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-2023-01955

March 7, 2024

Greg Dudgeon
Superintendent, Mount Rainier National Park
55210 238th Avenue East
Ashford, Washington 98304

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Mount Rainier National Park Carbon River Road Reconstruction Project.

Dear Mr. Dudgeon:

This letter responds to your August 18, 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 replacement of a section of road along the Carbon River (located at 46.994917, -121.917524). 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 National Park Service's (NPS) consultation request and related initiation package. Where relevant, we have adopted the information and analyses you have provided and/or referenced but only after our independent, science-based evaluation confirmed they meet our regulatory and scientific standards.

We adopt by reference the following sections of the Biological Assessment provided to NMFS titled "Carbon River Road: Emergency (2022) and Proposed Final Reconstruction (2005)".

- 1.2 Project Description, Appendix C-1 and C-2, 6.1.11 Conservation Measures Incorporated into Project, and 6.3 Aquatic Effects Analysis for the Carbon River Road Emergency (2022) Reconstruction for the *Proposed Action*.
- 1.3 Project Area and Setting, 2.2 NMFS species, and 3.2 Existing Conditions, in part, for the *Environmental Baseline*
- 6.3 Aquatic Effects Analysis for the Carbon River Road Emergency (2022) Reconstruction, and 6.4 Aquatic Effects Analysis for the Proposed Final Reconstruction, **in part**, for the *Effects of the Action on Listed Species and Critical Habitat.*

A complete record of this consultation is on file at the Oregon Washington Coastal Office, Central Puget Sound Branch, Lacey, Washington.

Consultation History

Early in 2022, NPS requested emergency consultation for Carbon River Road repairs on a failed road segment in the National Park. The project would be funded and constructed by the Federal Highways Administration (FHWA), administered by the NPS, and would receive a Clean Water Act Permit through the U.S. Army Corps of Engineers (Corps). At that time, NMFS provided conservation recommendations which were incorporated into the project design.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of the district court's July 5 order. On November 14, 2022, the Northern District of California issued an order granting the government's request for voluntary remand without vacating the 2019 regulations. The District Court issued a slightly amended order two days later on November 16, 2022. As a result, the 2019 regulations remain in effect, and we are applying the 2019 regulations here. For purposes of this consultation and in an abundance of caution, we considered whether the substantive analysis and conclusions articulated in the biological opinion and incidental take statement would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different.

August – October 2022, the NPS and FHWS performed emergency work to rebuild and stabilize the majority of the proposed action road segment. In-water construction was conducted outside the in-water work window (Aug 22- Oct 5 2022)

NMFS received a request for consultation from the NPS on August 18, 2023. More information was requested December 8, 2023, and meetings occurred December 20, 2023, and January 5, 2024 with the Action Agencies. This consultation was initiated on February 2, 2024, following NPS' submission of stormwater treatment plans for the site.

On February 1, 2024, NMFS shared draft Terms and Conditions with NPS and FHWA and received minor edits back on February 15, which were incorporated into this Opinion.

Proposed Action:

BA sections 1.2, 6.1.11, 6.3 and Appendices C1 and C2 describe the proposed action. We summarize here and note that a large portion of the proposed work has already been completed. This action would be funded, administered, and have construction overseen by the US Federal Highway Administration (FHWA). The proposed action would also have associated Clean Water Act (CWA) permitting for in-water work through the U.S. Army Corps of Engineers (Corps). We summarize here the proposed action:

The NPS proposes to rebuild a failed segment of the Carbon River Road, near the end of the road a few hundred feet away from a trail visitor's center and the Carbon River Hike/Bike Trail (46.9949, -121.9175). This road segment is adjacent to the Carbon River at river mile (RM) 24.

It has failed in the past and, most recently, the entirety of the road bed was scoured out during high winter flows. See Figure , below.

Figure 1. Carbon River Road segment following high flows in January, 2022.

Farther up (upstream), the road from the failed segment associated with this proposed action, the road has been closed to vehicles since 2006 when a flood washed out significant portions of the 5-mile-long section, also along the Carbon River. That segment was converted to a hike-bike trail after the 2006 flood.

A large portion of the work has already been completed. In February 2020 and November 2021, heavy rains caused the Carbon River to wash away portions of the Carbon River Road immediately upstream of its confluence with June Creek, near the park boundary. A stabilization project was completed by NPS staff from August 22 through October 5, 2022. These emergency repairs rebuilt the road and included approximately 200 linear feet of armoring that included placement and installation of downed trees and 1,400 cubic yards of riprap. Gravel was placed on top of the riprap to allow vehicular access across the repair area in advance of permanent repairs. See Figures 2 and 3, below.

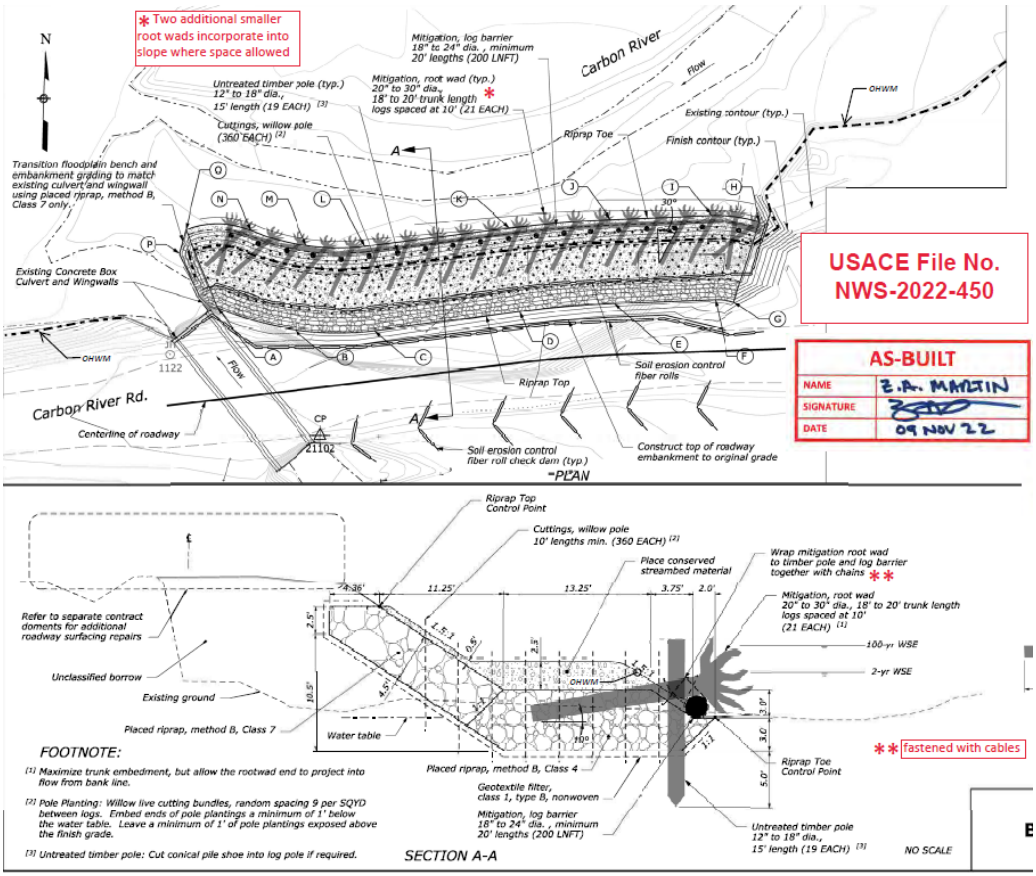


Figure 2. As-built figures for the already-completed work (occurred August 22 – October 5, 2022). Downed trees from the storm event from the previous photo were incorporated into the shoreline protection.

Figure 3. Photo of the reconstructed site in June, 2023, approximately 9 months after emergency work was completed.

The proposed final reconstruction to repair the site still remains to be completed and is anticipated to occur summer 2025. In-water work would be performed during the WDFW July 16 to August 15 designated in-water work window. Construction is estimated to take the entire in-water work window with a potential request for an extension. The project would include additional reconstruction of approximately 50 linear feet of road embankment/armoring downstream (west) of the completed emergency repairs. Repairs would also be made to the damaged wingwall of the June Creek box culvert (fish friendly). See Figure 4 below. Plantings and placement of coarse woody debris would occur in the previous area of the emergency stabilization (east) to help establish of native vegetation. The road would be repaved. Limited excavation of river gravels and cobbles on site from the river bed for project fill and has been previously conducted and is proposed for the incomplete portion of the action. In total, the entire area that will be rebuilt is estimated 12,000 square feet. 6,000 square feet will be paved road. Stormwater runoff from the paved road segment would be managed by Low Impact Development (LID) treatment measures. The road surface would be designed to drain away from the Carbon River channel and June Creek by directing towards the adjacent forested area to the south of the road.

