NATIONAL MARINE FISHERIES SERVICE
ENDANGERED SPECIES ACT SECTION 7
BIOLOGICAL OPINION

Title: Biological and Conference Opinion for the Issuance of the 5-Year Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity, Pursuant to the National Pollution Discharge Elimination System

Consultation Conducted By: Endangered Species Act Interagency Cooperation Division of the Office of Protected Resources, National Marine Fisheries Service.

Action Agency: United States Environmental Protection Agency, Office of Water

Publisher: Office of Protected Resources, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce

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Consultation Tracking number: OPR-2019-04051

Digital Object Identifier (DOI): https://doi.org/10.25923/nn0q-q605

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1 INTRODUCTION

The Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 et seq.), jointly administered by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS, taken together, the Services), establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat they depend on. Section 7(a)(2) of the ESA requires Federal agencies to insure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitat. Federal agencies must do so in consultation with NMFS for threatened or endangered species (ESA-listed), or designated critical habitat that may be affected by the action that are under NMFS' jurisdiction for threatened or endangered species (ESA-listed), or designated critical habitat that may be affected by the action that are under NMFS' jurisdiction (50 C.F.R. §402.14(a)). If a Federal action agency determines that an action "may affect, but is not likely to adversely affect" endangered species, threatened species, or designated critical habitat (a not likely to adversely affect determination, NLAA) and NMFS concurs with that determination for species under NMFS' jurisdiction, consultation concludes informally (50 C.F.R. §402.14(b)).

When consultation is not concluded informally, section 7(b)(3) of the ESA requires that at the conclusion of consultation, NMFS provide an opinion stating whether the Federal agency's action is likely to *jeopardize the continued existence* of an ESA-listed species or result in *destruction or adverse modification* of designated critical habitat. Specifically:

"Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of an ESA-listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 C.F.R. §402.02).

"Destruction or adverse modification" means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species (50 C.F.R. §402.02).

If NMFS determines that the action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat, NMFS provides a reasonable and prudent alternative that allows the action to proceed in compliance with section 7(a)(2) of the ESA. If incidental take is expected, ESA section 7(b)(4) requires NMFS to provide an incidental take statement that specifies the impact of any incidental taking and includes reasonable and prudent measures to minimize such impacts and terms and conditions to implement the reasonable and prudent measures.

Updates to the regulations governing interagency consultation became effective September 26, 2019 [84 FR 44976]. While discussions for this consultation preceded this date, formal consultation was initiated after the rule became effective and we are applying the updated regulations to this consultation. As the preamble to the final regulations noted:

> *This final rule does not lower or raise the bar on section 7 consultations, and it does not alter what is required or analyzed during a consultation. Instead, it improves clarity and consistency, streamlines consultations, and codifies existing practice. For example, the change in the definition of "effects of the action" simplifies the definition while still retaining the scope of the assessment required to ensure a complete analysis of the effects of the proposed Federal action. The two-part test articulates the practice by which the Services identify effects of the proposed*

action. Likewise, the causation standard to analyze effects provides additional explanation on how we analyze activities that are reasonably certain to occur.

The action agency for this consultation is the United States Environmental Protection Agency (EPA). The EPA proposes to authorize stormwater discharges and certain non-stormwater discharges from facilities belonging to 30 industrial sector classifications into Waters of the United States under the 2021 Multi-Sector General Permit (MSGP).

This consultation, biological opinion, and incidental take statement, was prepared by NMFS Office of Protected Resources Endangered Species Act Interagency Cooperation Division ("We") in accordance with section 7(a)(2) of the statute (16 U.S.C. 1536(a)(2)), associated implementing regulations (50 C.F.R. Part 402), and agency policy and guidance.

This document represents NMFS' opinion on the effects of EPA issuance of the 2021 MSGP on the following ESA-listed species and designated critical habitat: Bryde's whale (*Balaenoptera brydei*), North Atlantic right whale (*Eubalaena glacialis*), and Southern Resident Distinct Population Segment (DPS) of killer whale (*Orcinus orca*); salmonids, Atlantic salmon (*Salmo salar*), nine Evolutionarily Significant Units (ESUs) of steelhead trout (*Oncorhynchus mykiss*), nine ESUs of Chinook salmon (*Oncorhynchus tshawytscha*), three ESUs of coho salmon (*Oncorhynchus kisutch*), two ESUs of chum salmon (*Oncorhynchus keta*), and two ESUs of sockeye salmon (*Oncorhynchus nerka*); anadromous non-salmonids, including the shortnose sturgeon (*Acipenser brevirostrum*), three DPSs of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), green sturgeon (*Acipenser medirostris*), and eulachon (*Thaleichthys pacificus*); other fish, including Nassau Grouper (*Epinephelus striatus*), bocaccio (*Sebastes paucispinis*), yelloweye rockfish (*Sebastes ruberrimus*), giant manta ray (*Manta birostris*), oceanic whitetip shark (*Carcharhinus longimanus*), and two DPSs of scalloped hammerhead (*Sphyrna lewini*); marine turtle species, including hawksbill (*Eretmochelys imbricata*), Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*), olive ridley (*Lepidochelys olivacea*), two DPSs of green turtle (*Chelonia mydas*), and two DPSs of loggerhead turtle (*Caretta caretta*); Pacific coral species, *Acropora globiceps, Acropora jacquelineae, Acropora retusa, Acropora speciosa, Euphyllia paradivisa, Isopora crateriformis, Orbicella annularis,* and *Seriatopora aculeata*, the Caribbean coral species boulder star coral (*Orbicella franksi*), elkhorn coral (*Acropora palmata*), lobed star coral (*Orbicella annularis*), mountainous star coral (*Orbicella faveolata*), pillar coral (*Dendrogyra cylindrus*), rough cactus coral (*Mycetophyllia ferox*), and staghorn coral (*Acropora cervicornis*); the black abalone (*Haliotis cracherodii*) and white abalone (*Haliotis sorenseni*); and designated critical habitat for Southern Resident killer whale based on effects to the critical habitat Physical and Biological Feature (PBF) prey, Chinook salmon, chum salmon, coho salmon, sockeye salmon, steelhead trout, eulachon, green sturgeon, Atlantic sturgeon, bocaccio, yelloweye rockfish, green sea turtle North Atlantic DPS, leatherback sea turtle, and loggerhead sea turtle (Northwest Atlantic DPS), Atlantic sturgeon, black abalone, and critical habitat proposed for ESA-listed Caribbean corals and ESA-listed Indo-Pacific corals.

A complete record of this consultation is on file at the NMFS Office of Protected Resources in Silver Spring, Maryland.

1.1 Background

The EPA's statutory authority for the MSGP is the National Pollutant Discharge Elimination System (NPDES) of the Clean Water Act (the Clean Water Act 33 USC §§ 1342 et seq.). The purpose of the proposed general permit is to satisfy the goals and policies of the Clean Water Act (33 USC §§1251). The Clean Water Act establishes the basic structure for regulating discharges of pollutants into and regulating quality standards for the Waters of the United States

The Clean Water Act made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. EPA's NPDES permit program controls point source discharges. Point sources are discrete conveyances such as pipes or man-made ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters.

Section 402 of the Clean Water Act directed EPA to develop a phased approach to regulate stormwater discharges under the NPDES program, and EPA published a final regulation on the first phase of this program in November 1990. It was at this time that EPA established permit application requirements for stormwater discharges associated with industrial activity.

1.1.1 NPDES Compliance Issues

Compliance under the NPDES permitting program is not perfect. According to EPA Office of Enforcement and Compliance Assurance (USEPA 2020), "over 29 percent of NPDES permitted facilities were in significant noncompliance with their permits in FY 2018. Violations range from significant exceedances of effluent limits, which can cause harm to human health and the environment, to failure to submit reports, which can mask serious deficiencies." As a result EPA's National Compliance Initiative was established to cut significant non-compliance in half and to ensure that the most serious violations are addressed in a timely and appropriate manner. At this time compliance under the EPA-issued MSGP mirrors that of the NPDES permitting program as a whole.

1.1.2 The ESA Eligibility Requirement for Coverage Under an EPA General Permit

It is EPA's policy that discharges that may result in adverse effects to ESA-listed species and/or designated critical habitat are not eligible for coverage under its General Permits, including the MSGP. The EPA's General Permits use an ESA Eligibility Certification procedure that identifies discharges in need of Services' expertise in reviewing facility notices of intent to discharge (NOI) to ensure that discharges are not likely to result in adverse effects to ESA-listed species and/or designated critical habitat. This is termed a "consistency review." If NMFS or the USFWS find that discharges under an NOI is likely to adversely affect ESA-listed resources, the Service may either provide technical assistance, identifying the necessary changes to control measures and stormwater pollution prevention plans (SWPPPs) to achieve NLAA, or inform EPA that the discharge is ineligible for coverage under the General Permit and will require an individual permit.

1.1.3 ESA Section 7 Consultation on the 2015 MSGP

NMFS conducted a formal ESA section 7 consultation on the 2015 MSGP and produced a programmatic biological opinion evaluating the expected effects of discharges, as authorized under the permit, authorized and the planned implementation of the permit. The analyses in NMFS' opinion on the 2015

MSGP determined that discharges authorized by the 2015 MSGP were likely to adversely affect ESA-listed species and designated critical habitat.

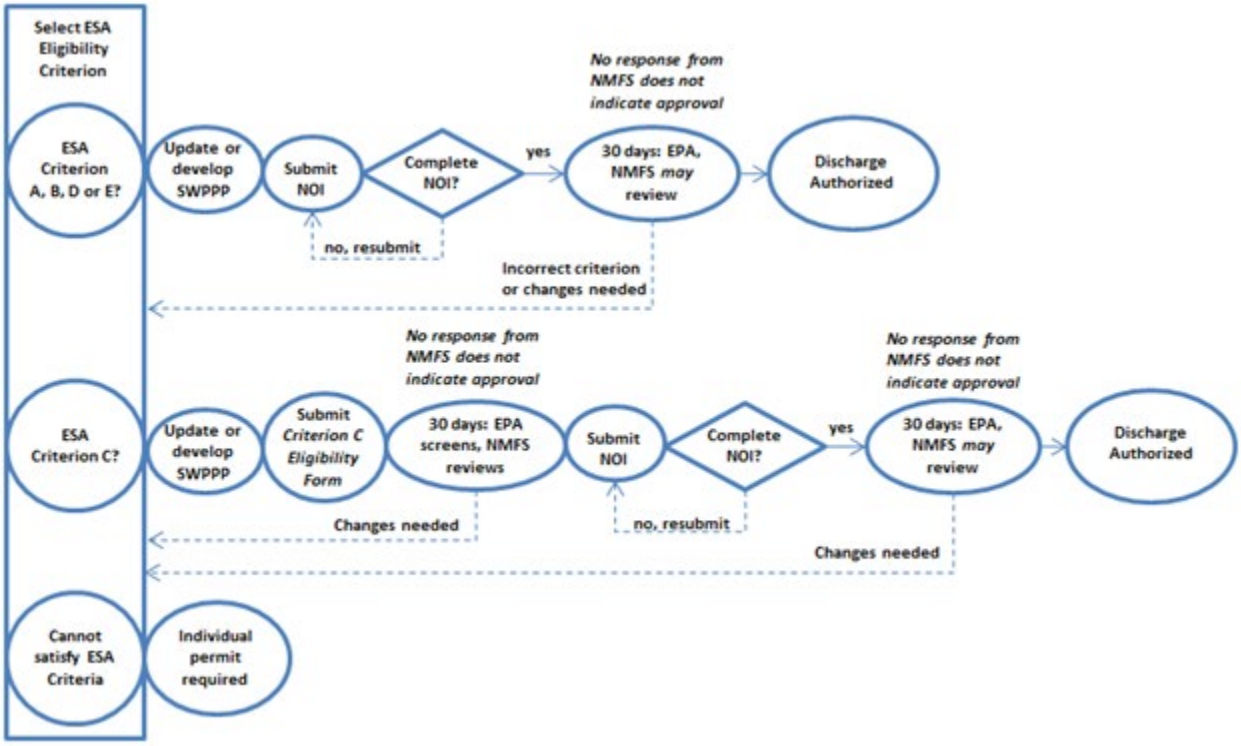

Figure 1. Preparation, submittal, and approval sequence for documents required under the ESA Eligibility Certification process of the 2015 MSGP

The MSGP consultation assessed the framework of the MSGP permitting program, in particular its implementation of the ESA Eligibility Certification process (Figure 1) because the pollutant discharge limits and monitoring thresholds specified in the MSGP were likely to result in exposures that would adversely affect ESA-listed resources. Successful implementation of the ESA Eligibility Certification process is required for the MSGP to achieve NLAA authorized discharges. There is an Incidental Take Statement in the NMFS' opinion on the 2015 MSGP for effects associated with the implementation of the permit because NMFS had identified issues with ESA Eligibility Certification and permit compliance during the consultation process. The Reasonable and Prudent Measures to minimize take require EPA to identify and address harmful discharges to waters where ESA-listed resources occur through gathering information on the activities authorized by the MSGP, including any corrective actions reported in the permittees' Annual Reports, monitoring the effectiveness of the MSGP provisions for the protection of endangered and threatened species and designated critical habitat, and reporting this information to NMFS.

1.1.4 Litigation on the 2015 MSGP

After EPA issued the 2015 MSGP in June 2015, several parties, collectively referred to as "petitioners," filed petitions for review of the permit, which were consolidated in the United States Court of Appeals for the Second Circuit. Petitioners included Waterkeeper Alliance, Apalachicola Riverkeeper, Galveston Baykeeper, Raritan Baykeeper, Inc. d/b/a NY/NJ Baykeeper, Snake River Waterkeeper, Ecological Rights

Foundation, Our Children's Earth Foundation, Puget Soundkeeper Alliance, Lake Pend Oreille Waterkeeper, and Conservation Law Foundation. Federal Water Quality Coalition and Federal Storm Water Association intervened in the case as respondents on August 4, 2015.

Before any briefs were filed in the MSGP litigation, the parties entered into settlement discussions under the auspices of the Second Circuit's Civil Appeals Mediation Program. A Settlement Agreement resulted from these discussions, which all parties signed on August 16, 2016. The Settlement Agreement did not affect the 2015 MSGP but stipulated several terms that EPA agreed to address in the proposed 2021 MSGP. EPA understands that the terms of the Settlement Agreement, in particular the proposed "Additional Implementation Measures" (AIM) benchmark exceedance protocol, will increase regulatory certainty for permitted facilities, as intervenors expressed, while resolving petitioners' concerns that the previous corrective actions for benchmark threshold exceedances were not sufficient to ensure that the permit controlled discharges as sufficient to protect water quality, as is required by the Clean Water Act. Industrial stormwater discharges are explicitly required to meet all provisions of CWA section 301, including applicable water quality standards (CWA §402(p)(3)(A)). The Settlement Agreement is incorporated into the docket for the 2021 MSGP on regulations.gov (Docket ID#: EPA-HQ-OW-2019-0372) at https://www.regulations.gov/document?D=EPA-HQ-OW-2019-0372-0015.

In the settlement, EPA agreed to the following:

- to fund a study conducted by the National Academies of Sciences, Engineering, and Medicine's National Research Council to: 1) suggest improvements to the current MSGP benchmarking monitoring requirements; 2) evaluate the feasibility of numeric retention standards; and 3) identify the highest-priority industrial facilities/subsectors for consideration of additional discharge monitoring.[1] The EPA agreed to consider the recommendations made by the study in drafting the 2021 MSGP and solicit comments on recommended changes to benchmark monitoring provisions regarding the sectors/subsectors, frequency, parameters, and/or parameter levels;
- to review examples of numeric and non-numeric effluent limitations and prohibitions for industrial stormwater that have been set in other jurisdictions (i.e., states where EPA is not the NPDES permitting authority) and evaluate the bases for those limitations. This analysis is incorporated into the docket on regulations.gov (Docket ID#: EPA-HQ-OW-2019-0372) at https://www.regulations.gov/document?D=EPA-HQ-OW-2019-0372-0025;
- to propose for comment an expansion to all EPA Regions of the existing eligibility criterion regarding operators discharging to Federal Superfund sites that applies to operators in Region 10 in the 2015 MSGP;
- to propose for comment a new eligibility condition for operators who, during their coverage under the next MSGP, will use coal tar sealant to initially seal or to re-seal pavement and thereby discharge polycyclic aromatic hydrocarbons (PAHs) in stormwater. EPA agreed to propose that

[1] The study was released in February 2019 and can be found at the following link: https://www.nap.edu/catalog/25355/improving-the-epa-multi-sector-general-permit-for-industrial-stormwater-discharges.

those operators are not eligible for coverage under the MSGP and must either eliminate such discharge or apply for an individual permit;

- to solicit comment on a provision where a facility not covered under the 2015 MSGP submits a NOI for permit coverage while there is a pending stormwater-related enforcement action by EPA, a state, or a citizen (to include both notices of violation (NOVs) by EPA or the State and NOI to bring a citizen suit). In this situation, EPA agreed to solicit comments on holding the facility's NOI for an additional 30 days to allow EPA an opportunity to: (a) review the facility's control measures expressed in its SWPPP, (b) identify any additional control measures that EPA deems necessary to control site discharges in order to ensure that discharges meet technology-based and water quality-based effluent limitations, and/or (c) to conduct further inquiry regarding the site's eligibility for general permit coverage;
- to include in the benchmark monitoring section of the proposed MSGP AIM requirements for responses to benchmark exceedances;
- to propose for comment specific edits regarding monitoring for impaired waters; and
- to review and revise the MSGP's sector-specific fact sheets associated with the permit.

This opinion addresses the permit as proposed with revisions outlined in a November 4, 2020 memo from EPA to the Services. This opinion does not evaluate EPA's fulfillment of the Settlement Agreement or the disposition of recommendations made by the National Academies of Sciences' report. While these influenced the 2021 MSGP, they are not the action itself.

1.1.5 Preconsultation

On February 28, 2019, NMFS sent EPA and the USFWS suggestions for changes to the MSGP NOI based on issues identified during implementation of the 2015 MSGP.

On April 29, 2019, EPA and the Services held the first pre-consultation kickoff meeting. EPA described the 2016 Settlement Agreement under the auspices of the Second Circuit's Civil Appeals Mediation Program, which required changes to the MSGP driven by a National Research Council Study.

On June 17, 2019, EPA and the Services held a follow up call to discuss specifics of the Settlement Agreement and proposed changes to the MSGP. During the call it was suggested that because most parts of the permit would remain the same, EPA's BE for the 2021 MSGP would incorporate the 2015 BE with an addendum explaining where and why the 2015 BE is still valid, and addressing substantive changes under the 2021 MSGP.

On July 9, 2019, NMFS provided EPA with comments on MSGP Appendix E: *Procedures Related to Endangered Species Protection*.

On October 7, 2019, NMFS provided EPA with an updated list of contacts that should be receiving and reviewing NOI.

On February 12, 2020, EPA signed the proposed 2021 MSGP.

On March 2, 2020, the proposed 2021 MSGP was published in the Federal Register for a 60-day public comment period. The comment period was subsequently extended for another 30 days ending on June 1, 2020.

1.2 Consultation History

On June 20, 2020, EPA requested an updated species list to assist them in preparing a BE for the upcoming consultation.

On July 3, 2020, EPA sent an initiation package to request formal consultation on the 2021 MSGP pursuant to the requirements of section 7 of the ESA.

On September 1, 2020, NMFS sent EPA a review of existing NOI issues because most of the facilities covered under the renewed permit would be the same.

On November 4, 2020, NMFS asked EPA to identify how many facilities issued their first ever NOI for coverage under the 2015 MSGP. The EPA responded that day with tables summarizing new NOI requests by state and ESA Eligibility Certification.

On November 4, 2020, EPA sent a letter with the subject line, "Interim Request for Consultation Period Extension and Update on the U.S. Environmental Protection Agency's National Pollutant Discharge Elimination System Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity." In this letter, EPA requested an extension of the consultation to December 31, 2020, and provided its final decisions on changes to the February 12, 2020 proposed permit.

On December 10, 2020, EPA sent NMFS permit details resulting from the November 2020 decisions, including the revised benchmark thresholds for copper and aluminum, a list of sectors with PAH monitoring requirements and the specific PAHs to be monitored, and the required frequency of monitoring.

On December 10, 2020, NMFS sent EPA the revised RPMs for review and comment

On December 15, 2020, NMFS sent an addendum to the RPMs to ensure that that EPA replace instructions to review the NOAA Species Directory with instructions for discharges in the Greater Atlantic and West Coast Regions to use the NMFS regional mappers, instructions for discharges in Puerto Rico to review the designated critical habitats for coral and sea turtles, and instructions for discharges in the Pacific Island Territories to contact the NMFS Pacific Island Regional Office.

On December 18, 2020, EPA sent NMFS terminology-clarifying edits to the RPMs.

On December 22, 2020, EPA agreed to extend the due date for the Services opinions to January 7, 2021.

On December 29, 2020, EPA sent NMFS revised language for the AIM to reflect a stepwise approach without automatic triggers by extreme exceedances.

2 THE ASSESSMENT FRAMEWORK

Section 7(a)(2) of the ESA requires Federal agencies, in consultation with NMFS, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species; or adversely modify or destroy their designated critical habitat.

The MSGP applies to discharges with unknown timing, frequencies, and intensities from multiple facilities over a large geographic area occurring over a five year permit term. Traditional approaches to section 7 consultations, which focus on the specific effects of a specific proposal, are not designed to address the number, spatial, and temporal scales of stormwater discharges under the MSGP. The opinion for the 2015 MSGP applied a programmatic analysis that evaluates the structure and decision-making

processes of the MSGP to determine whether they are likely to insure that the authorized discharges collectively comply with the requirements of section 7(a)(2).

Mixed programmatic consultations combine direct approval of actions that will not be subject to further ESA section 7(a)(2) consultation and approval of a framework for the development of future actions that are authorized, funded, or carried out at a later time. For mixed programmatic actions, as defined in the 2015 Incidental Take Statement (ITS) rule at 50 C.F.R. §402.02, NMFS is required to issue an ITS for those portions of the program that are authorized at the program level, not subject to a future section 7 consultation, are reasonably certain to result in incidental take, and are otherwise compliant with ESA section 7(a)(2). In a mixed programmatic action, any future actions within the framework that will be subject to step-down consultations when the future actions are authorized, funded, or carried out, an ITS may be issued at that time for the incidental take associated with those actions, as necessary. There are no step down consultations for this work because the MSGP only authorizes discharges that are NLAA.

The MSGP applies to discharges with unknown timing, frequencies, and intensities from multiple facilities over a large geographic area occurring over a five-year permit term. Traditional approaches to section 7 consultations, which focus on the effects of a specific proposal, are not designed to address the number, spatial, and temporal scales of stormwater discharges under the MSGP. The opinion for the 2015 MSGP applied a programmatic analysis that evaluates the structure and decision-making processes of the MSGP to determine whether they are likely to insure that the authorized discharges collectively comply with the requirements of section 7(a)(2).

Eligibility for coverage under the 2021 MSGP requires the facility operator to "...demonstrate that your stormwater discharges, authorized non-stormwater discharges, and stormwater discharge-related activities are not likely to adversely affect any species that are federally listed as endangered or threatened ("ESA-listed") and are not likely to adversely affect habitat that is designated as "critical habitat" under the ESA, or said discharges and activities were the subject of an ESA consultation or an ESA section 10 permit." As explained in sections 1.1.1 through 1.1.3, discharges that are not NLAA are not covered by the MSGP and, at this time, compliance under EPA's NPDES program is poor. To reinforce compliance under the MSGP, the EPA and the Services will perform consistency reviews of the NOI to discharge under the MSGP where ESA-listed species may be affected. Industrial stormwater discharges that are not eligible for the MSGP require an individual permit from EPA and will be subject to a separate ESA section 7 consultation. This opinion addresses the framework of the MSGP, including implementation of eligibility certification, monitoring requirements, inspection and reporting requirements, and best management practices.

An ESA section 7 assessment involves the following steps:

Description of the Proposed Action (Section 3): In this framework programmatic consultation, the description of the action describes the MSGP elements that have been added to or changed for the 2021-2026 permit term.

Action Area (Section 4): We determine the degree of overlap between the discharges that would be authorized by the MSGP, as proposed for the 2021-2026 permit term, with the ranges of endangered and threatened species and designated critical habitat under NMFS' jurisdiction to describe the action area within the spatial extent of stressors caused by the discharges.

Species and Critical Habitat Considered in this Opinion (Section 5): We identify ESA-listed species and designated critical habitat that are likely to co-occur with the stressors from the action in space and time and evaluate the status of those species and habitat. We first identify the new species or listing changes that have occurred since NMFS' consultation on the 2015 MSGP in Section 5.1 *Recently Listed Species and Designated Critical Habitat*This is followed by Section 5.2. *Updates to the Status of Species and Designated Critical Habitat Addressed in NMFS' Consultation on the* 2015 MSGP.

Updates to the Environmental Baseline (Section 6): We describe changes since NMFS' consultation on the 2015 MSGP in the environmental baseline as the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

Effects of the Action (section 7): The effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. This section of the opinion evaluates the changes made to the MSGP for the 2021-2026 permit term. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

General permits authorized by Federal agencies apply to activities over large geographic areas occurring over long periods of time, with substantial uncertainty about the number, location, timing, frequency, and intensity of specific activities those programs authorize, fund, or carry out. Our traditional approaches to section 7 consultations, which focus on the specific effects of a specific proposal, are not designed to address the spatial and temporal scales and level of uncertainty that is typical of consultations on general permits. Instead of trying to adapt the traditional approach to programmatic consultations, we developed an assessment framework that allows us to help Federal agencies insure that their programs comply with the requirements of section 7(a)(2) of the ESA Our assessment framework for general permits first assesses whether the actions a general permit authorizes are likely to adversely affect ESA-listed species or designated critical habitats . We do this by estimating exposure and response to the stressors these actions contribute, just as described above for traditional consultations in section 7.2.1 *Changes Affecting Pollutant Exposures.*and 7.2.2 *Aggregate Impacts* If ESA-listed species and designated critical habitats are likely to be adversely affected, we then examine the general permit's structure and decision-making processes to determine whether they are likely to insure that the actions the agency authorizes collectively comply with the requirements of section 7(a)(2) in Section 7.2.3 *Changes Affecting Permit Implementation.*

Before assessing an agency's decision-making process (as described above), NMFS will first establish whether the proposed action could expose ESA-listed species and designated critical habitat to potentially harmful stressors and whether ESA-listed species and designated critical habitats are likely to be adversely affected. If exposure to stressors and adverse effects are not likely to occur, we do not assess the agency's decision-making process.

NMFS' opinion on the 2015 MSGP determined that the benchmark thresholds and effluent limitation guidelines were not sufficiently protective of ESA-listed species and designated critical habitat. The 2015 opinion therefore evaluated implementation of the permit program to determine if the decision processes and monitoring and feedback features of the permit would prevent harmful exposures to ESA-listed species and designated critical habitat. For the 2021 MSGP, most of these benchmark thresholds and effluent limitation guidelines remained unchanged or were made less protective. Thus, they are not sufficiently protective of ESA-listed species and designated critical habitat and an evaluation of the 2021 permit's implementation is necessary. This opinion evaluates the 2921 MSGP using the following seven elements:

1. Scope: Has the general permit been structured to reliably estimate the probable number, location and timing of the discharges that would be authorized by the program?
2. Stressors: Has the general permit been structured to reliably estimate the physical, chemical, or biotic stressors that are likely to be produced as a direct or indirect result of the discharges that would be authorized (that is, the stressors produced by the actual discharges to Waters of the United States)?
3. Overlap: Has the general permit been structured to reliably estimate whether or to what degree specific endangered or threatened species or designated critical habitat are likely to be exposed to potentially harmful impacts that the proposed permit would authorize?
4. Monitoring/Feedback: Has the general permit been structured to identify, collect, and analyze information about authorized actions that may have exposed endangered or threatened species or designated critical habitat to stressors at concentrations, intensities, durations, or frequencies that are known or suspected to produce physical, physiological, behavioral, or ecological responses that have potential individual or cumulative adverse consequences for individual organisms or physical or biological features (PBFs) of designated critical habitat?
5. Responses of Listed Resources: Does the general permit incorporate an analytical methodology that considers:
    - Status and trends of endangered or threatened species or designated critical habitat;
    - Demographic and ecological status of populations and individuals of those species given their exposure to pre-existing stressors in different drainages and watersheds;
    - Direct and indirect pathways by which endangered or threatened species or designated critical habitat might be exposed to the discharges to Waters of the United States; and
    - Physical, physiological, behavior, sociobiological, and ecological consequences of exposing endangered or threatened species or designated critical habitat to stressors from discharges at concentrations, intensities, durations, or frequencies that could produce physical, physiological, behavioral, or ecological responses, given their pre-existing demographic and ecological condition?
6. Compliance: Does the general permit have a mechanism to reliably determine whether or to what degree operators have complied with the conditions, restrictions or mitigation measures the proposed permit requires when they discharge to Waters of the United States?

7. Adequacy of Controls: Does the general permit have a mechanism to change the action to prevent or minimize endangered or threatened species or designated critical habitat from being exposed to stressors from discharges at concentration, durations or frequencies that have adverse effects to individual listed organisms, populations or species or PBFs of designated critical habitat?

