UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
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PORTLAND, OR 97232-1274

Refer to NMFS No:
WCRO-2023-00764-Corrected

December 17, 2024

Science Kilner
Regional Environmental Officer
U.S. Department of Homeland Security
FEMA Region 1010,
130-228th Street, SW
Bothell, Washington 98021-8627

Re: CORRECTED - Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the North Shore Levee West Project, City of Hoquiam, Greys Harbor County, Washington (HUC 171001050400)

Dear Ms. Kilner:

This letter responds to your May 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 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.

This corrected biological opinion (WCRO-2023-00764-Corrected) issued on January 8, 2025, replaces a previous version (WCRO-2023-00764), issued on December 17, 2024. The WCRO-2023-00764 version is no longer in effect. Changes made in this WCRO-2023-00764-Corrected version are corrections that do not implicate the reinitiation triggers, and include non-substantive errors describing the proposed action.

We reviewed the Federal Emergency Management Agency's (FEMA) 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 FEMA (2023) sections here:

- Proposed Action section 1. Elements of the Proposed Action, and section 2 Consequences of the Proposed Action for the proposed action
- Action Area section 1.1 Delineation of Aquatic Portion of the Action Area and 1.2 Additional Elements within the Extent of the Aquatic Portion of the Action Area for the action area
- Environmental Setting section 3. Aquatic Habitat, section 4. Floodplain Habitat and section 5 Presence of Listed Species and Designated Critical Habitat in the Action Area for the environmental baseline

- Effects of the Proposed Action section 2. Aquatic Habitat Effects and section 3 Effects of Designated Critical Habitat for the effects of the action on species and critical habitat

We received the initial consultation request on May 26, 2023. We received a revised BA on 12/18/2024. Consultation was initiated on 12/18/2023.

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

FEMA (2023) proposes to fund Hoquiam's construction of 5.7 miles of levee to protect the city from floods and sea level rise and reduce the cost of flood insurance. The proposed levee elevation is 16 feet high (NAVD88). The proposed levee consists of 2.4 miles of floodwalls constructed of sheet pile I-walls or concrete, pile founded T-walls (BA section 1.1.1), 2.5 miles of earthen berm (BA section 1.1.1) and 0.8 miles of raised road (BA section 1.1.1) and 15 transitions between levee types (BA section 1.1.1). The sequence of levee types is shown in BA Figure 5 (sheets 1-12). The construction schedule is April 2025 to December 2026. Other elements of the proposed action include:

1. Closure structures (stoplogs, swing gates, rolling gates, trolley gates and automatic passive gates) at levee crossings (railroad, street, driveway, and sidewalks) that remain open except during a flood (FEMA 2023).
2. New 10th street stormwater pump station and 42-inch outfall to the Hoquiam River (BA section 1.2).
3. Treatment of stormwater runoff from 47,244 square feet of new and 270,370 sf of replaced pollution generating impervious surface (PGIS) (BA section 1.3).
4. Construction of new culverts for six ditches and channels through the levee (BA section 1.4).
5. Installation of 400 piles to provide bank stabilization in front of the levee along 2000 feet of the Hoquiam River (BA section 1.5 and BA section 1.8,).
6. Placement of 24,172 square feet of riprap for wave action scour protection in front of 900 feet of Grays Harbor I-walls (BA section 1.6).
7. Restoration of 7.17 acres of floodplain wetland habitat as mitigation for the permanent fill of 2.87 acres of wetland, and 1.66 acres floodplain (BA section 1.8).
8. Impact avoidance and minimization measures (BA section 1.9).

FEMA (2023) section 2 states that as consequence of the proposed action, six pump stations will be upgraded and there may be increased development behind the levee as a result of reduced flood insurance costs.

BIOLOGICAL OPINION

We examined the status of each species that would be adversely affected by the proposed action to inform the description of the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. We also examined the condition of critical habitat throughout the designated area and discuss the function of the physical or biological features essential to the conservation of the species that create the conservation value of that habitat. Finally, we examined the likely effects on any listed species and critical habitats for which your agency 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*.

