimate in the Draft EIS). We note that the Northwest Power Council also identified a further 10% to 15% reduction in solar capital costs just from 2018 to 2020.\(^{36}\)

ODOE raises these issues here primarily because of the uncertainty involved around the timeline of implementing some of the measures evaluated by the various alternatives within the Draft EIS. For example, MO3 evaluates breaching the four Lower Snake River Dams. It is highly unlikely that this could occur by 2022 under any circumstance. A more robust analysis of the cost of potential power replacement resources in that scenario would consider a forecast of how power replacement costs would be likely to change some number of years into the future. A more comprehensive analysis would also utilize some method of portfolio optimization to identify a combination of complementary resources that could replace any reduction in output from the federal hydropower system, including targeted energy efficiency investments, demand response measures, and storage in addition to an evaluation of renewable generation technologies.

**Specific Recommendation:** Final EIS must include a more robust power replacement analysis that includes the development of an optimized portfolio of resources that incorporates forecasted technology costs over the following time horizons: 2022, 2030, 2035, and 2040.

**Customer Power Rate Impacts**

As noted in the introduction to this section of ODOE’s comments, impacts to the power sector resulting from the alternatives discussed in the Draft EIS can be quantified in terms of cost. There are technically feasible options for replacing any reduction in power output from the federal hydropower system that results from this or any other process; the issue resolves itself as a matter of cost, and an allocation of those costs. BPA is required by the Northwest Power Act to provide preference and priority in selling power to consumer-owned utilities (including municipal utilities, rural electric cooperatives, people’s utility districts, and tribal utilities)\(^{37}\). These “preference customers” of BPA often purchase firm power from BPA, and many are full requirements customers that receive 100% of their power from BPA to serve retail customers. As a result, any costs of actions taken pursuant to the alternatives evaluated within the Draft EIS will impact these preference customers the most. In Oregon, consumer-owned utilities (preference customers of BPA) serve the most rural and lowest income areas of the state, which creates questions around how to equitably allocate the costs to achieve non-power objectives within the Columbia River System. This discussion should be included in the EIS.

Step 5 of the methodology for power and transmission analysis evaluates the impact of each alternative on customer rates. As explained in the Draft EIS, this analysis of BPA’s rates considers multiple variables, including: (1) the cost of potential replacement power resources and new transmission investments; (2) impacts to BPA revenues from surplus power sales and


\(^{37}\) Draft EIS at 3-799.
transmission sales; and (3) the cost of any structural or operational measures within an alternative. To the extent that these variables result in net costs for the power customers of BPA, robust cost mitigation efforts should be considered that consider the potential inequities in how these costs are allocated across the region.

Figure 3-165, as an example, illustrates how BPA spends every dollar of its power revenues during the BP-20 rate period from October 1, 2019 through September 30, 2021:

As a self-funded government entity, BPA is required by law to sell power to its customers in a manner that reflects its actual costs. To develop its revenue requirement for serving its power customers, BPA must consider its program costs, debt payments, and other costs established through the ratemaking process (including the Residential Exchange program, power purchases, and the cost of transmission). On account of the scale of some of the costs associated with the alternatives evaluated within the Draft EIS, ODOE recommends that an analysis be conducted of

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38 Draft EIS at 3-823.
39 Draft EIS at 3-805.
40 Draft EIS at 3-804.
how best to equitably allocate the costs across the region to achieve the non-power objectives sought by each alternative.

Specific Recommendation: Update the cost analysis within the EIS to include an evaluation of how to equitably allocate the costs of achieving non-power objectives within the EIS.

Oregon Department of Fish and Wildlife Comments

The Oregon Department of Fish and Wildlife (ODFW) has participated in good faith as a cooperating agency in the EIS process since the summer of 2017, providing feedback in a timely manner despite difficult timelines. ODFW has actively reviewed documents, commented and made recommendations to the Action Agencies throughout the process. Active participation as a cooperating agency resulted in thousands of comments and recommendations across hundreds of versions of previous Draft EIS development components, very little of which has been incorporated into this Draft EIS.

High-Level Draft EIS Concerns

Purpose and Need

The Draft EIS does not satisfy the purpose of the CRSO court-ordered NEPA process, which was to evaluate the large-scale project of the 2014 BiOp RPA and its alternatives. Judge Simon repeatedly emphasized that the goal of the EIS is to force the consideration of environmental impacts in the decision-making process. For example, “the option of breaching, bypassing, or even removing a dam may be considered more financially prudent and environmentally effective than spending hundreds of millions of dollars more on uncertain habitat restoration and other alternative actions.”

The Action Agencies appear to believe that it satisfied the purpose of CRSO court-ordered NEPA process through its development and analysis of Multiple Objective 3 (MO3). However, MO3 was fundamentally deficient from its inception because it is a proposed action that includes both structural and operational measures that in some cases benefit but in other instances result in detrimental impacts to natural resources in a manner that masks the environmental impact of individual measures. For example, the Action Agencies selection of individual measures that are combined in MO3 obscures the actual beneficial environmental impacts to water quality, including anadromous fish species, of “the option of breaching, bypassing, or even removing a dam” that would have informed the public and decisionmakers as the Court had urged. Further, the Draft EIS summarily dismissed MO3 from further consideration during the Preferred Alternative selection process based upon the action agencies’ inclusion of meeting its agency statutory obligations in its purpose and need statement. NEPA is clear that an agency must analyze a reasonable alternative to its proposed action, even if it was outside of its statutory authority to implement. The Action Agencies’ inclusion of its statutory mandates in its purpose

and need statement resulted in precluding further analysis of that reasonable alternative, preventing public disclosure and discourse.

