DECISION DOCUMENT
NATIONWIDE PERMIT 56

This document discusses the factors considered by the Corps of Engineers (Corps) during the issuance process for this Nationwide Permit (NWP). This document contains: (1) the public interest review required by Corps regulations at 33 CFR 320.4(a)(1) and (2); and (2) a discussion of the environmental considerations necessary to comply with the National Environmental Policy Act. This evaluation of the NWP includes a discussion of compliance with applicable laws, consideration of public comments, an alternatives analysis, and a general assessment of individual and cumulative environmental effects, including the general potential effects on each of the public interest factors specified at 33 CFR 320.4(a).

1.0 Text of the Nationwide Permit

Finfish Mariculture Activities. Structures in marine and estuarine waters, including structures anchored to the seabed in waters overlying the outer continental shelf, for finfish mariculture activities. This NWP also authorizes structures for bivalve shellfish mariculture and/or seaweed mariculture if the structures for bivalve shellfish and/or seaweed production are a component of an integrated multi-trophic mariculture structure (e.g., the production of bivalve shellfish or seaweed on the structure used for finfish mariculture, or a nearby mariculture structure that is part of the single and complete project).

This NWP authorizes the installation of cages, net pens, anchors, floats, buoys, and other similar structures into navigable waters of the United States. Net pens, cages, and other floating structures must be securely anchored and clearly marked. To the maximum extent practicable, the permittee must remove these structures from navigable waters of the United States if they will no longer be used for finfish mariculture activities or multi-trophic mariculture activities.

This NWP does not authorize the construction of land-based fish hatcheries or other attendant features.

Structures in an anchorage area established by the U.S. Coast Guard must comply with the requirements in 33 CFR 322.5(l)(2). Structures may not be placed in established danger zones or restricted areas designated in 33 CFR part 334, Federal navigation channels, shipping safety fairways or traffic separation schemes established by the U.S. Coast Guard (see 33 CFR 322.5(l)(1)), or EPA or Corps designated open water dredged material disposal areas.

This NWP does not authorize:

(a) The cultivation of an aquatic nuisance species as defined in the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 or the cultivation of a

nonindigenous species unless that species has been previously cultivated in the waterbody; or

(b) Attendant features such as docks, piers, boat ramps, stockpiles, or staging areas.

Notification: The permittee must submit a pre-construction notification to the district engineer. (See general condition 32.)

In addition to the information required by paragraph (b) of general condition 32, the pre-construction notification must also include the following information: (1) a map showing the locations and dimensions of the structure(s); (2) the name(s) of the species that will be cultivated during the period this NWP is in effect; and (3) general water depths in the project area(s) (a detailed survey is not required). No more than one pre-construction notification per structure or group of structures should be submitted for the finfish mariculture operation during the effective period of this NWP. The pre-construction notification should describe all species and culture activities the operator expects to undertake during the effective period of this NWP. (Authority: Section 10)

Note 1: The permittee should notify the applicable U.S. Coast Guard office regarding the finfish mariculture activity.

Note 2: To prevent introduction of aquatic nuisance species, no material that has been taken from a different waterbody may be reused in the current project area, unless it has been treated in accordance with the applicable regional aquatic nuisance species management plan.

Note 3: The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 defines “aquatic nuisance species” as “a nonindigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural, or recreational activities dependent on such waters.”

Note 3: The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 defines “aquatic nuisance species” as “a nonindigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural, or recreational activities dependent on such waters.”

1.1 Requirements

General conditions of the NWPs are in the Federal Register notice announcing the issuance of this NWP. Pre-construction notification requirements, additional

conditions, limitations, and restrictions are in 33 CFR part 330.

1.2 Statutory Authorities

- Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403)

1.3 Compliance with Related Laws (33 CFR 320.3)

1.3.1 General

Nationwide permits are a type of general permit designed to authorize certain activities that have no more than minimal individual and cumulative adverse environmental effects and generally comply with the related laws cited in 33 CFR 320.3. Activities that result in more than minimal individual and cumulative adverse environmental effects cannot be authorized by NWPs. Individual review of each activity authorized by an NWP will not normally be performed, except when pre-construction notification to the Corps is required or when an applicant requests verification that an activity complies with an NWP. Potential adverse impacts and compliance with the laws cited in 33 CFR 320.3 are controlled by the terms and conditions of each NWP, regional and case-specific conditions, and the review process that is undertaken prior to the issuance of NWPs.

The evaluation of this NWP, and related documentation, considers compliance with each of the following laws, where applicable: Section 10 of the Rivers and Harbors Act of 1899; Sections 401, 402, and 404 of the Clean Water Act; Section 307(c) of the Coastal Zone Management Act of 1972, as amended; Section 302 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended; the National Environmental Policy Act of 1969; the Fish and Wildlife Act of 1956; the Migratory Marine Game-Fish Act; the Fish and Wildlife Coordination Act, the Federal Power Act of 1920, as amended; the National Historic Preservation Act of 1966; the Interstate Land Sales Full Disclosure Act; the Endangered Species Act; the Deepwater Port Act of 1974; the Marine Mammal Protection Act of 1972; Section 7(a) of the Wild and Scenic Rivers Act; the Ocean Thermal Energy Act of 1980; the National Fishing Enhancement Act of 1984; the Magnuson-Stevens Fishery and Conservation and Management Act, the Bald and Golden Eagle Protection Act; and the Migratory Bird Treaty Act. In addition, compliance of the NWP with other Federal requirements, such as Executive Orders and Federal regulations addressing issues such as floodplains, essential fish habitat, and critical resource waters is considered.

The evaluation of this NWP is largely a qualitative evaluation that utilizes available information on the categories of activities authorized by this NWPs, the potential environmental impacts of those authorized activities, potential mitigation measures, and the potential benefits of the authorized activities. The Council on Environmental

Quality's regulations at 50 CFR parts 1500 to 1508 for implementing the National Environmental Policy Act do not require quantitative analyses for environmental assessments. Since this NWP authorizes activities across the United States, this environmental assessment uses, available national information supplemented with other available information.

1.3.2 Terms and Conditions

Many NWPs have pre-construction notification requirements that trigger case-by-case review of certain activities. Two NWP general conditions require case-by-case review of all activities that may adversely affect Federally-listed endangered or threatened species or historic properties (i.e., general conditions 18 and 20, respectively). General condition 16 restricts the use of NWPs for activities that are located in Federally-designated wild and scenic rivers. None of the NWPs authorize the construction of artificial reefs. General condition 28 addresses the use of an NWP with other NWPs to authorize a single and complete project, to ensure that the acreage limits of each of the NWPs used to authorize that project are not exceeded.

In some cases, activities authorized by an NWP may require other federal, state, or local authorizations. Examples of such cases include, but are not limited to: activities that are in marine sanctuaries or affect marine sanctuaries or marine mammals; the ownership, construction, location, and operation of ocean thermal conversion facilities or deep water ports beyond the territorial seas; activities that result in discharges of dredged or fill material into waters of the United States and require Clean Water Act Section 401 water quality certification; or activities in a state operating under a coastal zone management program approved by the Secretary of Commerce under the Coastal Zone Management Act. In such cases, a provision of the NWPs states that an NWP does not obviate the need to obtain other authorizations required by law. [33 CFR 330.4(b)(2)]

Additional safeguards include provisions that allow the Chief of Engineers, division engineers, and/or district engineers to: assert discretionary authority and require an individual permit for a specific activity; modify NWPs for specific activities by adding special conditions on a case-by-case basis; add conditions on a regional or nationwide basis to certain NWPs; or take action to suspend or revoke an NWP or NWP authorization for activities within a region or state. Regional conditions are imposed to protect important regional concerns and resources. [33 CFR 330.4(e) and 330.5]

1.3.3 Review Process

The analyses in this document and the coordination that was undertaken prior to the issuance of the NWP fulfill the requirements of the National Environmental Policy Act (NEPA), the Fish and Wildlife Coordination Act, and other acts promulgated to protect the quality of the environment.

All NWPs that authorize activities that may result in discharges into waters of the United States require compliance with the water quality certification requirements of Section 401 of the Clean Water Act. Nationwide permits that authorize activities within, or affecting land or water uses within a state that has a Federally-approved coastal zone management program, must also be certified as consistent with the state's program, unless a presumption of concurrence occurs. The procedures to ensure that the NWPs comply with these laws are described in 33 CFR 330.4(c) and (d), respectively.

1.4 Public Comments and Responses

For a summary of the public comments received in response to the September 15, 2020, Federal Register notice, refer to the preamble in the Federal Register notice announcing the issuance of this NWP. The substantive comments received in response to the September 15, 2020, Federal Register notice were used to improve the NWP by changing NWP terms and limits, notification requirements, and/or NWP general conditions, as necessary.

The Corps proposed this new NWP as NWP B, to authorize structures and work in navigable waters of the United States, including federal waters over the outer continental shelf, for finfish mariculture activities.

The Corps removed the phrase "and work" from this NWP because this NWP only authorizes structures, and this NWP does not authorize any of the operational aspects of finfish mariculture activities. The operation of a finfish mariculture facility does not constitute "work" as that term is defined at 33 CFR 322.2(c) for the purposes of Section 10 of the Rivers and Harbors Act of 1899. Section 322.2(c) defines "work" as "any dredging or disposal of dredged material, excavation, filling, or other modification of a navigable water of the United States." After the finfish mariculture structure is installed, subsequent operations to produce finfish do not physically modify navigable waters of the United States in a manner that would be considered "work" under the Act

Some commenters supported the issuance of this NWP and some commenters opposed issuance of this NWP. A couple of commenters said that this NWP does not authorize activities that are similar in nature. Many commenters said that finfish mariculture activities should require individual permits to give the public an opportunity to review proposed activities. One commenter stated that finfish mariculture activities could result in significant cumulative impacts on marine wildlife and the environment, which cannot be properly assessed and mitigated. One said that finfish mariculture activities in estuarine waters should require individual permits because of the high risk of water quality impacts, animal escapes, and habitat damage.

This NWP authorizes structures in navigable waters of the United States for finfish mariculture activities. A category of activities for an NWP is based on the general characteristics and uses of the permitted activity. A category of activities is not based on potential configurations of the regulated activities, or the size of those activities. Concerns about the size of authorized activities and potential adverse environmental effects can be addressed in part by addition quantitative limits on the NWP. The Corps believes there are finfish mariculture activities that can result in no more than minimal individual and cumulative adverse environmental effects and are appropriate for NWP authorization. In addition, the NWP regulations at 33 CFR part 330 include numerous provisions that allow district engineers to exercise discretionary authority to require individual permits for activities when the determine those activities will cause more than minimal adverse environmental effects. Division engineers have the authority to modify, suspend, or revoke an NWP on a regional basis (see 33 CFR 330.5(c)). District engineers have the authority to modify, suspend, or revoke an NWP authorization on a case-by-case basis (see 33 CFR 330.5(d)). The potential individual and cumulative adverse environmental effects caused by finfish mariculture activities will be assessed by district engineers when they review PCNs for proposed activities. For some of the adverse environmental effects identified by commenters, the Corps lacks the authority to regulate the particular activities that are the cause of those effects.

Several commenters recommended the development and implementation of project-specific permit conditions to ensure that authorized activities will have no more than minimal individual or cumulative adverse environmental effects. Several commenters requested that NWP B include conditions limiting the amount of feed, pesticides, herbicides, pharmaceuticals that can be released in project waters. A couple of commenters suggested NWP B require specific design and operation standards, including depth and current velocity guidelines for net pen siting class size. A commenter said that the geographic variability of aquatic environments and their ecological functions would be problematic when characterizing project impacts of finfish mariculture activities on a national scale.

Project-specific conditions are more appropriately identified by district engineers when they review PCNs for proposed NWP B activities. If a proposed activity is authorized by NWP B, the district engineer will add appropriate conditions to the NWP authorization to help ensure that the adverse environmental effects are no more than minimal, individually and cumulatively. Permit conditions must be directly related to the impacts of the proposal, appropriate to the scope and degree of those impacts, and reasonably enforceable (see 33 CFR 325.4(a)). Potential permit conditions addressing finfish mariculture operations, such as amount of feed, pesticides, herbicides, pharmaceuticals that can be released in project waters are beyond the scope of the Corps' legal authority, because the Corps does not have the authority regulate discharges of feed, pesticides, herbicides, and pharmaceuticals into navigable waters, including federal waters on the outer continental shelf. District engineers will review PCNs for proposed NWP B activities, which will include information on the design and size of the proposed structures.

During the evaluation of PCNs, district engineers consider the current environmental setting and the ecological functions currently being provided by aquatic resources in the vicinity of the proposed activity.

A couple of commenters said that notification to the U.S. Coast Guard should be required for all proposed finfish mariculture projects to ensure that structures are not placed within restricted zones, shipping safety fairways, federal channels, traffic separation schemes or within U.S. EPA- or Corps- designated open water dredged material disposal areas. The Corps believes it is the project proponent's responsibility to notify the U.S. Coast Guard of the proposed activity, if such notification is required by law or regulations.

One commenter stated that the availability of an NWP for finfish mariculture activities could be beneficial in promoting the business of finfish mariculture in areas where it is currently difficult to gain approval. The commenter added that growing seasons should be extended to allow for more jobs and tax revenue. One commenter suggested adopting location specific terms (freshwater, marine, offshore) and dropping the term "activity" and instead use "practice"

The Corps proposed this NWP to provide authorization under Section 10 of the Rivers and Harbors Act of 1899 for structures used for finfish mariculture activities. Project proponents may be required to obtain other federal, state, and local authorizations required by law or regulation. This NWP does not have any limitations related to growing seasons. The Corps believes it has provided sufficient specificity regarding which types of waters this NWP can be used in (i.e., marine and estuarine waters), including the use of term "mariculture" instead of the broader term "aquaculture." The Corps' authorization is limited to the installation of structures in navigable waters of the United States, which is why the term "activity" is used. The Corps does not regulate the operation of the finfish mariculture facility during the production of finfish, and the activities associated with production activities such as feeding, handling, and administering antibiotics, therapeutics, and other chemicals.

Regarding multi-trophic mariculture projects, one commenter stated that the activity is still considered experimental, with potential for adverse environmental impacts and a lack of proven success at commercial sales, and would therefore not be suitable for authorization under a NWP which should only be utilized for projects with predictable outcomes. The Corps understands that multi-trophic mariculture activities have been practiced in other countries (Largo et al. 2016, Troell et al. 2009), so it is not an experimental approach. It is intended to cultivate different tropic levels to help reduce nutrient loads to surrounding waters.

Many commenters stated that applicants should be required to clarify the species to be farmed as well as provide information on broodstock source and quantity. Several commenters said that PCNs should include project-specific details regarding configuration, structures, techniques, proposed production quantities,

densities, spacing, and containment systems. One commenter recommended that the PCN include a decommissioning plan.

The Corps has added text to this NWP to prohibit the cultivation of aquatic nuisance species as defined in the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 and the cultivation of nonindigenous species unless that species has been previously cultivated in the waterbody. The Corps only regulates the structures used for finfish mariculture activities, and their configuration in the waterbody. The Corps does not have the authority to regulate the techniques used to produce finfish, or how many finfish are produced over a specific period of time. If the project proponent wants to cease using the authorized structures for finfish mariculture activities, those structures must be removed. General condition 13 requires, to the maximum extent practicable, the removal of temporary structures from navigable waters after their use has been discontinued. For permanent structures, the Corps has added a provision to this NWP to require the permittee to remove these structures from navigable waters of the United States when those structures will no longer be used for finfish mariculture activities or multi-trophic mariculture activities.

A few commenters said that all finfish mariculture activities should require PCNs so that district engineers can evaluate consistency with environmental standards, impacts to navigation, commerce, fishing, and other resource use conflicts. One commenter suggested that the applicant should be required to disclose in the PCN the intended use of acoustic deterrent devices. Many commenters suggested that a higher level of detail should be required for finfish mariculture activity PCNs. A few commenters said the PCN should include a site analysis incorporating available spatial information including depth, wave climate, current velocity, substrate type, and proximity to any hard-bottom habitats. A couple of commenters stated that applicants should be required to provide detailed site maps, indicating the project location in relation to ecologically important marine/estuarine areas. One commenter said that applicants should be required to disclose the proposed activity's proximity to other mariculture or commercial fishing operations.

All activities authorized by this NWP require PCNs. The Corps does not have the authority to regulate the use of acoustic deterrent devices, so it would be inappropriate to require disclosure of the use of such devices in PCNs for proposed NWP B activities. The information requirements for PCNs in paragraph (b) of general condition 32 are intended to provide the information necessary for the district engineer to determine whether a proposed activity qualifies for NWP authorization without an excessive amount of paperwork. The Corps declines to require the suggested information for NWP B PCNs because it is not needed to assist the district engineer in the determination of NWP eligibility.

A few commenters said that the PCN should include a detailed statement on avoidance and minimization measures regarding the following impacts: attraction and entanglement of wild fish, sharks, mammals, and seabirds; effects of chemicals, antifoulants, feed, and waste on water quality, habitat, and marine life;

physical effects of all structures on habitat and marine life; displacement, disruption and risks to existing fishing activities; economic impacts to fishing industries; and spatial conflicts with other ocean users. A few commenters said that the applicant should be required to provide prevention, monitoring, and response plans that address escapement of cultured adults, progeny, and gametes; release of antimicrobials; disease transmission to wild stocks; release of nutrients; chemical pollution; structural failures; entanglement of fishing gear and marine species; small vessel strikes; and marine debris.

The Corps does not agree that the suggested information is necessary for PCNs for proposed NWP B activities to assist in the district engineer's determination regarding whether the proposed activity regulated by the Corps (i.e., the placement of structures in navigable waters of the United States for finfish mariculture activities) is expected to result in no more than minimal individual and cumulative adverse environmental effects. Much of the suggested information relates to operational aspects of finfish mariculture operations, which the Corps does not have the authority to regulate or control.

One commenter stated that under NWP review, there is potential for an applicant to begin work within 45-days of submitting a PCN, even if the permittee has not received a written response from the district engineer. The commenter said that the 45-day default authorization should not occur and that the proposed activity cannot proceed until the district engineer issues a written verification.

After the Corps district receives a PCN, the prospective permittee cannot begin the activity until either: (1) he or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or (2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer (see paragraph (a) of general condition 32). If the permittee was required to notify the Corps pursuant to general condition 18 that listed species or designated critical habitat (or species proposed for listing) might be affected or are in the vicinity of the activity, the permittee cannot begin the activity until receiving written notification from the Corps that there is ''no effect'' on listed species or that any consultation required under Section 7 of the Endangered Species Act has been completed. The Corps declines to add a provision to NWP B to require the project proponent to receive written authorization from the Corps prior to commencing the authorized activity.

A couple of commenters expressed concern that structure placement within estuarine habitats may result in reduced current, velocity, altering circulation patterns, and consequently changing substrate characteristics. One commenter stated that the addition of artificial structures and moorings, and changes to seabed alter topography and hydrodynamics. Some commenters voiced concerns regarding the use of NWPs for emerging finfish mariculture activities, due to potential impacts on water quality, habitat, and wild species, requesting that activities in the area be

reviewed through the individual permit process.

The Corps acknowledges that structures placed in navigable waters may reduce water velocities to some degree and alter sediment transport and coastal erosion and deposition processes. District engineers will review proposed NWP B activities and determine whether it minimizes the impacts where practicable pursuant to general condition 23. Division and district engineers have discretionary authority to modify, suspend, or revoke NWP authorizations to further condition or restrict the applicability of an NWP when they have concerns for any factor of the public interest (see 33 CFR 330.1(d)).

Many commenters said that construction of finfish mariculture operations should be prohibited within a specific proximity to marine protected areas, submerged aquatic vegetation, reef communities, habitats with significant important to existing aquatic communities, migration pathways, at specific water depths, and those areas subject to chronic oxygen and nitrogen depletion. A few commenters stated that finfish mariculture activities should be prohibited from areas identified as being prone to hypoxia or otherwise ecologically sensitive. Several commenters said that increases in finfish mariculture projects would have the potential to damage the commercial fishing industry by either decreasing the need for wild fishing or by causing adverse impacts to the health and habitat of wild fished species. One commenter stated that finfish mariculture could have the potential to adversely impact local economies by pushing out responsible, small-scale seafood producers and crop growers.

Several commenters expressed concern with spatial conflicts, specifically with fishing, fishery research cruises, and long-term ocean monitoring stations which occupy much of state and federal waters. Additional potential conflicts identified by commenters included gear entanglement, displacement from traditional fishing areas, navigational safety, and income loss. Many commenters raised concerns about project siting requirements, with one commenter suggesting that the Corps should be required to perform a spatial siting analysis prior to issuance of an NWP verification to ensure the proposed activity does not interfere with existing fisheries operations, research projects, or affect federal marine protected areas, and essential fish habitat.

Impacts regarding navigation are localized and therefore it is more efficient for district engineers to evaluate potential impacts in their review of PCNs. Finfish mariculture operators have, absent any potential exceptions, the same rights to use navigable waters as other users such as fishers, recreational users, researchers, and commercial users as long as they obtain all required federal, state, and local authorizations. In addition to the authorization under Section 10 of the Rivers and Harbors Act of 1899, finfish mariculture operators may be required to obtain other federal, state, or local authorizations. The Corps does not have the authority to conduct spatial planning for finfish mariculture activities. If the district engineer determines a proposed NWP B activity may adversely affect essential fish habitat, he or she will conduct essential fish habitat consultation with NMFS. Activities in

marine protected areas may be require authorizations from the federal or state agency that has management responsibilities for those areas.

A couple of commenters stated that structures could cause interference with access to treaty protected fishing grounds for tribal fisherman. Several commenters said that these activities could impact recreational activities by closing off areas of navigable waters that would otherwise be used for boating, fishing, tourism, and other water-related activities. A few commenters stated that finfish mariculture activities would close off or privatize areas currently used by the commercial fishing industry. One commenter stated that finfish mariculture activities could have the potential to adversely impact local economies by pushing out responsible, small-scale seafood producers and crop growers.

Activities authorized by NWP B must comply with general condition 17, tribal rights. District engineers will review PCNs for proposed NWP B activities and assess potential impacts to navigation, including boating, fishing, tourism, and other water-related activities that use those navigable waters. There are a variety of activities (e.g., piers, port facilities, marine hydrokinetic devices) authorized by the Corps in navigable waters under its section 10 authorities that preclude or restrict use by others. The potential economic impacts of finfish mariculture activities on local businesses and residents is outside the Corps' control and responsibility.

A couple of commenters said that finfish mariculture activities should raise farmed species that live in or adjacent to the body of water, to minimize the introduction of disease from species relocated from other regions. Another commenter suggested using only species native to the ecosystem where the finfish mariculture activity is located. One commenter requested the establishment of exclusion zones, using assessments that consider not just the immediate area, but potential impacts to nearby waters as well. One commenter said that by requiring siting of finfish mariculture outside of known migratory pathways, predation from wild species may be minimized, entanglements may be reduced, and potential fish spills from net/cage damage by predatory species may also be reduced. One commenter suggested siting finfish mariculture activities in deep, open waters to minimize the effects of nutrient and sediment dispersal from the project site, which may cause increases in nitrogen and phosphorous levels, as well as increases in phytoplankton and algae. Several commenters said that finfish mariculture activities should not be authorized in estuarine waters to minimize adverse effects to water quality. A few commenters stated that the PCN review process does not provide for adequate planning and would eliminate project-specific public notice and comment period that would facilitate responsible site selection.

The Corps does not have the authority to specify which species are cultivated at a finfish mariculture structure authorized by the Corps under section 10 of the Rivers and Harbors Act of 1899. In addition, the Corps does not have the authority to establish mariculture exclusion zones in navigable waters. Siting requirements on finfish mariculture activities may be imposed by other federal, state, or local

government agencies.