Cumulative Effects (Section 8): Cumulative effects are the effects to ESA-listed species and designated critical habitat of future state or private activities that are reasonably certain to occur within the action area (50 C.F.R. §402.02). Effects from future Federal actions that are unrelated to the action are not considered because they require separate ESA section 7 compliance.

Integration and Synthesis (Section 9): We begin with problem formulation that identifies and integrates the stressors of the action with the species' status (Section 5.2) and the Environmental Baseline (Section 6) and formulate risk hypotheses based on the anticipated exposure of listed species and critical habitat to stressors and the likely response of species and habitats to this exposure. We consider the effects of the action within the action area on populations or subpopulations and on PBFs when added to the environmental baseline and the cumulative effects to determine whether the action could reasonably be expected to:

- Reduce appreciably the likelihood of survival and recovery of ESA-listed species in the wild by reducing its numbers, reproduction, or distribution, and state our conclusion as to whether the action is likely to jeopardize the continued existence of such species; or
- Appreciably diminish the value of designated critical habitat for the conservation of an ESA-listed species, and state our conclusion as to whether the action is likely to destroy or adversely modify designated critical habitat.

The results of our jeopardy and adverse modification analyses are summarized in the *Conclusion* (Section 10). If, in completing the last step in the analysis, we determine that the action under consultation is likely to jeopardize the continued existence of ESA-listed species or destroy or adversely modify designated critical habitat, then we must identify Reasonable and Prudent Alternative(s) to the action, if any, or indicate that to the best of our knowledge there are no reasonable and prudent alternatives (see 50 C.F.R. §402.14(h)(3)).

For a mixed programmatic consultation, an *Incidental Take Statement* (Section 11) is included for those actions where no step-down consultation will occur and take of ESA-listed species is reasonably certain to occur. The ITS may also set limits or boundaries on the total amount of incidental take expected as a result of the programmatic action as a whole. Additional ITSs may be issued for step-down formal consultations for those activities reasonably likely to result in incidental take in keeping with the revisions to the regulations specific to ITSs (80 FR 26832, May 11, 2015; ITS rule). The ITS specifies the impact of the take, reasonable and prudent measures to minimize the impact of the take, and terms and conditions to implement the reasonable and prudent measures (ESA section 7 (b)(4); 50 C.F.R. §402.14(i)).

We provide discretionary *Conservation Recommendations* (Section 12) that may be implemented by the action agency (50 C.F.R. §402.14(j)). Finally, we identify the circumstances in which *Reinitiation of Consultation* (section 13) is required (50 C.F.R. §402.16).

2.1 Information Used in this Assessment

To comply with our obligation to use the best scientific and commercial data available, we collected information identified through searches of Web of Science, scientific publisher databases (e.g., Elsevier), government databases (e.g., EPA's National Service Center for Environmental Publications), and literature cited sections of peer reviewed articles, species listing documentation, and reports published by government and private entities. This opinion is based on our review and analysis of various information sources, including:

- EPA's initiation package containing:
    - the 2016 Settlement Agreement
    - EPA's 2015 BE
    - an addendum to the 2015 BE addressing why portions of the 2015 BE are still valid and examining changes made for the 2021 MSGP
    - the proposed 2021 MSGP permit
    - the proposed 2021 MSGP fact sheet
    - the Proposed 2021 MSGP Appendix E: Procedures Relating to Endangered Species Protection, and
    - the NAS study Improving the EPA Multi-Sector General Permit for Industrial Stormwater Discharges (2019) .
- data from the following databases:
    - The National Water Quality Monitoring Councils' Water Quality Portal (WQP)
    - EPA's Enforcement Compliance and History Online (ECHO)
    - EPA's E-Enterprise for the Environment, which includes the eNOI submitted by 2015 MSGP facility operators
    - EPA's Ecotoxicology Knowledgebase (ECOTOX)
- government scientific publications, including status reviews, recovery plans, and listing notices for ESA-listed species and designated critical habitat
- reports on the status and trends of water quality
- NMFS' opinion for the 2015 MSGP, and
- the best available commercial and scientific information, including peer reviewed research.

These information resources identify information relevant to the potential stressors and responses of ESA-listed species and designated critical habitat under NMFS' jurisdiction that may be affected by the proposed action. This information was used to evaluate the action's framework in order to draw conclusions on risks the action may pose to the continued existence of these species and the value of designated critical habitat for the conservation of ESA-listed species.

In 2019, NMFS and the USFWS revised regulations for implementing section 7 of the ESA to clarify, interpret, and implement portions of the Act concerning the interagency cooperation procedures. Among

these revisions was § 402.14(h)(3) that allows the Services to adopt all or part of a Federal agency's initiation package. Rather than repeat the content of these resources in this opinion, they are adopted and referenced where needed. Similarly, rather than repeat information and analyses used in the NMFS opinion for the 2015 MSGP, the opinion is referenced where appropriate and the text in this opinion explains why the information or analyses are still valid.

3 DESCRIPTION OF THE PROPOSED ACTION

Many of the permit requirements of the 2015 MSGP remain unchanged in the proposed 2021 MSGP. The EPA's initiation package contains the proposed 2021 MSGP permit, an addendum to the 2015 BE addressing those changes made for the 2021 reissuance of the permit, an appendix to the addendum containing the revised instructions for the ESA Eligibility Certification process, and the proposed fact sheet for the permit. On November 4, 2020, this addendum was supplemented with a letter explaining EPA's final decisions on changes to the permit. Not all 2021 MSGP changes are substantive and are not part of this consultation. For example, the sequence of permit sections were ordered to place monitoring ahead of corrective actions and language in the permit was simplified to make it more readable. This opinion adopts the documents submitted with EPA's request for consultation as detailed descriptions of the action and relies on the analyses in NMFS' opinion on the 2015 MSGP for those aspects of the permit that have not been changed for the 2021-2026 permit term. Substantive changes in the 2021 MSGP that are part of this consultation are summarized in the following subsections.

3.1 Eligibility Certification

The EPA was concerned that operators seeking coverage under the 2015 MSGP were certifying their ESA eligibility criteria incorrectly because they were relying on descriptions of the criteria in the permit without following the instructions in *Appendix E: Procedures Relating to Endangered Species Protection*. The 2021 MSGP now refers facility operators directly to Appendix E to make sure they follow those instructions to make a valid certification. EPA has also incorporated a smartform approach to its NOI submission system that guides facility operators through the NOI submission and ESA Eligibility Certification process. The form provides an open-text field for the facility operator to provide a brief summary of the basis for their criterion selection. The NOI cannot be submitted if the requested information is not complete. Some changes were also made to the certification criteria:

- **Criterion A (No ESA-listed species and/or critical habitat present in action area)** –Services' editorial suggestions were incorporated reminding the facility operator that they must use Services' information to identify whether an ESA-listed species is present in their action area.
- **Criterion B (Eligibility requirements met by another operator under the 2021 MSGP)** – Services' editorial suggestions were incorporated reminding the facility operator that they are required to provide the expiration date for that permit.
- **Criterion C (ESA-listed species and/or designated critical habitat likely to occur, but discharges not likely to adversely affect them)** – Criterion C was intended for first-ever dischargers under the 2015 MSGP. The proposed 2021 MSGP allows a facility that has certified under Criterion C for the 2015 MSGP to certify under Criterion C for the 2021-2026 permit term provided that 1) no changes have been made to the action area and no additional ESA-listed species or designated critical habitat have been listed within the action area or 2) there have been changes to the action area and/or newly ESA-listed species or designated critical habitat occur within the action area

since certifying under the 2015 MSGP, but the facility operator demonstrates that the discharge is NLAA. In all cases, a Criterion C Evaluation Form must be submitted for Service's review 30 days prior to submitting their NOI.

The Criterion C Evaluation Form itself was updated to include consideration of situations when "stormwater discharges may adversely affect the immediate vicinity of the discharge point through streambank erosion and scour" under Hydrological Effects. The description of Toxicity of Pollutants was expanded to include "exposures to multiple stressors at the same time." Finally, the Criteria C Eligibility Form adds: "My facility has not had any exceedances under the 2015 MSGP of any required benchmark(s) or numeric effluent limits. I comply with the applicable monitoring requirements and have not had any exceedances."

- **Criterion D (ESA Section 7 consultation has successfully concluded)** – In the 2015 MSGP, one scenario that was eligible under Criterion D was: "A biological opinion that concludes that the action is likely to jeopardize listed species or to result in the destruction or adverse modification of critical habitat, and any recommended reasonable and prudent alternatives or reasonable and prudent measures are being implemented." This scenario is not eligible for coverage under the 2021 MSGP.
- **Criterion E (Issuance of section 10 permit)** - Revised to read: Potential take is authorized through the issuance of a permit under section 10 of the ESA by the USFWS and/or NMFS, and this authorization addresses the effects of the facility's discharges and discharge-related activities on ESA-listed species and designated critical habitat. You must include copies of the correspondence between yourself and the participating agencies in your SWPPP and your NOI.

3.2 Electronic Reporting

The electronic reporting system for the 2021 MSGP integrates the ESA Eligibility Certifications instructions from Appendix E and the Criterion C certification form through a series of "smart" questions. Each question prompt is based on the response to the previous question guiding the operator toward a valid certification. The operator is also required to affirm completion of certain required steps (e.g., consulting both NMFS and FWS species' information) before being able to proceed further in the form. Finally, operators are required to attach documents or provide additional information depending on their selection.

3.3 Graphical Example for Defining the Action Area

Under the 2015 MSGP, many facility operators did not correctly identify their action area. The 2021 MSGP will provide a graphical example showing that the action area is not limited to the facility property but includes all areas that may be affected by stormwater flowing from the site.

3.4 Permit Authorization

In addition to filing requirements and deadlines for obtaining authorization already established under the 2015 MSGP, the 2021 MSGP adds requirements for reporting pending enforcement actions and placing signage regarding MSGP coverage for stormwater discharges on facility property. Operators that were not previously covered under the 2015 MSGP are required to indicate on their NOI whether their facility has a pending enforcement action associated with stormwater discharge by EPA, a state, or a citizen. Operators are also required to post a readable and accessible sign on their site indicating that stormwater

discharges from the site are covered under the MSGP, the NPDES number, contact information, information on obtaining the SWPPP, and the following statement: *"If you observe indicators of stormwater pollutants in the discharge or in the receiving waterbody, contact the EPA through the following website: https://echo.epa.gov/report-environmental-violations."*

3.5 Additional Control Measure Considerations

The 2021 MSGP added a requirement for facility operators to consider structural improvements and enhanced pollution prevention measures and other mitigation measures to minimize impacts from stormwater discharges from major storm events that cause extreme flooding conditions. Storm preparedness suggestions in the permit include temporarily storing exposed materials indoors and delaying delivery of materials to be stored outside until after an anticipated extreme storm event to minimize the potential transport of pollutants into stormwater discharges.

3.6 Monitoring

For the 2021 permit term, the MSGP includes updated benchmark monitoring thresholds, benchmark monitoring requirements for three additional sectors, an option for composite sampling, a new "report-only" indicator pollutant monitoring requirement for sectors that had few to no monitoring and reporting requirements under the 2015 MSGP, a revised benchmark monitoring and corrective response strategy, and revised monitoring requirements for those discharging to impaired waters.

3.6.1 Updated Benchmark Thresholds

For the 2021 MSGP, EPA proposed changes to benchmark monitoring for six inorganic pollutants. Section 7.3.1.1 of the 2015 opinion for the MSGP describes the remaining benchmark monitored pollutants and effluent limitations, which are not discussed in this opinion because they have not changed. The 2021 MSGP benchmark concentrations for aluminum, cadmium, copper, and selenium were updated to be consistent with recent revisions to EPA's water quality guidelines.

3.6.1.1 Multi-variable Models for Aluminum and Copper

Multi-variable models were originally developed by EPA to arrive at site-specific criteria for aluminum and copper because the toxicity of both metals is influenced by water chemistry conditions in a given waterbody. The EPA used these models to calculate nationally representative MSGP benchmark thresholds for aluminum and copper based on water quality data reported in the USGS National Water Information System database and collected from surface waters across the conterminous U.S. between 1984 and 2018. Based on this analysis, EPA derived benchmark monitoring thresholds for aluminum and copper to represent a level of protection that EPA estimated to be protective 90 percent of the time, at a national level, for 95 percent of the genera.

Aluminum

For the aluminum benchmark, a multiple linear regression model was used to derive a threshold resulting from the interaction of nationally representative values for total hardness, pH, and dissolved organic carbon (DOC). The resulting aluminum threshold proposed for the 2021 MSGP is 1,100 µg/L. The aluminum benchmark threshold for the 2015 MSGP was 750 µg/L.

Copper

For the copper benchmark, a metal bioavailability model called the Biotic Ligand Model was used to derive a threshold from the interaction of nationally representative values for temperature, pH, DOC, calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity. The resulting copper threshold proposed for the 2021 MSGP is 5.19 µg/L. The copper benchmark threshold for the 2015 MSGP was hardness-based and ranged from 3.8 to 33.2 µg/L.

Operator-derived aluminum and copper values after benchmark exceedance

For the 2021 MSGP, EPA will allow an exception to applying the nationally representative benchmark thresholds for aluminum and copper in cases when stormwater discharges of these constituents at certain facilities may pose less of a concern than the nationally representative thresholds would indicate. To be eligible for the exception, EPA will require the operator to demonstrate that, while the concentration of these metals in their discharge will exceed the nationally representative thresholds, it will not exceed a site-specific threshold calculated using the same multi-variable models using site specific water quality data to represent the spatial and temporal variability of the site. The EPA will require that the exemption request be made publically available, including a narrative summary of the results, a description of the data collection procedures, which must be consistent with guidance in Section 3 of EPA's Industrial Stormwater Monitoring and Sampling Guide,[2] include the model input and output, and, for copper, include a discussion of how the data collected reflects the site-specific characteristics and how the operator considered special circumstances that may affect copper toxicity throughout the expected range of receiving water conditions. Under this proposed exception, operators that exceed the MSGP benchmark for aluminum or copper must still comply with any AIM requirements (see Section 3.6.5 of this opinion) and additional benchmark monitoring until the exemption request is submitted to and approved by the EPA Regional Office.

3.6.1.2 Cadmium

The 2015 MSGP benchmark thresholds for cadmium were the 2001 acute aquatic life criteria of 2.0 µg/L for freshwater at a hardness of 100 mg/L calcium carbonate ($CaCO_3$) and 40 µg/L for saltwater. In 2016, EPA updated the criteria to reflect the best science available to account for new laboratory tests, new species, and new genera used in toxicity testing. The freshwater criterion was revised from 2.0 to 1.8 ug/L at a hardness of 100 mg/L $CaCO_3$ and the saltwater criterion was revised to 33 µg/L. EPA will update the 2021 MSGP cadmium benchmark values to these revised criteria. However, for the MSGP, hardness-dependent freshwater benchmarks are not calculated for a specific hardness value, rather they are selected from a table providing a benchmark value for freshwater hardness ranges (Table 1). For example, the freshwater cadmium benchmark for stormwater with a hardness between 75 and 99.9 mg/L $CaCO_3$ is 1.79 µg/L and the benchmark for stormwater with a hardness between 100 and 124.99 mg/L $CaCO_3$ is 2.21 µg/L.

[2] https://www.epa.gov/sites/production/files/2015-11/documents/msgp_monitoring_guide.pdf

Table 1. Hardness-based freshwater benchmark monitoring thresholds

Freshwater Hardness Range	Cadmium (µg/L)	Lead (µg/L)	Nickel (µg/L)	Silver (µg/L)	Zinc (µg/L)
0-24.99 mg/L	0.49	14	150	0.7	40
25-49.99 mg/L	0.94	23	200	0.7	50
50-74.99 mg/L	1.37	45	320	1.7	80
75-99.99 mg/L	1.79	69	420	3.0	110
100-124.99 mg/L	2.21	95	520	4.6	130
125-149.99 mg/L	2.62	122	610	6.5	160
150-174.99 mg/L	3.03	151	710	8.7	180
175-199.99 mg/L	3.43	182	800	11.2	200
200-224.99 mg/L	3.83	216	890	13.8	230
225-249.99 mg/L	4.22	246	980	16.8	250
250+ mg/L	5.00	262	1020	18.3	260

3.6.1.3 Selenium

In 2016, EPA updated its criteria for selenium. For acute criteria, EPA developed an intermittent exposure equation requiring several site-specific input factors. The chronic criteria for still waters is now 1.5 µg/L, and 3.1 µg/L for flowing waters. The 2015 MSGP freshwater selenium benchmark was 5 ug/L. For the 2021 MSGP, EPA will use benchmark threshold values of 1.5 µg/L for still waters and 3.1 µg/L for flowing waters. This change will be addressed in the effects analysis.

3.6.1.4 Magnesium and Iron

EPA proposed to eliminate benchmark monitoring requirements for magnesium and iron. Magnesium is a naturally occurring substance that is not expected to be toxic to most organisms. The EPA could not find information to support retaining a magnesium benchmark, so the proposed 2021 MSGP does not require benchmark monitoring for magnesium. The 2015 MSGP iron benchmark is based on EPA's chronic water quality guideline for iron while most of the MSGP benchmarks are based on guidelines for acute (i.e., short-term) exposures that would occur during the initial pulse of stormwater discharge, which is expected to contain the highest levels of pollutants. There is no acute water quality guideline for iron and there are few studies indicating effects would result from acute exposures to iron, so EPA chose to eliminate the benchmark monitoring requirement in the 2021 MSGP. This change will be addressed in the effects analysis.

3.6.2 Sectors with New Monitoring Requirements

The 2021 MSGP now requires benchmark monitoring for Sector I (Oil and Gas Extraction), Sector P (Land Transportation and Warehousing), and Sector R (Ship and Boat Building and Repair Yards). Oil and gas extraction operators will be required to monitor for ammonia, nickel, total recoverable lead, nitrate-nitrogen, total recoverable zinc, and hardness. Land transportation and warehousing operators use

on-site chemicals like solvents, diesel fuel, gasoline, hydraulic fluids, antifreeze, and transmission fluids. Leaks and spills from petroleum-based products and chemicals can contain PAHs. EPA proposed that facilities in Sector P have benchmark monitoring for lead, mercury, and hardness. Ship and boat building and repair yards use solvents, oils, fuel, antifreeze, abrasives, and paints, and generate acid and alkaline wastes. These operations will be required to monitor stormwater for total recoverable chromium, total recoverable copper, total recoverable lead, total recoverable nickel, total recoverable zinc, and hardness.

3.6.3 Composite Sampling

The 2015 MSGP required that monitoring samples be collected as a grab sample within the first 30 minutes of a measurable storm event (i.e., any detectable flow). The 2021 MSGP allows flow or time-weighted composite sampling that must be initiated within the first 30 minutes of the storm event. In the case of snowmelt, samples must be taken during a period with a measurable discharge (i.e., any detectable flow). However, composite sampling may not be used to measure parameters that have a short holding time for processing or that degrade or transform quickly such as pH, temperature, oil and grease, and chromium.

3.6.4 New and Revised Monitoring Requirements

3.6.4.1 "Report-only" indicator monitoring

For the 2021 permit term, the MSGP now includes a "report-only" requirement for quarterly indicator monitoring of Total Suspended Solids (TSS), pH, Chemical Oxygen Demand (COD), and PAH. Report-only indicator monitoring of TSS, pH, and COD is required of subsectors that did not have benchmark monitoring requirements under the 2015 MSGP and reported little if any numeric data on their discharge quality or performance of their control measures (Table 2).

Table 2. Sectors required to monitor pH, TSS, and COD quarterly.

Sector	Subsector	Facility/Facility Product	SIC code
Sector B: Paper and Allied Products	B2	Pulp Mills	2611
		Paper Mills	2621
		Paperboard Containers and Boxes	2652-2657
		Converted Paper and Paperboard Products, Except Containers and Boxes	2671-2679
Sector C: Chemicals and Allied Products	C5	Medicinal Chemicals and Botanical Products; Pharmaceutical Preparations; in vitro and in vivo Diagnostic Substances; and Biological Products, Except Diagnostic Substances	2833-2836
		Paints, Varnishes, Lacquers, Enamels, and Allied Products	2851
Sector D: Asphalt Paving and Roofing Materials and Lubricants	D2	Miscellaneous Products of Petroleum and Coal	2992, 2999
Sector E: Glass, Clay, Cement, Concrete, and Gypsum Products	E3	Flat Glass	3211
		Glass and Glassware, Pressed or Blown	3221, 3229
		Glass Products Made of Purchased Glass	3231
		Hydraulic Cement	3241

Sector	Subsector	Facility/Facility Product	SIC code
		Cut Stone and Stone Products	3281
		Abrasive, Asbestos, and Miscellaneous Nonmetallic Mineral Products	3291-3299
Sector F: Primary Metals	F5	Primary Smelting and Refining of Nonferrous Metals	3331-3339
		Secondary Smelting and Refining of Nonferrous Metals	3341
		Miscellaneous Primary Metal Products	3398, 3399
Sector I: Oil and Gas Extraction and Refining	I1	Crude Petroleum and Natural Gas	1311
		Natural Gas Liquids	1321
		Oil and Gas Field Services	1381-1389
Sector J: Mineral Mining and Dressing	J3	Clay, Ceramic, and Refractory Materials	1455, 1459
		Chemical and Fertilizer Mineral Mining	1474-1479
Sector L: Landfills, Land Application Sites, and Open Dumps	L2	All Landfill, Land Application Sites and Open Dumps, except Municipal Solid Waste Landfill (MSWLF) Areas Closed in Accordance with 40 CFR 258.60	LF
Sector N: Scrap Recycling Facilities	N2	Source-separated Recycling Facility	5093
Sector O: Steam Electric Generating Facilities	O1	Steam Electric Generating Facilities, including coal handling sites	SE
Sector P: Land Transportation and Warehousing	P1	Railroad Transportation	4011, 4013
		Local and Highway Passenger Transportation	4111-4173
		Motor Freight Transportation and Warehousing	4212-4231
		United States Postal Service	4311
Sector R: Ship and Boat Building and Repairing Yards	R1	Ship and Boat Building or Repairing Yards	3731, 3732
Sector T: Treatment Works	T1	Treatment Works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 mgd or more, or required to have an approved pretreatment program under 40 CFR Part 403. Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with section 405 of the CWA	TW

Sector	Subsector	Facility/Facility Product	SIC code
Sector U: Food and Kindred Products	U3	Meat Products	2011-2015
		Dairy Products	2021-2026
		Canned, Frozen, and Preserved Fruits, Vegetables, and Food Specialties	2032-2038
		Bakery Products	2051-2053
		Sugar and Confectionery Products	2061-2068
		Beverages	2082-2087
		Miscellaneous Food Preparations and Kindred Products	2091-2099
		Tobacco Products	2111-2141
Sector V: Textile Mills, Apparel, and Other Fabric Product Manufacturing; Leather and Leather Products	V1	Textile Mill Products	2211-2299
		Apparel and Other Finished Products Made from Fabrics and Similar Materials	2311-2399
		Leather and Leather Products (note: see Sector Z1 for Leather Tanning and Finishing)	3131-3199
Sector W: Furniture and Fixtures	W1	Wood Kitchen Cabinets	2434
		Furniture and Fixtures	2511-2599
Sector X: Printing and Publishing	X1	Printing, Publishing, and Allied Industries	2711-2796
Sector Y: Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries	Y2	Miscellaneous Plastics Products	3081-3089
		Musical Instruments	3931
		Dolls, Toys, Games, and Sporting and Athletic Goods	3942-3949
		Pens, Pencils, and Other Artists' Materials	3951-3955 (except 3952 – see Sector C)
		Costume Jewelry, Costume Novelties, Buttons, and Miscellaneous Notions, Except Precious Metal	3961, 3965
		Miscellaneous Manufacturing Industries	3991-3999
Sector Z: Leather Tanning and Finishing	Z1	Leather Tanning and Finishing	3111
Sector AB: Transportation Equipment, Industrial or Commercial Machinery	AB1	Industrial and Commercial Machinery, Except Computer and Office Equipment (see Sector AC)	3511-3599 (except 3571-3579)
		Transportation Equipment Except Ship and Boat Building and Repairing (see Sector R)	3711-3799 (except 3731, 3732)
Sector AC: Electronic, Electrical, Photographic, and Optical Goods	AC1	Computer and Office Equipment	3571-3579
		Measuring, Analyzing, and Controlling Instruments; Photographic and Optical Goods, Watches, and Clocks	3812-3873

Sector	Subsector	Facility/Facility Product	SIC code
		Electronic and Electrical Equipment and Components, Except Computer Equipment	3612-3699
Sector AD: Non-Classified Facilities	AD1	Other stormwater discharges designated by the Director as needing a permit (see 40 CFR 122.26(a)(9)(i)(C) & (D)) or any facility discharging stormwater associated with industrial activity not described by any of Sectors A-AC. NOTE: Facilities may not elect to be covered under Sector AD. Only the Director may assign a facility to Sector AD.	

In addition, report-only biannual (i.e. two times per year) indicator monitoring for priority pollutant PAHs is required in the first and fourth year of permit coverage for certain higher risk sectors that conduct activities likely to have petroleum hydrocarbon exposure (Table 3). The specific PAHs to be analyzed for are: naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, benzo[g,h,i]perylene, indeno[1,2,3-c,d]pyrene, and dibenz[a,h]anthracene.

Table 3. Sectors required to monitor PAHs biannually

Sector	Subsector	Activity/Facility Product	SIC code
All sectors	Any	Facilities with paved surfaces that will be initially sealed or re-sealed with coal-tar sealcoat	Any
Sector A: Timber Products	A1-5	Facilities that manufacture, use, or store creosote or creosote-treated wood in areas that are exposed to precipitation	Any
Sector C: Chemicals And Allied Products	C5	Petroleum Refining	2911
Sector D: Asphalt Paving And Roofing Materials And Lubricants	D1	Asphalt Paving and Roofing Materials	2951, 2952
	D2	Miscellaneous Products of Petroleum and Coal	2992, 2999
Sector F: Primary Metals	F1	Steel Works, Blast Furnaces, and Rolling and Finishing Mills	3312-3317
	F2	Iron and Steel Foundries	3321-3325
	F3	Rolling, Drawing, and Extruding of Nonferrous Metals	3351-3357
	F4	Nonferrous Foundries (Castings)	3363-3369
	F5	Primary Smelting and Refining of Nonferrous Metals	3331-3339
		Secondary Smelting and Refining of Nonferrous Metals	3341
		Miscellaneous Primary Metal Products	3398, 3399

Sector	Subsector	Activity/Facility Product	SIC code
Sector H: Coal Mines And Coal Mining-Related Facilities	H1	Coal Mines and Coal Mining-Related Facilities	1221-1241
Sector I: Oil And Gas Extraction And Refining	I1	Crude Petroleum and Natural Gas	1311
		Natural Gas Liquids	1321
		Oil and Gas Field Services	1381-1389
Sector M: Automobile Salvage Yards	M1	Automobile Salvage Yards	5015
Sector O: Steam Electric Generating Facilities	O1	Steam Electric Generating Facilities, including coal handling sites	SE
Sector P: Land Transportation And Warehousing	P1	Railroad Transportation	4011, 4013
		Petroleum Bulk Stations and Terminals	5171
Sector Q: Water Transportation	Q1	marine cargo handling	4491
Sector R: Ship And Boat Building And Repairing Yards	R1	Ship and Boat Building or Repairing Yards	3731, 3732
Sector S: Air Transportation Facilities	S1	Air Transportation Facilities	4512-4581

Indicator monitoring is a permit condition and is required throughout the permit term. As a permit condition, failure to conduct and report indicator monitoring is a permit violation. The indicator monitoring parameters do not have thresholds or baseline values, so there are no follow-up actions triggered or required to change these indictors in the discharge. The requirement in Part 2.2.1 of the permit to meet applicable water quality standards still applies.

The EPA will use indicator monitoring data to establish a comparable understanding across sectors of industrial stormwater discharge quality, potential water quality problems, and stormwater control effectiveness. The operator is expected to evaluate and compare the indicator monitoring data over time to see where values may fluctuate and why, and review and revise the SWPPP and sediment control measures as appropriate. Indicator monitoring data collected and analyzed under the 2021 MSGP will also allow EPA to evaluate whether sector-specific benchmarks are warranted in a future permit.

3.6.4.2 Intermittent Benchmark Monitoring

The EPA will require benchmark monitoring for at least two four quarter periods during the 2021-2026 permit term. Monitoring will be required for the first four quarters of coverage (i.e., year one). If no benchmark exceedances are reported by a facility, they may suspend benchmark monitoring for the following eight quarters (i.e., years two and three), but must resume monitoring for four quarters (i.e., the fourth year), after which monitoring can be discontinued for eight quarters if no exceedance occurs. Benchmark monitoring data are primarily for the operator's use to determine the overall effectiveness of control measures and to assist the operator in determining when additional action(s) may be necessary to comply with the effluent limitations in Part 2 of the permit. The benchmark thresholds are not numeric effluent limitations; a benchmark exceedance, therefore, is not a permit violation. However, if a benchmark exceedance triggers AIM (reviewed below), failure to conduct any required measures is a permit violation. Monitoring Discharges to Impaired Waters

EPA will require operators discharging to impaired waters to monitor for all pollutants that are causing impairments for one year, as in the 2015 MSGP. If the monitored pollutant is not detected in the

discharge, or it is detected but it has not been determined that its presence is caused solely by natural background sources, operators may discontinue monitoring for that pollutant for two years, after which EPA will require monitoring to resume for only for those pollutants that are both causing impairments and associated with the industrial activity and/or benchmarks for another year.