**Adequacy and Equity of the Development and Analysis of Reasonable Alternatives**

This Draft EIS does not contain a true “anadromous fish-focused” alternative. Early in the Draft EIS process, a suite of structural and operational measures were identified, some of which likely benefited anadromous fish survival and some of which likely decreased anadromous fish survival. The action agencies then chose and reassembled a subset of these measures into four multiple objective alternatives (MOs) without any quantitative or qualitative analysis of the individual measures. Failure to conduct analysis of individual measures effectively eliminated any understanding of the relative nature, magnitude or duration of any one measure’s impact on anadromous fish survival. The four MOs and the No Action Alternative were then analyzed both quantitatively and qualitatively. However, these analyses captured only the interacting effects of combinations of individual measures on the affected environment. Thus, the true efficacy of any measure meant to benefit anadromous fish was obscured and could not be considered.

Although ODFW is not necessarily advocating for this particular alternative, an example of an *environmentally preferred alternative* that would likely avoid jeopardy of ESA listed anadromous salmonids, lead to recovery, and that was not analyzed as part of the Draft EIS process – but should have been – would contain the following measures (from Tables 2-7 and 2-9).

**Structural Measures:**

1) Modify the upper ladder serpentine flow control ladder sections at Bonneville Dam  
2) Expand network of Lamprey Passage Systems to bypass impediments  
3) Modify turbine cooling water strainer systems to safely exclude Pacific lamprey  
4) Modify turbine intake bypass screens that cause juvenile lamprey impingement  
5) Modify existing fish ladders, incorporating lamprey passage features and criteria  
6) Lower Snake River Breach  
   a. Develop procedures to operate existing equipment during reservoir drawdown  
      (Lower Granite, Little Goose, Lower Monumental, and Ice Harbor Dams)  
   b. Develop contingency plans to address unexpected issues with drawdown operations  
      (Lower Granite, Little Goose, Lower Monumental, and Ice Harbor Dams)

**Operational Measures:**

1) Remove earthen embankments and adjacent structures, as required, at each lower Snake River Dam  
2) Modify equipment and infrastructure to adjust to drawdown conditions at each lower Snake River Dam  
3) Develop procedures to operate existing equipment during reservoir drawdown at each lower Snake River Dam  
4) Develop contingency plans to address unexpected issues with drawdown operations at each lower Snake River Dam
5) Lower Columbia River Fish Passage Spill
   a. Spill through surface passage structures for steelhead overshoots, overwintering steelhead, and kelt
   b. Set juvenile fish passage spill to 125 percent TDG

6) Other Operational Measures.
   a. Strive to hold minimum 220 kcfs spring flow/200 kcfs summer flow at McNary Dam using upstream storage
   b. Reservoir drawdown to Minimum Operating Pool to reduce outmigration travel time (McNary, John Day, The Dalles, and Bonneville Dams)

7) Maintain all existing fish and wildlife mitigation programs

This constitutes a reasonable alternative not analyzed in the Draft EIS, which is significantly distinguishable from the other analyzed alternatives. ODFW urges the action agencies to adhere to NEPA’s mandate and incorporate review of this reasonable yet unexamined alternative.

Adequacy and Equity of Water Quality Analysis

The Draft EIS water quality analysis fundamentally failed to analyze and summarize environmental effects of water quality in a manner which allows the public or decisionmakers to understand the full range potential impacts to fish and fish habitats. The water temperature analysis focused solely on daily maximum temperatures, although important to fish and aquatic species, does not adequately inform environmental consequences. The water quality analysis does not adequately address the following environmental information:

1) The full range of daily water temperature fluctuation across alternatives, including average daily mean and daily minimum temperatures.
2) The water temperature benefits likely to occur under MO3 particularly as they relate to the enhance ability for summer cold water releases from Dworshak Reservoir and the restoration of ecological functions such as reconnection of hyporheic flow, floodplain creation, development of riparian habitat to cool the lower Snake River.
3) The water temperature benefits likely to occur under MO3 as result of less solar heat accumulation with conversion from four reservoirs to restoration of approximately 140 miles of riverine habitats.
4) The water temperature impairments likely from measures to increase reservoir forebay elevations, increasing reservoir surface area and decreasing water travel time which are found in all Alternatives including the PA.
5) Opportunities to use cooler water from reservoir depth to reduce fish ladder water temperatures at John Day dam and other lower Columbia River projects that demonstrate mild stratification from the Corps temperature monitoring data.
6) Mitigation actions that could be employed during drought or low water years to prevent fish kills the nature of those that occurred during the summer of 2015.

The Final EIS must include a more robust water temperature environmental consequences analysis that describes and contrasts water temperature impacts in a meaningful way considering the affected resources including anadromous fish. The Final EIS must also include a
A contingency plan to manage water temperatures during drought years, low flow years, and during periods of high temperature to avoid future fish kills such as that which occurred in 2015.

Adequacy and Equity of the Climate Analysis

The Draft EIS analysis misrepresents the impacts of climate change and does not identify sufficient measures to avoid and mitigate impacts. The Draft EIS Climate section asserts that future conditions will include reduced snowpack, increased water temperatures and lower summer discharges, and a likely increase in the frequency of cumulative daily temperature exceedance events. However, these climate impacts are not integrated into and should be in the descriptions of water temperature impacts described in Chapter 3, the Affected Environment and Environmental Consequences sections. For example, the Draft EIS states, “Air temperature is projected to be warmer throughout Region C and D (Section 4.1).” Warmer air temperature combined with projected reduced summer and fall flow volume (Section 4.2) will likely lead to increased riverine and reservoir surface water temperature but does not discuss how these climate conditions will exacerbate water temperatures that already exceed water quality standards for temperature (68 °F) approximately 257 times each summer on average in the Lower Columbia River as measures at the forebay of McNary, The Dalles, John Day, and Bonneville Dams under the No Action Alternative. The Draft EIS makes no further distinction between the remaining alternatives as to how this may differ. In actuality, anadromous salmonids, fish that have evolved to cold water habitats, will be exposed to more individual extreme water temperature exceedances or more cumulative exposure to less severe water temperature exceedances can and will be negatively impacted a survive less.