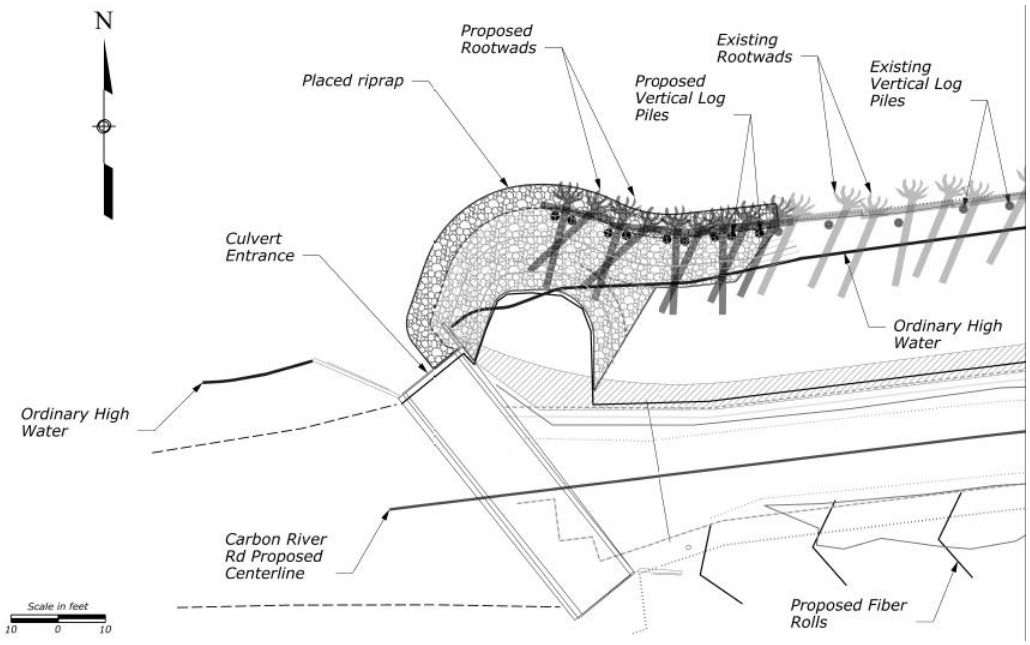


Figure 4. Proposed remaining work – downstream and connecting to previously completed armoring and road reconstruction at the June Creek box culvert.

Dewatering/diversion of a segment of the river channel adjacent to the road will occur by construction of an upstream dam from native river sediments (from on-site) with an excavator. A dewatering plan will be created by the contractor and reviewed and approved by FHWA prior to construction. Though it is uncertain how large the dewatered segment will be because of the dynamism of the Carbon River at this location. Project engineers estimate the channel could be a maximum of 750 feet long and a total of 1.33 acres. Cofferdams, also of native materials, will be constructed in the river channel. Pumps will be used if needed and pumped water will be discharged 150 feet away from the River and June Creek. Prior to and during drawdown, fish will be captured via seining, netting, and lastly, electrofishing, then released outside the project area. Emergency work fish salvage in 2022 resulted in the relocation of five bull trout and five *O. mykiss*. Upon completion of work, the site will be left with the diversion/dewatering dam upstream in place. The Carbon River is expected to "reclaim" the dewatered area relatively quickly (months to a year). The steps of dewatering are as follows:

- Staging clean equipment and materials at the job site.
- Constructing an access ramp from the road to the river channel from large riprap.
- Conducting fish exclusion and dewatering.
- Constructing cofferdams from available native materials in the river channel.
- Continuing fish exclusion and dewatering for a total of three days.
- Conducting work below ordinary high water in the dry.
- Recontouring the project area and replacing large woody debris in the project area post-construction.
- Leaving site ready for Carbon River to reclaim the channel and redistribute native materials during high flows.

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.

Rangewide Status of the 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. We supplement the status of species and critical habitat provided in the BA with NMFS' status information.

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 DPS (Distinct Population Segment), ESU (Evolutionarily Significant Unit), ICTRT (Interior Columbia Technical Recovery Team), MPG (Multiple Population Grouping), NWFSC (Northwest Fisheries Science Center), TRT (Technical Recovery Team), and VSP (Viable Salmonid Population).

We note here that the status of species and designated critical habitats, range wide, are both adversely affected by climate change.

Table 1. Rangwide status of PS Chinook and Steelhead Species and Critical Habitats

Puget Sound Chinook salmon	Threatened 6/28/05 (70 FR 37159)	Shared Strategy for Puget Sound 2007 NMFS 2006	Williams et al. 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 Chinook salmon critical habitat	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.			
Puget Sound steelhead	Threatened 5/11/07	NMFS 2019	Williams et al. 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
Puget Sound steelhead critical habitat	2/24/16 81 FR 9252	• Critical habitat for Puget Sound steelhead includes 2,031 stream miles. Nearshore and offshore marine waters were not designated for this species. There are 66 watersheds within the range of this DPS. Nine watersheds received a low conservation value rating, 16 received a medium rating, and 41 received a high rating to the DPS.			

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 encompasses all areas of disturbance including where fill has been placed and the road has been rebuilt, as well as in-water areas. It includes those areas where shoreline/road stabilization has occurred and will occur and all areas impacted by construction. The aquatic portion of the action area is defined by estimation of the distance where and turbidity would attenuate to the baseline levels within Carbon River (relatively small due to high turbidity of this glacially fed river). It includes some portion of the Carbon River which will continue to be cut off/restricted from flow due to armoring on the site.

Washington law (WAC 173-201A-200) indicates for waters above 100 cubic feet per second (cfs) flow at the time of construction, the point of compliance shall be 300 feet downstream of the activity causing the turbidity exceedance.

Stormwater effects caused by harmful runoff from pollution generating impervious surface (PGIS) would likely be the farthest-reaching effect of this proposed action. Proposed LID stormwater treatment methods will greatly reduce input of contaminants into the Carbon River and June Creek. Despite, this some contaminants will still enter the waterways. NMFS takes a fate and transport approach to understanding downstream movement of stormwater contaminants such as PAHs and 6ppd/q. We expect the action area to extend downstream and include designated critical habitat for PS Chinook salmon and PS steelhead. Because of the small amount of impervious and low traffic usage, we expect the stormwater effects to extend to the Puyallup River, but not beyond.

Environmental Baseline in the Action Area

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

Sections 1.3, 2.2, and 3.2 of the submitted BA describe the environmental baseline of the action area and to this NMFS added information from the 2021-2022 Puyallup Tribe Fisheries Report, Personal communication with the Senior Puyallup Tribe Fisheries Biologist, National Wetland Inventory classifications, and WDFW SalmonScape data.

The roadway and existing armoring had been destroyed more than once in the last several years, and the condition of the site, prior 2022 to construction, was a part of the Carbon River's active channel (see Figure 1).

An excerpt describing habitat and salmonid spawning in the Carbon River from the 2022-2023 Puyallup Tribe Fisheries Report (p 97, emphases added) (Marks et al.):

*The Carbon River is a major tributary of the Puyallup River, entering the Puyallup at RM 17.9, just north of the city of Orting. The Carbon River drainage provides excellent spawning and rearing opportunities for salmon, steelhead and bull trout. In the past, steelhead have been documented as high as the Mt. Rainier National Park boundary. However, the majority of spawning for all species within this drainage, with the exception of bull trout, occurs within the lower 11 miles of the mainstem Carbon River and lower 12.6 miles of South Prairie Creek.…**Above RM 8.5, the Carbon River flows through a narrow canyon for several miles before becoming unconstrained downstream of the Mt. Rainier National Park boundary. This canyon reach supports Chinook and steelhead spawning,** however, chum and pink salmon have not been observed above RM 8. **The Mt. Rainier National Park boundary is located at RM 23. From the park boundary, up to approximately RM 26, the gradient remains low enough to provide some spawning opportunities along channel margins and pool tail-outs. Several small and moderate debris jams occur throughout this reach**.*

The proposed construction area is just upstream of the 7810-Road Bridge and is located on the edge of the river channel (previously constrained on the south side by the Carbon River Road) and the surrounding wetland. Construction will occur in the Carbon River, in the area of road still standing, and at the confluence of June Creek. The stretch of Carbon River Road just upstream of the project site and trail center has been decommissioned/converted to a foot and bicycle trail following similar collapses of the road upstream coinciding with a flood in 2006. Surrounding the project area are mature pines and a wide valley, where the Carbon River has historically meandered for thousands of years. See Figure 6, below. The riparian wetland on the south side of the road is a part of the Mount Rainer National Park. It is a diverse old growth forest and is classified on the National Wetlands Inventory mapper as a seasonally saturated palustrine evergreen forested wetland (PF07B). June Creek also flows along the south side of the road – angling (upstream) south and east from the June Creek box culvert (the confluence with the Carbon River). See Figure 5, below.

