



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

October 19, 2022

Refer to NMFS No: WCRO-2022-01599

James Mazza
Chief, Regulatory Division
U.S. Department of the Army
San Francisco District, Corps of Engineers
450 Golden Gate Avenue, 4th Floor
San Francisco, California 94102-3404

Re: Endangered Species Act Section 7(a)(2) Concurrence Letter and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Oyster Point Marina Project in South San Francisco, California (Corps No. SPN-2012-00151S)

Dear Mr. Mazza:

On June 30, 2022, NOAA's National Marine Fisheries Service (NMFS) received your request for a written concurrence that the U.S. Army Corps of Engineers' (Corps) proposed authorization of the replacement of existing dock structures, piles, and accessway platforms at the Oyster Point Marina (Project) by the San Mateo County Harbor District under Section 404 of the Clean Water Act of 1973 (33 U.S.C. Section 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. Section 403) is not likely to adversely affect (NLAA) species listed as threatened or endangered or critical habitats designated under the Endangered Species Act (ESA).

This response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA and implementing regulations at 50 CFR 402. 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. As a result, the 2019 regulations are once again in effect, and we are applying the 2019 regulations here. For purposes of this consultation, we considered whether the substantive analysis and conclusions articulated in the concurrence letter would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different.

Thank you also for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1855(b)) for this action.

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 document will be available within two weeks at the Environmental



Consultation Organizer [<https://eco.fisheries.noaa.gov>]. A complete record of this consultation is on file at NMFS North-Central Coast Office in Santa Rosa, California.

Consultation History

The Corps requested informal consultation with NMFS via letter dated June 30, 2022. The consultation package included a biological assessment prepared by Moffat & Nichol on behalf of the San Mateo County Harbor District, dated May 20, 2022. On July 15, 2022, NMFS requested additional information via email to the Corps and to Moffat & Nichol, inquiring about the possibility of incorporating light transmittance for the replacement floating concrete docks, information regarding the design of the public kayak launch, and the timing of and potential mitigation for the installation and use of the intertidal crane pads. On August 29, 2022, the Corps responded via email to the information request, forwarding the information response from Moffat & Nichol. In regard to the possibility of light transmittance for the replacement floating concrete docks, Moffat & Nichol responded that the floats will consist of solid concrete around a core of solid polystyrene flotation, and it will not be feasible to incorporate light transmittance while meeting the required floatation and durability requirements. Moffat & Nichol also provided information regarding the public kayak launch and the use of crane pads in the intertidal zone. Sufficient information was received by NMFS on August 29, 2022, to initiate consultation.

Proposed Action and Action Area

The San Mateo County Harbor District (Applicant) proposes to replace deteriorated existing floating docks and accessways at the Oyster Point Marina (Figure 1). The Applicant proposes to replace floating Docks 12 through 14 in the East Basin of Oyster Point Marina, replace existing accessways at Docks 11 through 14, install a public kayak launch, and remove interim bridge ways and replace existing access platforms for Docks 1 through 6 in the West Basin.

Construction equipment will be transported to the site via truck or barge, and will consist of hand tools, floating work platform (sectional barge), long-reach excavator, small work boat, crane, and impact hammer. This Project will be completed over a period of two years during two in-water work windows (June 1 through November 30) and is anticipated to take up to 8 months.

At Docks 12-14 in the East Basin, 96 boat slips will be replaced with 79 wider slips to accommodate larger vessels. Existing docks create 29,000 square feet of total overwater coverage, while replacement docks will result in 30,500 square feet of overwater coverage, resulting in a net increase of 1,500 square feet of overwater coverage. The Project also proposes to provide a side-tie area on Dock 13 to accommodate larger vessels. A public kayak launch will be installed and connected to Dock 14 in the East Basin. The kayak launch is anticipated to be approximately 550 square feet and comprised of concrete decking or composite lumber with high-density polyethylene (HDPE) floatation. The kayak launch will be pre-fabricated offsite and floated into place. To replace the floating docks, existing docks will be disconnected from piles and adjacent dock modules by hand, floated to the shoreline, lifted by crane, placed on land, and taken to a landfill by truck for disposal. Replacement concrete floating docks will be delivered to the site by truck, lifted by crane, placed into the water, and moved into place by work boat.

