UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
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VIA ELECTRONIC FILING

Refer to NMFS No:
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October 28, 2021

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
Mail Code: DLC, HL-11.1
888 First Street, NE
Washington, D.C. 20426

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for Puget Sound Energy (PSE), Inc., 125 FERC 62,064 (2008), Baker River Project, FERC No. P-2150-147, Lower Baker Dam Seepage Reduction (Grouting Program) and Crest Improvement (Crest Project) Authorization

Dear Secretary Bose,

This letter responds to your letters dated March 8, 2021, and June 25, 2021 requesting initiation of formal consultation with the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act (ESA) for the subject action for the Seepage Reduction and Crest Improvement Authorization. Your request qualified for our expedited review and analysis because it met our screening criteria and contained all required information on, and analysis of, your proposed actions and potential effects to listed species and designated critical habitat. The Seepage Reduction activities will occur over a three year period followed by the Crest Improvement activities over the next three year period.

We have also included in our analysis the project's likely effects on EFH for Pacific Coast Salmon pursuant to Section 305(b) of the MSA. Based on that analysis, the NMFS concluded that the action Seepage Reduction project would adversely affect designated EFH for Pacific Coast Salmon. Therefore, we have provided 1 conservation recommendation that can be taken by the FERC to avoid, minimize, or otherwise offset potential adverse effects on EFH. Because the NMFS concurs with the FERC's determination that the action would not adversely affect EFH for coastal pelagic species and Pacific Coast groundfish, consultation under the MSA is not required for those EFHs.

Section 305(b) (4) (B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving this recommendation. If the response is inconsistent with the EFH conservation recommendations, the FERC must explain why the recommendations will not be followed, including the scientific justification for any disagreements over the effects of the action and recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation

recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we request that in your statutory reply to the EFH portion of this consultation you clearly identify the number of conservation recommendations accepted.

The ongoing impacts of the Lower Baker Dam (LBD) operation are addressed by and subject to the requirements of the 2008 FERC license and the 2008 NMFS Biological Opinion (2006-05514). Because of this, the ongoing operation of the LBD as part of PSE's Baker River Hydroelectric Project and effects therefrom are considered part of the environmental baseline for purposes of the ESA Section 7 consultation for the proposed non-capacity license amendment, and would continue unaffected by this license amendment. As such, this opinion addresses only the likely effects of the proposed non-capacity related license amendment, which were not addressed by the 2008 NMFS Biological Opinion.

In addition, the species management practices for the fish passage facility are not the subject of this consultation. PSE operates the facility according to the FERC License Articles and Settlement Agreement. The Washington Department of Fish and Wildlife (WDFW) and three local Tribes serve as the Fish Co-Managers that guide PSE's operations together with the associated Aquatic Resources Group. The current management practices of the fish passage facility do not include passage of adult PS Chinook salmon or adult PS steelhead above the dam. As such, there are no functional anadromous populations of these fish in the Baker River above the dam. However, critical habitat is designated above the dam for PS steelhead and the Recovery Plan identifies fish passage above the dam as important for the recovery goals of the species (NMFS 2019). Therefore, we consider that there is the possibility that PS steelhead could be managed differently in the future and be transported above the dam because the current facility is capable of supporting functional passage up and downstream of the dam for this species. Therefore, we identify the likely long term effects of the project and consider how PS steelhead and the currently unoccupied critical habitat may be affected.

We reviewed the Federal Energy Regulatory Commission's (FERC) consultation request and related initiation package. Where relevant, we have adopted the information and analyses you have provided and/or referenced, but only after our independent, science-based evaluation confirmed they meet our regulatory and scientific standards. We adopt and incorporate by reference the following sections of the submitted biological assessment (B) dated February 17, 2021:

- Proposed Action Description Section 2, pages 5-18
- Action Area Section 3.4.1 and Section 3.4.2
- Federally Listed Fish Species and Critical Habitat Baseline
  - Potential Species Presence and Baseline Status in the Action Areas
    - Puget Sound (PS) Chinook Salmon- Section 4.4.2
    - PS Steelhead- Section 4.6.2
  - PS Steelhead Critical Habitat Baseline (action area is not designated as critical habitat for PS Chinook)- Section 5.2, pages 44-48
- Effects of the Action to Species- Section 6.1-6.4 (excluding Section 6.2.7.1), pages 48-68
- Effects of the Action to Critical Habitat- Section 6.5.2, pages 71-72

We specifically identify any discussion or information contained in the BA with which we disagree. We also supplement these sections below with summaries of the information contained in the BA and additional information and rationale where necessary to support our analysis and conclusions.

Consultation History

Leakage along PSE's LBD abutments has been increasing since the last grouting project was completed in 1982. FERC has ordered foundation grouting to mitigate for the long-term leakage and potential abutment erosion. PSE proposes a 3-year continuous grouting program using an amended cementitious grout, from the upstream dam face into the identified fissures. Following that project and using the staging areas from the grouting program, the PSE will construct the crest safety improvements which will also take about 3 years to complete.

