UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OR 97232-1274

Refer to NMFS No:
WCRO-2023-00981

March 19, 2025

Ralph Rizzo
Division Administrator
Federal Highway Administration, Washington Division
711 S. Capitol Way, Suite 501
Olympia, Washington 98501

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the SE Grace Avenue Phase 2 Improvements

Dear Mr. Rizzo:

This letter responds to your June 14, 2023, 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 all 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 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. In our biological opinion below, we indicate what parts of your document we have incorporated by reference and where that information is being incorporated.

We adopt by reference the following sections of the Biological Assessment (BA) (MacKay and Sposito 2023):

- Section 3, for the description of the proposed action;
- Section 6 for species and habitat information;
- Section 7 for the environmental baseline conditions;
- Section 8 and 9 for effects of the proposed actions;
- Appendix A for the Essential Fish Habitat Assessment;
- Appendix B for the ESA Stormwater Design Checklist; and,
- Appendix C for the Preliminary Hydrology Report.

We note where we have supplemented information in the BA with our own data analysis. The BA will be included in the administrative record for this consultation and we will send it to readers of the biological opinion as an email reply attachment to requests sent to consultationupdates.wcr@noaa.gov and reference the NMFS No. for this consultation: WCRO-2023-00981.

On June 14, 2023, the NMFS received a request for formal consultation along with a BA from the FHWA. In their BA, the FHWA determined that the proposed action was likely to adversely affect ESA-listed species and designated critical habitat, and adversely affect essential fish habitat (EFH) within the action area. The NMFS reviewed the BA and it was determined that all information necessary to complete consultation was received.

On November 26, 2024, the NMFS notified the FHWA of the extension of the downstream portion of the action area from the Lake River and Columbia River confluence to the mouth of the Columbia River at the Pacific Ocean due to the fate and transport of stormwater contaminants in freshwater systems. This extension of the action area would result in the addition of nine ESA-listed salmonids, the southern DPS of Pacific eulachon, and the southern DPS of green sturgeon; associated designated critical habitat of all species; and Pacific coast groundfish EFH, therefore the NMFS requested a decision on whether FHWA would like to include these additional species, critical habitats, and EFH for analysis within this consultation. The FHWA responded on November 26, 2024 requesting that the additional species, critical habitats, and EFH be included in this consultation.

On January 23, 2025, the NMFS requested clarification from the Washington State Department of Transportation (WSDOT), the non-federal representative for FHWA, about the total quantities of pollution generating impervious surfaces (PGIS) and stormwater treatment. WSDOT requested the information from the City, and responded to the NMFS on January 30, 2025.

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.

BIOLOGICAL OPINION

Proposed Action

The City of Battleground (the City), with funding from the FHWA, proposes to make improvements to a 1.01 mile-section of SE Grace Avenue from the intersection with SE Rasmussen Boulevard to E Main Street in order to improve safety and traffic capacity. Improvements would include:

- Realigning the SE Grace Avenue and E Main street intersection to form a 4-leg signalized intersection
- Widening the existing 22-foot-wide roadway to accommodate two 11-foot travel lanes and a continuous 12-foot-wide center turn lane
- Adding 6-foot-wide bike lanes

- Adding detached 6-foot-wide sidewalks and pedestrian crossings
- Adding 6-foot-wide planting strips
- Adding improved street lighting
- Upgrading utilities within the Right of Way
- Adding landscaping throughout the alignment
- Stormwater improvements

The construction footprint for the proposed action occurs entirely on land, there is no in-water work proposed. Runoff from construction and increased and reconstructed PGIS make stormwater runoff the primary route of effect for ESA species and designated critical habitats.

Currently, the project area includes 3.67 acres of untreated existing PGIS and 0.26 acres of treated existing PGIS. The proposed action would result in the conversion of 0.59 acres of existing PGIS to pervious landscaping, 1.07 acres of new PGIS, and retrofitting 2.60 additional acres of existing PGIS to treat stormwater. This would result in a combined total of 4.41 acres of new, reconstructed, and existing PGIS, 3.92 acres of which will be receiving stormwater treatment. 0.48 acres of existing PGIS will remain untreated, and 0.01 acres of existing non-pollution generating impervious surface (NPGIS) will be converted to PGIS and also remain untreated.

The project area is currently divided into two threshold discharge areas (TDAs). TDA 1 includes SE Grace Avenue from SE 4th Street south to SE Rasmussen Boulevard. TDA 2 includes SE Grace Avenue from SE 4th Street to E Main Street. Current stormwater runoff from TDA 1 receives some treatment at the existing detention and wet pond facility, which then travels about 5,000 feet through a series of ditches and culverts to Salmon Creek. Stormwater runoff from TDA 2 is currently collected at four locations (E Main Street, SE 1st Street, SE 2nd Street, and SE 4th Street), where it travels through city pipes approximately 500 feet and is discharged, untreated, at four separate outfalls along Woodin Creek.

The proposed stormwater improvements include:

- Upgrading the existing detention and wet pond facility to increase capacity;
- Constructing a system of curbs and gutters to convey stormwater from an expanded TDA 1 to the detention and wet pond facility;
- Installing a series of Contech Filterra boxes for enhanced stormwater runoff treatment in TDA 1 before being discharged to the detention and wet pond facility;
- Reducing the four existing discharge locations in TDA 2 to one; and,
- Installing Contech StormFilter cartridges in TDA 2 prior to the connection to the existing E Main street storm main system.

The remaining untreated stormwater runoff from 0.49 acres of PGIS in TDA 2 is not able to be infiltrated onsite due to poor soil conditions. This untreated PGIS is located approximately 500 feet from the nearest receiving water body, Woodin Creek, where ESA-listed species may be present. Section 3 and Appendices B and C of the BA provide a detailed description of the proposed action including specific plans for stormwater treatment and best management practices (BMPs) and are adopted here by reference (MacKay and Sposito 2023).

Status of Species and Critical Habitat

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.