Four existing accessways at Docks 11 through 14 in the East Basin will be replaced, which includes the abutment, access platform, security gate, and gangway. Replacement access platforms will be the same width and length as existing accessways in the East Basin. Three existing accessways at Docks 1 through 6 in the West Basin will be replaced and lengthened shoreward to re-establish access to the shoreline, which was previously raised. Replacement access platforms will be the same width as existing accessways in the West Basin, but will be greater in length to extend inland to connect to the Bay Trail. Replacement of access platforms and gangways will not result in additional overwater coverage.

Existing gangways for Docks 1-3 and 12-14 will be removed by crane, placed on land, and removed by truck for recycling. The existing gangway at Dock 11 will be removed and reinstalled on the new access platform. Replacement gangways will be constructed off-site and transported to the site via truck. New gangways will be installed using a crane, and will be comprised of grated aluminum. Existing concrete access platforms will be demolished and removed. The concrete platforms will either be cut from the existing piles and removed as a unit using a crane, or removed in smaller pieces using a hammer. If the concrete platform must be removed using a hammer, a platform will be installed below the existing access platform to catch any falling pieces. Replacement access platforms will be supported by up to four 16-inch square concrete piles. New platforms will be constructed using precast concrete and cast-in-place concrete. The interim bridge ways that were installed to provide interim access to Docks 1-6 will be replaced by crane, placed on land, and trucked away. Replacement access platforms will be supported by up to four 16-inch square concrete piles, driven using an impact hammer. New platforms will be constructed using precast concrete and cast-in-place concrete.

For construction on West Basin access platforms and Dock 11 access platforms, crane pads will need to be partially installed within the intertidal at each access platform, below the High Tide Line (HTL). A total of four crane pads made of gravel are proposed, totaling 5,500 square feet of temporary impacts to habitat below the HTL. A truck will haul the gravel for the crane pads to the action area, and a front loader will be used to place the gravel pads. Crane pads will be installed above tidal waters predicted for the particular construction period, and are not anticipated to come into contact with tidal waters. Additionally, construction equipment placed in the intertidal zone is also not expected to come into contact with tidal waters. Crane pads will be removed in between the two proposed work windows.

Pile replacement is proposed for both the dock and accessway replacements. Up to one hundred-fifteen (115) 12- to 14- inch square concrete piles will be removed, and replaced with one hundred-five (105) 16-inch square concrete or fiber glass piles. Piles will be removed using a vibratory pile extractor or by direct pull. Piles will be installed using an impact hammer. Vibratory pile driving is not proposed due to risk of damaging the piles. Pile installation will be limited to four piles per day, with an estimated 500 blows to install each pile. Pile installation and in-water work will be limited to daylight hours. The Applicant proposes to implement Best Management Practices (BMPs) to avoid and minimize impacts from construction, as detailed in the Project's Biological Assessment. Pile installation will result in a net increase of up to 25 square feet (0.0006 acre) of permanent impacts to benthic habitat in Oyster Point Marina.

We considered, under the ESA whether or not the proposed action would cause any other activities and determined that it would not.