Many commenters expressed concerns regarding potential impacts to existing habitat, specifically coral reef systems, mangroves, and submerged aquatic vegetation that could be caused by increases in nutrient and sediment dispersal from the finfish mariculture operation. One commenter said that net pen structures and their associated anchoring systems have the potential to increase available habitat, supporting biodiversity, similar to engineered artificial reefs. In addition, this commenter said that the structures would prevent trawling of the benthic ecosystem within the footprint of the facility, further protecting species.

When reviewing PCNs for proposed NWP B activities, district engineers will evaluate potential impacts on habitats in the vicinity of the proposed finfish mariculture structures. The Corps acknowledges that finfish mariculture structures can provide structural habitat that benefits some aquatic species, as well as providing some refuge from predators and fishers.

Several commenters expressed concerned with the potential entanglement of wild fish and marine mammal species, stating that NWP review would not allow for adequate evaluation for potential impacts. One commenter discussed the potential for illegal extermination of predator species such as sea lions by operators of finfish mariculture facilities. A few commenters raised concerns regarding the use of acoustic deterrent devices, which they said are not consistently useful and have been known to cause deleterious impacts to non-target species. Other commenters stated that these activities would have the potential to attract and concentrate predators, which may lead to entanglements or vessel strikes. One commenter said that risks and impacts to protected species are minimized by existing federal requirements for operations, including the use of improved technologies and regular maintenance, such as line-tightening, which has been shown to prevent accidental entanglement. A few commenters stated that this NWP must prohibit gear types known to cause harm to marine species. One commenter said that finfish mariculture structures should be removed from waters during peak seasons for protected species.

If the district engineer determines that a proposed finfish mariculture activities may affect listed species or designated critical habitat, he or she will conduct ESA section 7 consultation with the U.S. FWS and/or NMFS. The operator of the finfish mariculture facility may also need to obtain authorization under the Marine Mammal Protection Act. The ESA section 7 consultation may result in permit conditions added to the NWP authorization to minimize the risk of entanglement of listed species. The Corps does not have the authority to regulate the management of predator species at a finfish mariculture facility, or the use of acoustic deterrent devices. The use of acoustic deterrent devices would be addressed through the ESA section 7 consultation process and/or the Marine Mammal Protection Act authorization process, if applicable.

One commenter said that finfish mariculture operations should only be stocked with eggs, larvae, or juveniles from pen-raised lineages, in order to avoid the need for wild capture. Another commenter stated that the cultivated species should have the same indigenous genetic stock as individuals of the species in the waters where the proposed finfish mariculture activity is located. The Corps does not have the authority to impose requirements on the stocking of finfish mariculture facilities, or which genetic stocks are cultivated.

Many commenters stated concerns with the potential for accidental fish escapements by individual species because the introduction of non-native species may spread pathogens and parasites to wild species, increase competition to at-risk communities, and cause genetic degradation among existing fish populations. Several commenters discussed the 2017 escape of over 200,000 non-native Atlantic salmon in the Puget Sound as a result of finfish mariculture operations, with some commenters requesting that these activities require individual permits, and other commenters stating that regional conditions should be implemented to ensure structural integrity of facility structure and prevent escape recurrences. One commenter said that although the Corps lacks the authority to regulate finfish escapes, it can require structures installed in navigable waters to be constructed to a standard where escape risks can be mitigated. One commenter stated that applicants should be required to report escape events to the Corps and that the Corps should maintain a database to monitor events and better prevent them in the future. A few commenters said that a universal standard should be developed that specifies requirements for the proposed finfish mariculture facilities and related features that would meet challenges posed by severe weather, and prevent potential escapements.

The Corps does not have legal authority to regulate the potential escapement of cultivated finfish. The Corps acknowledges that finfish mariculture activities have the potential to facilitate the spread of pathogens and parasites, but the Corps does not have the authority to regulate or control those occurrences. General condition 14 requires proper maintenance of authorized structures and fills. The project proponent is responsible for designing and constructing the finfish mariculture structures so that they have an appropriate degree of structural integrity. Since the Corps does not have the authority to address potential fish escapes, there would be no useful purpose served by requiring the operator to report escapes to the Corps, or for the Corps to maintain a database to track escape events.

One commenter said that all mariculture operations should be considered point sources under the Clean Water Act and be required to obtain discharge permits. This commenter also said that routine disease testing and other water quality monitoring should also be mandated. One stated that effects to water quality within the local environment from other sources would have the potential to cause impacts to cultured species and subsequently economic returns of the finfish farm, suggesting that maintenance of the facility would be in the best interest of the operation and thus encourages management operations that support the local

environment. Some commenters said that finfish mariculture activities can cause changes to benthic community composition beneath and adjacent to structures because of excess feed, feces, and antifoulant accumulation. A couple of commenters stated that finfish mariculture projects should be held to the same regional water quality standard as offshore seafood processors. Several commenters expressed concern with the ingredients utilized in fish feed, which one commenter said often contains toxic heavy metals like cadmium and zinc and recommended that feed formulation and efficiencies be standardized and managed in order to lessen adverse environmental impacts. Another commenter suggested that finfish mariculture operators should be required to publish reports with the complete traceability of all mariculture feed products. One commenter asserted that permittees be required to provide proof that the finfish mariculture operations would not contribute to hypoxia in receiving waters.

Some finfish mariculture operations may require authorization under Section 402 of the Clean Water Act for discharges from finfish mariculture operations. Section 402 of the Clean Water Act is administered by the U.S. EPA or states with approved programs. The Corps lacks the authority to require disease testing and water quality monitoring. Water quality monitoring may be required by states in estuaries and the territorial seas. The Corps acknowledges that finfish mariculture activities can have effects on benthic communities. The Corps does not have the authority to regulate the production of finfish after the mariculture facility is constructed.

Several commenters expressed concerns about the potential effects of the use of antimicrobials, pesticides, and anti-foulants, and the introduction of excess feed and fish waste in project waters. These commenters stated that use of these materials could lead to degradation of water quality, risking public health, and increase organic nutrient loads leading to eutrophication, causing widespread damage to wildlife. A few commenters said that industrial finfish mariculture operations may cause adverse impacts to public health, as the antibiotics, pesticides, and other chemicals that are heavily used to prevent disease and parasites in farmed species could accumulate in fish tissues to be consumed by the public. One commenter stated that these issues have influenced other countries like Canada, Argentina and Denmark, to move away from industrial finfish mariculture.

The Corps does not have the authority to regulate the use of antimicrobials, antibiotics, pesticides, anti-foulants and other chemicals, how feed is provided to the cultivated finfish, or the composition of that feed and its potential effects on water quality. Water quality concerns may be addressed through state or federal water quality standards under the Clean Water Act, or state laws.

A couple of commenters said that ESA section 7 consultation should be mandatory for all proposed finfish activities and that all applicants should be required to obtain an incidental take permits for potential effects to listed species. One commenter stated that NOAA would be the appropriate agency to provide expertise in reviewing and assigning specific permit terms in regard to site selection, conflicts between

aquaculture projects, marine resources, other ocean users, and wild-capture fisheries. A couple of commenters said that individual finfish mariculture projects should be coordinated with state natural resource agencies to identify regional and site-specific concerns, needs analyses, and project-specific conditions.

All activities authorized by this NWP require PCNs. If the district engineer reviews a PCNs and determines that any proposed activity may affect listed species or designated critical habitat, he or she will conduct ESA section 7 with the U.S. FWS and/or NMFS as appropriate. Incidental take permits are issued under Section 10(a)(1)(B) of the ESA, not section 7(a)(2). The Corps declines to add a provision to this NWP requiring coordination with state natural resource agency, whose legal authorities are highly variable and generally do not apply in federal waters.

One commenter questioned the Corps' reliance on general condition 23 to minimize project impacts. Another commenter said that all NWP B applicants should be required to provide a mitigation plan. Several commenters voiced concern over the risk for breakage of anchored mooring systems for finfish mariculture structures during significant weather events, which increases risks to navigational safety and marine debris. Additional concerns regarding marine debris were voiced by another commenter, who suggested that operators may dispose of solid waste into waters rather than through appropriate methods. One commenter recommended requiring agency coordination for proposed NWP B activities under paragraph (d) of general condition 32.

General condition 23 provides the mitigation requirements for the NWPs. District engineers can require the project proponent to submit a mitigation plan if, after reviewing a PCN, the district engineer determines that mitigation is necessary to ensure the authorized activity will cause no more than minimal individual and cumulative adverse environmental effects. The project proponent is responsible for designing and constructing the finfish mariculture facility so that it complies with applicable engineering standards, and will maintain structural integrity within the appropriate parameters of sea and weather conditions, and potential predatory behavior by large vertebrates. The Corps does not believe that agency coordination under paragraph (d) of this NWP is necessary for these activities.

One commenter asserted that the draft decision document for NWP B did not meet NEPA requirements, stated that it lacked adequate discussion on purpose and need, which the public needs for consideration of the scope of reasonable alternatives. One commenter said that an environmental impact statement should be required for approval of NWP B, claiming that the Corps failed to adequately discuss how potentially significant impacts will be mitigated below the level of significance in the draft decision document. One commenter stated the Corps failed to address potential adverse cumulative impacts at a regional level where specific locations recently identified by NOAA are more likely to be impacted.

The national decision document for this NWP was revised to address the

requirements for environmental assessments in the Council on Environmental Quality's NEPA regulations that were published in the Federal Register as a final rule on July 16, 2020 (85 FR 43304). A section on purpose and need was added to the national decision document. The Corps made a finding of no significant impact. Therefore, an environmental impact statement is not required for the issuance of this NWP. The national decision document considers the cumulative effects expected to occur as this NWP is used during the 5-year period it is anticipated to be in effect, and it is a national analysis since the geographic scope of the national decision document is the United States. Division engineers consider cumulative effects of NWP activities on a regional basis.

One commenter stated that the minimal effect determination is conclusory, as no quantitative impact limits, general conditions, or regional conditions have been specified and the impact section did not provide discussion on any foreseeable or unknown impacts. One commenter said that the Corps' minimal effects determination should provide estimates for the anticipated size of mariculture operations to be permitted under NWP B and potential impacts of those operations based on known impacts of net pen finfish mariculture.

The Corps did not provide a minimal effects determination in the draft national decision document, so the commenter cannot say that it is conclusory. The NWPs are not required to have quantitative impact limits, and the proposed NWP general conditions were provided in the proposed rule. The regional conditions have not been finalized by division engineers. The draft decision document discusses reasonably foreseeable impacts. The Corps is not required to consider speculative impacts. The Corps did provide estimates of the impacts that may occur during the 5-year period this NWP is anticipated to be in effect.

2.0 Purpose and Need for the Proposed Action

The proposed action is the issuance of this NWP to authorize structures in navigable waters of the United States, including federal waters on the outer continental shelf for finfish mariculture activities that result in no more than minimal individual and cumulative adverse environmental effects. This proposed action is needed for efficient implementation of the Corps Regulatory Program, by authorizing with little, if any, delay or paperwork this category of activities, when those activities have no more than minimal individual and cumulative adverse environmental effects. Issuing an NWP to authorize activities that have no more than minimal adverse environmental effects instead of processing individual permit applications for these activities, reduces regulatory burdens on the public, benefits the environment through reduced losses of jurisdictional waters and wetlands, and allows the Corps to allocate more of its resources towards evaluating proposed activities requiring authorization under Section 10 of the Rivers and Harbors Act of 1899 that have the potential to cause more substantial adverse environmental effects.

3.0 Alternatives

This evaluation includes an analysis of alternatives based on the requirements of NEPA. The alternatives discussed below are based on an analysis of the potential environmental impacts and impacts to the Corps, federal, tribal, and state resource agencies, general public, and prospective permittees.

3.1 No Action Alternative (Do Not Issue the Nationwide Permit)

Under the no action alternative, the Corps would not issue this NWP. Individual permits issued under Section 10 of the Rivers and Harbors Act of 1899 would be required for finfish mariculture activities, unless Corps districts issued regional general permits to authorize a similar category of activities.

3.2 Issue the Nationwide Permit With Modifications

This alternative consists of issuing the NWP while considering the comments received in response to the proposal to issue this NWP with modifications, including the proposed changes identified by the Corps and changes suggested by commenters. This alternative includes changes to the terms and conditions of this NWP, including quantitative limits for this NWP, pre-construction notification thresholds and requirements, and other provisions of this NWP. This alternative also includes consideration of modifying, adding, or removing general conditions that apply to this NWP. In addition, this alternative includes the mechanisms in the Corps' NWP program regulations at 33 CFR 330.5(c) and (d) where division and district engineers can modify, suspend, or revoke NWP authorizations on a regional or case-by-case basis to ensure that the NWP authorizes only those activities that result in no more than minimal individual and cumulative adverse environmental effects. In the September 15, 2020, Federal Register notice, the Corps requested comments on the proposed issuance of this NWP.

Since the Corps' NWP program began in 1977, the Corps has continuously strived to develop NWPs that only authorize activities that result in no more than minimal individual and cumulative adverse environmental effects. Every five years the Corps reevaluates the NWPs during the reissuance process, and may modify an NWP to address concerns for the aquatic environment. Utilizing collected data and institutional knowledge concerning activities authorized by the Corps regulatory program, the Corps reevaluates the potential impacts of activities authorized by NWPs. The Corps also uses substantive public comments on proposed NWPs to assess the expected impacts.

3.3 Issue the Nationwide Permit Without Modifications

This alternative consists of issuing the NWP as it was proposed in the September 15, 2020, proposal. This alternative also includes the mechanisms in the Corps' NWP program regulations where division and district engineers can modify, suspend, or revoke NWP authorizations on a regional or case-by-case basis to ensure that the NWP authorizes only those activities that result in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.5(c) and (d)).

4.0 Affected Environment

This environmental assessment is national in scope because the NWP may be used across the country, unless the NWP is revoked or suspended by a division or district engineer under the procedures in 33 CFR 330.5(c) and (d), respectively. For this NWP, the affected environment consists of aquatic ecosystems, including estuarine and marine ecosystems, in the United States, as they have been directly and indirectly affected by past and present federal, non-federal, and private activities. The past and present activities include activities authorized by the various NWPs issued from 1977 to 2017, activities authorized by other types of Department of the Army (DA) permits, as well as other federal, tribal, state, and private activities that are not regulated by the Corps. Aquatic ecosystems are also influenced by past and present activities in uplands, because those land use/land cover changes in uplands and other activities in uplands have indirect effects on aquatic ecosystems (e.g., MEA 2005a, Reid 1993). Due to the large geographic scale of the affected environment (i.e., the entire United States), as well as the many past and present human activities that have shaped the affected environment, it is only practical to describe the affected environment in general terms. In addition, it is not possible to describe the environmental conditions for specific sites where the NWPs may be used to authorize eligible activities.

The total land area in the United States is approximately 2,260,000,000 acres, and the total land area in the contiguous United States is approximately 1,891,000,000 acres (Bigelow and Borchers 2017). Land uses in the United States as of 2012 is provided in Table 4.1 (Bigelow and Borchers 2017). Of the land area in the entire United States, approximately 60 percent (1,370,000,000 acres) is privately owned (Bigelow and Borchers 2017). Of the remaining lands in the United States, the federal government hold 28 percent (644,000,000 acres), state and local governments own 8 percent (189,000,000 acres), and 3 percent (63,000,000 acres) is held in trust by the Bureau of Indian Affairs (Bigelow and Borchers 2017).

Table 4.1. Major land uses in the United States – 2012 (Bigelow and Borchers 2017).

Land Use	Acres	Percent of Total
Agriculture	1,186,000,000	52.5
Forest land	502,000,000	22.2
Transportation use	27,000,000	1.2
Recreation and wildlife areas	254,000,000	11.2
National defense areas	27,000,000	1.2
Urban land	70,000,000	3.1
Miscellaneous use	196,000,000	8.5
Total land area	2,260,000,000	100.0

4.1 Quantity of Aquatic Ecosystems in the United States

There are approximately 283.1 million acres of wetlands in the United States; 107.7 million acres are in the conterminous United States and the remaining 175.4 million acres are in Alaska (Mitsch and Hernandez 2013). Wetlands occupy less than 9 percent of the global land area (Zedler and Kercher 2005). According to Dahl (2011), wetlands and deepwater habitats cover approximately 8 percent of the land area in the conterminous United States. Rivers and streams comprise approximately 0.52 percent of the total land area of the continental United States (Butman and Raymond 2011). Therefore, the wetlands, streams, rivers, and other aquatic habitats that are potentially waters of the United States and subject to regulation by the Corps under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 comprise a minor proportion of the land area of the United States. The remaining land area of the United States (more than 92 percent, depending on the proportion of wetlands, streams, rivers, and other aquatic habitats that are subject to regulation under those two statutes) is outside the Corps regulatory authority.

Frayer et al. (1983) evaluated wetland status and trends in the United States during the period of the mid-1950s to the mid-1970s. During that 20-year period, approximately 7.9 million acres of wetlands (4.2 percent) were lost in the conterminous United States. Much of the loss of estuarine emergent wetlands was due to changes to estuarine subtidal deepwater habitat, and some loss of estuarine emergent wetlands was due to urban development.

The U.S. Fish and Wildlife Service also examined the status and trends of wetlands in the United States during the period of the mid-1970s to the 1980s, and found that there was a net loss of more than 2.6 million acres of wetlands (2.5 percent) during that time period (Dahl and Johnson 1991). Freshwater wetlands comprised 98 percent of those wetland losses (Dahl and Johnson 1991). During that time period, losses of estuarine wetlands were estimated to be 71,000 acres, with most of that

loss due to changes of emergent estuarine wetlands to open waters caused by shifting sediments (Dahl and Johnson 1991).

Between 2004 and 2009, there was no statistically significant difference in wetland acreage in the conterminous United States (Dahl 2011). According to the 2011 wetland status and trends report, during the period of 2004 to 2009 urban development accounted for 11 percent of wetland losses (61,630 acres), rural development resulted in 12 percent of wetland losses (66,940 acres), silviculture accounted for 56 percent of wetland losses (307,340 acres), and wetland conversion to deepwater habitats caused 21 percent of the loss in wetland area (115,960 acres) (Dahl 2011). Some of the losses occurred to wetlands that are not subject to Clean Water Act jurisdiction and some losses are due to activities not regulated under Section 404 of the Clean Water Act, such as unregulated drainage activities, exempt forestry activities, or water withdrawals. From 2004 to 2009, approximately 100,020 acres of wetlands were gained as a result of wetland restoration and conservation programs on agricultural land (Dahl 2011). Another source of wetland gain is conversion of other uplands to wetlands, resulting in a gain of 389,600 acres during the period of 2004 to 2009 (Dahl 2011). Inventories of wetlands, streams, and other aquatic resources are incomplete because the techniques used for those studies cannot identify some of those resources (e.g., Dahl (2011) for wetlands; Meyer and Wallace (2001) for streams).

Losses of vegetated estuarine wetlands due to the direct effects of human activities have decreased significantly due to the requirements of Section 404 of the Clean Water Act and other laws and regulations (Dahl 2011). During the period of 2004 to 2009, less than one percent of estuarine emergent wetlands were lost as a direct result of human activities, while other factors such as sea level rise, land subsidence, storm events, erosion, and other ocean processes caused substantial losses of estuarine wetlands (Dahl 2011). The indirect effects of other human activities, such as oil and gas development, water extraction, development of the upper portions of watersheds, and levees, have also resulted in coastal wetland losses (Dahl 2011). Eutrophication of coastal waters can also cause losses of emergent estuarine wetlands, through changes in growth patterns of marsh plants and decreases in the stability of the wetland substrate, which changes those marshes to mud flats (Deegan et al. 2012).

The Emergency Wetlands Resources Act of 1986 (Public Law 99-645) requires the U.S. Fish and Wildlife Service (USFWS) to submit wetland status and trends reports to Congress (Dahl 2011). The latest status and trends report, which covers the period of 2004 to 2009, is summarized in Table 4.2. The USFWS status and trends report only provides information on acreage of the various aquatic habitat categories and does not assess the quality or condition of those aquatic habitats (Dahl 2011).

Table 4.2. Estimated aquatic resource acreages in the conterminous United States in 2009 (Dahl 2011).

Aquatic Habitat Category	Estimated Area in 2009 (acres)
Marine intertidal	227,800
Estuarine intertidal non-vegetated	1,017,700
Estuarine intertidal vegetated	4,539,700
All intertidal waters and wetlands	5,785,200
Freshwater ponds	6,709,300
Freshwater vegetated	97,565,300
• Freshwater emergent wetlands	27,430,500
• Freshwater shrub wetlands	18,511,500
• Freshwater forested wetlands	51,623,300
All freshwater wetlands	104,274,600
Lacustrine deepwater habitats	16,859,600
Riverine deepwater habitats	7,510,500
Estuarine subtidal habitats	18,776,500
All wetlands and deepwater habitats	153,206,400

The acreage of lacustrine deepwater habitats does not include the open waters of Great Lakes (Dahl 2011).

The Federal Geographic Data Committee has established the Cowardin system developed by the USFWS (Cowardin et al. 1979) as the national standard for wetland mapping, monitoring, and data reporting (Dahl 2011) (see Federal Geographic Data Committee (2013)). The Cowardin system is a hierarchical system which describes various wetland and deepwater habitats, using structural characteristics such as vegetation, substrate, and water regime as defining characteristics. Wetlands are defined by plant communities, soils, or inundation or flooding frequency. Deepwater habitats are permanently flooded areas located below the wetland boundary. In rivers and lakes, deepwater habitats are usually more than two meters deep. The Cowardin et al. (1979) definition of “wetland” differs from the definition used by the Corps and U.S. EPA for the purposes of implementing Section 404 of the Clean Water Act. The Corps-U.S. EPA regulations defines wetlands as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.” [33 CFR 328.3(c)(4); 40 CFR 230.3(o)(3)(iv)] The Cowardin et al. (1979) requires only one factor (i.e., wetland vegetation, soils, hydrology) to be

present for an area to be a wetland, while the Corps-U.S. EPA wetland definition requires all three factors to be present under normal circumstances (Tiner 2017, Mitsch and Gosselink 2015). The NWI produced by applying the Cowardin et al. (1979) definition is the only national scale wetland inventory available. There is no national inventory of wetland acreage based on the Corps' wetland definition at 33 CFR 328.3(c)(16).

There are five major systems in the Cowardin classification scheme: marine, estuarine, riverine, lacustrine, and palustrine (Cowardin et al. 1979). The marine system consists of open ocean on the continental shelf and its high energy coastlines. The estuarine system consists of tidal deepwater habitats and adjacent tidal wetlands that are usually partially enclosed by land, but may have open connections to open ocean waters. The riverine system generally consists of all wetland and deepwater habitats located within a river channel. The lacustrine system generally consists of wetland and deepwater habitats located within a topographic depression or dammed river channel, with a total area greater than 20 acres. The palustrine system generally includes all non-tidal wetlands and wetlands located in tidal areas with salinities less than 0.5 parts per thousand; it also includes ponds less than 20 acres in size. Approximately 95 percent of wetlands in the conterminous United States are freshwater wetlands, and the remaining 5 percent are estuarine or marine wetlands (Dahl 2011).

The National Resources Inventory (NRI) is a statistical survey conducted by the Natural Resources Conservation Service (NRCS) (USDA 2018) of natural resources on non-federal land in the United States. The NRCS defines non-federal land as privately owned lands, tribal and trust lands, and lands under the control of local and state governments. Acreages of palustrine and estuarine wetlands and the land uses those wetlands are subjected to are summarized in Table 4.3. The 2015 NRI estimates that there are 110,638,500 acres of palustrine and estuarine wetlands on non-Federal land and water areas in the United States (USDA 2018). The 2015 NRI estimates that there are 49,598,800 acres of open waters on non-Federal land in the United States, including lacustrine, riverine, and marine habitats, as well as estuarine deepwater habitats.