There are 8 listed salmonid evolutionarily significant units (ESU), and 7 listed distinct population units (DPS) within the action area:

- Chinook Salmon (*Oncorhynchus tshawytscha*);
  - Lower Columbia River (LCR) Chinook salmon
  - Upper Columbia River (UCR) spring-run Chinook salmon
  - Upper Willamette River (UWR) spring-run Chinook salmon
  - Snake River (SR) spring/summer-run Chinook Salmon
  - SR fall-run Chinook salmon
- Columbia River (CR) chum salmon (*Oncorhynchus keta*);
- LCR coho salmon (*Oncorhynchus kisutch*);
- SR sockeye salmon (*Oncorhynchus nerka*);
- Steelhead (*Oncorhynchus mykiss*);
  - LCR DPS
  - Middle Columbia River (MCR) DPS
  - UCR DPS
  - Snake River Basin (SRB) DPS
  - UWR DPS
- Southern DPS of Pacific eulachon (*Thaleichthys pacificus*);
- Southern DPS of green sturgeon (*Acipenser medirostris*)

Section 6 of the BA describes the status of LCR Coho salmon, LCR Chinook salmon, CR Chum salmon, and LCR steelhead, and is being adopted here by reference. Due to the extension of the action area downstream to the mouth of the Columbia River, the status of 11 additional ESA-listed species was not evaluated in the BA. We supplement the status of species and critical habitat provided in the BA with NMFS' status information.

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 °C (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.

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. 2020). 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 (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 el 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).

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.

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**
LCR Chinook salmon	Threatened 6/28/05	NMFS 2013	NMFS 2022a; Ford 2022	This ESU comprises 32 independent populations. Relative to baseline VSP levels identified in the recovery plan (Dornbusch 2013), there has been an overall improvement in the status of a number of fall-run populations although most are still far from the recovery plan goals; Spring-run Chinook salmon populations in this ESU are generally unchanged; most of the populations are at a "high" or "very high" risk due to low abundances and the high proportion of hatchery-origin fish spawning naturally. Many of the populations in this ESU remain at "high risk," with low natural-origin abundance levels. Overall, we conclude that the viability of the Lower Columbia River Chinook salmon ESU has increased somewhat since 2016, although the ESU remains at "moderate" risk of extinction	• Reduced access to spawning and rearing habitat • Hatchery-related effects • Harvest-related effects on fall Chinook salmon • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Contaminant
UCR spring-run Chinook salmon	Endangered 6/28/05	Upper Columbia Salmon Recovery Board 2007	NMFS 2022b; Ford 2022	This ESU comprises four independent populations. Current estimates of natural-origin spawner abundance decreased substantially relative to the levels observed in the prior review for all three extant populations. Productivities also continued to be very low, and both abundance and productivity remained well below the viable thresholds called for in the Upper Columbia Salmon Recovery Plan for all three populations. Based on the information available for this review, the Upper Columbia River spring-run Chinook salmon ESU remains at high risk, with viability largely unchanged since 2016.	• Effects related to hydropower system in the mainstem Columbia River • Degraded freshwater habitat • Degraded estuarine and nearshore marine habitat • Hatchery-related effects • Persistence of non-native (exotic) fish species • Harvest in Columbia River fisheries

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
SR spring/summer-run Chinook salmon	Threatened 6/28/05	NMFS 2017a	NMFS 2022c; Ford 2022	This ESU comprises 28 extant and four extirpated populations. There have been improvements in abundance/productivity in several populations relative to the time of listing, but the majority of populations experienced sharp declines in abundance in the recent five-year period Overall, at this time we conclude that the Snake River spring/ summer-run Chinook salmon ESU continues to be at moderate-to-high risk.	• Degraded freshwater habitat • Effects related to the hydropower system in the mainstem Columbia River, • Altered flows and degraded water quality • Harvest-related effects • Predation
Snake River fall-run Chinook salmon	Threatened 6/28/05	NMFS 2017b	NMFS 2022d; Ford 2022	This ESU has one extant population The single extant population in the ESU is currently meeting the criteria for a rating of “viable” developed by the ICTRT, but the ESU as a whole is not meeting the recovery goals described in the recovery plan for the species, which require the single population to be “highly viable with high certainty” and/or will require reintroduction of a viable population above the Hells Canyon Complex (NMFS 2017b). The Snake River fall-run Chinook salmon ESU therefore is considered to be at a moderate-to- low risk of extinction.	• Degraded floodplain connectivity and function • Harvest-related effects • Loss of access to historical habitat above Hells Canyon and other Snake River dams • Impacts from mainstem Columbia River and Snake River hydropower systems • Hatchery-related effects • Degraded estuarine and nearshore habitat.
UWR Chinook salmon	Threatened 6/28/05	NMFS 2011	NMFS 2024; Ford 2022	This ESU comprises seven populations. Abundance levels for all but Clackamas River DIP remain well below their recovery goals. The Clackamas River DIP currently exceeds its abundance recovery goal and its pHOS goal (<10% hatchery-origin fish). While returns to Fall Creek Dam number in the low hundreds, prespawn mortality rates are very high in the basin, and the effects of fires and high summer temperatures resulted in a recruitment failure in 2021. Overall, there has likely been a declining trend in the viability of the Upper Willamette River Chinook salmon ESU since the last review. In order to meet the biological recovery criteria for viability, the UWR Chinook salmon ESU must have four out of seven viable populations. The magnitude of this change is not sufficient to suggest a change in risk category, however, so the Upper Willamette River Chinook salmon ESU remains at “moderate” risk of extinction.	• Degraded freshwater habitat • Degraded water quality • Increased disease incidence • Altered stream flows • Reduced access to spawning and rearing habitats • Altered food web due to reduced inputs of microdetritus • Predation by native and non-native species, including hatchery fish • Competition related to introduced salmon and steelhead • Altered population traits due to fisheries and bycatch