3.6.5 Actions to Address Benchmark Threshold Exceedances

Facility operators are required to respond with AIM for benchmark monitoring exceedances based on the nature and magnitude of exceedances using a tiered AIM procedure with three levels, Level 1, Level 2 and Level 3. Operators are required to respond with increasingly robust stormwater control measures coinciding with the levels, starting with reviewing controls and making adjustments at AIM Level 1, then implementing additional pollution prevention and good housekeeping measures for AIM Level 2, and lastly installing one or more permanent structural or treatment train technologies that are appropriate for the type of pollutant for AIM Level 3. The 2021 MSGP has streamlined the triggering conditions and revised the escalation process through AIM levels to be linear/sequential and responsive to the public comments received.[3]

The 2021 MSGP includes two AIM triggering events for all AIM levels and the triggering events do not change from level to level. The triggering events are based on quarterly samples that result in an exceedance of the annual average, including a one-sample exceedance, or two-, or three-sample average exceedance that result in a mathematically certain exceedance of the annual average. The two triggering events for each level of AIM are: (a) The four-quarterly annual average for a parameter exceeds the benchmark threshold, and (b) Fewer than four quarterly samples have been collected (not to be confused with the additional quarterly samples required after the triggering event), but a single sample or the sum of any sample results within the sampling year exceeds the benchmark threshold by more than four times for a parameter. This result indicates an exceedance is mathematically certain (i.e., the sum of quarterly sample results to date is already more than four times the benchmark threshold).

Requiring AIM for a one-sample exceedance, or two-, or three-sample average exceedance that indicates an annual average exceedance, is appropriate to ensure that facilities respond in a timely manner as soon as any potential issues are identified. Any quarterly sample collected that results in a benchmark exceedance based on mathematical certainty will trigger a timely response in accordance with the responses and deadlines specified in the permit.

The required responses for each AIM level are also consistent with the familiar recommended protocol contained within EPA's existing industrial stormwater sector-specific fact sheets, which suggest that the operator should first focus on reviews of existing control measures, stormwater pollution prevention plans, and other on-site activities to see if any actions or SWPPP revisions are necessary (as in AIM Level 1), then look at additional pollution prevention/good housekeeping measures that could be implemented (as in AIM Level 2), and finally structural source controls and/or treatment controls that could be installed (as in AIM Level 3).

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[3] This adjustment to the proposed permit was made after the BE amendment was submitted, and was noted in EPA's November 4, 2020 memo to the Services (included in Appendix xx). Some changes may be made to the procedures described in this section in the final permit. However, EPA intends to require AIM with a similar three-level structure and increasingly stringent follow-up actions/responses if exceedances continue, as proposed.

AIM Level 1 requires two responses in-addition to continued quarterly monitoring. These responses are identical to required responses for a benchmark exceedance in the 2015 MSGP. First, the operator would need to immediately review existing control measures in the SWPPP and other on-site activities to see if any actions or SWPPP revisions are necessary. Any measure to prevent future exceedances need to be implemented within 14 days. After compliance with AIM Level 1 responses and deadlines, the operator is required to continue quarterly benchmark monitoring for the next four quarters for the parameter(s) that caused the AIM triggering event at all affected discharge points, beginning no later than the next full quarter after compliance.

An operator's AIM Level 1 status changes to AIM Level 2 if the continued quarterly benchmark monitoring results indicate that an AIM triggering event per Part 5.2.2 has occurred (i.e., the benchmark threshold continues to be exceeded for the parameter(s)), unless the operator qualifies for an exception per Part 5.2.6.

AIM exceptions

The following exceptions are available for an exceedance triggering event at any AIM level [4]: 1) can be made if it is determined and documented in the SWPPP that the exceedance is solely attributable to natural background sources, 2) the exceedance is solely attributable to run-on sources, with EPA agreement, 3) the exceedance is attributable to a one-time abnormal event (this can only occur once per parameter per discharge point or substantially similar discharge point), how any measures taken within 14 days of such event will prevent an occurrence and a sample is taken during the next measurable storm event that does not trigger AIM; 4) a demonstration that discharges of copper and aluminum do not result in an exceedance of facility-specific criteria using the national recommended water quality criteria in-lieu of the applicable MSGP benchmark threshold, and 5) an exception can be made if the operator adequately demonstrates to EPA within 30 days of the triggering occurrence that the discharge does not result in any exceedance of water quality standards, and EPA approves such demonstration within 90 to 180 days. If EPA disapproves such demonstration, controls must be installed within specified timeframes (30 to 90 days, or extended with EPA approval) of the disapproval. A dispute process is in place involving the Director of the Water Management Division for the EPA Region for situations where EPA does not approve or disapprove the demonstration within specified timeframes. If the benchmark threshold is exceeded for the same parameter after controls are installed, EPA may require the operator to apply for an individual permit.

3.7 Anticipated Number of New Dischargers

As of November 9, 2020, the ECHO database identified a total of 2,396 facilities[5] that have filed NOI to discharge under the 2015 MSGP. These include 676 facilities[6] that filed their first-ever NOI for MSGP coverage. About 200 of these new facilities submitted their NOI during the initial six months after issuance of the 2015 MSGP. The bulk of these were from Massachusetts (n=58), New Mexico, (n=53) and Puerto Rico (n=39). The fewest were from Guam (n=1) and Washington (n=1). Thereafter, about 100 facilities filed their first ever MSGP NOI each year. It is reasonable to expect a similar number of first

[4] See Part 5.2.6 in the 2021 MSGP for more details on AIM exceptions.

[5] This tally is based on unique Facility Registry Service IDs filing an NOI between 2015 and November 9, 2020.

[6] This tally supplied by EPA on November 4, 2020

ever NOI for coverage over the upcoming 2021 MSGP permit term. This would result in about 3,000 facilities with 2021 MSGP coverage. While many new discharges are expected to be in industrialized areas, about half of the first-ever dischargers had ESA-listed species present in their action area. Because the action includes discharges from an unknown number and location of new facilities, the determinations made in this opinion applies over the entire action area of EPA's permitting authority.

3.8 Conservation Measures to Avoid Exposure

Conservation measures other than those already required by the 2021 MSGP have not been developed.

4 ACTION AREA

The action area is defined by regulation as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action" (50 C.F.R. §402.02). Section 4.1 of NMFS' opinion for the 2015 MSGP includes an inventory and maps of the distribution of HUC 12 watersheds that are subject to MSGP. The action area includes waters that may be directly affected where EPA has NPDES permitting authority and other waters affected by discharges to those waters. For example, the Connecticut River flows through Massachusetts into Connecticut. While EPA does not have permitting authority in Connecticut, authorized discharges to the Connecticut River at the state border potentially expose the ESA-listed sturgeon in Connecticut.

Those areas where EPA is the NPDES permitting authority include:

1. Washington D.C., Idaho, Massachusetts, New Hampshire, New Mexico, and Puerto Rico
2. The Pacific Territories of American Samoa, Guam, Northern Marianas Islands, Johnson's Atoll, Midway Island, and Wake Island
3. Indian Country in Alabama, Arizona, California, Colorado, Connecticut, Florida, Iowa, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Montana, Nebraska, New York, North Carolina, North Dakota, Oregon, Rhode Island, South Carolina, South Dakota, Utah, Virginia, Washington, Wisconsin, and Wyoming[7]
4. Federal Operators in Colorado, Delaware, Vermont, and Washington
5. Designated Areas in Oklahoma and Texas. The EPA has retained authorization to issue permits for activities associated with the exploration, development, or production of oil or gas or geothermal resources, including transportation of crude oil or natural gas by pipeline.

The action area specified in EPA's BE includes "Waters of the United States," as defined in 40 C.F.R. § 122.2. That provision defines "Waters of the United States" as certain inland waters (i.e. streams, rivers, lakes, ponds) and the territorial sea, which generally extends three miles (4.8 kilometers) from shore[8].

[7] Specific lands excluded from MSGP permitting are listed in Table 7.3 of the BE addendum for the 2021 MSGP.

[8] Permitting under NPDES applies to waters beyond the territorial sea. Section 402 authorizes permits which *"apply, and insure compliance with, any applicable requirements of sections 301, 302, 306, 307, and 403."* Section 403 of the Clean Water Act addresses ocean discharges, including the territorial sea, the contiguous zone, and the ocean. The term ''contiguous zone'' means the entire zone established or to be established by the United States under article 24 of the Convention of the Territorial Sea and the Contiguous Zone. The term ''ocean'' means any portion of the high seas beyond the contiguous zone.

NMFS expects that MSGP-authorized discharges would be indistinguishable from other sources at the outer boundary of the territorial seas.

5 Species and Designated Critical Habitat Considered in this Opinion

This section first identifies the species and critical habitat considered in this opinion. Section 5.1 addresses species and that have been listed and critical habitat that has been designated or proposed since consultation on the 2015 MSGP and explains whether they are likely to be exposed to MSGP discharges such that they be included in the effects analysis of this opinion. Section 5.2 updates the status of the species and designated critical habitat for those species that were addressed in NMFS' opinion on the 2015 MSGP. Table 4 below identifies the ESA-protected species and designated critical habitat, including DPSs and ESUs, under NMFS' jurisdiction that have ranges and critical habitat, where designated, overlapping with waters potentially affected by the proposed 2021 MSGP. This table includes both the recently listed species and designated critical habitat (Section 5.1) and those species that were determined to be adversely affected in the 2015 opinion (Section 5.2).

With the exception of the North Atlantic right whale, this opinion does not consider species already determined to be NLAA in NMFS' opinion for the 2015 MSGP. See Table 5 of the 2015 opinion for a complete listing of species with ranges overlapping EPA's permitting authority action area. The potential exposures of those species and the 2021 MSGP action area's overlap with their range and designated critical habitat has not changed since the 2015 MSGP nor have the anticipated effects of the proposed action, so these species are not included in this opinion for the 2021 MSGP.

Table 4. Species protected under the ESA with ranges that overlap with waters affected by the proposed MSGP.

Species	ESA Status	Critical Habitat	Recovery Plan
Marine Mammals – Cetaceans			
Killer Whale (*Orcinus orca*) – Southern Resident DPS	E – 70 FR 69903 Amendment 80 FR 7380	71 FR 69054	73 FR 4176 01/2008
North Atlantic Right Whale (*Eubalaena glacialis*)	E – 73 FR 12024	81 FR 4837	70 FR 32293 08/2004
Bryde's Whale (*Balaenoptera edeni*) – Gulf of Mexico subspecies	E – 84 FR 15446	-- --	-- --
Marine Reptiles			
Green Turtle (*Chelonia mydas*) – East Pacific DPS – Central North Pacific DPS – Central West Pacific DPS – North Atlantic DPS	81 FR 20057 T T E T	-- -- 63 FR 46693	63 FR 28359 01/1998 10/1991 – U.S. Atlantic
Hawksbill Turtle (*Eretmochelys imbricata)*	E – 35 FR 8491	63 FR 46693	57 FR 38818 08/1992 – U.S. Caribbean, Atlantic, and Gulf of Mexico 63 FR 28359 05/1998 – U.S. Pacific
Kemp's Ridley Turtle (*Lepidochelys kempii*)	E – 35 FR 18319	-- --	03/2010 – U.S. Caribbean, Atlantic, and Gulf of Mexico 09/2011

Species	ESA Status	Critical Habitat	Recovery Plan
Leatherback Turtle (*Dermochelys coriacea*)	E – 35 FR 8491	44 FR 17710 and 77 FR 4170	10/1991 – U.S. Caribbean, Atlantic, and Gulf of Mexico 63 FR 28359 05/1998 – U.S. Pacific
Loggerhead Turtle (*Caretta caretta*) – North Pacific Ocean DPS	76 FR 58868 E	-- --	63 FR 28359
Northwest Atlantic Ocean DPS	T	79 FR 39855	74 FR 2995 10/1991 – U.S. Caribbean, Atlantic, and Gulf of Mexico 05/1998 – U.S. Pacific 01/2009 – Northwest Atlantic
South Atlantic Ocean DPS	T	-- --	-- --
Olive Ridley Turtle (*Lepidochelys olivacea*) All Other Areas/Not Mexico's Pacific Coast Breeding Colonies	T – 43 FR 32800	-- --	-- --
Salmonids			
Atlantic Salmon (*Salmo salar*) – Gulf of Maine DPS	E – 74 FR 29344 and 65 FR 69459	74 FR 39903	70 FR 75473 and 81 FR 18639 (Draft) 11/2005 03/2016 – Draft 2/2019- Final
Chinook Salmon (*Oncorhynchus tshawytscha)* – California Coastal ESU	70 FR 37160 T	70 FR 52488	81 FR 70666
– Central Valley Spring-Run ESU	T	"	79 FR 42504
– Lower Columbia River ESU	T	70 FR 52629	78 FR 41911
– Upper Columbia River Spring-Run ESU	E	"	72 FR 57303
– Upper Willamette River ESU	T	"	76 FR 52317
– Puget Sound ESU	T	"	72 FR 2493
– Sacramento River Winter-Run ESU	E	58 FR 33212	79 FR 42504
– Snake River Fall-Run ESU	T	58 FR 68543	11-2017
– Snake River Spring/Summer Run ESU	T	64 FR 57399	11-2017
Chum Salmon (*Oncorhynchus keta*) – Columbia River ESU	70 FR 37160 T	70 FR 52629	78 FR 41911
– Hood Canal Summer-Run ESU	T	"	72 FR 29121
Coho Salmon (*Oncorhynchus kisutch*) – Central California Coast ESU	70 FR 37160 E	64 FR 24049	77 FR 54565
– Southern Oregon and Northern California Coasts ESU	T	"	79 FR 58750
– Lower Columbia River ESU	T	81 FR 9251	78 FR 41911
– Oregon Coast ESU	T – 73 FR 7816	73 FR 7816	81 FR 90780
Sockeye Salmon (*Oncorhynchus nerka*) – Ozette Lake ESU	70 FR 37160 T	70 FR 52630	74 FR 25706
– Snake River ESU	E	58 FR 68543	80 FR 32365
Steelhead Trout (*Oncorhynchus mykiss*) – California Central Valley DPS	71 FR 834 T	70 FR 52487	79 FR 42504
– Central California Coast DPS	T	"	81 FR 70666
– Northern California DPS	T	"	"
– South-Central California Coast DPS	T	"	78 FR 77430
– Southern California DPS	E	"	77 FR 1669

Species	ESA Status	Critical Habitat	Recovery Plan
– Upper Columbia River DPS	T	70 FR 52629	72 FR 57303
– Upper Willamette River DPS	T	‘’	76 FR 52317
– Lower Columbia River DPS	T	‘’	78 FR 41911
– Middle Columbia River DPS	T	‘’	74 FR 50165
– Snake River Basin DPS	T	‘’	11-2017
– Puget Sound DPS	T – 72 FR 26722	81 FR 9251	12-2019
Anadromous non-Salmonid Fish			
Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) – Gulf of Maine DPS	77 FR 5879 T	82 FR 39160	-- --
– New York Bight DPS	E		-- --
– Chesapeake DPS	E		
Eulachon (*Thaleichthys pacificus*) –Southern DPS	T – 75 FR 13012	76 FR 65323	9/2017
Green Sturgeon (*Acipenser medirostris*) – Southern DPS	T – 71 FR 17757	74 FR 52300	8/2018
Shortnose Sturgeon (*Acipenser brevirostrum*)	E – 32 FR 4001	-- --	63 FR 69613 12/1998
Other Fish			
Bocaccio (*Sebastes paucispinis*) – Puget Sound/Georgia Basin DPS	E – 75 FR 22276 and 82 FR 7711	79 FR 68041	10/2017
Giant Manta Ray (*Manta birostris*)	T – 83 FR 2916	Not prudent	-- --
Nassau Grouper (*Epinephelus striatus*)	T – 81 FR 42268	-- --	8/2018- Outline
Oceanic Whitetip Shark (*Carcharhinus longimanus*)	T – 83 FR 4153	Not prudent	9/2018- Outline
Scalloped Hammerhead Shark (*Sphyrna lewini*) – Central and Southwest Atlantic DPS – Eastern Pacific DPS	79 FR 38213 T E	-- --	-- --
Yelloweye Rockfish (*Sebastes rubberimus*) – Puget Sound/Georgia Basin DPS	T – 75 FR 22276 and 82 FR 7711	79 FR 68041	10/2017
Marine Invertebrates			
Indo-Pacific Corals			
Acropora globiceps Coral	T – 79 FR 53851	85 FR 76262 (proposed)	-- --
Acropora jacquelineae Coral	“	“	-- --
Acropora retusa Coral	“	“	-- --
Acropora speciosa Coral	“	“	-- --
Acropora tenella Coral	“	“	-- --
Euphyllia paradivisa Coral	“	“	-- --
Isopora crateriformis Coral	“	“	-- --
Seriatopora aculeata Coral	“	“	-- --
Caribbean Corals			
Boulder Star Coral	T – 79 FR 53851	85 FR 76302 (proposed)	
Lobed Star Coral (*Orbicella annularis*)	“	“	-- --
Mountainous Star Coral (*Orbicella faveolata*)	“	“	-- --
Rough Cactus Coral *(Mycetophyllia ferox)*	“	“	-- --
Pillar Coral (*Dendrogyra cylindrus*)	“	“	-- --
Elkhorn Coral (*Acropora palmata*)	“	73 FR 72210	80 FR 12146
Staghorn Coral (*Acropora cervicornis*)	“	”	””
Other Marine Invertebrate			

Species	ESA Status	Critical Habitat	Recovery Plan
Chambered Naultilus (*Nautilus pompilius*)	T – 83 FR 48976	Not prudent	-- --
White Abalone (Haliotis sorenseni)	E – 66 FR 29046	Not prudent	
Black Abalone (Haliotis cracherodii)	E – 74 FR 1937	76 FR 66806	

5.1 Recently Listed Species and Designated Critical Habitat

NMFS has listed additional species and designated critical habitat for protection under the ESA since issuance of the 2015 MSGP. Those that have ranges overlapping with the action area include the Gulf of Mexico subspecies of the Bryde's whale, the chambered nautilus, the oceanic whitetip shark, the giant manta ray, and the Nassau grouper. NMFS also issued a rule specifying 11 DPS for green turtle in 2016. Finally, we reconsider the NLAA determination in the 2015 MSGP biological opinion for North Atlantic right whale due to a change in the status of the species associated with increased mortality rates and decreased reproduction since issuance of the 2015 permit.

5.1.1 Gulf of Mexico Bryde's whale

The range for the endangered Gulf of Mexico Bryde's whale is throughout the Gulf. The species is consistently located in the northeastern Gulf of Mexico along the continental shelf break between 100 and 400 meters deep. The EPA has permitting authority over certain fossil fuel operations in Texas (see Figure 3 of NMFS' 2015 opinion). While many of these are along the Texas coast, the Gulf of Mexico Bryde's whale is not expected to frequent these areas. Any exposures of the Gulf of Mexico Bryde's whale to MSGP-permitted stormwater discharges from these facilities are expected to be substantially diluted, microbially metabolized, or incoporated into sediments before reaching waters where the species is found. The exposures to pollutants from such discharges are expected to be extremely unlikely to occur and therefore NLAA. The Gulf of Mexico Bryde's whale is not discussed further in this opinion.

5.1.2 Chambered Nautilus

The threatened chambered nautilus is an extreme habitat specialist that lives in close association with steep-sloped forereefs in the western Pacific Ocean (Jereb 2005, Saunders 2010). There are very few MSGP permits issued in the Pacific territories. There is a single MSGP discharger within the species range (Miller 2018). It is a canning factory located within Pago Pago Harbor, American Samoa. The harbor itself does not contain habitat for the chambered nautilus. There is a population of chambered nautilus that has been studied in the Taena Bank area, but this reef is four kilometers southeast of entrance to Pago Pago Harbor (McLetchie 2017). Exposures of the chambered nautilus to discharges from this cannery are expected to be insignificant and are therefore NLAA. The chambered nautilus is not discussed further in this opinion.

5.1.3 Oceanic Whitetip Shark

The oceanic whitetip shark is a truly pelagic species, generally remaining offshore in the open ocean. It is usually found offshore in the open ocean, on the outer continental shelf, or around oceanic islands in deep water greater than 184 meters (Backus et al. 1956, Strasburg 1958, Compagno 1984, Bonfil et al. 2008). As such, exposures to MSGP-discharges are expected to be insignificant and therefore NLAA. The oceanic white tip shark is not discussed further in this opinion.

5.1.4 Giant Manta Ray

Giant manta rays are typically found offshore in the open ocean, though these animals are sometimes found around cleaning stations of nearshore reefs and estuarine waters. Biologists from NMFS have observed giant manta ray infrequently near the entrance to San Juan Bay in Puerto Rico, particularly near channel marker buoys in San Juan Harbor. Overall, the species is not frequently reported in waters of Puerto Rico. The rarity of giant manta rays in Puerto Rico waters and their preference for deeper, offshore areas means any exposure to MSGP-authorized discharges would rarely occur near Puerto Rico. Giant manta rays are extremely unlikely to be exposed to MSGP-authorized discharges from the cannery in Pago Pago Harbor or the Wake Island Airfield. Manta species were observed in Tumon Bay Marine Preserve of Guam. The coastline of Tumon Bay is populated by hotels and other resort facilities, but no marinas. It is unlikely that an MSGP NOI would be submitted for discharges to Tumon Bay. Observation of manta rays during aerial surveys of Guam were infrequent, but increased slightly from 1963 to 2012 (Martin 2016). These reports are not specifically of the giant manta ray and could actually represent observations of the reef manta, which are more likely to occur close to land. The MSGP-authorized discharges to Guam's coastal waters are to Apra Harbor and Agana Bay. Manta species were not observed in surveys of these areas conducted between 2008 and 2012 (Martin 2016). Over the 2015 MSGP permit term, only two NOI were submitted from Guam for first time coverage under the MSGP. Considering that the giant manta ray is a pelagic species of manta ray and manta species have not been observed in or near waters receiving MSGP-authorized discharges in recent years, exposures of giant manta ray are expected to be extremely unlikely to occur and therefore NLAA. The giant manta ray is not discussed further in this opinion.

5.1.5 Critical Habitat Designated for the Atlantic Sturgeon

In 2017, NMFS designated critical habitat for the five DPSs of Atlantic sturgeon. The following critical habitat designations overlap with areas where EPA has permitting authority:

- The Potomac River below Little Falls Dam in Virginia (Chesapeake DPS),
- The Connecticut River below the Holyoke Dam in Massachusetts (New York Bight DPS),
- The Merrimack River below the Essex Dam in in Massachusetts (Gulf of Maine DPS), and
- The Piscataqua River from its confluence with the Salmon Falls and Cocheco Rivers downstream to where the main stem river discharges at its mouth into the Atlantic Ocean, as well as the waters of the Cocheco River from its confluence with the Piscataqua River and upstream to the Cocheco Falls Dam, and waters of the Salmon Falls River from its confluence with the Piscataqua River and upstream to the Route 4 Dam (Gulf of Maine DPS).

The characteristics of designated critical habitat include a requirement of 6 mg/L or greater dissolved oxygen for juvenile rearing habitat. The 2015 MSGP-authorized discharges along each of these waters may influence dissolved oxygen, so the effects of the MSGP on critical habitat designated for the Chesapeake, New York Bight, and Gulf of Maine DPS of the Atlantic sturgeon are addressed in later sections of this opinion.

5.1.6 Critical Habitat Proposed for Indo-Pacific and Caribbean ESA-Listed Corals

Critical habitat recently proposed for the Indo-Pacific ESA-listed coral species (85 FR 76262) and Caribbean coral species (85 FR 76302) includes the PBF of "marine water with levels of

anthropogenically-introduced (from humans) chemical contaminants that do not preclude or inhibit any demographic function." The implications of MSGP authorized discharges on designated critical habitat are addressed in later sections of this opinion.

5.2 Updates to the Status of Species and Designated Critical Habitat Addressed in NMFS' Consultation on the 2015 MSGP

The 2015 consultation for the MSGP applied the recovery plans and status reports that were the most recent information available at the time the opinion was written. This section updates Section 5.1 *Species and Designated Critical Habitat Likely to be Adversely Affected by the Proposed Action* of the 2015 MSGP biological opinion using recently published status reviews and recovery plans. Refer to Section 5.1 of the 2015 MSGP biological opinion for species descriptions, status at the time of the 2015 MSGP consultation, and life history. Recovery goals are included for each species, where available, as the 2015 MSGP biological opinion did not include this information.

5.2.1 Cetaceans

5.2.1.1 The 2017–2020 North Atlantic Right Whale Unusual Mortality Event

An unusually high number of vessel-strike and entanglement mortalities, starting in 2017 and continuing into 2020, has claimed approximately ten percent of the North Atlantic right whale population. There are fewer than 100 breeding females left. Only 22 births have been observed in the four calving seasons since 2017, less than one-third the previous average annual birth rate for the species. The best current abundance estimate available for the North Atlantic right whale stock is 428 individuals (95 percent credible intervals 406-447)(NMFS 2020).

Table 5 in NMFS' opinion on the 2015 MSGP identified the North Atlantic right whale as a species that is expected to have insignificant exposures to MSGP-authorized discharges. This determination is being reassessed given the changes in the status of the species. Because many MSGP discharges occur along the New England coast where this species forages, in this opinion we reassess, in a spatially informed manner, whether exposures to MSGP discharges may still be considered insignificant under the 2021 MSGP, given the current status of the species. MSGP permits[9] for discharges to estuarine and coastal waters of New England where the North Atlantic right whale forages in summertime are concentrated in the urban areas of Boston, Salem, Quincy, and Lynn, Massachusetts. Comparing the locations of coastal dischargers with the thousands of sightings reported in New England waters over the past 20 years to the NOAA Right Whale Sighting Advisory System (Consortium 2020)[10] revealed sightings within Nahant Bay near Lynn and south of Marblehead near Salem, but none close to Boston or Quincy. Discharges from the MSGP-permitted facilities in Lynn are to Broad Sound and do not reach Nahant Bay. Discharges from Salem MSGP-permitted facilities are to waters where numerous recreational boats are moored:

[9] ECHO accessed October 8, 2020 (https://echo.epa.gov/)

[10] Accessed October 13, 2020. The Right Whale Sighting Advisory System is a NOAA Fisheries program designed to reduce vessel strikes by alerting mariners to the presence of presence of North Atlantic right whales in near real-time. These sightings are provided by the United States Coast Guard, aerial surveys, shipboard surveys, whale watch vessels, and other sources (commercial ships, fishing vessels, and the general public). This database does not include effort data and does not represent a systematic survey of the species abundance and distribution.

Beverly Harbor, Salem Harbor, and Marblehead Harbor. The whales are not expected to enter these crowded waters.

Most North Atlantic right whale sightings occur within Cape Cod Bay. The sightings close to shore near MSGP-permitted facilities include two sightings on April 6 and April 29, 2014, and two sightings on May 3 and 5, 2019 in the Cape Cod Canal near an MSGP-permitted petroleum and natural gas electrical power station. Sightings were also reported on October 5 and 6, 2019 at the entrance to Barnstable Harbor, which receives MSGP-authorized discharges from two marinas. One other sighting was reported on November26, 2017 in Madaket Harbor of Nantucket, which receives MSGP-authorized stormwater discharges from a boat repair facility.

The power station has a history of benchmark exceedances for iron, but that permit has been terminated. The marinas and boat repair operation have reported benchmark exceedances for copper and zinc, but these have been resolved as of December 2019. The benchmark limits are based on EPA's guidelines for the protection of aquatic life, specifically fish and invertebrates. Limits for metals like copper and zinc protect fish and aquatic invertebrates from damage to gill tissues and attendant consequences. Marine mammals do not have direct exposures to aquatic toxicants because they do not have sensitive tissues like gills in direct contact with water. As a baleen whale, the North Atlantic right whale is exposed to aquatic toxicants through incidental ingestion of water while feeding and consuming toxicants accumulated in prey. With the exception of toxicants that bioaccumulate or biomagnify through the food web, whales are expected to be less sensitive than fish and aquatic invertebrates to aquatic toxicants.

Considering that North Atlantic right whale sightings in proximity to MSGP-authorized dischargers have been very rare over the past 20 years and the expectation that pollutant limits for the protection of aquatic life are sufficiently conservative for the protection of marine mammals, NMFS considers these exposures to be insignificant and therefore NLAA. The North Atlantic right whale is not discussed further in this opinion.

5.2.1.2 Southern Resident Killer Whale

Section 5.1.1.1 of NMFS' opinion on the 2015 MSGP reviewed the physical description, life history, status, and designated critical habitat for the endangered southern resident killer whale. Despite conservation efforts prior to the 2016 status review for southern resident killer whales, the population has not grown. The overall status of the population is not consistent with a healthy, recovered population and the DPS remains in danger of extinction. The recovery plan for this species calls for clean-up of contaminated sites and monitoring and minimizing inputs of toxic chemicals into the whales' habitat and food chain. The criteria for recovery and delisting require a sustained average population growth of 2.3 percent per year for 28 years, population parameters that are consistent with a healthy growing population, and actions to address threats completed. Interim downlisting criteria require an average population growth rate of 2.3 percent per year for 14 years and progress toward addressing threats. These metrics represent sustained growth such that the species could be downlisted from endangered to threatened.

