UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
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Refer to NMFS No:
WCRO-2024-01160

February 13, 2025

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Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the SR 520/124th Ave NE Interchange Improvements Project (WSDOT WIN: A52030K)

Dear Ms. Handel:

This letter responds to your May 29, 2024, request for initiation of consultation with the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act (ESA) for the subject action. Your request qualified for our expedited review and analysis because it met our screening criteria and contained the necessary required information on, and analysis of, your proposed action and its potential effects to listed species and designated critical habitat.

We reviewed the Federal highway Administration's (FHWA) consultation request and related biological assessment (BA). 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. In our biological opinion below, we indicate what parts of your document(s) we have incorporated by reference and where that information is being incorporated. We incorporated information from the consultation initiation package concerning the proposed action, action area, species and critical habitats present, effects analysis, and environmental baseline.

On October 12, 2023, the Washington State Department of Transportation (WSDOT) held an informal meeting with the US Fish and Wildlife Service (USFWS) and NMFS liaison and project staff to introduce the project. Subsequent pre-BA meetings, attended by representatives of FHWA and WSDOT, and the USFWS and NMFS liaison, were held November 27, 2023, and January 26, 2024. An additional conversation between WSDOT and FHWA was held on March 20, 2024, which resulted in minor revisions to the action area.

Updates to the regulations governing interagency consultation (50 CFR part 402) were effective on May 6, 2024 (89 Fed. Reg. 24268). We are applying the updated regulations to this consultation. The 2024 regulatory changes, like those from 2019, were intended to improve and clarify the consultation process, and, with one exception from 2024 (offsetting reasonable and prudent measures), were not intended to result in changes to the Services' existing practice in implementing section 7(a)(2) of the Act. 89 Fed. Reg. at 24268; 84 Fed. Reg. at 45015. We have considered the prior rules and affirm that the substantive analysis and conclusions articulated in this biological opinion and incidental take statement would not have been any different under the 2019 regulations or pre-2019 regulations, except we note that we have included an offsetting reasonable and prudent measure in the incidental take statement (an option that was not included in the section 7 regulations prior to 2024).

Project Description

The WSDOT provided a detailed project description in Section 1.3 of the BA. The project will occur in Bellevue, King County, Washington, in the Lake Washington–Sammamish River sub-watershed (Hydraulic Unit Code [HUC] 171100120400) and within Water Resource Inventory Area (WRIA) 8 (Cedar-Sammamish). The project is divided into two major components: 1) SR 520/124th Avenue NE interchange improvements; and 2) fish passage barrier correction on Goff Creek. Barrier correction will restore access to approximately 710 meters of upstream habitat.

Removal of the barrier, as well as other project construction elements, will occur approximately 2,329 feet upstream of several impassable barriers and will therefore not directly impact listed salmonids. The only impact to listed salmonids from this project is due to runoff from existing and new pollutant-generating impervious surfaces (PGIS). The WSDOT proposes to treat all new PGIS with enhanced stormwater treatment best management practices (compost-amended biofiltration strips and media filter drains). Stormwater management is discussed in detail in Section 1.3.1.7 of the BA.

BIOLOGICAL OPINION

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 also examined the condition of critical habitat throughout the designated area and discuss the function of the physical or biological features essential to the conservation of the species that create the conservation value of that habitat. We are incorporating by reference the action agency's list of species and critical habitat present in the action area (Table 3-1 of the BA), and the action agency's description of the life history stages of listed species likely to be present during construction and operation of the proposed project (Section 3.3 of the BA).

We supplement the BA with NMFS' presentation of the status of species and critical habitat.

Rangewide Status of the Species and Critical Habitat

This opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' current "reproduction, numbers, or distribution" as described in 50 CFR 402.02. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the current function of the essential PBFs that help to form that conservation value.

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. Major ecological realignments are already occurring in response to climate change (IPCC WGII, 2022). Long-term trends in warming have continued at global, national and regional scales. Global surface temperatures in the last decade (2010s) were estimated to be 1.09 °C higher than the 1850-1900 baseline period, with larger increases over land ~1.6 °C compared to oceans ~0.88 (IPCC WGI, 2021). The vast majority of this warming has been attributed to anthropogenic releases of greenhouse gases (IPCC WGI, 2021). Globally, 2014-2018 were the 5 warmest years on record both on land and in the ocean (2018 was the 4th warmest) (NOAA NCEI 2022). Events such as the 2013-2016 marine heatwave (Jacox et al. 2018) have been attributed directly to anthropogenic warming in the annual special issue of Bulletin of the American Meteorological Society on extreme events (Herring et al. 2018). Global warming and anthropogenic loss of biodiversity represent profound threats to ecosystem functionality (IPCC WGII 2022). These two factors are often examined in isolation, but likely have interacting effects on ecosystem function.

Updated projections of climate change are similar to or greater than previous projections (IPCC WGI, 2021). NMFS is increasingly confident in our projections of changes to freshwater and marine systems because every year brings stronger validation of previous predictions in both physical and biological realms. Retaining and restoring habitat complexity, access to climate refuges (both flow and temperature) and improving growth opportunity in both freshwater and marine environments are strongly advocated in the recent literature (Siegel and Crozier 2020).