The Draft EIS 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. ODFW agrees, and also asserts that that this is likely to occur with greater regularity as the effects of climate change persist in the Columbia Basin. However, this connection between climate impacts and historic water temperature problems is not adequately described in the Draft EIS. From the perspective of anadromous salmonid survival any alternative that does not include measures to mitigate excessive water temperatures will result in sub-lethal effects (compromised fitness) or direct lethal mortality. Further, the PA analysis described in Chapter 7 contains no mention of the effects of increased water temperature on fish populations, particularly the effects caused by climate change. Finally, the Draft EIS does not include a thermal emergency contingency plan. The Draft EIS must anticipate thermal emergencies and provide a plan to mitigate such events. The Final EIS must include that plan to meet the requirements of NEPA.

Adequacy and Equity of the Socioeconomic Analysis

The Draft EIS includes an inequitable economic analysis of climate change. The Draft EIS goes into an extremely detailed future looking view of how climate change and the region’s efforts to decrease carbon heavy power production such as coal and gas generation facilities will severely
exacerbate power reliability and replacement cost under MO3 and MO4. At the same time the Draft EIS fails to provide the same, or any, analysis for how climate change will impact salmonid survival, and what those impacts would have on regional cultural and socioeconomic resources.

The Draft EIS did not include a socioeconomic analysis of recreational fisheries. Further, the Draft EIS includes an inequitable economic analysis of commercial and tribal fisheries that greatly undervalues these fisheries in geographic scope and current economic value. The Draft EIS fails to translate any of the changes in relative fish abundance across alternatives into comparable fishery socioeconomic gains or losses for the public and decisionmakers consideration.

The socioeconomic elements of the Draft EIS fail to address or employ widely-accepted professional economic standards to ensure a thorough, objective, and transparent evaluation of the Draft EIS alternatives. These standards are defined in court interpretations of the National Environmental Policy Act, the Corps’ guidance documents for socioeconomic analyses, and other socioeconomic analysis process standards42.

Consequently, there are severe, systemic gaps in the socioeconomic analyses of the Draft EIS that inaccurately represent regional effects of alternatives with respect to recreational, commercial and tribal fisheries in a manner that prevents reasoned decision-making. Specifically, the Draft EIS fails to:

1) Make use of all the available, relevant, accurate, and reliable socioeconomic information.
2) Make a substantial, objective effort at studying, analyzing, and evaluating all the socioeconomic issues relevant to the actions considered.
3) Account fully for the socioeconomic importance of ecosystems and ecological risks.
4) Consider equally both monetized and non-monetized effects.
5) Examine the multiple socioeconomic consequences of the preferred alternative and other alternatives.
6) Fully disclose all relevant information, and provide full transparency to the decision-making process, to enable the public and decisionmakers to understand the rationale for selecting the preferred alternative.

The Final EIS must be modified to include all of the available socioeconomic information as opposed to the Draft EIS’s current limited analysis. For example, the Draft EIS reports current

42 Principles and Requirements for Federal Investments in Water Resources (pdf)
Interagency Guidelines (pdf)
Department of the Interior. 2015. Agency specific procedures for implementing the Council on Environmental Quality’s Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies
Executive Order 12866. 1993. Regulatory planning and review
gross domestic product (GDP) and full-time equivalent (FTE) fishery values for Oregon and Washington. But those numbers reflect only the current state and value of salmon fisheries in Oregon and Washington, which, due in large part to negative impacts from the CRS Operations, are operating under a constraining set of rules that severely limits harvest. Given that other sections of the Draft EIS 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. 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. The Draft EIS simply does not provide an equitable economic analysis of fisheries as a commodity. If the Action Agencies had analyzed a true anadromous focused alternative, as has been repeatedly suggested by ODFW, then increased regional employment and economic value would be substantial.

Furthermore, recreational fishing is combined with other recreational activities into a single metric in the Draft EIS 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 CRS 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 Draft EIS 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, the non-monetary tribal interests must be an integral part of this discussion.

As stated previously, 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 Draft EIS. These above-described issues with the Draft EIS prevent reasoned decision-making.

**Failure to Utilize High Quality Information and Accurate Scientific Analysis**

The Draft EIS fails to ensure the professional and scientific integrity of the discussions and analyses. Where high quality scientific evidence is presented, it is commonly caveated based primarily on speculation and is discounted in favor of less scientifically-defensible information.
This presents a subjective view and ultimately a biased representation of the state of the science. A few examples are noted as follows.

The Draft EIS uses two quantitative modeling approaches to predict survival benefits or decrements across alternatives: (1), the Northwest Fisheries Science Center’s (NWFSC) Comprehensive Passage (COMPASS) and Life-cycle models and, (2), the Comparative Survival Study’s (CSS) Cohort and Life-cycle models (CRSO-84, CSS Annual Report 2017). Despite the fact that both approaches have been reviewed and scrutinized extensively, the discussion and summarization of the results of the two models are presented in a biased manner: (1) Model results between models (e.g., NWFSC and CSS) are not given fair and equitable consideration; (2) CSS Model results are presented with misleading and unnecessary qualifier statements while output from NWFSC models are represented as fact with no qualification and no meaningful discussion of assumptions; (3) Fish modeling results are presented in a biased manner, use unnecessarily charged language, and are generally not presented in a fair and transparent manner particularly when modeling results differ between models. Examples of this bias become particularly pronounced as the effect descriptions in Chapter 3 are characterized in Chapter 7 as the justification for choosing the PA.