Action Area

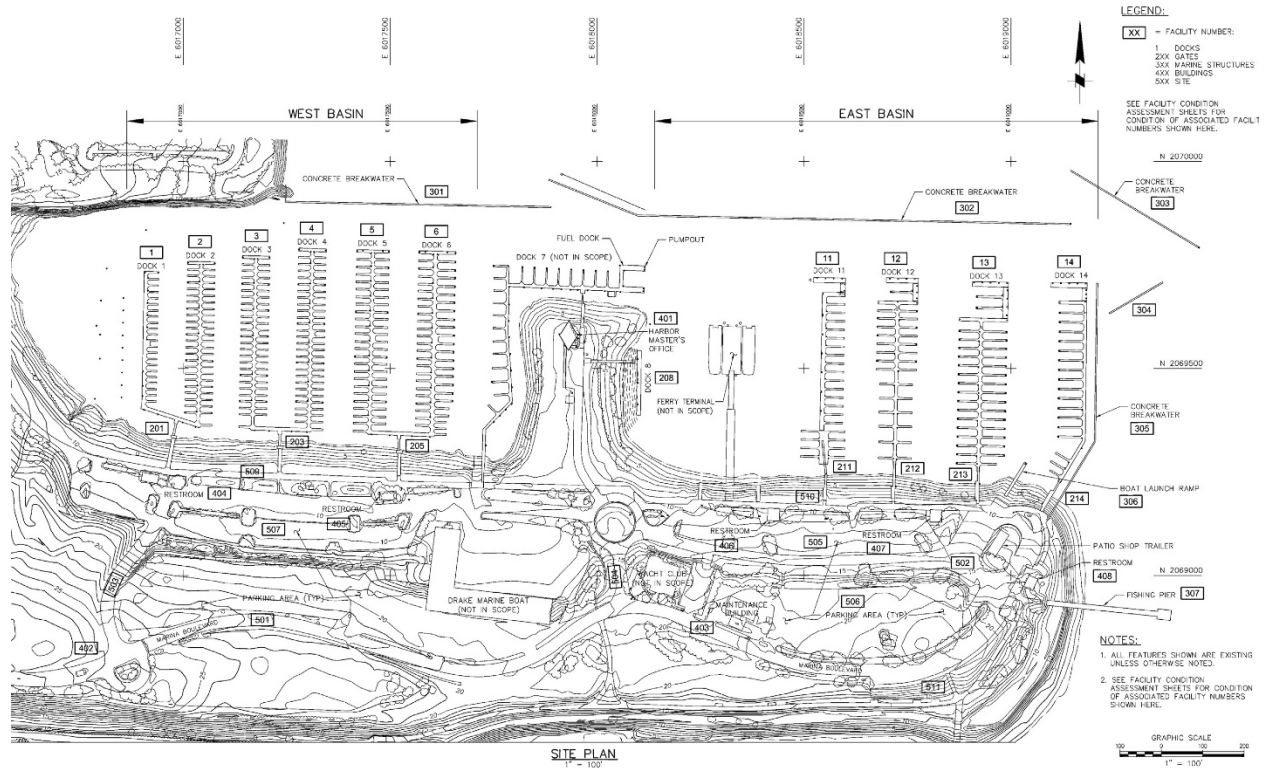


Figure 1. Map of Oyster Point Marina

The action area for this Project consists of approximately 36 acres within Oyster Point Marina, located at 95 Harbor Master Road, South San Francisco, San Mateo County, California. Oyster Point Marina currently contains 408 berths divided into the West Basin and East Basin, with floating docks, gangways and piles, a boat launch ramp, public fishing pier, swimming beach, and other landside facilities. The West Basin contains Docks 1 through 6 while the East Basin contains Docks 11 through 14. The floating docks consist of a main walkway with finger piers extending on either side, held in place by 12- to 14-inch square concrete guide piles, with guide pile restraints consisting of steel angles bolted to the dock surface. The marina is protected from the San Francisco Bay by concrete sheet pile breakwaters in both basins.

In 2021, the grade along the West Basin shoreline was raised to accommodate sea level rise as part of a private site development. The Bay Side trail was relocated shoreward and interim aluminum bridges were installed to re-establish access from the new raised shorelines to Docks 1-6. Docks 1-7 are comprised of timber deck and frame construction, with polyethylene enclosed floatation. Access to West Basin dock is provided by aluminum bridges, concrete access platforms, and grated metal gangways.