Climate change is systemic, influencing freshwater, estuarine, and marine conditions. Other systems are also being influenced by changing climatic conditions. Literature reviews on the impacts of climate change on Pacific salmon (Crozier 2015, 2016, 2017, Crozier and Siegel 2018, Siegel and Crozier 2019, 2020) have collected hundreds of papers documenting the major themes relevant for salmon. Here we describe habitat changes relevant to Pacific salmon and steelhead, prior to describing how these changes result in the varied specific mechanisms impacting these species in subsequent sections.

Forests

Climate change will impact forests of the western U.S., which dominate the landscape of many watersheds in the region. Forests are already showing evidence of increased drought severity, forest fire, and insect outbreak (Halofsky et al. 2020). Additionally, climate change will affect tree reproduction, growth, and phenology, which will lead to spatial shifts in vegetation. Halofsky et al. (2018) projected that the largest changes will occur at low- and high-elevation forests, with expansion of low-elevation dry forests and diminishing high-elevation cold forests and subalpine habitats.

Forest fires affect salmon streams by altering sediment load, channel structure, and stream temperature through the removal of canopy. Holden et al. (2018) examined environmental factors contributing to observed increases in the extent of forest fires throughout the western U.S. They found strong correlations between the number of dry-season rainy days and the annual extent of forest fires, as well as a significant decline in the number of dry-season rainy days over the study period (1984-2015). Consequently, predicted decreases in dry-season precipitation, combined with increases in air temperature, will likely contribute to the existing trend toward more extensive and severe forest fires and the continued expansion of fires into higher elevation and wetter forests (Alizedeh 2021).

Agne et al. (2018) reviewed literature on insect outbreaks and other pathogens affecting coastal Douglas-fir forests in the Pacific Northwest and examined how future climate change may influence disturbance ecology. They suggest that Douglas-fir beetle and black stain root disease could become more prevalent with climate change, while other pathogens will be more affected by management practices. Agne et al. (2018) also suggested that due to complex interacting effects of disturbance and disease, climate impacts will differ by region and forest type.

Freshwater Environments

The following is excerpted from Siegel and Crozier (2019), who present a review of recent scientific literature evaluating effects of climate change, describing the projected impacts of climate change on instream flows:

Cooper et al. (2018) examined whether the magnitude of low river flows in the western U.S., which generally occur in September or October, are driven more by summer conditions or the prior winter’s precipitation. They found that while low flows were more sensitive to summer evaporative demand than to winter precipitation, interannual variability in winter precipitation was greater. Malek et al. (2018), predicted that summer evapotranspiration is likely to increase in conjunction with declines in snowpack and increased variability in winter precipitation. Their results suggest that low summer flows are likely to become lower, more variable, and less predictable.

The effect of climate change on ground water availability is likely to be uneven. Sridhar et al. (2018) coupled a surface-flow model with a ground-flow model to improve predictions of surface water availability with climate change in the Snake River Basin. Projections using RCP

4.5 and 8.5 emission scenarios suggested an increase in water table heights in downstream areas of the basin and a decrease in upstream areas.

As cited in Siegel and Crozier (2019), Isaak et al. (2018), examined recent trends in stream temperature across the Western U.S. using a large regional dataset. Stream warming trends paralleled changes in air temperature and were pervasive during the low-water warm seasons of 1996-2015 (0.18-0.35°C/decade) and 1976-2015 (0.14-0.27°C/decade). Their results show how continued warming will likely affect the cumulative temperature exposure of migrating sockeye salmon *O. nerka* and the availability of suitable habitat for brown trout *Salmo trutta* and rainbow trout *O. mykiss*. Isaak et al. (2018) concluded that most stream habitats will likely remain suitable for salmonids in the near future, with some becoming too warm. However, in cases where habitat access is currently restricted by dams and other barriers salmon and steelhead will be confined to downstream reaches typically most at risk of rising temperatures unless passage is restored (FitzGerald et al. 2020, Myers et al. 2018).

Streams with intact riparian corridors and that lie in mountainous terrain are likely to be more resilient to changes in air temperature. These areas may provide refuge from climate change for a number of species, including Pacific salmon. Krosby et al. (2018), identified potential stream refugia throughout the Pacific Northwest based on a suite of features thought to reflect the ability of streams to serve as such refuges. Analyzed features include large temperature gradients, high canopy cover, large relative stream width, low exposure to solar radiation, and low levels of human modification. They created an index of refuge potential for all streams in the region, with mountain area streams scoring highest. Flat lowland areas, which commonly contain migration corridors, were generally scored lowest, and thus were prioritized for conservation and restoration. However, forest fires can increase stream temperatures dramatically in short time-spans by removing riparian cover (Koontz et al. 2018), and streams that lose their snowpack with climate change may see the largest increases in stream temperature due to the removal of temperature buffering (Yan et al. 2021). These processes may threaten some habitats that are currently considered refugia.

Marine and Estuarine Environments

Along with warming stream temperatures and concerns about sufficient groundwater to recharge streams, a recent study projects nearly complete loss of existing tidal wetlands along the U.S. West Coast, due to sea level rise (Thorne et al. 2018). California and Oregon showed the greatest threat to tidal wetlands (100%), while 68% of Washington tidal wetlands are expected to be submerged. Coastal development and steep topography prevent horizontal migration of most wetlands, causing the net contraction of this crucial habitat.