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
CR chum salmon	Threatened 6/28/05	NMFS 2013	NMFS 2022a; Ford 2022	This species has 17 populations divided into 3 MPGs. 3 populations exceed the recovery goals established in the recovery plan (Dornbusch 2013). The remaining populations have unknown abundances. Abundances for these populations are assumed to be at or near zero. The viability of this ESU is relatively unchanged since the last review (moderate to high risk), and the improvements in some populations do not warrant a change in risk category, especially given the uncertainty regarding climatic effects in the near future.	• Degraded estuarine and nearshore marine habitat • Degraded freshwater habitat • Degraded stream flow as a result of hydropower and water supply operations • Reduced water quality • Current or potential predation • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat in the lower Columbia River • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Juvenile fish wake strandings • Contaminants
LCR coho salmon	Threatened 6/28/05	NMFS 2013	NMFS 2022a; Ford 2022	Of the 24 populations that make up this ESU. Only six of the 23 populations for which we have data appear to be above their recovery goals. Overall abundance trends for the Lower Columbia River coho salmon ESU are generally negative. Natural spawner and total abundances have decreased in almost all DIPs, and Coastal and Gorge MPG populations are all at low levels, with significant numbers of hatchery-origin coho salmon on the spawning grounds. Improvements in spatial structure and diversity have been slight, and overshadowed by declines in abundance and productivity. For individual populations, the risk of extinction spans the full range, from “low” to “very high.” Overall, the Lower Columbia River coho salmon ESU remains at “moderate” risk, and viability is largely unchanged since 2016.	• Degraded estuarine and near-shore marine habitat • Fish passage barriers • Degraded freshwater habitat: Hatchery-related effects • Harvest-related effects • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat in the lower Columbia River • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Juvenile fish wake strandings • Contaminants

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
SR sockeye salmon	Endangered 6/28/05	NMFS 2015	NMFS 2022f; Ford 2022	This single population ESU is at remains at "extremely high risk," although there has been substantial progress on the first phase of the proposed recovery approach—developing a hatchery-based program to amplify and conserve the stock to facilitate reintroductions. Current climate change modeling supports the "extremely high risk" rating with the potential for extirpation in the near future (Crozier et al. 2020). The viability of the Snake River sockeye salmon ESU therefore has likely declined since the time of the prior review, and the extinction risk category remains "high."	• Effects related to the hydropower system in the mainstem Columbia River • Reduced water quality and elevated temperatures in the Salmon River • Water quantity • Predation
UCR steelhead	Threatened 1/5/06	Upper Columbia Salmon Recovery Board 2007	NMFS 2022b; Ford 2022	This DPS comprises four independent populations. The most recent estimates (five-year geometric mean) of total and natural-origin spawner abundance have declined since the last report, largely erasing gains observed over the past two decades for all four populations (Figure 12, Table 6). Recent declines are persistent and large enough to result in small, but negative 15-year trends in abundance for all four populations. The overall Upper Columbia River steelhead DPS viability remains largely unchanged from the prior review, and the DPS is at high risk driven by low abundance and productivity relative to viability objectives and diversity concerns.	• Adverse effects related to the mainstem Columbia River hydropower system • Impaired tributary fish passage • Degraded floodplain connectivity and function, channel structure and complexity, riparian areas, large woody debris recruitment, stream flow, and water quality • Hatchery-related effects • Predation and competition • Harvest-related effects

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
LCR steelhead	Threatened 1/5/06	NMFS 2013	NMFS 2022a; Ford 2022	This DPS comprises 23 historical populations, 17 winter-run populations and 6 summer-run populations. 10 are nominally at or above the goals set in the recovery plan (Dornbusch 2013); however, it should be noted that many of these abundance estimates do not distinguish between natural- and hatchery- origin spawners. The majority of winter-run steelhead DIPs in this DPS continue to persist at low abundance levels (hundreds of fish), with the exception of the Clackamas and Sandy River DIPs, which have abundances in the low 1,000s. Although the five-year geometric abundance means are near recovery plan goals for many populations, the recent trends are negative. Overall, the Lower Columbia River steelhead DPS is therefore considered to be at “moderate” risk.,	• Degraded estuarine and nearshore marine habitat • Degraded freshwater habitat • Reduced access to spawning and rearing habitat • Avian and marine mammal predation • Hatchery-related effects • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat in the lower Columbia River • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Juvenile fish wake strandings • Contaminants
UWR steelhead	Threatened 1/5/06	NMFS 2011	NMFS 2024; Ford 2022	This DPS has four demographically independent populations. Populations in this DPS have experienced long-term declines in spawner abundance. Although the recent magnitude of these declines is relatively moderate, continued declines would be a cause for concern. Overall, the Upper Willamette River steelhead DPS continued to decline in abundance. Although the most recent counts at Willamette Falls and the Bennett Dams in 2019 and 2020 suggest a rebound from the record 2017 lows, it should be noted that current “highs” are equivalent to past lows. In the absence of substantial changes in accessibility to high-quality habitat, the DPS will remain at “moderate-to-high” risk. Overall, the Upper Willamette River steelhead DPS is therefore at “moderate-to-high” risk, with a declining viability trend.	• Degraded freshwater habitat • Degraded water quality • Increased disease incidence • Altered stream flows • Reduced access to spawning and rearing habitats due to impaired passage at dams • Altered food web due to changes in inputs of microdetritus • Predation by native and non-native species, including hatchery fish and pinnipeds • Competition related to introduced salmon and steelhead • Altered population traits due to interbreeding with hatchery origin fish