Table 4.3. The 2015 National Resources Inventory acreages for palustrine and estuarine wetlands on non-federal land, by land cover/use category (USDA 2018).

National Resources Inventory Land Cover/Use Category	Area of Palustrine and Estuarine Wetlands (acres)
cropland, pastureland, and Conservation Reserve Program land	17,300,000
forest land	65,800,000
rangeland	7,800,000
other rural land	14,600,000
developed land	1,500,000
water area	3,600,000
Total	111,000,000

The land cover/use categories used by the 2015 NRI are defined below (USDA 2018). Croplands are areas used to produce crops grown for harvest. Pastureland is land managed for livestock grazing, through the production of introduced forage plants. Conservation Reserve Program land is under a Conservation Reserve Program contract. Forest land is comprised of at least 10 percent single stem woody plant species that will be at least 13 feet tall at maturity. Rangeland is land on which plant cover consists mostly of native grasses, herbaceous plants, or shrubs suitable for grazing or browsing, and introduced forage plant species. Other rural land consists of farmsteads and other farm structures, field windbreaks, marshland, and barren land. Developed land is comprised of large urban and built-up areas (i.e., urban and built-up areas 10 acres or more in size), small built-up areas (i.e., developed lands 0.25 to 10 acres in size), and rural transportation land (e.g., roads, railroads, and associated rights-of-way outside urban and built-up areas). Water areas are comprised of waterbodies and streams that are permanent open waters.

The wetlands data from the Fish and Wildlife Service's Status and Trends study and the Natural Resources Conservation Service's National Resources Inventory should not be compared, because they use different methods and analyses to produce their results (Dahl 2011).

Activities authorized by NWPs will adversely affect a smaller proportion of the Nation's wetland base than indicated by the wetlands acreage estimates provided in the most recent status and trends report, or the NWI maps for a particular region.

Not all wetlands, streams, and other types of aquatic resources are subject to federal jurisdiction under the Clean Water Act (Mitsch and Gosselink 2015). Two U.S. Supreme Court decisions have identified limits to Clean Water Act jurisdiction.

In 2001, in *Solid Waste Agency of Northern Cook County v. Army Corps of Engineers* (531 U.S. 159) the U.S. Supreme Court held that the use of isolated, non-navigable, intrastate waters by migratory birds is not, by itself a sufficient basis for exercising federal regulatory authority under the Clean Water Act (see 80 FR 37056). In the Supreme Court's 2006 decision in *Rapanos* v. *United States,* (547 U.S. 715), one justice stated that waters and wetlands regulated under the Clean Water Act must have a "significant nexus" to downstream traditional navigable waters. Four justices (the plurality) concluded that Clean Water Act jurisdiction applies only to relatively permanent waters connected to traditional navigable waters and to wetlands that have a continuous surface connection to those relatively permanent waters. The remaining justices in *Rapanos* stated that Clean Water Act jurisdiction applies to waters and wetlands that meet either the significant nexus test or the Plurality's test.

There are 94,133 miles of shoreline in the United States (NOAA 1975). Of that shoreline, 88,633 miles are tidal shoreline and 5,500 miles are shoreline along the Great Lakes and rivers that connect those lakes to the Atlantic Ocean. More recently, Gittman et al. (2015) estimated that there are 99,524 miles of tidal shoreline in the conterminous United States.

4.2 Quality of Aquatic Ecosystems in the United States

The USFWS status and trends study does not assess the condition or quality of wetlands and deepwater habitats (Dahl 2011). Information on water quality in waters and wetlands, as well as the causes of water quality impairment, is collected by the U.S. EPA under Sections 305(b) and 303(d) of the Clean Water Act. Table 4.4 provides U.S. EPA's most recent national summary of water quality in the Nation's waters and wetlands.

Table 4.4. National summary of water quality data (U.S. EPA, https://iaspub.epa.gov/waters10/attains_nation_cy.control accessed 11/27/2020).

Category of water	Total waters	Total waters assessed	Percent of waters assessed	Good waters	Threatened waters	Impaired waters
Rivers and streams	3,533,205 miles	1,110,961 miles	31.4	518,293 miles	4,495 miles	588,173 miles
Lakes, reservoirs and ponds	41,666,049 acres	18,629,795 acres	44.7	5,390,570 acres	30,309 acres	13,208,917 acres
Bays and estuaries	87,791 square miles	56,141 square miles	63.9	11,516 square miles	0 square miles	44,625 square miles
Coastal shoreline	58,618 miles	4,627 miles	7.9	1,298 miles	0 miles	3,329 miles
Ocean and near coastal waters	54,120 square miles	6,944 square miles	12.8	726 square miles	0 square miles	6,218 square miles
Wetlands	107,700,000 acres	1,242,252 acres	1.2	569,328 acres	0 acres	672,924 Acres
Great Lakes shoreline	5,202 miles	4,460 miles	85.7	106 miles	0 miles	4,354 miles
Great Lakes open waters	196,343 square miles	39,231 square miles	20.0	1 square mile	0 square miles	39,230 square miles

Waters and wetlands classified by states as “good” meets all their designated uses. Waters classified as “threatened” currently support all of their designated uses, but if pollution control measures are not taken one or more of those uses may become impaired in the future. A water or wetland is classified by the state as “impaired” if any one of its designated uses is not met. The definitions of “good,” “threatened,” and “impaired” are applied by states to describe the quality of their waters (the above definitions were found in the metadata in U.S. EPA (2015)). Designated uses include the “protection and propagation of fish, shellfish and wildlife,” “recreation in and on the water,” the use of waters for “public water supplies, propagation of fish, shellfish, wildlife, recreation in and on the water,” and “agricultural, industrial and other purposes including navigation.” (40 CFR 130.3). These designated uses are assessed by states in a variety of ways, by examining various physical, chemical and biological characteristics, so it is not possible to use the categories of “good,” “threatened,” and “impaired” to infer the level of ecological functions and services these waters perform.

According to the latest U.S. EPA national summary data, 52.9 percent of assessed

rivers and streams, 70.9 percent of assessed lakes, reservoirs, and ponds, 79.5 percent of assessed bays and estuaries, 71.9 percent of assessed coastal shoreline, 89.5 percent of assessed ocean and near coastal waters, 54.2 percent of assessed wetlands, 97.6 percent of assessed Great Lakes shoreline, and 100 percent of Great Lakes open water are impaired.

Twenty-eight causes of impairment were identified for bays and estuaries. The top 10 causes of impairment for these waters are: polychlorinated biphenyls, nutrients, mercury, turbidity, dioxins, toxic organics, metals (other than mercury), pesticides, pathogens, and organic enrichment/oxygen depletion. For bays and estuaries, the top 10 sources of impairment are: legacy/historic pollutants, urban-related runoff/stormwater, unknown sources, atmospheric deposition, municipal discharges/sewage, unspecified non-point sources, other sources, natural/wildlife, agriculture, and industrial.

Coastal shorelines were impaired by 16 identified causes, the top 10 of which are: mercury, pathogens, turbidity, organic enrichment/oxygen depletion, pH/acidity/caustic conditions, nutrients, oil and grease, temperature, cause unknown – impaired biota, and algal growth. The top 10 sources of impairment of coastal shorelines are municipal discharges/sewage, urban-related runoff/stormwater, unknown sources, recreational boating and marinas, hydromodification, industrial, unspecified non-point sources, agriculture, legacy/historic pollutants, and land application/waste sites/tanks.

Ocean and near coastal waters were impaired by 16 identified causes, the top 10 of which are: mercury, organic enrichment/oxygen depletion, pathogens, metals (other than mercury), pesticides, turbidity, nuisance exotic species, total toxics, pH/acidity/caustic conditions, and polychlorinated biphenyls. The top 10 sources of impairment of ocean and near coastal waters are: atmospheric deposition, unknown sources, unspecified non-point sources, other sources, recreation and tourism (non-boating), recreational boating and marinas, urban-related runoff/stormwater, hydromodification, municipal discharges/sewage, and construction.

Water quality standards are established by states, with review and approval by the U.S. EPA (see Section 303(c) of the Clean Water Act and the implementing regulations at 40 CFR part 131). Under Section 401 of the Clean Water Act States review proposed discharges to determine compliance with applicable water quality standards.

Most causes and sources of impairment identified by states in the water quality summary discussed above are not due to activities regulated under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act of 1899. Inputs of sediments into aquatic ecosystems can result from erosion occurring within a watershed (Beechie et al. 2013, Gosselink and Lee 1989). As water moves through a watershed it carries sediments and pollutants to streams (e.g., Allan 2004, Dudgeon et al. 2005, Paul and Meyer 2001) and wetlands (e.g., Zedler and Kercher

2005, Wright et al. 2006). Non-point sources of pollution (i.e., pollutants carried in runoff from farms, roads, and urban areas) are largely uncontrolled (Brown and Froemke 2012) because the Clean Water Act only requires permits for point sources discharges of pollutants (i.e., discharges of dredged or fill material regulated under section 404 and point source discharges of other pollutants regulated under section 402). Estuaries across the world have been substantially degraded by human activities (NRC 2010). Habitat alterations as a cause or source of impairment may be the result of activities regulated under section 404 and section 10 because they involve discharges of dredged or fill material or structures or work in navigable waters, but habitat alterations may also occur as a result of activities not regulated under those two statutes, such as the removal of vegetation from upland riparian areas. Hydrologic modifications may or may not be regulated under section 404 or section 10.

The indirect effects of changes in upland land use (which are highly likely not to be subject to federal control and responsibility, at least in terms of the Corps Regulatory Program), including the construction and expansion of upland developments, have substantial adverse effects on the quality (i.e. the ability to perform hydrologic, biogeochemical, and habitat functions) of jurisdictional waters and wetlands because those upland activities alter watershed-scale processes. Those watershed-scale processes include water movement and storage, erosion and sediment transport, and the transport of nutrients and other pollutants.

Habitat alterations as a cause or source of impairment may be the result of activities regulated under section 404 and section 10 because they involve discharges of dredged or fill material into jurisdictional waters or structures or work in navigable waters, but habitat alterations may also occur as a result of activities not regulated under those two statutes, such as the removal of vegetation from upland riparian areas. Hydrologic modifications may or may not be regulated under section 404 or section 10, depending on whether those hydrologic modifications are the result of discharges of dredged or fill material into waters of the United States regulated under Section 404 of the Clean Water Act or structures or work in navigable waters of the United States regulated under Section 10 of the Rivers and Harbors Act of 1899. When states, tribes, or the U.S. EPA establish total daily maximum loads (TMDLs) for pollutants and other impairments for specific waters, there may be variations in how these TMDLs are defined (see 40 CFR part 130).

As discussed below, many anthropogenic activities and natural processes affect the ability of jurisdictional waters and wetlands to perform ecological functions. Stream and river functions are affected by activities occurring in their watersheds, including the indirect effects of land uses changes (Beechie et al. 2013, Allan 2004, Paul and Meyer 2001). Booth at al. (2004) found riparian land use in residential areas also strongly affects stream condition because many landowners clear vegetation up to the edge of the stream bank. The removal of vegetation from upland riparian areas and other activities in those non-jurisdictional areas do not require DA authorization. Wetland functions are also affected by indirect effects of land use activities in the

land area that drains to the wetland (Zedler and Kercher 2005, Wright et al. 2006). Human activities within a watershed or catchment that have direct or indirect adverse effects on rivers, streams, wetlands, and other aquatic ecosystems are not limited to discharges of dredged or fill material into waters of the United States or structures or work in a navigable waters. Human activities in uplands have substantial indirect effects on the structure and function of aquatic ecosystems, including streams and wetlands, and their ability to sustain populations of listed species. It is extremely difficult to distinguish between degradation of water quality caused by upland activities and degradation of water quality caused by the filling or alteration of wetlands (Gosselink and Lee 1989).

4.3 Aquatic Resource Functions and Services

Functions are the physical, chemical, and biological processes that occur in ecosystems (33 CFR 332.2). Wetland functions occur through interactions of their physical, chemical, and biological features (Smith et al. 1995). Wetland functions depend on a number of factors, such as the movement of water through the wetland, landscape position, surrounding land uses, vegetation density within the wetland, geology, soils, water source, and wetland size (NRC 1995). In its evaluation of wetland compensatory mitigation in the Clean Water Act Section 404 permit program, the National Research Council (2001) recognized five general categories of wetland functions:

- Hydrologic functions
- Water quality improvement
- Vegetation support
- Habitat support for animals
- Soil functions

Hydrologic functions include short- and long-term water storage and the maintenance of wetland hydrology (NRC 1995). Water quality improvement functions encompass the transformation or cycling of nutrients, the retention, transformation, or removal of pollutants, and the retention of sediments (NRC 1995). Vegetation support functions include the maintenance of plant communities, which support various species of animals as well as economically important plants. Wetland soils support diverse communities of bacteria and fungi which are critical for biogeochemical processes, including nutrient cycling and pollutant removal and transformation (NRC 2001). Wetland soils also provide rooting media for plants, as well as nutrients and water for those plants. These various functions generally interact with each other, to influence overall wetland functioning, or ecological integrity (Smith et al. 1995; Fennessy et al. 2007). As discussed earlier in this report, the Corps regulations at 33 CFR 320.4(b) list wetland functions that are important for the public interest review during evaluations of applications for DA permits, and for the issuance of general permits.

Not all wetlands perform the same functions, nor do they provide functions to the

same degree (Smith et al. 1995). Therefore, it is necessary to account for individual and regional variation when evaluating wetlands and the functions and services they provide. The types and levels of functions performed by a wetland are dependent on its hydrologic regime, the plant species inhabiting the wetland, soil type, and the surrounding landscape, including the degree of human disturbance of the landscape (Smith et al. 1995).

Ecosystem services are the benefits that humans derive from ecosystem functions (33 CFR 332.2). The Millennium Ecosystem Assessment (2005a) describes four categories of ecosystem services: provisioning services, regulating services, cultural services, and supporting services. For wetlands and open waters, provisioning services include the production of food (e.g., finfish, shellfish, seaweeds), fresh water storage, food and fiber production, production of chemicals that can be used for medicine and other purposes, and supporting genetic diversity for resistance to disease. Regulating services relating to open waters and wetlands consist of climate regulation, control of oceanographic and hydrologic flows, water quality through the removal, retention, and recovery of nutrients and pollutants, erosion control, mitigating natural hazards such as floods, and providing habitat for pollinators. Cultural services that come from wetlands and open waters include spiritual and religious values, recreational opportunities, aesthetics, and education. Wetlands and open waters contribute supporting services such as soil formation, sediment retention, and nutrient cycling.

Aquatic ecosystems in the current affected environment provide a wide variety of ecological functions and services to differing degrees (MEA 2005a) to human communities. Degraded ecosystems can provide ecological functions and services that continue to provide some conservation value (Weins and Hobbs 2015).

Marine ecosystems provide a number of ecosystem services, including fish production; materials cycling (e.g., nitrogen, carbon, oxygen, phosphorous, and sulfur); transformation, detoxification, and sequestration of pollutants and wastes produced by humans; support of ocean-based recreation, tourism, and retirement industries; and coastal land development and valuation, including aesthetics related to living near the ocean (Peterson and Lubchenco 1997).

Seagrasses provide ecological services such as organic carbon production, detrital export, nutrient cycling, sediment stabilization, increased biodiversity, habitat for a variety of aquatic organisms (including fish species of recreational and commercial importance), and energy exchanges with other aquatic habitats (Orth et al. 2006).

Costanza et al. (2014) estimated the value of ecosystem services, by general categories of ecosystem type. Their estimates, based on data analysis conducted in 2011 and using the 2007 value of the U.S. dollar, are provided in Table 4.5. The ecosystem categories providing the highest values of ecosystem services by acre per year were coral reefs ($142,661 per acre per year), followed by tidal marshes

and mangrove wetlands ($78,506 per acre per year). Forested and floodplain wetlands had a value of $10,401 per acre per year.

Table 4.5 – Estimates of the value of ecosystem services, by ecosystem category (Costanza et al. 2014)

Ecosystem category	2007$ per acre per year
Marine	554
open ocean	24
coastal	3,622
• estuaries	11,711
• seagrass/algae beds	11,711
• coral reefs	142,661
• coastal shelf	900
Terrestrial	1,985
forest	1,539
• tropical	2,180
• temperate/boreal	1,270
grass/rangelands	1,687
wetlands	56,770
• tidal marsh/mangroves	78,506
• swamps/floodplains	10,401
lakes/rivers	5,067
desert	-
tundra	-
ice/rock	-
cropland	2,255
urban	2,698

When natural ecosystems are converted to human-dominated ecosystems, there are tradeoffs between the losses in ecosystem services provided by natural ecosystems and the gains in goods and services provided by land use changes, resource extraction, harvesting, and other activities (MEA 2005c). For thousands of years, human communities have altered landscapes and ecosystems to serve their needs, such as food, safety, and commerce, and made trade-offs by increasing certain ecosystem functions and services while reducing other ecosystem functions and services (Karieva et al. 2007).

This NWP authorizes structures in navigable waters of the United States, including federal waters on the outer continental shelf for finfish mariculture activities. This NWP may also authorize structures in navigable waters of the United States, including federal waters on the outer continental shelf, for multi-trophic mariculture activities that cultivate a combination of finfish, seaweed, and bivalve molluscs. The waters in which this NWP can be used are the estuarine and marine systems of the Cowardin classification system.

Activities authorized by this NWP will provide a wide variety of goods and services that are valued by society. For example, finfish mariculture activities provide

sources of protein and other nutrients to human populations (Duarte et al. 2009). Finfish mariculture activities can provide ecosystem services beyond provisioning services (food production) (Alleway et al. 2019), in waters that have been altered by human activities. Spatial planning for finfish mariculture activities can help identify locations where these cultivation activities can provide greater levels of ecosystem services (Alleway et al. 2019), and minimize adverse environmental impacts (Lester et al. 2018, Gentry et al. 2016). However, finfish aquaculture, as well as cultivation of shellfish and seaweed in multi-species operations may also result in declines in water quality, entanglement, and other adverse effects to marine species and their habitats that would have to be addressed in project design and operation.

4.4 Human Activities and Natural Factors that Affect the Quantity and Quality of Aquatic Ecosystems in the United States

The affected environment is the current environmental setting against which the environmental effects of the proposed action is evaluated, to determine whether the issuance of the NWP will have a significant impact on the quality of the human environment. The affected environment is also used as a basis for comparison to determine whether activities authorized by the NWP will result in no more than minimal individual and cumulative adverse environmental effects when added to the current environmental setting.

For thousands of years, humans have caused substantial impacts on ecosystems and the ecological functions and services they provide (Ellis et al. 2010, Evans and Davis 2018). Around the beginning of the 19th century, the degree of impacts of human activities on the Earth's ecosystems began to exceed the degree of impacts to ecosystems caused by natural disturbances and variability (Steffen et al. 2007). All of the Earth's ecosystems have been affected either directly or indirectly by human activities (Vitousek et al. 1997). Over 75 percent of the ice-free land on Earth has been altered by human occupation and use (Ellis and Ramankutty 2008). Approximately 33 percent of the Earth's ice-free land consists of lands heavily used by people: urban areas, villages, lands used to produce crops, and occupied rangelands (Ellis and Ramankutty 2008). For marine ecosystems, Halpern et al. (2008) determined that there are no marine waters that are unaffected by human activities, and that 41 percent of the area of ocean waters are affected by multiple anthropogenic stressors (e.g., land use activities that generate pollution that go to coastal waters, marine habitat destruction or modification, and the extraction of resources). The marine waters most highly impacted by human activities are continental shelf and slope areas, which are affected by both land-based and ocean-based human activities (Halpern et al. 2008). Human population density is a good indicator of the relative effect that people have had on local ecosystems, with lower population densities causing smaller impacts to ecosystems and higher population densities having larger impacts on ecosystems (Ellis and Ramankutty 2008). Human activities such as urbanization, agriculture, and forestry alter ecosystem structure and function by changing their interactions with other

ecosystems, their biogeochemical cycles, and their species composition (Vitousek et al. 1997). Changes in land use reduce the ability of ecosystems to produce ecosystem services, such as food production, reducing infectious diseases, and regulating climate and air quality (Foley et al. 2005).

Ecosystems are not separate from human communities, and they are interdependent and comprise a single social-ecological system (Folke et al. 2011). Social-ecological systems are altered by human activities, as well as natural perturbations and changing environmental conditions, but they possess resilience and adaptive capacities that allow them to continue to provide ecological functions and services when properly managed (Chapin et al. 2010). Social-ecological systems exist at a number of scales, ranging from local to regional to global (Folke et al. 2010). Despite the prevalence of human activities altering landscapes and seascapes and the ecosystems within those landscapes and seascapes over long periods of time, many of those ecosystems continue to provide ecological functions and services to varying degrees (Clewell and Aronson 2013). Disturbances to ecosystems, landscapes, and seascapes may result in those systems recovering to their original state through biotic and abiotic characteristics and processes that provide resilience, or those systems may be transformed to a different ecological state (i.e., an alternative stable state) (van Andel and Aronson 2012). From the perspective of social-ecological systems, resilience is defined by Folke et al. (2010) as the capacity of a social-ecological system to withstand disturbance and undergo changes, while retaining its ability to exhibit similar structure, functions, and interactions. If the ecosystem, landscape, or seascape changes to an alternative stable state, the alternative stable state may be considered an improvement or degradation, depending on the perspective of the person evaluating the change (Backstrom et al. 2018, van Andel and Aronson 2012). This NWP will be used to authorize certain activities that require DA authorization in these social-ecological systems, and the potential environmental consequences of the reissuance of this NWP is evaluated under the current environmental setting and the potential impacts to jurisdictional waters and wetlands that may occur during the 5-year period this NWP is anticipated to be in effect. The environmental consequences of the reissuance of this NWP is also considered for the various public interest review factors in section 6.0 of this document, which include social and ecological components.

Recent changes in climate have had substantial impacts on natural ecosystems and human communities (IPCC 2014). Climate change, both natural and anthropogenic, is a major driving force for changes in ecosystem structure, function, and dynamics (Millar and Brubaker 2006). However, there are other significant drivers of change to aquatic and terrestrial ecosystems. In addition to climate change, aquatic and terrestrial ecosystems are also adversely affected by land use and land cover changes, natural resource extraction (including water withdrawals), pollution, species introductions, and removals of species (NAS and RS 2019, Staudt et al. 2013, Bodkin 2012, MEA 2005a) and changes in nutrient cycling (Julius et al. 2013). During the past century, changes to ecosystems have been driven primarily by

changes in biological factors, such as land use/land cover changes and the spread of non-native species, but in the future changes in abiotic processes, such as climate change and nitrogen deposition, may become predominant drivers of ecosystem change (Radeloff et al. 2015). The current contribution of climate change to changes in ecosystems is small compared to other anthropogenic causes of change to ecosystems (Radeloff et al. 2015, Williams et al. 2019) that are identified above, especially land use and land cover changes.