Rising ocean temperatures, stratification, ocean acidity, hypoxia, algal toxins, and other oceanographic processes will alter the composition and abundance of a vast array of oceanic species. In particular, there will be dramatic changes in both predators and prey of Pacific salmon, salmon life history traits and relative abundance. Siegel and Crozier (2019) observe that changes in marine temperature are likely to have a number of physiological consequences on fishes themselves. For example, in a study of small planktivorous fish, Gliwicz et al. (2018) found that higher ambient temperatures increased the distance at which fish reacted to prey.

Numerous fish species (including many tuna and sharks) demonstrate regional endothermy, which in many cases augments eyesight by warming the retinas. However, Gliwicz et al. (2018) suggest that ambient temperatures can have a similar effect on fish that do not demonstrate this trait. Climate change is likely to reduce the availability of biologically essential omega-3 fatty acids produced by phytoplankton in marine ecosystems. Loss of these lipids may induce cascading trophic effects, with distinct impacts on different species depending on compensatory mechanisms (Gourtay et al. 2018). Reproduction rates of many marine fish species are also likely to be altered with temperature (Veilleux et al. 2018). The ecological consequences of these effects and their interactions add complexity to predictions of climate change impacts in marine ecosystems.

Perhaps the most dramatic change in physical ocean conditions will occur through ocean acidification and deoxygenation. It is unclear how sensitive salmon and steelhead might be to the direct effects of ocean acidification because of their tolerance of a wide pH range in freshwater (although see Ou et al. 2015 and Williams et al. 2019), however, impacts of ocean acidification and hypoxia on sensitive species (e.g., plankton, crabs, rockfish, groundfish) will likely affect salmon indirectly through their interactions as predators and prey. Similarly, increasing frequency and duration of harmful algal blooms may affect salmon directly, depending on the toxin (e.g., saxitoxin vs domoic acid), but will also affect their predators (seabirds and mammals). The full effects of these ecosystem dynamics are not known but will be complex. Within the historical range of climate variability, less suitable conditions for salmonids (e.g., warmer temperatures, lower streamflows) have been associated with detectable declines in many of these listed units, highlighting how sensitive they are to climate drivers (Ford 2022, Lindley et al. 2009, Williams et al. 2016, Ward et al. 2015). In some cases, the combined and potentially additive effects of poorer climate conditions for fish and intense anthropogenic impacts caused the population declines that led to these population groups being listed under the ESA (Crozier et al. 2019).

Climate change effects on salmon and steelhead

In freshwater, year-round increases in stream temperature and changes in flow will affect physiological, behavioral, and demographic processes in salmon, and change the species with which they interact. For example, as stream temperatures increase, many native salmonids face increased competition with more warm-water tolerant invasive species. Changing freshwater temperatures are likely to affect incubation and emergence timing for eggs, and in locations where the greatest warming occurs may affect egg survival, although several factors impact intergravel temperature and oxygen (e.g., groundwater influence) as well as sensitivity of eggs to thermal stress (Crozier et al. 2021). Changes in temperature and flow regimes may alter the amount of habitat and food available for juvenile rearing, and this in turn could lead to a restriction in the distribution of juveniles, further decreasing productivity through density dependence. For migrating adults, predicted changes in freshwater flows and temperatures will likely increase exposure to stressful temperatures for many salmon and steelhead populations, and alter migration travel times and increase thermal stress accumulation for ESUs or DPSs with early-returning (i.e. spring- and summer-run) phenotypes associated with longer freshwater holding times (Crozier et al. 2021, FitzGerald et al. 2020). Rising river temperatures increase the energetic cost of migration and the risk of *en route* or pre-spawning mortality of adults with long freshwater migrations, although populations of some ESA-listed salmon and steelhead may be able to make use of cool-water refuges and run-timing plasticity to reduce thermal exposure (Keefer et al. 2018, Barnett et al. 2020).

Marine survival of salmonids is affected by a complex array of factors including prey abundance, predator interactions, the physical condition of salmon within the marine environment, and carryover effects from the freshwater experience (Holsman et al. 2012, Burke et al. 2013). It is generally accepted that salmon marine survival is size-dependent, and thus larger and faster growing fish are more likely to survive (Gosselin et al. 2021). Furthermore, early arrival timing in the marine environment is generally considered advantageous for populations migrating through the Columbia River. However, the optimal day of arrival varies across years, depending on the seasonal development of productivity in the California Current, which affects prey available to salmon and the risk of predation (Chasco et al. 2021). Siegel and Crozier (2019) point out the concern that for some salmon populations, climate change may drive mismatches between juvenile arrival timing and prey availability in the marine environment. However, phenological diversity can contribute to metapopulation-level resilience by reducing the risk of a complete mismatch. Carr-Harris et al. (2018), explored phenological diversity of marine migration timing in relation to zooplankton prey for sockeye salmon *O. nerka* from the Skeena River of Canada. They found that sockeye migrated over a period of more than 50 days, and populations from higher elevation and further inland streams arrived in the estuary later, with different populations encountering distinct prey fields. Carr-Harris et al. (2018) recommended that managers maintain and augment such life-history diversity.