5.2.2 Northwest Pacific Salmonids

Section 5.1.2 of NMFS' opinion on the 2015 MSGP reviewed the species descriptions, life history, and designated critical habitat for ESA-listed salmonids in the action area. This information has not changed and will not be repeated here. With but a few exceptions, ESA-listed salmon and steelhead continue to do

poorly throughout their Washington, Idaho, Oregon, and California range. In most of Washington State, according to the state's biennial report on salmon (stateofsalmon.wa.gov), ESA-listed salmon are below recovery goals (see Table 5). While some species such as Snake River fall-run Chinook and Hood Canal summer-run chum are demonstrating large successes and continue upward trends towards recovery, other species, such as the Puget Sound Chinook and the upper Columbia River spring-run Chinook continue to diminish.

In Idaho, with the exception of the Snake River fall-run Chinook, species are not making progress or are showing only slight signs of progress toward recovery goals. For example, in 2018, only thirteen wild sockeye returned to Idaho, the recovery goal is 2,500.

Oregon salmon species include Oregon Coast Coho. The 2017 adult returns reached only 8.5 percent of the abundance goal. In 2016, the lower Columbia River coho salmon spawner abundance increased from 2015, but was still the fourth lowest observed in the past 15 years of monitoring (ODFW 2016). Lower Columbia River Chinook returns are far below abundance goals and in recent years have shown no progress toward improving in numbers. Upper Willamette River Chinook and steelhead abundance has remained steady in recent years, but far below recovery targets.

Table 5. Washington state ESA-listed salmon progress toward recovery.

Getting Worse	Not Making Progress	Showing Signs of Progress	Approaching Goal
Upper Columbia River Spring Chinook	Upper Columbia River Steelhead	Mid-Columbia River Steelhead	Hood Canal Summer Chum
Puget Sound Chinook	Lower Columbia River Chum	Lake Ozette Sockeye	Snake River Fall Chinook
	Lower Columbia River Coho	Lower Columbia River Steelhead	
	Lower Columbia River Fall Chinook	Snake River Steelhead	
	Lower Columbia River Spring Chinook	Puget Sound Steelhead	
	Snake River Spring and Summer Chinook		

California returns of all listed salmon continue to decline (Table 6). For example, in total 237,000 salmon and steelhead returned to monitored California rivers to spawn in 2016/2017. This amounts to a 30 percent reduction from the 2015/2016 returns.

Table 6. Total salmon and steelhead returning to California rivers 2013 – 2017.

Monitoring year	Total Salmon and Steelhead Abundance
2016/2017	237,000
2015/2016	335,000
2014/2015	520,000
2013/2014	680,000

Every five years NMFS reviews the status of ESA-listed salmonids in the Pacific Northwest. The most recent reviews were conducted in 2016. The results of these reviews are summarized in Table 7.

Table 7. Summary of the 2016 five-year status reviews for ESA-listed salmonids in the Pacific Northwest

ESU/DPS	Abundance and productivity	Condition of designated critical habitat PBFs
Chum salmon		
Columbia River	Most populations have very low abundances and productivity, low genetic diversity, high risk of extinction	Rearing PBFs (water quality and cover) are degraded; Migration PBFs significantly impacted by dams; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; All 19 watersheds of high or medium conservation value
Hood Canal summer-run	Some recovery criteria have been met. Stable to increasing abundance trend, increasing population productivity	Spawning and rearing PBFs are degraded; Migration and rearing PBFs are impaired by loss of floodplain habitat necessary for juvenile growth and development; Elevated temperatures and environmental mixtures anticipated in freshwater habitats ; All 12 watersheds of high or medium conservation value
Chinook salmon		
California coastal	Some Recovery criteria have been met, but at considerable risk from population fragmentation and reduced spatial diversity. Comparisons to historical abundance is depressed in many basin. Only one population has had consistent run exceeding 1,000 spawning fish.	Spawning PBFs are degraded by timber harvest; Rearing and migration PBFs impacted by dams and invasive species; Estuarine PBFs degraded by water quality and saltwater mixing; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of 45 watersheds, 27 are of high and 10 are of medium conservation value.
Central Valley spring-run	Stable to declining trends, low abundances, low genetic diversity, fragmented populations	Spawning and rearing PBFs are degraded by elevated temperatures, lost access to historic spawning sites, and loss of floodplain habitat; Migration PBFs degraded by loss of cover and water diversions; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of 38 watersheds, 28 are of high and 3 are of medium conservation value
Lower Columbia River	Trends for most populations are declining. Only one population is self-sustaining. The near loss of the spring-run life history remains an important concern for maintaining genetic diversity.	Spawning and rearing PBFs are degraded by timber harvest, agriculture, urbanization, loss of floodplain habitat, and reduced natural cover; Migration PBFs impacted by dams; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of occupied watersheds, 31 are of high and 13 are of medium conservation value.

ESU/DPS	Abundance and productivity	Condition of designated critical habitat PBFs
Puget Sound	Abundance is several orders of magnitude below historic levels. Approximately half the populations are declining and half are increasing in abundance. Most of the populations that are increasing have lambda of close to 1 (barely replacing themselves).	Spawning, rearing and migration PBFs are degraded by forestry, agriculture, urbanization, and loss of habitat; Estuarine PBFs degraded by water quality, altered salinity, and lack of natural cover; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of 61 watersheds, 40 are of high and 9 are of medium conservation value.
Sacramento winter-run	Only one small population, declining population trend hatchery-supported propagation, low genetic diversity	Spawning and rearing PBFs are degraded by elevated temperatures and loss of habitat; Migration PBFs degraded by lack of natural cover and water diversions; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; The entire Sacramento river and delta are considered of high conservation value
Snake River fall-run	Stable to increasing abundance trend, moderate extinction risk. Productivity of naturally spawned populations uncertain. Large proportion of hatchery-reared fish.	Spawning, rearing and migration PBFs are degraded by loss of habitat, impaired stream flows, barriers to fish passage, and poor water quality; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; The entire river corridor is considered of high conservation value
Snake River spring/summer-run	Low abundances, high risk of extinction. Poor natural productivity with unknown rates. Several Salmon River populations have higher abundances, but still well below recovery criteria. Moderate genetic diversity.	Spawning, rearing and migration PBFs are degraded by loss of habitat, altered stream flows, barriers to fish passage, dams, loss of cover, and poor water quality; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; The river corridor is considered of high conservation value
Upper Columbia River spring-run	All populations have low abundance and the long-term trend in growth rate of the is declining (the population is not replacing itself).	Spawning and rearing PBFs are degraded by urbanization and irrigation water diversions; Migration PBFs degraded by numerous dams; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of occupied watersheds, 26 are of high and 5 are of medium conservation value
Upper Willamette River	Only one of seven remaining naturally reproducing independent populations. Unknown historical abundance. Declining trends with a high hatchery-produced fraction.	Migration, rearing, and estuary PBFs are degraded by dams, water management, loss of riparian vegetation, and quality of floodplain habitat; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of 59 assessed watersheds, 22 are of high and 18 are of medium conservation value
Coho salmon		

ESU/DPS	Abundance and productivity	Condition of designated critical habitat PBFs
central California coast	Stable population trend, low abundances, fragmented populations, supported by hatchery propagation.	Degradation in quality and quantity of PBFs, especially in southern end of range; Rearing PBFs degraded by loss of suitable incubation substrate and loss of habitat; Elevated temperatures anticipated in freshwater habitats; Environmental mixtures anticipated in freshwater habitats may impact PBFs
lower Columbia River	90 percent reduction in abundance of all independent populations. Two of 25 populations have significant natural production. Long and short term lambda projections remain negative. Diversity of populations remain in the high risk category.	Spawning and rearing PBFs are degraded by timber harvest, agriculture, urbanization, loss of floodplain habitat, and reduced natural cover; Migration PBFs impacted by dams; Elevated temperatures and environmental mixtures anticipated in freshwater habitats
Oregon coast	Drastic reductions in abundance compared to historical estimates. Highly variable abundances with periods of severe declines followed by a year of increases. Long term trends remain negative due to low abundances in the 1990s.	Rearing PBFs are degraded by elevated water temperature; All PBFs degraded by reduced water quality from contaminants and excess nutrients; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of 80 assessed watersheds, 45 are of high and 27 are of medium conservation value
Southern Oregon/Northern California	Data on population abundance and trends are limited for this. Trend data are variable throughout the.	Spawning PBFs are degraded by logging; Rearing and migration PBFs degraded by loss of riparian vegetation and loss of floodplain habitat; Elevated temperatures and environmental mixtures anticipated in freshwater habitats
Sockeye salmon		
Ozette Lake	Stable productivity rates, but abundance only 1 percent of historical levels. Low genetic diversity and low resilliance to future perturbations.	Rearing PBFs are degraded by excessive predation, invasive species, and loss of habitat; Spawning and migration PBFs are degraded by low water levels, loss of suitable spawning habitat, and low summer water flows; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; The entire watershed is of high conservation value
Snake River	Only one population remaining in Redfish Lake and it is supported by hatchery propagation. Increasing abundance, but well below those needed for sustainable natural production. Low resilience to future perturbations.	Rearing and migration PBFs are degraded by impaired water quality from adjacent land uses; Migration PBFs are degraded by multiple dams; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; All occupied and used areas of the watershed are of high conservation value

ESU/DPS	Abundance and productivity	Condition of designated critical habitat PBFs
Steelhead		
California Central Valley	Long-term trend of declining abundances and reduced genetic diversity. Populations supplemented by hatchery propagation.	Spawning PBFs are degraded by altered water flows and temperature; Rearing and migration PBFs are degraded by altered riverine habitat, dense urbanization and agriculture, poor water quality, and water diversions; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of 67 occupied watersheds, 37 are of high and 18 are of medium conservation value
Central California Coast	5-year population trend uncertain. Population abundance supplemented by hatchery propagation. Populations are likely not viable, and have lost spatial structure.	Spawning and rearing PBFs are degraded by sedimentation and elevated temperature; All PBFs are degraded by loss of habitat, low summer flows, erosion, and contaminants; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of 47 occupied watersheds, 19 are of high and 15 are of medium conservation value
Lower Columbia River	5-year population trend stable. Populations have low genetic diversity and impacted by a loss of available habitat.	Rearing PBFs are degraded by agricultural runoff and lack of available prey; Spawning, rearing and migration PBFs are degraded by timber harvests, dams, and loss of floodplain habitat; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of 41 occupied watersheds, 28 are of high and 11 are of medium conservation value
Middle Columbia River	5-year population trend stable to improving, but abundances still low compared to historical numbers.	Rearing PBFs are degraded by water quality, reduced invertebrate prey, and loss of riparian vegetation; Migration PBFs are degraded by several dams; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of 106 assessed watersheds, 73 are of high and 24 are of medium conservation value
Northern California	5-year population trend stable to improving, but abundances still low compared to historical numbers.	Rearing PBFs are degraded by loss of riparian vegetation and elevated temperature; Spawning PBFs are degraded by lack of quality substrate and sedimentation; Migration PBFs are degraded by bridges, culverts, and forest road construction; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of 50 assessed watersheds, 27 are of high and 14 are of medium conservation value

ESU/DPS	Abundance and productivity	Condition of designated critical habitat PBFs
Puget Sound	5-year population trend stable, but populations have reduced genetic diversity.	Rearing, migration and spawning PBFs are degraded by forestry, agriculture, urbanization, loss of floodplain habitat, and poor water quality; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Most watersheds are of high or medium conservation value
Snake River Basin	5-year population trend stable to improving, but still in moderate danger of extinction. Overall abundances are still below thresholds necessary for recovery.	Rearing PBFs are degraded by agricultural runoff, reduced invertebrate prey, loss of riparian vegetation, and elevated temperature; Migration PBFs are degraded by several dams; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of assessed watersheds, 229 are of high and 41 are of medium conservation value
South-Central California Coast	5-year popluation trend declining, depressed abundances.	Rearing and migration PBFs are degraded by elevated temperatures and contaminants from urban and agricultural runoff; Estuarine PBFs are degraded by altered habitat and contaminated runoff; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of 29 occupied watersheds, 12 are of high and 11 are of medium conservation value
Southern California	5-year population trend uncertain. Population abundance supplemented by hatchery propagation. Populations are at the extreme southern end of the species' range. Large annual variations in abundances, and fragmented distributions.	All PBFs are degraded by pollutants in urban and agricultural runoff, elevated temperatures, erosion, and low water flows; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of 29 freshwater and estuarine watersheds, 21 are of high and 5 are of medium conservation value
Upper Columbia River	5-year population trend improving, but low genetic diversity. Abundances still below those necessary for recovery.	Rearing PBFs are degraded by agricultural runoff and lack of available prey; Migration PBFs are degraded by several dams; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of 41 occupied watersheds, 31 are of high and 7 are of medium conservation value
Upper Willamette River	5-year population trend declining, large fluctuations in abundances.	Rearing PBFs are degraded by agricultural runoff and lack of available prey; Migration PBFs are degraded by dams and elevated temperatures; Elevated temperatures and environmental mixtures anticipated in freshwater habitats; Of assessed watersheds, 14 are of high and six are of medium conservation value

Recovery goals for each ESA-listed North Pacific salmonid species center on elimination of identified threats and achieving specific population and habitat use metrics at a granular detail for individual populations. For example, the recovery criteria for the Upper Columbia River Steelhead DPS requires at least 3,000 spawners distributed at specific abundances among each of the Wenatchee, Entiat, Methow, and Okanogan populations. Recovery criteria for each Pacific Northwest salmonid species is detailed in their respective recovery plans identified in Table 4.

5.2.2.1 Urban Stream Syndrome and Coho Salmon Pre-spawn Mortality

The phenomenon of urban runoff degrading quality in terms of aquatic chemistry and habitat is evidenced in the pollutant sources for aquatic impairments reviewed in Tables 9 through 13 of NMFS' opinion on the 2015 MSGP. The toxicity of urban stormwater is well documented (Deering et al. 2004, McCarthy et al. 2008, Boehler et al. 2017, Young et al. 2018). Coho salmon are uniquely sensitive to urban runoff. Urban runoff has resulted in acute mortality syndrome in coho salmon of the Pacific Northwest for decades (Scholz et al. 2011, McIntyre et al. 2018, Chow et al. 2019). The syndrome is a pattern of rapid mortality occurring concurrent with stormwater events in adult fish returning to freshwaters to spawn. In the most highly urbanized areas, the syndrome results in the loss of 40 to 90 percent of returning fish. Leachates from tire tread wear particulates were identified as an important source of the toxicants causing mortality in fish. Recent monitoring identified occurrence of toxic concentrations of a transformation product of an antioxidant chemical used in the production of tires (Tian et al. 2020).

5.2.3 Atlantic Salmon, Gulf of Maine DPS

Section 5.1.2.2 of NMFS' opinion on the 2015 MSGP reviewed the physical description, life history, status, and designated critical habitat for the endangered Gulf of Maine DPS of Atlantic Salmon and that summary will not be repeated here. In 2019, the USFWS and NMFS jointly released a recovery plan with the goal of enabling the species to maintain self-sustaining, wild populations with access to sufficient suitable habitat in three freshwater recovery units and ensure that necessary management options for marine survival of the species are in place (NMFS and USFWS 2019). In addition, the plan seeks to reduce or eliminate all threats that, either individually or in combination, pose a risk of endangerment to the DPS. Recovery criteria for downlisting the Gulf of Maine DPS of Atlantic salmon from endangered to threatened requires total annual returns of at least 1,500 adults originating from wild origin, or hatchery stocked eggs, fry or parr spawning in the wild, with at least two of the three freshwater recovery units having a minimum annual escapement of 500 naturally reared adults. Among the recovery units that have met or exceeded the abundance criterion, the population has a positive mean growth rate greater than 1.0 in the preceding 10-year period and the habitat includes a minimum of 7,500 units of accessible and suitable spawning and rearing habitats capable of supporting the offspring of 1,500 naturally reared adults. Delisting of the Gulf of Maine DPS will require both habitat protection and restoration at significant levels. Delisting criteria require a self-sustaining annual escapement of at least 2,000 wild origin adults in each recovery unit, for a DPS-wide total of at least 6,000 wild adults. Delisting would require that each recovery unit have a positive mean population growth rate of greater than 1.0 in the preceding 10-year period and self-sustaining population, whereby the total wild population in each Salmon Habitat Recovery Unit has less than a 50-percent probability of falling below 500 adult wild spawners in the next 15 years based on population viability analysis (PVA) projections. Delisting of the DPS also requires that sufficient suitable spawning and rearing habitat for the offspring of the 6,000 wild adults is accessible and distributed throughout the designated Atlantic salmon critical habitat, with at least

30,000 accessible and suitable Habitat Units in each recovery unit, located according to the known migratory patterns of returning wild adult salmon.

5.2.4 Non-salmonid Anadromous Species

5.2.4.1 Atlantic Sturgeon and Designated Critical Habitat

Section 5.1.3.3 of NMFS' opinion on the 2015 MSGP reviewed the physical description, life history, and status for the Atlantic sturgeon and that summary will not be repeated here. NMFS designated critical habitat for each ESA-listed DPS of Atlantic sturgeon in August of 2017 (Figure 2; 82 FR 39160). While this species is highly mobile and any DPS could occur along any segment of the Atlantic coastline, the MSGP authorizes discharges to rivers designated as critical habitat for the threatened Gulf of Maine DPS and the endangered New York Bight and Chesapeake Bay DPSs. The PBFs determined to be essential for Atlantic sturgeon reproduction and recruitment include (1) suitable hard bottom substrate in low salinity waters for settlement of fertilized eggs, refuge, growth, and development of early life stages; (2) transitional salinity zones for juvenile foraging and physiological development; (3) water of appropriate depth and absent physical barriers to passage; (4) unimpeded movement of adults to and from spawning sites; and (5) water quality conditions that support spawning, survival, growth, development, and recruitment.

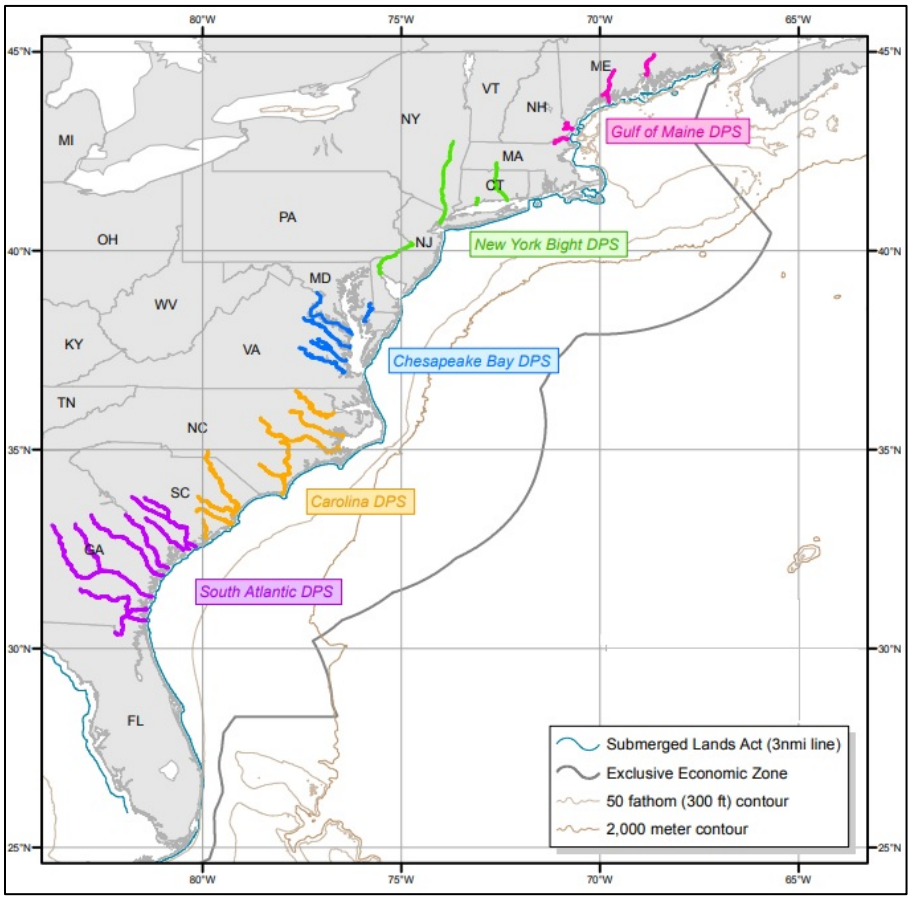


Figure 2. General map of critical habitat for each DPS of Atlantic sturgeon

A five-year status review for this species was initiated in 2018. Recovery plans have not yet been drafted for any of the Atlantic sturgeon DPSs.

5.2.4.2 Shortnose Sturgeon

Section 5.1.3.2 of NMFS' opinion on the 2015 MSGP reviewed the physical description, life history, and status for the shortnose sturgeon and that information will not be repeated here. Critical habitat has not been designated for shortnose sturgeon and there are no recent status reviews for this species. The Shortnose Sturgeon Recovery Plan was developed in 1998. The long-term recovery objective, as stated in the Plan, is to recover all 19 discrete populations to levels of abundance at which they no longer require protection under the ESA (NMFS 1998). To achieve and preserve minimum population sizes for each population segment, essential habitats must be identified and maintained, and mortality must be monitored and minimized. Accordingly, other key recovery tasks discussed in the plan are to define essential habitat characteristics, assess mortality factors, and protect shortnose sturgeon through applicable federal and state regulations.

5.2.4.3 North American Green Sturgeon, Southern DPS

Section 5.1.3.4 of NMFS' opinion on the 2015 MSGP reviewed the physical description, life history, and status for the Southern DPS of the North American green sturgeon and that summary will not be repeated here. A status review for this species was initiated in 2020 and has not yet been completed. For delisting, the 2018 recovery plan requires that the adults of the DPS census population remain at or above 3,000 for three generations with an effective population size of at least 500 individuals in any given year (NMFS 2018a). Each annual spawning run must be comprised of a combined total from all spawning locations of at least 500 adult fish in any given year in at least two rivers within their historical range. Successful spawning will be determined by the annual presence of larvae for at least 20 years with a net positive trend in juvenile and subadult abundance and broad distribution of size classes representing multiple cohorts that are stable over 20 years or more. Further, delisting requires that there be no net loss of demographic and genetic diversity from current levels.

The plan also requires barrier removal or modification in the Sacramento, Feather, and/or Yuba Rivers such that successful spawning occurs annually in at least two rivers as evidenced by annual presence of larvae for at least 20 years, and passage provided for adult green sturgeon through the Yolo and Sutter bypasses. Water temperature and flows need to be provided in spawning habitat such that juvenile recruitment is documented annually, as evidenced by the annual presence of age-0 juveniles in the lower Sacramento River or San Francisco Bay Delta Estuary. Concentrations of contaminants in adults are required to be below levels that are identified as limiting population maintenance and growth. Operation guidelines and/or fish screens must be applied to water diversions in the mainstem Sacramento, Feather, and Yuba Rivers and San Francisco Bay Delta Estuary such that early life stage entrainment is below a level that limits juvenile recruitment. Finally, the recovery plan requires that take of adults and subadults through poaching and state, federal and tribal fisheries be minimal and not limit population persistence and growth.

5.2.4.4 Southern Pacific Eulachon

Section 5.1.3.1 of NMFS' opinion on the 2015 MSGP reviewed the physical description, life history and status of the Southern Pacific eulachon and that summary will not be repeated here. A status review for

this species was initiated in 2020 and has not yet been completed. The 2015 opinion included this species among those adversely affected by MSGP-authorized discharges.

5.2.5 Other Fish

5.2.5.1 Scalloped Hammerhead Eastern Pacific DPS, Central & Southwest Atlantic DPS

Section 5.1.4.1 of NMFS' opinion on the 2015 MSGP reviewed the physical description, life history, and status for the scalloped hammerhead Eastern Pacific DPS and Central and Southwest Atlantic DPS, and that summary will not be repeated here. In November of 2015, NMFS determined that no identifiable PBFs that are essential to the conservation of these scalloped hammerhead DPSs and that are considered essential to their conservation and thus meet the definition of critical habitat (80 FR 71774). A 2019 status review for these DPS species determined that the status of these DPS has not changed.

5.2.5.2 Bocaccio and Yelloweye Rockfish

Section 5.1.4.2 of NMFS' opinion on the 2015 MSGP reviewed the physical description, life history, and status of the endangered bocaccio and threatened yelloweye rockfish and described the designated critical habitat PBFs designated for ESA-listed rockfish (79 FR 68041). That summary will not be repeated here. A joint recovery plan for these species was published in 2019 (NMFS 2017). The recovery objectives include: 1) continue to improve our knowledge of the current and historical population status and habitats so that populations can be characterized on a management unit basis and a detailed program can be developed for implementing recovery actions to most efficiently achieve delisting criteria, 2) reduce or eliminate existing threats from fisheries/anthropogenic mortality, and 3) reduce or eliminate existing threats to habitats and restore degraded or removed habitat. The downlisting criteria for bocaccio from endangered to threatened require completed research and/or programs to understand, limit, and mitigate threats. Delisting criteria for both species requires that the threats be found to not limit recovery of the listed species. Metrics for success in meeting criteria are based on a selection of spawning potential ratio scenarios.

5.2.5.3 Nassau Grouper

Section 5.1.4.3 of NMFS' opinion on the 2015 MSGP reviewed the physical description and life history of the threatened Nassau grouper and that summary will not be repeated here. Critical habitat has not yet been designated for this species. NMFS developed a recovery outline as interim guidance to direct recovery efforts until a full plan may be developed (NMFS 2016a). The Recovery Vision Statement within the outline seeks to achieve Nassau grouper spawning aggregations that occur across their historical range in numbers sufficient to produce larvae to increase adult abundance. These aggregations must be of sufficient size and distribution to support successful larval recruitment across the range. In turn, the growth of juveniles to the sub-adult and adult life stages must increase and be maintained over many years in order to realize an increase of reproductive adults in the spawning aggregations. Recovery will require conservation of habitats for all life stages.

5.2.6 Sea Turtles

5.2.6.1 Leatherback Turtle

Section 5.1.5.1 of NMFS' opinion on the 2015 MSGP reviewed the physical description, life history, and status of the endangered leatherback turtle and described the designated critical habitat PBFs for the Pacific leatherback and that summary will not be repeated here. For delisting of the leatherbacks in the

U.S. Caribbean, Atlantic, and Gulf of Mexico, the 1992 recovery plan requires that 75 percent of the nesting habitat be publically owned, the adult female population increase over the next 25 years (i.e., by 2017) as evidenced by a statistically significant trend in the number of nests at Culebra, Puerto Rico; St. Croix, USVI; and along the east coast of Florida, and that all priority one tasks (i.e., information collection, monitoring and protection) be successfully implemented (NMFS and USFWS 1992). For delisting in the Pacific, the 1998 recovery plan (NMFS and USFWS 1998c) requires the following:

1) All regional stocks that use U.S. waters have been identified to source beaches based on reasonable geographic parameters.
2) Each stock must average 5,000 (or a biologically reasonable estimate based on the goal of maintaining a stable population in perpetuity) females estimated to nest annually (FENA) over six years.
3) Nesting populations at "source beaches" are either stable or increasing over a 25-year monitoring period.
4) Existing foraging areas are maintained as healthy environments.
5) Foraging populations are exhibiting statistically significant increases at several key foraging grounds within each stock region.
6) All Priority #1 tasks have been implemented.
7) A management plan designed to maintain sustained populations of turtles is in place.

5.2.6.2 Hawksbill Turtle

Section 5.1.5.2 of NMFS' opinion on the 2015 MSGP reviewed the physical description and life history of the endangered hawksbill turtle and described the designated critical habitat PBFs and that summary will not be repeated here. For delisting of the hawksbill turtles in the U.S. Caribbean, Atlantic, and Gulf of Mexico, the 1992 recovery plan mirrors that for the leatherback turtles, requiring that, over the next 25 years (i.e., by 2017), 50 percent of the nesting habitat be publically owned; the adult female population increase, as evidenced by a statistically significant trend in the annual number of nests on at least five index beaches, including Mona Island (Puerto Rico) and Buck Island Reef National Monument (St. Croix); numbers of adults, subadults, and juveniles are increasing, as evidenced by a statistically significant trend in at least five key foraging areas within Puerto Rico, USVI, and Florida; and all priority one tasks have been successfully implemented (NMFS and USFWS 1992). For delisting hawksbill turtle in the Pacific the 1998 recovery plan (NMFS and USFWS 1998b) requires the following:

1) All regional stocks that use U.S. waters have been identified to source beaches based on reasonable geographic parameters.
2) Each stock must average 1,000 FENA (or a biologically reasonable estimate based on the goal of maintaining a stable population in perpetuity) over six years.
3) All FENA at "source beaches" are either stable or increasing for 25 years (i.e. 2023).
4) Existing foraging areas are maintained as healthy environments.
5) Foraging populations are exhibiting statistically significant increases at several key foraging grounds within each stock region.

6) All Priority #1 tasks have been implemented.

7) A management plan designed to maintain sustained populations of turtles is in place.

8) Ensure formal cooperative relationship with regional sea turtle management programs (South Pacific Regional Environment Program).

9) International agreements are in place to protect shared stocks.