FEMA (2023) section 5.7 describe the status of green sturgeon and their critical habitat and their occurrence in the action area. We supplement this with the information on the effects of climate change to all listed species and critical habitat below and the additional information on green sturgeon and their critical habitat from our most recent status updates.

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. Long-term trends in warming have continued at global, national and regional scales. Global surface temperatures in the last decade (2010s) were estimated to be 1.09 °C higher than the 1850-1900 baseline period, with larger increases over land ~1.6 °C compared to oceans ~0.88 (IPCC Working Group I 2021). The vast majority of this warming has been attributed to anthropogenic releases of greenhouse gases (IPCC Working Group I 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, Alexander 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, Christidis et al. 2018). Global warming and anthropogenic loss of biodiversity represent profound threats to ecosystem functionality (IPCC Working Group II 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 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).

Marine and Estuarine Environments

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

Rising ocean temperatures, stratification, ocean acidity, hypoxia, algal toxins, and other oceanographic processes will alter the composition and abundance of a vast array of oceanic species. In particular, there will be dramatic changes in both predators and prey of Pacific salmon, salmon life history traits and relative abundance. Siegel and Crozier (2019) observe that changes in marine temperature are likely to have a number of physiological consequences on fishes themselves. For example, in a study of small planktivorous fish, Gliwicz, Babkiewicz et al. (2018) found that higher ambient temperatures increased the distance at which fish reacted to prey. Numerous fish species (including many tuna and sharks) demonstrate regional endothermy, which in many cases augments eyesight by warming the retinas. However, Gliwicz, Babkiewicz et al. (2018) suggest that ambient temperatures can have a similar effect on fish that do not demonstrate this trait. Climate change is likely to reduce the availability of biologically essential omega-3 fatty acids produced by phytoplankton in marine ecosystems. Loss of these lipids may induce cascading trophic effects, with distinct impacts on different species depending on compensatory mechanisms (Gourtay, Chabot et al. 2018). Reproduction rates of many marine fish species are also likely to be altered with temperature (Veilleux, Donelson et al. 2018). The ecological consequences of these effects and their interactions add complexity to predictions of climate change impacts in marine ecosystems. Perhaps the most dramatic change in physical ocean conditions will occur through ocean acidification and deoxygenation.

The Southern DPS of green sturgeon were listed as threatened on 4/7/06. The green sturgeon recovery plan was published in 2018 and the most recent status review was published in 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 Southern DPS green sturgeon prefer marine waters of less than a depth of 110 meters. The limiting factors to recovery are:

- 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
- Reduction of its spawning area to a single known population
- Lack of water quantity
- Poor water quality
- Poaching

Southern DPS of green sturgeon critical habitat was designated 10/9/09 (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 (Hoquiam River up to 47°3′3″ N./123°55′34″ W). 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.

"Action area" means all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). The aquatic action area is described in the "Action Area" chapter of the BA on pages 66-68 and shown in detail in BA Figure 20 (FEMA 2023). The upstream boundary of the action area is established by noise effects from pile driving and the downstream boundary about one mile off of the mouth of Grays Harbor is established by effects from stormwater from the project 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 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).

FEMA (2023) contains the following adopted descriptions:

- Section 3 titled "Aquatic Habitat", in Chapter "Environmental Setting" provides physical and biological environmental baseline information about Grays Harbor and the Hoquiam River.
- Section 4 titled "Floodplain Habitat" provides environmental baseline on their respective floodplains.
- Section 5.7.1 describes how and when green sturgeon occur in Grays Harbor, and
- Section 5.7.2 describes the condition of the green sturgeon critical habitat physical and biological features present in Grays Harbor.

We supplement the FEMA (2023) environmental baseline information below.