Table 4.6 – Human activities and natural factors that cause changes in aquatic ecosystems and the functions and services they perform

Resource type(s)	Human activities and natural factors that drive ecosystem change	Reference(s)
wetlands and waters (generally)	• land use/land cover changes • alien species introductions • species overexploitation • pollution • eutrophication • resource extraction (e.g., water withdrawals) • climate change • natural disturbances	MEA (2005a)
wetlands, including estuaries	• wetland conversion through drainage, dredging, and filling • hydrologic modifications that change wetland hydrology and hydrodynamics • pollutants (point source and non-point source), including nutrients and contaminants • waterfowl and wildlife management activities • agriculture and aquaculture activities • flood control and stormwater protection (e.g., severing hydrologic connections between rivers and floodplain wetlands) • silvicultural activities • agricultural activities • urban development • mining activities • water withdrawals, aquifer depletion • river management (e.g., channelization, navigation improvements, dams, locks, weirs) • altered sediment transport • introductions of non-native species • land subsidence, erosion	Mitsch and Gosselink (2015) Mitsch and Hernandez (2013) Wright et al. (2006) Zedler and Kercher (2005) Brinson and Malvárez (2002)

Resource type(s)	Human activities and natural factors that drive ecosystem change	Reference(s)
seagrass beds	• dredging • coastal development activities • degradation of water quality • sediment and nutrient runoff from adjacent lands • physical disturbances • natural processes, such as herbivore grazing, physical disturbances caused by waves and tidal currents • invasive species • diseases • commercial fishing activities • aquaculture • algal blooms • low light availability • nutrient limitations • global climate change	Borum et al. (2013) Waycott et al. (2009) Orth et al. (2006)
coral reefs	• overexploitation/overfishing • destructive fishing practices • nutrients, sediments, pesticides, and other pollutants (point source and non-point source) • nutrient loading • changes in storm frequency and intensity • increasing ocean surface temperatures • ocean acidification • coastal land uses, including development and agriculture • coral mining • sea level rise • invasive species • diseases • bleaching • global climate change	Sheppard (2014) MEA (2005a) Hughes et al. (2003)

coastal areas	• development activities, including the construction of residences, commercial buildings, industrial facilities, resorts, and port developments • agricultural and forestry activities • point source and non-point source pollution (nutrients, organic matter, other pollutants) • aquaculture • fishing activities • overharvesting of species • intentional and unintentional introductions of non-native species • dredging • reclamation • shore protection and other structures • habitat modifications • changes to hydrology and hydrodynamics • global climate change • shoreline erosion • pathogens and toxins • debris and litter	Robb (2014) Day et al. (2013) Lotze et al. (2006) MEA (2005b) NRC (1994)
oceans	• pollution (point and non-point source) • fishing activities • changes in sea temperatures • ultraviolet light • ocean acidification • species invasions • commercial activities • other human activities • benthic structures • offshore energy infrastructure (e.g., wind farms, pipelines)	Halpern et al. (2015) Halpern et al. (2008)

Aquatic resources and the functions and services they provide are directly and indirectly affected by changes in land use and land cover, alien species introductions, overexploitation of species, pollution, eutrophication due to excess nutrients, resource extraction including water withdrawals, climate change, and various natural disturbances (MEA 2005a). Cumulative effects to aquatic resources that form the current environmental setting are the result of landscape-level processes (Gosselink and Lee 1989) or seascape-level processes. As discussed in more detail below, cumulative or aggregate effects to aquatic resources are caused by a variety of activities (including activities that occur entirely in uplands) that take place within a landscape unit, such as the watershed for a river or stream (e.g., Allan 2004, Paul and Meyer 2001, Leopold 1968) or the contributing drainage area for a wetland (e.g., Wright et al. 2006, Brinson and Malvárez 2002, Zedler and Kercher 2005).

There is little national-level information on the current ecological state of the Nation's wetlands, streams, and other aquatic resources, or the general degree to which they perform various ecological functions, although reviews have

acknowledged that most of these aquatic resources are degraded to some degree (Zedler and Kercher 2005, Allan 2004) or impaired (U.S. EPA 2015) because of various activities, disturbances, and other stressors. Therefore, the analysis in this environmental assessment is a qualitative analysis.

There is a wide variety of causes and sources of impairment of the Nation's estuarine waters and marine waters (U.S. EPA 2015), which also contribute to cumulative effects to these aquatic resources. Many of those causes of impairment are point and non-point sources of pollutants that are not regulated under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act of 1899. Two common causes of impairment for estuarine and marine waters, habitat alterations and flow alterations, may be due in part to activities regulated by the Corps under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899. Habitat and flow alterations may also be the caused by activities that do not involve discharges of dredged or fill material or structures or work in navigable waters. For wetlands, impairment due to habitat alterations, flow alterations, and hydrology modifications may involve activities regulated under section 404, but these causes of impairment may also be due to unregulated activities, such as changes in upland land use that affects the movement of water through a watershed or contributing drainage area or the removal of vegetation.

The Millennium Ecosystem Assessment (MEA 2005a) broadly defines wetlands as inland wetlands (e.g., swamps, marshes, lakes, rivers, peatlands, and underground water habitats), coastal and near-shore marine wetlands (e.g., coral reefs, mangroves, seagrass beds, and estuaries), and human-made wetlands (e.g., rice fields, dams, reservoirs, and fish ponds). According to the MEA (2005a), the principal drivers of direct change to estuarine and marine wetlands include the conversion of saltwater marshes, mangroves, seagrass meadows, and coral reefs to other land uses, diversions of freshwater flows, increased inputs of nitrogen, overharvesting various species, water temperature changes, and species introductions. These changes are indirectly driven by increases in human populations in coastal areas (MEA 2005a). Robb (2014) identified a number of threats to estuaries and estuarine habitats such as salt marshes, seagrass beds, and sand flats. Those threats include land-based activities in surrounding watersheds, such as development activities, agricultural activities, forestry activities, pollution, freshwater diversions, shoreline stabilization, waterway impairments, and inputs of debris and litter. With respect to activities occurring directly in coastal waters, Robb (2014) identified the following threats: shoreline development, the construction and operation of port facilities, dredging, marine pollution, aquaculture activities, resource extraction activities, species introductions, and recreational activities. Changing climate conditions also pose threats to estuaries through sea level rise, changing water temperatures, ocean acidification, and changing precipitation patterns (Robb 2014).

Marine and coastal waters are affected by human activities in the ocean, coastal areas, and watersheds that drain to those marine and coastal waters (Korpinen and

Andersen 2016). In marine and coastal environments, human activities and other disturbances that affect resources in those waters can come from a variety of sources, including water-based activities (e.g., transportation, fishing, mariculture, power generation, and tourism) and land-based activities (e.g., urban and suburban development, agriculture, non-point source pollution, forestry activities, power generation, and mining activities) (Clark Murray et al. 2014).

Waycott et al. (2009) estimated that the areal extent of seagrass beds across the world has declined by nearly 30 percent since the late 19th century. They identified two main categories of causes for that decline: direct impacts from dredging and coastal development activities, and indirect impacts from degradation of water quality. Submersed aquatic vegetation is affected by a wide variety of human activities such as dredging in seagrass meadows, anchoring vessels in seagrass beds, coastal development activities, increased sediment inputs from a variety of sources including land development activities, habitat conversions resulting from mariculture activities, increased nutrient inputs to coastal waters, and climate change (MEA 2005a). According to Orth et al. (2006), seagrasses are threatened by numerous stressors, such as sediment and nutrient runoff from adjacent lands, physical disturbances, overgrazing, invasive species, diseases, commercial fishing activities, aquaculture, algal blooms, and global climate change. Human activities that contribute to cumulative effects to submerged aquatic vegetation include coastal development, hard shore stabilization structures, land uses changes in surrounding watersheds that increase inputs of sediments, nutrients, and pollutants to waters inhabited (or could be inhabited) by seagrasses, discharges of pollutants directly into waters, aquaculture activities, and boating activities (Orth et al. 2017, Orth et al. 2006). Orth et al. (2017, 2006) did not quantify how frequently each of these stressors pose threats to seagrasses. the relative contributions of each of the identified human activities that affect seagrasses. Submersed aquatic vegetation may be affected by natural processes, such as herbivore grazing, physical disturbances caused by waves and tidal currents, and other stressors such as low light availability, higher temperatures, or nutrient limitations (Borum et al. 2013). Boating activities (e.g., mooring, use of propellers) and fish and shellfish harvesting activities can also contribute to cumulative impacts to submersed aquatic vegetation beds (Fonseca et al. 1998). The recovery of submersed aquatic vegetation from anthropogenic and natural disturbances can vary by species, and is dependent in part on the reproductive mechanisms of those species (Borum et al. 2013, Fonseca et al. 1998). At the meadow or landscape scale, seagrass beds can fully recover after disturbance within 5 years, but recovery can take longer if there are persistent environmental changes persist or seagrass seeds or other propagules are not available to reestablish seagrasses in the affected area (O'Brien et al. 2018).

A variety of human activities have caused, and are continuing to cause declines in corals and coral reefs. Coral reefs are adversely affected by pollution, including sedimentation, excess nutrients, oil discharges, pesticides, and sewage (Sheppard 2014; MEA 2005a; Hughes et al. 2003). Shoreline development activities, development activities in watersheds draining to coastal waters, and agriculture

activities in coastal watersheds also contribute to declines in corals and coral reefs (Sheppard 2014; MEA 2005a; Hughes et al. 2003). The pollution may be in runoff from nearby lands or discharged directly into waters inhabited by corals. Corals and coral reefs are also harmed by overexploitation, including overfishing, as well as destructive fishing practices (MEA 2005a) and anchors used by boats (Sheppard 2014). Climate change and associated increases in storm frequency and intensity, diseases, water temperatures, and coral bleaching also contribute to declines in corals and coral reefs (Sheppard 2014; MEA 2005a; Hughes et al. 2003). Invasive species have also affected corals and coral reefs (Sheppard 2014).

For aquatic ecosystems, climate change affects water quality, biogeochemical cycling, and water storage (Julius et al. 2013). Climate change will also affect the abundance and distribution of wetlands across the United States, as well as the functions they provide (Mitsch and Gosselink 2015). Climate change results in increases in water temperatures, more waterbodies with anoxic conditions, degradation of water quality, and increases in flood and drought frequencies (Julius et al. 2013). The increasing carbon dioxide concentration in the atmosphere also changes the pH of the oceans, resulting in ocean acidification (RS and NAS 2014), which adversely affects corals and some other marine organisms.

In the United States, approximately 39 percent of its population lives in counties that are next to coastal waters, the territorial seas, or the Great Lakes (NOAA 2013). Those counties comprise less than 10 percent of the land area of the United States (NOAA 2013). Humans have been altering estuarine waters and coastal areas for millennia, but those changes have rapidly accelerated over the past 150 to 300 years (Lotze et al. 2006). Coastal waters are also affected by a wide variety of activities. Day et al. (2013) identified the following general categories of human activities that impact estuaries: physical alterations (e.g., habitat modifications and changes in hydrology and hydrodynamics), increases in inputs of nutrients and organic matter (enrichment), releases of toxins, and changes in biological communities as a result of harvesting activities and intentional and unintentional introductions of new species. The major drivers of changes to coastal areas are: development activities that alter coastal forests, wetlands, and coral reef habitats for aquaculture and the construction of urban areas, industrial facilities, and resort and port developments (MEA 2005b). Dredging, reclamation, shore protection and other structures (e.g., causeways and bridges), and some types of fishing activities also cause substantial changes to coastal areas (MEA 2005b). Nitrogen pollution to coastal zones change coral reef communities (MEA 2005b). Adverse effects to coastal waters are caused by habitat modifications, point source pollution, non-point source pollution, changes to hydrology and hydrodynamics, exploitation of coastal resources, introduction of non-native species, global climate change, shoreline erosion, and pathogens and toxins (NRC 1994). Over the course of history, in estuarine waters human activities caused declines of greater than 90 percent of important species, losses of more than 65 percent of seagrasses and wetland habitat, substantially degraded water quality, and facilitated introductions of new species (Lotze et al. 2006).

Substantial alterations of coastal hydrology and hydrodynamics are caused by land use changes in watersheds draining to coastal waters, the channelization or damming of streams and rivers, water consumption, and water diversions (NRC 1994). Approximately 52 percent of the population of the United States lives in coastal watersheds (NOAA 2013). Eutrophication of coastal waters is caused by nutrients contributed by waste treatment systems, non-point sources, and the atmosphere, and may cause hypoxia or anoxia in coastal waters (NRC 1994). Changes in water movement through watersheds may also alter sediment delivery to coastal areas, which affects the sustainability of wetlands and intertidal habitats and the functions they provide (NRC 1994). Most inland waters in the United States drain to coastal areas, and therefore activities that occur in inland watersheds affect coastal waters (NRC 1994). Inland land uses, such as agriculture, urban development, and forestry, adversely affect coastal waters by diverting fresh water from estuaries and by acting as sources of nutrients and pollutants to coastal waters (MEA 2005b).

Coastal wetlands have been substantially altered by urban development and changes to the watersheds that drain to those wetlands (Mitsch and Hernandez 2013). Coastal habitat modifications are the result of dredging or filling coastal waters, inputs of sediment via non-point sources, changes in water quality, or alteration of coastal hydrodynamics (NRC 1994). Coastal development activities, including those that occur in uplands, affect marine and estuarine habitats (MEA 2005a). The introduction of non-native species may change the functions and structure of coastal wetlands and other habitats (MEA 2005a). Fishing activities may also modify coastal habitats by changing habitat structure and the biological communities that inhabit those areas (NRC 1994).

In order to effectively understand and manage ecosystems, including aquatic ecosystems, it is necessary to take into account how people and societies have reshaped aquatic and terrestrial resources over time (Ellis 2015), through the effects of human activities on those ecosystems. This includes permitting programs that regulate activities in aquatic resources and other types of natural resources. The current state of an ecosystem (e.g., a wetland or an estuary) can range from “near natural” (i.e., minimally disturbed) to semi-natural to production systems such as agricultural lands to overexploited (i.e., severely impaired) (van Andel and Aronson 2012). Degradation occurs when an ecosystem is subjected to a prolonged disturbance (Clewell and Aronson 2013), and the degree of degradation can be dependent, in part, on the severity of disturbance. Disturbances can be caused by human activities or by natural events, such as changes to ecosystems caused by ecosystem engineers (e.g., beavers) and other organisms, storms, fires, or earthquakes. Two important factors that affect how aquatic ecosystems and other ecosystems respond to disturbances are resistance and resilience.

For ecosystems, stability is the ability of an ecosystem to return its starting state after one or more disturbances cause a significant change in environmental

conditions (van Andel et al. 2012). Resistance is the ability of an ecosystem to exhibit little or no change in structure or function when exposed to a disturbance (van Andel et al. 2012). Resilience is the ability of an ecosystem to regain its structural and functional characteristics in a relatively short amount of time after it has been exposed to a disturbance (van Andel et al. 2012). Human activities can change the resilience of ecosystems (Gunderson 2000). In some situations, resilience can be a positive attribute (e.g., the ability to withstand disturbances), and in other situations, resilience can be a negative attribute (e.g., when it is not possible to restore ecosystem because it has changed to the degree where it is resistant to being restored) (Walker et al. 2004). The concept of ecological resilience presumes the existence of multiple stable states, and the ability of ecosystems to tolerate some degree of disturbance before transitioning to an alternative (different) stable state (Gunderson 2000). A regime shift (i.e., a change from one stable state to an alternative stable state) can occur when human activities reduce the resilience of an ecosystem, or functional groups of species within that ecosystem, or when there are changes in the magnitude, frequency, and duration of disturbances (Folke et al. 2004). Folke et al. (2004) and Gunderson (2000) provide examples of aquatic ecosystems that can exist in multiple stable states.

An example of a regime change in an estuary is a shift from an estuary with clear waters and benthic communities dominated by seagrasses, to an estuary with turbid waters dominated by phytoplankton that has insufficient light for seagrasses to grow and persist (Folke et al. 2004). Another example of a regime shift is where an increase in nutrients to a wetland (likely from many sources in the area draining to that wetland) causes a wetland's plant community from a diverse plant community dependent on low nutrient levels to a monotypic plant community dominated by an invasive species that can persist under the higher nutrient levels (Gunderson 2000).

Determining whether an ecosystem altered by human activities is degraded or in an alternative stable state depends on the perspective of the person making that judgment (Hobbs 2016). That judgment is dependent in part on the ecological functions and services currently being provided by the alternative stable state and the value local stakeholders place on those ecosystem functions and services. In other words, different people may have different views on the current ecological state of a particular ecosystem (Hobbs 2016, Walker et al. 2004): some people may think it is degraded and other people may think it continues to provide important ecological functions and services. It is also important to understand that degradation can be considered both a state, and a process that falls along a continuum, ranging from minimally degraded to severely degraded, since all ecosystems have been directly or indirectly altered by human activities to some degree (FAO 2011). Degraded ecosystems can continue to provide important ecological functions and services, although they may be different from what they provided historically. In summary, the affected environment or current environmental setting consists of a variety of aquatic and terrestrial resources that have been subjected to varying degrees of disturbance by human activities, and provide different degrees of aquatic resource functions and services.

5.0 Environmental Consequences

5.1 General Evaluation Criteria

This document contains a general assessment of the reasonably foreseeable effects of the individual activities authorized by this NWP and the anticipated cumulative effects of the activities authorized by this NWP during the 5-year period it is anticipated to be in effect. In the assessment of these individual and cumulative effects, the terms and limits of the NWP, pre-construction notification requirements, and the standard NWP general conditions are considered. The NWP general conditions include mitigation measures that reduce individual and cumulative adverse environmental effects. The supplemental documentation provided by division engineers will address how regional conditions affect the individual and cumulative effects of the NWP.

The environmental effects of proposed activities are evaluated by assessing the direct and indirect effects that those activities have on the current environmental setting (Canter 1996). The current environmental setting is the product of the cumulative or aggregated effects of human activities that have persisted over time, as well as the natural processes that have influenced, and continue to influence, the structure, functions, and dynamics of ecosystems. The current environmental setting includes the present effects of past activities authorized by previously issued versions of this NWP and other NWPs. The current environmental setting can vary substantially in different areas of the country and in different waterbodies. The current environmental setting is dependent in part on the degree to which past and present human activities have altered aquatic and terrestrial resources in a particular geographic area over time. For a particular site in which an NWP may take place, the current environmental setting can range from highly developed/overexploited (e.g., urban areas, where human impacts to ecosystems are highest) to production systems (e.g., agricultural lands) to seminatural (e.g., parks) to near natural (e.g., wilderness areas, where human impacts to ecosystems are lowest) (van Andel and Aronson 2012). Human impacts on semi-natural ecosystems are lower than human impacts to production ecosystems (van Andel and Aronson 2012). Since humans have altered aquatic and terrestrial environments in numerous, substantial ways for thousands of years (e.g., Evans and Davis 2018, Ellis 2015), the current environmental setting takes into account how human activities and changing biotic and abiotic conditions have modified existing aquatic and terrestrial resources.

The terms “cumulative effects” and “cumulative impacts” has been defined in various ways. For example, the National Research Council (NRC) (1986) defined “cumulative effects” as the on-going degradation of ecological systems caused by repeated perturbations or disturbances. MacDonald (2000) defines “cumulative

effects" as the result of the combined effects of multiple activities that occur in a particular area that persist over time. Cumulative effects are caused by the interaction of multiple activities in a landscape unit, such as a basin or an ecoregion (Gosselink and Lee 1989), or a seascape. Cumulative effects can accrue in a number of ways. Cumulative effects can occur when there are repetitive disturbances at a single site over time, and the resource is not able to fully recover between each disturbance. Cumulative effects can also occur as a result of multiple activities occurring in a geographic area over time.

Consistent with the definitions cited above, the cumulative impacts of this NWP are the product of how many times this NWP is used to authorize structures in navigable waters of the United States, including federal waters on the outer continental shelf, across the country during the 5-year period this NWP is anticipated to be in effect. In section 5.2 of this document, the Corps estimates the number of times this NWP will be used during the 5-year period it is expected to be in effect, as well as estimates of the acreage of permanent and temporary impacts, and the acreage of compensatory mitigation required by district engineers to offset losses of jurisdictional waters. The individual and cumulative impacts of activities authorized by this NWP are evaluated against the current environmental setting. This approach is consistent with the Council on Environmental Quality's definition of "effects or impacts" at 40 CFR 1508.1(g): "Effects or impacts means changes to the human environment from the proposed action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives." The estimated use of this NWP, as well as the estimated authorized impacts and required compensatory mitigation, over the next 5 years are reasonably foreseeable and have a reasonably close causal relationship to the issuance of this NWP. The following evaluation comprises the NEPA analysis and the public interest review specified in 33 CFR 320.4(a)(1) and (2).

The issuance of an NWP is based on a general assessment of the effects on public interest and environmental factors that are likely to occur as a result of using this NWP to authorize activities in waters of the United States. As such, this assessment must be speculative or predictive in general terms. Since NWPs authorize activities across the nation, projects eligible for NWP authorization may be constructed in a wide variety of environmental settings, and affect waters and wetlands of varying quality, from severely degraded to performing one or more functions to a high degree. Nationwide permit activities may result in permanent or temporary losses of aquatic resources, or partial or complete losses of aquatic resources. Therefore, it is difficult to predict all of the direct and indirect impacts that may be associated with each activity authorized by an NWP. For example, the NWP that authorizes 25 cubic yard discharges of dredged or fill material into various types of waters of the United States may be used to fulfill a variety of project purposes, and the direct and indirect effects may vary depending on the specific activity and the environmental characteristics of the site in which the activity takes place. Therefore, certain NWPs require pre-construction notification for certain activities to provide district engineers the opportunity to review proposed activities on a case-by-case basis and determine

whether they will result in no more than minimal individual and cumulative adverse environmental effects.

Indication that a factor is not relevant to a particular NWP does not necessarily mean that the NWP would never have an effect on that factor, but that it is a factor not readily identified with the authorized activity. Factors may be relevant, but the adverse effects on the aquatic environment are negligible, such as the impacts of a boat ramp on water level fluctuations or flood hazards. Consistent with 40 CFR 1501.8(g), only the reasonably foreseeable effects or impacts that have a reasonably close causal relationship to the activities authorized as a result of the issuance of this NWP are evaluated in detail in the environmental assessment for this NWP. Division and district engineers will impose, as necessary, additional conditions on the NWP authorization or exercise discretionary authority to address regionally or locally important factors or to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects. In any case, adverse effects will be controlled by the terms, conditions, and additional provisions of the NWP. For example, Section 7 Endangered Species Act consultation will be required for all activities that may affect endangered or threatened species or critical habitat (see 33 CFR 330.4(f) and NWP general condition 18).

In a specific waterbody or a specific area of the ocean (e.g., marine ecoregions (Spalding et al. 2007), division or district engineers may determine that the cumulative adverse environmental effects of activities authorized by this NWP are more than minimal. Division and district engineers will conduct more detailed assessments for geographic areas that are determined to be potentially subject to more than minimal cumulative adverse environmental effects. Division and district engineers have the authority to require individual permits in waterbodies, marine ecoregions, or other geographic areas where the cumulative adverse environmental effects are determined to be more than minimal, or add conditions to the NWP either on a case-by-case or regional basis to require mitigation measures to ensure that the cumulative adverse environmental effects of these activities are no more than minimal. When a division or district engineer determines, using local or regional information, that a waterbody, marine ecoregion, or other geographic area is subject to more than minimal cumulative adverse environmental effects due to the use of this NWP, he or she will use the revocation and modification procedure at 33 CFR 330.5. In reaching the final decision, the division or district engineer will compile information on the cumulative adverse effects and supplement the information in this document.

The Corps expects that the convenience and time savings associated with the use of this NWP will encourage applicants to design their projects within the scope of the NWP rather than request individual permits for projects which could result in greater adverse impacts to the aquatic environment. The minimization encouraged by the issuance of this NWP, as well as compensatory mitigation that may be required for specific activities authorized by this NWP, is likely to help reduce

cumulative effects to the Nation's wetlands, streams, and other aquatic resources.