Synchrony between terrestrial and marine environmental conditions (e.g., coastal upwelling, precipitation and river discharge) has increased in spatial scale causing the highest levels of synchrony in the last 250 years (Black et al. 2018). A more synchronized climate combined with simplified habitats and reduced genetic diversity may be leading to more synchrony in the productivity of populations across the range of salmon (Braun et al. 2016). For example, salmon productivity (recruits/spawner) has also become more synchronized across Chinook populations from Oregon to the Yukon (Dorner et al. 2018, Kilduff et al. 2014). In addition, Chinook salmon have become smaller and younger at maturation across their range (Ohlberger 2018). Other Pacific salmon species (Stachura et al. 2014) and Atlantic salmon (Olmos et al. 2020) also have demonstrated synchrony in productivity across a broad latitudinal range.

At the individual scale, climate impacts on salmon in one life stage generally affect body size or timing in the next life stage and negative impacts can accumulate across multiple life stages (Healey 2011; Wainwright and Weitkamp 2013, Gosselin et al. 2021). Changes in winter precipitation will likely affect incubation and/or rearing stages of most populations. Changes in the intensity of cool season precipitation, snow accumulation, and runoff could influence migration cues for fall, winter and spring adult migrants, such as coho and steelhead. Egg survival rates may suffer from more intense flooding that scours or buries redds. Changes in hydrological regime, such as a shift from mostly snow to more rain, could drive changes in life history, potentially threatening diversity within an ESU (Beechie et al. 2006). Changes in summer temperature and flow will affect both juvenile and adult stages in some populations, especially those with yearling life histories and summer migration patterns (Crozier and Zabel 2006; Crozier et al. 2010, Crozier et al. 2019).

At the population level, the ability of organisms to genetically adapt to climate change depends on how much genetic variation currently exists within salmon populations, as well as how selection on multiple traits interact, and whether those traits are linked genetically. While genetic diversity may help populations respond to climate change, the remaining genetic diversity of many populations is highly reduced compared to historic levels. For example, Johnson et al. (2018), compared genetic variation in Chinook salmon from the Columbia River Basin between contemporary and ancient samples. A total of 84 samples determined to be Chinook salmon were collected from vertebrae found in ancient middens and compared to 379 contemporary samples. Results suggest a decline in genetic diversity, as demonstrated by a loss of mitochondrial haplotypes as well as reductions in haplotype and nucleotide diversity. Genetic losses in this comparison appeared larger for Chinook from the mid-Columbia than those from the Snake River Basin. In addition to other stressors, modified habitats and flow regimes may create unnatural selection pressures that reduce the diversity of functional behaviors (Sturrock et al. 2020). Managing to conserve and augment existing genetic diversity may be increasingly important with more extreme environmental change (Anderson et al. 2015), though the low levels of remaining diversity present challenges to this effort (Freshwater 2019). Salmon historically maintained relatively consistent returns across variation in annual weather through the portfolio effect (Schindler et al. 2015), in which different populations are sensitive to different climate drivers. Applying this concept to climate change, Anderson et al (2015) emphasized the additional need for populations with different physiological tolerances. Loss of the portfolio increases volatility in fisheries, as well as ecological systems, as demonstrated for Fraser River and Sacramento River stock complexes (Freshwater et al. 2019, Munsch et al. 2022).

Status of the Species

Table 1, below provides a summary of listing and recovery plan information, status summaries and limiting factors for the species addressed in this opinion. More information can be found in recovery plans and status reviews for these species. Acronyms appearing in the table include ESU (Evolutionarily Significant Unit), TRT (Technical Recovery Team), DPS (Distinct Population Segment), PSTRT (Puget Sound Technical Recovery Team), and MPG (Multiple Population Grouping).

Status of the Critical Habitat

This section describes the status of designated critical habitat affected by the proposed action by examining the condition and trends of the essential physical and biological features of that habitat throughout the designated areas. These features are essential to the conservation of the ESA-listed species because they support one or more of the species’ life stages (e.g., sites with conditions that support spawning, rearing, migration and foraging). A summary of the status of critical habitats considered in this opinion is provided in Table 2. There is no steelhead critical habitat in the action area.

Table 1. Listing classification and date, recovery plan reference, most recent status review, status summary, and limiting factors for each species considered in this opinion.