5.2.6.3 Kemp's Ridley Turtle

Section 5.1.5.3 of NMFS' opinion on the 2015 MSGP reviewed the physical description, life history, and status of the endangered Kemp's ridley turtle and that summary will not be repeated here. The recovery plan for this species was developed by the Services and Mexico's Secretariat of Environment and Natural Resources (NMFS et al. 2011). To down-list this species from endangered to threatened, the recovery plan requires a population of at least 10,000 nesting females in a season (as measured by clutch frequency per female per season) distributed at the primary nesting beaches (Rancho Nuevo, Tepehuajes, and Playa Dos) in Mexico, recruitment of at least 300,000 hatchlings to the marine environment per season at the three primary nesting beaches (Rancho Nuevo, Tepehuajes, and Playa Dos) in Mexico to ensure a minimum level of known production through in situ incubation, incubation in corrals, or a combination of both. Delisting Kemp's ridley turtle requires an average population of at least 40,000 nesting females per season over a 6-year period distributed among nesting beaches in Mexico and the U.S., and reliable average annual recruitment of hatchlings over a 6-year period from in situ nests and beach corrals sufficient to maintain a population of at least 40,000 nesting females per nesting season distributed among nesting beaches in Mexico and the U.S into the future.

5.2.6.4 Olive Ridley Turtle

Section 5.1.5.3 of NMFS' opinion on the 2015 MSGP reviewed the physical description and life history of the threatened olive ridley turtle and that summary will not be repeated here. The most recent 5-year status review for this species was completed in 2014, and is incorporated into the 2015 opinion. The 1998 recovery plan for the U.S. Pacific populations of olive ridley turtles indicates that contaminants in the marine environment are not a current problem among the threats faced by this species (NMFS/USFWS 1998).

5.2.6.5 Loggerhead Turtle North Pacific DPS and Northwest Atlantic DPS

Section 5.1.5.4 of NMFS' opinion on the 2015 MSGP reviewed the physical description, life history, and status of the endangered North Pacific DPS and threatened Northwest Atlantic DPS of loggerhead turtle and that summary will not be repeated here. A five-year status review for the Northwest Atlantic DPS species was initiated in 2019 and is not yet complete. Two of the Northwest Atlantic loggerhead turtle DPS recovery units overlap with waters where EPA has NPDES permitting authority: the Northern Gulf of Mexico Unit and the Greater Caribbean Unit (NMFS and USFWS 2008). The recovery plan requires that the Northern Gulf of Mexico Unit attain an annual rate of increase over a generation time of 50 years is three percent or greater than the previous year, resulting in a total annual number of nests of 4,000 or greater for this recovery unit, with a statistical confidence of 95 percent, and that the increase in number of nests must be a result of corresponding increases in numbers of nesting females (estimated from nests, clutch frequency, and remigration interval). For the Greater Caribbean Recovery Unit, recovery requires that the total annual number of nests at a minimum of three nesting assemblages increase over a

generation time of 50 years and that this increase in number of nests must be a result of corresponding increases in numbers of nesting females (estimated from nests, clutch frequency, and remigration interval).

According to the 2020 status review, the North Pacific Ocean loggerhead turtle DPS continues to meet the definition of an endangered species because it is in danger of extinction throughout its range as a result of numerous factors. The greatest threats are caused by fisheries bycatch, which reduces abundance, and climate change, which reduces productivity. Other threats include loss and modification of habitat, overutilization, and predation. These threats are reflected in the low abundance of nesting females. Nesting appears to be increasing; however, relatively few females return to nest on a regular basis, raising concern regarding the impact of threats on the survival of mature females and thus the resilience and recovery of the DPS (NMFS and USFWS 2020). Delisting of the North Pacific DPS of loggerhead sea turtle requires all of the following criteria to be met (NMFS and USFWS 1998d):

1) to the best extent possible, take in international waters must be reduced via enforced agreements
2) all regional stocks that use U.S. waters must have been identified to source beaches based on reasonable geographic parameters
3) all FENA at "source beaches" must be either stable or increasing for over 25 years
4) each stock must average 5,000 FENA (or a biologically reasonable estimate based on the goal of maintaining a stable population in perpetuity) over six years
5) existing foraging areas must be maintained as healthy environments
6) foraging populations must be exhibiting statistically significant increases at several key foraging grounds within each stock region
7) all Priority #1 tasks have been implemented
8) a management plan designed to maintain stable or increasing populations of turtles must be in place
9) ensure formal cooperative relationship with a regional sea turtle management program
10) international agreements must be in place to protect shared stocks (e.g., Mexico and Japan).

5.2.6.6 Green Turtle

NMFS listed 11 DPSs of green turtle in 2016, which changed the 2015 status review. MSGP discharges occur to habitats used by the North Atlantic, South Atlantic, East Pacific, and Central North Pacific DPS of green turtle, which are threatened, and the Central West Pacific DPS of green turtle, which is endangered. This listing update does not affect existing designated critical habitat in Puerto Rico and does not influence the determinations made for the green turtle in NMFS' opinion for the 2015 MSGP. The 1998 recovery plan addressed the green turtle as Atlantic (NMFS and USFWS 1991) and Pacific (NMFS and USFWS 1998a) populations. The U.S. population of green turtles in the Atlantic can be considered for delisting if, over a period of 25 years (i.e. by 2023), the following conditions are met:

1) the level of nesting in Florida has increased to an average of 5,000 nests per year for at least six years

2) at least 25 percent of all available nesting beaches (420 km) is in public ownership and encompasses greater than 50 percent of the nesting activity

3) a reduction in stage class mortality is reflected in higher counts of individuals on foraging grounds, and

4) All priority one tasks have been successfully implemented.

For the Pacific population, delisting requires that:

1) all regional stocks that use U.S. waters be identified to source beaches based on reasonable geographic parameters

2) each stock must average 5,000 FENA over six years

3) nesting populations at "source beaches" must be either stable or increasing over a 25-year monitoring period

4) existing foraging areas must be maintained as healthy environments

5) foraging populations must be exhibiting statistically significant increases at several key foraging grounds within each stock region

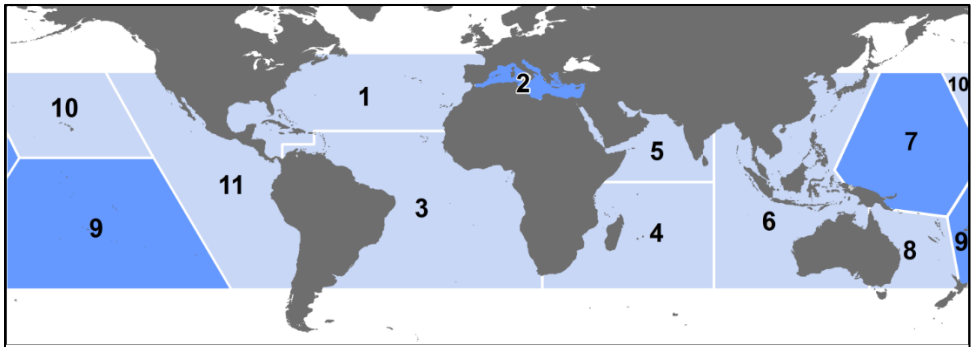
6) all Priority #1 tasks must have been implemented

7) a management plan to maintain sustained populations of turtles must be in place, and

8) international agreements must be in place to protect shared stocks.

5.2.6.7 Updated Green Sea Turtle Listing

The green turtle was initially listed under the ESA on July 28, 1978 (43 FR 32800) as endangered for breeding populations in Florida and the Pacific coast of Mexico, and threatened in all other areas throughout its range. On April 6, 2016, NMFS listed 11 DPSs of green sea turtles as threatened or endangered under the ESA (81 FR 20057). Eight DPSs are listed as threatened: Central North Pacific, East Indian-West Pacific, East Pacific, North Atlantic, North Indian, South Atlantic, Southwest Indian, and Southwest Pacific. Three DPSs are listed as endangered: Central South Pacific, Central West Pacific, and Mediterranean.



Threatened (light blue ■) and endangered (dark blue ■) green turtle DPSs:
1. North Atlantic, 2. Mediterranean, 3. South Atlantic, 4. Southwest Indian, 5. North Indian, 6. East Indian-West Pacific, 7. Central West Pacific, 8. Southwest Pacific, 9. Central South Pacific, 10. Central North Pacific, and 11. East Pacific.

Figure 3. Map depicting DPS boundaries for green turtles

MSGP discharges occur to habitats used by the North Atlantic, South Atlantic, East Pacific, and Central North Pacific DPS of green turtle, which are threatened, and the Central West Pacific DPS of green turtle, which is endangered. The listing change did not affect existing designated critical habitat in Puerto Rico and does not influence the determinations made for the green turtle in NMFS' opinion for the 2015 MSGP. The opinion on the 2015 MSGP concluded that effects of industrial stormwater to sea turtles were associated with erosive flow, turbidity, and TSS on their habitats. Drinking water exposures to toxic pollutants discharged to the sea were expected to be extremely dilute and insignificant with indirect dietary exposures to stormwater pollutants through integration with all sources of bioaccumulating and biomagnifying pollutants incorporated into the food chain.

5.2.7 Corals

Section 5.1.7 of NMFS' opinion on the 2015 MSGP summarized the ESA-listed corals and that summary will not be repeated here. Since 2014, coral reef habitats have been subject to elevated ocean surface temperatures (Figure 3) precipitating a prolonged global bleaching event extending into early 2017 (Hughes 2017, NESDIS 2017). In addition, the 2017 western Atlantic hurricane season was unusually intense, with four hurricanes over a period of less than two months. Hurricanes Harvey (August 25, category three) and Nate (October 4, category one) struck in the Gulf of Mexico and the category hurricanes Irma (August 30, category 5) and Maria (September 16, category 4) struck Florida and the Caribbean. The hurricanes churned coastal sediments into the water column and torrential rain carried sediments in runoff from land (Hernández et al. 2020).

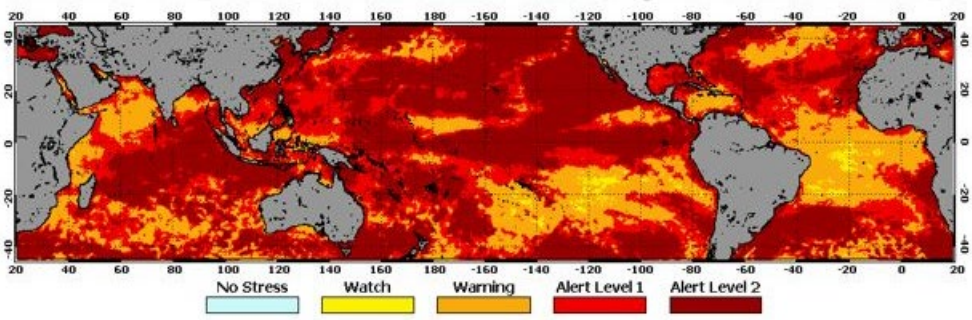


Figure 4. Reef Watch satellite coral bleaching alert area January 2014-December 2016.

Post-hurricane assessments found that staghorn coral and boulder star coral were the most severely impacted ESA-listed coral species. These species are major contributors to nearshore reefs in the Caribbean that provide coastal protection (Viehman 2020). An assessment of data collected between 2014 and 2017 rate the overall condition of Puerto Rico coral reefs after monitoring and restoration efforts as "fair" (Alvarez et al. 2020). Recovery outlines have been developed for ESA-listed Indo-Pacific coral species and the ESA-listed Caribbean coral species as interim guidance to direct recovery efforts until full plans may be developed (NMFS 2015, 2016b).

NMFS' vision for restoration and delisting the 15 ESA-listed Indo-Pacific corals is that they should be present throughout as much of their historical ranges to the extent that future environmental changes allow, and expand their ranges into new locations with more favorable habitat conditions. Changing environmental conditions on a global scale are the primary drivers of the status of these listed corals and it is not realistic to expect future distributions to reflect the past. Coral reefs where these species occur are

expected to continue to experience low levels of local anthropogenic impacts, retain their ecosystem function, and show increased resilience to global environmental changes. Recovery of the 15 ESA-listed Indo-Pacific corals will require conservation of the coral reef ecosystem through threat abatement, and facilitation of adaptation to changing conditions to ensure a high probability of survival into the future.

NMFS' vision for restoration and delisting the ESA-listed coral species in the Atlantic-Caribbean is that these species should be present across their historical range, with populations large enough and genetically diverse enough to support successful reproduction and recovery from mortality events and dense enough to maintain ecosystem function. Recovery of ESA-listed Atlantic-Caribbean coral will require conservation of the coral reef ecosystem through threats abatement to ensure a high probability of survival into the future.

Designated critical habitat recently proposed for the Indo-Pacific ESA-listed coral species (85 FR 76262) and Caribbean coral species (85 FR 76302) includes the PBF of "marine water with levels of anthropogenically-introduced (from humans) chemical contaminants that do not preclude or inhibit any demographic function."

5.2.8 Abalone

Section 5.1.6 of NMFS' opinion on the 2015 MSGP summarized the physical, appearance life histories, and status of white and black abalone. That summary will not be repeated here. A status review specifically for white abalone was completed in 2018. It concluded that much progress progress has been made in producing large numbers of healthy white abalone for research and outplanting, but the species remains at low densities in the wild. The abundance, density, size and spatial distribution, and population trends needed for downlisting and delisting are not progressing and several threats remain to be addressed, including the effects of environmental contaminants (NMFS 2018b).

6 UPDATES TO THE ENVIRONMENTAL BASELINE

The "Environmental Baseline" is defined as: "the past and present impacts of all Federal, State, or private actions and other human activities in an action area, the anticipated impacts of all proposed Federal projects in an action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process." The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 C.F.R. §402.02). This includes discharges and activities authorized by the administratively continued 2015 MSGP, and other activities authorized by the EPA (e.g., NPDES permits, cooling water intake, air emissions, and the cleanup and management of hazardous waste) that have undergone or are in the process of completing ESA section 7 consultations. The purpose of the Environmental Baseline is to describe the condition of the ESA-listed species and designated critical habitat in the action area without the consequences caused by the proposed action.

NMFS does not expect that the overarching drivers contributing to the environmental baseline within EPA's action area (e.g., example, land and water use, bycatch, and pollutant sources) have changed substantially since issuing the 2015 MSGP. In addition to the species status updates described in Section 4, this section updates the Environmental Baseline within the action area of the 2015 MSGP biological opinion (Section 6.2) with information from the Clean Water Act 305(b) assessments overlapping with the action area for this opinion. The Clean Water Act requires states and territories to assess water quality every two years under 305(b) and identify waters that are impaired under 303(d) and in need of restoration. Restoration is achieved by establishing the maximum amount of an impairing pollutant allowed in a waterbody, or total maximum daily load (TMDL). These assessments are sent as an integrated report every even numbered year to EPA, which must approve of each impaired waters' listing. As a result, many of the most recent state assessments are not finalized as of December 2020. The summary in this environmental baseline section includes integrated water quality report assessments finalized by EPA since the 2015 MSGP was issued. This section also examines the implications of consequential climatic events over the 2015 MSGP permit term: the 2017 hurricane seasons and 2020 wildfire season. These action area-specific baseline descriptions are summarized by regions for East Coast, Puerto Rico, Texas, the West Coast, and the Pacific Territories.

6.1 East Coast

Specific major rivers of the conterminous Eastern United States are the only freshwaters of concern for this opinion because, unlike the salmonids of the Pacific Northwest, the ESA-listed Atlantic sturgeon and shortnose sturgeon do not use streams and other backwaters. The rivers of concern within the action area are based on the NMFS Greater Atlantic Region section 7 mapper data for Atlantic sturgeon designated critical habitat for . While the Atlantic sturgeon was listed for protection under the ESA in 2011, critical habitat for the species was designated in 2017, two years after the 2015 MSGP was issued. The rivers of concern include the:

- Piscataqua River in New Hampshire, including critical habitat from its confluence with the Salmon Falls and Cocheco Rivers downstream to where the main stem river discharges at its mouth into the Atlantic Ocean

- Cocheco River in New Hampshire, including critical habitat from its confluence with the Piscataqua River and upstream to the Cocheco Falls Dam
- Salmon Falls River in New Hampshire, including critical habitat from its confluence with the Piscataqua River and upstream to the Route 4 Dam
- Merrimack River in Massachusetts, including critical habitat from the Essex Dam (also known as the Lawrence Dam) downstream to where the main stem river discharges at its mouth into the Atlantic Ocean
- North River in Massachusetts
- Taunton River of Massachusetts
- Thames River in Connecticut because the Mohegan Reservation is located on its shores
- Connecticut River in Massachusetts, including critical habitat from the Holyoke Dam downstream to where the main stem river discharges at its mouth into Long Island Sound for Atlantic sturgeon, and, for the landlocked shortnose sturgeon, from Turners Falls to the Holyoke Dam
- Delaware River
- Potomac River in Washington D.C., including critical habitat from the Little Falls Dam downstream to where the main stem river discharges at its mouth into the Chesapeake Bay

The EPA approved New Hampshire's 2018 303(d) list for freshwaters in February of 2020. Prior to the 2018 assessment, the Cocheco River was listed as impaired due to polychlorinated biphenyls (PCBs). This listing was found to be in error and the water is no longer considered impaired by excess nitrogen. Even so, the Cocheco and associated tributaries remain impaired by PAHs, legacy organochlorine pesticides, lead, aluminum, iron, pH, low dissolved oxygen, and other stressors contributing to the impairment of the biological community (e.g., flashiness). The Piscataqua River continues to be impaired by excess nitrogen, dioxin, mercury, PCBs, light penetration, and stressors resulting in an impaired estuarine biological community. Approved TMDLS for fecal coliform and enterococcus are now in place for these Piscataqua River impairments. For the Salmon Falls River, impairments include impaired biological communities, indicators of eutrophication (chlorophyll-a, dissolved oxygen and oxygen saturation, and total nitrogen), dioxin, mercury, PCBs, and pH. Approved TMDLs for mercury and dissolved oxygen are now in place for certain segments of the Salmon Falls River. Approved TMDLs are also in place for enterococcus, *Escherichia coli*, fecal coliform, and non-native aquatic plant impairments. The 2018 assessment did not include marine waters, but the draft 202 303(d) list adds assessment zones located in Great Bay impaired by eutrophication indicators chlorophyll a and total nitrogen.

The EPA approved Massachusetts's 2016 303(d) list in January of 2020. The 2016 assessment identified additional *Escherichia coli* impairments in segments of the Merrimack, Taunton, and Connecticut Rivers. Indicators of sewage and eutrophication impairments were also identified for 13 harbor and bay segments. New enterococcus, nitrogen, and estuarine community impairments were identified for 14 waters with existing TMDLs and these impairments were incorporated into the existing TMDL. New TMDLs were established for eight harbor and bay segments: six for fecal coliform, one for nitrogen, and one for an estuarine biological community impairment. Restoration activities resulted in use attainment for the sediment impairments (TSS and turbidity) in Dorchester Bay. The fecal coliform impairments of Hyannis

Harbor and Little Pleasant Bay were withdrawn because new assessment methods indicated they were not actually impaired. Water quality standards were also attained for fecal coliform, eutrophication indicators, TSS, and estuarine biological community impairments of five other harbor and bay segments, but the reason for attainment was not specified.

Washington, D.C. assessed nearly all it waters for the 2016 reporting year, and these waters were all identified as impaired and in need of a TMDL. The top five impairments for rivers and streams (39 miles) were polychlorinated biphenyls (PCBs), pathogens, zinc, copper, and turbidity. For impaired bays and estuaries (5.9 square miles), the top five impairments are PCBs, *Escherichia coli*, turbidity, pH, and dieldrin, DDT and its metabolites, chlordane, heptachlor epoxide, and PAHs tied for fifth place. A TMDL addressing the fecal coliform impairment of Washington's Tidal Basin has been established since the 2014 reporting year, but the other impairments for the basin (i.e., legacy organochlorine pesticides, PCBs, PAHs, and pH) are still in need of a TMDL.

6.1.1 Municipal Separate Storm Sewer Systems

Municipal Separate Storm Sewer Systems (MS4s) are conveyances or a system of conveyances that are:

- owned by a state, city, town, village, or other public entity that discharges to Waters of the United States,
- designed or used to collect or convey stormwater (e.g., storm drains, pipes, ditches),
- not a combined sewer, and
- not part of a sewage treatment plant, or publicly owned treatment works (POTW).

To prevent harmful pollutants from being washed or dumped into MS4s, certain operators are required to obtain NPDES permits and develop stormwater management programs (SWMPs). The SWMP describes the stormwater control practices that will be implemented consistent with permit requirements to minimize the discharge of pollutants from the sewer system. In 2016, EPA Region 1 issued an MS4 General Permit for stormwater discharges within urbanized areas of Massachusetts and New Hampshire (Figure 5). Recent modifications clarifying requirements of permit holders become effective in January 6, 2021. In August of 2016, NMFS Greater Atlantic Region Field Office completed informal consultation, concurring with the conclusion made by EPA Region 1 that the proposed MS4 General Permit for Massachusetts and New Hampshire is not likely to adversely affect NMFS ESA-listed species and/or designated/proposed critical habitat within the action area of the permit.

In February of 2018, EPA Region three reinitiated consultation with NMFS Greater Atlantic Region Field Office on its MS4 General Permit for stormwater discharges within Washington D.C.. Reinitiation was required to address the designation of critical habitat for the Atlantic sturgeon. NMFS Greater Atlantic Region Field Office issued its concurrence that the MS4 was NLAA for critical habitat designated for Atlantic sturgeon in February of 2018.

Under CWA Section 402(p)(3), 33 U.S.C. §1342(p)(3), industrial stormwater discharges are required to meet technology-based requirements and any more stringent requirements necessary to meet water quality standards. Municipal stormwater discharges, however, are held to different standards. CWA Section 402(p)(3)(B) states that permits for MS4 discharges may be issued on a system or jurisdiction-wide basis, and must effectively prohibit non-stormwater discharges into the sewer system. Stormwater discharges

regulated under an MS4 permit represent a baseline stormwater impact to which MSGP-regulated discharges are added.

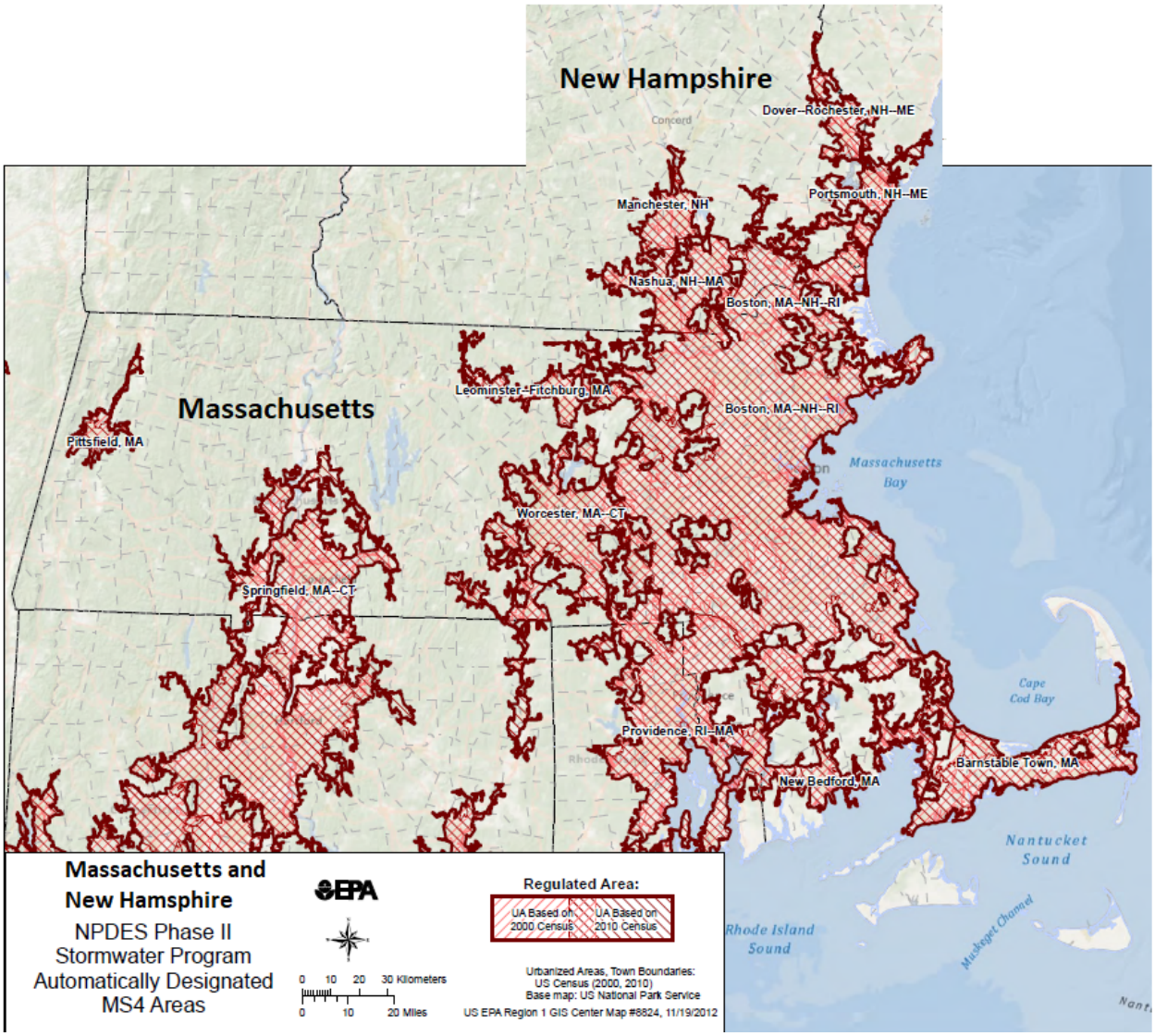


Figure 5. Map of Urbanized Areas of Massachusetts and New Hampshire Automatically Designated MS4 Areas.

6.2 Puerto Rico

Puerto Rico also assessed most of its waters for the 2016 reporting year and identified recovery of designated uses for 28 miles of previously impaired coastal shoreline. Since the 2014 reporting year, indicator bacteria TMDLs were completed for Caño Merle and the San Juan Bay Estuary System, and 12 coastal/estuarine waters attained their designated uses. With the exception of the San Juan Bay Estuary, the recovered impairments were all dissolved oxygen. For San Juan Bay, the recovered impairments were for cadmium, copper, cyanide, lead, nitrate/nitrite, and surfactants. However, the reason for the nitrate/nitrite recovery was due to a change in the criteria, and the reason for the remaining impairment recoveries is not identified. The top five current impairments for Puerto Rico's bays and estuaries (12.6 miles) are fecal coliform, low dissolved oxygen, copper, turbidity, and pH. A total of 442.2 miles of

coastal shoreline are impaired by turbidity, low dissolved oxygen, pH, enterococcus bacteria, and temperature. The sources for these impairments are associated with sewage and urban/marina runoff.

6.2.1 Hurricanes in 2017

Major hurricanes have caused significant losses in coral cover and changes in the physical structure of many reefs in Puerto Rico, as well as loss or damage to seagrass beds from blowouts and sediment movement. Tropical storms and hurricanes can result in severe flooding, leading to significant sediment transport to nearshore waters from terrestrial areas, as well as shifting of marine sediments. In addition to affecting sessile benthic organisms such as ESA-listed corals, changes in the structure of the reef affect species like sea turtles, in particular greens and hawksbills that use reef habitats for refuge and foraging. In-water habitat for green and hawksbill sea turtles is temporarily or permanently lost or degraded depending on the magnitude of the storm.

Based on NOAA hurricane data and data from the Federal Emergency Management Agency, there have been a total of 11 hurricanes and tropical storms that have affected Puerto Rico between 1975 and 2017. Hurricanes Irma and Maria passed through the Caribbean in September 2017. Many portions of Puerto Rico were relatively unaffected by Hurricane Irma, although the storm did cause damage to Vieques, but Hurricane Maria affected all of Puerto Rico. The islands are still recovering from the effects of the storms, but in-water assessments of habitats indicate that some coral areas suffered only minor damage from the storm while other areas suffered significant damage (Figure 6).

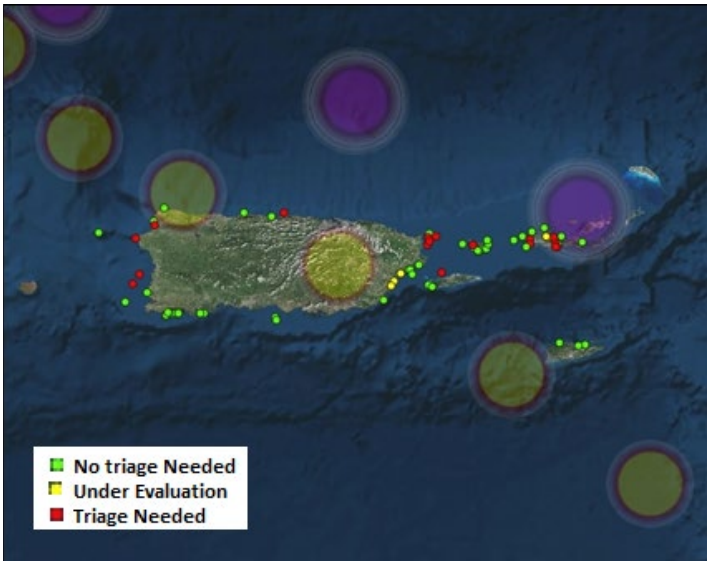


Figure 6. Map showing tracks of Hurricanes Irma (large purple dots) and Maria (large yellow dots) in area where Puerto Rico is located and results of coral surveys conducted through 2018 (NOAA 2017a).