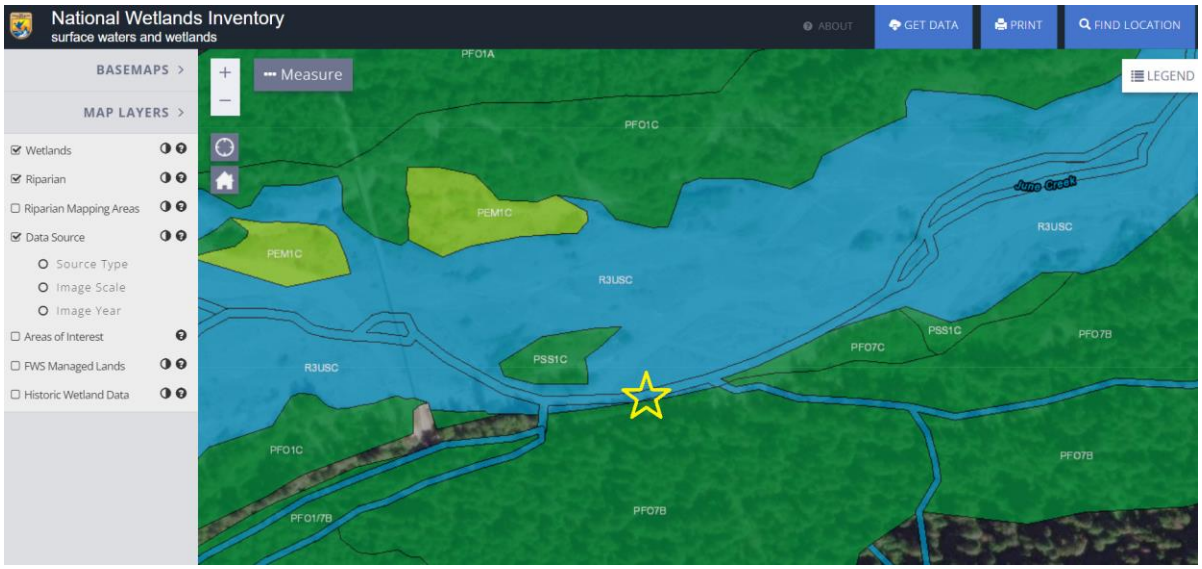


Figure 5. National Wetlands inventory mapper showing the riverine wetland (Carbon River) and the wide adjacent wetlands. Most are Palustrine, Forested, Evergreen, Seasonally Saturated (those ending in B) and some Seasonally Flooded (those ending in C).

Figure 6. Google imagery view showing the topography of the Carbon River looking upstream (East) at the project location. The project site is the small, yellow pin on the center right.

Because the Carbon River is glacially fed, temperatures within the river are typically low and turbidity in the river is typically extremely high. During construction for the completed work, upstream readings ranged from 325 to 435 Nephelometric Turbidity Units (NTU). In the action area, the river forms a braided channel which is typical of glacially fed rivers that have a high sediment supply. The channel is dynamic and unstable with bedload consisting of large rubble,

boulders, and pockets of fine sorted materials (Kerwin 1999). Between 1990 and 1996, the active channel widened by up to 100 feet in several locations, and the channel has aggraded rapidly.

The construction area contains approximately 0.1 miles of former-Carbon River Road, now a portion of the Carbon River. It includes both the raised road bed as well as portions of the riverbed which have been and would be converted back into road under this proposed action.

Species and Critical Habitat within the Action Area

Lower reaches in the Carbon River are more populated with Chinook salmon and steelhead (Puyallup Tribe 2019) but Chinook salmon and steelhead have documented presence just downstream on SalmonScape and five *O. mykiss* were relocated during dewatering for the emergency work on site during Aug-Oct 2022 which were determined by on site staff to be "resident rainbows."

PS Steelhead: Steelhead returning in the Carbon River system are winter-run. The 2022-2023 Puyallup Fishery report details seasonality of steelhead within the Puyallup system. "Steelhead are often present in the watershed throughout the year…Although, most fish don't start migrating towards the upper reaches until March. **The winter run continues through June, with peak migration occurring in mid-to late April, through early May." This is the time adult steelhead would most likely be in the action area. Eggs, alevins and fry are present for many months following spawning, i.e. through the IWWW.** Steelhead spawners frequently utilize the mainstem Puyallup, White, and Carbon rivers; however, the majority of spawning occurs within many of the associated smaller tributaries. "The majority of young wild winter steelhead migrate to saltwater after 2 years in freshwater (81.6%). Approximately 2.5% of the steelhead sampled spent 1 year in freshwater, 15.6% three-years, and less than 0.25% four-years before out-migrating" (Marks 2023). We expect run timing for the Carbon to be similar to the Puyallup since it is a tributary, entering the Puyallup at RM 17.9, whereas the Puyallup extends upstream about 60 river miles total.

PS Steelhead critical habitat is located 0.5 miles downstream of the project site.

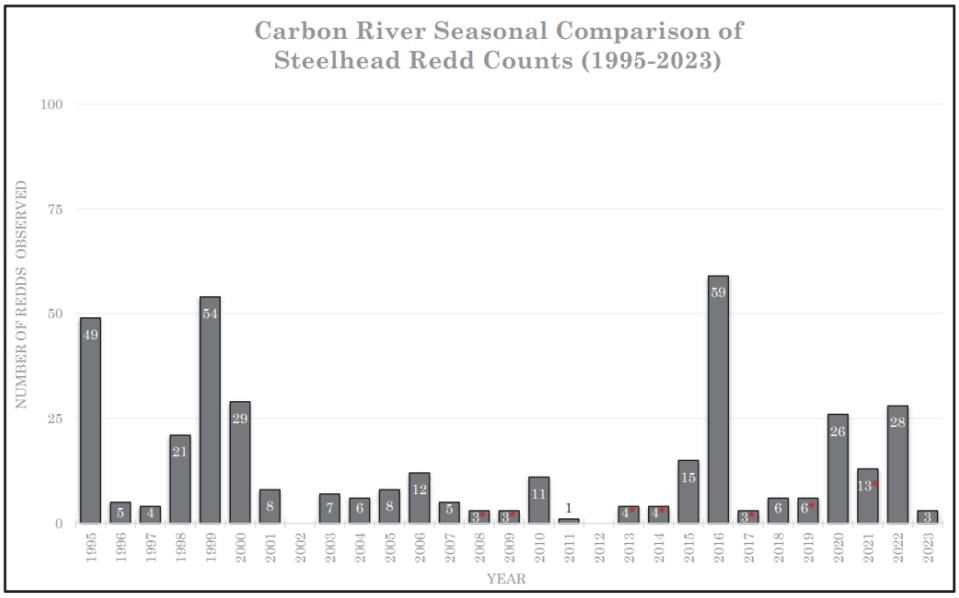
The Federal Register designation of critical habitat for PS steelhead notes (69 FR 74572) all "occupied areas in the overall Puyallup River subbasin contain spawning, rearing, or migration PCEs [principal constituent elements] for this DPS [distinct population segment]," and that "all of the occupied watersheds in the Puyallup subbasin were of high conservation value to the DPS."

WDFW SalmonScape documents winter steelhead presence (distribution type = gradient accessible) in the Carbon River at the project site and also within the first low-gradient portion of June Creek. The nearest documented steelhead presence and spawning is 0.5 miles downstream of the project site. There are no barriers to prevent steelhead from reaching the project location.

During the 2022 emergency work, five "rainbow trout" were relocated from the dewatered side channel prior to construction. Steelhead and rainbow trout have many life strategies for anadromy and reproduction. Whether a juvenile *O. mykiss* outmigrates or stays a resident

"rainbow" has many determining factors such as physiology, genetics, timing, and environmental factors such as temperature - and these are not all well-understood (Kendall 2014). At this project location there are no barriers preventing steelhead from migrating. Therefore, any *O. mykiss* at this location could have a marine component of their life cycle, i.e. be a PS steelhead.

According to Ford et al. (2022), the spawning count of natural origin steelhead for the Carbon River system has been much higher than that of the Puyallup (classified separately in the viability report). The 5-year geometric mean natural spawner counts from the latest 5-year period were 735 (2015-2019). That count has ranged from 246 to 969. Recent steelhead runs have collapsed in in the Puyallup system. 2022 brought the lowest returns in 80 years. (July 26, 2023 pers. comm. Puyallup Tribe Senior Fish Biologist, Marks 2023). See Figure 7, below.



*The redd data is incomplete due to extremely poor survey condition which prevented a regular full season of surveys. To determine the total escapement for steelhead, each redd is multiplied by a factor of 1.62 *(i.e. 42 redds x 1.62 steelhead per redd = total escapement of 68 steelhead).* Addition biological expansion factors are applied to estimate escapement for suitable habitat areas that are often unsurveyable.

Figure 7. Steelhead redd counts on the Carbon River (not including major tributaries) from 1995 through 2023. Note, 2023 had 3 counted redds total.

The Puyallup/Carbon and White river populations of PS Steelhead are priority winter-run populations for the recovery of the South-Central MPG (NMFS 2019). Target abundance for the Puyallup/Carbon is 4,500 (low) to 15,100 (high). The graphs below demonstrate that actual abundance is well below recovery goals.