5.2 Impact Analysis

This NWP authorizes structures in navigable waters of the United States, including federal waters over the outer continental shelf, for finfish mariculture activities. For finfish mariculture activities in coastal waters and in federal waters on the outer continental shelf, under Section 10 of the Rivers and Harbors Act of 1899 the Corps regulates structures and work in navigable waters of the United States. For the purposes of Section 10 of the Rivers and Harbors Act of 1899, the term "structure" is defined at 33 CFR 322.2(b) as including, "without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other obstacle or obstruction." For finfish mariculture activities, structures that require section 10 permits include net pens and cages, lines, anchors, and other structural components used for cultivating finfish. The net pens and cages may be located at the water surface, and cages may be at some depth below the water surface. "Work" is defined at 33 CFR 322.2(c) as including, "without limitation, any dredging or disposal of dredged material, excavation, filling, or other modification of a navigable water of the United States." Finfish mariculture activities and multi-trophic mariculture activities are not likely to involve these categories of work, since these activities are conducted in open waters and the structures are usually attached to the seabed by anchors or other devices.

The authority of the Secretary of the Army, acting through the Corps of Engineers, to prevent obstructions to navigation in navigable waters of the United States was extended to artificial islands, installations, and other devices located on the seabed, to the seaward limit of the outer continental shelf, by section 4(f) of the Outer Continental Shelf Lands Act of 1953 as amended (43 U.S.C. 1333(e)). Therefore, structures used for finfish mariculture activities in federal waters on the outer continental shelf require section 10 permits from the Corps if they are attached to the seabed on the outer continental shelf.

The impacts of mariculture activities in coastal waters should be evaluated in the context of the coastal waters and the watersheds that drain to those coastal waters (Soto et al. 2008). Structures and work in navigable waters may alter the physical, chemical, and biological characteristics of those waters, but they generally do not result in a loss in the quantity of navigable waters. Structures and work in navigable waters may alter the ecological functions and services provided by those waters. Those alterations will vary, depending on the specific characteristics of the aid to navigation authorized by this NWP and the environmental setting in which the NWP activity may occur. The environmental setting will vary from site to site, by region, and across the country.

After the structures authorized by this NWP are completed, the operation of the finfish mariculture activity will likely involve activities that do not require DA authorization, such as the addition or removal of finfish from the cages or net pens, feeding activities, the administration of antibiotics and other therapeutics to keep the cultivated finfish healthy, the use of chemicals to control sea lice and other parasites, and the use of antifouling agents.

Pre-construction notification is required for all activities authorized by this NWP. The pre-construction notification requirement allows district engineers to review proposed activities on a case-by-case basis to ensure that the individual and cumulative adverse environmental effects of those activities are no more than minimal. If the district engineer determines that the adverse environmental effects of a particular project are more than minimal after considering mitigation, then he or she will assert discretionary authority and the applicant will be notified that another form of DA authorization, such as a regional general permit or individual permit, is required (see 33 CFR 330.4(e) and 330.5).

The potential impacts of activities authorized by this NWP on the Corps' public interest review factors listed in 33 CFR 320.4(a)(1) are discussed in more detail in section 6.0 of this document.

The terms of this NWP, including any acreage limits or any other quantitative limits in the text of the NWP, the protections provided by many of the NWP general conditions, plus any regional conditions imposed by division engineers and activity-specific conditions imposed by district engineers will help ensure that the activities authorized by this NWP result in no more than minimal individual and cumulative adverse environmental effects. An additional safeguard is the ability of district engineers to exercise discretionary authority and require project proponents to obtain individual permits for proposed activities whenever a district engineer determines that a proposed activity will result in more than minimal individual or cumulative adverse environmental effects after considering any mitigation proposed by the applicant (see 33 CFR 330.1(e)(3)).

The Council on Environmental Quality's NEPA regulations at 40 CFR 1508.1(g) defines "effects or impacts' as "changes to the human environment from the proposed action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives, including those effects that occur at the same time and place as the proposed action or alternatives and may include effects that are later in time or farther removed in distance from the proposed action or alternatives." Furthermore, 40 CFR 1508.1(g)(2) states that:

> [a] "but for" causal relationship is insufficient to make an agency responsible for a particular effect under NEPA. Effects should generally not be considered if they are remote in time, geographically remote, or the product of a lengthy causal chain. Effects do not

> include those effects that the agency has no ability to prevent due to its limited statutory authority or would occur regardless of the proposed action.

Therefore, the impact analysis in this environmental assessment focuses on the impacts or effects that are reasonably foreseeable and have a reasonably close causal relationship to the activities authorized by this NWP under the Corps' permitting authorities (i.e., work in navigable waters regulated under Section 10 of the Rivers and Harbors Act of 1899 and/or discharges of dredged or fill material into waters of the United States regulated under Section 404 of the Clean Water Act).

After the finfish mariculture structures and multi-trophic mariculture structures (e.g., net pens, cages, anchors, lines) are installed in navigable waters of the United States, there will be environmental impacts that are caused by the operation of the finfish mariculture facility that was authorized by this NWP. Operation of the finfish mariculture facility will involve placing young finfish into the net pens or cages so that they can grow to a suitable size for sale to restaurants, markets, and other entities, or to produce seafood products. Various species of native and non-native finfish may be cultivated at these facilities. Other aspects of finfish mariculture operations are likely to include feeding of the finfish and the application of antibiotics, therapeutics, pesticides, and other chemicals. Feeding activities may also cause environmental impacts, through the production of feeds (Kristoffersson and Anderson 2006), or the release of unconsumed feeds to the surrounding waters and to benthic habitats in the vicinity of the finfish mariculture facilities (Rust et al. 2014). The finfish being cultivated will also produce waste products, including feces and urine that will be released to the surrounding waters. The Corps does not have the authority to regulate these operational activities, even though these activities may have a "but for" causal relationship to the activities permitted under Section 10 of the Rivers and Harbors Act of 1899. Since the Corps does not have the authority to prevent or control the environmental impacts caused by those "but for" operational activities, the Corps does not have to conduct detailed analyses of these operational activities under the current NEPA definition of "effects" at 40 CFR 1508.1(g)(2). The Corps does not have the authority to prevent or control the environmental impacts caused by those operational activities. As discussed elsewhere in this document, there may be other federal agencies that have the legal authority to regulate some operational components of finfish mariculture activities. Other operational components of finfish mariculture activities might not be regulated by any federal, state, or local government agency.

Structures or work in navigable waters of the United States does not typically result in losses of navigable waters, but they may change the ecological functions and services performed by those waters. Examples of exceptions would include fills in navigable waters to create fast land along the shoreline, or artificial islands. Structures and work in navigable waters may alter the physical, chemical, and biological characteristics of those waters, but they generally do not result in a loss in the quantity of navigable waters. Structures and work in navigable waters may alter

the ecological functions and services provided by those waters. Those alterations will vary, depending on the specific characteristics of the specific activity authorized by this NWP and the environmental setting in which the NWP activity may occur. The environmental setting will vary from site to site, and from region to region across the country.

The individual environmental impacts are the environmental impacts caused by the activities authorized by this NWP, including the direct and indirect impacts caused by the specific NWP activity at the project site. In the context of the Corps' public interest review (33 CFR 320.4(a)(1) and the Corps' regulations for section 10 general permits at 33 CFR 322.2(f), the cumulative environmental impacts are the environmental impacts caused by the activities authorized by this NWP during the 5-year period the NWP is anticipated to be in effect. Both the individual and cumulative environmental impacts are evaluated against the current environmental setting, which is described at a national scale in section 4.0 of this document. The current environmental setting varies substantially throughout the United States. In some areas of the country, the current environmental setting is the result of substantial alteration of waterbodies and other ecosystems by various human activities, but in other areas of the country, the current environmental setting has been less affected by various human activities, and those alterations are more subtle and more difficult to discern (Clewell and Aronson 2013). The categories of human activities and natural factors that have altered aquatic ecosystems are discussed in section 4.4 of this document, and are summarized in Table 3.6. The types of ecological functions and services provided by aquatic ecosystems also vary considerably by region and by specific ecosystems, with some ecosystems performing ecological functions and services to a high degree, and other ecosystems performing ecological functions and services to a lesser degree.

The analysis of environmental consequences in this environmental assessment is a qualitative analysis because of the lack of quantitative data at a national scale on the various human activities and natural factors that may concurrently alter the current environmental setting during the 5-year period this NWP is expected to be in effect. As discussed in section 4.4, the activities authorized by this NWP are just one category among many categories of human activities and natural factors that affect ocean waters, estuarine waters, lakes, wetlands, streams, and other aquatic resources, and the ecological functions and services they provide.

As discussed in section 4.0 of this document and the Millennium Ecosystem Assessment (2005c), all ecosystems have been affected by human activities to some degree. According to Clewell and Aronson (2013), anthropogenic and natural disturbances to ecosystems can be placed in three categories: (1) stress with maintenance of ecosystem integrity; (2) moderate disturbance where the ecosystem can recover in time through natural processes; and (3) impairment, which may result in a more severe disturbance that may require human intervention (e.g., restoration) to prevent the ecosystem from changing into an alternative, perhaps less functional ecological state. Ecosystems can often tolerate gradual changes and

continue to provide ecological functions and services before those changes reach a threshold, that when crossed, causes the ecosystem to change abruptly into an alternative stable state (Scheffer et al. 2001). For some ecosystems, multiple impacts or disturbances can cause an ecosystem to pass a threshold can result in substantial changes to that ecosystem, but for other ecosystems the changes may be more subtle (Folke et al. 2004). It is difficult to predict where these thresholds are, and ecosystems may exhibit little change before that threshold is reached (Scheffer et al. 2009).

The severity of potential impacts to aquatic resources caused by NWP activities is dependent, in part, on ecosystem resilience and resistance, whether the permitted impacts are temporary or permanent, and how the affected resources respond to the permitted impacts. Impacts to aquatic resources caused by NWP activities may result in a partial, total, or no loss of aquatic resource functions and services, depending on the specific characteristics of the NWP activity and the environmental setting in which those impacts occur. In addition, the duration of the adverse effects (temporary or permanent) caused by NWP activities, can be influenced by the resilience and resistance of the aquatic resource to disturbances caused by those NWP activities. Since there is considerable variation across the country in terms of the types of aquatic resources, the ecological functions and services they provide, and their resilience and resistances to disturbances caused by NWP activities, other human activities, and natural disturbances, the environmental consequences of the issuance of this NWP will vary by site and by region. Given the geographic scope in which this NWP can be used to authorize activities that require DA authorization and the wide variability in aquatic resource structure, functions, and dynamics from site to site and from region to region, the analysis of environmental consequences is a qualitative analysis.

The environmental effects or impacts that are likely to be caused by individual activities authorized by this NWP are evaluated against the current environmental setting (i.e., the affected environment, which is described at a national scale in section 4.0 of this document). The current environmental setting is the result of human activities altering ecosystems over thousands of years (Perring and Ellis 2013), as well as natural changes in environmental conditions that have occurred over time. Since historical baselines (i.e., the state of ecosystems in the absence of modifications caused by human activities) no longer exist in most areas, ecosystem management decisions should be made by using contemporary baselines that acknowledge how humans have dominated and changed ecosystems over long periods of time (Kopf et al. 2015). Permit decisions are an example of management decisions for ecosystems such as oceans, estuaries, lakes, rivers, streams, and wetlands, where the proposed impacts that require a permit are evaluated against the current environmental setting to decide whether the permit (e.g., an NWP authorization) should be issued by the regulatory authority.

The impacts of activities authorized by this NWP during the 5-year period it is anticipated to be in effect are evaluated against the current affected environment, to

determine the potential severity of those anticipated impacts in light of the human alterations and natural changes to aquatic ecosystems that have occurred over time and space. This evaluation takes into account how the activities authorized by this NWP might affect aquatic ecosystems, the resilience of aquatic ecosystems, and the ability of aquatic ecosystems to continue to provide ecological functions and services after the authorized activities have occurred. When evaluating pre-construction notifications, district engineers should be taking into account the current environmental setting, as well as how the jurisdictional waters and wetlands might respond as a result of conducting the NWP activity, including how resilient those waters and wetlands are to disturbances caused by discharges of dredged or fill material and/or structures or work in navigable waters.

Compensatory mitigation required by district engineers for specific activities authorized by this NWP may help reduce the contribution of those activities to the cumulative effects caused by NWPs on the Nation's wetlands, streams, and other aquatic resources, by providing ecological functions to partially or fully replace some or all of the aquatic resource functions lost as a result of those activities. Mitigation requirements, including compensatory mitigation requirements for the NWPs, are described in general condition 23. Compensatory mitigation projects must also comply with the applicable provisions of 33 CFR part 332. District engineers will establish compensatory mitigation requirements on a case-by-case basis, after evaluating pre-construction notifications. Compensatory mitigation requirements for individual NWP activities will be specified through permit conditions added to NWP authorizations. When compensatory mitigation is required, the permittee is required to submit a mitigation plan prepared in accordance with the requirements of 33 CFR 332.4(c). Credits from approved mitigation banks or in-lieu fee programs may also be used to satisfy compensatory mitigation requirements for NWP authorizations. Monitoring is required to demonstrate whether the permittee-responsible mitigation project, mitigation bank, or in-lieu fee project is meeting its objectives and providing the intended aquatic resource structure and functions. If the compensatory mitigation project is not meeting its objectives, adaptive management will be required by the district engineer. Adaptive management may involve taking actions, such as site modifications, remediation, or design changes, to ensure the compensatory mitigation project meets its objectives (see 33 CFR 332.7(c)).

The estimated use of this NWP during the 5-year period the NWP is expected to be in effect and the estimated impacts to wetlands, streams, and other aquatic resources in the United States, plus the estimated acreage of compensatory mitigation, is provided in this section of this document. Division and district engineers will monitor the use of this NWP on a regional and case-specific basis, and under their authorities in 33 CFR 330.5(c) and (d), modify, suspend, or revoke NWP authorizations in situations when the use of the NWP will result in more than minimal cumulative adverse environmental effects. Because the activities authorized by this NWP constitute only a small proportion of the categories of human activities that directly and indirectly affect ocean and estuarine waters, the activities authorized by this NWP over the next 5 years are likely to result in only a

minor incremental change to the current environmental setting for ocean and estuarine waters and the ecological functions and services they provide.

Under 33 CFR 330.4(f)(2), for an NWP activity proposed by a non-federal permittee, the district engineer will review the pre-construction notification and if she or he determines the proposed NWP activity may affect listed species or designated critical habitat, section 7 consultation will be conducted with the U.S. Fish and Wildlife Service (U.S. FWS) or National Marine Fisheries Service (NMFS) depending on which species the district engineer determined may be affected by the proposed NWP activity. During the ESA section 7 consultation process the U.S. FWS or NMFS will evaluate the effects caused by a proposed NWP activity, the environmental baseline, the status of the species and critical habitat, and the effects of any future state or private activities that are reasonably certain to occur within the action area. For formal ESA section 7 consultations, the U.S. FWS or NMFS will formulate their opinion as to whether the proposed NWP activity is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat (see 50 CFR 402.14(g)). The ESA section 7 consultation requirements may also be fulfilled through informal consultation, when the U.S. FWS or NMFS provide their written concurrence that the proposed activity is not likely to adversely affect endangered or threatened species or their designated critical habitat (see 50 CFR 402.13(c)). The project proponent may be required to obtain separate incidental take authorizations under the Marine Mammals Protection Act.

When determining whether a proposed NWP activity will cause no more than minimal individual and cumulative adverse environmental effects, the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by the NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. These criteria are listed in the NWPs in Section D, “District Engineer’s Decision.” The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

Additional conditions can be placed on proposed activities on a regional or case-by-

case basis by division or district engineers to ensure that the activities have no more than minimal individual and cumulative adverse environmental effects. Regional conditions added to this NWP will be used to account for differences in aquatic resource functions, services, and values across the country, ensure that the NWP authorizes only those activities with no more than minimal individual and cumulative adverse environmental effects, and allow each Corps district to prioritize its workload based on where its efforts will best serve to protect the aquatic environment. Regional conditions can prohibit the use of an NWP in certain waters (e.g., high value waters or specific types of wetlands or waters. Specific NWPs can also be revoked on a geographic or watershed basis where the individual and cumulative adverse environmental effects resulting from the use of those NWPs are more than minimal.

In high value waters, division and district engineers can: 1) prohibit the use of the NWP in those waters and require an individual permit or regional general permit; 2) impose an acreage limit for the NWP; 3) add regional conditions to the NWP to ensure that the individual and cumulative adverse environmental effects are minimal; or 4) for those NWP activities that require pre-construction notification, add special conditions to NWP authorizations, such as compensatory mitigation requirements, to ensure that the adverse environmental effects are minimal. Nationwide permits can authorize activities in high value waters as long as the individual and cumulative adverse environmental effects are minimal.

The construction and use of fills for temporary access for construction may be authorized by NWP 33 or regional general permits. The related activity must meet the terms and conditions of the specified permit(s). If the activity is dependent on portions of a larger project that require an individual permit, this NWP will not apply. [See 33 CFR 330.6(c) and (d)]

The impacts of activities authorized by this NWP during the 5-year period it is anticipated to be in effect are evaluated against the current affected environment, to determine the potential severity of those anticipated impacts in light of the human alterations to aquatic ecosystems that have occurred over time and space. This evaluation takes into account how the activities authorized by this NWP might affect aquatic ecosystems, the resilience of aquatic ecosystems, and the ability of marine and estuarine ecosystems to continue to provide ecological functions and services after the authorized activities have occurred. When evaluating pre-construction notifications, district engineers should be taking into account the current environmental setting, as well as how the jurisdictional waters might respond as a result of the implementation of the NWP activity, including how resilient those waters are to disturbances caused by structures or work in navigable waters.

The Corps estimates that this NWP will be used approximately 5 times per year on a national basis, resulting in impacts to 10 acres of coastal waters and federal waters on the outer continental shelf. The reported use includes pre-construction notifications submitted to Corps districts, as required by the terms and conditions of

the NWP as well as regional conditions imposed by division engineers. The reported use also includes voluntary notifications to submitted to Corps districts where the applicants request written verification in cases when pre-construction notification is not required. The reported use does not include activities that do not require pre-construction notification and were not voluntarily reported to Corps districts. All activities authorized by this NWP require pre-construction notification.

The Corps estimates that none of the activities authorized by this NWP will require compensatory mitigation to offset the authorized impacts to coastal waters and federal waters on the outer continental shelf and ensure that the authorized activities resulted in only minimal adverse effects on the aquatic environment. This NWP authorizes structures in navigable waters of the United States, including federal waters on the outer continental shelf, and those structures will not cause losses of those waters.

Based on these annual estimates, the Corps estimates that approximately 25 activities could be authorized over a five year period until this NWP expires, resulting in impacts to approximately 50 acres of coastal waters. Compensatory mitigation might not be required for these activities because the NWP authorizes only structures in navigable waters, and these structures will not result in losses of coastal waters and federal waters on the outer continental shelf. Compensatory mitigation is the restoration (re-establishment or rehabilitation), establishment, enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved. [33 CFR 332.2] Other forms of mitigation (e.g., avoidance and minimization) may be required for activities authorized by this NWP. The demand for these types of activities could increase or decrease over the five-year duration of this NWP. The authorized impacts are expected to result in only minor changes to the affected environment (i.e., the current environmental setting), which is described in section 4.0 of this document.

Mitigation required by district engineers for specific activities authorized by this NWP may help reduce the contribution of those activities to the cumulative effects on the Nation's marine and estuarine waters, by providing ecological functions to partially or fully replace some or all of the aquatic resource functions lost as a result of those activities. Mitigation requirements, including compensatory mitigation requirements for the NWPs are described in general condition 23. Compensatory mitigation required by district engineers for the activities authorized by this NWP must also comply with the applicable provisions of 33 CFR part 332. District engineers will establish mitigation requirements on a case-by-case basis, after evaluating pre-construction notifications. Mitigation requirements for individual NWP activities will be specified through permit conditions added to NWP authorizations. When compensatory mitigation is required, the permittee is required to submit a mitigation plan prepared in accordance with the requirements of 33 CFR 332.4(c). Credits from approved mitigation banks or in-lieu fee programs may also be used to

satisfy compensatory mitigation requirements for NWP authorizations. Monitoring is required to demonstrate whether the permittee-responsible mitigation project, mitigation bank, or in-lieu fee project is meeting its objectives and providing the intended aquatic resource structure and functions. If the compensatory mitigation project is not meeting its objectives, adaptive management will be required. Adaptive management may involve taking actions, such as site modifications, remediation, or design changes, to ensure the compensatory mitigation project meets its objectives (see 33 CFR 332.7(c)).

5.3 Impact Analysis for Alternatives to the Proposed Action

5.3.1 No Action Alternative (Do Not Issue the Nationwide Permit)

The no action alternative would not achieve one of the goals of the Corps' Nationwide Permit Program, which is to regulate with little, if any, delay or paperwork certain activities having minimal impacts (33 CFR 330.1(b)). The no action alternative would also reduce the Corps' ability to pursue the current level of review for other activities that have greater adverse effects on the aquatic environment, including activities that require individual permits as a result of division or district engineers exercising their discretionary authority under the NWP program. The no action alternative would also reduce the Corps' ability to conduct compliance actions.

If this NWP is not available, substantial additional resources would be required for the Corps to evaluate these minor activities through the individual permit process, and for the public and federal, tribal, and state resource agencies to review and comment on the large number of public notices for these activities. In a considerable majority of cases, when the Corps publishes public notices for proposed activities that result in no more than minimal adverse environmental effects, the Corps typically does not receive responses to these public notices from either the public or federal, tribal, and state resource agencies. Therefore, processing individual permits for these minimal impact activities is not likely to result in substantive changes to those activities. Another important benefit of the NWP program that would not be achieved through the no action alternative is the incentive for project proponents to design their projects so that those activities meet the terms and conditions of an NWP. The Corps believes the NWPs have significantly reduced adverse effects to the aquatic environment because most applicants modify their activities that require DA authorization to comply with the NWPs and avoid the longer permit application review times and larger costs typically associated with the individual permit process.

Under the no action alternative, district engineers may issue regional general permits or programmatic general permits to authorize similar categories of activities that would have no more than minimal adverse environmental effects that could have been authorized by this NWP. However, those regional general permits or

programmatic general permits may have different quantitative limits, different restrictions, and other permit conditions, and those quantitative limits, restrictions, and permit conditions may result in the authorization of activities that have greater, similar, or lesser adverse environmental effects than the activities that would have been authorized by this NWP. Under the no action alternative, there may be differences in consistency in implementation of the Corps Regulatory Program among Corps districts. District engineers can tailor their regional general permits and programmatic general permits to effectively address the specific categories of aquatic resources found in their geographic areas of responsibility, the specific categories of activities that occur in those geographic areas, and the ecological functions and services those categories of aquatic resources provide. The environmental consequences of this aspect of the no action alternative are more difficult to predict because of the potential variability of regional general permits and programmatic general permits among Corps districts across the country, when such general permits are available to authorize a similar category of activities as this NWP authorizes.

If this NWP is not issued, districts would have to draft, propose, and issue regional general permits or programmatic general permits through the public notice and comment process and prepare applicable environmental documentation to support their decisions on whether to issue those regional general permits or programmatic general permits. It would take a substantial amount of time to issue those regional general permits and programmatic general permits, and in the interim proposed activities would have to be authorized through the individual permit process.

5.3.2 Issue the Nationwide Permit With Modifications

This NWP was developed to authorize structures in navigable waters of the United States, including federal waters on the outer continental shelf, for finfish mariculture activities that have no more than minimal individual and cumulative adverse environmental effects. The Corps has considered changes to the terms and conditions of this NWP suggested by comments received in response to the proposed rule, as well as modifying or adding NWP general conditions, as discussed in section 1.4 of this document and the preamble of the Federal Register notice announcing the issuance of this NWP.

The environmental consequences of changing the terms and conditions of the proposed NWP may vary, depending on whether modifications for the issued NWP are more restrictive, less restrictive, or is similarly restrictive compared to the proposal. The environmental consequences of changing the terms and conditions of this NWP are also dependent on the application of existing tools used to ensure that activities authorized by this NWP will only have no more than minimal adverse environmental effects. Those tools include the quantitative limits of the NWP, the pre-construction notification process, and the ability of division and district engineers to modify, suspend, or revoke this NWP on a regional or case-by-case basis.