The Draft EIS employs a “TDG tool”, a model used to quantify exposure of out-migrating salmon and steelhead to total dissolved gas (TDG) and the contribution of TDG to mortality irrespective of other sources. The model has not been peer-reviewed or otherwise scrutinized in any meaningful way, yet output, particularly related to reach-average exposure, is nonetheless presented as reputable. Model parameters are based almost solely on laboratory studies conducted decades ago. It strains credulity that these parameters, and consequently the mechanisms that drive output, would realistically represent the real-world effects of variation in TDG. Further, the model is highly dependent on or sensitive to uncertain parameter assumptions (e.g., TDG_{crit} from laboratory studies), where the unsubstantiated selection of values can have a disproportionate effect on outcomes. The authors of the Draft EIS point to some of these insufficiencies briefly, but then include estimates as though “TDG tool” were a completely qualified model upon which decisions can be made. The Final EIS should eliminate the use of the “TDG tool” in its analysis of fish survival.

The Draft EIS fails to consider in any meaningful way empirical field observations of TDG impacts to fish migrating in-river through the Snake and Columbia Rivers collected over two decades as part of the well-established Smolt Monitoring Program (SMP; http://www.fpc.org/smolt_home.html). As noted above, the Draft EIS relies heavily—in modeling or generally in discussion—on information from laboratory or in situ mesocosm experiments. While useful in shedding light specific mechanisms underlying a response, scaling results from such experiments to the natural environment where conditions vary in time and space can be, and commonly is, tenuous. With this in mind, it is all the more surprising that empirical information from the SMP was discounted in the Draft EIS. Through the SMP, the action agencies have funded decades of monitoring at projects within the lower Snake and Columbia Rivers in order to observe for signs of GBT in fish as a means of identifying if adaptive managements changes to spill operations are necessary to avoid adverse impacts to fish. This federally funded program constitutes the best available data characterizing real-world population-level effects of variation in TDG on anadromous fish. The Final EIS must consider
thoroughly this information to provide a more accurate picture of the effects of TDG on life-cycle survival across alternatives.

The Draft EIS includes inaccurate analysis of environmental effect because it arbitrarily ties discontinuation of Lower Snake River Compensation Plan hatchery releases to implementation to MO3, which is then argued will create a survival decrement for naturally produced Snake River salmonids and applied as a “predator swamping” impact. This is a false premise for several reasons: (1) The Lower Snake River Compensation Plan is direct mitigation for the effects of the Snake River Dams. Even if a breach alternative were implemented, it would likely be years before breaching occurred and longer still for the full impact of these dams to be abated; (2) Implementation of an MO3 style breach alternative would require the action agencies to seek congressional authorization and funding, and a supplemental EIS would likely have to be developed. It is implausible that no mitigation package would be designed in that instance to maintain all sectors of society during, at the very least, the transition period to when one or more dams are removed. Specifically, it is highly unlikely Lower Snake River Compensation Plan hatchery releases would be discontinued abruptly as language in the Draft EIS asserts. Further, a period of monitoring to demonstrate naturally-produced fish abundances were actually increasing to levels that would allow limiting hatchery supplementation would be needed; (3) If the Lower Snake River Dams were breached, the lower 140 miles of habitat would be converted from a reservoir habitat that supports nonnative predatory fish species such as bass, walleye, and channel catfish to a riverine habitat type that is unsuitable for these predators. Thus, population abundances of nonnative predatory fish species would decrease, reducing exposure to predators, and likely mitigating and “predator swamping” effect; and (4) there are other effects of breaching of the four lower Snake River dams that would likely protect migrants from any “predator swamping” impact. Fish travel times are predicted to decrease substantially under MO3, further limiting exposure to both fish and avian predators. Also, according to CSS modeling, smolt to adult return rates under MO3 are predicted to exceed the level necessary to achieve generational increases in abundance. Therefore, any “predator swamping” effect would likely be temporary and attenuate as productivity accrues. This is important to consider given that any potential reduction in hatchery production would be gradual, as noted above. Given these points, the certainty of the “predator swamping” argument espoused in the Draft EIS is incomplete, if not misleading, and should be tempered or removed.

The Draft EIS suggests that after independent review (IEPR) of the NWFSC and CSS approaches to modeling, changes in conclusions may be reflected in the Final EIS and ROD (“…the similarities and differences in the two CSS models as well as COMPASS will be the subject of IEPR, the results of which will inform the final version of this EIS.”). This would presumably occur without public or cooperating agency review and thus would place interpretation of findings from the IEPR and modification to the EIS at the sole discretion of the action agencies. This is antithetical to a fair and transparent process.

Language in the Draft EIS states, “These eddies can adversely affect downstream travel time and in-river survival and are not accounted for in the models during low flow conditions. Consequently, to some degree both models may have the potential to overestimate improvements in juvenile survival, travel time, and SARs.” Eddy formation would not be new under MO4;
Eddies form under current conditions. So, any deleterious effects due to eddies would be inherent in fitted model coefficients. Thus, models would not overestimate survival benefits due eddy formation specifically. Ultimately, eddy formation occurs in natural riverine habitats and any eddies that occur at CRS projects do not delay downstream travel times in any measurable way.

