DRAFT ECONOMIC ANALYSIS OF POTENTIAL CRITICAL HABITAT DESIGNATION FOR THE GREEN SEA TURTLE

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1 Application of ESA Section 4(b)(2)

Section 4(b)(2) of the ESA requires that we consider the economic impact, impact on national security, and any other relevant impact, of designating any particular area as critical habitat. Additionally, the Secretary has the discretion to consider excluding any area from critical habitat if she determines the benefits of exclusion (that is, avoiding some or all of the impacts that would result from designation) outweigh the benefits of designation based upon the best scientific and commercial data available. The Secretary may not exclude an area from designation if exclusion will result in the extinction of the species. Because the authority to exclude is discretionary, exclusion is not required for any particular area under any circumstances.

The ESA provides the USFWS and NMFS (the Services) with broad discretion in how to consider impacts. (See, H.R. Rep. No. 95-1625, at 17, reprinted in 1978 U.S.C.C.A.N. 9453, 9467 (1978). "Economics and any other relevant impact shall be considered by the Secretary in setting the limits of critical habitat for such a species. The Secretary is not required to give economics or any other 'relevant impact' predominant consideration in his specification of critical habitat...The consideration and weight given to any particular impact is completely within the Secretary's discretion."). Courts have noted the ESA does not contain requirements for any particular methods or approaches (See, e.g., Bldg. Indus. Ass'n of the Bay Area et al. v. U.S. Dept. of Commerce et al., No. 13-15132, 9th Cir., July 7, 2015 [upholding district court's ruling that the ESA does not require the agency to follow a specific methodology when designating critical habitat under Section 4(b)(2]). For this potential critical habitat designation, we followed the same basic approach to describing and evaluating impacts as we have for recent critical habitat rulemakings in the NMFS Southeast Region.

This draft report describes the economic impacts that we project would result from including the areas described above in the potential designation of critical habitat for the green sea turtle. We considered these impacts in deciding whether to exercise our discretion to propose excluding particular areas from the designation. Both positive and negative impacts (these terms are used interchangeably with benefits and costs, respectively) were identified and were considered. Impacts were evaluated in quantitative terms where feasible, but qualitative appraisals were used where more appropriate to particular impacts or available information.

The primary impacts of a critical habitat designation result from the ESA Section 7(a)(2) requirement that federal agencies ensure their actions are not likely to result in the destruction or adverse modification of critical habitat, and that they consult with NMFS in fulfilling this requirement. Determining these impacts is complicated by the fact that Section 7(a)(2) also requires that federal agencies ensure their actions are not likely to jeopardize listed species' continued existence. One incremental impact of designation is the extent to which federal agencies modify their proposed actions to ensure they are not likely to destroy or adversely modify the critical habitat beyond any modifications they would make because of listing and the requirement to avoid jeopardizing listed species. When the same modification would be required due to impacts to both the species and critical habitat, the impact of the designation is co-extensive with resulting from the ESA listing of the species (i.e., attributable to both the listing of the species and the designation of critical habitat). To the extent possible, our analysis identified impacts that would be incremental due to the potential designation of critical habitat -

meaning those impacts that are over and above impacts attributable to the green sea turtle's listing or any other existing regulatory protections. Relevant, existing regulatory protections (including the species' listing) are referred to as the "baseline" and are also discussed in the following sections.

The following impact analyses describe projected future federal activities that would trigger Section 7 consultation requirements because they may affect the essential feature(s) and consequently may result in economic impacts. Additionally, these analyses describe broad categories of project modifications that may reduce impacts to the essential feature(s), and state whether the modifications are likely to be solely a result of the critical habitat designation or co-extensive with another baseline regulation, including the ESA listing of the species.

2 Economic Impacts

Economic impacts of the critical habitat designation result through implementation of Section 7 of the ESA in consultations with federal agencies to ensure their proposed actions are not likely to destroy or adversely modify critical habitat. These economic impacts may include both administrative and project modification costs; economic impacts that may be associated with the conservation benefits of the designation are described later. We conducted analysis of the economic impacts of the potential critical habitat rule to critical habitat units and aggregated impacts to appropriate economic or geopolitical areas to assist in projecting the extent to which discrete areas may be impacted.

SUMMARY OF KEY FINDINGS

- **Total incremental costs**[1]: Total present value impacts of critical habitat designation for the green sea turtle are projected to be $9.1 million over the next ten years ($1.3 million annualized). While a degree of uncertainty underlies this analysis, the results provide an indication of the potential activities that may be affected, the relative costs of critical habitat designation across particular areas of potential critical habitat, and a reasonable estimate of future costs.
- **Key assumptions**: This analysis assumes that the types, frequencies, and locations of activities that have required Section 7 consultation over the past 10 years is generally reflective of the types, frequency, and location of activities that will require Section 7 consultation in the future. To the extent that we handle consultations differently over the next ten years (e.g., more dealt with on a programmatic basis, or critical habitat results in a shift to more formal consultations), our analysis could over or underestimate the incremental administrative burden of critical habitat for the green sea turtle.