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Puget Sound Chinook salmon	Threatened 6/28/05 (70 FR 37159)	Shared Strategy for Puget Sound 2007 NMFS 2006	NMFS 2016; Ford 2022	This ESU comprises 22 populations distributed over five geographic areas. All Puget Sound Chinook salmon populations continue to remain well below the TRT planning ranges for recovery escapement levels. Most populations also remain consistently below the spawner–recruit levels identified by the TRT as necessary for recovery. Across the ESU, most populations have increased somewhat in abundance since the last status review in 2016, but have small negative trends over the past 15 years. Productivity remains low in most populations. Overall, the Puget Sound Chinook salmon ESU remains at "moderate" risk of extinction.	• Degraded floodplain and in-river channel structure • Degraded estuarine conditions and loss of estuarine habitat • Degraded riparian areas and loss of in-river large woody debris • Excessive fine-grained sediment in spawning gravel • Degraded water quality and temperature • Degraded nearshore conditions • Impaired passage for migrating fish Severely altered flow regime
Puget Sound steelhead	Threatened 5/11/07 (72 FR 26722)	NMFS 2019	NMFS 2016; Ford 2022	This DPS comprises 32 populations. Viability of has improved somewhat since the PSTRT concluded that the DPS was at very low viability, as were all three of its constituent MPGs, and many of its 32 DIPs (Hard et al. 2015). Increases in spawner abundance were observed in a number of populations over the last five years within the Central & South Puget Sound and the Hood Canal & Strait of Juan de Fuca MPGs, primarily among smaller populations. There were also declines for summer- and winter-run populations in the Snohomish River basin. In fact, all summer-run steelhead populations in the Northern Cascades MPG are likely at a very high demographic risk.	• Continued destruction and modification of habitat • Widespread declines in adult abundance despite significant reductions in harvest • Threats to diversity posed by use of two hatchery steelhead stocks • Declining diversity in the DPS, including the uncertain but weak status of summer-run fish • A reduction in spatial structure • Reduced habitat quality • Urbanization • Dikes, hardening of banks with riprap, and channelization
Southern resident killer whale	Endangered 11/18/05 (70 FR 57565)	NMFS 2008	NMFS 2021	The Southern Resident killer whale DPS is composed of a single population that ranges as far south as central California and as far north as southeast Alaska. While some of the downlisting and delisting criteria have been met, the biological downlisting and delisting 63 criteria, including sustained growth over 14 and 28 years, respectively, have not been met. The SRKW DPS has not grown; the overall status of the population is not consistent with a healthy, recovered population. Considering the status and continuing threats, the Southern Resident killer whales remain in danger of extinction.	• Quantity and quality of prey • Exposure to toxic chemicals • Disturbance from sound and vessels • Risk from oil spills

Table 2. Critical habitat, designation date, federal register citation, and status summary for critical habitat considered in this opinion

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Puget Sound Chinook salmon	9/02/05 70 FR 52630	Critical habitat for Puget Sound Chinook salmon includes 1,683 miles of streams, 41 square mile of lakes, and 2,182 miles of nearshore marine habitat in Puget Sounds. The Puget Sound Chinook salmon ESU has 61 freshwater and 19 marine areas within its range. Of the freshwater watersheds, 41 are rated high conservation value, 12 low conservation value, and eight received a medium rating. Of the marine areas, all 19 are ranked with high conservation value.
Southern Resident Killer Whale	08/02/2021 86 FR 41668	Critical habitat includes approximately 2,560 square miles of marine inland waters of Washington: 1) the Summer Core Area in Haro Strait and waters around the San Juan Islands; 2) Puget Sound; and 3) the Strait of Juan de Fuca. Six additional areas include 15,910 square miles of marine waters between the 20-feet (6.1-meter (m)) depth contour and the 656.2-feet (200-m) depth contour from the U.S. international border with Canada south to Point Sur, California. We have excluded the Quinault Range Site. Based on the natural history of the Southern Residents and their habitat needs, NMFS identified three PCEs, or physical or biological features, essential for the conservation of Southern Residents: 1) Water quality to support growth and development; 2) prey species of sufficient quantity, quality, and availability to support individual growth, reproduction and development, as well as overall population growth; and 3) passage conditions to allow for migration, resting, and foraging Water quality in Puget Sound, in general, is degraded. Some pollutants in Puget Sound persist and build up in marine organisms including Southern Residents and their prey resources, despite bans in the 1970s of some harmful substances and cleanup efforts. The primary concern for direct effects on whales from water quality is oil spills, although oil spills can also have long-lasting impacts on other habitat features In regards to passage, human activities can interfere with movements of the whales and impact their passage. In particular, vessels may present obstacles to whales' passage, causing the whales to swim further and change direction more often, which can increase energy expenditure for whales and impacts foraging behavior. Reduced prey abundance, particularly Chinook salmon, is also a concern for critical habitat.

For most salmon, NMFS' critical habitat analytical review teams (CHARTs) ranked watersheds within designated critical habitat at the scale of the fifth-field hydrologic unit code (HUC5) in terms of the conservation value they provide to each ESA-listed species that they support (NMFS 2005). The conservation rankings were high, medium, or low. To determine the conservation value of each watershed to species viability, the CHARTs evaluated the quantity and quality of habitat features, the relationship of the area compared to other areas within the species' range, and the significance to the species of the population occupying that area. Even if a location had poor habitat quality, it could be ranked with a high conservation value if it were essential due to factors such as limited availability, a unique contribution of the population it served, or is serving another important role. The status of species and critical habitat in the action area is described in Section 3.0 of the BA.

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 action area is described in Section 2.0 of the BA. We summarize the action area here as extending from the site of the proposed action in Bellevue, King County, WA, to shallow nearshore areas at the Hiram M. Chittenden Locks, based on the downstream extent of stormwater contaminants.