On November 5, 2018, the Commission designated PSE as its non-federal representative, for the purpose of conducting informal consultation with NMFS for this action. PSE submitted the Draft Biological Assessment (BA) for the Commission's review on May 6, 2019. In the submittal, PSE requested initiation by the Commission of formal Section 7 consultation with NMFS following its adoption of the BA, the consultation to eventually culminate with a license amendment incorporating the Reasonable and Prudent Measures and the Terms and Conditions of the biological opinion for the LBD seepage reduction and crest improvement projects.

Following the Commission's adoption of the BA as its own on June 13, 2019, the Commission submitted to the NMFS its request to initiate formal consultation. Following receipt of bids and discussion with the Commission, PSE suspended project permitting and consultation August 29, 2019, pending project alternatives identification and analysis. PSE notified the NMFS of the change and requested to pause the consultation pending PSE's selection of the revised alternative, which involves a change in construction methods.

Upon selection of the revised alternative, and concurrent with re-initiation of informal consultation, PSE requested the withdrawal of its May 6, 2019 draft BA submittal to the Commission, also requesting that the Commission withdraw its BA and its June 13, 2019 request of the Services for formal consultation. The Commission submitted a letter to NMFS withdrawing its request for formal consultation on February 12, 2021. This action terminated the previous formal consultation and allowed PSE to re-initiate informal consultation on the revised alternative as the Commission's designated non-federal representative.

PSE re-initiated informal consultation with the NMFS in late 2020, completing revisions of the BA to incorporate changes impelled by the modified project plan. Determinations and mitigation measures identified in the revised BA remained unchanged from the previous version, however, descriptions of the revised project scope and associated sections were updated to reflect the new plan and schedule.

Between August 2018 and September 2021, NMFS staff met with PSE multiple times including a site visit in April 2019 to discuss the details of the proposed action and to review draft of the BA.

On May 12, 2021, NMFS received FERC's letter dated April 28, 2021 requesting formal consultation on this action.

On June 11, 2021, NMFS initiated formal consultation on the proposed action.

On June 25, 2021, FERC sent a letter extending their request for completed consultation. The letter asked that NMFS provide a final opinion by October 1, 2021.

Table 1. Effects determinations made by FERC and NMFS.

Species	FERC Listed Species Determination	FERC Critical Habitat Determination	NMFS Listed Species Determination	NMFS Critical Habitat Determination[1]
PS Chinook salmon	LAA	No Effect	LAA	N/A
PS Steelhead	LAA	NLAA	LAA	NLAA

Proposed Action

The proposed action is summarized in FERC's consultation request letter and in the BA. Detailed descriptions of the projects are contained is Section 2.1 and 2.2 of the BA. In summary, FERC proposes to authorize PSE to perform two dam maintenance actions in sequence on the Lower Baker Dam on the Baker River near Concrete, Washington.

For the Grouting Program, PSE proposes a 3-year continuous grouting program using an amended cementitious grout, from the upstream dam face into the identified fissures. Previous foundation grouting programs were conducted in 1934, 1959, and 1982. In consultation with the FERC, PSE has determined that continuing seepage and bedrock erosion, if unabated, may pose a long-term safety risk for the dam and the downstream human population. Following the Grouting Program, PSE will construct the crest safety improvements which will also take about 3 years to complete.

We considered, under the ESA, whether or not the proposed action would cause any other impacts than those described here and in the BA and determined that it would not.

Action Area

"Action area" means all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). The aquatic action area pertaining to ESA-listed PS Chinook salmon and PS steelhead is described by FERC in Section 3.3 and 3.4 of the BA. Temporary water quality impacts from the grouting have the farthest reaching effects and will likely extend from the base of the dam downstream to the Skagit River. It is highly unlikely that water quality will be affected in the Skagit River. Upstream of the dam in Lake Shannon, noise from construction would extend a maximum of approximately 4,500 feet from the dam in Lake Shannon. The action area also includes the upland staging areas adjacent

[1] If critical habitat is not designated in the project area and is not effected by the proposed action, we do not include a critical habitat effects analysis or determination.

to the dam. NMFS agrees with FERC's action area designation and that effects are highly unlikely to occur outside of the area.

PS Chinook salmon critical habitat is not designated in the action area. Given the "no effect" determination made by FERC and that critical habitat does not exist in the action area, where effects are expected to occur, we do not include an evaluation of effects to PS Chinook critical habitat in this biological opinion. PS steelhead critical habitat is designed in the Baker River and upstream of the dam in Lake Shannon, although listed PS Steelhead do not occur in the upper 0.6 mile of the Baker River or above the dam in Lake Shannon.

Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of state or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02). We independently reviewed and incorporated information provided in the BA to determine the "environmental baseline" conditions in the action area, which includes designated critical habitat of PS steelhead (BA Section 5).