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
MCR steelhead	Threatened 1/5/06	NMFS 2009b	NMFS 2022h; Ford 2022	This DPS comprises 17 extant populations. Recent (five-year) returns are declining across all populations, the declines are from relatively high returns in the previous five-to-ten year interval, so the longer-term risk metrics that are meant to buffer against short-period changes in abundance and productivity remain unchanged. The Middle Columbia River steelhead DPS does not currently meet the viability criteria described in the Middle Columbia River steelhead recovery plan.	• Degraded freshwater habitat • Mainstem Columbia River hydropower-related impacts • Degraded estuarine and nearshore marine habitat • Hatchery-related effects • Harvest-related effects • Effects of predation, competition, and disease
SRB steelhead	Threatened 1/5/06	NMFS 2017a	NMFS 2022i; Ford 2022	This DPS comprises 24 populations. Based on the updated viability information available for this review, all five MPGs are not meeting the specific objectives in the draft recovery plan, and the viability of many individual populations remains uncertain. Of particular note, the updated, population-level abundance estimates have made very clear the recent (last five years) sharp declines that are extremely worrisome, were they to continue.	• Adverse effects related to the mainstem Columbia River hydropower system • Impaired tributary fish passage • Degraded freshwater habitat • Increased water temperature • Harvest-related effects, particularly for B-run steelhead • Predation • Genetic diversity effects from out-of-population hatchery releases
Southern DPS of Pacific eulachon	Threatened 3/18/10	NMFS 2017c	NMFS 2022j	The Southern DPS of eulachon includes all naturally-spawned populations that occur in rivers south of the Nass River in British Columbia to the Mad River in California. Sub populations for this species include the Fraser River, Columbia River, British Columbia and the Klamath River. In the early 1990s, there was an abrupt decline in the abundance of eulachon returning to the Columbia River. Despite a brief period of improved returns in 2001-2003, the returns and associated commercial landings eventually declined to the low levels observed in the mid-1990s. Although eulachon abundance in monitored rivers has generally improved, especially in the 2013-2015 return years, recent poor ocean conditions and the likelihood that these conditions will persist into the near future suggest that population declines may be widespread in the upcoming return years.	• Changes in ocean conditions due to climate change, particularly in the southern portion of the species' range where ocean warming trends may be the most pronounced and may alter prey, spawning, and rearing success. • Climate-induced change to freshwater habitats • Bycatch of eulachon in commercial fisheries • Adverse effects related to dams and water diversions • Water quality, • Shoreline construction • Over harvest • Predation

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Southern DPS of green sturgeon	Threatened 4/7/06	NMFS 2018	NMFS 2021	The Sacramento River contains the only known green sturgeon spawning population in this DPS. The current estimate of spawning adult abundance is between 824-1,872 individuals. Telemetry data and genetic analyses suggest that Southern DPS green sturgeon generally occur from Graves Harbor, Alaska to Monterey Bay, California and, within this range, most frequently occur in coastal waters of Washington, Oregon, and Vancouver Island and near San Francisco and Monterey bays. Within the nearshore marine environment, tagging and fisheries data indicate that Northern and Southern DPS green sturgeon prefer marine waters of less than a depth of 110 meters.	• Reduction of its spawning area to a single known population • Lack of water quantity • Poor water quality • Poaching

The FHWA determined that critical habitat for LCR steelhead and LCR Chinook salmon would not be affected by the action due to no critical habitat being mapped in the initially proposed action area. Due to the extension of the action area downstream to the mouth of the Columbia River, the NMFS is including supplemental information in this opinion on critical habitat for LCR steelhead and LCR Chinook, as well as the additional species and their critical habitats listed above.

For most salmon and steelhead, NMFS's 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.

A summary of the status of critical habitats, considered in this opinion is provided in Table 2, below.

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
Lower Columbia River Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Oregon and Washington containing 47 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some, or high potential for improvement. We rated conservation value of HUC5 watersheds as high for 30 watersheds, medium for 13 watersheds, and low for four watersheds.
Upper Columbia River spring-run Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses four subbasins in Washington containing 15 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some, or high, potential for improvement. We rated conservation value of HUC5 watersheds as high for 10 watersheds, and medium for five watersheds. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Snake River spring/summer-run Chinook salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers, and all tributaries of the Snake and Salmon rivers (except the Clearwater River) presently or historically accessible to this ESU (except reaches above impassable natural falls and Hells Canyon Dam). Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Upper Willamette River Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Oregon containing 56 occupied watersheds, as well as the lower Willamette/Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some, or high, potential for improvement. Watersheds are in good to excellent condition with no potential for improvement only in the upper McKenzie River and its tributaries (NMFS 2005). We rated conservation value of HUC5 watersheds as high for 22 watersheds, medium for 16 watersheds, and low for 18 watersheds.

Snake River fall-run Chinook salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers, and all tributaries of the Snake and Salmon rivers presently or historically accessible to this ESU (except reaches above impassable natural falls, and Dworshak and Hells Canyon dams). Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Columbia River chum salmon	9/02/05 70 FR 52630	Critical habitat encompasses six subbasins in Oregon and Washington containing 19 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 16 watersheds, and medium for three watersheds.
Lower Columbia River coho salmon	2/24/16 81 FR 9252	Critical habitat encompasses 10 subbasins in Oregon and Washington containing 55 occupied watersheds, as well as the lower Columbia River and estuary rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 34 watersheds, medium for 18 watersheds, and low for three watersheds.
Snake River sockeye salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers; Alturas Lake Creek; Valley Creek; and Stanley, Redfish, Yellow Belly, Pettit and Alturas lakes (including their inlet and outlet creeks). Water quality in all five lakes generally is adequate for juvenile sockeye salmon, although zooplankton numbers vary considerably. Some reaches of the Salmon River and tributaries exhibit temporary elevated water temperatures and sediment loads that could restrict sockeye salmon production and survival (NMFS 2015b). Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Upper Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Washington containing 31 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 20 watersheds, medium for eight watersheds, and low for three watersheds.
Lower Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses nine subbasins in Oregon and Washington containing 41 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 28 watersheds, medium for 11 watersheds, and low for two watersheds.

Upper Willamette River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses seven subbasins in Oregon containing 34 occupied watersheds, as well as the lower Willamette/Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. Watersheds are in good to excellent condition with no potential for improvement only in the upper McKenzie River and its tributaries (NMFS 2005). We rated conservation value of HUC5 watersheds as high for 25 watersheds, medium for 6 watersheds, and low for 3 watersheds.
Middle Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 15 subbasins in Oregon and Washington containing 111 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of occupied HUC5 watersheds as high for 80 watersheds, medium for 24 watersheds, and low for 9 watersheds.
Snake River basin steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 25 subbasins in Oregon, Washington, and Idaho. Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Southern DPS of green sturgeon	10/09/09 74 FR 52300	Critical habitat has been designated in coastal U.S. marine waters within 60 fathoms depth from Monterey Bay, California (including Monterey Bay), north to Cape Flattery, Washington, including the Strait of Juan de Fuca, Washington, to its United States boundary; the Sacramento River, lower Feather River, and lower Yuba River in California; the Sacramento-San Joaquin Delta and Suisun, San Pablo, and San Francisco bays in California; tidally influenced areas of the Columbia River estuary from the mouth upstream to river mile 46; and certain coastal bays and estuaries in California (Humboldt Bay), Oregon (Coos Bay, Winchester Bay, Yaquina Bay, and Nehalem Bay), and Washington (Willapa Bay and Grays Harbor), including, but not limited to, areas upstream to the head of tide in various streams that drain into the bays. Several activities threaten the PBFs in coastal bays and estuaries and need special management considerations or protection. The application of pesticides, activities that disturb bottom substrates/ adversely affect prey resources/ degrade water quality through re-suspension of contaminated sediments, commercial shipping and activities that discharge contaminants and result in bioaccumulation of contaminants in green sturgeon; disposal of dredged materials that bury prey resources; and bottom trawl fisheries that disturb the bottom/prey resources for green sturgeon.