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 impacts to listed species or designated critical habitat from federal agency activities or existing federal agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02). Section 4.0 of the BA describes the environmental baseline in the action area.

Two stocks of Puget Sound ESU Chinook salmon use the action area in the Lake Washington basin: the Cedar River stock in south Lake Washington and the Sammamish River stock in north Lake Washington (King County 2005). Within the action area, fall Chinook salmon are documented as present and they rear within Lake Washington (NWIFC 2024). Relatively few Chinook salmon, if any, have been observed in Kelsey Creek over the past 13 years (Heller 2023). Escapement of naturally spawning Puget Sound Chinook salmon into the Lake Washington basin between 1994 and 2007 has averaged 243 individuals for the north Lake Washington (Sammamish River) population and 581 individuals for the south Lake Washington (Cedar River population). Hatchery production in the Lake Washington basin occurs at the Issaquah Creek State Hatchery. Chinook salmon from this hatchery are considered part of the Puget Sound ESU.

One designated MPG of Puget Sound DPS steelhead occurs within the action area, the Central and South Puget Sound MPG. That MPG is further divided into demographically independent populations (DIPs), two of which occupy the action area: the North Lake Washington and Lake Sammamish winter DIP and the Cedar River winter DIP (NMFS 2016). Lake Washington steelhead have undergone steep declines in abundance over time. Historic annual abundance to the two DIPs in the action area are estimated to be roughly 28,000 individuals (NMFS 2019). Abundance trends since the early 2000s have been strongly negative and remain depressed, with escapement since 2000 remaining under 50 individuals annually, predominantly from the Cedar River (NMFS 2011, 2016; Blanton et al. 2011). Extinction risk for the Cedar River DIP is calculated at to be 100 percent (Cram et al. 2018). The North Lake Washington and Lake Sammamish DIP had insufficient data to make projections in the study by Cram et al. (2018).

Winter steelhead use Lake Washington and its tributaries primarily for foraging and as a migratory corridor to their spawning habitat located upstream of the action area (WDFW 2019). Adult steelhead typically enter rivers and streams in the Lake Washington system from November through May and spawn between February and June. Smolts outmigrate between mid-March and early June and stragglers may be present during the in-water work window (Myers et al. 2015).

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.

Section 5.0 of the BA provides a detailed discussion and comprehensive assessment of the effects of the proposed action, and is adopted here (50 CFR 402.14(h)(3)). NMFS has evaluated this section and after our independent, science-based evaluation determined it meets our regulatory and scientific standards. We summarize the BA’s description of effects here:

- Riparian vegetation removal, and instream work, including channel grading which affect benthic prey communities, and cause turbidity, will occur above a barrier, which limits or avoids exposure of listed fish.
- New PGIS which will include stormwater treatment; residual chemicals will move down past the barrier where redds, alevin and fry of PS chinook salmon and PS steelhead, and rearing steelhead will be exposed.
- Barrier removal/improved passage (access to approximately 2,329 linear feet of habitat which will become accessible to anadromous fish once the other downstream barriers are corrected)

Because the project will occur upstream of several impassable barriers, the only exposure of listed salmonids from this project is to runoff from existing and new PGIS. In-water work will occur approximately 2,329 feet upstream of the closest downstream barrier.

NMFS supplements the BA with the following information: Puget Sound Chinook salmon and Puget Sound steelhead will be affected by the proposed action. The effects of stormwater discharge from the new proposed PGIs will be permanent for the life of the project. Juvenile and adult salmonids are likely to be exposed to chronic low levels of a wide array of contaminants, including fuels and oils, PAHs, and road material and tire wear particles. Steelhead, and spring run Chinook salmon in particular, have relatively long freshwater residency periods and thus are likely to experience latent effects from exposure. The intensity of effects depends largely on the pollutant, its concentration, and/or the duration of exposure. However, the incremental addition of small amounts of these pollutants are a source of potential adverse effects to salmon and steelhead, even when the source load cannot be distinguished from ambient levels. Repeated and chronic exposures, even at very low levels, are still likely to injure or kill small numbers of individual fish, by themselves and through synergistic interactions with other contaminants already present in the water (Baldwin et al. 2009; Feist et al. 2011; Hicken et al. 2011; Spromberg and Meador 2006; Spromberg and Scholz 2011). The response for many exposed individuals will be sublethal, impairing growth and fitness of some individuals, in each cohort of juvenile fish for the foreseeable future.

Enhanced stormwater treatment provided throughout the project corridor for all new PGIS will help reduce adverse effects. The migration of salmonids will be rapid at or near the stormwater outfalls and project stormwater discharges will be intermittent and in unpredictable pulses. Some individuals may experience compromised health from exposure to stormwater contaminants but the vast majority will pass through quickly without long-term exposure or short-term exposure at lethal or sub-lethal levels.

The water quality feature of designated critical habitat for PS Chinook salmon will be adversely affected by contaminants in stormwater still present post-treatment. The conservation role that the water quality is intended to support is rearing and migration values. The effect on rearing and migration, while negative, is incrementally so, and is not at a level that substantially reduces rearing and migration in the action area.