The Baker River and Lake Shannon are surrounded by private and state timberlands are fed primarily by melting snow from the slopes of nearby Mount Baker and Mount Shuksan. Lower Baker Dam lies about one mile upstream from the Baker River's confluence with the Skagit River – inside the Town of Concrete.

Species Status

We examined the status of each species that would be adversely affected by the proposed action to inform the description of the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. We independently reviewed and incorporated information provided in the BA (Section 4.4 and Section 4.6) to examine the status of PS Chinook salmon and PS steelhead throughout the action area. We also considered information in the most recent recovery plans and status reviews for PS Chinook salmon (Shared Strategy 2007, NWFSC 2015, NMFS 2017) and PS steelhead (NMFS 2019, NWFSC 2015, NMFS 2017) which provide important information on the listed species' status, presence, abundance, density or periodic occurrence, and the condition and location of habitat, including critical habitat.

One factor affecting the status of ESA-listed species considered in this opinion, and aquatic habitat at large, is climate change. Climate change is likely to play an increasingly important role in determining the abundance and distribution of ESA-listed species, and the conservation value of designated critical habitats, in the Pacific Northwest. These changes will not be spatially

homogeneous across the Pacific Northwest. The largest hydrologic responses are expected to occur in basins with significant snow accumulation, where warming decreases snow pack, increases winter flows, and advances the timing of spring melt (Mote et al. 2014, Mote 2016). Rain-dominated watersheds and those with significant contributions from groundwater may be less sensitive to predicted changes in climate (Tague et al. 2013, Mote et al. 2014).

The adaptive ability of these threatened and endangered species is depressed due to reductions in population size, habitat quantity and diversity, and loss of behavioral and genetic variation. Without these natural sources of resilience, systematic changes in local and regional climatic conditions due to anthropogenic global climate change will likely reduce long-term viability and sustainability of populations in many of these ESUs (NWFSC 2015). New stressors generated by climate change, or existing stressors with effects that have been amplified by climate change, may also have synergistic impacts on species and ecosystems (Doney et al. 2012). These conditions will likely intensify the climate change stressors inhibiting recovery of ESA-listed species in the future.

The Skagit River, with its 2,900 tributaries, is the only river system outside of Canada and Alaska that supports all five species of Pacific salmon (WDOE 2016). While most Puget Sound Chinook river populations remain far below their recovery planning targets, the Skagit populations some are doing better. For instance, the recent 5-year abundance geomean for Suiattle River spring Chinook salmon is at 103 percent of its low productivity planning target for abundance. Upper Sauk River spring Chinook salmon and Upper Skagit River summer Chinook salmon are at 43 percent and 37 percent, respectively, of their low productivity planning targets. Escapement numbers of Chinook Salmon in the Lower Skagit River stock were just over 2,200 in 2015 (WDFW 2016). The aggregated mean escapement for the three summer/fall Chinook Salmon management units has increased over the past 12 years to 11,761 compared to the prior 12 years' mean of 9,886 (Puget Sound Indian Tribes and WDFW, 2017). A similar trend of increasing escapement was recorded for the spring Chinook Salmon management unit - an increase from 939 to 1,428 (Puget Sound Indian Tribes and WDFW, 2017). The Skagit River population of PS steelhead has fluctuated over the years. In 2009 the Skagit spring steelhead fishery was closed after experiencing a historically low run of less than 3000 fish. Numbers rebounded a bit between 2012 and 2017, but then declined since their recent peak in 2014, with 3092 fish returning in 2020.

A small barrier dam is located about 0.6 of a mile downstream of the LBD at the fish trap. This barrier dam prevents fish from accessing the upper 0.6 mile stretch of the Baker River. The lower 0.4 mile of the Baker River between the small barrier dam and the Skagit River is accessible to fish. PS Chinook salmon and PS steelhead rear in the lower Baker River. Within Lake Shannon, the floating surface collector (the mechanism that attracts outmigrating salmonids), is located about 0.25 of a mile from the dam crest. This mechanism prevents salmonids from accessing the lake in close proximity to the dam.

Endemic runs of both PS Chinook salmon and PS steelhead in the Baker River watershed no longer functionally exist (NMFS 2008). PS Chinook and PS steelhead in the action area are from the Skagit River subpopulations. Fish from these populations can access and rear in the lower Baker River. As mentioned above, the operation of the dam and the larger hydroelectric project

are considered as part of the environmental baseline. The dam operations include a truck and haul program, primarily for the management of non-listed sockeye salmon. PS steelhead are not transported above the dam, although there is a resident population of rainbow trout (*O. mykiss*) in Lake Shannon. Occasionally, smolts will outmigrate to the Baker River. Once they descend below the dam they cannot be distinguished from listed PS steelhead smolts and are then considered to be part of the PS steelhead listed DPS (these number about 225 smolts per year).