Grays Harbor is an estuarine bay, fed by the Chehalis River and five smaller rivers, located on the southwest Pacific coast of Washington state about 45 miles (72 km) north of the mouth of the Columbia River. It is approximately 15 miles long and 13 miles wide. The city of Aberdeen at the mouth of the Chehalis River has a population of 16,654. The city of Hoquiam along the northwest Grays Harbor Bayshore has a population of 8,600. Both cities have slight negative population growth, although the Washington Department of Commerce projects a stable to slightly increasing human population growth (WDOC 2024).

The Port of Grays Harbor is the largest coastal shipping port north of California and has become one of the largest centers for the shipment of autos and grains to China and Korea. The Port of Grays Harbor includes four terminals that service an average of about 84 Ocean Going Vessels per year. The USACE regularly dredges the navigation channel and turning basin in the action area to maintain a bottom depth of -36 feet MLLW at the site and is currently deepening the channel to the fully authorized depth of -38 feet MLLW. Before 1989, sludge and effluent discharged by pulp mills contaminated sediments in Grays Harbor with dioxin. The Washington Department of Ecology developed a dioxin total maximum daily load (TMDL) for Grays Harbor and the EPA approved the TMDL in June 1992. Concentrations of dioxin in Grays Harbor sediments are slowly attenuating.

The proposed action replaces about 126,293 sf of Airport Road, 53,226 sf of Paulson Road and SR 109 pavement, 38,781 sf of Moon Island Road embankment (partial), and 52,070 sf of levee floodwall along the existing highway (270,370 total) as the height of the levee embankment beneath these roads is increased (as shown in FEMA, 2023, Table 3). Because this asphalt is redeveloped pollution generating impervious surface (PGIS) rather than new PGIS, it does not trigger new stormwater treatment BMPs (Ecology, 2024) (FEMA 2023, Figure 13) and the effects of stormwater runoff are not changed from the environmental baseline effects, which we summarize here.

The stormwater runoff from the 270,370 square feet of redeveloped asphalt must meet the minimum BMP requirements 1-5. BMP 5 requires that stormwater runoff from be analyzed with the List approach.

> "For each surface, evaluate the feasibility of the BMPs in the order listed for that type of surface, and use the first BMP that is considered feasible. The designer must document the site conditions and infeasibility criteria used to deem BMPs infeasible. Once a BMP is deemed feasible and used for a surface, no other BMP from the list is necessary for that surface."

The first BMP for hard surfaces is "BMP T5.30: Full Dispersion". This BMP allows for "fully dispersing" runoff from impervious surfaces into areas preserved as forest, native vegetation, or cleared area. Runoff is presumed to not leave the dispersion area because it will "disappear" through a combination of infiltration and evapotranspiration.

For the Single Event Hydrograph Method we use 75 percent of the 2 year 24 hour storm inches in the formula $Q_d = \frac{(P-0.2\,S)^2}{P+0.85}$ for $P > 0.25$ inches where

- Q_d is the runoff depth (inches)
- P is the precipitation depth in inches $= 0.75x3.43 = 2.46$ for Aberdeen,
- S is the potential max natural detention $= \frac{1000}{CN} - 10$ where $CN = 98$ for pavement $= \frac{1000}{98} - 10 = 0.2$

$Q_d = \frac{\left(2.46-(0.2x0.2)\right)^2}{2.46+0.8(0.2)} = 2.23$ inches

Over 24 hours, 2.23 inches of stormwater are going to sheet flow laterally landward to the vegetated levee surface sloped at 3:1=20 degrees. The length of the levee surface is $\sqrt{(16ft^2 + 48ft^2)} = 50\ ft$. Assuming zero infiltration the average depth across the levee would be 0.044 inches.

For full dispersion the required width of the dispersion area is 10 feet per 20 feet of impervious surface so if the pavement is less than 30 feet wide, the dispersion area would be less than 15 feet wide or less than 1/3 of the width of the actual vegetated levee bank.