In other areas, triage of affected corals was performed to stabilize colonies affected by the storms and work on reef restoration is still on going. Seagrass beds also suffered varying levels of effects depending on their location around the islands in relation to currents, waves, and storm surge. Reports of impacts from Hurricanes Irma and Maria on coastal areas of Puerto Rico indicate that beaches in many parts of the island and outlying islands such as Culebra and Vieques were significantly affected by erosion associated with storm surge (E. Díaz, PRDNER, pers. comm. to L. Carrubba, NMFS, October 12, 2017). There were

also reports of numerous vessel groundings, contamination of nearshore waters due to flooding of terrestrial areas including wastewater treatment plants, transport of debris to nearshore waters and debris accumulations where in-water structures were damaged, and storm damage to coral and seagrass habitats (E. Díaz, PRDNER, pers. comm. to L. Carrubba, NMFS, October 12, 2017). Some benthic habitats that did not suffer physical impacts from the hurricanes are not fully recovering, apparently due to the longer-term effects of contaminant and debris transport to nearshore waters associated with flooding caused by the storm.

While the Atlantic 2020 hurricane season was intense, no hurricanes made landfall in Puerto Rico wher EPA is the permitting authority. NMFS looked for, but did not find any information suggesting reefs surrounding Puerto Rico were physically harmed. However, considering the torrential rains that did impact Puerto Rico during this most recent hurricane season, it is likely that stormwater retention pond and other stormwater control measures failed and discharged pollutants into the sea.

6.3 Texas

The EPA approved Texas' 2020 integrated water quality assessment in May of 2020. No new costal water impairments were added or removed from the Texas 303(d) list of impaired waters. NMFS' opinion on the 2015 MSGP used the 2010 integrated assessment report because data for subsequent years were not accessible. Coastal water impairments identified in the current 303(d) list that were identified during the 2014, 2016, and 2018 reporting years include copper (n=4), bacteria in recreational waters (n=4), PCBs in fish tissues (n=2) and depressed dissolved oxygen (n=1).

Coral reefs do not occur along the Texas coastline.

A number of hurricanes have affected Texas since the 2015 MSGP was issued. In 2017 Hurricane Harvey's category 4 winds caused massive structural damage and stalled over Texas for several days soaking a 29,000 square mile area with at least 20 inches of rain over 7 days (NOAA 2017b). The Atlantic 2020 hurricane season brought a record number of hurricanes. Hurricane Hanna, a category 1 hurricane based on wind speed, made landfall in south Texas on July 25. What makes this storm remarkable was the torrential rainfall exceeding one foot in some areas (NOAA 2020). In September, the storm surge from Hurricane Beta flooded much of coastal Texas (NOAA 2020).

6.4 West Coast

The state of Washington's 2012 integrated water quality assessment was approved by EPA in 2016 (Opalski 2016). The 2012 integrated list identifies 303 freshwater segments that have been removed from the state 303(d) list due to attaining water quality standards (n=116), being subject to a plan to achieve water quality standards through a TMDL or other pollutant control strategy (n=156), or for which the state determined that the data no longer met revised threshold requirements for non-attainment (n=31). Impairments in Washington's 2012 303(d) list total 3,571 freshwater segments. This includes 1,622 waters listed for the first time. The state also identified 77 marine and estuarine waters as impaired, with primary impairments being fecal coliform, dissolved oxygen, invasive exotic species, sediment toxicity, PCBs, and PAHs in fish tissue. The top five impairments in Washington freshwaters are temperature, dissolved oxygen, bacteria, pH, and PCBs in fish tissue(DEQ 2020).

The EPA approved most of Oregon's proposed 2012 303(d) listings and delistings in December of 2016 (ODEQ 2020). Thirty two waters were recommended for removal from the 303(d) list. Most removals were waters that had been identified as impaired by manganese and/or beryllium because there are no

standards for these elements. Eleven waters were proposed for removal because they had attained criteria. Among the remaining waters recommended for delisting are those that were inactive due to low priority under insufficient program funding (n=9), those for which criteria or designated use changed (n=5), insufficient data with data collection prioritized (n=3), or those that were subject to a plan to achieve water quality standards through a TMDL or other pollutant control strategy (n=4). The integrated water quality assessment also identified 84 additional waters for listing, with the top five impairments being impaired biological community, dissolved oxygen, lead, mercury, and copper.

The EPA approved Idaho's 2018-2020 section 303(d) list in October of 2020. The state listed 71 additional waters as impaired and delisted 147 waters: 21 because data indicate the standard has been attained and 43 due to approval of a TMDL. The remaining delistings were based on insufficient data, clarifications, or duplicates of existing listings. The top impairment causes for Idaho streams are impaired biological communities and habitats, water temperature, *Eschericia coli*, sedimentation/siltation, and mercury. The integrated report indicates that some of these impairments have improved since the 2016 reporting year. The extent of sedimentation/siltation impairments decreased by about 30 percent, temperature impairments decreased by 24 percent, and stream miles with impaired biological communities and habitats declined by about 11 percent.

Data from California's 2016 integrated report identified nine additional impaired waters in Indian Country Lands where EPA is still the permitting authority. The top five impairments identified for these areas were aluminum, indicator bacteria, toxicity, temperature, and sediment. While the assessment did not identify any waters which had a TMDL developed since the last reporting cycle or attained their designated uses, only 33 percent of California's rivers and streams and 42 percent of its bays and estuaries were assessed for the 2016 reporting cycle.

6.4.1 Wildland Fire (West Coast)

NMFS' opinion on the 2015 MSGP discussed wildland fires in Section 6.1.8. Fires that are allowed to burn naturally in riparian or upland areas may benefit or harm aquatic species, depending on the degree of departure from natural fire regimes. These beneficial and harmful effects of wildfire are discussed in the NMFS' opinion on the 2015 MSGP. The intensity and extent of wildfires appear to be increasing over time, suggesting a departure from natural fire regimes. In the 1990s, the average annual acreage burned by wildfire was 3.3 million acres in an average of 78,600 individual fires. Since 2000, the average annual acreage burned by wildfire was 6.9 million acres, three times the area burned in the 1990s. The 2015 fire season was the largest on record, with 10.1 million acres burned. As of November 2, 2020, over 47,500 wildfires have burned nearly 8.7 million acres this year (CRS 2020). Fire retardants used to fight wildfires risk polluting water and adversely ESA-listed species (NMFS 2019).

6.5 Pacific Territories

Guam assessed 2.4 percent of its bays and estuaries (22.3 square miles assessed) and 14 percent of the coastal shoreline (16.6 miles assessed). While enterococcus bacteria TMDLs were developed for 25 beaches, no previously impaired waters were identified as attaining their designated use in the 2016 reporting period. Enterococcus bacteria TMDLs are still needed for about 16 miles of beach, and 0.7 miles of beach need a TMDL for PCBs in fish tissue. About 12 square miles of Guam's bays and estuaries are impaired by PCBs in fish tissue, and Tumon Bay was identified as impaired by antimony, tetrachloroethylene, trichloroethylene, arsenic, dieldrin, and chlordane. While sources for these impairments were not identified in Guam's 2016 integrated assessment report, the presence of the legacy

contaminants PCBs, dieldrin, and chlordane does not suggest current industrial activity that would be subject to the MSGP.

American Samoa assessed 78 percent of its coastal shoreline (124 linear miles) during its 2016 reporting year. Enterococcus bacteria TMDLs were developed for 41 beaches and the original listing of one beach as impaired by arsenic was determined to be incorrect. Overall enteroccoccus bacteria impairs 58.6 miles of coastline and impaired biological communities (specific cause unknown) occur along 41 miles of coastline. Sources of pollutants in these waters were identified as multiple unspecified nonpoint sources and sediments contaminated with legacy pollutants.

The Northern Marianas Islands assessed water quality along 235.3 miles of coastal shoreline and determined that 89.5 miles were impaired and required a TMDL for phosphate. Specific impairments, in addition to phosphate, include 83.3 miles impaired by enterococcus bacteria, 53 miles exhibiting impaired biological communities, 25.6 miles impaired by low dissolved oxygen, 9.9 miles with pH impairments, and less than five miles impaired by mercury, copper, and lead. Pollutant sources were identified as septic systems, livestock operations, and military bases.

6.6 Climate Change

The globally-averaged combined land and ocean surface temperature data, as calculated by a linear trend, show a warming of approximately 1.0°C from 1901 through 2016 (Hayhoe et al. 2018). The IPCC Special Report on the Impacts of Global Warming (2018) noted that human-induced warming reached temperatures between 0.8 and 1.2°C above pre-industrial levels in 2017, likely increasing between 0.1 and 0.3°C per decade. Warming greater than the global average has already been experienced in many regions and seasons, with most land regions experiencing greater warming than over the ocean (Allen et al. 2018). Annual average temperatures have increased by 1.8°C across the contiguous U.S. since the beginning of the 20th century with Alaska warming faster than any other state and twice as fast as the global average since the mid-20th century (Jay et al. 2018). Global warming has led to more frequent heatwaves in most land regions and an increase in the frequency and duration of marine heatwaves (Hoegh-Guldberg et al. 2018). Average global warming up to 1.5°C as compared to pre-industrial levels is expected to lead to regional changes in extreme temperatures, and increases in the frequency and intensity of precipitation and drought (Hoegh-Guldberg et al. 2018).

The Atlantic Ocean appears to be warming faster than all other ocean basins except perhaps the southern oceans (Cheng et al. 2017). In the western North Atlantic Ocean, surface temperatures have been unusually warm in recent years (Blunden and Arndt 2017). Since the early 1980s, the annual minimum sea ice extent (observed in September each year) in the Arctic Ocean has decreased at a rate of 11 to 16 percent per decade (Jay et al. 2018). Further, ocean acidity has increased by 26 percent since the beginning of the industrial era (IPCC 2014) and this rise has been linked to climate change. Climate change is also expected to increase the frequency of extreme weather and climate events including, but not limited to, cyclones, tropical storms, heat waves, and droughts (IPCC 2014).

7 EFFECTS OF THE ACTION

Effects of the action are defined as all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur (50 C.F.R. §402.02). A conclusion of "reasonably certain to occur" must be based on clear and substantial information, using the best scientific and commercial data available. Information supporting such a conclusion includes existing plans for the activity and the economic, administrative, and legal requirements necessary for the activity to go forward. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 C.F.R. §402.17).

The analyses in NMFS' opinion on the 2015 MSGP are considered valid for those elements of the permit that have not changed for the 2021-2026 MSGP permit term. Sections 7.4.1 through 7.4.6 of that opinion determined that discharges authorized by the 2015 MSGP were likely to adversely affect ESA-listed species and designated critical habitat through erosive waters and contribution of toxicants and sediments. Specifically Table 23 of the NMFS opinion on the 2015 MSGP identified the potential for adverse effects due to exposures to some pollutants even though they met their benchmark or effluent limitation goal requirements. In addition, adverse effects were expected due to additive and possibly synergistic toxicity of pollutant mixtures, unmonitored pollutants like PAHs, and benchmark threshold exceedances. Benchmark threshold exceedances are not considered permit violations, provided corrective measures are implemented in a timely manner. Indeed, as of December 2020, among the 300 MSGP-covered facilities that occur within catchments adjacent to waters where Atlantic and shortnose sturgeon occur, 71 reported that corrective actions were completed over the prior year.

While most NOI submitted under the 2021 MSGP are expected to be submitted by existing dischargers, an uncertain number of new dischargers are expected to apply for coverage. About half of the first-ever dischargers under the 2015 MSGP had ESA-listed species present in their action area. Because the action includes discharges from an unknown number and location of new facilities, the determinations made in this opinion apply over the entire action area of EPA's permitting authority and thus apply to newly designated critical habitats for Atlantic sturgeon, ESA-listed Caribbean corals, and ESA-listed Indo-Pacific corals as well as the species and designated critical habitats evaluated for adverse effects in the 2015 MSGP opinion, as updated Section 5.2.

7.1 Overlap of Current and Pending Permits with Species' Ranges and Designated Critical Habitat

The potential for exposure to MSGP- authorized discharges is determined by the overlap of the action area affected by EPA's permitting authority and the distribution of ESA-listed species ranges and designated critical habitat. There are 344 expired or administratively continued 2015 MSGP permits and pending MSGP permits discharging to waters where ESA-listed species and designated critical habitat occur. NMFS expects that those facilities with expired permits will reapply for coverage under the 2021 MSGP. The permits are concentrated in the northeastern states, so Atlantic and shortnose sturgeon are likely to be exposed to harmful concentrations of stormwater pollutants in fresh and marine waters (Table 8).

About 200 permits are discharging to marine waters where the Southern Resident killer whale, sea turtles, and marine fish occur. At this time, facilities with MSGP-authorized discharges do not appear to occur

near inland waters where eulachon or green sturgeon spawn. There are only three near-coastal discharges on the Pacific Northwest coast where sea turtles, bocaccio, yellow eye rockfish, eulachon, green sturgeon, or Southern Resident killer whale would be exposed. Southern Resident killer whales are not expected to be directly exposed to stormwater pollutants because whales breathe air, unlike fish, they do not have gills in direct contact with water and ambient pollutants. Cetaceans also do not drink water, they obtain water from their food. Southern Resident killer whale pollutant exposures are dietary, through accumulated pollutant in their prey source, primarily Chinook salmon. Chinook salmon are an important component of the Southern Resident killer whale diet and are listed among the PBFs of designated critical habitat. From Table 8, we see that there are 36 facilities discharging to waters affecting Chinook salmon.

Scalloped hammerhead Central & Southwest Atlantic DPS are more likely to encounter MSGP discharges than the Eastern Pacific DPS, because there are few near-coastal discharges to the Pacific Islands (n=6 permits) and off of the west coast (n=3 permits). In addition, ten permits are discharging to the coastal waters of Texas, where scalloped hammerhead Central & Southwest Atlantic DPS and ESA-listed sea turtles may be exposed to these discharges. Like Southern Resident killer whales, sea turtles breathe air. However, sea turtles do drink water, unlike cetaceans.

There are 24 near coastal MSGP facilities potentially affecting Atlantic-Caribbean corals, Nassau grouper, scallopped hammerhead sharks, and ESA-listed sea turtles. The near coastal discharges in the Pacific Islands may also affect the ESA-listed corals.

As described in Section 3.7, new facilities are expected to file for coverage under the MSGP, and more facilities may apply for coverage in areas where there are currently few permits. Because the MSGP authorizes discharges that exceed benchmark thresholds, as long as AIM are implemented in a timely fashion, and the magnitude of future exceedances are unknown, there is potential for harmful exposures to occur.

Table 8. Number of current and pending MSGP permits discharging to waters where ESA-listed species and designated critical habitat under NMFS' jurisdiction occur.

Species and Designated Critical Habitat	Number of current and pending MSGP permits
Atlantic sturgeon, All DPSs	260
Atlantic sturgeon, Chesapeake Bay DPS	32
Atlantic sturgeon, Gulf of Maine DPS	1
Atlantic sturgeon, NY Bight DPS	17
Atlantic Sturgeon, New York Bight Critical Habitat Unit 1: Connecticut River	14
Atlantic Sturgeon, Chesapeake Bay Critical Habitat Unit 2: Potomac River	28
Atlantic Sturgeon, Gulf of Maine Critical Habitat Unit 4: Piscataqua River	10
Atlantic Sturgeon, Gulf of Maine Critical Habitat Unit 5: Merrimack River	13
Shortnose sturgeon	256
Caribbean Coral and Nassau Grouper	24
Green sea turtle, North and South Atlantic DPSs	142

Species and Designated Critical Habitat	Number of current and pending MSGP permits
Kemp's ridley sea turtle	142
Leatherback sea turtle	145
Loggerhead sea turtle, Northwest Atlantic DPS	146
Bocaccio and yelloweye rockfish	3
Middle Columbia River Steelhead, Threatened*	3
Puget Sound Chinook Salmon, Threatened*	5
Puget Sound Steelhead, Threatened*	7
Snake River Basin Steelhead, Threatened*	35
Snake River Fall-run Chinook Salmon, Threatened*	18
Snake River Spring/Summer-run Chinook Salmon, Threatened*	12
Upper Columbia River Spring-run Chinook Salmon, Endangered*	1
Upper Columbia River Steelhead, Threatened*	1

* In Pacific salmonids designated critical habitat

7.2 Effects under the 2021 MSGP

The effects analysis of this opinion describes how the changes made to the MSGP for the 2021-2026 permit term are expected to affect ESA-listed species and designated critical habitat under NMFS' jurisdiction. The assessment considered effects to those species and designated critical habitat that NMFS determined were likely to be adversely affected by the discharges authorized by the 2015 MSGP and to critical habitats for ESA-listed coral and Atlantic sturgeon, that were designated since EPA issued the 2015 MSGP. These changes include aspects related to stormwater exposure (e.g., monitoring requirements, benchmark thresholds) and permit implementation (e.g., ESA Eligibility Certification, Electronic Reporting). These are handled separately, with changes related to stormwater exposure addressed in an effects analysis and changes made to permit implementation addressed in a programmatic analysis. The Integration and Synthesis (Section 9) of this opinion integrates the updates to the status of the species and environmental baseline in this opinion with the assessment of the effects of changes to the 2021 MSGP.

7.2.1 Changes Affecting Pollutant Exposures.

The following sections describe changes made for the 2021-2016 MSGP permit term that affect or inform exposures of ESA-listed species and designated critical habitat under NMFS' jurisdiction.

7.2.1.1 Graphical Example for Defining the Action Area

Under the 2015 MSGP, many facility operators did not correctly identify their action area. Often they delineated their action area as the property boundaries or extending to the first stormwater control measure without confirmation that the measure eliminated discharge of constituents to Waters of the United States. The 2021 MSGP will provide a graphical example showing that the action area is not limited to the facility property, but includes all areas affected by stormwater flowing from the site.

Conclusion: NMFS expects that this change for the 2021-2026 MSGP permit term will increase the likelihood that an operator will acknowledge discharges made to waters where ESA-listed species and designated critical habitat occur. As a result, they are more likely to certify their ESA Eligibility correctly, which may require submission of a Criterion C form for the Service's review. The Services will then be

able to advise EPA if the discharge is likely to adversely affect ESA-listed species and offer technical assistance regarding measures that can be taken to avoid or minimize adverse effects. This has the effect of minimizing harmful exposures to ESA-listed species and designated critical habitat. Given the more than 29 percent noncompliance rate among NPDES permits (see Section 1.1.1) and the allowance for benchmark threshold exceedances, provide the AIM protocol is implemented, there is a high probability that the intended effect will not be achieved over the 2021-2026 permit term.

7.2.1.2 Additional Control Measure Considerations

The 2021 MSGP added a requirement to consider structural improvements and enhanced pollution prevention measures and other mitigation measures to minimize impacts from stormwater discharges from major storm events that cause extreme flooding conditions. Storm preparedness suggestions include temporarily storing exposed materials indoors and delaying delivery of materials to be stored outside until after an anticipated extreme storm event. The need for this change is acutely evident given the extreme hurricane events occurring in 2017 and 2020, which were described in Updates to the Environmental Baseline Sections 6.2.1 and 6.3, and the associated transport of contaminants to waterbodies.

Conclusion: NMFS expects that this change for the 2021-2026 MSGP permit term will reduce the likelihood of harmful exposures of ESA-listed species and designated critical habitat to contaminants resulting from stormwater control failures during an extreme storm event.

7.2.1.3 Updated Benchmark Thresholds

For the 2021 MSGP, EPA proposed changes to benchmark monitoring for six inorganic pollutants. Section 7.3.1.1 of the 2015 opinion for the MSGP describes the remaining benchmark monitored pollutants and effluent limitations. The 2021 MSGP benchmark concentrations for aluminum, cadmium, copper, and selenium were changed and monitoring requirements for magnesium and iron were removed.

Multi-variable Models for Aluminum and Copper

Multi-variable models were developed by EPA to arrive at site-specific criteria for aluminum and copper because the toxicity of both metals is influenced by water chemistry conditions in a given waterbody. For the MSGP, EPA used these models to calculate nationally representative benchmark thresholds for aluminum and copper based on water quality data reported in the USGS National Water Information System database and collected from surface waters across the conterminous U.S. between 1984 and 2018. The threshold values were arrived at by calculating criteria for each sampling event of more than 500 water bodies sampled at least ten times and selected the criterion concentration at the tenth percentile of resulting criteria. It is not clear whether weighting was used to adjust the data to ensure that certain waterbodies, regions, or stream orders were not over or under represented among the data or whether trophic state was a factor in selection of waters. Based on this analysis, EPA derived benchmark monitoring thresholds for aluminum and copper to represent a level of protection that is estimated to be protective 90 percent of the time, at a national level, for 95 percent of the genera. As a result, the MSGP benchmark thresholds for aluminum and copper were increased.

Aluminum: For the aluminum benchmark, a multiple linear regression model was used to derive a threshold resulting from the interaction of nationally representative values for total hardness, pH, and dissolved organic carbon (DOC). The resulting aluminum threshold proposed for the 2021 MSGP is 1,100 µg/L. The aluminum benchmark threshold for the 2015 MSGP was 750 µg/L.

The implications of this change for ESA-listed species and biological components of designated critical habitat is in part determined by the likelihood of exposure to aluminum in stormwater discharges. Comparison of the locations of existing MSGP-permitted facilities with waters where ESA-listed species occur identifies 16 permits required to monitor for aluminum for stormwater discharges to catchments adjacent to freshwaters used by Atlantic and shortnose sturgeon, and five within watersheds where Snake River Basin Steelhead, Snake River Fall-run Chinook Salmon, Snake River Spring/Summer-run Chinook Salmon, Puget Sound Chinook Salmon, and Middle Columbia River Steelhead may be exposed to harmful concentrations of aluminum in stormwater discharges.

Copper: For the copper benchmark, a metal bioavailability model called the Biotic Ligand Model was used to derive a threshold from the interaction of nationally representative values for temperature, pH, DOC, calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity. The resulting copper threshold proposed for the 2021 MSGP is 5.19 µg/L. The copper benchmark threshold for the 2015 MSGP was hardness-based and ranged from 3.8 to 33.2 µg/L.

The implications of this change for ESA-listed species and biological components of designated critical habitat is determined by the likelihood of exposure and the probability of adverse effects upon exposure at the benchmark threshold. Comparison of the locations of existing MSGP-permitted facilities with waters where ESA-listed species occur identified 12 permits required to monitor for copper for stormwater discharges within catchments adjacent to freshwaters containing Atlantic and shortnose sturgeon, and ten within watersheds where Snake River Basin Steelhead, Snake River Fall-run Chinook Salmon, and Snake River Spring/Summer-run Chinook Salmon may be exposed to harmful concentrations of aluminum in stormwater discharges.

Operator-Derived Aluminum and Copper Values: For the 2021 MSGP, EPA will allow an exception to applying the nationally representative benchmark thresholds for aluminum and copper in cases when stormwater discharges of these constituents at certain facilities may pose less of a concern. To be eligible for the exception, EPA will require the operator to demonstrate that, while their discharge will exceed the nationally representative thresholds, it would not exceed a site-specific threshold calculated using the same multi-variable models as the national benchmark using site-specific water quality data adequately representing the spatial and temporal variability of the site.

Conclusion on Multi-Variable Models: NMFS expects raising the aluminum and copper benchmark thresholds, or applying operator derived site-specific thresholds for the 2021-2016 permit term will result in AIM not being triggered until higher concentrations of these metals are identified in monitored discharges. NMFS' opinion on the 2015 MSGP concluded that benchmark thresholds applied over the 2015-2020 permit term for these specific metals were expected to result in adverse effects to ESA-listed species. Further analysis of the revised benchmark thresholds here would not change that conclusion. The increased freshwater benchmark thresholds for copper and aluminum in the 2021 MSGP increases the probability that exposures to ESA-listed anadromous fish species (i.e., eulachon, sturgeon, salmon and steelhead) and designated critical habitat under NMFS' jurisdiction will occur at harmful levels.

Cadmium

Section 3.6.1.2 of this opinion describes the updated cadmium benchmark threshold for the 2021 MSGP. The effect of reducing the cadmium benchmark threshold is that AIM would be triggered at lower concentrations in monitored discharges than under the 2015 MSGP.

Conclusion on Cadmium: NMFS expects that lowering the cadmium benchmark threshold for the 2021-2026 MSGP relative to the threshold applied in the 2015 MSGP would still result in harmful exposures because benchmark threshold exceedances are authorized under the 2021 MSGP, provided AIM are implemented, and the magnitudes of future exceedances are unknown. This change to the 2021 MSGP increases the probability that AIM would be implemented to minimize cadmium exposures, but does not eliminate the potential for exposures of ESA-listed species or designated critical habitat under NMFS' jurisdiction to harmful concentrations of cadmium, or cadmium in mixtures.

Selenium

In 2016, EPA updated its criteria for selenium. For acute criteria, EPA developed an intermittent exposure equation requiring several site-specific input factors. The chronic criteria for still waters is now 1.5 µg/L and 3.1 µg/L for flowing waters. The 2015 MSGP freshwater selenium benchmark was 5 ug/L. For the 2021 MSGP, EPA will use benchmark threshold values of 1.5 µg/L for still waters and 3.1 µg/L for flowing waters.

The effect of reducing selenium benchmark thresholds is that AIM would be triggered at lower concentrations in monitored discharges than under the 2015 MSGP.

Conclusion on Selenium: NMFS expects that lowering the selenium benchmark threshold for the 2021-2026 MSGP relative to the threshold applied in the 2015 MSGP would still result in harmful exposures because benchmark threshold exceedances are authorized under the 2021 MSGP, provided AIM are implemented, and the magnitudes of future exceedances are unknown. This change to the 2021 MSGP increases the probability that AIM would be implemented to minimize selenium exposures, but does not eliminate the potential for exposures of ESA-listed species or designated critical habitat under NMFS' jurisdiction to harmful concentrations of selenium, or selenium in mixtures.

Magnesium and Iron

Section 3.6.1.4 of this opinion describes the deletion of magnesium and iron benchmark threshold monitoring requirements.

Conclusion on Magnesium and Iron: The available evidence indicates exposures to magnesium and iron in stormwater are not likely to cause adverse effects. This change to the 2021 MSGP is not expected to influence the likelihood of exposures of ESA-listed species or designated critical habitat under NMFS' jurisdiction to harmful levels of pollutants. This change is not likely to adversely affect ESA-listed species or designated critical habitat.

7.2.1.4 Sectors with New Monitoring Requirements

Section 3.5.3 of this opinion describes the sectors that have new monitoring requirements under the 2021 MSGP. There are at least 78 permits discharging to waters where ESA-listed species under NMFS' jurisdiction occur that will be performing this additional monitoring. Two discharge to coastal waters of Puerto Rico where corals, sea turtles, and Nassau Grouper may be exposed. Thirteen permits discharge to waters designated as critical habitat for the Atlantic surgeon, and 73 discharge to waters where shortnose and Atlantic sturgeon occur. Three permits discharge to waters affecting Puget Sound steelhead. There are

45 dischargers to marine waters where the North Atlantic DPS of the green sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, and the Northwest Atlantic DPS of the loggerhead sea turtle occur.

Conclusion: NMFS expects that adding new monitoring requirements for the 2021-2026 MSGP would still result in harmful exposures because benchmark threshold exceedances are authorized under the 2021 MSGP, provided AIM are implemented, and the magnitudes of future exceedances are unknown. This change to the 2021 MSGP increases the probability that AIM would be implemented to minimize exposures to pollutants discharged by facilities belonging to these sectors, but does not eliminate the potential for exposures of ESA-listed species or designated critical habitat under NMFS' jurisdiction to harmful concentrations of pollutants.

7.2.1.5 Composite Sampling

The 2015 MSGP required that monitoring samples be collected as a grab sample within the first 30 minutes of a measurable storm event. The 2021 MSGP allows flow or time-weighted composite sampling that must be initiated within the first 30 minutes of the storm event. In the case of snowmelt, samples must be taken during a period with a measurable discharge. However, composite sampling may not be used to measure parameters that have a short holding time for processing or that degrade or transform quickly such as pH, temperature, oil and grease, and chromium.

Allowing composite sampling reduces the probability that AIM would be implemented because composite samples would have lower pollutant concentrations than grab samples collected over the first 30 minutes of a storm event, as required under the 2015 MSGP. Weighted sampling provides a more representative indication of pollutant load over the storm event, but does not account for the toxic effect of that first pulse. Paired sets of 30-minute and 3-hour samples from the National Stormwater Quality Database illustrated that first 30-minute flush sample concentrations were about 2.5 times greater than the composite sample concentrations for commercial and institutional land-use categories (Maestre et al. 2004).

Conclusion: NMFS expects that the option to conduct composite sampling over the 2021-2026 MSGP permit term would be less likely to trigger AIM, increasing the potential for exposures of ESA-listed species or designated critical habitat under NMFS' jurisdiction to harmful concentrations of pollutants during the initial stormwater discharge.