Southern DPS of eulachon	10/20/11 76 FR 65324	Critical habitat for eulachon includes portions of 16 rivers and streams in California, Oregon, and Washington. All of these areas are designated as migration and spawning habitat for this species. In Oregon, we designated 24.2 miles of the lower Umpqua River, 12.4 miles of the lower Sandy River, and 0.2 miles of Tenmile Creek. We also designated the mainstem Columbia River from the mouth to the base of Bonneville Dam, a distance of 143.2 miles. Dams and water diversions are moderate threats to eulachon in the Columbia and Klamath rivers where hydropower generation and flood control are major activities. Degraded water quality is common in some areas occupied by southern DPS eulachon. In the Columbia and Klamath river basins, large-scale impoundment of water has increased winter water temperatures, potentially altering the water temperature during eulachon spawning periods. Numerous chemical contaminants are also present in spawning rivers, but the exact effect these compounds have on spawning and egg development is unknown. Dredging is a low to moderate threat to eulachon in the Columbia River. Dredging during eulachon spawning would be particularly detrimental.

Finally, we examined the likely effects on any listed species and critical habitats for which the FHWA made "not likely to adversely affect" determinations. Our conclusions regarding the effects of the action on those species and critical habitats is presented below under the heading: NLAA determinations.

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). Section 5 of the BA describes the terrestrial and aquatic action area and is being adopted here by reference, but with the following modification. Based on the likely downstream transport of stormwater contaminants such as 6PPD/6PPD-quinone and PAHs, the NMFS further extended the action area from Lake River to the mouth of the Columbia River at the Pacific Ocean due to the transport, persistence, and changes to potential toxicity of pollutants that would cause effects to water quality and to listed species downstream. The distance from the Lake River confluence to the Columbia River confluence is approximately 83 river miles. The described area overlaps with the geographic ranges of the ESA-listed species and the boundaries of designated critical habitats described in the BA and supplemented with species and critical habitat identified in Table 1 and Table 2. The action area also overlaps with areas that have been designated as EFH for Pacific Coast salmon and Pacific Coast groundfish under the MSA.

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).

The status of each species considered in this consultation varies considerably from very high risk of extinction, to moderate, to low risk of extinction. The environmental baseline is such that individual ESA-listed species in the lower Columbia River and its tributaries are exposed to reduced water quality, lack of suitable riparian and aquatic habitat, and restricted movement due to developed urban area and land use practices that have limited access to historically available habitat. Many conditions in the baseline are understood to limit productivity, and specified as factors limiting productivity in a manner that impedes recovery. These stressors, as well as those from climate change, already exist. To these stressors we consider the added adverse effects to species and their critical habitat produced by the proposed action (see below). Section 7 of the BA describes the environmental setting and baseline conditions and is adopted here by reference (MacKay and Sposito 2023). To the environmental baseline information provided in the BA, we supplement with environmental baseline information for the Columbia River.

On the mainstem of the Columbia River, hydropower projects including the Federal Columbia River Hydropower System (FCRPS) have significantly degraded salmon and steelhead habitats (Bottom et al. 2005; Fresh et al. 2005; NMFS 2011; NMFS 2013; NMFS 2020). The series of dams and reservoirs that make up the FCRPS block an estimated 12 million cubic yards of debris and sediment that would otherwise naturally flow down the Columbia River and replenish shorelines along the Washington and Oregon coasts. Hydroelectric development modified natural flow regimes, resulting in higher water temperatures, changes in fish community structure leading to increased rates of piscivorous and avian predation on juvenile salmon and steelhead, and delayed migration for both adult and juvenile salmonids. Physical features of dams such as turbines also kill migrating fish. In-river survival is inversely related to the number of hydropower projects encountered by emigrating juvenile fish.

The Columbia River Estuary extends from the mouth of the river to its furthest extent of tidal influence at the Bonneville Dam (RM 146). The estuary includes three physiographic subsystems based on salinity: the euryhaline region, which is subject to large fluctuations in salinity, extending from the mouth of the river to RM 18, the brackish mixing zone between RM 18 and RM 34, and the tidal freshwater zone between RM 34 and RM 146 (Weitkamp et al. 2014; Bottom et al. 2005). The flow regimes, physical composition, and sediment input of each of these zones have been significantly altered by upriver activities over the last 150 years, resulting in degraded conditions for fish (Bottom et al. 2005). These impacts have been particularly harmful for juvenile emigrating salmon. While historical Columbia River salmon returns averaged between 11 and 16 million annually (with a much larger number of juveniles emigrating), these rates have declined to less than 12% of predevelopment levels (Bottom et al. 2005).

The most extensive urban development in the LCR subbasin has occurred in the Portland/ Vancouver area. Along the western bank of the Columbia River, the City of Portland has constructed 45 miles of levees, cutting off the river from its floodplain and channelizing flow. These activities, along with the upstream dam operations, have reduced productivity and foraging habitat for salmonids as well as the distribution of sediment and nutrients from floodplain habitat. Habitat complexity is a key factor related to the success of species after floods (Pearsons et al. 1992). The extensive levee system in the LCR inhibits habitat forming processes, thereby reducing the availability of rearing habitat and forage opportunities for salmonids.