To estimate the difference between the baseline treatment and the treatment that would be required for 200,000 square feet of new pavement we reviewed the 2024 Stormwater Management Manual III-1.2 Choosing Your Runoff Treatment BMPs for Western Washington.

Assuming that all that is required for this pavement is a Basic Treatment BMP to remove 80 percent of total suspended solids (TSS), either BMP T5-30 Full Dispersion or BMP T9-40 Vegetated Filter Strip would apply. As shown above, the width of the levee slope exceeds the width required for full dispersion and the width of the vegetated filter strip for a 20-degree slope is 10 feet, also significantly less than the 50-foot width of the levee so the proposed minimum BMP for this redeveloped pavement likely meets and perhaps exceeds the treatment requirement for 270,370 square feet of new pavement.

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 biological assessment provides a detailed discussion and comprehensive assessment of the effects of the proposed action in Section 3.1 of the initiation package, 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.

FEMA (2023) identifies two proposed action stressors that could have direct effects on green sturgeon: stormwater and pile driving noise.

Stormwater

Pages 13 and 14 of FEMA (2023), describes how the proposed action will raise the elevation of 2821 feet of levee along Grays Harbor up to 2 feet and reconstruct the paved road on top of this section of the levee. Table 3 in Section 1.3.1 shows that this reconstruction will replace 270,370 square feet of existing pollution generating impervious surface (PGIS) and add 47,244 square feet of new PGIS. Section 1.3.2 explain that stormwater from the new PGIS will be treated with 440 ft by 12 ft vegetated filter strips on each side of the road before discharge to Grays Harbor. Section 2.3 "Stormwater Effects" acknowledges that treatment reduces but does not remove all stormwater pollutants. Brinkmann, Montgomery et al. (2022) noted that white sturgeon were unaffected by exposure to 6PPD-quinone (6PPD-Q) concentrations up to 14.2 $\frac{\mu g}{L}$ for 96 hours. However, sublethal effects were not studied and some species studied showed no visible effects for up to 7 hours before the species' succumbed to the exposure. The BA proposes that green sturgeon may be similarly tolerant to the effects of 6PPD-Q; however, similar species can have substantially different tolerances to 6PPD-Q. For example, chum salmon show almost no effects from the chemical at high concentrations, whereas nearly 100% of coho salmon die within minutes to a concentration as small as 0.1ug/l 6PPD-Q. While the stormwater effects to green sturgeon are largely unknown, no mortality has been observed at the proposed concentrations, and a similar species (white sturgeon) are not known to be visibly affected.

Pile driving noise

FEMA (2023) Section 1.5 "Bank Stabilization and Erosion Protection" describes how the contractor will use vibratory and impact pile driving to install 200 18-inch diameter timber piles or 14-inch steel H-piles. In Section 2.1.1 "Hoquiam River-In Water Noise" Table 14 shows the sound pressure levels used to calculate the radial distance from the pile to a point where sound pressure levels decrease below NMFS thresholds for injury to fish (Table 15). The BA explains that green sturgeon presence in Grays Harbor overlaps the in-water work window and although there is no record of them entering the Hoquiam River they could be exposed to pile driving noise effects but notes that since adult or sub-adult green sturgeon are large fish, they are most likely to avoid or leave the area without injury.

FEMA (2023) Section 3.2 "Effects on Green Sturgeon Designated Critical Habitat" analyzes the effects of the proposed action on six physical and biological features of green sturgeon critical habitat in Grays Harbor. Critical habitat extends into the Hoquiam River from Grays Harbor. Green sturgeon food resources may be slightly reduced by the removal of woody vegetation from the levee maintenance clear zone, the installation of riprap along sections of the levee and stormwater runoff from new or replaced PGIS. The marine face of the project will similarly degraded floodplain habitat and increased PGIS, which will negatively affect prey availability and will decrease the availability of critical habitat in the action area. Water quality may also be slightly degraded by stormwater runoff from new or replaced PGIS. The current floodplain area surrounding the project is largely industrial and features limited habitat quality. However, what remains of intact floodplain will be increasingly impaired by construction and the long-term life of the project. The effects to critical habitat are expected to occur throughout the life of the levee structure.