**Mitigation**

As participant in the development of the CRSO EIS as Cooperating Agency, the ODFW repeatedly recommended the following list of mitigation measures to Avoid, Minimize, Rectify, Reduce, or Compensate for environmental impacts to anadromous fish from the proposed CRSO structural and operational measures:

1) Install Passive Integrated Transponder (PIT) detector arrays at all project spillway weirs and other undetected passage routes as technology allows.
2) The Action Agencies should immediately fund or conduct lethal removal of any California or Steller Sea lion predating on salmonids or sturgeon at passage pinch points such as Bonneville Dam.
3) Optimize dam flows for White Sturgeon spawning and early life stage survival.
4) Reduce load following limited to +/- 5%.
5) Develop contingency operations to increase both juvenile and adult fish survival during drought, low flow years, or years of excessive water temperatures similar to 2015.
6) Construct and operate cool water intakes in the forebay of John Day dam to cool fish ladder temperatures during high water temperature periods.
7) Change FRM to make more water available to fish (relax rule curves to manage towards normative hydrograph).
8) Mimic natural hydrograph (ops) (including in the estuary).
9) Build secondary fish ladders at Lower Granite and Little Goose dams to facilitate year around volitional fish passage during periods when the primary ladders are dewatered for annual maintenance. Design secondary ladder entrances to minimize adult delay during high spill operations.
10) Maintain less than 1-degree Celsius water temperature differential between fish ladders and tailraces for all CRS projects.
11) Modify CRS project powerhouse intake fish screens to reduce lamprey impingement.
12) Spill Increase to maximize SPE (shouldn't change hydrograph) to improve juvenile fish passage.
13) Cease juvenile fish transport systems and focus on improving in-river juvenile salmonids survival.
14) Optimize spill patterns at each project. This would require conducting deferred maintenance and repairs at The Dalles project to allow for full operation of spillbay operations.
15) Provide volitional passage and reintroduce anadromous fish above barriers when and where appropriate within the Columbia Basin.
16) Develop and implement environmental flow operations to provide periods of overbank flow when and where appropriate.
17) Expand Albeni Falls flow operations to expand protections for downstream Chum operations below Bonneville.
18) Increase opportunities for selective flow augmentations from storage reservoirs to benefit flow and water temperatures to increase anadromous fish survival.
19) Maximize storage of cold water at DWA, LIB and CJO projects for later summer flow augmentation.
20) Minimize reservoir operating elevations and viability operations to minimize reservoir surface area and fish travel time through reservoirs.
21) Reduce tailrace water elevation fluctuations due to load following (for sturgeon this would be directed to early life stage development time).
22) Increase likelihood of refill at storage projects that provide downstream water temperature management.
23) Increase shoreline vegetation for habitat and shading.
24) Implement deeper (existing) storage reservation diagrams to reduce FRM draft.
25) Investigate development of guide curves to avoid situations where heavy spill has to occur in the spring to meet FRM requirements. Concept would be to have a guide curve that is forecast based (to only be used in high water supply situations) to allow for earlier draft than the current SRDs.
26) Change seasonal/monthly turbine operations/priorities to change temperature mixing for cooling.
27) Repair and reconfigure stilling basins (project specific) to higher elevation/less depth for plunging flows to limit TDG.
28) Install deterrents to fish entrance of draft tubes when not in operation
29) Reconnect mainstem and off channel habitats.
30) Restore mainstem habitat through increased habitat complexity (rapid, riffle, run, pool), shallow water rearing habitat connectivity, temperature reduction, riparian function restoration, restore ecosystem processes.
31) Decrease White Sturgeon habitat fragmentation through dam passage improvements and/or dam removal.
32) Develop strategies to rebuild and/or augment fish ladders to promote volitional sturgeon passage.
33) Develop operational plans to strategically draw down reservoirs to minimize absorption of solar radiation and minimize volume of reservoir habitats that favor exotic predatory fish species.
34) Expand wire arrays to minimize avian predation at project tailraces.
35) Install wire array to dissuade avian predation at McNary
36) Modify project operations to allow larval lamprey (ammocoetes) in shallow water rearing areas to safely move to deeper water as water surface elevation drops.

Unfortunately, none of these recommendations appear as new mitigation measures in Mitigation Chapter of the Draft EIS. These are important mitigation opportunities to effectively offset
many of the unintended consequences to anadromous salmonids that would occur as a result of implementation of the structural and operational measures currently proposed in the Draft EIS. ODFW urges the action agencies to incorporate of these mitigation measures as part of the Final EIS.

High Level Preferred Alternative Concerns

Purpose and Need

The Preferred Alternative (PA) does not meet the purpose and need for the proposed action. Specifically, the Draft EIS purpose and need states, “In addition, the co-lead agencies are responding to the Opinion and Order issued by the U.S. District Court for the District of Oregon such that this EIS will evaluate how to insure that the prospective management of the System is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat, including evaluating mitigation measures to address impacts to listed species.”

The Draft EIS claim, “Operations intended to benefit anadromous and resident fish should contribute to the survival and recovery of ESA-listed species…” Yet neither of the quantitative fish models supports this assertion (particularly when climate change is considered). In fact, both approaches to modeling alternatives predict anadromous Snake River ESA-listed yearling salmonid smolt-to-adult return (SARs) survival rates below that necessary to avoid jeopardy and move toward recovery. Specifically, CSS analyses predict the PA will be deficient, in terms of average Snake River yearling Chinook life-cycle survival (~2.7% SAR) relative to that necessary to facilitate recovery (2-6% SAR range, averaging 4% SAR). The NWFSC’s life-cycle model predicts the PA will underperform more severely for Snake River yearling Chinook Salmon survival (<1.0% SAR) falling far below not only what is necessary for recover, but also the rate of adult return required to avoid population declines (2% SAR). This is true even when output from this model is scaled to mimic latent effects (1.12% SAR with a 50% adjustment). Where other species and stocks were modeled, or where surrogates were considered in lieu of direct estimates, the PA similarly fell short of the rate of adult return likely necessary for recovery or to avoid generational decreases in abundance.