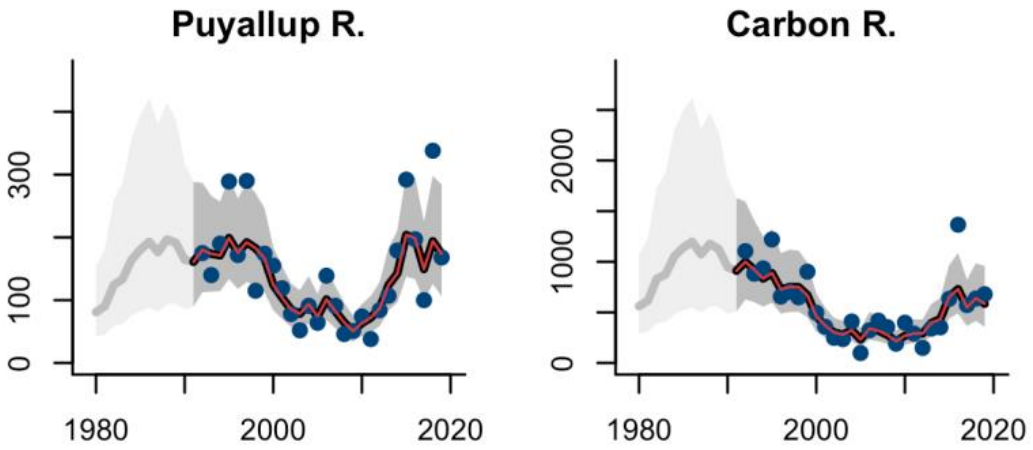


Figure 8. Abundance of natural origin spawning steelhead in Carbon and Puyallup Rivers since the 1980s (Ford 2022).

PS Chinook:
Only fall-run Chinook salmon exist in the Carbon River. In the Biological Viability Assessment for Pacific salmon, Carbon River Chinook are grouped with the Puyallup River, whereas the White River (also a Puyallup tributary) is separate for spring Chinook salmon. Chinook salmon generally spawn in the lower reaches of the Carbon and its large tributaries. WDFW SalmonScape documents the nearest presence of fall Chinook salmon (distribution type = gradient accessible) in the Carbon River at the project location and in June Creek in the first low-gradient area nearest the confluence with Carbon River. The nearest documented presence of fall Chinook salmon in SalmonScape is approximately 0.3 miles downstream of the project site. The upper limit of potential Chinook salmon distribution within the Carbon River has not been clearly defined. Suitable spawning habitat for Chinook salmon is present in the upper Carbon River along channel margins and pool tailouts. Stream surveys by park fisheries staff have not, however, detected Chinook spawning within the park (Marks et al. 2019). There are no additional barriers preventing migration of Chinook above that point and high turbidity due to glacial melt inhibits effective surveying of the higher reaches near the glacier. At the 7810 bridge just downstream of the project site, spring Chinook were observed several decades ago (WCC 1999).

Critical Habitat for PS Chinook salmon is present just downstream of the project site, approximately 0.2 miles downstream.

The Federal Register designation of critical habitat for PS Chinook notes (69 FR 74572) "all occupied areas [of the Puyallup Evolutionary Significant Unit (ESU)] contain spawning, rearing, or migration PCEs [Primary Constituent Elements] for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, dams, forestry, irrigation impoundments and withdrawals, urbanization. Of the five watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU."

From the 2022-2023 Puyallup Fishery Report, Puyallup River adult fall Chinook typically enter the Lower Puyallup River in June, and continue to move through the system as late as November. Spawning also first starts typically in the upper watershed. **Adult Chinook present in the action area would likely be present in June-October. Eggs, alevins and fry are present for many months following spawning, i.e. through the IWWW. Juveniles could be present year-round.** According to the Puyallup Tribe Senior Fisheries Biologist, yearling life histories of Chinook have been seen within this system, meaning some juveniles stay for a year or more (July 26, 2023 pers. comm.).

According to Ford et al. (2022), the spawning count of natural origin PS Chinook for the Puyallup has declined drastically since the 1990s, from 5-year geometric mean spawner counts in the 2000s between 1990 and 1999, but dropping sharply to counts around 500 for the past 20 years. Additionally, Chinook in the Puyallup systems are dominated by hatchery returns. The Puyallup fall Chinook, with low returns, are at genetic and demographic risk of extinction and far from meeting their recovery goals outlined by NMFS in the 2007 recovery plan (NMFS 2007). See Figures 9 and 10, below.

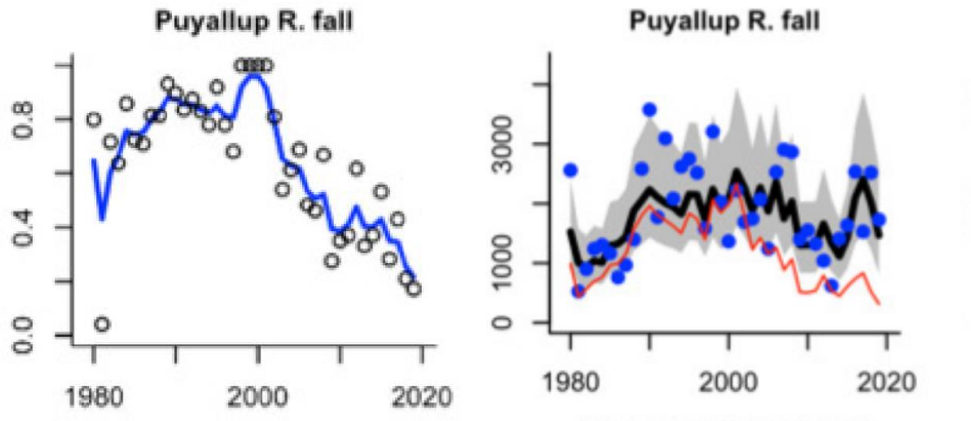


Figure 9. Left - Estimated fraction of natural-origin spawning fall Chinook over the last 40 years in the White and Puyallup Rivers. Right – Predicted abundance since 1980. Black line is the smooth estimated total. Red line is the natural population spawning abundance. Gray band is the 95% confidence interval of total abundance (Ford 2022.)

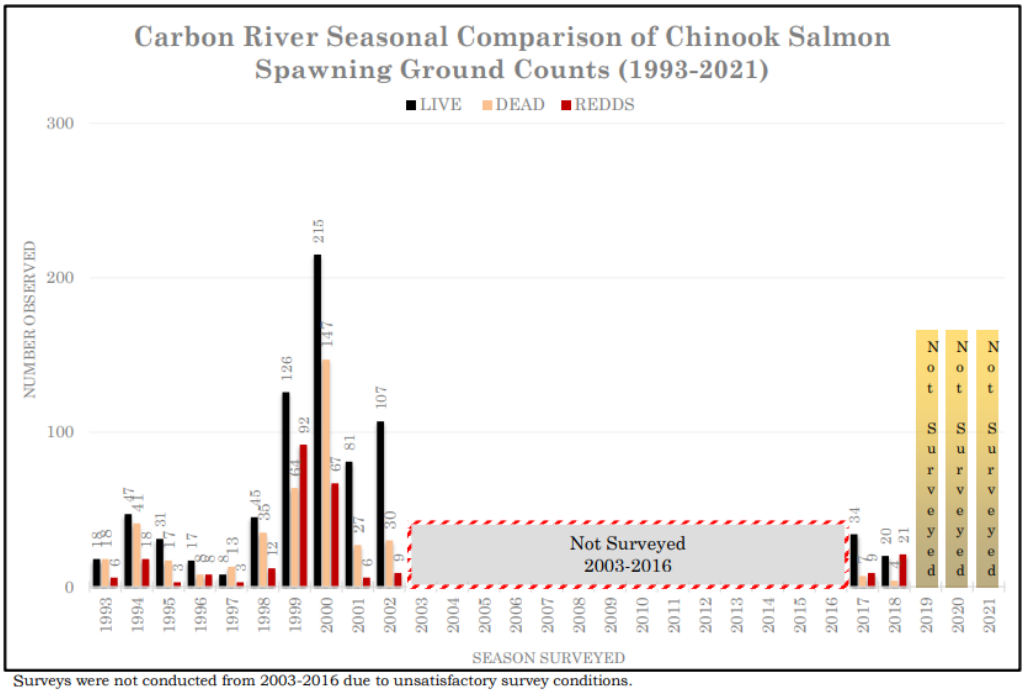


Figure 10. Carbon River Chinook spawning counts conducted by the Puyallup Tribe. Recent surveys show extremely low redd and individual counts in 2017 and 2018 (Mark 2023)

Effects of the Action

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

The biological assessment provides an assessment of the effects of the proposed action on PS Chinook salmon and PS steelhead species in Sections 6.4 and 6.3 as similar to those direct effects on Bull Trout. This section of the initiation package is adopted here (50 CFR 402.14(h)(3)). Those habitat effects discussed in the BA only include temporary construction related effects. They include increased turbidity during construction and disturbance to the channel habitat. Direct effects discussed include harm during dewatering, salvage, and construction. We supplement the effects on species and critical habitat with the following additional presentation of effects:

Construction effects from the first phase of construction, which have already occurred as part of NPS's emergency response, are also analyzed in this opinion. Those effects are similar to the effects of in-water construction as described in the BA and in the effects described below.