"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 6 "Cumulative Effects" on BA page 170 is incorporated by reference here. Gray's Harbor and the City of Hoquiam have been heavily developed for more than a century. The proposed action will increase the effects to green sturgeon and their critical habitat by increasing the likelihood that increased development may increase due to cheaper flood insurance rates and flood protection. The increased development will decrease green sturgeon foraging habitat in the Hoquiam River and marine habitats in Grays Harbor.

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.

In review, sDPS green sturgeon is a threatened species that spawn in the Sacramento River and forage in coastal estuaries including Grays Harbor during the late summer and fall. Hoquiam levee construction during the in-water work window, may expose green sturgeon to sound pressure from pile driving. Following completion of the project, green sturgeon may be exposed to slightly higher concentrations of stormwater pollutants from new and reconstructed PGIS from the proposed actions. As the area develops, we can anticipate construction of new development that will likely add to stormwater discharges to Grays Harbor, and will further degrade water quality unless measures are implemented to reduce the pollutants and hydrological aspects of the runoff. In both cases, we expect the adverse effect of these stressors to individual green sturgeon to be very small. Likewise, green sturgeon critical habitat food resources and water quality in Grays Harbor may be slightly degraded by permanent elements of the proposed action. As noted in our review of climate change effects, as sea level rise submerges tidal wetlands and

development and steep topography prevent most wetlands from migrating horizontally, their contribution of nutrients to the green sturgeon benthic food web will decrease.

The proposed action will discharge post-construction stormwater that, despite being treated, will still contain a wide variety of pollutants and contaminants, including sediment, nutrients, metals, petroleum-related compounds, pesticides, tire tread particles, and other chemical compounds. Some of these contaminants are persistent and can travel long distances in aquatic systems. Some are also likely to accumulate in species as they pass from one species to the next through the food web. Pollutants and contaminants introduced to aquatic systems via post-construction stormwater associated with the proposed action may harm fish that come into contact with them far downstream when they enter fish tissues at levels high enough to modify behavior, disrupt endocrine functions, or cause immunotoxic effects, either by themselves or through additive, interactive, and synergistic interactions with other contaminants in the estuary.

These harmful effects may impact southern DPS green sturgeon, a long-lived, benthic-dwelling species that spends an appreciable amount of their life cycle in bays, estuaries, and lower elevation mainstem of rivers where they are vulnerable to the effects of stormwater pollutants and contaminants, particularly in suspended sediments and bioaccumulation of contaminants in their prey. Although, exposure to pollutants has not been identified as limiting factor for this species, some effects are likely to negatively impact green sturgeon.

Pollutants and contaminants discharged from stormwater runoff from the project area are also likely to have an adverse impact on the PBFs of green sturgeon and their need for food resources, sediment quality, and water quality at estuarine sites and coastal marine areas, including Grays Harbor.

The volume of stormwater that would be discharged as a result of the proposed action is very small in comparison to the volume of streamflow downstream, and the impact of pollutants and contaminants in that discharge are also very small when compared to the adverse effects caused by the contaminants in all historical or existing stormwater discharges. Nonetheless, this discharge will incrementally contribute to pollutant levels at the embayment scale owing to the sustained, long-term, and chronic nature of stormwater discharges and the compounding effects of environmental processes that affect the fate and transport of those pollutants.