Failure to Disclose and Analyze Environmental Effects of a Preferred Alternative Beyond Year One Operation

There is a fundamental disconnect between the time period of analysis cited in the Draft EIS (e.g., likely environmental impacts over a 25-year period) and the description of the PA (only one year of operational measures clearly described with subsequent years’ operations dependent upon adaptive management that appears to allow significant variations in operation not analyzed in the Draft EIS). This disconnect is compounded by language in Appendix R that inadequately describes adaptive management (presumably operation in years 2-25). In other words, Appendix R describes adaptive management and suggests the PA could be fundamentally changed as “opportunities” are presented. Yet there is no description of what these opportunities might be or
what operational changes may be implemented; however, this Draft EIS also includes a
description of environmental consequences of the Preferred Alternative. So which is it? Have the
action agencies failed to accurately analyze the likely environmental impacts of the PA (i.e.,
misrepresented environmental impacts for year one only as opposed to 25 years of such
operations), or does this Draft EIS fail to identify and disclose to the public what operations and
measures were analyzed as occurring in years 2-25 in the PA? This PA appears to be that of a
programmatic EIS, but there is no acknowledgment by the action agencies that site-specific
analysis must be conducted when more concrete operations and measures are identified. In
short, the action agencies have analyzed only the impacts of a single year of proposed operations.
This was done without apparent consideration of future check-points or any proposals for
supplemental analysis to assess environmental impacts if and when operations or structural
measures are manipulated in future years. As discussed above, given the Action Agencies’
failure to identify the environmental impacts of individual measures or structural changes, this
Draft EIS does not provide typical “bookends” to allow such adaptive management in the future
absent supplemental environmental analysis.

NEPA Process Irregularities

Chapter 1 and 2 of the Draft EIS describe how the Draft EIS will use descriptors such as “no
effect”, “marginal effect”, “minor effect”, and “major effect to characterize the magnitude,
duration, and severity of environmental consequences. Yet Chapter 7, abandons use of these
descriptors as effects are described to justify the choice of the PA and, in particular, justifying
why other alternatives or measures in other alternatives are discounted. ODFW believes the
Final EIS must use consistent language when discussing alternatives

Adequacy and Equity of the Socioeconomic Analysis

Recreational fisheries socioeconomic analysis is absent from the PA analysis. The economic
contributions section of the PA is a brief summary of previously developed regional economic
analyses and lacks any recent or current analysis. Consequently, this section is not based-upon
sound science and is overly general, not being specific to the study area. Further detail and
context are needed for the reader to be able to interpret this summary and compare these studies
while understanding the key assumptions specific to each without having to solely rely on dated
analyses

There are terminology errors in the Passive Use Values Sections that should be corrected.
Clarifications are made in the page specific comments. The key issue is the interchangeable use
of the terms "passive use" and "non-use values". These types of values are different and using the
same term for them interchangeably is incorrect and confusing. There are also quite a few
misuses of the term Total Economic Value (TEV), which by definition, should include non-use
values. In addition, in the summary of studies it is unclear how the dollar values for the WTP
estimate were adjusted for inflation and put into a comparable year, until the reader gets to the
table at the very end of the section.
The social welfare section lacks robust quantitative analysis; therefore, the analysis lacks scientific rigor for all scenarios. It is overwhelmingly qualitative in nature; the authors defend this putative necessity by stating: “Due to the complexity of fishery management, it is not possible to predict changes in fishery management that may result from changes in fish abundance”. This lack of quantitative data makes it difficult to compare scenarios and hard to determine the magnitude of impact(s) on social welfare. The Final EIS should include an assessment using the current fishery management schema as the baseline and quantitatively estimate changes in management structures, actions and allocations according to predicted changes in species abundances. This approach may require some assumptions; however, it would make quantitative comparisons of the alternatives possible and the necessary assumptions could be clearly defined, presented, and disclosed, including a discussion of uncertainty related to future fishery management.

Failure to Utilize High Quality Information and Accurate Scientific Analysis

The water quantity/quality dataset for the PA provided to the fish modelers characterized variation on a daily average time step (CSS-78). The Juvenile Fish Passage Spill Operations measure in the PA, based on the Regional 2020 Flexible Spill Agreement operation requires data analysis on an hourly time step given operations change within day (i.e., 16-hours enhanced spill/8-hours power-focused spill). Because fish at dams begin to sound at dusk, they are more vulnerable to increased powerhouse encounter rates during nighttime hours than during daytime hours. This behavior cannot be modeled where input data do not capture diel variation in water quantity/quality parameters. Therefore, the fish modeling results are almost certainly overestimating the actual survival benefit of the PA (CSS Memo CRSO-77; Chapter 2 of the CSS 2019 Annual Report).

The PA, as currently constructed, will not be able to provide adequate fish survival benefits particularly in light of pressures on survival from future climate change. Although the CSS modeling predicts a slight improvement in SARs under the PA, compared to the NAA, predicted mean rates were still far less than the 4% regional benchmark necessary for healthy and harvestable populations. Further, SARs at the lower end of all simulations (i.e., 25th percentile) for the PA was less than 2%; below the level necessary (2% SAR) to achieve population replacement and avoid generational decreases in abundance. These values at the lower end of predictions will become increasingly more likely with future climate change as conditions in both freshwater and the ocean vary more dramatically. The only alternative analyzed as part of the CRSO EIS capable of SARs that meet these regional goals to rebuild populations (≥ 2% SARs) and provide for recovery to healthy and harvestable populations (Average 4% SARs) is MO3 the alternative including breach.