The Puyallup and Carbon River PS Chinook DPS (fall run), the Puyallup and Carbon River PS steelhead DPS (winter run), and possibly PS steelhead summer-run strays from other watersheds within the Central and South MPG would be affected by the proposed action. The effects of construction will be temporary, and will not impact more than two sea-run cohorts (returning adults and young of year) of the affected populations. Long term impacts will occur associated with the rebuilt road segment that will affect all life stages and many cohorts of both species' populations for the life of the structures.

Construction timing for in water work is proposed from July 16 to August 15 over one season/IWWW and "an extension will be requested during construction if unavoidable delays become apparent." Because emergency work was conducted outside the July 16th-August 15th work window (Work was conducted from August 22 – October 5, 2022) and the BA mentions the possibility of an extension, this suggests the proposed work window may be exceeded again. We therefore have analyzed the effects of the action as if construction will occur beyond the work window by one month, **from July 16 to September 15.**

Adult Chinook present in the action area would likely be present in June-October. Eggs, alevins and fry are present for many months following spawning. Juvenile Chinook could be present year-round. The winter run for steelhead continues through June, with peak migration occurring in mid-to late April, through early May." This is the time adult steelhead would most likely be in the action area. Eggs, alevins and fry are present for many months following spawning.

Based on timing, construction would affect the following species life stages within the action area: Adult Chinook, in-migrating and spawning (overlaps entirely with spawning season); Chinook eggs, alevins, and fry that are present for many months following spawning; Chinook juveniles which could be present year-round; steelhead sub-adults that have not yet out-migrated (due to life history plasticity); steelhead eggs, alevins, and fry.

Long term effects from the enduring presence of the structures will affect all life stages of both species for the life of the rebuilt road, armoring, and repaired segment of the June Creek box culvert.

Effect pathways are summarized and each discussed below:

Temporary construction effects to PS Chinook salmon and steelhead resulting from:

- Dewatering and Fish Relocation
- Construction/Disturbance

Long term effects to all life stages of PS Chinook salmon and steelhead resulting from:

- Elimination of Carbon River Channel – conversion of the destroyed road bed (now river channel) to a road with in-water armoring.
- Continued ensured fish passage under the road due repairs to the June Creek box culvert.
- Stormwater effect to species and critical habitat

Dewatering and Fish Relocation:

A wetted area up to 750 feet long and a total of 1.33 acres could be dewatered for construction. The area could be much less if that braid/channel of the Carbon River is not experiencing flow or relatively no flow during construction. Because work will occur when Chinook and their redds could be in the action area, actions associated with the dewatered area have the potential to harm and kill juvenile salmon and steelhead as well as kill any eggs, alevins, or fry. The dewatered area will be a large segment of one of the braided channels in the Carbon River. It may not be watered during the time of construction, but it will likely be in a configuration were a large amount of water is flowing adjacent the rebuilt road. Because other channels will remain unblocked, fish passage upstream of the site is not expected to be diminished from this activity.

Fish relocation would occur prior to dewatering and involve netting, potential electroshocking, handing, and relocating listed species. Fish relocation and dewatering pose a risk of injury or mortality to rearing juvenile salmonids. Electroshocking would be used as a last-resort. Once captured, listed fish would be transported and released by a qualified fisheries biologist to suitable in-stream locations within the Carbon River outside the action area. The use of a pump to dewater could entrain juveniles on the mesh of the pump intake. Any fish collecting gear, whether passive (Hubert 1996) or active (Hayes et al. 1996) has some associated risk to fish, including stress, disease transmission, injury, or death. The construction of a ramp down into the channel and movement of sediment to create a dam at the head of the side channel, as well as dewatering, would kill eggs and alevins in the sediment associated with a redd or redds.

Dewatering the area will also kill invertebrates inhabiting this reach, thus reducing forage. Driving an excavator in the channel to create the dam could crush redds, if present, aquatic invertebrates which juvenile steelhead and Chinook feed on, and potentially crush juvenile fish. Localized elevated turbidity could kill eggs downstream and harm juveniles. Though some adult and juvenile fish may be injured or killed during salvage and relocation, effects to handled and relocated fish will primarily be the loss of fitness due to increased stress and disruption to normal feeding behaviors. No density data for either species exists for this segment, relatively high in the Carbon River system. However, five *O. mykiss* were relocated during the first dewatering event 2022. We expect this will occur again. As discussed in the baseline section, due to life history plasticity of *O. mykiss*, individuals affected by the proposed action are treated as steelhead. Up to 20 *O. mykiss* (non-sea-run) could be salvaged from the dewatered area. And from that, no more than 5% known mortality would occur as a result of this activity (1 individual).

If a redd of either species is destroyed, the number of eggs killed/made unviable would be unknown. But if one steelhead redd were destroyed, this would constitute a loss of 2,5000-10,000 eggs, and if one Chinook redd were destroyed, 3,000-14,000 eggs would be lost. Due to the glacial runoff in Carbon River, the location of any potential redds would be difficult to discern prior to dewatering. NMFS does not expect more than 1 redd of either species to be present at this location. NMFS also does not expect a (one) mature sea-run adult of either species to be salvaged.

Construction/Disturbance

Background turbidity of the Carbon River at the project location is extremely high. During the 2022 construction, upstream turbidity measured at 325 to 435 NTUs, which was insignificant from downstream measurements during construction. Because of this turbidity effects on individuals during construction are considered minimal, compared to background levels.

In-water work during the construction of the final segment of armoring and repair of the June Creek box culvert will physically disturb sediments in the dewatered area. Sediments and the water column will be disturbed if trees are removed from areas of the Carbon river that are not dewatered (to be incorporated into the armoring design). In addition to suspended solids (discussed above), these activities can physically destroy redds and invertebrates in the stream sediment. Construction will eliminate a portion of the river channel for use for forage, cover, and thermal refugia. Because the upstream dam creating the dewatered area will be left in place, this elimination could persist for several months but likely no longer than a year.

Elimination of riverine habitat and armoring effects

By reconstructing this estimated 12,000 square foot road segment and rebuilding hard armoring, fill is placed directly in the river bed. The built-up road bed and armoring eliminate in-channel and riparian habitat and their coinciding features on which steelhead and Chinook depend, such as forage, cover, and shading. By reducing habitat and habitat quality available to listed species, there is enduring harm to individuals. Road reconstruction will ensure that this area is continually used and by vehicles and habitat continues to be eliminated. There are no current plans from the NPS to decommission this road segment. The 250 linear feet of armoring along road will cause scour waterward of that armoring, which will decrease aquatic invertebrates (forage) and increase turbidity and depth at this location. Turbidity, as discussed above, is already very high within the Carbon river at this location. Incorporation of trees and their root wads into the design of the armoring will somewhat reduce scour, provide potential refuge/cover for individuals, and increase habitat heterogeneity. Repair of the box culvert on June Creek will prolong the life of this structure, which has elements of shoreline armoring and would not occur but for the road at this location. However, the repair will also ensure continued fish passage for June Creek to coincide with road reconstruction. June creek has the possibility of steelhead use, as well as documented presence and spawning of Coho salmon (not listed under ESA) (discussed in the EFH section below).

Use of in-channel wood to construct the log-portion of armoring will change more or less mobile woody material to stabilized portion of the armoring. The majority of wood mass will be embedded in the armoring itself and a small portion will interact with the active channel. This wood in the armoring will provide refuge and foraging locations for salmonids. Historical timber harvest activities in the upper Carbon have resulted in the loss of the channel adjacent, old growth conifer tree component that served as the source of short and long-term recruitment of functional sized wood pieces. As a result, large wood is either absent or virtually past its useful life expectancy in the Carbon subbasin and land use practices are preventing future recruitment (WCC 1999). Large in channel wood is essential for the creation of dynamic habitat which supports salmonid spawning and rearing. Thus, harm to both species will result from a reduction

in spawning and rearing habitat directly correlated with the amount of wood removed and incorporated into the armoring.

There would be a simplification of river habitat along hard armoring installed at this site. Simplified stream reaches typically produce limited macroinvertebrate prey and provide poor functional habitat for rearing juvenile salmonids (Florsheim *et al*. 2008). The armoring would reduce forage and cover for juvenile Chinook and steelhead. Though, the addition of wood into the design will lessen the reduction caused by the armoring itself. Plantings proposed for in the reconstructed area (including willows) will help counter the disconnection of the river from its riparian. In time, if planted vegetation matures, it would contribute shade and insects for salmonids.