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 green sturgeon or destroy or adversely modify its designated critical habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant

habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "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:

1. Harm from vibratory and impact pile driving (noise).
2. Harm by pollutants in stormwater runoff

We cannot predict with meaningful accuracy the number of ESA-listed species that are reasonably certain to be injured or killed annually by exposure to any of these stressors. The distribution and abundance of the fishes that occur within the action area can be affected by habitat quality, competition, and predation. They can also be affected by the interaction of processes that influence genetic, population, and environmental characteristics. These biotic and environmental processes interact in ways that may be random or directional and may operate across broader temporal and spatial scales than are affected by the proposed action. Additionally, NMFS is not aware of any device or practicable technique that would yield reliable counts of individuals that may experience these impacts. In such circumstances, we use the casual link established between the activity and the likely extent and duration of changes in habitat conditions to describe the extent of take as a numerical level of habitat disturbance. The most appropriate surrogates for take are parameters related to the proposed action that are directly related to the magnitude of the expected take.

Harm from vibratory and impact pile driving (noise): ESA-listed species present in the action area may be harmed during pile installation. Specifically, the action would cause benthic disturbances that are likely to diminish benthic prey resources. Benthic prey abundance maybe affected by the action, reducing the available prey in the affected area. Additionally, individuals may be harmed by the sound pressure generated during vibratory pile installation and impact proofing. In this case, the surrogate is the number of strikes from the impact driver. The number of impact strikes are correlated to the turbidity generated, area of benthic disturbance, and underwater sound pressure resulting from pile driving. If the number of piles installed or strikes per pile exceeds 500 impact pile driver strikes per day for 18-inch timber or 14-inch by 89-inch steel H bank stabilization piles, and 800 impact pile driver strikes per day for 24-inch wide steel sheet cofferdam piles, the take limit is exceeded and the opinion must be re-initiated. This surrogate serves as an effective re-initiation trigger since the number of piles can be tracked on a continuous basis.

Harm by pollutants in stormwater runoff: The amount of PGIS is the best available surrogate for the extent of take from exposure to stormwater runoff. The amount of PGIS is appropriate because as PGIS increases, the potential for and intensity of pollutant effects to green sturgeon increases. If the area of PGIS exceeds 47,244 square feet of new PGIS or 270,370 square feet of redeveloped PGIS the take limit is exceeded and the opinion must be re-initiated. This surrogate serves as an effective re-initiation trigger since the area of the PGIS can be observed on a continuous basis.

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).

FEMA shall:

1. Minimize noise effects on foraging habitat.
2. Minimize PGIS effects to floodplain, in-stream, and marine habitats.
3. Implement a monitoring plan to confirm that incidental take from the proposed action is not exceeded.

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. FEMA 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 contactors apply soft-start procedures to allow for fishes to vacate the action area and avoid pile driving effects.
    b. Ensure that piles do not exceed the number or size described in *Amount of Take* Section of this Opinion.
    c. Ensure pile installation and proofing occurs during July 15–December 31 work window.

2. The following terms and conditions implement reasonable and prudent measure 2:
    a. Confirm the amount of new PGIS does not exceed 47,244 square feet.

b. Confirm the amount of redeveloped PGIS does not exceed 270,370 square feet.

3. The following terms and conditions implement reasonable and prudent measure 3:
    a. FEMA or the permit applicant shall report all monitoring items, to include at minimum the following:
        i. Report the days of in-water work;
        ii. Report the dimensions, type, and number of piles installed.
        iii. Report the number of non-soft strikes of vibratory pile driving, impact proofing, and the number of impact hammer strikes.
        iv. Report the final total area of new and redeveloped PGIS.
        v. Report any observed injured or dead fish during pile driving.
    b. Submit monitoring documents to projectreports.wcr@noaa.gov within 3 months of project completion and include the NMFS tracking number (WCRO-2023-00764) in the subject line when the reports are submitted.

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).