Outside of this major urban area, the majority of residences and businesses rely on septic systems. Common water quality issues with urban development and residential septic systems include high water temperatures, low dissolved oxygen (DO), increased fecal coliform bacteria, and increased chemicals associated with pesticides and urban runoff. Under these environmental conditions, fish in the action area may experience a number of impacts related to stress, including reductions in biological reserves, altered biological processes (e.g., growth, osmoregulation, and survival), and increased disease susceptibility. Untreated urban road runoff has also been linked to mass mortality events for coho salmon, Chinook salmon, and steelhead due to the contaminant 6PPD-quinone (6PPD-q) (Chow et al. 2019; French et al. 2022).

Water quality within the LCR has also been impaired by toxic pollutants due to legacy contamination from industrial activities. The Columbia River Bi-State Water Quality Program was established in the early 1990s as a public-private partnership with the goal of assessing and improving water quality within the LCR (LCBSP 1996). A 2016 amendment to the Clean Water Act also directed the EPA to establish the Columbia River Basin Restoration Working Group. While local, state, tribal, and federal restoration projects have yielded some successes, these efforts have generally fallen short (GAO 2018).

In summary, the action area is part of a highly anthropologically impacted corridor for migrating salmon, whose populations have continued to decrease or remain somewhat stable at low levels for many years. However, the aquatic habitats present in the action area continue to provide a wide range of important habitat functions for ESA-listed species.

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.

The BA provides a detailed discussion and comprehensive assessment of the effects of the proposed action in Section 8, 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. The following section summarizes the effects analysis from the BA. We also provide supplemental information for the additional species considered in this Opinion due to the action area extension.

Short term effects to water quality are primarily associated with the proposed construction activities, which may cause temporary increases in turbidity, however, measurable increases in sediment and turbidity are not expected due to extensive sediment and erosion control best management practices (BMPs) and the distance from the receiving water bodies. The long-term effects of the proposed actions on ESA-listed species and designated critical habitat are primarily associated with the alterations of water quality caused by stormwater runoff due to new and reconstructed PGIS. The proposed action includes stormwater management BMPs that will ultimately improve water quality when compared to existing conditions. Current conditions include 3.67 acres of untreated PGIS, and post-construction stormwater management will total 3.92 acres of treated PGIS, with only 0.49 acres of PGIS area left untreated. The remaining untreated roadway runoff will continue to drain into the existing storm conveyance system and discharge to Woodin Creek, about 500 ft from the post-construction discharge point. The effects as described in Section 8 of the BA will be generally the same for the additional ESA-listed species and their critical habitats considered in this Opinion.

We expect that every year some individuals of all life stages of LCR coho salmon, LCR Chinook salmon, LCR steelhead, CR chum salmon, UWR steelhead, MCR steelhead, UCR steelhead, SR steelhead, UCR spring-run Chinook salmon, UWR spring-run Chinook salmon, SR Spring/ summer-run Chinook salmon, SR fall-run Chinook salmon, SR Sockeye salmon, southern DPS of Pacific eulachon, and southern DPS of green sturgeon, would experience sublethal effects such as stress and reduced prey consumption as a result of stormwater runoff pollutants. The highest concentration levels of constituents and chemical mixtures that are toxic to fish and aquatic life in stormwater runoff are expected to occur at the point of discharge and at first-flush rain events after long periods of no rain. Some individuals would respond with avoidance behaviors that disrupt feeding and migratory behavior. Others would experience reduced growth, impairment of essential behaviors related to successful rearing and migration, cellular trauma, physiological trauma, reproductive failure, and mortality. Among the contaminants of concern, 6PPD-Q and PAHs are most harmful to fish.

Lipophilic chemicals such as PAH's tend to bioaccumulate in the tissues of aquatic organisms, particularly those at the top of trophic food chains such as salmonids. Increased levels of PAHs, oils, and other contaminants would be widely dispersed, and can have detrimental effects at very low levels of exposure either directly or indirectly through the consumption of contaminated prey or exposure to contaminants in the water column. Environmental and biological accumulation of these chemicals can result in adverse long-term ecosystem impacts including altering species behavior, reproduction, and growth. PAHs and their metabolites are acutely toxic to salmonids and may cause lethal narcosis at low levels of exposure, can bioaccumulate through food webs (water, groundwater, soil, and plants; Bravo et al. 2011; Zhang et al. 2017), and can also cause chronic sub-lethal effects to aquatic organisms at very low levels (Neff 1985; Varanasi et al. 1985; Meador et al. 1995).

6PPD-Q is among the most toxic chemicals known for aquatic organisms, especially to coho salmon (LC50 0.08 µg/L) (Tian et al. 2022) and ranks as among the most potently acute aquatic toxicants when compared to chemicals with existing Clean Water Act Aquatic Life Ambient Water Quality Criteria (Ecology 2022). 6PPD-Q is also highly toxic to O. mykiss (LC50fry 0.47 – LC50juvenile 2.26 µg/L), and moderately toxic to Chinook salmon (LC50 67.3 µg/L) (Roberts et al. 2024; Lo et al. 2023). Sublethal concentrations of 6PPD-Q can disrupt aerobic metabolism, swimming performance, and cardiovascular function in O. mykiss (steelhead) and lake trout (*Salvelinus namaycush*), potentially affecting fish survival (Selinger 2025).

Stormwater negatively impacts critical habitat of all listed species within the action area by degrading water quality. Contaminants in stormwater can be transported far downstream to estuaries and the ocean dissolved in surface waters, attached to suspended sediments, or via aquatic food webs (e.g., bioaccumulation). Aquatic organisms including ESA-listed salmonids may take up contaminants from their surrounding environments by direct contact with water and sediments, or ingestion of contaminated plankton, invertebrates, detritus, or sediment, indicating that prey and substrate are also adversely affected features of critical habitat. We anticipate water quality to be degraded by the discharge of stormwater effluent from the new PGIS. Although the project would provide treatment to reduce contaminants in stormwater effluent, we expect some degradation of the water quality PBF of critical habitat for all ESA-listed species in this Opinion. However, given that discharges from the stormwater facilities would contain less contaminant within the effluent than is currently discharged, we believe that water quality, sediment quality, and prey communities would continue to support the conservation role (e.g. growth, maturation, survival) for individuals of each of the designated species. Water quality effects reduce fitness and likelihood of survival among an indeterminate number of individuals in all exposed cohorts for the foreseeable future, but these effects would not be large enough to cause any population-level impacts or reduce the survival and recovery of listed species.