In the East Basin, Docks 12-14 are constructed of solid laminated Ammoniacal Copper Zinc Arsenate (ACZA) treated-wood deck on polyethylene enclosed floatation, while Dock 11 is a floating concrete dock. While Dock 11 was replaced with concrete docks in 2013, the access platform was not replaced. East Basin docks are accessed via concrete access platforms and grated metal gangways.

In the upland areas, the upper shoreline consists of an asphalt concrete walking path and California grasses. The intertidal area consists of a strip of intertidal vegetation and mud, which transitions to riprapped areas in the lower intertidal.

Background and Action Agency's Effects Determination

The Corps determined that the proposed Project may affect, but is not likely to adversely affect federally listed species and their critical habitat based on the Project's proposed avoidance and minimization measures, and the ability of ESA-listed species to avoid the area during the proposed work.

Available information indicates the following listed species (Distinct Population Segments [DPS]) under the jurisdiction of NMFS may be affected by the Project:

- Central California Coast steelhead DPS** (*Oncorhynchus mykiss*)
 - threatened (71 FR 834; January 5, 2006);
 - critical habitat (70 FR 52488; September 2, 2005); and
- North American green sturgeon Southern DPS** (*Acipenser medirostris*)
 - threatened (71 FR 17757; April 7, 2006);
 - critical habitat (74 FR 52300; October 9, 2009).

Steelhead life history is summarized in Busby *et al.* (1996). Central California Coast (CCC) steelhead pass through the San Francisco Bay to rear as juveniles or to upstream areas to spawn as adults. Their migrations take place in the winter and spring months. The life history of green sturgeon in California is summarized in Vick *et al.* (2021). The Southern DPS of the North American green sturgeon are anadromous, entering the San Francisco Bay in late winter to spring to migrate to spawning sites in the Sacramento River and its tributaries. After spawning, adult green sturgeon may remain upstream for days to months prior to migrating to the Pacific Ocean through the mainstem Sacramento River. Juveniles typically migrate downstream and live in the lower delta and bays for 3-4 years before entering the Pacific Ocean. Green sturgeon forage on benthic prey items throughout the San Francisco Bay estuary, notably shallow tidal flats dominated by burrowing shrimp and other benthic prey (Dumbauld *et al.* 2008). Green sturgeon may be present in the San Francisco Bay and action area year-round (Vick *et al.* 2021).

Regarding EFH, the Corps also determined that the proposed project may adversely affect EFH, but that adverse effects would be temporary and minor, resulting in temporary increase in turbidity and impacts to water quality during construction. The project area is located within an area identified as EFH for various life stages of fish species managed within the Pacific Coast Salmon Fishery Management Plan (FMP), the Pacific Groundfish FMP, and the Coastal Pelagic FMP. San Francisco Bay, including the Project area, is also designated as an estuary habitat area

of particular concern (HAPC) for various federally managed fish species as defined in the Pacific Salmon and Groundfish FMPs. HAPC are described in the regulations as subsets of EFH that are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. Designated HAPC are not afforded additional regulatory protection under the MSA; however federal projects with potential adverse impacts to HAPC are more carefully scrutinized during the consultation process.

ENDANGERED SPECIES ACT

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 (50 CFR 402.02). In our analysis, which describes the effects of the proposed action, we considered 50 CFR 402.17(a) and (b). When evaluating whether the proposed action is not likely to adversely affect listed species or critical habitat, NMFS considers whether the effects are expected to be completely beneficial, insignificant, or discountable. Completely beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Effects are considered discountable if they are extremely unlikely to occur.

The effects of the proposed action during construction include temporary increases in underwater noise and turbidity, and both a temporary disturbance and permanent loss of benthic habitat. By restricting the work period between June 1 and November 30, the proposed construction schedule avoids the primary migration period of CCC steelhead in the San Francisco Bay. Thus, NMFS anticipates CCC steelhead will not be present in the action area during project construction. As discussed below, impacts from pile replacement and crane pad installation will be temporary and fully dissipate prior to the CCC steelhead migration period. Therefore, any effects to CCC steelhead associated with construction are anticipated to be discountable.