7.2.1.6 Intermittent Benchmark Monitoring

The EPA will require benchmark monitoring throughout the 2021 permit term starting with required monitoring for the first four quarters, followed by eight quarters without benchmark monitoring, provided no benchmark thresholds have been exceeded. EPA will require benchmark monitoring to resume for another four quarters, after which monitoring can be discontinued for eight quarters if no exceedance occurs, and so on. The MSGP permits are issued over five year intervals. This provision in the permit may allow roll over of monitoring requirements between permit terms, provided the monitoring requirements (i.e, constituents, benchmark monitoring thresholds) remain the same in the next permit term. This differs from the 2015 MSGP, which required monitoring for the first four quarters and only required additional monitoring beyond four quarters if benchmark exceedances were observed. The effect of monitoring in the first and fourth year of permit coverage increases the probability that AIM will be implemented if stormwater control measures are not maintained throughout the 2021-2026 MSGP permit term.

Conclusion: NMFS expects that adding monitoring requirements in the fourth year of the 2021-2026 permit term will minimize the potential for exposures of ESA-listed species or designated critical habitat under NMFS' jurisdiction to harmful concentrations of pollutants because AIM will be triggered in cases where the effectiveness of stormwater control measures has declined over the permit term. This does not eliminate the potential for exposures of ESA-listed species or designated critical habitat under NMFS' jurisdiction to harmful concentrations of pollutants because benchmark threshold exceedances are authorized under the 2021 MSGP, provided AIM are implemented, and the magnitudes of future exceedances are unknown.

7.2.1.7 Monitoring Discharges to Impaired Waters

EPA will require operators discharging to impaired waters monitor for all pollutants that are causing impairments for one year, as in the 2015 MSGP. Under the 2021 MSGP, if the monitored pollutant is not detected in the discharge, or it is detected but it has been determined that its presence is caused solely by natural background sources, operators may discontinue monitoring for that pollutant for two years, after which EPA intends that monitoring will resume for only for those pollutants that are both causing impairments and associated with the industrial activity and/or benchmarks for another year.

The effect of monitoring for pollutants contributing to aquatic impairments increases the probability that AIM will be implemented if pollutants causing an aquatic impairment are detected in the stormwater discharge.

Conclusion: NMFS expects that adding this monitoring requirement in the 2021-2026 permit term will minimize the potential for exposures of ESA-listed species or designated critical habitat under NMFS' jurisdiction to harmful concentrations of pollutants because AIM will be triggered in cases where the discharge is contributing to an aquatic impairment, irrespective of benchmark threshold exceedances.

7.2.1.8 Summary and Conclusion for Changes Affecting or Informing Pollutant Exposures

For the most part, the changes made for the 2021-2026 MSGP permit term increase the probability that AIM will be implemented to minimize exposures of ESA-listed species and designated critical habitat to harmful concentrations of pollutants. With the exception of revised freshwater benchmarks for copper and aluminum, the increased monitoring requirements under the 2021 MSGP make the permit more protective over the 2021-2026 permit term.

Nevertheless, the 2021 MSGP retains benchmark threshold values for pollutants at concentrations greater than those resulting in toxic effects (i.e. ammonia, fluoride, nickel and zinc) to ESA-listed species and increases benchmark threshold values for aluminum and copper. The original 2015 MSGP benchmark thresholds for these two pollutants were identified as problematic in NMFS' opinion on the 2015 MSGP. Finally, as in the 2015 MSGP, exceedances of benchmark thresholds are authorized over the 2021-2026 permit term provided that corrective measures (termed AIM for the 2021 MSGP) are implemented in a timely manner.

Taken together, the conclusions made with respect to pollutant exposures in NMFS' opinion on the 2015 MSGP are still valid for the revised 2021 MSGP. Sections 7.4.1 through 7.4.6 of the 2015 opinion discuss the effects of exposures to MSGP discharges at effluent limit guideline or benchmark thresholds on ESA-listed species and designated critical habitat and concludes that MSGP-authorized discharges are likely to adversely affect ESA-listed species and designated critical habitat under NMFS' jurisdiction.

7.2.2 Aggregate Impacts

This opinion must also consider the aggregate effects of MSGP authorized discharges to determine whether, taken together, these present industrial stormwater "hot spots" affecting watersheds where species and designated critical habitat under NMFS' jurisdiction occur. Aggregate impacts include: (1) time-crowded perturbations (i.e., repeated occurrence of one type of impact in the same area) or perturbations that are so close in time that the effects of one perturbation do not dissipate before a subsequent perturbation occurs; (2) space-crowded perturbations (i.e., a concentration of a number of different impacts in the same area) or perturbations that are so close in space that their effects overlap; (3) interactions or perturbations that have qualitatively and quantitatively different consequences for the ecosystems, ecological communities, populations, or individuals exposed to them because of synergism (when stressors produce fundamentally different effects in combination than they do individually), additivity, magnification (when a combination of stressors have effects that are more than additive), or antagonism (i.e., when two or more stressors have less effect in combination than they do individually); and (4) nibbling (i.e., the gradual disturbance and loss of land and habitat) or incremental and decremental effects are often, but not always, involved in each of the preceding three categories (NRC 1986). Stormwater and snowmelt discharges are, by nature, time-crowded, and concurrent discharges within a watershed shared by MSGP facilities. These discharges are mixtures of pollutants, not all of which are monitored under the MSGP, but should be minimized by the sector pollutant control measures required by the MSGP. Further, these discharges may physically disturb aquatic systems through introduction of warmer water and, due to erosivity, redistributing bedded sediments and increasing turbidity. Stormwater events are episodic, with variable intensity and frequency that cannot be predicted at the resolution of stormwater events; however, general expectations may be possible based on seasonal predictions for rain events. Snowmelt events can be more tractable and could be modeled on a location-by-location basis using information on snowpack mass and expected thaw rates. However, under climate change, temperature swings can be dramatic, decreasing the predictability of snowmelt. The only fixed aggregate effects information that can be assessed at a national scale is the density of existing permits.

NMFS' opinion on the 2015 MSGP illustrated the density of facilities discharging to waters where ESA-listed species and designated critical habitat are present. It is reasonable to expect that MSGP-permitted facilities under the 2021-2026 permit term will continue to be concentrated in the areas of industrial activity where other MSGP-permitted facilities are located. Over the 2015-2020 permit term, the largest number of dischargers filing first-ever NOI for MSGP coverage in areas potentially affecting ESA-listed resources under NMFS' jurisdiction were discharges from urbanized areas of Massachusetts (n=170), followed by New Hampshire (n=82), Puerto Rico (n=80), and urbanized areas of Idaho (n=73 – inaccessible to ESA-listed salmonids). Note that, when considering potential effects to threatened and endangered species and their designated critical habitat, NMFS regional biologists reviewing a *Criterion C Eligibility Form* or conducting MSGP-related technical assistance or consultation will consider the individual discharge source in the context of all stressor sources present within a watershed, not simply the pollutant load from the facility, or the facility and neighboring MSGP-permitted sources.

7.2.3 Changes Affecting Permit Implementation

NMFS' opinion on the 2015 MSGP concluded that successful implementation of the ESA Eligibility Criterion Procedure, taken with the inspections, stormwater controls, monitoring, and corrective actions required by the 2015 MSGP, were key to minimizing risk to ESA-listed species and designated critical

habitat. Changes were made to three elements related to the implementation of the MSGP over the 2021-2026 permit term.

NMFS' opinion on the 2015 MSGP evaluated the permit using seven elements. We review these here to place the changes to the MSGP proposed for the 2021-2026 permit term in context.

7.2.3.1 Scope

The first element evaluates whether the general permit has been structured to reliably estimate the probable number, location and timing of the discharges that would be authorized by the program. While EPA has not made changes affecting the permit scope, expectations for future submissions are informed by the 2015-2020 MSGP permit term. The EPA estimated that the 2015 MSGP would reauthorize discharges from approximately 2,365 existing facilities and that an average of approximately 52 additional facilities will seek coverage under the MSGP each year, totaling approximately 250 new facilities over the 5-year lifetime of the 2021 MSGP. Information summarized in Section 3.7 of this opinion indicates that EPA reported roughly twice as many additional facility operators submitted their first time ever NOI for coverage under the 2015 MSGP. Based on NOI submitted over the 2015 MSGP permit term, the bulk of the NOI submitted for the 2021-2026 MSGP permit term are expected to be from existing permit holders, it is reasonable to expect a similar number of first ever NOI submissions for coverage over the upcoming permit term. This would result in about 3,000 facilities with MSGP coverage over the 2021-2026 permit term.

7.2.3.2 Stressors

The second element evaluates whether the general permit has been structured to reliably estimate the physical, chemical, or biotic stressors that are likely to be produced as a direct or indirect result of the discharges that would be authorized (that is, the stressors produced by the actual discharges to Waters of the United States). The MSGP requires discharge monitoring for those pollutants determined by EPA, based upon discharge data and other information submitted to EPA by covered facilities, to be of potential concern in stormwater discharges on a sector-by-sector basis. Based on recommendations from an EPA-funded National Research Council review, EPA has added additional monitoring requirements for three sectors (see Section 7.2.1.4 of this opinion).

In order increase its understanding of unregulated stressors resulting from MSGP-authorized discharges, EPA also added additional "report-only" monitoring requirements that will help them identify the presence of and need to regulate pollutants in stormwater from certain sectors. While report-only monitoring addresses pollutants in stormwater discharges, it is reviewed as a permit implementation change because this monitoring produces non-actionable data and could not be addressed in Section 7.2.1, *Changes Affecting Pollutant Exposures.*

Report-only indicator monitoring of TSS, pH, and COD is required of subsectors that did not have benchmark monitoring requirements under the 2015 MSGP and reported little if any numeric data on their discharge quality or performance of their control measures (Table 2). TSS, pH, and COD are indicators for sediment (TSS), reducing and oxidizing pollutants (pH), and organic pollutants (COD).

Report-only biannual (i.e. twice per year) indicator monitoring for priority pollutant PAHs is required in the first and fourth year of permit coverage for certain higher risk sectors that conduct activities likely to have petroleum hydrocarbon exposure (Table 3). The specific PAHs to be analyzed for are: naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene,

benzo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, benzo[g,h,i]perylene, indeno[1,2,3-c,d]pyrene, and dibenz[a,h]anthracene.

The EPA intends to use indicator monitoring data to establish a comparable understanding across sectors of industrial stormwater discharge quality, potential water quality problems, and stormwater control effectiveness. The operator is expected to evaluate and compare the indicator monitoring data over time to see where values may fluctuate and why, and review and revise the SWPPP and sediment control measures for their facility as appropriate. Indicator monitoring data collected and analyzed under the 2021 MSGP will also allow EPA to evaluate whether sector/subsector-specific benchmarks are warranted in a future proposed permit.

7.2.3.3 Overlap and Responses of Listed Resources

Two of the elements are related to evaluations addressed through the ESA Eligibility Certification process, which, on an NOI by NOI basis, integrates the Service's expertise to identify whether or to what degree specific endangered or threatened species or designated critical habitat are likely to be exposed to potentially harmful impacts that the proposed permit would authorize while taking into consideration:

- Status and trends of endangered or threatened species or designated critical habitat;
- Demographic and ecological status of populations and individuals of those species given their exposure to pre-existing stressors in different drainages and watersheds;
- Direct and indirect pathways by which endangered or threatened species or designated critical habitat might be exposed to the discharges to Waters of the United States; and
- Physical, physiological, behavioral, sociobiological, and ecological consequences of exposing endangered or threatened species or designated critical habitat to stressors from discharges at concentrations, intensities, durations, or frequencies that could produce physical, physiological, behavioral, or ecological responses, given their pre-existing demographic and ecological condition.

Changes to the ESA Eligibility Certification process for the 2021-2026 permit term are intended to increase the probability that an operator makes a valid certification on the NOI, thus allowing the Services to evaluate potential responses of listed resources to discharges where needed. Incorrect certifications were common among the NOI submitted under the 2015 MSGP. For ESA-listed species under NMFS' jurisdiction, as many as 84 NOI were incorrectly certified as "Criterion A, no species present" and many other certifications addressed only species under jurisdiction of the USFWS.

EPA was concerned that operators seeking coverage under the 2015 MSGP were certifying their ESA eligibility criteria incorrectly because they were relying on descriptions of the criteria in the permit itself without following the instructions in *Appendix E: Procedures Relating to Endangered Species Protection*. The 2021 MSGP now refers facility operators directly to Appendix E to make sure they follow those instructions.

EPA has also incorporated a smartform approach to its NOI submission system that guides facility operators through NOI submission and ESA Eligibility Certification process, making sure that species under NMFS' jurisdiction are considered. The NOI form also provides an open-text field for the facility operator to provide a brief summary of the basis for their criterion selection (e.g., identify source of certification guidance, reference documentation). Editorial clarifications and substantive changes were

also made to the certification criteria. Clarifying edits were made to ESA certification criteria A, B, and E.

Criterion C, in which the operator provides information supporting a determination that their discharge is NLAA, was expanded to accommodate NOI submissions from operators that certified under Criterion C during the prior permit term. One Criterion C scenario applies to cases where no changes have been made to the action area and no additional ESA-listed species or designated critical habitat occurs within the action area. The other scenario is for an existing Criterion C certification where there have been changes to the action area and/or additional ESA-listed species or designated critical habitat now occur within the action area since certifying under the 2015 MSGP. The Criterion C Evaluation Form itself was updated to include consideration of the fact that "stormwater discharges may adversely affect the immediate vicinity of the discharge point through streambank erosion and scour" under Hydrological Effects. The description of Toxicity of Pollutants was extended to include "exposures to multiple stressors at the same time." The smartform approach integrates the *Protocol for EPA's Completeness Review of Criterion C Eligibility Forms* such that the information provided must be complete or the application process will not proceed (see Section 2.10.3 of NMFS' opinion on the 2015 MSGP). Finally, the Criterion C Eligibility Form adds: "I comply with the applicable monitoring requirements and have not had any exceedances" to the certification statement.

Criterion D, in which ESA Section 7 consultation has successfully concluded, was changed to exclude discharges associated with consultations resulting in jeopardy and/or destruction or adverse modification of critical habitat determinations from coverage under the 2012 MSGP.

7.2.3.4 Monitoring/Feedback

The monitoring and feedback element evaluates whether the general permit has been structured to identify, collect, and analyze information about authorized actions that may have exposed endangered or threatened species or designated critical habitat to stressors at concentrations, intensities, durations, or frequencies that are known or suspected to produce physical, physiological, behavioral, or ecological responses that have potential individual or cumulative adverse consequences for individual organisms or physical or biological features of designated critical habitat.

The monitoring and reporting requirements added for the 2021-2026 MSGP permit term (see Sections 7.2.1.4 and 7.2.1.6 of this opinion) enhance elements of the permit that are key to EPAs ability to avoid jeopardizing listed species or destroying or adversely modifying designated critical habitat. Existing monitoring and feedback elements from the 2015 MSGP were reviewed in Section 7.5.4 of NMFS' opinion on the 2015 MSGP.

The RPMs from the prior consultation required EPA to provide annual reports regarding permit performance to NMFS that allowed analysis of authorized actions that may have exposed endangered or threatened species or designated critical habitat to stressors at concentrations, intensities, durations, or frequencies that are known or suspected to produce physical, physiological, behavioral, or ecological responses that have potential individual or cumulative adverse consequences for individual organisms or physical or biological features of designated critical habitat.

7.2.3.5 Compliance

The compliance element evaluates whether the general permit has mechanisms to reliably determine whether or to what degree operators have complied with the conditions, restrictions or mitigation

measures the proposed permit requires when they discharge to Waters of the United States. The first step to achieve compliance under the 2021 MSGP is submission of complete and valid NOI. The electronic reporting system for the 2021 MSGP integrates the ESA Eligibility Certification instructions from Appendix E and the Criterion C certification form through a series of "smart" questions. Each question prompt is based on the response to the previous question guiding the operator toward a valid certification. The operator is also required to affirm completion of certain required steps (e.g., consulting both NMFS and USFWS species' information) before being able to proceed further in the form. Finally, operators would be required to attach certain documents, or provide information depending on their selection.

The EPA ECHO database is a centralized database that integrates compliance and enforcement data for permits issued under the Clean Air Act, the Clean Water Act, and the Resource Conservation and Recovery Act. The MSGP permitted operators are required to submit discharge monitoring reports, annual reports, and other required information, including quarterly visual assessment and corrective action summaries electronically through ECHO. The database also tracks compliance with requirements to submit discharge monitoring reports and identifies the number of quarters in noncompliance, including effluent violations, over the three prior years. At the time of this writing, EPA-issued MSGP stormwater permits include 626 facilities with significant violations (specifically, failure to submit discharge monitoring reports), 40 facilities with effluent violations over the past three years, 32 facilities with formal enforcement actions, and ten facilities with informal enforcement actions.

In addition to the transparent compliance and enforcement tracking afforded by the ECHO database, the 2021 MSGP adds requirements for acknowledging enforcement actions and installing signage on facility property. Operators that were not previously covered under the 2015 MSGP are required to indicate on their NOI whether their facility has a pending enforcement action related to stormwater by EPA, a state, or a citizen. Operators are also now required to post their site with a readable and accessible sign indicating that stormwater discharges from the site are covered under the MSGP, the NPDES number, contact information, information on obtaining the SWPPP, and the following statement: *"If you observe indicators of stormwater pollutants in the discharge or in the receiving waterbody, contact the EPA through the following website: https://echo.epa.gov/report-environmental-violations."*

7.2.3.6 Adequacy of Controls

The final element evaluates whether the general permit has a mechanism to change the action to prevent or minimize endangered or threatened species or designated critical habitat from being exposed to stressors from discharges at concentration, durations or frequencies that have adverse effects to individual listed organisms, populations, or species, or PBFs of designated critical habitat. NMFS' opinion on the 2015 MSGP evaluated the corrective action triggers built into the permit. These are now the phased AIM protocol described in Section 3.6.5 of this opinion. Under this protocol, corrective measures are prescribed to minimize pollutant discharges that are proportional to the severity and frequency of benchmark threshold exceedances. As a result, the AIM protocol is expected to prevent or minimize endangered or threatened species or designated critical habitat from being exposed to stressors from discharges at concentrations, durations or frequencies that have adverse effects to individual listed organisms, populations or species or PBFs of designated critical habitat.

7.2.3.7 Summary and Conclusion for Changes Affecting Implementation

Using information from the 2015-2020 permit term, EPA is better able to gauge the scope of the MSGP-regulated community for the 2021-2026 permit term. Implementation of the MSGP over the 2021-2026

permit term will gather additional information on stressors through increased monitoring requirements for sectors I, P, and R, additional monitoring during the fourth year of permit coverage, report-only monitoring of PAHs, and report-only monitoring of pollutant indicators: TSS, pH, and COD. Changes made to the NOI submission forms and ESA Eligibility Criteria for the 2021-2026 MSGP permit term are expected to increase the probability that complete and accurate NOI, with valid ESA Eligibility Certifications will be submitted. This will ensure that the Services expertise' will be applied where needed (i.e., Overlap) to minimize pollutant exposures of ESA-listed species and designated critical habitat (i.e., Response of Listed Resources). The changes for the 2021-2026 permit term are also expected to increase compliance and foster accountability among facility operators through the required signage and acknowledgment of existing enforcement actions, with new dischargers required to report whether their facility has a pending enforcement action related to stormwater. Finally, with respect to adequacy of controls, as a systematic and prescriptive approach to identifying and implementing the necessary corrective measures, the AIM protocol provides the regulated community with greater regulatory certainty. Improved regulatory certainty is expected to foster more constructive relationships with regulators and stakeholders.

NMFS concludes that changes made for the 2021-2026 MSGP permit term will provide greater protection of ESA-listed species and designated critical habitat under NMFS' jurisdiction through improved identification of discharges that may expose ESA-listed species and designated critical habitat under NMFS' jurisdiction to harmful concentrations of pollutants in stormwater and a systematic response protocol that should minimize subsequent exposures.

8 CUMULATIVE EFFECTS

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 C.F.R. §402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

The future intensity of specific non-Federal activities in the action area is molded by difficult-to-predict future economy, funding levels for restoration activities, and individual investment decisions. In addition, the need to for communities to adapt to climate change and recover from severe climatic events will influence how wetlands, inland surface waters, and coastal areas are managed. Due to their additive and long-lasting nature, the adverse effects of non-Federal activities that are stimulated by general resource demands, and driven by changes in human population density and standards of living, are likely to compound in the future. Specific human activities that may contribute to declines in the abundance, range, and habitats of ESA-listed species in the action area include the following: urban and suburban development; shipping; infrastructure development; water withdrawals and diversion; recreation, including off-road vehicles and boating; expansion of agricultural and grazing activities, including alteration or clearing of native habitats for domestic animals or crops; and introduction of non-native species which can alter native habitats, out-compete or prey upon native species.

Activities that degrade water quality will continue into the future. These include conversion of natural lands, land use changes from low impact to high impact activities, water withdrawals, effluent discharges, the progression of climate change, the introduction of nonnative invasive species, and the introduction of contaminants and pesticides. While some of the stressors associated with non-federal activities that degrade water quality will be directly accounted for in section 7 consultations between NMFS and EPA, some may be accounted for only indirectly, while others may not be accounted for at all. In particular, many non-point sources of pollution, which are not subject to Clean Water Act NPDES permit and regulatory requirements, have proven difficult for states to monitor and regulate. Non-point source pollution has been linked to loss of aquatic species' diversity and abundance, fish kills, seagrass bed declines, and toxic algal blooms (Gittings 2013). Non-point sources of pollution are expected to increase as the human population continues to grow. Given the challenges of monitoring and controlling non-point source pollution and accounting for all the potential stressors and effects on listed species, chronic stormwater discharges will continue to result in aggregate impacts.

8.1 Climate Change

Climate change is discussed in both the environmental baseline section of this opinion and in the cumulative effects because it is a current and ongoing circumstance that, for the most part, is not subject to consultation, yet influences environmental quality and the effects of the action, currently and in the future. Infrastructure resilience projects and implementation of new technologies are subject to consultation if they are federally constructed, permitted, or funded. NMFS' policy guidance with respect to climate change when evaluating an agency's action is to project climate effects over the timeframe of the action's consequences. It will usually be the case that consideration is not limited to only the duration of the specified activity, but also to its continuing effects for the foreseeable future. For example, where a construction activity is the subject of consultation, we must consider not only the effects caused from the construction itself, but also the effects of the resulting structure once completed. Similarly, in the case of consultations on permits or other authorizations that are likely to be renewed, it can be appropriate to

analyze the project over some period of time beyond the initial authorization period to the fullest extent possible (based on the information available and the ability to predict impacts with an acceptable degree of accuracy).

Given the challenges of monitoring and controlling non-point source pollution and accounting for all the potential stressors and effects on ESA-listed species, chronic stormwater discharges from all sources will continue to result in aggregate impacts. As climate change proceeds, precipitation rates will change (Figure 7), and the frequency of heavy rainfall events, where stormwater control upsets are more likely, is expected to increase nationwide (Figure 8). Interaction of climate change effects on precipitation with the aggregate of the built environment resulting from construction activities will require NMFS to apply sustained attention to aggregate effects.

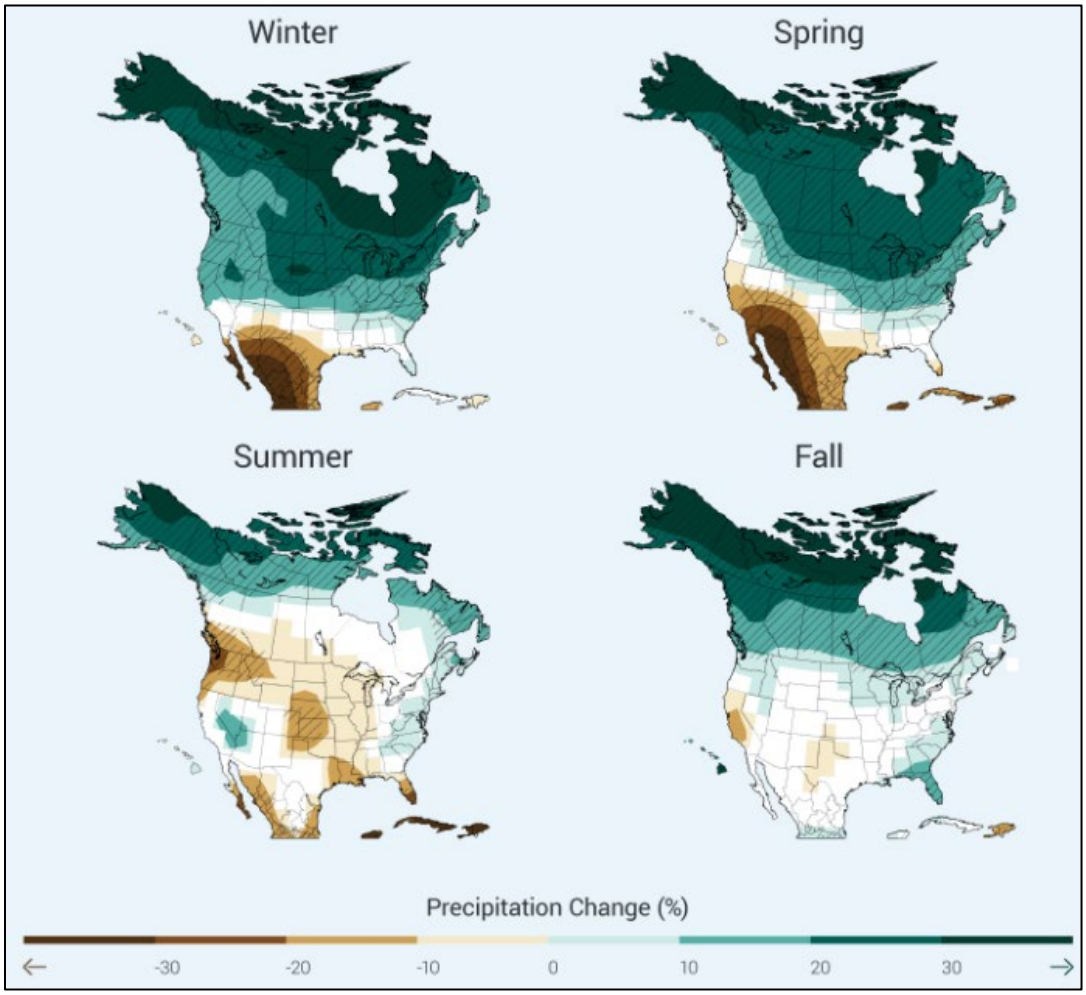


Figure 7. Seasonal precipitation change for 2071-2099 (compared to 1970-1999).[11]

[11] Assumes existing emissions rate increases. Hatched areas are projected changes that are significant and consistent among models, unhatched areas indicate projected changes do not differ from natural variability. (Figure source: NOAA NCDC / CICS-NC). http://nca2014.globalchange.gov/report/our-changing-climate/precipitation-change

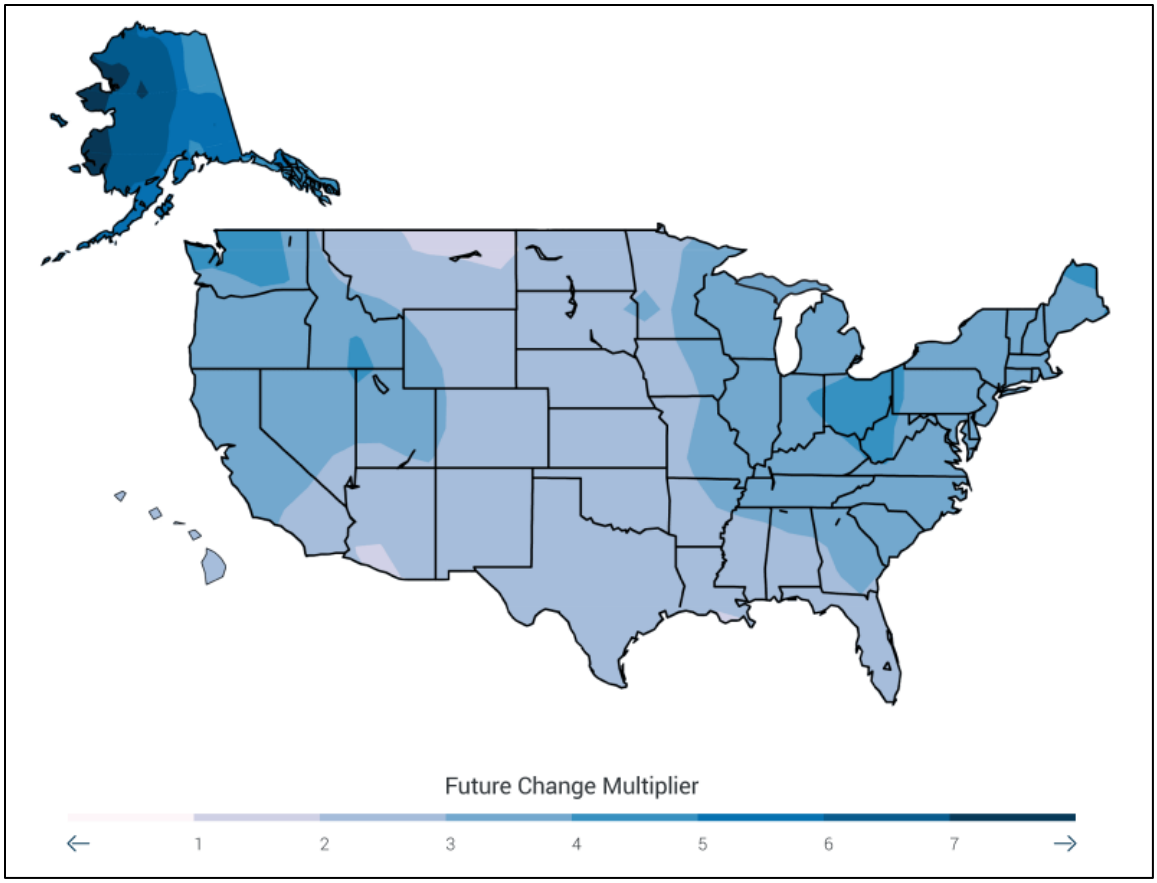


Figure 8. Increase in frequency of extreme daily precipitation events for 2081-2100 (compared to 1981-2000).[12]

[12] http://nca2014.globalchange.gov/report/our-changing-climate/precipitation-change

9 INTEGRATION AND SYNTHESIS OF EFFECTS

The *Integration and Synthesis* section is the final step in our assessment of the risk posed to species and critical habitat because of implementing the action. In this section, we consider the prior analyses and baseline conditions in NMFS' opinion on the 2015 MSGP with the *Effects of the Action* (Section 7) analysis in this opinion evaluating changes made for the 2021-2026 MSGP permit term, updates to the environmental baseline (Section 6 of this opinion), and anticipated cumulative effects (Section 8 of this opinion) to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) reduce appreciably the likelihood of both the survival and recovery of a ESA-listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the *Status of the Species and Critical Habitat* (section 5.1 of NMFS' opinion on the 2015 MSGP updated in Section 5.2 of this opinion).