The project’s removal of the fish passage barrier at Goff Creek which will result in temporary effects such as handling, turbidity, and general and riparian impacts, described in the BA at section 5, and this will also create a long-term gain of access to 710 meters (`1/2 mile) of upstream habitat areas for PS Chinook salmon and PS steelhead.

SRKWs critical habitats will also be affected by the project’s effects on their prey. The Lake Washington basin salmon, particularly Chinook salmon, serve as primary prey for SRKWs. The proposed long-term operation and maintenance of the project are expected to adversely affect two listed species of salmonids, Chinook salmon and steelhead. Though deleterious effects to these SRKW prey species are anticipated to be low, some individuals of each species, as described above, will have adverse health and fitness, which likely reduces survival of a subset of the individuals, incrementally but adversely affecting available prey for SRKW recovery. We do not expect the number of juvenile salmonids severely affected to reach a level that would discernibly impact adult abundance and therefore this effect, while adverse, does not reduce the forage in a way that impairs health, fitness, growth, survival or fecundity of SRKW individuals. Furthermore, given the treatment of all discharges from the PGIS at the project areas, and the proposed conservation measures, we believe that the incremental nature of the adverse effects indicates that prey communities would continue to support the conservation role of SRKW critical habitat.

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). 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. Cumulative effects are described in detail in Section 5.3 of the BA, and but we note for the record that projects subject to Federal permits are excluded from the cumulative effects because they will be evaluated under future section 7 consultations. Other non-federal effects included:

- Several revitalization and improvement projects associated with the BelRed corridor redevelopment (summarized in Bellevue’s Major Project’s List [Bellevue 2023] and BelRed Improvements[(Bellevue 2024a]); other enhancement projects are listed on the City of Bellevue’s GIS (Bellevue 2024b)
- Multiple projects planned within the City of Redmond in the action area, as identified in the city’s GIS (Redmond 2024)
- Redevelopment projects along Lake Washington, Lake Union, and the Ship Canal, as outlined in Seattle’s 2035 Comprehensive Plan (Seattle 2016)

Although some of these actions are likely to improve conditions in the action area for listed aquatic species, over time, other actions may further degrade water quality in the action area. Taken as a whole, State, Tribal, local, and private actions in the foreseeable future will have adverse effects to listed species habitat and conditions in the aquatic portion of the action area.

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.

The species considered in this Opinion are listed as threatened or endangered based on declines from historic levels of abundance and productivity, loss of spatial structure and diversity, and an array of limiting factors as a baseline habitat condition. The species will be affected over time by cumulative effects, some positive – as recovery plan implementation and regulatory revisions increase habitat protections and restoration, and some negative – as climate change and unregulated or difficult to regulate sources of environmental degradation persist or increase.

Overall, to the degree that habitat trends are negative, as described below, effects on viability parameters of each species are also likely to be negative.

The environmental baseline within the action area has been degraded by the effects of intense streambank and shoreline development and by aquatic activities. The baseline has also been degraded by nearby and upstream industry, urbanization, agriculture, forestry, water diversion, and road building and maintenance. Such conditions can make fish present in the action area more vulnerable to effects of the proposed action.

As described in more detail above at Section 2.2, climate change is likely to increasingly affect the abundance and distribution of the ESA-listed species considered in the Biological Opinion (Opinion). The exact effects of climate change are both uncertain, and unlikely to be spatially homogeneous. However, climate change is reasonably likely to cause reduced instream flows in some systems, and may impact water quality through elevated in-stream water temperatures and reduced dissolved oxygen, as well as by causing more frequent and more intense flooding events.

Climate change may also impact coastal waters through elevated surface water temperature, increased and variable acidity, increasing storm frequency and magnitude, and rising sea levels. The adaptive ability of listed-species is uncertain, but likely reduced due to reductions in population size, habitat quantity and diversity, and loss of behavioral and genetic variation.

In this context we consider the added effects of the proposed action’s effect on individuals of the listed species at the population scale. The proposed action will cause direct and indirect effects on the ESA-listed species considered in the Opinion well into the foreseeable future.

<u>Fish Population level effects</u>: Stormwater discharges will occur continuously year-round, regularly overlapping with the presence of listed species in Kelsey Creek and Lake Washington. Adverse effects to Chinook and steelhead are likely to occur every year when juveniles and prespawn adults are exposed. Exposure will be at varying levels of intensity based on life stage (juvenile versus adults) and duration (steelhead having more exposure than Chinook based on their longer freshwater rearing behavior), we expect that some juveniles each year will have impaired health and of these, some will die as a result. We do not expect this reduced abundance of juveniles to be high enough to create a discernible change in the abundance of adults, meaning productivity will not be reduced. Finally, even when climate change is considered, the action’s effects the biological environment are expected to be of such a small scale that the proposed action is not expected to exacerbate the negative trend in either of the affected populations of PS Chinook salmon or PS steelhead.

<u>Conservation value effects</u>: Similar to our presentation on population level effects, when we add the project effects to the baseline, we evaluate if the change in Physical or Biological Features (PBFs) or Primary Constituent Elements will reduce the conservation role for which the critical habitat was designated. The proposed action will slightly reduce the functional levels of habitat features (water quality for all three species, prey for SRKW) within the action area; however, the incremental nature of this adverse effect indicates that critical habitat will remain functional and retain the current ability for PBFs to serve the intended conservation roles for the species. Therefore, the critical habitats will maintain their current level of functionality, and retain their

current ability for PBFs to become functionally established, to serve the intended conservation role for Puget Sound Chinook salmon and southern resident killer whale, even when climate change is factored.