For Southern DPS green sturgeon, the effects of the proposed construction are likely to include elevated underwater sound levels, degraded water quality, benthic habitat disturbance, and temporary loss of benthic habitat.

This Project includes the installation of one hundred-five (105) 16-inch square concrete or fiber glass piles. Piles will be installed using an impact hammer, with a wood block for noise attenuation during pile driving. Underwater construction can result in elevated levels of underwater sound that, depending on the type of construction, can disturb, injure, or kill fish (Popper and Hawkins 2019). Monitoring of underwater sound levels associated with pile driving by impact hammers has been performed previously for concrete pile installation in the San Francisco Bay. Based on the hydroacoustic data collected from previous installations of 16-inch concrete piles, impact pile driving from this proposed Project can result in noise levels of 184 dB

peak, 173 dB Root Mean Square (RMS), and 160 dB Sound Exposure Level (SEL) at 10 meters from the sound source (Molnar *et al.*, 2020). Using these estimated noise levels and an estimated maximum daily limit of four pile installations per day at 500 strikes per pile, the accumulated SEL at 10 meters is calculated to be 193 dB. As such, the accumulated sound levels from the proposed in-water construction could reach or exceed the physical injury threshold (187 dB SELcum) for fish larger than two grams within a 25-meter area around each pile proposed for replacement. Additionally, the estimated noise level of 173 dB RMS exceeds the behavior threshold for noise impacts (150 dB RMS) to Southern DPS green sturgeon within 341 meters of the sound source.

While Southern DPS green sturgeon may be present in the San Francisco Bay year-round, Oyster Point Marina does not provide an optimal habitat for foraging or shelter. This marina has 408 boat slips and experiences heavy boat traffic. The presence of boats and docks contribute to overhanging space that result in shading of the water column and benthic habitats. Shading can reduce primary productivity, change invertebrate assemblies, and reduce the density and diversity of benthic invertebrates (Glasby *et al.*, 1999, Struck *et al.*, 2004, Stutes *et al.*, 2006). As such, Oyster Point Marina is unlikely to be a productive foraging space for Southern DPS green sturgeon. For any Southern DPS green sturgeon present in the action area during pile driving, the Applicant proposes to use a soft start technique to initiate pile driving to provide the opportunity for fish to disperse to other areas. Based on the existing heavily trafficked nature of the action area, the limited resources for foraging in the action area, and the proposed soft start initiation of pile driving, it is unlikely an individual green sturgeon would remain for an extended period within a 25-meter radius of a pile during installation and be subjected to accumulated sound levels that reach or exceed the physical injury threshold of 187 dB SELcum. If green sturgeon are present in the vicinity of a pile driving event, they would likely be startled and temporarily leave the immediate area of project activities. Green sturgeon that react behaviorally would have adequate aquatic habitat in areas adjacent to Oyster Point Marina and in San Francisco Bay to disperse where similar areas are available for foraging and refuge. For these reasons, the effects of underwater sound levels associated with impact pile driving on Southern DPS green sturgeon in Oyster Point Marina are expected to be insignificant. The physical obstructions provided by the existing concrete breakwaters in the action area are expected to limit the extent of elevated underwater sound levels during pile driving to the confines of Oyster Point Marina.

Existing piles will be removed with a vibratory extractor. Based on hydroacoustic data collected from projects using vibratory pile installation or extraction methods (Molnar *et al.*, 2020), the sound pressure levels generated by this Project's use of vibratory extractor would not present a risk of physical injury or mortality to listed fish species. Noise levels associated with operating hand tools during pile repair are also not expected to present a risk of injury to listed fish species. Thus, the effects of underwater sound levels associated with the use of a vibratory pile extractor and hand tools are expected to be insignificant.