The following conservation recommendations are discretionary measures that NMFS believes are consistent with this obligation and therefore should be carried out:

1. Prioritize construction to complete in-water work as soon as possible.
2. The applicant should be encouraged to install epoxy-coated steel piles if the piles to be installed are galvanized steel piles. This is to reduce the possibility of zinc leeching at the site.
3. The applicant should be encouraged to develop a plan to reduce the environmental impacts at the levees.
4. The applicant should be encouraged to increase bioinfiltration of stormwater where proposed filtration is inadequate.
5. Analyze the potential for stormwater runoff from 270,370 square feet of replaced PGIS on Airport Way to reach Grays Harbor and investigate ways to reasonably reduce this potential.

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."

NLAA DETERMINATIONS

We reviewed FEMA 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: Eulachon, Lower Columbia River Chinook salmon, Columbia River chum salmon and Southern Resident Killer Whales (FEMA 2023).

ESSENTIAL FISH HABITAT RESPONSE

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

In addition, the project occurs within, or in the vicinity of an estuary, which is designated as a habitat area of particular concern (HAPC) for various federally managed fish species within the Pacific Coast Salmon and Pacific Coast Groundfish FMPs. HAPC are described in the regulations as subsets of EFH which are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. Designated HAPC are not afforded any additional regulatory protection under the MSA; however, federal projects with potential adverse impacts on HAPC will be more carefully scrutinized during the consultation process.

Adverse Effects on EFH

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

1. Dewatering of the Hoquiam Tidal Channel upstream of an impassable culvert, which adversely affects Pacific Coast Salmon EFH and designated HAPCs;
2. Loss of 1.66 acres of Hoquiam River floodplain due to the levee structure, which adversely affects Pacific Coast Salmon EFH;
3. Pollution (stormwater) runoff from 47,244 square feet of new PGIS and 270,370 square feet of replaced PGIS, which adversely affects Pacific Coast Salmon EFH, Coastal Pelagic EFH, and Groundfish EFH and designated HAPCs;
4. Decreased nearshore estuary habitat along the marine shoreline, which adversely affects Pacific Coast Salmon EFH, Coastal Pelagic EFH, and Groundfish EFH, and designated HAPCs;
5. Repairs of floodgates, which adversely affects Pacific Coast Salmon EFH, Coastal Pelagic EFH, and Groundfish EFH, and designated HAPCs.

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.

- Develop plans to replace the impassable culvert to improve abundance and productivity to native salmonids;
- Acquire and/or restore stream habitats upstream of the new levee system to ensure flood protection measures do not decrease native salmon habitat;
- Acquire land or otherwise increase biofiltration of stormwater runoff where proposed filtration is inadequate to trap contaminants from entering aquatic systems. This conservation recommendation may decrease the lethality of PGIS on salmonids, especially coho salmon;

- Acquire land or otherwise restore marine nearshore habitat, which will increase survival and productivity of juvenile EFH salmonids, coastal pelagic, and groundfish species; Among other measures, options may include:
    - Remove creosote piles from the project site and throughout Grays Harbor
    - Create shallow nearshore habitat where hard armoring (e.g., sheet piles) exist or are proposed.
    - Plant eelgrass where nearshore habitat is suitable, which will improve productivity and survival of juvenile EFH salmonids, coastal pelagic, and groundfish species.
    - Decrease the number of stormwater outfalls by creating stormwater retention and bioinfiltration areas, which increase the survival of EFH salmonids, particularly coho salmon.

Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, FEMA 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

FEMA 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.

Please direct questions regarding this letter to Tom Hausmann, at tom.hausmann@noaa.gov in Portland, Oregon.

Sincerely,

Kathleen Wells
Assistant Regional Administrator
Oregon Washington Coastal Office

cc: Galeeb Kachra, Senior Environmental Protection Specialist, FEMA Region 10
Jeffrey Parr, Environmental Specialist, FEMA Region 10

References:

Brinkmann, M., D. Montgomery, S. Selinger, J. G. P. Miller, E. Stock, A. J. Alcaraz, J. K. Challis, L. Weber, D. Janz, M. Hecker and S. Wiseman (2022). "Acute Toxicity of the Tire Rubber-Derived Chemical 6PPD-quinone to Four Fishes of Commercial, Cultural, and Ecological Importance." Environmental Science & Technology Letters **9**(4): 333-338.