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' biological opinion that the proposed action is not likely to jeopardize the continued existence of Puget Sound Chinook salmon or steelhead, nor is it or destroy or adversely modify designated critical habitat for either species.

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). "Harass" is further defined by guidance as to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." "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 Incidental Take Statement (ITS).

Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

- For PS Chinook and PS steelhead, take in the form of harm from exposure to stormwater pollutants.
- For SRKW, take in the form of harm from reduced quality or quantity of prey from stormwater pollutants and the temporary reduction in detrital prey from riparian vegetation removal.

The extent of harm from stormwater for Puget Sound Chinook salmon and steelhead from exposure to long-term water quality and prey reductions from stormwater runoff (adults and juveniles) due to the addition of 3.453 acres of new PGIS and replacement of 3.272 acres of existing PGIS. The extent of harm of SRKW from exposure to reduced quality and quantity of forage due to stormwater exposure of prey would also rely on the PGIS metrics above. These metrics are the best available surrogates for the extent of take from exposure to roadway-related contaminants because they are easily observable and causal: as the size of the PGIS increases, the volume of stormwater runoff and contaminants increases.

The extent of harm from prey reductions associated with riparian vegetation removal is the amount of riparian vegetation impact: 0.74 acres. This is a causal metric because an increase in riparian vegetation removal will further reduce detrital sources of prey. This metric can be readily observed/

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" refer to those actions the Director considers necessary or appropriate to minimize the impact of the incidental take on the species (50 CFR 402.02). The FHWA and WSDOT shall:

1. Minimize incidental take of Puget Sound Chinook salmon and Puget Sound steelhead associated with stormwater.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions. The FHWA or any applicant 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 ITS (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. The following terms and conditions implement reasonable and prudent measure 1:

    a. Ensure the project does not exceed the design specifications (creates no more than 3.5 acres of new PGIS and replaces no more than 3.3 acres of existing PGIS).
    b. Regularly inspect and maintain stormwater treatment facilities to maximize the removal of stormwater pollutants.

Reinitiation of Consultation

Under 50 CFR 402.16(a): "Reinitiation of consultation is required and shall be requested by the federal agency where discretionary federal involvement or control over the action has been retained or is authorized by law and: (1) If the amount or extent of taking specified in the incidental take statement is exceeded; (2) If new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) If 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 the biological opinion or written concurrence; or (4) If a new species is listed or critical habitat designated that may be affected by the identified action."

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).

1. The FHWA should continue to investigate opportunities to provide enhanced stormwater treatment for all PGIS in the action area.

ESSENTIAL FISH HABITAT RESPONSE

Thank you also for your request for essential fish habitat (EFH) consultation. NMFS reviewed the proposed action for potential effects on EFH pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation. We have concluded that the action would adversely affect EFH designated under the Pacific Coast Salmon and Pacific Groundfish Fishery Management Plans (FMPs) and provide one conservation recommendation.

Magnuson-Stevens Fishery Conservation and Management Act

Section 305(b) of the MSA directs federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the associated physical, chemical, and biological properties that are used by fish (50 CFR 600.10). 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 may result from actions occurring within EFH or outside of it and may include direct, indirect, site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH (50 CFR 600.905(b)).

EFH Affected by the Proposed Action

The proposed project occurs within EFH for various federally managed fish species within the Pacific Salmon and Pacific Coast Groundfish FMPs. Riverine areas are also Habitat Areas of Particular Concern for Pacific Salmon.

Adverse Effects on EFH

The NMFS determined the proposed action would adversely affect EFH due to a small area riparian habitat removal adjacent to Goff Creek, and temporary turbidity generated during in-water work and benthic disturbance within the creek (Section 5.0 of the BA). Water quality will be degraded due to runoff from PGIS within spawning, rearing, and migration habitat for Pacific Salmon, as well as habitat for Pacific Coast Groundfish. Removal of the fish passage barrier at Goff Creek will however result in a gain of 710 meters of potential upstream habitat for Pacific Coast Salmon.

EFH Conservation Recommendations

The NMFS determined that the following Conservation Recommendation is necessary to avoid, minimize, mitigate, or otherwise offset the adverse effects of the proposed action on EFH. Implementation of this conservation measure would reduce the harmful effects of water quality degradation in Pacific Salmon and Pacific Coast Groundfish EFH.

1. The FHWA should continue to investigate opportunities to provide enhanced stormwater treatment for all PGIS in the action area.

Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, FHWA 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 the measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise 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)).

Supplemental Consultation

The FHWA 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/welcome). A complete record of this consultation is on file at Oregon Washington Coastal Office.

Please direct questions regarding this letter to Bonnie Shorin at bonnie.shorin@noaa.gov.

Sincerely,

Kathleen Wells
Assistant Regional Administrator
Oregon Washington Coastal Office

cc: Lindsey Handel, FHWA
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