Impacts to water quality in the form of increased turbidity and disturbance to benthic habitat are expected to occur during pile removal and installation. Fish may suffer reduced feeding ability under turbid conditions (Benfield and Minello 1996). Fish may even experience gill injury if exposed to excessively high levels of turbidity (Nightingale and Simenstad 2001). However, excessively high levels of turbidity rising to the level of injury are not anticipated to occur during

pile removal or installation for this Project. Additionally, as mentioned above, conditions in Oyster Point Marina do not provide optimal foraging habitat for green sturgeon. Increases in turbidity are limited to the duration of construction, and are expected to settle out of suspension after the following tidal cycle. Pile removal and replacement will occur from a floating sectional barge. Proposed construction BMPs are expected to adequately contain construction debris and prevent the discharge of contaminants into waters of Oyster Point Marina. Based on the above, the effects of minor, localized, and temporary degradation of water quality are expected to be insignificant for threatened green sturgeon.

The action area is located within designated critical habitat for Southern DPS green sturgeon and CCC steelhead. The designation of critical habitat for this species uses the term primary constituent element (PCE) or essential features. The new critical habitat regulations (81 FR 7414) replace this term with physical or biological features (PBFs). This shift in terminology does not change the approach used in conducting our analysis, whether the original designation identified primary constituent elements, physical or biological features, or essential features. In this letter of concurrence, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat. PBFs of designated critical habitat for Southern DPS green sturgeon in estuarine areas include adequate food resources, water flow, water quality, migratory corridors, water depths, and sediment quality. PBFs for CCC steelhead relevant to estuarine areas include areas free of obstruction and excessive predation; water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.

During construction, critical habitat will be temporarily affected by increases in turbidity and temporary and permanent disturbance of benthic substrate. However, as discussed above, effects to water quality are expected to be insignificant. Additionally, the removal of ACZA-treated wood floats and replacement with biologically inert concrete floating docks will provide long-term water quality benefits. Pile construction activities will disturb benthic substrate immediately surrounding and beneath the piles, and pile installation will permanently impact up to 25 square feet (0.0006 acre) of benthic habitat in Oyster Point Marina. Placement of temporary crane pads in the intertidal area of Oyster Point Marina will result in 5,500 square feet of temporary gravel fill placed below the High Tide Line (HTL). Gravel crane pads will be removed in between the two in-water work windows, and permanently removed after construction is completed. The gravel crane pads will impact intertidal marsh vegetation, bay mud, and small-sized rock slope protection in the lower intertidal. Substrate disturbance could potentially reduce the density of benthic invertebrates that inhabit the action area. However, the benthic habitat in the area has been highly modified and degraded by the existing marina and ongoing maritime activities, and substrate within Oyster Point Marina is unlikely to provide quality foraging habitat. Tidal marsh areas impacted by construction are expected to recover and revegetate through natural recruitment. Substrate disturbed during construction is expected to return to pre-project conditions within a few weeks due to recolonization of benthic invertebrates from adjacent areas.

The Project proposes to replace 4,200 square feet (0.10 acre) of accessways, remove 29,000 square feet (0.67 acre) of floating docks, and install 30,500 square feet (0.70 acre) of floating

docks, and a 550-square foot (0.01 acre) kayak launch. Project construction will allow 33,200 square feet (0.76 acre) of overwater shading to persist into the future, and create 2,050 square feet (0.05 acre) of additional overwater shading. Overwater structures such as docks and accessways result in shading of the water column and benthic habitats, which can have negative impacts on primary productivity, submerged aquatic vegetation (SAV) growth, and invertebrate assemblages. The area to be affected by this Project's overwater structure is limited to within the confines of Oyster Point Marina. There are currently no SAVs within the marina, and existing conditions in the marina are not expected to support growth of SAVs. Given the highly modified condition of the marina and existing vessel traffic, the proposed Project is not expected to degrade PBFs of designated critical habitat in the action area.