An additional key assumption is that impacts of future activities that adversely affect an essential feature, but which will not require modification due to existing baseline protections, will be sufficiently limited that the functionality of the critical habitat will not be diminished. As a result, incremental project modifications will not need to be implemented specifically due to green sea turtle critical habitat. While there is some uncertainty as to the degree of protection that baseline protections will provide the potential critical habitat, this analysis concludes that across nearly all activity categories and areas being considered for critical habitat, project modifications required to address adverse

[1] Cost estimates are expressed in 2022 dollars. Present values are calculated over ten years (2023 – 2032) assuming a 7% discount rate (U.S. Office of Management and Budget 2003).

modification of the critical habitat would already be required due to the listing of the green sea turtle and other baseline protections, including those to listed corals, seagrass, other ESA-listed sea turtles and marine mammals, and designated critical habitat. As a result, incremental costs of the potential critical habitat rule are almost entirely limited to the additional administrative effort required for Section 7 consultations to consider impacts to the critical habitat. The lone exception to this assumption is beach nourishment projects in the East Pacific Distinct Population Segment (DPS), for which we assume project modifications could be undertaken to mitigate impacts to foraging habitat and that these modifications would not be undertaken without green sea turtle critical habitat.

- Distribution of costs:
    - By activity: Impacts to coastal and in-water construction activities (permitted or conducted by the USACE) account for 57% of total impacts. Dredging and disposal and beach nourishment combine to account for an additional 15% of total impacts. No other activity category accounted for more than 5% of total impacts.
    - By unit: Impacts to activities conducted in Florida constitute 40% of total projected impacts of the potential designation. Overall, the North Atlantic DPS accounts for 78% of projected incremental impacts. The East Pacific DPS and Central North Pacific DPS account for 11% and 6% of total impacts, respectively, while impacts for the South Atlantic, Central West Pacific, and Central South Pacific DPSs each constitute 2% of total impacts or less.

Table 1 shows total projected costs of the potential critical habitat designation by DPS. Table 2 displays total projected costs of the potential critical habitat designation by activity category.

Table 1.PROJECTED INCREMENTAL COSTS (IN 2022 DOLLARS) OF GREEN SEA TURTLE CRITICAL HABITAT DESIGNATION BY DPS (2023-2032)

DPS	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	PERCENT OF TOTAL
North Atlantic	$1,000,000	$7,100,000	78%
South Atlantic	$21,000	$140,000	2%
East Pacific	$140,000-$145,000	$1,000,000-$1,100,000	11%
Central North Pacific	$77,000	$540,000	6%
Central South Pacific	$30,000	$210,000	2%
Central West Pacific	$19,000	$130,000	1%
Total	**$1,300,000**	**$9,100,000-$9,200,000**	**100%**

Table 2. PROJECTED INCREMENTAL COSTS (IN 2022 DOLLARS) OF GREEN SEA TURTLE CRITICAL HABITAT DESIGNATION BY ACTIVITY CATEGORY (2023- 2032)

DPS	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	PERCENT OF TOTAL
Construction	$930,000-$940,000	$6,500,000-$6,600,000	71%
Water Quality	$34,000	$240,000	3%
Fisheries Management	$34,000	$240,000	3%
Aquaculture	$40,000	$280,000	3%
Military	$66,000	$460,000	5%

DPS	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	PERCENT OF TOTAL
Marine Debris Removal	$20,000	$140,000	2%
Research/ Restoration	$90,000	$630,000	7%
Oil and Gas	$36,000	$250,000	3%
Offshore Wind	$14,000	$98,000	1%
Space Launch and Reentry	$19,000	$20,000	0%
Protected Area Management	$31,000	$220,000	2%
Total	**$1,300,000**	**$9,100,000-$9,200,000**	**100%**

2.1 Introduction

The purpose of the economic analysis is to identify and consider the potential economic impacts associated with the designation of critical habitat areas for the green sea turtle. These economic impacts provide information on some of the potential "benefits of exclusion." In addition, this information addresses the requirements of Executive Order 12866 (as affirmed and supplemented by Executive Order 13563), which directs federal agencies to assess the costs and benefits of regulatory actions.

To estimate the economic impacts of critical habitat designation, this analysis compares the state of the world with and without green sea turtle critical habitat. The "without critical habitat" scenario represents the baseline for the analysis, considering protections already afforded the potential critical habitat as a result of the listing of the green sea turtle as a threatened species, or as a result of other federal, state, and local regulations or protections. The "with critical habitat" scenario describes the incremental impacts associated specifically with this potential designation of critical habitat.