Changing the national terms and conditions of this NWP may change the incentives for project proponents to reduce their proposed impacts to jurisdictional waters and wetlands to qualify for NWP authorization, and receive the required DA authorization for regulated activities in less time than it would take to receive individual permits for those activities. Under the individual permit process, the project proponent may request authorization for activities that have greater impacts on jurisdictional waters and wetlands, and may result in larger losses of aquatic resource functions and services.

The environmental consequences of division engineers exercising their discretionary authority to modify, suspend, or revoke this NWP on a regional basis may be a reduction in the number of activities that could be authorized by this NWP in a region or more NWP activities requiring pre-construction notification through regional changes in the PCN requirements for this NWP. The environmental consequences are likely to include reduced losses of waters of the United States because regional conditions can only further condition or restrict the applicability of an NWP (see 33 CFR 330.1(d)). The modification, suspension, or revocation of this NWP on a regional basis by division engineers may also reduce the number of activities authorized by this NWP, which may increase the number of activities that require standard individual permits. If more activities require standard individual permits, permitted losses of jurisdictional waters and wetlands may increase because standard individual permits have no quantitative limits.

An environmental consequence of regional conditions added to the NWPs by division engineers is the enhanced ability to address differences in aquatic resource functions, services, and values among different regions across the nation. Corps divisions may add regional conditions to the NWPs to enhance protection of the aquatic environment in a region (e.g., a Corps district, state, or watershed) and address regional concerns regarding jurisdictional waters and wetlands and other resources (e.g., listed species or cultural resources) that may be affected or impacted by the activities authorized by this NWP. Division engineers can also revoke an NWP in a region if the use of that NWP results in more than minimal adverse environmental effects, especially in high value or rare waters or wetlands. When an NWP is issued or reissued by the Corps, division engineers issue supplemental documents that evaluate potential impacts of the NWP at a regional level, and assess cumulative impacts caused by this NWP on a regional basis during the period this NWP is in effect. [33 CFR 330.5(c)]

An environmental consequence of district engineers modify, suspending, or revoking this NWP on a case-by-case basis is the ability of district engineers to address site-specific conditions, including the degree to which aquatic resources on the project site provide ecological functions and services. Activity-specific modifications may also address site-specific resources (e.g., listed species or cultural resources) that may be affected by NWP activities. The environmental consequences of modification of this NWP on an activity-specific basis by district

engineers may be further reductions in losses of waters of the United States for specific activities authorized by NWP because of mitigation required by district engineers during their reviews of PCNs to ensure that those activities result in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). If a proposed NWP activity will result in more than minimal adverse environmental effects, then the district engineer will exercise discretionary authority and require an individual permit. The individual permit review process requires a project-specific alternatives analysis, including the consideration of off-site alternatives, and a public interest review.

5.3.3 Issue the Nationwide Permit Without Modifications

Issuing the NWP as proposed would likely result in little or no changes in the number of activities authorized by this NWP, and the environmental impacts of authorized activities. Project proponents would likely continue to design their project to qualify for NWP authorization. Finalizing the proposed national terms and conditions of this NWP would likely continue to provide incentives for project proponents to reduce their proposed impacts to jurisdictional waters and wetlands to qualify for NWP authorization, and receive the required DA authorization for regulated activities in less time than it would take to receive individual permits for those activities. Under this alternative, for those activities that require individual permits project proponents may request authorization for activities that have greater impacts on jurisdictional waters and wetlands, and may result in larger impacts to aquatic resource functions and services.

Under this alternative, the environmental consequences of division engineers exercising their discretionary authority to modify, suspend, or revoke this NWP on a regional basis would be similar to the environmental consequences discussed in section 5.3.2. Corps divisions may add regional conditions to the NWPs to enhance protection of the aquatic environment in a region (e.g., a Corps district, state, or watershed) and address regional concerns regarding jurisdictional waters and wetlands and other resources (e.g., listed species or cultural resources) that may be affected or impacted by the activities authorized by this NWP. Division engineers can also revoke an NWP in a region if the use of that NWP results in more than minimal adverse environmental effects, especially in high value or rare waters or wetlands. When an NWP is issued or reissued by the Corps, division engineers issue supplemental documents that evaluate potential impacts of the NWP at a regional level, and assess cumulative impacts caused by this NWP on a regional basis during the period this NWP is in effect. [33 CFR 330.5(c)]

Under this alternative, the ability of district engineers to modify, suspended, or revoke this NWP on a case-by-case to address site-specific conditions, including the degree to which aquatic resources on the project site provide ecological functions and services, is likely to have environmental consequences similar to the environmental consequences of the alternative identified in section 3.2. Activity-specific modifications under this alternative may also address site-specific

resources (e.g., listed species or cultural resources) that may be affected by NWP activities. Activity-specific modifications may also include mitigation requirements similar to the potential mitigation requirements discussed in section 5.3.2.

The issuance of this NWP adopts the alternative identified in section 3.2 of this document. The Corps has considered the comments received in response to the proposed rule, and made changes to the NWPs, general conditions, and definitions to address those comments. Division engineer may add regional conditions to this NWP to help ensure that the use of the NWPs in a particular geographic area will result in no more than minimal individual and cumulative adverse environmental effects. District engineers may also add regional conditions to this NWP to help ensure compliance with other applicable laws, such as Section 7 of the Endangered Species Act, Section 106 of the National Historic Preservation Act, and the essential fish habitat provisions of the Magnuson-Stevens Fishery Conservation and Management Act. Division engineers may also add regional conditions to this NWP to fulfill its tribal trust responsibilities.

Corps divisions and districts also monitor the use of this NWP and the authorized impacts identified in NWP verification letters. At a later time, if warranted, a division engineer may add regional conditions to further restrict or prohibit the use of this NWP to ensure that it does not authorize activities that result in more than minimal adverse environmental effects in a particular geographic region (e.g., a watershed, landscape unit, or seascape unit). To the extent practicable, division and district engineers will use regulatory automated information systems and institutional knowledge about the typical adverse effects of activities authorized by this NWP, as well as substantive public comments, to assess the individual and cumulative adverse environmental effects resulting from regulated activities authorized by this NWP.

6.0 Public Interest Review

6.1 Public Interest Review Factors (33 CFR 320.4(a)(1))

For each of the 20 public interest review factors, the extent of the Corps consideration of expected impacts resulting from the use of this NWP is discussed, as well as the reasonably foreseeable cumulative adverse effects that are expected to occur. The Corps decision-making process involves consideration of the benefits and detriments that may result from the activities authorized by this NWP.

(a) Conservation. The activities authorized by this NWP may affect the natural resource characteristics and conservation values of the project area, since the NWP authorizes finfish mariculture activities that may cause physical, chemical, and biological changes to marine and estuarine waters. Mitigation measures may be required through permit conditions added to the NWP authorization by division or

district engineers to minimize impacts to conservation values. Mitigation measures are also imposed through the general conditions that apply to this NWP. Mariculture activities can help reduce fishing pressure on wild populations of finfish (Diana 2009).

Site selection for finfish mariculture activities is an important tool for managing the environmental and social impacts of these activities (Price and Morris 2013). Thoughtfully planned and sustainable mariculture activities can help provide conservation values (Froehlich et al. 2017). To help reduce the adverse effects of these activities, they should be located in well-flushed waters where the bottom sediments can erode and allow movement of sediment along the bottom of the waterbody. Site selection for finfish mariculture activities can also help reduce potential adverse effects to corals, seagrass beds, and mangroves (Price and Morris 2013) by locating these facilities in areas where these ecosystems are absent, or some distance from these habitat types.

An ecosystem approach to finfish mariculture activities can help reduce losses of ecosystem functions and services (Soto et al. 2008), for example by engaging in practices that promote nutrient cycling and the recycling of waste products (e.g., integrated multi-trophic mariculture activities). This NWP authorizes structures for multi-trophic mariculture activities, where shellfish and seaweed may be cultivated with finfish to allow for nutrient cycling, and these mariculture activities also have the potential for adverse effects. Finfish mariculture activities can affect conservation values when adult and juvenile cultivated finfish escape from cages and net pens, and the escaped finfish interact with populations of wild finfish (Jensen et al. 2010). Escapes from mariculture facilities are not completely preventable (Diana 2009). Cultivated finfish escaping from mariculture facilities may compete with wild fish stocks for food and space (Naylor et al. 2005). Interbreeding of escaped farm and wild finfish could cause long-term declines in the fitness and productivity of wild finfish populations (Rust et al. 2014, Naylor et al. 2005). Escapes can occur as a result of operational and technical failures during the cultivation of finfish in these waters. In addition, escapes can occur after structural failures of the cages and net pens provide openings for cultivated individuals to escape into marine and estuarine waters. Escapes can also occur when the cultivated finfish are handled to transfer them to or from the finfish mariculture structures. Escapes of cultivated finfish can also occur when the finfish reproduce while they are in the cages or net pens, when fertilized eggs are transported away from these structures by moving water into nearby marine or estuarine waters where they can grow into adult fish (Jensen et al. 2010).

Finfish that have escaped from finfish mariculture facilities can have adverse effects on wild fish populations, even if the escaped fish are not able to reproduce in those waters (Naylor et al. 2005). Escaped finfish may also destroy nests made by individuals of wild finfish species in their natural habitats (Naylor et al. 2005).

In the United States, finfish mariculture operators using net pens have taken actions

to reduce the number and impacts of fish escapes (Rust et al. 2014). Fish escapes can be reduced by using stronger netting for net pens (Jensen et al. 2010). Other measures to control escapes include improved management and design of net pens, the use of effective antipredator nets, raising young finfish in on-shore facilities during early growth periods before transferring them to net pens, using sterile individuals so they cannot reproduce, and improved fish handling during operations (Rust et al. 2014). Jensen et al. (2010) recommend the development of technical standards for cages and net pens, and strict adherence to those standards, to reduce the risk of finfish escapes from finfish mariculture facilities. To reduce the risk of escapes, Jensen et al. (2010) recommend mandatory reporting of finfish escapes, and training for employees. The Corps does not have the authority to regulate the handling of cultivated finfish that might potentially result in escapes, and project proponents are responsible for designing and properly maintaining their finfish mariculture facilities, which should help reduce the potential for escapes. However, the district engineer may request that the permittee design the finfish mariculture structures so that there is less risk in escapes of animals.

In addition to the ecological risks that may be caused by fish escapes from finfish mariculture facilities, other ecological risks include the intentional or unintentional introduction of other non-native species to marine ecosystems, as well as the possible spread of pathogens and parasites (Atalah and Sanchez-Jerez 2020, Diana 2009) from cultivated finfish. More than 25% of the finfish species cultivated through finfish mariculture activities are not native to the regions in which these activities are located (Atalah and Sanchez-Jerez 2020).

The Corps does not have the authority to control the species of finfish cultivated in the structures constructed for finfish mariculture activities. Cultivating finfish species in ocean waters outside their native ecoregions should be considered a high risk activity that could potentially have substantial adverse ecological and socio-economic outcomes (Atalah and Sanchez-Jerez 2020). For proposed NWP activities where the district engineer determines the authorized structures may affect listed species or designated critical habitat, requirements regarding the species to be cultured may be addressed through the ESA section 7 consultation process.

Most finfish used for mariculture activities have low genetic diversity because of artificial selection used over several generations to enhance favorable characteristics for cultivation and sales (Atalah and Sanchez-Jerez 2020). Interbreeding between wild stocks of finfish and cultivated finfish may also homogenize the genetic composition of finfish species and reduce the ability of those species to survive as environmental conditions change (Naylor et al. 2005).

Escapes of cultivated finfish from finfish mariculture facilities may also increase the risk of transmitting pathogens and parasites (e.g., sea lice) that can cause outbreaks of diseases, and facilitate the movement of pathogens and parasites from one place to another (Naylor et al. 2005, Diana 2009). There is potential for

pathogens to be transferred from cultivated finfish to wild finfish, and some of these pathogens may be non-native (Rust et al. 2014). Antibiotics and other chemicals, nutrients, biosecurity measures, controlling the density of cultivated finfish, and artificial selection for genetically resistant finfish varieties may be used to control pathogens or diseases (Rust et al. 2014). The Corps does not have the authority to control the use of antibiotics, therapeutics, and other chemicals that may be used for finfish mariculture operations to produce healthy finfish. Some of these chemicals may be regulated or otherwise controlled by the Food and Drug Administration or the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (Rust et al. 2014). In addition, the Corps does not have the authority to regulate potential pathogen transfers between cultivated finfish and wild finfish stocks.

Nutrients released from finfish mariculture activities may increase nitrogen and phosphorous levels in nearby waters and may promote increases in phytoplankton and algae (Price and Morris 2013) in those waters. These nutrients may help increase production in oligotrophic waters (Alleway et al. 2019), including the support of a greater diversity and abundance of aquatic species (Diana 2009). There is uncertainty as to whether nutrients from finfish mariculture activities can contribute to eutrophication and harmful algal blooms (Price and Morris 2013). The potential for increased contributions of nutrients to coastal waters that might result in eutrophication of those waters can be reduced by siting finfish mariculture facilities in locations with well-flushed waters.

There may be trash or garbage placed in marine and estuarine waters where finfish mariculture activities are located. The Corps does not have the legal authority to control the placement of trash or garbage in navigable waters of the United States. The placement of trash or garbage into navigable waters of the United States may be regulated under Section 402 of the Clean Water Act. The Corps' regulations at 33 CFR 323.3(e)(3) state that trash and garbage are not considered "fill material" for the purposes of Section 404 of the Clean Water Act. Therefore, the Corps does not have the legal authority to control the placement of trash or garbage into waters of the United States. However, the Corps does have the legal authority to require that temporary structures placed in navigable waters of the United States and temporary discharges of dredged or fill material into waters of the United States to be removed after completion of the authorized work. General condition 13 requires the removal of temporary structures or fills after they have fulfilled their intended purposes.

(b) Economics. Finfish mariculture activities are likely to have positive impacts on the local economy. For example, finfish mariculture activities can provide jobs and other economic benefits in isolated communities, as well as communities that are impoverished or otherwise disadvantaged (Alleway et al. 2019). These activities may generate jobs and revenue for local growers as well as revenue to supply companies that sell materials used for these activities. Finfish mariculture activities may supply seafood for restaurants and other consumers. The authorized mariculture activities are likely to benefit the community by improving the local

economic base, which is affected by employment, tax revenues, community services, and property values.

Finfish mariculture activities can help support indigenous and traditional communities, so that they can continue to some degree their customary ways of life (Alleway et al. 2019). Finfish mariculture activities can also provide some jobs in coastal areas where opportunities for fishers of wild stocks have decreased because of declining populations of wild finfish; these fishers could be employed by finfish mariculture operations. Mariculture activities can also provide employment opportunities that shift workers from activities that have the potential to cause greater environmental impacts (Diana 2009).

Integrated multi-trophic mariculture activities, which include finfish mariculture combined with seaweed and/or shellfish mariculture, can provide additional jobs (Troell et al. 2009), while reducing adverse effects on water quality by assimilating wastes excreted by finfish. Integrated multi-trophic mariculture activities can also provide economic benefits for mariculture operators by diversifying the species being cultivated, and providing a means to continue to generate revenue from the cultivation of more desirable species, if the market value of a particular species declines (Price and Morris 2013). Integrated multi-tropic mariculture activities can expand the economic benefits for mariculture operators, by concurrently cultivating other species of commercial value (e.g., mussels, kelps) alongside finfish (Price and Morris 2013). Increasing domestic finfish mariculture activities can help decrease reliance on foreign imports of finfish, and help satisfy increased demand for seafood, provide jobs, and enhance food security (Price and Morris 2013).

(c) Aesthetics. Finfish mariculture activities may alter the visual character of some waters of the United States, but such changes will be minor. The extent and perception of these changes will vary, depending on the size and configuration of the mariculture activity, the nature of the surrounding area, and the public uses of the area. The use of the project area and the surrounding land may also alter local aesthetic values. Shafer et al. (2010) found that people who live closest to nearshore mariculture facilities tended to have negative perceptions about those facilities, while acknowledging the economic benefits mariculture operations can have for local communities. Finfish mariculture operators may discard equipment, such as lines, floats, and anchors that may impair the aesthetics of the waters and shoreline in the vicinity of the operation. General condition 13 requires the removal of temporary structures and fills after completion of the authorized activity. Under Section 404 of the Clean Water Act, the Corps does not regulate the placement of trash or garbage into waters of the United States, because trash or garbage is specifically excluded from the definition of “fill material” at 33 CFR 323.2(e). Discharges of trash or garbage into waters of the United States, including navigable waters, may be regulated by EPA and approved states under Section 402 of the Clean Water Act. The Corps no longer has the authority to regulate the placement of refuse in navigable waters of the United States under Section 13 of the Rivers and Harbors Act of 1899.

Finfish mariculture activities in nearshore coastal waters may affect the visual, acoustic, and olfactory characteristics of coastal areas near these activities. Some coastal residents and visitors may perceive these effects as being positive or neutral, whereas other residents or visitors may perceive these effects as negative. These perceptions may depend, in part, on the history of the coastal area and whether it has long-standing traditions of fishing and mariculture activities (NRC 2010). Finfish mariculture facilities may face opposition from members of local communities, was well as restrictions imposed by state governments, which may prompt producers to attempt to cultivate finfish in federal waters on the outer continental shelf (Naylor et al. 2005). Siting mariculture operations in federal waters on the outer continental shelf can reduce or eliminate these effects on aesthetics by making them more distant from coastal populations (NRC 2010).

(d) General environmental concerns. Activities authorized by this NWP are likely to have some adverse effects on general environmental concerns, such as water, air, and noise pollution. The authorized activities may affect, to varying degrees, the physical, chemical, and biological characteristics of the aquatic environment. The adverse effects of the activities authorized by this NWP on general environmental concerns are likely to be minor, after taking into account the current environmental setting, which has been affected by a variety of human activities and environmental changes (see section 3.4 of this document). Adverse effects to the chemical composition of the aquatic environment will be controlled, to some degree, by general condition 6, which states that the material used for construction must be free from toxic pollutants in toxic amounts. General condition 23 requires mitigation to minimize adverse effects to the aquatic environment through avoidance and minimization at the project site. Mitigation, including avoidance and minimization measures such as siting considerations to minimize adverse environmental effects, may be required by district engineers to ensure that the net adverse effects on the aquatic environment are no more than minimal. Specific environmental concerns are addressed in other sections of this document.

Potential adverse effects of finfish mariculture activities on aquatic ecosystems include: pressures on wild fisheries to produce feeds for cultivated finfish, organic and nutrient enrichment of benthic habitats, eutrophication of coastal zones, releases of chemicals to coastal waters, potential areas of anoxia, and adverse impacts caused by escaped cultivated finfish (Soto et al. 2008). Fry et al. (2014) examined federal laws that could be used to address potential concerns regarding public health risks associated with offshore finfish mariculture activities. They identified 11 environmental laws that engage in public health issues, which are administered by a variety of federal agencies, including the National Oceanic and Atmospheric Administration, U.S. Environmental Protection Agency, Food and Drug Administration, U.S. Coast Guard, Occupational Safety and Health Administration, and U.S. Department of Agriculture. They recommend the development of a comprehensive regulatory structure to deal with potential public health concerns from these activities (Fry et al. 2014).

Sustainable mariculture activities can be conducted through careful and thoughtful site selection, establishing an appropriate size for the mariculture operation, and selecting appropriate species to cultivate (Froehlich et al. 2017). There may be unavoidable environmental risks associated with finfish mariculture activities, and the trade-offs between those risks and the benefits of food production require decisions by society in general (Naylor et al. 2005). Mitigation measures can reduce a number of those environmental risks but those risks cannot be completely eliminated. The environmental impacts of finfish mariculture activities on ocean waters are influenced by the following geographic factors: temperature and current regimes of the waters, the latitude at which the operation is located, the type of sediment in the benthos, and the trophic status of the waters at the site (Price and Morris 2013). Environmental impacts can be reduced by siting these activities in more open waters, rather than enclosed basins. The design of finfish mariculture activities, along with operational standards (e.g., stocking densities, rotational practices, biosecurity measures), can help reduce the adverse effects of these activities on marine and coastal environments and facilitate the ecosystem services provided by these activities (Alleway et al. 2019). The environmental impacts of mariculture activities should not be considering in isolation, since there are a variety of human activities that also cause environmental impacts to coastal waters, and the environmental impacts of mariculture activities may be fairly small relative to the environmental impacts caused by other activities such as industrial activities (Soto et al. 2008) and the environmental impacts caused by other activities, such as shipping and cruises.

Mitigation to reduce damage to net pens and decrease finfish escapes from mariculture facilities may include using materials that are more effective at withstanding damage from predatory animals, making the nets tauter to reduce the ability of seals to grabbing fish, and using covers on propellers for boats supporting the finfish mariculture activities (Naylor et al. 2005). Capturing escaped finfish is another potential mitigation measure. Escapes of cultivated finfish from mariculture facilities can facilitate the spread of parasites and pathogens amount wild populations of finfish species (Atalah and Sanches-Jerez 2020). Finfish that escape from finfish mariculture facilities can contribute to irreversible losses of genetic diversity in finfish populations, which can decrease the ability of that species to adapt to changing environmental conditions (Atalah and Sanchez-Jerez 2020).

The finfish mariculture activities authorized by this NWP are unlikely to be direct contributors to coastal habitat loss because these activities occur through structures installed in open waters, including federal waters on the outer continental shelf. This NWP does not authorize the construction of land-based support facilities for finfish mariculture operations. Support facilities may be constructed on the coast, and this NWP does not authorize the construction or expansion of those support facilities. If construction or expansion of support facilities in coastal areas requires DA authorization under section 10 or section 404, then a separate DA permit is required.

Finfish mariculture activities can have adverse effects on the water column, including water quality. Finfish mariculture activities can be sited and configured so that the cages used to hold the cultivated finfish so that the dominant current can provide maximum water flows, higher oxygen levels, and facilitate the transport of fish waste away from the cages (Jensen et al. 2010) and facilitate the dispersal of that fish waste to reduce the accumulation of that waste and its impacts on water quality and benthic habitats.

Finfish mariculture activities can have affect benthic environments in marine and estuarine waters. For example, fish feeds and fish feces may be flushed from cages or net pens and settle on benthic habitats (Price and Morris 2013). The accumulation of fish feeds and fish feces can have adverse effects on benthic communities, by increasing inputs of organic matter, lowering oxygen levels, and changing the chemical characteristics of benthic sediments. Finfish mariculture operators in the United States have been actively taking steps to change feed composition and increase feeding efficiency to reduce adverse environmental impacts due to nutrient loading (Rust et al. 2014). The severity of those adverse effects is dependent in part on whether those materials accumulate faster on the benthos than they can be broken down through biogeochemical processes. Impacts to biogeochemical cycling processes in benthic sediments are usually are limited to 100 meters from the fish cages or net pens (Price and Morris 2013), as long as the finfish mariculture activities are managed appropriately.

Finfish mariculture activities in coastal and federal waters over the outer continental shelf can also affect biogeochemical cycling processes in benthic sediments through increases in nutrients from feeds that are not consumed by the cultivated finfish and the waste materials those finfish excrete into nearby waters (Price and Morris 2013).