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. Section 8. c. of the BA provides a discussion of the cumulative effects and is incorporated here by reference. In summary, Clark County and the Battleground area are experiencing significant residential, commercial and industrial growth and development. While there are no specific federal actions planned within the project vicinity, there is potential for cumulative effects from urban development in the future.

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 status of LCR coho salmon, LCR Chinook salmon, LCR steelhead, CR chum salmon, UWR steelhead, MCR steelhead, UCR steelhead, SR steelhead, UWR spring-run Chinook salmon, SR spring/summer-run Chinook salmon, SR fall-run Chinook salmon, southern DPS of Pacific eulachon, and southern DPS of green sturgeon in this Opinion is threatened. The status of UCR spring-run Chinook salmon and SR Sockeye salmon is endangered. Extinction risk for each species varies considerably from very high risk of extinction, to moderate, to low risk of extinction. Ford (2022) reports that all salmonid species are at "moderate" to "high" risk of extinction attributed to low abundance relative to historic numbers with reduced productivity, spatial structure, and diversity. Improving freshwater habitat conditions has been identified to be especially important for salmonid species for spawning and rearing success and to improve recovery (Ford 2022; NMFS 2013a).

These species are listed under the ESA because of reductions in abundance from historic levels, low productivity, reductions in diversity and diminishment in spatial structure (Ford 2022). These conditions are due in part to systemic degraded habitat as factors for decline and similarly are found in the baseline of the action area, where multiple anthropogenic changes exist. Water quality, including contaminants/pollutants, and degraded freshwater habitat are limiting factors for the species analyzed in this opinion and will be affected by the proposed action.

As discussed in section 5. b. of the BA, there is no in-water work and as described above, the direct effects of upland construction activities are expected to be minimal. BMPs will also be implemented during construction to minimize PGIS effects. The proposed actions will, however, have permanent adverse effects on the ESA listed species and designated critical habitat in the action area due to increased amounts of PGIS and discharge of stormwater runoff, which will contribute to water quality pollutants already present in the Lower Columbia River basin.

To offset adverse effects to ESA-listed species from increased PGIS, the proposed action includes retrofitting a portion of existing PGIS that is not currently treated. This results in a total of 3.92 acres of stormwater treatment for new and existing PGIS. Currently, only 0.26 acres is treated for PGIS.

When we consider the status of threatened fish populations and degraded environmental baseline conditions within the action area, the proposed action poses a small additional amount of long-term chronic water quality degradation from added PGIS. While permanent contaminant effects may include lethal, sublethal, and behavioral responses to a very small number of individual fish, the proposed action should not result in appreciable modification of the baseline conditions for species survival, nor will the proposed action impair ongoing recovery efforts.

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 LCR coho salmon, LCR Chinook salmon, LCR steelhead, CR chum salmon, UWR steelhead, MCR steelhead, UCR steelhead, SR steelhead, UCR spring-run Chinook salmon, UWR spring-run Chinook salmon, SR spring/summer-run Chinook salmon, SR fall-run Chinook salmon, SR Sockeye salmon, southern DPS of Pacific eulachon, and southern DPS of green sturgeon or destroy or adversely modify their designated critical habitats.

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 ITS.

Amount or Extent of Take

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

Harm of some individual salmon, steelhead, green sturgeon, and eulachon of all life stages, due to long-term water quality degradation and prey reductions from stormwater runoff due to increased impervious surfaces and stormwater inputs of heavy metals, suspended solids, petroleum hydrocarbons, excess nutrients, pesticides, 6PPD-quinone, and other trace pollutants. This habitat modification can significantly impair essential breeding, spawning, rearing, migrating, feeding, or sheltering behavioral patterns such that fish will be injured or killed from the increase in pollution or will experience a reduction in fitness, growth or survival.

Accurately quantifying the number of fish harmed by these pathways is not possible because injury and death of individuals in the action area is a function of habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. These biotic and environmental processes are highly variable and interact in ways that may be random or directional, and may operate across broad temporal and spatial scales. The precise distribution and abundance of fish within the action area, at the time of the action are not a simple function of the quantity, quality, or availability of predictable habitat resources within that area. Rather, the distribution and abundance of fish also show wide, random variations due to biological and environmental processes operating at much larger demographic and regional scales. Furthermore, there are no methods available to monitor this death and injury because it will occur after the proposed action has been completed. Therefor it is not practical or realistic to attempt to identify and monitor the number of fish or sea stars taken by the pathways described.

In cases such as this, where quantifying a number of fish is not possible, we use take surrogates or take indicators that rationally reflect the incidental take caused by the proposed action. In this case, the extent of take is 4.41 acres of PGIS (3.92 acres of existing PGIS, 0.01 acres of existing NPGIS converted to PGIS, and 0.48 acres net new PGIS). This extent is easily observable, and is causally related to the source of harm, as a larger impervious area would contribute more stormwater runoff and that increased volume would increase the area affected and increase the load of contaminants, exposing more individuals of the listed species and their prey. Reinitiation shall be triggered if additional PGIS is constructed.

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 shall require the City of Battleground to:

1. Minimize incidental take of all 15 ESA-listed species associated with stormwater effects.

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 stormwater system designs meet or exceed standards as described in the July 2024 update of the Ecology Stormwater Management Manual for Western Washington
    b. Ensure the project does not exceed the design specifications and creates no more than 4.41 acres of new and replaced PGIS. The City of Battleground, their contractors, and FHWA shall provide an As-build report including the total area of both new and replaced PGIS to NMFS within 90 days following project completion. This report should be sent to projectreports.wcr@noaa.gov including "Attn: WCRO-2023-00981" within the subject line.
    c. Construct and maintain stormwater treatment facilities to maximize the removal of stormwater pollutants. Specifically, the FHWA shall ensure that the City and their contractors:
        i. Inspect and maintain the detention/wet pond facility, Contech Filterra units, and Contech StormFilter media cartridges at least twice a year for a period of three years, and annually thereafter. The recommended timing of the twice annual inspections should take place prior to a first flush event and once immediately after a heavy rain event or at the end of the rainy season. Annual inspections should take place prior to the first flush event. Consider adaptive management of stormwater treatment to address lack of treatment effectiveness if observed.
        ii. Maintain records of inspection and maintenance to document compliance with the maintenance standards referenced in Appendix C of the BA. Records do not need to be provided to NMFS unless requested.