Yet, language in the PA dismisses the breach measures as viable components of a PA as they would likely, in the Action Agencies' estimation, preclude meeting many objectives of the purpose and need. The argument focuses heavily on deleterious impacts to flood risk management (FRM), water supply/irrigation, hydroelectric power generation, navigation and recreation and seems to imply that these impacts cannot be mitigated. In addition, and as noted above, the PA fails to acknowledge that breach measures are the only mitigation action that would likely lead to recovery of imperiled salmon and steelhead stocks. The document seems to
point to uncertainty in modelling of benefits to fish as a rationale to discount output, yet one
conclusion remains consistent among the different approaches (i.e., CSS vs NWFSC fish
modeling results); breach appears to be the one path that could precipitate recovery of
disclosed.

Appendix R: The Process for Future Adaptive Implementation of the Fish Spill Operation

Taken as a whole the description of the process for adaptive management simply implies the
operations under the PA will change through time, starting in year 2 of 25. There is no actual
information which allows the reader to discern how operations will change, and consequently, if
operations will change for the better or worse for fish survival as compared to the first year of
operation in PA (e.g., heavier focus on power generation). Further, specific language in
Appendix R suggests future (i.e., beyond year two) implementation of a block spill experimental
design or virtually any operational or structural adjustments to the PA deemed “opportunities”,
regardless of whether those adjustments are detrimental to fish.

Failure to Accurately Disclose Likely Environmental Impacts for Specific PA Measures

All but two of the Structural Measures in the PA either are measures retained from the NAA or
are new measures developed to benefit lamprey (some of which are likely to constrain survival
of salmon and steelhead). The only structural measures included in the PA that were developed
to mitigate for reductions in salmonid survival are the Lower Granite Trap Modifications and the
Bonneville Ladder Serpentine Weir Modifications. Both of these measures have been reduced in
scope to only include trap gate modifications which will likely reduce anticipated benefits to less
than measurable levels. Taken as whole, the Structural Measures in the PA will have an overall
adverse impact on salmonid survival as compared to those in the No Action Alternative.

Conversely, all of the Operational Measures in the PA are different from those proposed in the
NAA except one: the Fall Operational Flexibility for Hydropower at Grand Coulee. Of the
sixteen new Operational Measures, fifteen are likely to be harmful to salmonid survival either
directly or by shifting risk of available water for spring flow from power generation or irrigation
onto flow availability for fish. Only one Operational Measure, the Juvenile Fish Passage Spill
Operation, is likely to benefit survival of salmonids as compared to the NAA. As noted, only
one Operational Measure-Fall Operational Flexibility for Hydropower at Grand Coulee-is likely
to be neutral to salmonid survival. Taken as a whole, the fourteen new Operational Measures are
likely to be harmful to salmonids, functionally eroding the potential benefits of the Juvenile Fish
Passage Spill Operation. Generally, any measures in the PA to promote salmon and steelhead
survival would be ameliorated by actions to support other objectives;

Concerns on measures specific to the PA

These two PA measures showed promise for anadromous fish benefits early in the Draft EIS
process but were narrowed in scope during development of the PA that any potential would be
negligible and not likely measurable in magnitude:
1) **Lower Granite Trap Modifications measure** - The measure has been reduced in scope to include modifications to just the trap gate which may have also reduced the potential benefits to adult salmonid survival;

2) **Bonneville Ladder Serpentine Weir Modifications measure** - The measure has been reduced in scope to include modifications to just the trap gate which may have also reduced the potential benefits to adult salmonid survival as compared to its scope in MO1 and MO3;

These seventeen PA measures are described as beneficial or neutral to fish survival in the Draft EIS but are actually harmful to anadromous salmonids if they were implemented:

1) **Ice Harbor Project Turbines 1 to 3 Replacement and Generator Rewind measure** - Even if the direct mortality of high-capacity turbines is shown to be no higher than that of the existing turbines, the increased turbine flow will lead to increase powerhouse passage of the run-at-large. This effect, compounded over multiple dams, will have a net negative impact on the smolt-to-adult returns. If the increased powerhouse flows are not included in the modeled datasets provided to the fish modelers, the increase in powerhouse passage will not have been reflected in the PA modeling fish analyses. This failure to accurately disclose impacts results in an overly optimistic picture of benefits to fish under the Preferred Alternative;

2) **McNary Project Turbine Replacement measure** - Even if the direct mortality of high-capacity turbines is shown to be no higher than that of the existing turbines, the increased turbine flow will lead to increase powerhouse passage of the run-at-large. This effect, compounded over multiple dams, will have a net negative impact on the smolt-to-adult returns. If the increased powerhouse flows are not included in the modeled datasets provided to the fish modelers, the increase in powerhouse passage will not have been reflected in the PA modeling fish analyses. Ultimately this results in a Draft EIS description of a measure beneficial to fish survival that in reality will be a measure that is detrimental to fish survival;

3) **Improved Fish Passage Turbines at John Day Dam measure** - Even if the direct mortality of high-capacity turbines is shown to be no higher than that of the existing turbines, the increased turbine flow will lead to increase powerhouse passage of the run-at-large. This effect, compounded over multiple dams, will have a net negative impact on the smolt-to-adult returns. If the increased powerhouse flows are not included in the modeled datasets provided to the fish modelers, the increase in powerhouse passage will not have been reflected in the PA modeling fish analyses. Ultimately this results in a Draft EIS description of a measure beneficial to fish survival that in reality will be a measure that is detrimental to fish survival;