Fallowing is a practice that can help reduce the adverse effects of finfish mariculture activities on benthic habitats. Once finfish production ceases and the fish are removed, sediment biogeochemical cycling processes can recover fairly quickly in well managed operations (Price and Morris 2013). This recovery is dependent upon having sufficient ability to recover ecological processes, such as re-colonization of the affected area by species from nearby waters and benthic habitats to help restore communities of organisms (Soto et al. 2008). The appropriate length of the fallowing period can vary from months to years, and can be based on the amount of time the benthos is expected to need to recover from the nutrient loading from finfish mariculture activities (Price and Morris 2013). For example, if the finfish mariculture operation is producing large numbers of individuals, or the site is located in waters where deposits of sediments and other materials accumulate, it may take longer (e.g., years) for sediment biogeochemical processes to recover after finfish production activities cease (Price and Morris 2013). Fallowing can also help reduce risks from pathogens or parasites that may be associated with finfish mariculture activities (Price and Morris 2013). Integrated multi-trophic mariculture

activities is another approach that can help reduce the addition of nutrients to the water column and the benthos, by cultivating species (e.g., seaweeds or mussels) that can consume some of the nutrients released during finfish mariculture activities (Alleway et al. 2019, Price and Morris 2013, Troell et al. 2009).

Antibiotics and therapeutic substances may be used in finfish mariculture activities to help fish recover from diseases, and antibiotics may be administered through feed, immersion, or injection. (Price and Morris 2013). Finfish mariculture activities may involve the use of chemicals such as antibiotics, disinfectants, antifouling agents, anesthetics, and parasiticides and these substances may be released into marine and estuarine habitats, including the water column and benthic sediments, and can affect other organisms (Burridge et al. 2010).

The use of antibiotics, parasiticides, and therapeutics is usually controlled by veterinarians (Burridge et al. 2010). The use of antibiotics and therapeutic substances for finfish mariculture usually has to be approved by the Food and Drug Administration. Some chemicals used for disinfectants for marine fish pens require approval by the U.S. Environmental Protection Agency. (Price and Morris 2013). The use of antibiotics in finfish mariculture activities can be reduced or eliminated by practicing integrated pest management, which can reduce stress on cultivated finfish, by managing stocking densities to promote the health of cultivated finfish, and using preventative vaccinations (Price and Morris 2013). In addition, vaccinations can help reduce the need to use antibiotics to control diseases in cultivated finfish (Price and Morris 2013). The Corps does not have the authority to control the use of antibiotics, therapeutics, and other chemicals that may be used for finfish mariculture operations to attempt to produce healthy finfish.

The amounts of antibiotics released from finfish mariculture activities is dependent on the finfish species being cultivated, the amount of feeding activity, and how well the antibiotics are metabolized by the digestive system of cultivated finfish (Price and Morris 2013). The use of antibiotics and other chemicals in finfish mariculture has been reduced over time, as management approaches for these mariculture activities have changed (Burridge et al. 2010). The effects of antibiotics and other chemicals on marine and estuarine habitats is dependent, in part, on the characteristics of the finfish mariculture site, including how well that site is flushed. Antibiotics that are not ingested by the cultivated finfish and assimilated into their bodies may be released to the water column; they may also accumulate in benthic substrates, where they may persist in the sediments for a few days to several years (Price and Morris 2013).

Therapeutic chemicals are used to infections from bacteria, parasites, viruses, and fungi. Pesticides may be used in finfish mariculture activities to control crustaceans, worms, arthropods, and algae, and the sale and labelling of pesticides may be regulated by the U.S. EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (Fry et al. 2014). Parasiticides may be used to treat sea lice (Price and Morris 2013) and may also affect non-target species of aquatic organisms,

especially crustaceans (Burridge et al. 2010). Therapeutic chemicals may be administered in feeds or through immersion, and they may be released into the aquatic environment through unconsumed food, feces when the chemicals have not been fully metabolized, or through direct discharges into the water column (Price and Morris 2013). Therapeutic chemicals released from finfish mariculture operations may accumulate in sediments below the finfish mariculture structures, or persist in the water column. Therapeutic chemicals can cause non-lethal toxicity, direct mortality of organisms, and accumulate in the food web (Price and Morris 2013). The persistence of therapeutic chemicals in the water column and in sediments can vary, from hours to months. The impacts of therapeutics and other chemicals used for finfish mariculture activities exhibit large variation because the characteristics of the sites used for these activity vary substantially, and differ in their capacities for absorbing wastes and other chemicals (Burridge et al 2010).

Finfish mariculture activities may result in the placement of trash or garbage into waters. The Corps does not have the legal authority to control the placement of trash or garbage in navigable waters of the United States. The placement of trash or garbage into navigable waters of the United States may be regulated under Section 402 of the Clean Water Act. Section 13 of the Rivers and Harbors Act of 1899, also known as the Refuse Act, provided the Secretary of the Army with the authority to permit the discharge of refuse into navigable waters of the United States. The Corps' regulations at 33 CFR 320.2(d) state that while Section 13 remains in effect, the permit authority of the Secretary of the Army has been superseded by the permit authority provided the Administrator, Environmental Protection Agency (EPA), and the states under sections 402 and 405 of the Clean Water Act (See 40 CFR parts 124 and 125).

(e) Wetlands. The finfish mariculture activities authorized by this NWP may result in impacts to tidal wetlands and seagrasses. In many cases the impacts will be small, infrequent, and temporary since the finfish mariculture activities primarily occur in relatively deep open waters. This NWP does not authorize attendant features that might result in the loss of wetlands, such as boat ramps, stockpiles, or staging areas. Few activities authorized by this NWP are expected to cause impacts wetlands because they are likely to be located in waters where there are no wetlands in the immediate vicinity of the finfish mariculture structure. Finfish mariculture activities are usually conducted in relatively deep waters, in water depths that are unlikely to support submersed aquatic vegetation because of insufficient light to reach the benthos and support the establishment and growth of seagrasses. Finfish mariculture activities may have adverse effects on seagrasses by potentially increasing water turbidity through sedimentation and nutrient loading and facilitating increases in populations of herbivorous invertebrates that feed on seagrasses (Price and Morris 2013).

Wetlands provide habitat, including foraging, nesting, spawning, rearing, and resting sites for aquatic and terrestrial species. The loss or alteration of wetlands may alter natural drainage patterns. Wetlands reduce erosion by stabilizing the substrate.

Wetlands also act as storage areas for stormwater and flood waters. The loss of wetland vegetation will adversely affect water quality because these plants trap sediments, pollutants, and nutrients and transform chemical compounds. Wetland vegetation also provides habitat for microorganisms that remove nutrients and pollutants from water. Wetlands, through the accumulation of organic matter, act as sinks for some nutrients and other chemical compounds, reducing the amounts of these substances in the water.

Seagrasses provide important ecological functions and services such as organic carbon production and export, nutrient cycling, sediment stabilization, enhanced biodiversity, and transfers of energy between adjacent habitats (Orth et al. 2006). Dumbauld and McCoy (2015) identified the following ecological functions performed by seagrasses: enhanced biodiversity, structured habitat for fish and invertebrates (nurseries, refuge from predation), sediment accretion and erosion control by dampening water currents, carbon sequestration, and foraging areas for waterfowl and shorebirds.

General condition 23 requires avoidance and minimization of impacts to waters of the United States, including wetlands, at the project site. Division engineers can regionally condition this NWP to restrict or prohibit the use of this NWP in high value tidal wetlands. District engineers will also exercise discretionary authority to require an individual permit if the wetlands to be filled are high value and the activity will result in more than minimal adverse environmental effects. District engineers can also add case-specific special conditions to the NWP authorization to provide protection to wetlands.

(f) Historic properties. General condition 20 states that in cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act have been satisfied.

(g) Fish and wildlife values. This NWP authorizes activities in coastal waters and federal waters on the outer continental shelf, which provide habitat to many species of fish and wildlife. Activities authorized by this NWP may alter the habitat characteristics of tidal waters. Tidal waters, including tidal wetlands and vegetated shallows, provides food and habitat for many species, including foraging areas, resting areas, corridors for fish movement, and nesting and breeding grounds. Open waters provide habitat for fish and other aquatic organisms. Equipment used for finfish mariculture activities, such as cages, net pens, lines, cables, and anchors, may impede bird feeding activity and trap birds. For multi-species mariculture activities authorized under this NWP that include bivalve shellfish and seaweed cultivation, equipment used for those activities may result in entanglement of marine animals. Pre-construction notification is required for all activities authorized by this NWP. The pre-construction notification requirements provides the district engineer with an opportunity to review the proposed activity, assess potential impacts on fish

and wildlife values, and ensure that the authorized activity results in no more than minimal adverse environmental effects.

Finfish mariculture activities can have positive impacts on ecosystems, by helping to replenish or sustain stocks of over-exploited species of finfish (Soto et al. 2008). Finfish mariculture activities are likely to supplement, not replace, capture fisheries for wild finfish of the same species (Naylor et al. 2005). There are a substantial number of people that perceive benefits of farmed finfish, and the potential adverse impacts of escaped finfish should be evaluated against the potential benefits that can occur from increasing production of these species through finfish mariculture activities (Naylor et al. 2005). Finfish mariculture activities can have adverse effects on wild fish populations where fish meal derived from the harvesting of wild fish stocks is used to feed the cultivated finfish (Diana 2009). These adverse effects can be reduced by the use of other sources of protein to feed cultivated finfish, such as plant derived proteins (Diana 2009).

Escapes of cultivated finfish can have adverse effects on the mortality and growth of wild individuals of finfish (Naylor et al. 2005). The risks of fish escapes increase with increasing numbers of cultivated finfish and increasing numbers of cages or net pens (Jensen et al. 2010). In a study of escapes for three finfish species at mariculture facilities in Norway, Jensen et al. (2010) estimated that the percentage of the number of escaped fish to the number of finfish in net pens or cages was Atlantic salmon (0.19%), Atlantic cod (1.2%), and rainbow trout (0.40%). The prevalent cause of fish escapes was equipment structural failures, followed by operational failures and outside factors (Jensen et al. 2010). Some escapes were the result of cultivated finfish chewing through the netting used for net pens. Structural failures can occur during heavy storms, and during strong currents, winds, and waves. Structural failures may also occur when the materials used for finfish mariculture structures fail as a result of fatigue.

The biological consequences of fish escapes from finfish mariculture facilities vary by region and by time (Naylor et al. 2005). Escapes of cultivated finfish can have adverse effects on wild fish populations by competing with those wild fish for food and other resources, transferring diseases and pathogens, and interbreeding between the cultivated fish and wild fish that may reduce the fitness of those species to survive and reproduce (Jensen et al. 2010, Naylor et al. 2005). Whether the escaped finfish become established in a region is dependent in part on whether changing biotic and abiotic conditions favor their persistence in the wild and whether repeated fish escapes (reintroductions) occur to overcome prior failures by the escaped finfish species to become established in those waters (Naylor et al. 2005). The Corps does not have the authority to control the species of finfish cultivated in the structures constructed for finfish mariculture activities. Nationwide permit general condition 14 requires proper maintenance for authorized structures, and proper maintenance of finfish mariculture structures can reduce the risk of fish escapes. However, fish escapes are usually accidental, and the Corps does not have the authority to regulate potential fish escapes. Permittees are responsible for

designing and operating permitted activities in compliance with all applicable federal and state laws and regulations.

Finfish mariculture activities can have indirect effects on fish and wildlife, such as marine mammals, sea birds, sea turtles, fish, marine plants (e.g., seagrasses), and corals (Price and Morris 2013). Finfish mariculture activities can cause adverse effects to coral reefs by contributing nutrients and sediments that can harm corals (Price and Morris 2013). Finfish mariculture activities may indirectly cause decreases in the sizes of fish populations if the mariculture structures attract fish and those fish become easier to capture by humans or other predators (Alleway et al. 2019). The structural habitat provided by net pens and cages and the excess feeds from finfish mariculture activities may attract wild fish, including sharks, as refuge areas and as potential food sources (Price and Morris 2013). Finfish mariculture activities may provide a supplemental source of food for scavenging fish (Price and Morris 2013), thereby contributing to the food webs of marine and estuarine waters.

Finfish mariculture activities can alter benthic communities (epifauna and infauna) below the fish cages or net pens when fish feces and excess feed from these structures settle on the bottom (Price and Morris 2013). Benthic impacts occur when fish waste products and feed that has not been consumed do not decompose at the same rate or faster as inputs to the sea floor occur (Rust et al. 2014). The changes to benthic communities generally occur within a distance of less than 80 meters from the finfish cages or net pens. Impacts of finfish mariculture activities on benthic communities can be reduced by siting these operations in well-flushed waters or by letting areas go fallow for a period of time to allow benthic habitats and communities to recover (Rust et al. 2014, Price and Morris 2013). Multi-species mariculture accompanying finfish production also has the potential to mitigate benthic impacts through waste recovery or transformation by co-cultured species (Reid et al. 2011). These discharges of organic wastes (fish excreta and unconsumed feeds) may be regulated by the U.S. EPA and approved states under the National Pollutant Discharge Elimination System permitting program under Section 402 of the Clean Water Act (Rust et al. 2014).

There has been little published research on the interactions between finfish mariculture structures and marine mammals (Price and Morris 2013). Some interactions have been identified so far, such as marine mammals preying on the fish being cultivated, or causing injuries or stress to cultivated finfish, which may make those fish more susceptible to disease (Price and Morris 2013). Marine mammals may also increase the risks of fish escapes from net pens by creating holes in the netting. Acoustic deterrent devices and acoustic harassment devices may be used by finfish mariculture operators to try to keep marine mammals away from finfish mariculture facilities, but these devices are not always effective and can affect species of marine organisms, by contributing to noise pollution in oceans (Price and Morris 2013, Guclusoy and Savas 2003). The presence and operation of aquaculture gear may also cause behavioral modification to wildlife via exclusion

from important habitats (Quinones et al. 2019, Clement 2013). These effects may be short to long-term and may be characterized by attraction or avoidance depending on the species present (Clement 2013).

Marine mammals could become entangled in nets or lines used for finfish mariculture activities (Price and Morris 2013, Clement 2013). Entanglement risk can be reduced by locating finfish mariculture activities outside of migratory routes for marine mammals, by keeping lines taut, using predator exclusion nets, or using rigid net materials (Price and Morris 2013). The use of predator nets may be effective for deterring target species such as pinnipeds, but also have the potential to create an entanglement risk for other wildlife (Quinones et al. 2019). Operators of finfish mariculture activities may need to obtain incidental take permits under the Marine Mammal Protection Act, if their operations could cause take of marine mammals.

Marine birds and sea turtles may also become entangled in fish pens or lines used for finfish mariculture activities (Price and Morris 2013). Marine birds may be attracted to finfish mariculture facilities to attempt to consume cultivated finfish (Price and Morris 2013). Sea turtles may be found at finfish mariculture facilities, but they are not going to these structures to feed, and they are also at risk of becoming entangled in nets or lines associated with finfish mariculture structures (Price and Morris 2013). As for marine mammals, the risk of entanglement can be reduced by using stiffer, more taut lines for these facilities.

District engineers will review pre-construction notifications for proposed activities authorized by this NWP and determine whether proposed activities “may affect” marine mammals, birds, and turtles that are listed as endangered or threatened under the Endangered Species Act. If the district engineer makes a “may affect” determination rather than a “no effect” determination, he or she will initiate formal or informal ESA section 7 consultation as appropriate with the U.S. Fish and Wildlife Services and/or the National Marine Fisheries Service. Please see NWP general condition 18 and 33 CFR 330.4(f) for the requirements for compliance with section 7 of the ESA.

General condition 2 will reduce adverse effects to fish and other aquatic species by prohibiting activities that substantially disrupt the movement of indigenous aquatic species, unless the primary purpose of the activity is to impound water. Compliance with general conditions 3 and 5 will ensure that the authorized activity has no more than minimal adverse effects on spawning areas and shellfish beds, respectively. The authorized activity cannot have more than minimal adverse effects on breeding areas for migratory birds, due to the requirements of general condition 4.

For an NWP activity, compliance with the Bald and Golden Eagle Protection Act (16 U.S.C. 668(a)-(d)), the Migratory Bird Treaty Act (16 U.S.C. 703; 16 U.S.C. 712), and the Marine Mammal Protection Act (16 U.S.C. 1361 et seq.) is the responsibility of the project proponent. General condition 19 states that the permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife

Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether “incidental take” permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

Consultation pursuant to the essential fish habitat provisions of the Magnuson-Stevens Fishery Conservation and Management Act will occur as necessary for proposed NWP activities that may adversely affect essential fish habitat. Consultation may occur on a case-by-case or programmatic basis. Division and district engineers can impose regional and special conditions to ensure that activities authorized by this NWP will result in only minimal adverse effects on essential fish habitat.

(h) Flood hazards. The activities authorized by this NWP are likely to have little or no adverse effects on the flood-holding capacity of 100-year floodplains, since these activities occur in coastal navigable waters or federal waters over the outer continental shelf. Compliance with general condition 9 will reduce flood hazards. This general condition requires the permittee to maintain, to the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters, except under certain circumstances.

(i) Floodplain values. Activities authorized by this NWP are likely to have negligible adverse effects on the flood-holding capacity of the floodplain, as well as other floodplain values, since it authorizes finfish mariculture activities, which occur in coastal waters and federal waters on the outer continental shelf. All activities authorized by this NWP require pre-construction notification, so district engineers will review all proposed activities to ensure that those activities result in no more than minimal adverse effects on floodplain values.

(j) Land use. Activities authorized by this NWP will have little or no adverse effects on coastal land use, since it is limited to finfish mariculture activities and those activities can only occur in coastal waters and federal waters on the outer continental shelf. In coastal waters where states have ownership over submerged lands, the project proponent may be required to obtain authorization, a lease, or other type of permission from a state government agency. Since the primary responsibility for land use decisions is held by state, local, and Tribal governments, the Corps’ control and responsibility is limited to significant issues of overriding national importance, such as navigation and water quality (see 33 CFR 320.4(j)(2)).

(k) Navigation. Activities authorized by this NWP will not adversely affect navigation, because these activities must comply with general condition 1. Certain activities authorized by this NWP, such as changing from bottom culture to floating or suspended culture methods, require pre-construction notification, which will allow district engineers to review those activities and determine if there will be any adverse effects on navigation. Finfish mariculture activities can occur in submerged cages at depths that can minimize adverse effects to navigation (Troell et al. 2009).

Finfish mariculture structures in an anchorage area established by the U.S. Coast Guard must comply with the requirements in 33 CFR 322.5(l)(2). This NWP prohibits finfish mariculture structures in established danger zones or restricted areas designated in 33 CFR part 334, federal navigation channels, and shipping safety fairways or traffic separation schemes established by the U.S. Coast Guard (see 33 CFR 322.5(l)(1)). All activities authorized by this NWP require pre-construction notification, which will allow district engineers to review these activities and determine if there will be any adverse effects on navigation, including potential conflicts with other users of navigable waters and federal waters on the outer continental shelf.

The U.S. Coast Guard may require a "private aids to navigation permit" for finfish mariculture activities that occur in the water column of coastal waters (see 33 CFR part 66). Under paragraph (c) of NWP general condition 1, the permittee may be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. The Corps may require these actions if, in the opinion of the Secretary of the Army or his or her authorized representative, the structure or work will cause unreasonable obstruction to the free navigation of the navigable waters.

(l) Shore erosion and accretion. The activities authorized by this NWP will likely have minor direct effects on shore erosion and accretion processes, since the NWP is limited to finfish mariculture activities that occur in coastal waters and federal waters on the outer continental shelf. If the structures used for finfish mariculture activities are located near the shore, those structures may dampen wave energy and reduce erosion. The structures used for finfish mariculture activities, when placed near the shore in exposed coastal environments, can help reduce shore erosion by attenuating wave energy (Alleway et al. 2019).

(m) Recreation. Finfish mariculture activities authorized by this NWP, especially activities in nearshore coastal waters, may have some adverse effects to recreational activities by occupying an area of navigable waters used for boating, recreation fishing, and other activities. Certain recreational activities, such as bird watching, and fishing may still be available or enhanced in the area. Escaped finfish may be captured by recreational fishers, which may provide additional recreational opportunities and satisfaction for people that practice this type of fishing (Naylor et al. 2005). People who live near coastal areas where mariculture activities may occur and who directly use those waters for recreation purposes tend to have more concerns about these activities (Shafer et al. 2010) than people who live farther away and are less likely to use these waters for recreation. On the other hand, if escaped finfish outcompete wild variants of finfish species, they may reduce recreational opportunities and satisfaction for recreational fishers who seek to catch wild individuals of that finfish species (Naylor et al. 2005). Potential impacts to recreational values and other potential uses of coastal waters may be reduced by locating finfish mariculture activities in federal waters over the outer continental shelf.

(n) Water supply and conservation. Activities authorized by this NWP are unlikely to adversely affect surface water and groundwater supplies, because it authorizes finfish mariculture activities in marine and estuarine coastal waters and in federal waters over the outer continental shelf. This NWP does not authorize land-based finfish aquaculture activities. These activities are unlikely to increase demand for potable water in the region. Activities authorized by this NWP are unlikely to adversely affect the quality of water supplies, since they can only occur in marine and estuarine waters. Many causes of water pollution, such as discharges regulated under Section 402 of the Clean Water Act, and non-point sources of pollution, are outside the Corps' control and responsibility. Finfish mariculture activities that exceed thresholds identified in effluent limitation guidelines for concentrated animal feeding operations may require permits under Section 402 of the Clean Water Act (see 40 CFR part 451, subpart B).

(o) Water quality. Finfish mariculture activities may have adverse effects on water quality. Impacts to water quality are dependent on the ability of the surrounding ecosystem to assimilate wastes and discharges from the mariculture facility (Diana 2009). Multi-trophic mariculture structures authorized by this NWP that include bivalve mollusc and/or seaweed cultivation with finfish cultivation may serve to moderate some of the potential effects of nutrient loading from the cultivated finfish, but this will depend on project design and the scale of each multi-trophic mariculture activity. Adverse effects to water quality are more likely to occur during the operational phases of these activities, such as feeding and finfish physiological processes (e.g., elimination of feces), after the mariculture structures are installed in coastal waters or in federal waters on the outer continental shelf. For the most part, the adverse effects to water quality are unlikely to be caused by the installation of finfish mariculture facilities that is authorized by this NWP, with the possible exception of the release of metal elements from cage materials, antifouling paints, and other substances on these structures. The operation of finfish mariculture activities can increase loads of feeds, nutrients, excreta, pharmaceuticals, and other pollutants in the water. Adverse effects to water quality caused by nutrients released to nearby waters during the operation of finfish mariculture facilities can be reduced through specific farming practices, the use of more efficient feeds and feeding practices, optimizing finfish production by changing the orientation and configuration of the net pens and cages, and site selection to improve nutrient assimilation and waste distribution (Rust et al. 2014). However, in naturally oligotrophic waters, finfish mariculture activities may increase nutrient levels that help increase the production of other organisms (Alleway et al. 2019).

Finfish mariculture activities may provide minor contributions of nitrogen and phosphorous that can lead to the eutrophication of coastal waters, but a potentially more substantial contributor of nutrients to eutrophication are point and non-point sources from land-based activities (Price and Morris 2013). In some waters, naturally occurring changes in nutrient concentrations from ocean upwelling may be higher than nutrient loads from finfish mariculture facilities (Rust et al. 2014). Water

turbidity in the vicinity of finfish mariculture activities may increase as a result of excretion of fish waste, dust from fish feed, and the removal of biofouling organisms, but those increases are likely to be temporary, especially in well flushed estuarine and marine waters (Price and Morris 2013).

Various chemicals associated with finfish mariculture activities can have adverse effects on water quality. Antifoulants are chemicals used to reduce or remove fouling organisms from marine finfish mariculture structures and lines (Price and Morris 2013), and these chemicals may be toxic to a variety of marine organisms. Antifoulants may be copper-based chemicals, and the copper may bind to sediments for a long period of time and accumulate in benthic habitats (Price and Morris 2013). Copper may have toxic effects on non-target marine organisms in the water column and in sediments below finfish cages or net pens. (Burridge et al. 2010). The Corps does not have the legal authority to regulate the use of antifoulants and antifouling paints that may be used for finfish mariculture structures.