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. Construct additional stormwater treatment facilities or BMPs to provide treatment of the remaining untreated PGIS in the project area (0.48 acre).
2. Construct proactive stormwater treatment facilities elsewhere in the watershed where treatment is absent or inadequate to improve water quality in the action area.
3. Develop and implement a regular street sweeping maintenance schedule to remove tire particles and contaminants from the roadway.
4. Participate in a monitoring and reporting program, such as the Washington Department of Ecology Stormwater Action Monitoring (SAM), which monitors stormwater pollutants. The project site can be proposed to the SAM program as a preferred monitoring location to inform BMP effectiveness.
5. Employ adaptive management of stormwater treatment to address lack of treatment effectiveness, new science, or contaminants of emerging concern.

NLAA DETERMINATIONS

We reviewed the FHWA consultation request document and related materials. Based on our knowledge, expertise, and your action agency's materials, we concur with the action agency's conclusions that the proposed action is not likely to adversely affect the following NMFS ESA-listed species and/or designated critical habitat:

- Southern Resident Killer Whale

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."

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 Fishery Management Council's Pacific Coast Salmon Fishery Management Plan (FMP) and Pacific Coast Groundfish FMP. Conservation recommendations are listed below.

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 Fishery Management Council's Pacific Coast Salmon Fishery Management Plan (FMP) and Pacific Coast Groundfish FMP.

Adverse Effects on EFH

NMFS determined the proposed action would adversely affect EFH as follows:

1. Water quality – The proposed action would cause short- and long-term incremental adverse effects on this attribute. Over the life of the expanded roadway, treated and untreated stormwater would discharge residual levels of petroleum-based pollutants, metals, and other contaminants into Woodin creek, Salmon Creek, Lake River and the Columbia River. The action would cause no measurable changes in water temperature or

salinity. We substantiate the adverse water quality outcomes here by indicating that habitat becomes unsuitable for coho, which is part of the Pacific Salmon FMP:

a. 6PPD/6PPD-q has been killing coho in Puget Sound urban streams for decades, dating back to at least the 1980s, likely longer (McCarthy, Incardona and Scholz 2008; Scholz et al. 2011).
b. Source-sink metapopulation dynamics (mediated by straying) are likely to place a significant drag on the future abundances of wild coho salmon in upland forested watersheds (the last best places for coho conservation in Puget Sound). In other words, urban mortality syndrome experienced in one part of the watershed could lead to abundance reductions in other populations because fewer fish are available to stray (Spromberg and Scholz 2011).
c. Coho are extremely sensitive to 6PPD-q, more so than most other known contaminants in stormwater (Scholz et al. 2011; Chow et al. 2019; Tian 2020).
d. Coho juveniles appear to be similarly susceptible to the acutely lethal toxicity of 6PPD/6PPD-q (McIntyre et al. 2015; Lo et al. 2023).
e. The onset of mortality is very rapid in coho (i.e., within the duration of a typical runoff event) (French et al. 2022).
f. Once coho become symptomatic, they do not recover, even when returned to clean water (Chow et al.2019).
g. It does not appear that dilution will be the solution to 6PPD pollution, as diluting roadway runoff in 95% clean water is not sufficient to protect coho from the mortality syndrome (French et al. 2022).

2. Prey availability – The proposed action would cause short- and long-term low level but chronic adverse effects on this attribute. Over the life of the expanded roadway, untreated stormwater would provide a persistent source of contaminants that could be taken up by benthic invertebrates that are forage resources for salmonid and groundfish species. Prey communities exposed to the various contaminants in stormwater may be reduced in quantity, composition, and quality if they accumulate toxins.

EFH Conservation Recommendations

NMFS determined that the following conservation recommendations are necessary to avoid, minimize, mitigate, or otherwise offset the adverse effects of the proposed action on EFH. To reduce adverse impacts from construction-related effects and roadway stormwater, the FHWA and/or the local recipient of FHWA funds should:

1. Contribute to and support local habitat improvement and enhancement projects within the Salmon-Washougal basin.
2. Construct additional stormwater treatment facilities or BMPs to provide infiltration treatment of runoff from all existing, new, and replaced PGIS and the remaining untreated PGIS in the project area (0.49 acre).
3. Construct proactive stormwater treatment facilities elsewhere in the watershed where treatment is absent or inadequate to improve water quality in the action area.

4. Ensure replanted vegetation in temporarily disturbed areas, proposed wetlands, and bioswales includes a variety of native plants that will increase their function to better filter runoff.
5. Participate in a monitoring and reporting program such as the Washington Department of Ecology Stormwater Action Monitoring (SAM), which monitors stormwater pollutants. The project site can be proposed to SAM as a preferred monitoring location to inform BMP effectiveness.
6. Employ adaptive management of stormwater treatment to address lack of treatment effectiveness, new science, or contaminants of emerging concern.,
7. Develop and implement regular street sweeping maintenance schedule to remove tire particles and contaminants from the roadway.

Fully implementing these EFH conservation recommendations would avoid or minimize the adverse effects described above for Pacific Coast salmon and groundfish.

Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, the 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 the Oregon Washington Coastal Office in Portland, Oregon.

Please direct questions regarding this letter to David Price in the Lower Columbia Washington Coast Branch of the Oregon Washington Coastal Office at 253-317-1498 or by electronic mail at David.Price@noaa.gov.

Sincerely,

Kathleen Wells
Assistant Regional Administrator
Oregon Washington Coastal Office

cc: Cindy Callahan, Senior Biologist, FHWA Washington Division
Jodie Beall, Environmental Biologist, WA State Department of Transportation Local Programs
Boem Kim, SW Area Engineer, FHWA

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