Adult PS Chinook salmon (less than 40 per year) and adult PS steelhead (less than a 12 per year) sometimes stray into the fish trap from the lower Baker River. These fish are returned to the Skagit River to encourage continued migration upstream to suitable spawning areas in the Skagit River or its other tributaries. Very small numbers (less than 40 fish per year) of juvenile PS Chinook salmon stray into the fish trap while rearing in the lower Baker River. Juvenile PS steelhead rearing in the lower Baker River enter the fish trap in higher numbers (100's of fish per year, up to as many as 1,600). Within the action area, critical habitat of PS steelhead is designated in the Baker River and above the dam in Lake Shannon. The only occupied critical habitat is the lower 0.4 mile of the Baker River. This reach provides rearing and spawning habitat, but the habitat is generally degraded. The reach lacks channel complexity associated with dam operation (lack of wood and natural substrate) and it occurs in a fairly steep ravine. The river is also impaired for temperature in the late summer/early fall (Table 5-2 of the BA).

Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered 50 CFR 402.17(a) and (b).

The BA provides a detailed discussion and comprehensive assessment of the effects of the proposed action in Section 6, Section 7, and Section 8. That analysis is adopted here by reference pursuant to 50 CFR 402.14(h)(3) for effects to PS Chinook salmon, PS steelhead, and PS steelhead critical habitat. NMFS has evaluated this section and after our independent, science-based evaluation determined it meets our regulatory and scientific standards. PS Chinook salmon and PS steelhead will be present in the action area during construction and are likely to be exposed to, and respond to, water quality changes. The only long term effect of the project is to the temperature of the Lower Baker River as discussed below.

Effects of the Action on Listed Species and Critical Habitat

Following our own independent assessment of the proposed action included in the BA, NMFS believes that the proposed action will likely cause the following effects to species as more fully described in Section 6, 7, and 8 of the BA. The effects of construction are primarily associated with the Grouting Program. The Crest safety improvements do not involve in-water work and the

temporary disturbance associated with that project involved minor disturbance from barges in Lake Shannon and minor noise from working on the crest of the dam.

Direct physical harm to listed PS Chinook and PS steelhead will not occur from work in Lake Shannon (barge movements or temporary water quality effects) because these listed fish do not occur in the lake. Further, as described in Section 6.2.7.2 and Appendix E of the BA, the project will not generate harmful levels of noise and the fish surface collector keeps salmonids at least 0.25 of a mile from the dam. Work will periodically generate disturbance level noise which will carry into the lake and may alter some normal behaviors, but not likely harm fish. Likewise, because of the surface fish collected, non-listed salmonids will not come in close proximity to elevated turbidity or other temporary water quality effects close to the dam construction area, and will therefore not likely be harmed within the lake (BA Section 8). For unoccupied PS steelhead critical habitat above the dam, these short term disturbances from noise and water quality are insignificant to habitat quality. The proposed action will have no long term effects to critical habitat quality in the lake.

For listed salmonids below the dam, very small numbers of adult and juvenile PS Chinook (10's of fish), very small number of adult PS steelhead (10's of fish), and hundreds of PS steelhead juveniles may be exposed to effects of the action when these fish occur in the lower 0.4 mile of the Baker River or if they stray into the fish trap. These effects will be most pronounced in the first year of construction for the Grouting Program and decrease to minor levels in the second and third year as explained below.

Water Quality

Short Term Effects

Section 6 of the BA describes the potential water quality impacts of the project in detail. At the start of the Grouting Program, turbid water with elevated pH and grout-associated contaminants will flow into the lower Baker River and into the stress relief ponds and fish trap. PSE will implement BMPs and adaptive management practices to minimize the severity of the water quality changes and the exposure of fish. Elevated pH waters originating from erosion of grout under and around the dam are anticipated to return to normal more than 1,000 feet upstream of the fish barrier dam (i.e., 1,000 feet above the point where salmonids may be present). Therefore, fish in the lower Baker River are unlikely to be harmed. However, some of the work will likely cause short-term and intermittent pH and turbidity increases when work is conducted near the intake on the left abutment. This water may flow to the stress relief ponds and fish trap where listed fish would be exposed.

Considering the location of listed fish relative to construction activity, temporary disturbance and to a lesser degree injury are the most likely categories of potential harm to listed fish. Data collected by PSE (BA Sections 4.4.2, 4.5.2, and 4.6.2) indicate that the numbers of listed adult fish exposed to potential harm is very small, relative to the respective populations, even when considered over the three-year term of Grouting Program. Fish are present in the Baker River downstream of the barrier dam but are likely only incidentally in this reach for opportunistic foraging with the likely majority of those fish entering and exiting the fish trap volitionally

during foraging. Juvenile steelhead, however, enter the trap in high numbers, peaking in the fall months but present throughout the year. The analysis of potential direct effects in Section 6.2 shows that the risks are highest in the first year of grouting and are most likely to occur in the fish trap or stress relief ponds and cause adverse physiological effects. The measures described in Section 2.1.2 and Appendix H will reduce the intensity and duration of potential exposures to elevated levels of turbidity or pH, which will minimize the severity effects and the number of potentially disturbed or injured fish. Therefore, it is likely that very small numbers of adult PS Chinook (on the order of 60 or fewer), adult PS steelhead (less than 12), juvenile PS Chinook (less than 40), and up to 1,600 juvenile steelhead could be exposed yearly during the Grouting Program, with a smaller subset of these fish experiencing lethal exposure in the first year of the Grouting Project.