Temperature and amount of runoff from the area of fill and road would be higher due to continued elimination of the stream channel adjacent to natural riparian and upland. The width of the road effectively eliminates shading provided by trees and the chance that insects (forage) will fall from the trees into the water is much lower. Land use has direct effects on stream habitat. Fewer invertebrates and allochthonous inputs will go into the stream due to a disconnected riparian. Thus, fitness of individuals and would be slightly suppressed for both species due to the degradation of habitat quality.

Stormwater

The project addresses stormwater runoff by proposing Low Impact Development (LID) treatment methods. The road will be graded such that stormwater flows to vegetated areas on the June Creek side, but is not drained near the June Creek bed itself. A total of 6000 square feet of pollution generating impervious surface (PGIS) will be created by the proposed action. Although the stormwater will be treated via filtration through naturally occurring soils during all but the largest storm events, some amount of chemicals toxic to salmonids will reach the waterway of June Creek and Carbon river. This site has relatively low traffic because it is a dead-end with a trailhead just down the road (0.1 miles). It receives higher traffic during the warmer months due to use by the public for trail access. Via a fate and transport approach to effects evaluation, low concentrations of contaminants would affect listed species of all life stages for the duration of the life of the road.

Published work identified stormwater from roadways and streets as causing a high percentage of rapid mortality of adult Coho salmon in the wild (Scholz et al. 2011) and laboratory settings (McIntyre et al. 2018). Subsequent laboratory studies showed this morality also occurred in juvenile Coho salmon (Chow et al. 2019) as well as to juvenile steelhead and Chinook salmon. Recent publications have identified a degradation product of tires (6PPD-quinone) as the causal factor in salmonid mortalities at concentrations of less than a part per billion (Peter et al. 2018, Tian et al. 2020). The parent compound (6PPD) is widely used by multiple tire manufacturers and the tire shreds/dust that produce the degradation product have been found to be ubiquitous where both rural and urban roadways drain into waterways (Feist et al. 2018, Sutton et al. 2019).

Recent evaluations of exposures of these contaminants to juvenile steelhead and Chinook salmon resulted in mortality French et al. (2022) exposed juvenile steelhead, Coho, sockeye, and

Chinook to 24 hours of untreated urban runoff and found mortality rates of 95-100% for coho, 4-42% for steelhead, 0-13% for Chinook, and 0% for sockeye. Brinkman et al (2022) showed acute toxicity of 6ppd in sub-adult rainbow trout, with 100% mortality rate at concentration of 1 microgram per liter. Lo et al. (2023) also identified mortality in juvenile Chinook salmon due to 6ppd. While the proposed action is not in an urban setting, tire wear particles and PAHs from fuel and oil dripping from vehicles, as well as vehicular exhaust, occurs with traffic, and increases with the volume of vehicles on roads and parking lots. We infer, because of proposed LID treatment measures at the site, that both species will be exposed to low levels of stormwater contaminants but that those levels could rise to lethal levels during large storm events that exceed the infiltration capacity of adjacent soils.

Despite on-site LID treatment of stormwater, steelhead and Chinook salmon in the action area will be exposed to low levels of contaminated stormwater runoff originating from the rebuilt road segment. Pollutants in post-construction runoff are expected to include oil, grease, polycyclic aromatic hydrocarbons (PAH), 6ppd, and other toxic chemicals associated with tires and vehicles. Concentration levels and toxicity will be seasonally affected by rainfall patterns. 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. First-flush rain events after long periods of no rain will also have higher concentrations of pollutants.

Critical Habitat

Though critical habitat begins for both species just miles downstream of the construction site (0.2 for Chinook and 0.5 for steelhead), water quality in critical habitat will be affected. Water quality is a feature of critical habitat supporting multiple life stages of Chinook and steelhead (spawning habitats, rearing habitats, and migration habitats). Though stormwater will be treated during most storm events, water quality be adversely affected – a small degree during typical storm events which do not cause sheet flow due to fully saturated sediment, but a large degree during large storm events, when soil saturation prevents treatment of runoff. Water quality degradation from stormwater is particularly harmful to rearing values as the juvenile life stages are most sensitive to health effects of PAHs and 6ppd (discussed above). Critical habitat in the Carbon River, and the rest of the occupied Puyallup basin, has high conservation value for both the PS steelhead and PS Chinook ESU. Each of these populations trended negatively in the most recent viability review. Enduring stormwater, even when treated, incrementally impairs water quality. The upper Carbon system has ongoing stormwater inputs from the adjacent reaches of the Carbon River Road. It also experiences and sudden dramatic turbidity inputs from fine sediment loadings when segments of the road fail (as occurred with this segment). The road accessing the Carbon River entrance to Mt. Rainier National Park was originally not built with river sediment, rather with fill and clays (WCC 1999).

Other project effects are constrained to areas well above designated 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 and 402.17(a)). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

The actual project area as well as land upstream on the Carbon is federally owned, drastically limiting the range of actions that can take place on the National Park upstream of this site. The first half (downstream) on the Carbon and all of the lower Puyallup are privately owned. Upstream of Fairfax is federally owned, mostly Forest Service and the upper reaches National Park. Much of the Carbon River's watershed is in timber production and the lower Carbon and lower Puyallup are cut off from their historic floodplains due to development and levies. Based on the fate and transport approach to the action area, the remainder of the action area (downstream of the project site) is likely to be affected over time by continued upland uses associated with timber production and impervious surfaces that contribute stormwater, reduce baseflows, and impair riparian values.

The Puyallup system was evaluated for potential changes in flow and temperature due to climate change – scenarios 2030-2059. Wade et al (2013) predicted that steelhead in the Puyallup, of all the Pacific Northwest systems analyzed, would not be exposed to greatly reduced flows or very high temperatures: however, climate impacts are still predicted to increase flow variation (lower low flows, higher high flows) and increase temperatures. Federally protected headwaters and glacial contributions to flow play a large factor in the climate resiliency of this system. Within the full range of the action area climate effects are likely to increase air and water temperatures, increase the risk of wildfire, and modify the hydrograph with longer periods of low flow and greater peaks in floods.

Glaciers on Mt. Rainier are retreating at a very high rate, contributing heavily to the aggradation of mainstem river channels and the elevated probability of glacial outburst events. **Aggradation can lead to increased flooding risks, higher peak river flows and channel widening**. Geologists reported glacial volume on Mt. Rainier has likely decreased by as much as 18% from 2003-to 2009, a loss of approximately 3% per year, which is a rate loss of nearly 10 times that of any past scientific reporting (Beason 2007 & Beason et al. 2009).

The Carbon River conveys tremendous quantities of fluvial materials downstream which contributes to its dynamic configuration. Continued effects of climate change at this project site will expose the rebuilt road segment to greater channel variation and risk of scour damage, as the Carbon Glacier melts more quickly and releases more sediment (aggradation) and as more intense flooding occurs associated with rainfall. Relatively recent major flood events that have damaged the NPS section of the Carbon River road have occurred, in 2006 (after which the majority of the road within the NPS was converted to a hike bike path), in 2020, and 2021 (which eroded away the section of road in this Opinion).

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.

PS steelhead and PS Chinook are listed as threatened under the ESA. Both watersheds, where occupied, are considered "high conservation value" for the population segments. Puyallup and Carbon River fall Chinook show natural productivity below replacement in nearly all years since the mid-1980s. Due to increased hatchery production, this population has also experienced a massive declination in the fraction of natural origin spawners since the early 2000s (80% in the late 90s to 30% from 2015-2019) (Ford 2022). Carbon River Fall Chinook (only Carbon River, not its tributaries) surveyed by the Puyallup Tribe most recently resulted in very low adult and redd counts, with 9 redds in 2017 and 21 redds in 2018 (see Figure 10 in the Baseline section).

At natural mean spawner counts of 735 (2015-2019), the Puyallup/Carbon River steelhead are well below their target recovery population numbers at about (4,500-high productivity; 15,100-low productivity). And 2022 brought the lowest steelhead returns to the system in 80 years. The mainstem Carbon River steelhead redd count was three (3) for 2023 (See Figure 7 above). When comparing the action to the recovery strategy for the Central and South Sound steelhead MPG, The proposed action uses LID stormwater treatment, which is suggested in the strategy. However, rebuilding the road in the same location causes the river to disconnect from its historic riparian and floodplain. (NMFS 2019)

Though natural stock of PS steelhead and Chinook salmon are present within the Puyallup system, the populations are drastically depressed and far from reaching recovery goals set forth in NMFS' recovery plans (NMFS 2019, NMFS 2007). See baseline section above for numeric details. Extensive loss of habitat due to dams, land use changes, and degraded conditions associated with those land use changes has depressed both species in the Puyallup basin. The second growth forest adjacent and upstream of the project site provide conditions for both species, but downstream conditions, especially levies and dikes in the lower Puyallup and logging in the lower Carbon are the largest factors contributing to low salmonid numbers within the National Park.