Heavy metals, such as cadmium, may be present in trace amounts in finfish feeds and may accumulate in sediments when feeds that have not been consumed by cultivated finfish settle on the substrate below the finfish mariculture facility (Price and Morris 2013). Zinc is another heavy metal that can be released from finfish mariculture activities, and it can be toxic to marine organisms, such as algae (Burridge et al. 2010). These impacts can be reduced through changes in feed composition that reduce the amounts of heavy metals such as zinc and copper. Most levels of heavy metals in sediments below finfish mariculture facilities are within environmentally acceptable ranges (Price and Morris 2013). The Corps does not have the legal authority to regulate the composition of feeds used for finfish mariculture activities.

Disinfectants can also be released into marine and estuarine waters during finfish mariculture activities when they are used to clean nets, boats, containers, diving equipment, platforms, and decking (Burridge et al. 2010), and the use of disinfectants might not be regulated by any government agency.

This NWP authorizes only structures and work in navigable waters of the United States, and these activities will be conducted primarily in coastal marine and estuarine waters and in federal waters over the outer continental shelf. Depending on the materials used to construct finfish cages and pens, lines, cables, floats, and anchors, there may be some effects on water quality from chemicals leaching from those materials. Metals such as copper, zinc, iron, and manganese can enter marine waters from finfish mariculture activities through feeds or antifoulant paints (Burridge et al. 2010), and higher levels of copper and zinc may be found near finfish mariculture sites.

Finfish mariculture activities in federal waters on the outer continental shelf can be sited in locations with faster currents, deeper water, and lower nutrient levels that

can accommodate larger finfish mariculture activities that operate within the capacity of those offshore waters to assimilate finfish waste and unconsumed feed (Troell et al. 2009), with minor effects on water quality. The water quality impacts of finfish mariculture activities can also be reduced through integrated multi-trophic mariculture activities, where seaweeds and/or bivalve molluscs can be cultivated alongside finfish to assimilate nutrients excreted as waste material from the cultivated finfish (Alleway et al. 2019, Price and Morris 2013, Troell et al. 2009), and use those nutrients for seaweed and bivalve mollusc growth. Offshore finfish mariculture activities use net pens or cages through which water currents flow, which can transport unconsumed feed to nearby waters and decrease water quality through increased nutrient and particulate matter loads (Troell et al. 2009).

The Corps does not have authority to regulate most operational aspects of finfish mariculture activities, such as feeding, control of nuisance or fouling organisms, or discharges of animal wastes. Some operational aspects of finfish mariculture activities may be regulated under Section 402 of the Clean Water Act by EPA or states with approved section 402 permitting programs. Adverse effects to water quality from finfish mariculture activities can be reduced through carefully developed feed formulations and increases in the efficiency of converting feed to finfish biomass (Price and Morris 2013).

The U.S. EPA issued effluent limitation guidelines for concentrated animal feeding operations that produce 100,000 pounds or more per year of aquatic animals in net pens or submerged cage systems, except for net pen facilities that produce native species released after a growing period of no longer than 4 months to supplement commercial and sport fisheries (see 40 CFR part 451, subpart B). These effluent limitation guidelines cover feed management, waste collection and disposal, transport or harvest discharges, carcass removal, materials storage, maintenance, recordkeeping, and training. Under EPA's regulations at 40 CFR part 451, finfish mariculture activities conducted in net pens or submerged cages that produce more than 100,000 pounds or more of finfish per year require section 402 permits for discharges of pollutants from those facilities.

Finfish mariculture activities conducted in cages can adversely affect water quality through releases of dissolved nitrogen, dissolved phosphorous, and lipids (Price and Morris 2013). These activities may also alter water turbidity and dissolved oxygen levels (Price and Morris 2013). In open oceans and other well-flushed waterbodies, the effects on water quality can be measured up to a distance of 30 meters from the finfish mariculture cages, and these water quality impacts are often temporary in duration (Price and Morris 2013). In coastal waters with poor flushing, there may be greater adverse effects to water quality (Price and Morris 2013). Where land uses (e.g., agriculture, urban, mining) in coastal areas may contribute nutrients and other pollutants to coastal waters via point and non-point pollution sources, it may be difficult to determine when an increase in nutrients is caused by finfish mariculture (Rust et al. 2014). Finfish mariculture activities can cause decreases in dissolved oxygen because of respiration by the cultivated finfish and

by microbes (Price and Morris 2013), but these decreases are likely to be minor.

During finfish mariculture operations, including the construction of net pens, cages, and other structures in navigable waters, small amounts of oil and grease from production or harvesting equipment may be discharged into the waterway. Because most production or harvesting activities will occur during a relatively short period of time, the frequency and concentration of these discharges are not expected to minor adverse effects on overall water quality.

Finfish mariculture activities may use chemicals that are released into the surrounding waters. Some of these chemicals generally cause only short term adverse environmental effects because are rapidly diluted by marine and estuarine waters, break down quickly, and are not retained in benthic sediments. Other chemicals may persist in these waters and may have long-term or short-term adverse effects on marine organisms near the finfish mariculture facilities. (Price and Morris 2013)

(p) Energy needs. The activities authorized by this NWP are likely to result in negligible changes in energy consumption in the area, because the NWP authorizes only certain aspects of finfish mariculture activities, specifically structures or work in marine and estuarine coastal waters and federal waters on the outer continental shelf. The predominant energy needs associated with finfish mariculture activities are likely to be energy needed to construct the structures authorized by this NWP and the fuel needed to run vessels that support the finfish mariculture facilities by transporting personnel, cultivated finfish, and materials. Therefore, consumption of electricity, natural gas, and petroleum products is unlikely to change as a result of the authorized activities.

(q) Safety. The activities authorized by this NWP will be subject to Federal, state, and local safety laws and regulations. Therefore, this NWP will not adversely affect the safety of the project area. Regulations for the design and operation of finfish mariculture activities have been promulgated by some state governments (e.g., Washington and Maine) (Naylor et al. 2005), but these state regulations may not apply to finfish mariculture activities in federal waters on the outer continental shelf. Storms may damage finfish mariculture structures and strain the mooring structures that hold the cages and net pens in place (Jensen et al. 2010), which can create safety issues and increase the potential for fish escapes. Safety issues relating to finfish mariculture activities may be addressed by the Occupational Safety and Health Administration of the U.S. Department of Labor (Fry et al. 2014).

(r) Food and fiber production. Activities authorized by this NWP are expected to increase food production, through the production of a variety of species of finfish. Finfish mariculture activities can help increase the production of marine fish species in areas where fishing activities exert pressure on marine fisheries (Naylor et al. 2005), to provide food to people. The activities authorized by this NWP are not likely to adversely affect fiber production. These activities are unlikely to change the

amount of available agricultural land in the nation, since they are located in estuarine and marine coastal waters and federal waters over the outer continental shelf. Finfish mariculture activities may interfere or compete with commercial and recreational fishing activities by excluding fishers from the waters where those mariculture activities occur. Finfish mariculture activities in federal waters on the outer continental shelf has the potential to help increase overall mariculture production, because of the limited number of sites in coastal waters suitable for finfish mariculture (Troell et al. 2009). There may also be health benefits from consuming farmed salmon, such as the benefits that may occur by consuming higher levels of omega-3 polyunsaturated fatty acids in salmon (Naylor et al. 2005). But there may also be health risks, such as the bioaccumulation of organic contaminants (e.g., polychlorinated biphenyls) in farmed salmon, which may be higher than the bioaccumulation in wild salmon stocks.

In the United States, aquaculture (including mariculture) development has been impeded because of uncertainties about federal and state permitting for these activities, conflicts in uses of coastal resources, and environmental concerns (Price and Morris 2013), and this NWP has potential to help reduce permitting uncertainties with respect to Section 10 of the Rivers and Harbors Act of 1899 to help increase food production through finfish mariculture activities.

(s) Mineral needs. Activities authorized by this NWP will have little or no adverse effects on demand for aggregates and stone, since these materials are usually not used for finfish mariculture activities. Activities authorized by this NWP may increase the demand for other materials, such as steel, aluminum, and copper, which are made from mineral ores. Finfish mariculture activities may increase mineral needs, especially for metals used to construct cages and cables, and other structures used for finfish mariculture activities.

(t) Considerations of property ownership. The NWP is consistent with 33 CFR 320.4(g), which states that an inherent aspect of property ownership is a right to reasonable private use. In estuarine and marine waters where the state retains title of submerged lands, the project proponent may be required to obtain a permit, lease, or other permission or license to conduct a finfish mariculture activity. In federal waters on the outer continental shelf, the project proponent may be required to obtain a lease or other form of permission from the Department of Interior. The NWP provides expedited DA authorization for finfish mariculture activities, provided those activities comply with the terms and conditions of the NWP and result in no more than minimal adverse environmental effects.

6.2 Additional Public Interest Review Factors (33 CFR 320.4(a)(2))

6.2.1 Relative extent of the public and private need for the proposed structure or work

This NWP authorizes structures in navigable waters of the United States, including federal waters on the outer continental shelf for finfish mariculture activities and multi-trophic mariculture activities (e.g., finfish cultivation along with the cultivation of seaweeds and/or bivalve molluscs) as long as those activities have no more than minimal individual and cumulative adverse environmental effects. These activities satisfy public and private needs for food and other products. The need for this NWP is based upon the number of these activities that occur annually with only minimal individual and cumulative adverse environmental effects.

6.2.2 Where there are unresolved conflicts as to resource use, the practicability of using reasonable alternative locations and methods to accomplish the objective of the proposed structure or work

Most situations in which there are unresolved conflicts concerning resource use arise when environmentally sensitive areas are involved (e.g., special aquatic sites, including wetlands) or where there are competing uses of a resource. The nature and scope of the activity, when planned and constructed in accordance with the terms and conditions of this NWP, reduce the likelihood of such conflict. In the event that there is a conflict, the NWP contains provisions that are capable of resolving the matter (see Section 1.2 of this document).

General condition 23 requires permittees to avoid and minimize adverse effects to waters of the United States to the maximum extent practicable on the project site. Consideration of off-site alternative locations is not required for activities that are authorized by general permits. General permits authorize activities that have no more than minimal individual and cumulative adverse effects on the environment and the overall public interest. The district engineer will exercise discretionary authority and require an individual permit if the proposed activity will result in more than minimal adverse environmental effects on the project site. The consideration of off-site alternatives can be required during the individual permit process.

6.2.3 The extent and permanence of the beneficial and/or detrimental effects which the proposed structure or work is likely to have on the public and private uses to which the area is suited

The nature and scope of the activities authorized by the NWP will most likely restrict the extent of the beneficial and detrimental effects to the area immediately surrounding the finfish mariculture activity. Activities authorized by this NWP may have no more than minimal individual and cumulative adverse environmental effects.

The terms, conditions, and provisions of the NWP were developed to ensure that individual and cumulative adverse environmental effects are no more than minimal. Specifically, NWPs do not obviate the need for the permittee to obtain other Federal, state, or local authorizations required by law. The NWPs do not grant any property rights or exclusive privileges (see 33 CFR 330.4(b) for further information).

Additional conditions, limitations, restrictions, and provisions for discretionary authority, as well as the ability to add activity-specific or regional conditions to this NWP, will provide further safeguards to the aquatic environment and the overall public interest. There are also provisions to allow suspension, modification, or revocation of the NWP on a regional or case-by-case basis.

7.0 Endangered and Threatened Species

No activity is authorized by any NWP if that activity is likely to jeopardize the continued existence of a threatened or endangered species as listed or proposed for listing under the Federal Endangered Species Act (ESA), or to destroy or adversely modify the critical habitat of such species (33 CFR 330.4(f)). If the district engineer determines a proposed NWP activity may affect listed species or designated critical habitat, he or she will conduct ESA section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS) as appropriate. The proposed NWP activity is not authorized until the ESA section 7 consultation process is completed or the district engineer determines the proposed NWP activity will have no effect on listed species or designated critical habitat. Current local procedures in Corps districts are effective in ensuring compliance with ESA. Those local procedures include regional programmatic consultations and the development of Standard Local Operating Procedures for Endangered Species (SLOPES). The issuance or reissuance of an NWP, as governed by NWP general condition 18 (which applies to every NWP and which relates to endangered and threatened species and critical habitat) and 33 CFR 330.4(f), results in “no effect” to listed species or critical habitat, because no activity that “may affect” listed species or critical habitat is authorized by NWP unless ESA Section 7 consultation with the USFWS and/or NMFS has been completed. If the non-federal project proponent does not comply with 33 CFR 330.4(f)(2) and general condition 18, and does not submit the required PCN, then the activity is not authorized by NWP. In such situations, it is an unauthorized activity and the Corps district will determine an appropriate course of action under its regulations at 33 CFR part 326 to respond to the unauthorized activity. Unauthorized activities may also be subject to the prohibitions of Section 9 of the ESA.

Each activity authorized by an NWP is subject to general condition 18, which states that “[n]o activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify designated critical habitat or critical habitat proposed for such designation.” In addition, general condition 18 explicitly states that the NWP does not authorize “take” of threatened or endangered species, which will ensure that permittees do not mistake the NWP authorization as a Federal authorization to take threatened or endangered species. General condition 18 also requires a non-federal permittee to

submit a pre-construction notification to the district engineer if any listed species or designated critical habitat (or proposed species or proposed critical habitat) might be affected or is in the vicinity of the project, or if the project is located in designated or proposed critical habitat. The Corps established the “might affect” threshold in 33 CFR 330.4(f)(2) and paragraph (c) of general condition 18 because it is more stringent than the “may affect” threshold for section 7 consultation in the USFWS’s and NMFS’s ESA section 7 consultation regulations at 50 CFR part 402. The word “might” is defined as having “less probability or possibility” than the word “may” (Merriam-Webster’s Collegiate Dictionary, 10th edition). Since “might” has a lower probability of occurring, it is below the threshold (i.e., “may affect”) that triggers the requirement for ESA section 7 consultation for a proposed Federal action This general condition also states that, in such cases, non-federal permittees shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized.

Under the current Corps regulations (33 CFR 325.2(b)(5)), the district engineer must review all permit applications for potential impacts on threatened and endangered species or critical habitat. For the NWP program, this review occurs when the district engineer evaluates the pre-construction notification or request for verification. Nationwide permit general condition 18 requires a non-federal applicant to submit a pre-construction notification to the Corps if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat (or critical habitat proposed for such designation). Based on the evaluation of all available information, the district engineer will initiate consultation with the USFWS or NMFS, as appropriate, if he or she determines that the proposed activity may affect any threatened and endangered species or designated critical habitat. Consultation may occur during the NWP authorization process or the district engineer may exercise discretionary authority to require an individual permit for the proposed activity and initiate section 7 consultation during the individual permit process. If the district engineer determines a proposed NWP activity is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat, he or she will initiate a conference with the USFWS or NMFS. If ESA Section 7 consultation or conference is conducted during the NWP authorization process, then the applicant will be notified that he or she cannot proceed with the proposed NWP activity until section 7 consultation is completed.

If the district engineer determines that the proposed NWP activity will have no effect on any threatened or endangered species or critical habitat, then the district engineer will notify the applicant that he or she may proceed under the NWP authorization as long as the activity complies with all other applicable terms and conditions of the NWP, including applicable regional conditions. When the Corps makes a “no effect” determination, that determination is documented in the record for the NWP verification.

In cases where the Corps makes a “may affect” determination, formal or informal section 7 consultation is conducted before the activity is authorized by NWP. A non-federal permit applicant cannot begin work until notified by the Corps that the proposed NWP activity will have “no effect” on listed species or critical habitat, or until ESA Section 7 consultation has been completed (see also 33 CFR 330.4(f)). Federal permittees are responsible for complying with ESA Section 7(a)(2) and should follow their own procedures for complying with those requirements (see 33 CFR 330.4(f)(1)). Therefore, permittees cannot rely on complying with the terms of an NWP without considering ESA-listed species and critical habitat, and they must comply with the NWP conditions to ensure that they do not violate the ESA. General condition 18 also states that district engineers may add activity-specific conditions to the NWPs to address ESA issues as a result of formal or informal consultation with the USFWS or NMFS.

Each year, the Corps conducts thousands of ESA section 7 consultations with the USFWS and NMFS for activities authorized by NWPs. These section 7 consultations are tracked in ORM. During the period of March 19, 2017, to October 20, 2020, Corps districts conducted 1,294 formal consultations and 8,233 informal consultations under NWP PCNs where the Corps verified that the proposed activities were authorized by NWP. During that time period, the Corps also used regional programmatic consultations for 21,677 NWP verifications to comply with ESA section 7. Therefore, each year an average of 8,700 formal, informal, and programmatic ESA section 7 consultations are conducted with the USFWS and/or NMFS in response to NWP PCNs, including those activities that required PCNs under paragraph (c) of general condition 18. In a study on ESA section 7 consultations tracked by the USFWS, Malcom and Li (2015) found that during the period of 2008 to 2015, the Corps conducted the most formal and informal section 7 consultations, far exceeding the numbers of section 7 consultations conducted by other federal agencies.

Section 7 consultations are often conducted on a case-by-case basis for activities proposed to be authorized by NWP that may affect listed species or critical habitat, in accordance with the USFWS’s and NMFS’s interagency regulations at 50 CFR part 402. Instead of activity-specific section 7 consultations, compliance with ESA may also be achieved through formal or informal regional programmatic consultations. Compliance with ESA Section 7 may also be facilitated through the adoption of NWP regional conditions. In some Corps districts SLOPES have been developed through consultation with the appropriate regional offices of the USFWS and NMFS to make the process of complying with section 7 more efficient.

Corps districts have, in most cases, established informal or formal procedures with local offices of the USFWS and NMFS, through which the agencies share information regarding threatened and endangered species and their critical habitat. This information helps district engineers determine if a proposed NWP activity may affect listed species or their critical habitat and, when a “may affect” determination is made, initiate ESA section 7 consultation. Corps districts may utilize maps or

databases that identify locations of populations of threatened and endangered species and their critical habitat. Where necessary, regional conditions are added to one or more NWPs to require pre-construction notification for NWP activities that occur in known locations of threatened and endangered species or critical habitat. Any information provided by local maps and databases and any comments received during the pre-construction notification review process will be used by the district engineer to make a “no effect” or “may affect” determination for the pre-construction notification.

Based on the safeguards discussed in this section, especially general condition 18 and the NWP regulations at 33 CFR 330.4(f), the Corps believes that the activities authorized by this NWP comply with the ESA. Although the Corps continues to believe that these procedures ensure compliance with the ESA, the Corps has taken some steps to provide further assurance. Corps district offices meet with local representatives of the USFWS and NMFS to establish or modify existing procedures such as regional conditions, where necessary, to ensure that the Corps has the latest information regarding the existence and location of any threatened or endangered species or their critical habitat. Corps districts can also establish, through SLOPES or other tools, additional safeguards that ensure compliance with the ESA. Through ESA Section 7 formal or informal consultations, the Corps ensures that no activity is authorized by any NWP if that activity is likely to jeopardize the continued existence of a threatened or endangered species as listed or proposed for listing under the ESA, or to destroy or adversely modify the critical habitat of such species. Other tools, such as SLOPES, the development of regional conditions added to the NWP by the division engineer, and conditions added to a specific NWP authorization by the district engineer help ensure compliance with the ESA.

If informal section 7 consultation is conducted, and the USFWS and/or NMFS issues a written concurrence that the proposed activity may affect, but is not likely to adversely affect, listed species or designated critical habitat based on conservation measures incorporated in the project to avoid or minimize potential effects to ESA resources, the district engineer will add conditions (e.g., conservation measures) to the NWP authorization. If the USFWS and/or NMFS does not issue a written concurrence that the proposed NWP activity “may affect, but is not likely to adversely affect” listed species or critical habitat, the Corps will initiate formal section 7 consultation if it changes its determination to “may affect, likely to adversely affect.”

If formal section 7 consultation is conducted and a biological opinion is issued, the district engineer will add conditions to the NWP authorization to incorporate appropriate elements of the incidental take statement of the biological opinion into the NWP authorization, if the biological opinion concludes that the NWP activity is not likely to jeopardize the continued existence of listed species or adversely modify or destroy critical habitat. If the biological opinion concludes that the proposed activity is likely to jeopardize the continued existence of listed species or adversely

modify or destroy critical habitat, the proposed activity cannot be authorized by NWP and the district engineer will instruct the applicant to apply for an individual permit. The incidental take statement includes reasonable and prudent measures and terms and conditions such as mitigation, monitoring, and reporting requirements that minimize incidental take. The Corps will determine which elements of an incidental take statement need to be added to the NWP authorization as permit conditions to fulfill its obligations under Section 7(a)(2) of the ESA. The appropriate elements of the incidental take statement are dependent on those activities identified in the biological opinion over which the Corps has control and responsibility (i.e., structures or work in navigable waters and their direct and indirect effects on listed species or critical habitat and/or the discharges of dredged or fill material into waters of the United States). The appropriate elements of the incidental take statement are those reasonable and prudent measures and terms and conditions that the Corps has the authority to enforce under its permitting authorities. Incorporation of the appropriate elements of the incidental take statement into the NWP authorization through binding, enforceable permit conditions may provide the project proponent an exemption from the take prohibitions in ESA Section 9 (see Section 7(o)(2) of the ESA).

The Corps can modify this NWP at any time that it is deemed necessary to protect listed species or their critical habitat, either through: 1) national general conditions or national-level modifications, suspensions, or revocations of the NWPs; 2) regional conditions or regional modifications, suspensions, or revocations of NWPs; or 3) activity-specific permit conditions (modifications) or activity-specific suspensions or revocations of NWP authorizations. Therefore, although the Corps has issued the NWPs, the Corps can address any ESA issue, if one should arise. The NWP regulations also allow the Corps to suspend the use of some or all of the NWPs immediately, if necessary, while considering the need for permit conditions, modifications, or revocations. These procedures are provided at 33 CFR 330.5.

8.0 Determinations

8.1 Finding of No Significant Impact

Based on the information in this document, the Corps has determined that the structures in navigable waters of the United States, including federal waters on the outer continental shelf, for finfish mariculture activities and multi-trophic mariculture activities authorized by the issuance of this NWP will not have a significant impact on the quality of the human environment. During the five-year period this NWP will be in effect, the activities authorized by this NWP will result in only minor changes to the affected environment described in section 4.0 of this environmental assessment. Therefore, the preparation of an environmental impact statement is not required for the issuance of this NWP.

8.2 Public Interest Determination

In accordance with the requirements of 33 CFR 320.4, the Corps has determined, based on the information in this document, that the issuance of this NWP to authorize structures in navigable waters of the United States for finfish mariculture activities and multi-trophic mariculture activities is not contrary to the public interest.

8.3 Compliance with Requirements for Issuance of General Permits under Section 10 of the Rivers and Harbors Act of 1899 (33 CFR 322.2(f))

Based on the information in this document, the Corps has determined that the structures in navigable waters of the United States authorized by this NWP, when conducted in compliance with the conditions included in the NWP authorization, will result in only minor changes to the current environmental setting described in section 4.0 of this document, and will have no more than minimal individual and cumulative adverse effects on the aquatic environment during the 5-year period this NWP is in effect.

8.4 Section 176(c) of the Clean Air Act General Conformity Rule Review

This NWP has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. It has been determined that the activities authorized by this permit will not exceed de minimis levels of direct emissions of a criteria pollutant or its precursors and are exempted by 40 CFR 93.153. Any later indirect emissions are generally not within the Corps continuing program responsibility and generally cannot be practicably controlled by the Corps. For these reasons, a conformity determination is not required for this NWP.

FOR THE COMMANDER

Dated: 4 January 2021

William H. Graham Jr.
Major General, U.S. Army
Deputy Commanding General for Civil and Emergency Operations

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