For adult and juvenile PS Chinook and adult PS steelhead, the loss of a small number of fish in the first year of the Grouting Program is likely insignificant to the populations of fish. For the juvenile PS steelhead, the numbers of individuals experiencing lethal exposure could number in the hundreds of fish. The exact smolt to adult ratio of these fish is not known. As a general rule, a very small fraction of salmonid smolts reach adulthood and return to spawn, and the ratio likely changes over time as a response to many environmental conditions. Therefore, it is likely that the population level effects for Skagit River steelhead will be minor and for only that cohort as the loss of those juveniles may equate to the loss of 10s of returning adult fish out of a returning population of about 3,000 in recent years. Despite the recent low returns of Skagit River steelhead, this short term perturbation to one cohort is likely not large enough in scale to affect the long term trends of population at the scale of the Skagit River subpopulations or for the larger DPS as a whole. For PS Chinook, the loss of fish in the first year of construction would likely only cause a minor decrease in that cohort and would be inconsequential to the population of Skagit River Chinook and the ESU as a whole.

Long Term Effects

The Grouting Program will reduce cold water seepage at the base of the dam into the lower Baker River. As described in Section 6.2.5 of the BA, this will likely cause a 1 degree Celsius (^{0}C) rise in water temperature in the lower Baker River during the late summer/early fall months. Based on the analysis in the BA, the number of days where maximum temperatures reach or exceed 13.9°C (the lower threshold for "at risk" temperature for salmonids) would likely increase from an average of 94 days to 113 days, and the number of days where maximum temperatures reach or exceed 16°C could increase from an average of 4 to 60 days. Therefore, the Grouting Program will increase the number of days in the late summer and early fall where the fish trap, stress relief ponds, and portions of the lower Baker River may be too warm to support foraging juveniles, primarily PS steelhead. As a baseline condition, salmonids (primarily the non-listed sockeye), will hold in the mainstem Skagit River until fall water flows increase and cool enough to attract the fish into the lower Baker River and fish trap. Because fish can volitionally move into and out of the river and the fish trap, it is unlikely that large numbers listed fish will be directly harmed by the increase in temperature; adult PS Chinook and adult PS steelhead would also hold in the mainstem river and would therefore not be exposed to increased temperatures. Like the sockeye, they would hold until fall water flows increased (with a corresponding decrease in temperature) before moving into the lower Baker River. However,

over the life of the Baker River Hydroelectric Project, at least some juvenile PS Chinook and PS steelhead would experience reduced fitness or mortality by being exposed to warmer waters for longer periods or by being displaced from the lower Baker River for longer periods. The number of fish that would actually be harmed would be a tiny proportion per cohort in some warmer years because fish can volitionally move into and out of the Baker River and the fish trap to more suitable habitat in the Skagit River and its other tributaries. This effect to temperature is discussed again below for its implications to critical habitat and again in the Integration and Synthesis section with respect to long term climate change.

Therefore, based on this summary and the totality of the analysis in the BA, we conclude that too few individuals are likely to be harmed or killed in the short from construction related effects and in the long term from a seasonal increase in temperature (very few juvenile fish per cohort would be directly harmed annually by the temperature change, to cause discernable effects on the larger PS Chinook Salmon and PS steelhead Skagit River subpopulations and these effects will have no consequence at the ESU and DPS level for these species.

In terms of critical habitat for PS steelhead, the seasonal effect to water temperature will likely have a permanent, but minor, adverse effect to the freshwater rearing component of critical habitat by increasing the number of days in the late summer/early fall when the lower Baker River is too warm to support juvenile foraging (13.9^0C reached or exceeded for 19 more days on average per year and 16°C reached or exceeded an average of 54 more days per year). Because there is not a functional endemic PS steelhead run in the Baker River, most of the critical habitat in the Baker River watershed is unoccupied. The proposed action will have no long term effects to critical habitat above the dam should it become occupied in the future. Therefore, the effect to temperature is limited to foraging habitat opportunity in the lower Baker River and conditions in the fish passage facility. The the lower Baker River provides some limited foraging opportunity for Skagit River subpopulations that stray into the lower Baker River, but the availability of forage is limited in this reach because it is a fairly steep gorge with simplified habitat features. In addition, the lower Baker River is a very small proportion of habitat (0.4 mile) in a river system with hundreds of miles of habitat available critical habitat for steelhead, making this seasonal reduction in available foraging habitat spatially and temporally minor. In addition, because PS steelhead are known to be habitat generalists in the Skagit River (Lowery et al. 2020), this spatial and temporal reduction in available habitat is not of a scale that would reduce the conservation value of the lower Baker River. The river will continue to provide foraging opportunity for most of the year with free passage of fish into and out of the river and fish trap so that fish may continue to volitionally use the habitat when it is suitable. As a migration corridor, if critical habitat above the dam were to become occupied in the future through management action, the effect to migration would be minor because adult PS steelhead would hold in the mainstem Skagit until fall water flows increase, which would also correspond to colder water flows.