Gliwicz, Z. M., E. Babkiewicz, R. Kumar, S. Kunjiappan and K. Leniowski (2018). "Warming increases the number of apparent prey in reaction field volume of zooplanktivorous fish." Limnology and Oceanography **63**: S30-S43.

FEMA (Federal Emergency Management Agency). 2023. Biological Assessment and Essential Fish Habitat Assessment North Shore Levee West Project.

Gourtay, C., D. Chabot, C. Audet, H. Le Delliou, P. Quazuguel, G. Claireaux and J. L. Zambonino-Infante (2018). "Will global warming affect the functional need for essential fatty acids in juvenile sea bass (Dicentrarchus labrax)? A first overview of the consequences of lower availability of nutritional fatty acids on growth performance." Marine Biology **165**(9).

Herring, S. C., N. Christidis, A. Hoell, J. P. Kossssin, C. J. Schreck and P. A. Stott (2018). "Introduction to Explaining Extreme Events of 2016 from a Climate Perspective." Bulletin of the American Meteorological Society **99**(1): S1-S6.

IPCC Working Group I (2021). Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of teh Intergovernmental Panel on Climate Change. P. Z. V. Masson-Delmotte, A. Pirani, S. L. Connors, C. Pean, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekci, R. Yu and B. Zhou. Cambridge University Press.

IPCC Working Group II (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability: Contribution of Working Group II to teh Sixthe Assessment Report of the Intergovernmental Panel of Climate Change. D. C. R. H.O. Portner, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Algria, M. Craig, S. Langsdorf, S. Loschke, V. Moller, A. Okem, and B. Rama, Cambridge University Press.

Jacox, M. G., M. A. Alexander, N. J. Mantua, J. D. Scott, G. Hervieux, R. S. Webb and F. E. Werner (2018). "Forcing of multi-year extreme ocean temperatures that impacted Californiz Current living marine resources in 2016." Bull. Amer. Meteor. Soc **99**(1).

NOAA NCEI (2022). NOAA National Centers for Environmental Information (NCEI), State of the Climate: Global Climate Report for Annual 2021. published online January 2022, retrieved on February 28, 2022 from https://www.ncdc.noaa.gov/sotc/global/202113.

Siegel, J. and L. Crozier (2019). Impacts of Climate Change on Salmon of the Pacific Northwest. A review of the scientific literature published in 2018. , Fish Ecology Division, NWFSC.

Siegel, J. and L. Crozier (2020). Impacts of Climate Change on Salmon of the Pacific Northwest: A review of the scientific literature published in 2019., National Marine Fisheries Service, Northwest Fisheries Science Center, Fish Ecology Division. .

Thorne, K., G. MacDonald, G. Guntenspergen, R. Ambrose, K. Buffington, B. Dugger, C. Freeman, C. Janousek, L. Brown, J. Rosencranz, J. Holmquist, J. Smol, K. Hargan and J. Takekawa (2018). "U.S. Pacific coastal wetland resilience and vulnerability to sea-level rise." Science Advances **4**(2).

Veilleux, H. D., J. M. Donelson and P. L. Munday (2018). "Reproductive gene expression in a coral reef fish exposed to increasing temperature across generations." Conservation Physiology **6**.

WDEQ (2019). Stormwater Management Manual for Western Washington, Washington State Department of Ecology Water Quality Program.

WDOC (Washington Department of Commerce). 2024. Accessed 10/10/2024. http://efaidnbmnnnibpcajpcglclefindmkaj/https://ofm.wa.gov/sites/default/files/public/dataresearch/pop/GMA/projections2022/gma_2022_high_low_charts.pdf