Conclusion

Based on this analysis, NMFS concurs with the Corps that the proposed action is not likely to adversely affect the subject listed species and designated critical habitats.

Reinitiation of Consultation

Reinitiation of consultation is required and shall be requested by the Corps or by NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) the proposed action causes take; (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 the written concurrence; or (4) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16). This concludes the ESA consultation.

MAGNUSON-STEVENSON 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)).

NMFS determined that the proposed action would adversely affect EFH designated under the Pacific Coast Salmon, Pacific Groundfish, and Coastal Pelagic FMPs due to localized increases in sound and turbidity during construction, permanent increases in overwater shading, as well as temporary and permanent impacts to benthic habitat. However, the anticipated effects of increased sound and turbidity to EFH are expected to be temporary and localized. The area of permanent impacts due to increases in overwater shading and decreases in benthic habitat due to pile driving is small, and ample fish forage areas exist in adjacent areas within the San Francisco Bay. Additionally, the removal of ACZA-treated wood floats from the marine environment is anticipated to improve water quality in the long-term. Thus, NMFS has no practical EFH Conservation Recommendations to provide.

The Corps 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 concludes the MSA consultation.

Please direct questions regarding this letter to Lu Wang, Santa Rosa, California at 707-575-6077 or via email at lu.wang@noaa.gov.

Sincerely,



Gary Stern
San Francisco Bay Branch Chief
North Central Coast Office

cc: Jordan Harroun, U.S. Army Corps of Engineers, San Francisco, California
(Jordan.D.Harroun@usace.army.mil)
Taylor Meyers, Moffat and Nichol, Seattle, Washington
(tmeyers@moffatnichol.com)
Copy to E-file FRN 151422WCR2022SR00130

REFERENCES

- Benfield, M.C., and T.J. Minello. 1996. Relative effects of turbidity and light intensity on reactive distance and feeding of an estuarine fish. *Environmental Biology of Fish* 46:211-216.
- Busby, P.J., T.C. Wainwright, G.J. Bryant, L.J. Lierheimer, R.S. Waples, F.W. Waknitz, and I.V. Lagomarsino. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon, and California.
- Dumbauld, B.R., D.L. Holden, and O.P. Langness. 2008. Do sturgeon limit burrowing shrimp populations in Pacific Northwest Estuaries. *Environmental Biology of Fishes*, 83(3), 283-296.

- Glasby, T.M. 1999. Effects of shading on subtidal epibiotic assemblages. *Journal of Experimental Marine Biology and Ecology* 234:275:290.
- Molnar, M., D. Buehler, R. Oestman, J. Reyff, K. Pommerenck, and B. Mitchell. 2020. Technical guidance for the assessment of hydroacoustic effects of pile driving on fish. Prepared for Department of Environmental Analysis, California Department of Transportation, 1120 N Street, MS-27, Sacramento, CA 95814. October 2020.
- Nightingale, B., and C.A. Simenstad. 2001. Dredging activities: Marine issues. Washington State Transportation Center, University of Washington, Seattle, WA, 98105.
- Popper, A. N., and A.D. Hawkins. 2019. An overview of fish bioacoustics and the impacts of anthropogenic sounds on fishes. *Journal of Fish Biology*, 94(5), 692-713.
- Struck, S.D., C.B. Craft, S.W. Broome, M.D. Sanclements, and J.N. Sacco. 2004. Effects of bridge shading on estuarine marsh benthic invertebrate community structure and function. *Environmental Management* 34(1):99-111.
- Stutes, A.L., J. Cebrian, and A.A. Corcoran. 2006. Effects of nutrient enrichment and shading on sediment primary production and metabolism in eutrophic estuaries. *Marine Ecology Progress Series* 321:29-43.
- Vick, P., L. Krasnow, M. Goldsworthy, B. Meux, S. Wang, T. Coleman, and P. Dudley. 2021. Southern Distinct Population Segment of North American Green Sturgeon (*Acipenser medirostris*) 5-Year Review: Summary and Evaluation.