4) **Fewer Fish Screens measure** - Fish screens are in place to shift salmonid powerhouse encounters toward bypass systems and away from turbines to increase survival. Assertions that "fish friendly turbines" will markedly reduce direct mortality is dubious, because even assuming a marginal reduction in mortality, removing screens promotes
passage through turbines; so, on average, the mortality burden will necessarily be greater than if screens were in place;

5) Sliding Scale at Libby and Hungry Horse measure - Storage Project draft limits/targets are set based on irrigation supply draft limits and/or FRM curves and targets. Any measure that allows for increased draft prior to spring refill or increased storage for irrigation will increase the likelihood that the volume of water that would have been available for spring flow augmentation is instead redirected to achieve refill targets or irrigation supply targets instead. This effectively prioritizes power production and/or irrigation over fish survival;

6) Modified Draft at Libby measure - Storage Project draft limits/targets are set based on irrigation supply draft limits and/or FRM curves and targets. Any measure that allows for increased draft prior to spring refill or increased storage for irrigation will increase the likelihood that the volume of water that would have been available for spring flow augmentation is instead redirected to achieve refill targets or irrigation supply targets instead. This effectively prioritizes power production and/or irrigation over fish survival;

7) Planned Draft Rate at Grand Coulee measure - Storage Project draft limits/targets are set based on irrigation supply draft limits and/or FRM curves and targets. Any measure that allows for increased draft prior to spring refill or increased storage for irrigation will increase the likelihood that the volume of water that would have been available for spring flow augmentation is instead redirected to achieve refill targets or irrigation supply targets instead. This effectively prioritizes power production and/or irrigation over fish survival;

8) Update System FRM Calculation at Grand Coulee measure - Storage Project draft limits/targets are set based on irrigation supply draft limits and/or FRM curves and targets. Any measure that allows for increased draft prior to spring refill or increased storage for irrigation will increase the likelihood that the volume of water that would have been available for spring flow augmentation is instead redirected to achieve refill targets or irrigation supply targets instead. This effectively prioritizes power production and/or irrigation over fish survival;

9) Slightly Deeper Draft for Hydropower measure - Storage Project draft limits/targets are set based on irrigation supply draft limits and/or FRM curves and targets. Any measure that allows for increased draft prior to spring refill or increased storage for irrigation will increase the likelihood that the volume of water that would have been available for spring flow augmentation is instead redirected to achieve refill targets or irrigation supply targets instead. This effectively prioritizes power production and/or irrigation over fish survival;

10) Contingency Reserves Within Juvenile Fish Passage Spill measure - This measure simply transfers the risk from a need for a contingency operational change from power generation onto fish survival. When contingency reserves are employed, fish survival will be diminished. Incorporation of this measure does not support the purpose and need of action to address improving the survival and recovery of species;

11) Above 1% Turbine Operations measure- This measure would increase the proportion of flow going through the powerhouse as opposed to over the spillway when implemented. Salmonid survival decreases as the proportion of flow increases going through
powerhouses as opposed to over the spillway. Incorporation of this measure does not support purpose and need of action to address improving the survival and recovery of species;

12) Increased Forebay Range Flexibility measure - This measure will increase the average forebay elevation in reservoirs during the salmonid outmigration season which will result in greater travel times and decrease salmonid survival;

13) Start Early Transport measure - Smolt-to-Adult return rates (SARs) are typically better for salmonids that migrate in the river as compared to those that are transported, particularly earlier in the spill season. This will likely decrease salmon and steelhead SARs;

14) Zero Generation Operations measure - this measure will effectively increase ponding during fall/winter periods. Although there will be few juvenile salmonids outmigrating during this period, there are kelt and adult overshoot steelhead that will need to move downstream preferably via spill as opposed to through turbines;

15) Predator Disruption Operations measure - Similar to the Corps previous avian predation management plans, this measure is highly unlikely to be effective at decreasing predation rates by avian predators on juvenile salmonids. The avian predators of the Columbia River have proven to be extremely flexible in moving nesting locations in response to previous Corps management actions. At the same time increasing the forebay elevations during spring salmonid outmigration periods will not likely be effective at reducing avian predation rates and will increase juvenile salmonid travel time and decrease survival of outmigration salmonids through the John Day reservoir;

16) John Day Full Pool measure - operating John Day pool at full elevation will create a larger reservoir surface area which will decrease juvenile salmonid survival during the fish passage season and increase the collection and absorption of solar radiation over the summer and early fall portions of the year. This will likely increase water temperatures during periods (July, August, and September) when temperatures already exceed state and tribal water quality standards and lead to decreased adult salmonid survival and possibly the incidence of severe adult fish kills such as those that occurred in 2015;

17) The Temporary Extension of Performance Standard Spill Operations mitigation measure will negate any benefits to salmonid survival resulting from the Juvenile Fish Passage Spill Operations measure;

This PA measure will only prolong unintended consequences to anadromous fish if repaired to status quo:

1) Maintenance improvements to the Little Goose jetty and retaining wall mitigation measure - as currently described, this measure would simply repair/rebuild the jetty and retaining wall to preexisting condition.

The Little Goose tailwater configuration is the most problematic project from the perspective of potential adult delay and/or juvenile egress of all the projects under consideration as part of the CRSO EIS, particularly during high spill conditions. Juvenile fish passage spill is annually curtailed at this project due to potential unintended biological consequences - perceived adult delay. Alternatively, this mitigation measure should first evaluate what tailrace configurational
changes need to occur to alleviate the unintended biological consequences and rebuild tailrace structural features in such a way as to provide meaningful mitigation rather than just rebuilding to the known problematic status quo configuration.

References

2019 Comparable Survival Study Annual Report 

CRSO-77 Memo, January 13, 2020. CRSO EIS Dataset for Preferred Alternative Modeling 