As a downstream migration corridor, PSE's operation of its fish passage facility includes adaptive management measures to minimize heat stress while transporting fish downstream (this is addressed again below in the Integration and Synthesis section with respect to climate change).

Under the current management eschoic, approximately 227 smolts per year from the non-listed *O. mykiss* in the lake, volitionally pass downstream through the fish passage facility. Given the

existing adaptive management actions that minimize heat stress for all fish that pass through the facility, it is unlikely that more than a few smolts per year would be adversely affected. In addition, the timing of the outmigration generally occurs before the temperature change would be an issue with March 1 through July 31 being the general timing of outmigration *O. mykiss* smolts from the lake. Given the adaptive management measures and the low numbers of these smolts that might be effected, this effect is inconsequential to the population.

Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.02 and 402.17(a)). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. The Cumulative Effects Section 6 on page 69 of the BA was reviewed and incorporated by reference and identifies non-federal forest practices occurring on the forested landscape near Lake Shannon as a mechanism that would continue to occasionally cause pulses of turbidity to Lake Shannon, which could sporadically adversely affect small number of the resident rainbow trout in the lake. In addition to FERC's assessment of cumulative effects, we also expect climate change to negatively impact listed species through habitat loss, increased severity and frequency of low flows and floods, decreased annual snowpack, and longer periods or severity of hot weather.

Integration and Synthesis

The Integration and Synthesis section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action to the environmental baseline and the cumulative effects, taking into account the status of the species and critical habitat, to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) Reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

Puget Sound Chinook Salmon and PS steelhead are listed as threatened, with habitat degradation and loss being one of the primary factors for their decline. The lower Baker River provides foraging habitat for both species. Cumulative effects in the action area are generally limited to occasional effects to Lake Shannon from on-going logging in the surrounding forestland. Climate change will likely cause long term negative pressure on salmonid populations. In this context we consider how the proposed action's impacts on individuals would affect the listed species at the population and ESU/DPS scales. Endemic runs of both PS Chinook salmon and PS steelhead in the Baker River watershed no longer functionally exist (NMFS 2008). Within the action area, juvenile PS Chinook salmon and PS steelhead rear in the lower Baker River, with large numbers of juvenile PS steelhead entering and exiting the fish trap seasonally while foraging. Adults of both species are captured in the fish trap in small numbers relative to their respective populations and are returned to the Skagit River.

The duration of the Grouting Project will be three years, followed by the three-year Crest Project, each with an array of activities of variable intensity and duration. Elevated turbidity and pH in the lower Baker River will be more pronounced in the first year of construction of Grouting Program with seepage rapidly decreasing after the first year. These water quality disturbances will adversely affect very small numbers of adult PS Chinook salmon and adult PS steelhead, and likely hundreds of juvenile PS steelhead, primarily in the first year of the Grouting Project. Although hundreds of juvenile PS steelhead would likely be adversely affected in the first year, this likely represents a very small proportion of one cohort, with decreasing numbers in the second and third year. In the long term, water temperature in the lower Baker River may increase by 1^0C and cause the lower Baker River to be less habitable for longer periods of time in the late summer and early fall and cause harm to some juvenile fish (a very small number annually with respect to the local population abundance). These direct losses of fish would have no bearing on the Skagit River subpopulations and no consequence at the ESU and DPS level. Therefore, the proposed action would not reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild because it will not measurably affect the respective species numbers, reproduction, or distribution. For PS steelhead critical habitat, the small, but permanent increase in water temperature of up to 1°C in the late summer and early fall is spatially limited to 0.4 miles of habitat in a river system with hundreds of miles of suitable habitat. Therefore, this effect will not appreciably diminish the value of designated critical habitat as a whole for the conservation of the species.

It is not known if the current management of the fish passage facility will change to transport PS steelhead above the dam in the near future, but considering the long term of the License and identification of passage at the Baker River dams as a goal in the PS steelhead Recovery Plan, we consider it could reasonably occur in the future. The current configuration of the fish passage facility is capable of supporting steelhead migration and could therefore support the goals of the Recovery Plan if the management choices change. Under the current management choices, approximately 227 smolts per year from the non-listed *O. mykiss* in the lake volitionally pass downstream through the fish passage facility and become part of the listed DPS. The current operations of the facility involve adaptive management actions that minimize heat stress for all fish that pass through the facility. In the future, with climate change, the 1^0C increase in water temperature below the dam may cause additional heat stress and cause harm to a greater proportion of outmigrants, but this would likely still not have bearing on the larger population of Skagit River steelhead and it would be inconsequential to the DPS. Further, the effect to temperature would not preclude the Baker River population from re-establishing if the management choices changes in the future. But, additional adaptive management measures may become necessary depending on how climate change ultimately impacts the action area.

Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS's biological opinion that the proposed action is not likely to jeopardize the continued existence of PS Chinook salmon and PS steelhead, or destroy or adversely modify PS steelhead designated critical habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. “Take” is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. “Harm” is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). “Incidental take” is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take is reasonably certain to occur as follows from harm of PS Chinook salmon and PS steelhead from pulses of turbid waters and pulses of water with high pH levels downstream of the LBD within the stress relief ponds, fish trap, and lower Baker River, and from harm associated with long term temperature increase from the Grouting Program.

The NMFS cannot predict with meaningful accuracy the number of PS Chinook salmon and PS steelhead that are reasonably certain to be injured or killed by exposure to these stressors during construction. The distribution and abundance of the fish that occur within an action area are affected by habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. These biotic and environmental processes interact in ways that may be random or directional, and may operate across far broader temporal and spatial scales than are affected by the proposed action. Thus, the distribution and abundance of fish within the action area cannot be attributed entirely to habitat conditions, nor can the NMFS precisely predict the number of fish that are reasonably certain to be injured or killed if their habitat is modified or degraded by the proposed action. Additionally, the NMFS knows of no device or practicable technique that would yield reliable counts of individuals that may experience these impacts. In such circumstances, the NMFS uses the causal link established between the activity and the likely extent and duration of changes in habitat conditions to describe the extent of take as a numerical level of habitat disturbance. The most appropriate surrogates for take are action-related parameters that are directly related to the magnitude of the expected take. Therefore, working for longer than planned would increase the number of fish likely to be exposed to these construction-related impacts and working in a manner that limits the intensity of pH and turbidity and the extent of affected downstream waters are directly measurable, as is the long term change to water temperature of the lower Baker River. Construction activities associated with Crest safety improvements are not likely to directly harm listed fish.

In summary, the extent of PS Chinook salmon and PS steelhead take for this action is defined as:

- For harm associated with increased turbidity and pH, the take surrogate is no more than 3 years of elevated turbidity and pH within the lower Baker River, the stress relief ponds, and the fish trap associated with the Grouting Program, with pH levels reaching background conditions below the LBD at least 1,000 feet above the fish barrier dam and for water that flows through the stress relief ponds and fish trap, both pH and turbidity reaching background conditions prior to waters entering the Skagit River.

- For long term harm associated with increased temperature, the extent of take will be exceeded if the temperature increases (as measured in BA Section 6.2.5) by more than one degree between August 1 and October 31 and juvenile and adult *O. mykiss* survival rates within the passage facilities fall below 98 percent[2] because of, or related to the increase in temperature (e.g. heat stress).

Effect of the Take

In the biological opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species, or destruction or adverse modification of critical habitat.

Reasonable and Prudent Measures

"Reasonable and prudent measures" (RMPs)are nondiscretionary measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02). FERC has the continuing duty to regulate the activities of the Licensee covered in this Incidental Take Statement. The FERC shall minimize incidental take by requiring the Licensee to carry out the following necessary and appropriate RPMs to minimize the effect of anticipated incidental take of PS Chinook Salmon and PS steelhead.

1. For the duration of the Grouting Program, continuously monitor turbidity at three stations, in accordance with paragraph 1, Section 6.2.2 of the BA.
2. For the Grouting Program, continuously monitor pH at three stations, in accordance with paragraph 2, Section 6.3.2 of the BA.
3. Comply with all conditions of the Washington Department of Ecology's Water Quality Protection Plan of July 12, 2021.
4. Because substantial reduction of seepage under and around the Lower Baker dam may cause a temperature increase of approximately 1°C during the late summer and early fall in the lower Baker River (BA, Section 6.2.5), the Licensee must operate and maintain, for the term of the seepage reduction project, an hourly water temperature monitoring station within or adjacent to the Baker River upstream fish trap for the purpose of evaluating impacts to water temperature in the Baker River from seepage reduction.
5. Because impacts to water temperature from seepage reduction may be amplified by anticipated long-term changes in regional and global climate, the Licensee must operate

[2] [2]Ninety eight percent survival within the passage facilities is consistent with the NMFS existing Section 18 prescription for this facility (20081021 biop errata filed with FERC 10-21-2008).

and maintain, during the months of July-October and for the term of the Licensee's existing FERC Baker River Hydroelectric Project License, an hourly water temperature monitoring station within or adjacent to the Baker River upstream fish trap for the purpose of evaluating impacts to water temperature (as described in BA Section 6.2.5) in the Baker River. Data from this monitoring shall be analyzed and reviewed with the Aquatic Resources Group at ten-year intervals, for the purpose of informing ongoing management decisions and future relicensing considerations.