For our analysis, we add the project's effects on species and designated critical habitat. This project is likely to adversely affect one cohort of PS Chinook and PS steelhead via construction effects that injure or kill redds, juvenile fish, or adult fish during dewatering of the worksite, and decrease health or fitness of additional fish during construction by via disturbance and impact from in-channel equipment and movement of materials (such as sediment during upstream dam construction and LWD for incorporation into armoring). Elimination of stream channel, creation of armoring, and detachment of the river from riparian vegetation enduring adverse impacts which result in reduced fitness or reduced survival among some members of all foreseeable cohorts while the road segment is in place. PGIS, though treated by adjacent forest soils, will contribute low levels of intermittent contaminants, reducing water quality, a PBF of critical habitat for both species. Because the productivity of natural origin spawners is low for both

species, compared to recovery goals, the project effects must be carefully considered in relation to the survival of the species.

Incorporation of woody material and plantings into the armoring segment minimizes impacts of the design compared to a rip-rap armoring while providing potential refuge for salmonids. We add the treated stormwater to the baseline conditions of the Carbon. Because water quality is not identified as a limiting factor in the Carbon River, the additional increment does not appreciably reduce the conservation role of water quality in the action area for PS Chinook salmon. While water quality is a limiting factor in some reaches of the Puyallup River, however. The additional increment of water quality impairment from LID treated stormwater, when added to the baseline, is not likely to further impair recovery potential of designated critical habitat for Puget Sound steelhead and Chinook, in the action area. Treatment of stormwater via infiltration through soil can collect and convey stormwater in ways that infiltrate into soils with large amounts of organic matter that bind or otherwise remove contaminants from the stormwater before it reaches a stream (WA Dept of Ecology 2022, McIntrye et al. 2015). Though treatment will capture most contaminants, we expect some unquantifiable but small amount to remain and enter June Creek and Carbon River. During storm events that exceed the capacity of the soil to infiltrate water, sheet flow will occur into June Creek. This runoff would not be treated. Overall, the additional increment of stormwater input from this 6,000 sq. ft. road area is likely too small and diffuse to attribute appreciable declines in the populations to the proposed action.

There are five types of take associated with the proposed action, and only two of those (in-water construction and relocation) would possibly result in direct mortality. The other three are enduring associated with the long-term impacts at the site and from stormwater input. While we anticipate some reductions in abundance in each of the affected populations we do not believe level of this reduction from effects of the proposed action would cause any meaningful impact on the remaining viability parameters for PS Chinook salmon or PS steelhead (productivity, spatial structure, or diversity), nor would they appreciably diminish the conservation value of critical habitat for these species. Factors that support this conclusion include:

1. Proposed minimization measures including incorporation of woody material into the stabilization and native plantings on the structure itself.
2. The small number of fish that could be affected during construction.
3. A relatively small project site along the Carbon River just upstream of high-quality salmonid habitat associated with the National Park.
4. Stormwater treatment of PGIS through a LID approach.
5. Low relative traffic frequency at this trailhead location that would result in low concentrations of contaminants in stormwater.

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 PS steelhead or PS Chinook or adversely modify critical habitat of these 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). "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:

NMFS has determined incidental take that is reasonably certain to occur in Table 2, below:

Table 2. Incidental take pathways and associated indicators in the amount or extent thereof.

Incidental Take Pathway	Amount or Extent of Incidental Take
Harm, injury, or death to PS steelhead and Chinook caused by **in-water construction.**	Disturbance within the active construction area up to 2 acres, and up to 300 feet downstream of the active construction area for one work season, from July 16 to September 15.
Capture, injury, or death to PS steelhead and PS Chinook from **fish relocation.**	Capture of up to 100 juvenile *O. mykiss* and juvenile Chinook salmon (combined). Capture of one (1) adult steelhead and one (1) adult Chinook salmon. Visible Injury or death of up to 10 total juvenile *O. mykiss* and juvenile Chinook salmon (combined). Destruction of 1 redd (either PS steelhead or Chinook salmon).
Harm to PS steelhead and PS Chinook caused by **dewatering** a portion of the Carbon River.	Harm associated with dewatering a channel of the Carbon River up to 1.33 acres total for up to six months.
Harm to PS steelhead and PS Chinook caused by **creation of enduring structures.**	275 linear feet of armoring, and 275 linear feet of disconnected riparian vegetation. 12,500 square feet of fill in the Carbon River (as viewed from above). Removal of 60 pieces of large woody debris (LWD) from the Carbon River – incorporated into the armoring.
Harm to steelhead, and Chinook caused by treated **stormwater input from PGIS**	Input of LID-treated stormwater from 6,500 square feet of PGIS into the Carbon River and June Creek. And intermittent untreated stormwater when soil filtration capacity is exceeded.

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" are measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

1. Reduce harm and mortality to listed species resulting from fish relocation and dewatering activities.
2. Minimize harm to species during construction.
3. Minimize harm to species from enduring impacts from in-water structures
4. Prepare and submit reports that summarize the effects of construction, fish relocation, and dewatering activities, and post-construction monitoring/site performance.

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 National Park Service or its contractor 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.

The following terms and conditions implement RPM 1 (relocation/dewatering):

a. Ensure that dewatered area is as small as necessary to complete the remaining in-water work.
b. Captured fish shall be kept in water to the maximum extent possible during relocation activities. They shall be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding. Fish shall not be removed from this water except when released. To avoid predation, use at least two containers and segregate young-of-year fish from larger age classes and other potential aquatic predators. Captured salmonids shall be relocated, as soon as possible, to a location which will allow for adequate survival of transported fish.
c. If any adult Chinook salmon or steelhead are found dead or injured any time during construction, or a recent redd is identified in the construction area, the biologist on site shall contact NMFS biologist Nissa Rudh by phone within 24 hours at (360)-701-9699, or the NMFS Central Puget Sound Office in Lacey, Washington at (503) 230-5400.
    i. All adult salmonid mortalities will be photographed and retained until further direction is provided by the NMFS biologist listed above.

d. Pumps used in the waterway shall be screened and maintained throughout construction to comply with NMFS' Fish Screening Criteria for Pump Intakes (NMFS 1996).

The following terms and conditions implement RPM 2 (construction):

a. Minimize stream crossings and in-channel work.
b. Do not remove any wood from the Carbon River
    i. Obtain woody material for armoring from off site and not from any water body. For example: use felled trees from the Fryingpan Creek vegetation clearing for the Carbon shoreline armoring).
    ii. Material may be moved within the channel out of the area of fill placement

The following terms and conditions implement RPM 3 (enduring effects):

a. Do not remove any wood from the Carbon River
    i. Obtain woody material for armoring from off site and not from any water body. For example: use felled trees from the Fryingpan Creek vegetation clearing for the Carbon shoreline armoring).
    ii. Material may be moved within the channel out of the area of fill placement

The following terms and conditions implement RPM 4 (summarize effects):

a. NPS and FHWA shall provide written reports following construction to: projectreports.wcr@noaa.gov and cc Nissa.rudh@noaa.gov They shall contain the following information:
    i. Dates of construction and photos representative of construction activities.
    ii. Total area of Carbon riverbed disturbed during construction
    iii. Number of ESA listed salmonids relocated along with species and life stage information. And the location of release
    iv. The total area dewatered and whether the dam created to dewater the area has breached at the time of the report.
    v. Total linear feet of all installed armoring.
    vi. Total square feet of pollution generating impervious surface created by the project.
    vii. Final design plans for LID approach to stormwater treatment.
b. NPS shall provide a final report at 3 years post-construction with a description of current armoring stability and site photos to projectreports.wcr@noaa.gov and cc Nissa.Rudh@noaa.gov They shall contain the following information:

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. Incorporate a long-term plan into the National Park's capital improvement plan to reroute or decommission and remove roadbeds directly adjacent to waterways.
2. Incorporate stormwater treatment goals for all untreated PSIG runoff throughout the Mount Rainer NP into the national park's capital improvement plan.
3. Do not rebuild this segment of road again if it washes out again. Instead, remove the June Creek box culvert, build a footbridge over June Creek, and have visitors park near the 7810 bridge and walk the short distance to the visitor's center. Recreation of the Carbon River road and associated armoring at this location is not a climate resilient option in this aggrading glacial river system with an already naturally dynamic and unstable channel system. This road segment has a high probability of being destroyed in the near future due to high flows and channel widening.

Reinitiation of Consultation

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

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

NMFS also reviewed the proposed action for potential effects on essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), including conservation measures and any determination you made regarding the potential effects of the action. This review was conducted pursuant to section 305(b) of the MSA, implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation.

The action area, including June Creek and the Carbon River at the project site, is documented EFH for Pacific Coast Salmon. EFH salmonid species that occur within the action area include Chinook, Pink, and Coho salmon.

The proposed action and action area for this consultation are described in Section 1 (ESA Biological Opinion) of this document. Carbon River is one of the largest tributaries of the Puyallup River. June Creek is a small perennial tributary into the Carbon River, at the project site, which has documented Coho spawning (pers. comm. Mt Rainier NP Fish Biologist.) The

proposed action will rebuild a failed road segment and armoring in the Carbon River, in the previous location which was destroyed and became part of the river in 2020 and 2021. It also repairs the June Creek box culvert (at the June Creek Confluence with the Carbon River) which was also damaged in the 2020-21 high water.