EPA proposes to reissue the MSGP for stormwater discharges associated with industrial activity over the permit period from 2021 to 2026. As determined by NMFS' opinion on the 2015 MSGP and the update to that effects analysis in Section 7 of this opinion, discharges to be authorized under the MSGP for the 2021-2026 permit term are also likely to adversely affect the same ESA-listed species and designated critical habitats as well as newly designated critical habitat for Atlantic sturgeon, and proposed critical habitat for ESA-listed Caribbean corals and ESA-listed Indo-Pacific corals. Under an EPA general permit, the adverse effects and measures to minimize adverse effects of specific NOIs are addressed where necessary through technical assistance from the Services.

The Permit Implementation Analysis assesses whether, and to what degree, EPA structured its permit to establish processes that addresses adverse effects to ESA-listed species, and ensures that authorized discharges are not likely to jeopardize the continued existence of endangered or threatened species or destroy or adversely modify designated critical habitat. We addressed this in NMFS' opinion on the 2015 permit and updated that assessment in Section 7.3 of this opinion.

Scope: NMFS concluded in 2015 that EPA was aware of the number and locations of existing facilities with MSGP permits and provided this information to NMFS. EPA also assessed the performance of its 2008 permit and made adjustments based on this assessment for the 2015 MSGP. The estimate provided by EPA for the 2015 MSGP was actually about half that of the number of NOI EPA reports that were submitted over the 2015-2020 permit term. EPA is aware of the scope of their action and that about half of new dischargers are likely to have ESA concerns, and has used its existing permitting information to adjust its estimate of the probable number of new discharges that it would authorize over the 2021-2026 permit term. Thus EPA will be mindful of how many new dischargers will certify their ESA Eligibility for the first time and require closer review.

Stressors: NMFS concluded in 2015 that EPA identified the physical, chemical or biotic stressors that were likely to be produced as a result of the discharges that would be authorized by the MSGP using data supplied by industry sources in the early years of industrial stormwater permitting. We also concluded that, through improved reporting tools, EPA would know or be able to reliably estimate whether those discharges occurred in concentrations, frequencies, or for durations that violated the terms of the MSGP. The EPA has increased monitoring requirements and the frequency of monitoring for the 2021-2026 permit term. The information collected will not only provide EPA with a better grasp of the discharges it is authorizing, but inclusion of additional monitoring parameters will inform changes in monitoring

requirements in future iterations of the MSGP. In addition, EPA continually upgrades the capabilities of its Water Pollutant Loading Tool that tracks discharge monitoring reports, thereby enhancing EPA's ability to know or be able to reliably estimate whether those discharges have occurred in concentrations, frequencies, or for durations that violate the terms of the MSGP. Thus discharges that may result in harmful exposures to ESA-listed resources are more likely to be addressed.

Overlap and Responses of ESA-listed Resources: NMFS concluded in 2015 that EPA would be able to reliably estimate whether and to what degree ESA-listed species and designated critical habitat were likely to be exposed to potentially harmful impacts of discharges authorized by the permit by virtue of the exposure assessments that were performed in the context of consultations associated with Eligibility Criteria B, D or E, or successful implementation of the *Criterion C Eligibility Form* procedure. In 2015, NMFS also concluded that, given successful implementation of the electronic reporting system and permittee compliance with the requirement to submit discharge monitoring reports, annual reports and other permit documentation electronically, EPA had a mechanism to identify, collect, and analyze information about its authorized discharges that may expose ESA-listed species and designated critical habitat to harmful stressors.

Problems with the ability of facility operators to make valid certifications were evident over the 2015-2020 permit term. Facility operators made errors in delineating their action area and apparently did not follow instructions for identifying the presence of ESA-listed resources. For the 2021-2026 permit term, EPA has updated its instructions for identifying the action area with illustrations showing how and why a facility's action area extends beyond the facility footprint. EPA has also made it easier for facility operators to make valid ESA Eligibility Certifications by refining the language and integrating the required information into a guided NOI process that requires the facility operator to verify that they are using the correct information sources. The EPA's electronic reporting systems have functioned and continue to function to allow EPA to identify, collect, and analyze information about its authorized discharges that may expose ESA-listed species and designated critical habitat to harmful stressors.

Monitoring/Feedback: NMFS concluded in 2015 that the MSGP Eligibility Criteria selection procedure developed by EPA in consultation with NMFS satisfied the requirement for EPA to identify effects to ESA-listed species and designated critical habitat when implementing its MSGP. The monitoring and reporting requirements added for the 2021-2026 MSGP permit term (see Sections 7.2.1.4 and 7.2.1.6 of this opinion) enhance elements of the permit that are key to EPAs ability to avoid jeopardizing listed species or destroying or adversely modifying designated critical habitat. Additional reporting requirements provide additional opportunities to provide feedback that minimizes exposures and thus minimizes risk.

Compliance: In 2015, NMFS concluded that EPA had a mechanism to allow them to reliably determine whether and to what degree operators complied with the conditions, restrictions, or mitigation measures required in the MSGP and thus could change the action to prevent or minimize endangered or threatened species or designated critical habitat from being exposed to stressors at harmful concentrations. Compliance with the 2021 MSGP discharge monitoring requirements, AIM protocol, and additional requirements to acknowledge enforcement actions and place signage on facility property work in concert with the 2021 MSGP Eligibility Criteria selection procedure for EPA to meet its obligations under the ESA. Current data in EPAs ECHO suggest that about 30 percent of MSGP operators fail to submit discharge monitoring reports. It is uncertain whether this noncompliance rate is attributable to the

ongoing pandemic. Failure to submit discharge monitoring reports is classified as a significant noncompliance.

Adequacy of Controls: Finally, in 2015, NMFS concluded that in the absence of additional measures that would be identified in the course of satisfying the ESA Eligibility Criteria (i.e., measures required for Eligibility Criteria B, D, and E, *Criterion C Eligibility Form* content), NMFS would not be able to conclude that EPA's MSGP had a mechanism to prevent or minimize listed resources' exposure to stressors in discharges if (1) EPA finds that these stressors occur at concentrations, durations, or frequencies that are potentially harmful to individual listed organisms, populations, or species; or (2) EPA identifies that the discharges lead directly or indirectly to ecological consequences that are potentially harmful to individual listed organisms, populations, species or PBFs of designated critical habitat. Under the 2021 MSGP these measures are formalized as the AIM protocol. As a formalized protocol implemented over the 2021-2026 permit term, AIM is expected to be more effective in preventing or minimizing exposures of endangered or threatened species or designated critical habitat to stressors from discharges at concentration, durations or frequencies that have adverse effects to individual listed organisms, populations or species or physical or biological features of designated critical habitat.

9.1 Summary

The analyses in NMFS' opinion on the 2015 MSGP and in this opinion evaluating changes made for the 2021-2026 MSGP permit term establish that, in the absence of successful implementation of the ESA Eligibility Certification procedure, exposures of ESA-listed species and designated critical habitat to stressors at concentrations resulting in adverse effects are expected to be authorized and occur under the MSGP. Changes made to the MSGP for the 2021-2026 permit term address implementation issues that were identified over the 2015-2020 permit term. The determination in the 2015 opinion relied particularly on the monitoring and reporting that would occur pursuant to the MSGP. The 2021 MSGP includes additional monitoring parameters and reporting requirements, thereby strengthening the information available to identify and minimize problematic exposures.

10 CONCLUSION

Because the action includes discharges from an unknown number and location of new facilities, the determinations made in this opinion apply over the entire action area of EPA's permitting authority and thus apply to newly designated critical habitats for Atlantic sturgeon, ESA-listed Caribbean corals, and ESA-listed Indo-Pacific corals as well as the species and designated critical habitats evaluated for adverse effects in the 2015 MSGP opinion, as updated Section 5.2 of this opinion.

After considering the current status of ESA-listed species, the environmental baseline, the effects of the action, and the cumulative effects of concurrent and future nonfederal actions in the action area, it is NMFS' opinion that EPA's reissuance of the MSGP is likely to adversely affect, but is not likely to jeopardize the continued existence of Southern Resident Distinct Population Segment (DPS) of killer whale; salmonids, Atlantic salmon, nine Evolutionarily Significant Units (ESUs) of steelhead trout, nine ESUs of Chinook salmon, three ESUs of coho salmon, two ESUs of chum salmon, and two ESUs of sockeye salmon; anadromous non-salmonids, including the shortnose sturgeon, three DPSs of Atlantic sturgeon, green sturgeon, and eulachon; other fish, including Nassau grouper, bocaccio, yelloweye rockfish, giant manta ray, oceanic whitetip shark, and two DPSs of scalloped hammerhead; marine turtle species, including hawksbill, Kemp's ridley, leatherback, olive ridley, two DPSs of green turtle, and two DPSs of loggerhead turtle; Pacific coral species, *Acropora globiceps, Acropora jacquelineae, Acropora retusa, Acropora speciosa, Euphyllia paradivisa, Isopora crateriformis, Orbicella annularis,* and *Seriatopora aculeata*, the Caribbean coral species boulder star coral, elkhorn coral, lobed star coral, mountainous star coral, pillar coral, rough cactus coral, and staghorn coral; the black abalone and white abalone.

It is also our opinion that EPA's reissuance of the MSGP is not likely to destroy or adversely modify designated critical habitat for Southern Resident killer whale based on effects to the critical habitat Physical and Biological Feature (PBF) prey, Chinook salmon, chum salmon, coho salmon, sockeye salmon, steelhead trout, eulachon, green sturgeon, bocaccio, yelloweye rockfish, green sea turtle North Atlantic DPS, leatherback sea turtle, and loggerhead sea turtle (Northwest Atlantic DPS), Atlantic sturgeon, black abalone, and proposed critical habitat designated for ESA-listed Caribbean corals and ESA-listed Indo-Pacific corals.

11 INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by regulation to include significant habitat modification or degradation that results in death or injury to ESA-listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (see 50 C.F.R. §222.102).

Incidental take is defined as take that results from, but is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity (see 50 C.F.R. §402.02). Section 7(b)(4) and 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this incidental take statement.

The basis for take of ESA-listed species anticipated under MSGP-authorized actions, particularly changes to the permit for the 2021 issuance, has been set forth in the effects section of this Opinion and in NMFS' opinion on the 2015 MSGP. NMFS has provided a detailed explanation of the conditions under which stormwater discharges, even when in compliance with MSGP benchmarks, result in take. Thus, NMFS believes that incidental take is possible as a result of the authorization of stormwater discharges under the renewed MSGP and the implementation of the permit program. The benchmarks applied in the MSGP are based on EPA's Guidelines for the Protection of Aquatic Life, which have not been evaluated by NMFS for protectiveness of ESA-listed species under NMFS' jurisdiction.

Engagement of NMFS' expertise through the MSGP ESA Eligibility Certification procedure and the terms and conditions listed below is expected to eliminate or minimize take. Given the scope, complexity, wide geographic reach and uncertainty of the type, frequency, location, and intensity of stormwater events, NMFS is unable to specify an amount or extent of take in terms of numbers of individuals or units of habitat for the entire extent of individual permit authorizations made under the MSGP permitting program. Any take is identified through the MSGP ESA Eligibility Certification procedure with which proposed dischargers are required to comply. Take of a threatened or endangered species resulting from discharges or discharge-related activities under the MSGP is only authorized when:

(1) Take has been authorized under the ESA of 1973, as amended, through a separate permit pursuant to ESA section 10(a)(1)(A) for research or to enhance the survival or propagation of an endangered or threatened species, or ESA section 10(a)(1)(B) exempting incidental "take" of endangered species or threatened species. In both cases, operators certify under MSGP eligibility criterion E.

(2) Take is exempted through an Incidental Take Statement included in an Opinion for a specific MSGP-permitted facility (i.e., certifying eligibility through criteria B or D). Where a discharger proposes to discharge under the MSGP and the discharge may cause the take of an ESA-listed species, permittees must either be in compliance with section 7 and the exemption of take in a previously-issued incidental take statement for facilities certifying eligibility under criterion B or D, or must submit a *Criterion C3 Eligibility Form* for review by EPA and NMFS at least 30 days prior to filing the NOI for permit coverage (or simultaneously as part of the NOI package in the NPDES eReporting tool with a subsequent 30-day review period), and must implement any

additional controls identified by NMFS to avoid or eliminate adverse effects on ESA-listed species and critical habitat before the discharge is authorized.

Accordingly, the amount or extent of any incidental take has been or will be more fully developed for those individual existing and new dischargers certifying under the MSGP's ESA Eligibility Certification procedure that section 7 consultation has been completed (i.e., Eligibility Criteria B, based on certification of another operator or D, completion of section 7 consultation or technical assistance from the Services).

This consultation focuses on whether the EPA has insured that their issuance of the general permit is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. It does not address specific actions that the general permit would authorize. We focus instead on whether EPA's program functions sufficiently to minimize take resulting from individual discharges.

In addition to any incidental take authorized in documentation supporting individual facility certifications under ESA eligibility criteria B and D, NMFS identifies the following as a surrogate for the allowable extent of take for the MSGP program as a whole: the ability to proceed without any adverse incident as defined in the MSGP to ESA-listed species or designated critical habitat attributable to any stormwater discharged in accordance with the general permit in the range of listed endangered or threatened species under NMFS' jurisdiction. An adverse incident is considered attributable to stormwater discharged in accordance with the general permit if the stormwater is known to have been discharged prior to, and near or upstream of the adverse incident and there is evidence that the stormwater caused the adverse incident (e.g. bank incision, erosion, sedimentation, elevated pollutant concentrations).

The RPMs described below are designed to ensure the successful implementation of the ESA Eligibility Certification procedure and benchmark monitoring, which NMFS believes will reduce the exposure of endangered or threatened species under NMFS' jurisdiction to stressors resulting from MSGP-authorized discharges.

11.1 Reasonable and Prudent Measures (RPMs)

The measures described below are non-discretionary and must be undertaken by the EPA so that they become a binding condition of the EPA's MSGP implementation and oversight responsibilities, as appropriate, for the exemption in section 7(a)(2) to apply. Section 7(b)(4) of the ESA requires that when an agency action is found to be consistent with section 7(a)(2) of the ESA and the action may incidentally take individuals of ESA-listed species, NMFS will issue a statement that specifies the impact of any incidental taking of endangered or threatened species. To minimize such impacts, reasonable and prudent measures, and terms and conditions to implement the measures, must be provided. Only incidental take resulting from agency actions and any specified reasonable and prudent measures and terms and conditions identified in the incidental take statement are exempt from the taking prohibition of section 9(a) pursuant to section 7(o) of the ESA. The EPA has a continuing duty to regulate the activities it authorizes which are covered by this incidental take statement. The RPMs, with their implementing terms and conditions, are designed to minimize the amount or extent of incidental take (50 C.F.R. §402.02).

NMFS believes the RPMs described below, in conjunction with changes to the permit noted in the description of the action, are necessary and appropriate to minimize the impacts of incidental take on ESA-listed species:

1) EPA must gather and synthesize information on the activities authorized by the MSGP, including any corrective actions reported in the permittees' Annual Reports. EPA will provide this information to NMFS.

2) To ensure compliance with the MSGP, EPA must monitor the effectiveness of the MSGP provisions for the protection of endangered and threatened species and designated critical habitat and report this information to NMFS.

11.1.1 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the EPA must comply with the following terms and conditions. These terms and conditions implement the reasonable and prudent measures described above. These include the take minimization, monitoring, and reporting measures required by the section 7 regulations (50 C.F.R. §402.14(i)). The EPA must report the progress of the action to NMFS Office of Protected Resources consistent with Term & Condition 2. The reporting requirements are established in accordance with 50 C.F.R. §220.45 and §228.5. These terms and conditions are non-discretionary. If the EPA fails to ensure compliance with these terms and conditions implementing the reasonable and prudent measures, the exemption provided by section 7(o)(2) may lapse.

Term and Condition to implement RPM 1:

The EPA will compile and provide to NMFS an annual report that will include the data from EPA's electronic reporting system(s) summarizing the covered facilities, as well as reporting and monitoring data submitted by the facilities to EPA pursuant to the MSGP. (This annual report should not be confused with the annual reports provided to EPA from the covered facilities.) The report should include, at minimum, the following data:

a) Locations of facilities covered under the MSGP by selected criteria. These should be provided in an electronic spreadsheet including, at a minimum: facility sector/subsector, name, ESA criterion selection, state, and geographic point data for the facilities and their discharge point locations.

   i) A preliminary report listing facility locations should be submitted to NMFS no later than 12 months after the issuance of the 2021 MSGP.

b) All instances of facilities covered under any ESA criteria that exceeded benchmarks, and numeric effluent limitation guidelines for their subsector(s) during one or more quarterly monitoring effort and data associated with these exceedances.

c) All instances where an operator (or EPA) determined there was a need to consider corrective actions (i.e., AIM protocol) at facilities covered under any of the ESA eligibility criteria. This listing should also include, if available, the trigger for corrective actions (e.g., spill, lack of required control, etc.) and the outcome (e.g., any actions taken or implemented to correct the problem).

d) Any observed/reported impacts to ESA-listed species or designated critical habitat as documented by facilities during or between the required inspection and/or monitoring efforts conducted at the facility.[13]

e) For facilities certifying under Criterion C, a brief description of any instances of coverage provided under the MSGP where the reviewing Service field office initially noted, in writing, that the facility's proposal did not appear to support coverage under the permit. The description shall include how the Service's concerns were addressed, and will specify whether the reviewing Service field office provided confirmation that any additional information and/or changes to the proposal (including, but not limited to, additional stormwater control measures) were sufficient to address the Service's concerns.

f) A box-and-whisker plot of reported PAH concentrations for each sector required to monitor PAHs.

g) Reported copper concentrations for each facility required to monitor copper and located within areas potentially affecting ESA-listed species and designated critical habitat under NMFS' jurisdiction.[14]

h) Reported aluminum concentrations for each facility required to monitor aluminum and located within areas potentially affecting ESA-listed species and designated critical habitat under NMFS' jurisdiction.[14]

- All information fulfilling bullets a-h above should be provided to NMFS Office of Protected Resources (see accompanying cover letter) along with a brief summary of, and EPA perspective on, information fulfilling bullets a through h, and:
    - Where possible, the data should be submitted in a format that is sortable (such as an electronic spreadsheet that can be sorted by sector/subsector, state, county, receiving waters, and parameter measured/exceeded at minimum).
    - The data should be clearly linked to sector type and geographic location (e.g., point data) to enable efficient review by NMFS that can be linked to the data specified in 1a above (e.g., to facility ID and location to allow for review by receiving water).

2) The first annual report should be submitted to NMFS no later than three months after the deadline for submitting results from the fourth quarterly inspection in the first year after issuance of the 2021 MSGP, as described by the MSGP.

a) Subsequent annual reports to NMFS should be submitted at 12-month intervals after this date.

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[13] While we recognize that the ICIS system does not specifically request this information, if such information is provided in the narrative section of the report, EPA should forward this to NMFS as part of their annual report of implementation of the MSGP.

[14] NMFS will provide a list of existing permits matching this requirement and will update with any new dischargers that fit this profile.

b) For the first monitoring report to NMFS, EPA may request a 3-month extension to the report submission deadline to address unforeseen challenges with querying and compiling information from the new reporting system.

3) NMFS will meet with EPA 30 days after each report is submitted to discuss the results and determine if modifications to the MSGP's implementation may need to be considered and whether reinitiation is warranted.

4) A preliminary report listing facility locations should be submitted to NMFS no later than 12 months after the issuance of the permit.

5) The EPA shall continue to include the following instructions requiring reporting of adverse incidents to ESA-listed species online.

> "NOTICE: Under section 9(a)(1)(B) of the Endangered Species Act, with respect to any endangered species of fish or wildlife listed pursuant to Section 4 of this act, it is unlawful for any person subject to the jurisdiction of the United States to take any such species within the United States or the territorial sea of the United States. To ensure consistency with the conditional take exemption associated with the MSGP, MSGP authorized dischargers shall notify the nearest National Marine Fisheries Service (NMFS) Regional Office within three days upon finding any dead, injured, or sick, specimen, nest, and/or egg(s) of endangered or threatened species under NMFS jurisdiction that appears to have been harmed by MSGP authorized discharges into Waters of the United States. In addition, notify the National Marine Fisheries Service, Office of Protected Resources at (301) 427-8400 and EPA at msgpesa@epa.gov.
>
> Include the date, time, and precise location of the injured animal, carcass, nest, and/or egg and any other pertinent information in your notification. Leave the plant or animal or animal alone, make note of any circumstances likely causing the death or injury, note the location and number of individuals involved and, if possible, take photographs. Operators may be asked to carry out instructions provided by NMFS to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved. Care should be taken in handling sick or injured specimens to preserve biological materials in the best possible state for later analysis of cause of death, if that occurs."
>
> All such instances should also be documented in the *Annual Report* from EPA.

Terms and Conditions to implement RPM 2:

Based on NMFS review of existing NOI, existing operators that are expected to seek coverage under the 2021 MSGP have made errors in previous iterations of the MSGP related to the incorrect assessment that threatened or endangered species or their designated critical habitat do not overlap with the facilities' action area. That is to say, NMFS determined that a number of facilities incorrectly certified that they are eligible to discharge under ESA Eligibility Criterion A. EPA has added an addendum to its action that it will review a subset of facilities certifying under Criterion A, identified in coordination with NMFS, to check that they have made a correct certification.

NMFS is adding the following terms and conditions to fully address RPM 2:

1) EPA will review a subset of the Criterion A certifications to determine whether those certifications are valid, including verifying that the discharge locations identified are correct.

2) EPA will replace reference to the NOAA species directory in Appendix E of the permit and the electronic NOI instructions with the following hyperlinks:

- For the Northeastern U.S.: NOAA Fisheries Greater Atlantic Region ESA Section 7 Mapper: https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=1bc332edc5204e03b250ac11f9914a27;
- For Puerto Rico:
    - *Acropora* critical habitat map: https://www.fisheries.noaa.gov/resource/map/acropora-elkhorn-and-staghorn-coral-critical-habitat-map-and-gis-data;
    - Green turtle critical habitat map: https://www.fisheries.noaa.gov/resource/map/green-turtle-critical-habitat-map-and-gis-data;
    - Hawksbill Turtle critical habitat map: https://www.fisheries.noaa.gov/resource/map/hawksbill-turtle-critical-habitat-map-and-gis-data;
- Western U.S.: West Coast Region Protected Resources App: https://www.webapps.nwfsc.noaa.gov/portal/apps/webappviewer/index.html?id=7514c715b8594944a6e468dd25aaacc9; and
- Pacific Islands: Contact the Pacific Islands Regional Office at (808) 725-5000 or pirohonolulu@noaa.gov

3) EPA will provide future information and/or coordination regarding unexpected developments once a facility is provided coverage under the MSGP if the reviewing NMFS regional office requests it. For example, NMFS may want to review post-event control measures for a facility that has experienced a flood, fire, or some other event potentially affecting stormwater control measures and stormwater constituents.

12 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on ESA-listed species or designated critical habitat, to help implement recovery plans, or to develop information (50 C.F.R. §402.02).

The following conservation recommendations would provide information for future consultation involving EPA's issuance and implementation of the MSGP:

- We recommend that EPA conduct targeted outreach to facilities operating under the administratively continued 2015 MSGP to assist them in getting coverage under the 2021 MSGP as soon as possible.
- We recommend that EPA leverage its National Compliance Initiative to target compliance among stormwater discharges to waters where ESA-listed resources under NMFS' jurisdiction occur. This includes discharges authorized under the MSGP and other stormwater permits (e.g., Construction General Permit, MS4s)
- We recommend that EPA continue to develop tools that assist facility operators with further measures and considerations that will improve both the EPA's and the facility's efforts to consistently avoid, reduce, or minimize effects to ESA-listed species and designated critical habitat associated with the discharges authorized under the MSGP.
- We recommend EPA maintain a list of receiving waters where Criterion A has been selected in error in previous permit cycles and crosscheck requests for coverage under Criterion A against this list to avoid inadvertent errors in criterion selection as NOIs are submitted. As additional receiving waters are identified where ESA-listed species and/or designated critical habitat are likely to occur, either through notification by NMFS or through other means (e.g., the EPA's proposed review of a subsample of Criterion A facilities), the list and crosscheck should be expanded accordingly. For example, facilities discharging to the following receiving waters should generally not be allowed to proceed with coverage under Criterion A:
    - Puerto Rico: waterbodies in the coastal zone
    - Washington: Puget Sound; tributaries to eastern Puget Sound, from the Puyallup River north; mainstem Columbia River; and certain tributaries to the Upper and Lower Yakima River
    - New England: Watersheds accessible to anadromous species
- We recommend EPA encourage facilities to describe and ensure control maintenance schedules are clearly defined and adhered to as part of their SWPPP, and that these activities are addressed both in the eNOIs and, where applicable, in the *Criterion C Eligibility Form*. For example, facilities that include settling ponds or other controls that allow contaminants to settle out prior to discharge into the receiving waters should specify the maintenance schedule for removing contaminants and confirm such maintenance was performed in the facility's *Annual Reports*. This would be of particular concern in dry areas (such as portions of the desert Southwest), where

contaminants that are successfully filtered out during a storm event may be resuspended and discharged in future storm events occurring many months later.

- We recommend that EPA's Healthy Watersheds Program be leveraged to increase awareness among MSGP permittees of the value of protecting watersheds and improve understanding of the range of management actions needed to avoid adverse impacts. In addition, outreach materials in Spanish should be made available to MSGP dischargers in Puerto Rico.
- We recommend EPA begin the technical assistance phase of ESA section 7 consultation ("preconsultation") during the development of the next draft MSGP permit in the Federal Register for public comment. This will allow EPA to incorporate recommended actions designed to protect ESA-listed species and designated critical habitat into its permit at an early stage and receive public comment on these actions.
- Maintain informal dialogue with NMFS on the events and observations for MSGP performance over the course of the permit term.

In order to keep NMFS' Endangered Species Cooperation Division informed of actions minimizing or avoiding adverse effects, or benefiting ESA-listed species or their habitats, the EPA should notify the NMFS Office of Protected Resources of any conservation recommendations they implement in their final action at the address listed on the cover letter to this document.

13 REINITIATION NOTICE

This concludes formal consultation on the EPA's reissuance of the MSGP. Consistent with 50 C.F.R. §402.16(a), reinitiation of formal consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and:

(a) The amount or extent of taking specified in the incidental take statement is exceeded.

(b) New information reveals effects of the action that may affect ESA-listed species or designated critical habitat in a manner or to an extent not previously considered.

(c) The identified action is subsequently modified in a manner that causes an effect to the ESA-listed species or designated critical habitat that was not considered in the biological opinion.

(d) A new species is listed or critical habitat designated under the ESA that may be affected by the action.

Specific to the reissuance of the MSGP, NMFS includes the following additional reinitiation triggers:

1. If the monitoring benchmarks or effluent limits in the permit are revised to be less stringent;

2. Chronic issues resulting from the ESA certification procedure (see RPM 2), including:

- Eligibility certifications for facilities certifying under Criteria B and D are found to be invalid due to consultations that did not actually occur, are out of date, have exceeded specified take, did not consider all ESA-species and designated critical habitat in the action area, or with Opinions that have unimplemented RPAs;
- Unsuccessful implementation of the Criterion C eligibility procedure according to the procedures outlined in the description of the action in this opinion;
- Invalid Criterion A certifications (i.e. incorrectly claiming species are not present in the action area) that are not referred to the Criterion C procedure or an individual permit; and
- Invalid criterion E certifications. For those facilities with ESA Eligibility Certifications based on an existing formal consultation, any instance where the amount or extent of take specified in the incidental take statement is exceeded as a result of an MSGP-authorized discharge requires that the Services must immediately request reinitiation of section 7 consultation.

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