Terms and Conditions

The terms and conditions described below are non-discretionary, and the FERC or Licensee must comply with them in order to implement the reasonable and prudent measures (50 CFR 402.14). The FERC or Licensee has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this incidental take statement (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. To implement the RPMs Number 1-5, the Licensee must complete a monitoring and reporting program to confirm that the terms and conditions are effective in minimizing take from permitted activities. The Licensee shall submit reports annually for the first 3 years of the Grouting Program, at the conclusion of the Crest Improvements, and then every 10 years after that. Send the report to: projectreports.wcr@noaa.gov. Be sure to include Attn: WCRO-2021-01118 in the subject line.

Conservation Recommendations

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02). NMFS is not providing conservation recommendations with this proposed action.

Reinitiation of Consultation

Reinitiation of consultation is required and shall be requested by FERC or by NMFS, where discretionary federal involvement or control over the action has been retained or is authorized by law and (1) The amount or extent of incidental taking specified in the ITS is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or if (4) a new species is listed or critical habitat designated that may be affected by the identified action.

Reservation of Authority pursuant to Section 18 of the Federal Power Act

Given the term of the license, it is anticipated that a prescription for fishways may be needed in the future to adapt to changing conditions or new information, including but not limited to changes in or new information regarding suitable water temperatures in the lower Baker River, the stress relief ponds, and the fish trap. In addition, the following general circumstances may warrant a prescription for fishways:

- Environmental conditions (including changes in habitat suitability for fish occupation);
- Fish biology or population status (e.g. ongoing/future management objectives for relevant species in the project area);
- Project operations or effects (e.g. as a result of ongoing studies, designs, plans, and implementation schedules pertaining to fishway construction, operation, maintenance, and monitoring);
- Fish passage technology (e.g. as a result of ongoing studies, designs, plans, and implementation schedules pertaining to fishway construction, operation, maintenance, and monitoring); and/or
- New requirements or objectives arising out of other applicable legal authorities (e.g., the Endangered Species Act, the Magnuson-Stevens Act).

Accordingly, pursuant to Section 18 of the Federal Power Act, as amended, the Secretary of the Department of Commerce, acting through NMFS, hereby reserves the authority to prescribe the construction, operation, and maintenance of such fishways as deemed necessary, including measures to determine, ensure, or improve the effectiveness of such fishways.

NMFS requests that FERC also include in the license an appropriate reopener clause acknowledging FERC's authority to reopen the license upon a request by NMFS to exercise this reservation pursuant to Section 18 of the Federal Power Act.

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT CONSULTATION

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. The MSA (section 3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration 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. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH.

This analysis is based, in part, on the EFH assessment provided by the FERC and descriptions of EFH for Pacific Coast salmon (PFMC 2014) contained in the fishery management plans developed by the PFMC and approved by the Secretary of Commerce.

Essential Fish Habitat Affected by the Project

The proposed action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life history stages of Chinook and Coho (*O. kisutch*), and PS pink salmon (*O. gorbuscha*) (PFMC 2014) and described in detail in Section 8 of BA.

Adverse Effects on Essential Fish Habitat

- Based on information provided by the action agency and the analysis of effects presented in the ESA portion of this document and in Section 8 of the BA, NMFS concludes that proposed action will have adverse effects on EFH designated for Chinook, pink, and Coho salmon. These effects include a temporary reduction in water quality from increased turbidity and pH, and long term reduction of habitat quality related to temperature.

Essential Fish Habitat Conservation Recommendations

Fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described above, approximately 325 acres of designated EFH for Pacific coast salmon.

1. Follow the RPMs and terms and conditions as presented in the ESA portion of this document.

Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, the FERC must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation Recommendations unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)).

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how

many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

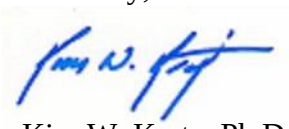
Supplemental Consultation

The FERC must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH Conservation Recommendations (50 CFR 600.920(l)).

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The biological opinion will be available through NOAA Institutional Repository https://repository.library.noaa.gov/. A complete record of this consultation is on file at the Oregon Washington Coastal Office in Lacey, Washington.

Please direct questions regarding this letter to Janet Curran, at janet.curran@noaa.gov.

Sincerely,



Kim W. Kratz, Ph.D.
Assistant Regional Administrator
Oregon Washington Coastal Office

cc: Marybeth Gay, FERC

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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Puget Sound Energy	)	FERC No. P-2150-147
	)	
National Marine Fisheries Service's Biological Opinion on the Non-Capacity Amendment of License for Lower Baker Dam Seepage Reduction and Crest Improvement	)	Baker River Hydroelectric Project

CERTIFICATE OF SERVICE

I hereby certify that I have this day served, by electronic filing, NOAA's National Marine Fisheries Service's biological opinion on the Non-Capacity Amendment of License for Dam Safety Improvements, cover letter to Kimberly D. Bose, FERC, and this Certificate of Service upon each person designated on the official service list compiled by the Commission in the above captioned proceeding.

Dated this 28th day of October, 2021.

Jennifer McDonald Carlson
Oregon Washington Coastal Office
NOAA Fisheries West Coast Region