We evaluated the action area for potential Habitat Areas of Particular Concern (HAPCs) for salmon. HAPCs are areas identified with increased scrutiny, study, or mitigation planning compared to surrounding areas because they represent high priority areas for conservation, management, or research and are necessary for healthy ecosystems and sustainable fisheries. The following HAPCs are present within the action area:

Complex Channels and Floodplains: Both complex channels and floodplains provide valuable habitat for all Pacific salmon species. Complex channels consist of meandering, island-braided, pool-riffle and forced pool-riffle channels. Complex floodplain habitats consist of wetlands, oxbows, side channels, sloughs and beaver ponds, and steeper, more constrained channels with high levels of large woody debris (LWD). Densities of spawning and rearing salmon are highest in areas of high-quality, naturally-functioning floodplain habitat and in areas with LWD, compared to anthropogenically modified floodplains.

Complex floodplain habitats are dynamic systems that change over time. As such, the habitat-forming processes that create and maintain these habitats (e.g., erosion and aggradation, input of large wood from riparian forests) should be considered integral to the habitat.

Thermal Refugia: Thermal refugia typically include cool water tributaries, lateral seeps, side channels, tributary junctions, deep pools, areas of groundwater upwelling, and other mainstem river habitats that are cooler than surrounding waters. Spatial scales can range from entire tributaries (e.g., spring-fed streams), to stream reaches, to highly localized pockets of water only a few square meters in size embedded within larger rivers.

Thermal refugia provide areas to escape high water temperatures and are critical to salmon survival, especially during hot, dry summers in California, Idaho, and eastern Oregon and Washington. Thermal refugia also provide important holding and rearing habitat for adults and juveniles.

Thermal refugia are susceptible to blockage by artificial barriers. Reduced flows can also reduce or eliminate access to refugia. Loss of structural elements such as large wood can also influence the formation of thermal refugia.

Spawning Habitat: Salmon spawning habitat is typically defined as low gradient stream reaches (<3%), containing clean gravel with low levels of fine sediment and high inter gravel flow. Many spawning areas have been well defined by historical and current spawner surveys, and detailed maps exist for some watersheds. Spawning habitat is especially sensitive to stress and degradation by a number of land- and water-use activities that affect the quality, quantity, and stability of spawning habitat (e.g., sediment deposition from land disturbance, streambank armoring, water withdrawals).

Adverse Effects on Essential Fish Habitat

The proposed action would result in both detrimental and neutral effects on EFH for Pacific Salmon. The effects on Chinook (an EFH species) and steelhead (not EFH) and their critical habitat were analyzed in the ESA Opinion above. Coho salmon are known to spawn in June Creek. Pink salmon (odd year) have not been documented up to RM 8 of the Carbon (project location is at RM 23 but action area extends downstream) (Puyallup Tribe 2023).

Habitat impacts will result from temporary construction and dewatering in the Carbon River. Long term effects (not associated with construction) include the enduring structures (road, PGIS, armoring) which would be in place in the river and would affect EFH for a period associated with the life of the proposed structures in the Carbon River. The extent of structural effects are limited to the area of the rebuilt road, but stormwater effects span downstream so far as stormwater runoff from the site is within the Carbon and Puyallup system.

Effects to Salmon HAPCs

Complex Channels and Floodplains: Carbon River has a highly complex and braided channel at the project site with lots of alluvial input from the Carbon Glacier but low levels of large woody debris, since logging in the past has removed large wood inputs. Temporary construction, including dewatering a potentially large area, would eliminate channel habitat accessible to salmonids for as long as the dewatering dam remains (estimated 6 months). Long term, the reconstructed road lowers the channel complexity of the Carbon by filling an area that the river expanded into. The project permanently removes large wood from the active channel by incorporating it into the armoring design, but the wood would retain some of its function in areas where it is in contact with the channel (root wads only). The armoring and road will channelize flow on the south side of the River and create additional scour, as well as disconnect the riparian from the road. Plantings on the new armoring may provide some riparian function in the future, when species are established and can provide shade and forage inputs (insects). Repair to the June Creek wingwall will ensure continued fish access to June Creek through an under-road box culvert.

Thermal Refugia: The Carbon River is a glacially fed stream with cold temperatures, particularly at this project site, in the upper reaches (nearer the glacier). While temporary construction would likely not change this, the enduring fill and PGIS would contribute to warming of water within this system. A decrease in shading over the water and increased contribution of runoff from the road and cleared landscape will contribute to warmer water in both Carbon River and June Creek. While this will likely not exceed threshold temperatures for harm to salmonids, it could contribute slightly to increased temperature downstream, in areas already naturally warmer and on the cusp of healthy salmonid thermal regimes.

Spawning Habitat: The Carbarn river, particularly farther downstream has historically and currently provides high-quality spawning habitat for salmonids and June creek has known Coho spawning. While recent documented accounts of EFH species in the Carbon mainstem have occurred up to the 7810 bridge, it can be assumed that species, including Chinook, could use this site. Glacial melt water obscures the visibility so surveying for these species is difficult. The

Puyallup Tribe (2023) documents the Carbon as having "The Carbon River drainage provides excellent spawning and rearing opportunities for salmon, steelhead and bull trout. However, the majority of spawning for all species within this drainage, with the exception of bull trout, occurs within the lower 11 miles of the mainstem Carbon River and lower 12.6 miles of South Prairie Creek." Disturbance and dewatering during construction will adversely affect EFH spawning habitat by eliminating a portion of the Carbon River usable for spawning and possibly destroying redds. Disturbance may prevent Coho from traveling upstream into June creek to spawn. Following construction, the action area would continue to be affected by contribution of treated stormwater, the removal of about 60 trees (large woody debris) from the Carbon River channel, a disconnection of the Carbon from its riparian, and a continued elimination and confinement of a 12,000 sq. ft. segment of the Carbon River. Planting vegetation along the road will help provide some shade and forage for salmonids when the vegetation matures and incorporation of woody debris into armoring will improve the functionality of armoring by creating create more dynamic habitat, possible refuge, and potentially sort sediments so they are more suitable for spawning material. Sediment type and quality would likely not change or be improved long term from this project.

Pollutants of Concern (POCs) in stormwater from the PGIS would have a long-term negative affect on EFH for the life of the bridge and associated structures. Because of stormwater LID treatment on site, these POCs would be greatly reduced, but still present at low levels in the action area. These POCs would drain, into the lowermost segment of June Creek and the Carbon River and travel downstream in the system. By constructing PGIS that contributes to reduced water quality and expanding stormwater runoff, the habitat would be depreciated by a small amount, proportion to 6,00 square feet of treated stormwater, seasonality, and the size of rain events. Large rain events may exceed the capacity of the LID treatment and discharge untreated stormwater containing higher concentrations of POCs. Coho juveniles and adults are particularly sensitive to 6ppd and die rapidly if exposed to runoff from PGIS (French et al. 2022, Sholz et al 2011). See the *Stormwater* section above for more information.

The chronic, episodic, and enduring diminishments of EFH created by this project incrementally degrade the function of EFH in the action area. Overall, they represent a small portion of impacts within the Carbon River basin, in total. Minimization measures including plantings, LID stormwater treatment, and incorporation of woody debris into the armoring reduce but do not eliminate the overall effects of the action on EFH. Long term armoring and fill, and stormwater constrain EFH within the action area.

EFH Conservation Recommendations

NMFS recommends the following conservation measures to reduce effects to essential fish habitat:

1. Mitigate enduring impacts of the road reconstruction by funding or preforming restoration actions resulting in 12,000 square feet of restored freshwater habitat or 0.1 DSAYS (12,000 sq. ft. * 50 years) of EFH freshwater habitat improvements within the Puyallup River basin.

2. Develop a preemptive alternate plan, other than reconstruction, if this segment fails again within the next 20 years.
3. Use non-plastic biodegradable materials for construction BMPs, such as coir logs and fiber rolls.
4. Do not place any permanent standard geotextile in the bank stabilization, because future bank failure would introduce these materials into the Carbon River as pollution. Geotextile may be used to protect the proposed utility conduit (for safety and maintenance purposes).
5. Report to Nissa.Rudh@noaa.gov and the WDFW area habitat biologist if any Chinook salmon are identified during construction, since this would constitute a new documented slightly upstream of the current documented extent.
6. Ensure survival of on-site riparian plantings. Replant areas that fail and maintain at least an 80% plant survival at 5 years from construction.

EFH Response Requirement

As required by section 305(b)(4)(B) of the MSA, the NPS, and/or 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)].

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

EFH Reinitiation

The NPS and/or 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)].

DATA QUALITY ACT

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 the NOAA Institutional Repository. A complete record of this consultation is on file at the Oregon Washington Coastal Office, Central Puget Sound Branch, Lacey, Washington.

Please contact Nissa Rudh at 360-701-9699 or Nissa.Rudh@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

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