To characterize the economic impacts of the potential critical habitat designation, this analysis undertakes the following general steps as detailed in the following sections:

1. Characterize the areas considered for designation, in terms of economic activities and existing management, as well as the presence of overlapping protections such as existing critical habitat designations or conservation areas.
2. Identify the types of projects or activities that may affect critical habitat and that may be subject to Section 7 consultation pursuant to the ESA, and forecast the expected occurrences of these activities within the boundaries of the potential critical habitat. We used historical data on Section 7 (and, in the case of the East Pacific DPS, EFH) consultations and interviews with federal action agencies to generate these forecasts.
3. Describe the suite of potential project modifications for these activities that may be recommended through Section 7 consultation to ensure they are not likely to destroy or adversely modify critical habitat.
4. Estimate the economic impacts of modifying these economic activities for each particular area of potential critical habitat, as warranted.
5. Provide information on the distribution of economic impacts across the particular areas considered for designation.
6. Evaluate the potential economic benefits stemming from the incremental project modifications.

2.2 Framework of the economic analysis

The U.S. Office of Management and Budget (OMB) instructs federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions. OMB's guidelines for conducting economic analyses of regulations direct federal agencies to measure the impacts of a regulatory action against a baseline, which it defines as the "best assessment of the way the world would look absent the proposed action" (U.S. Office of Management and Budget 2003). In other words, the baseline includes the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat. Impacts that are incremental to that baseline (i.e., occurring over and above existing constraints) are attributable to the proposed regulation. NMFS's and the U.S. Fish and Wildlife Service's regulations addressing the content and timing of critical habitat economic analyses require that the economic analyses of critical habitat rules be focused exclusively on the incremental effects of the designation (50 CFR 424.19).

Accordingly, this economic analysis employs "without critical habitat" and "with critical habitat" scenarios:

1. The "**without critical habitat**" scenario represents the baseline for the analysis, considering protections already afforded the critical habitat proposed for the green sea turtle. The baseline for this analysis is the state of regulation absent designation of new critical habitat.
2. The "**with critical habitat**" scenario describes and where possible monetizes the incremental impacts due specifically to designation of critical habitat. Incremental project modifications and associated impacts are those that are expected to occur solely as a result of critical habitat designation.

2.2.1 Identifying Baseline Protections

The baseline for this analysis is the existing state of regulation prior to the designation of critical habitat, including the listing of the green sea turtle under the ESA, and other federal, state, and local laws and guidelines. The baseline also reflects a wide range of additional factors beyond compliance with existing regulations that provide protection to the habitat proposed to be designated as critical habitat. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by NMFS and other government entities, and trends in other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.

Baseline impacts and protections include implementation of Sections 7, 9, and 10 of the ESA to the extent that they are expected to occur absent designation of critical habitat for the green sea turtle. This analysis does not quantify the baseline costs associated with these protections, as the critical habitat designation would not affect these costs.

- Section 7 of the ESA requires federal agencies to consult with NMFS to ensure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of any endangered or threatened species or destroy or adversely modify critical habitat that has already been designated for listed species. Baseline consultations under the jeopardy and adverse modification standards result in administrative costs, as well as costs of implementing any project modifications resulting from consideration of these standards.

- Section 9 defines the actions that are prohibited by the ESA. In particular, it prohibits "take" of endangered wildlife, where "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (16 USC § 1532). Economic impacts associated with Section 9 that are relevant to this analysis manifest themselves in application of Sections 7 and 10 for listed species. There are no Section 9 prohibitions for critical habitat.
- Under Section 10(a)(1)(B) of the ESA, a non-federal entity (e.g., a landowner or local government) may develop a Habitat Conservation Plan (HCP) for a listed animal species in order to meet the conditions for issuance of an incidental take permit in connection with a land or water use activity or project (U.S. Fish and Wildlife Service 2002). The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that effects of incidental take are adequately avoided or minimized. Development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be precipitated by the designation of critical habitat, or the designation influences stipulated conservation efforts under HCPs.

The protection of listed species and critical habitat is not limited to the ESA. Other federal agencies, as well as state and local governments, may also protect the natural resources under their jurisdiction. If compliance with the Clean Water Act (CWA), state environmental quality laws, or best management practices, for example, protects critical habitat for the green sea turtle, such protective efforts are considered to be baseline protections. Of note, however, such efforts may not be considered baseline in the case that they would not have been triggered absent the designation of critical habitat. In such cases, they are considered incremental impacts.

2.2.2 Identifying Incremental Impacts

Evaluating and, to the extent possible, monetizing the incremental impacts of critical habitat designation for the green turtle is the focus of this economic analysis. Incremental impacts of critical habitat rules result from changes in the management of projects and activities, above and beyond those changes resulting from existing required or voluntary conservation efforts undertaken due to other federal, state, and local regulations or guidelines.

When critical habitat is designated, Section 7 requires federal agencies to ensure that their actions are not likely to destroy or adversely modify critical habitat, in addition to ensuring that the actions are not likely to jeopardize the continued existence of the species. The added administrative costs of considering critical habitat in Section 7 consultation and the additional impacts of implementing conservation efforts (i.e., reasonable and prudent alternatives in the case of an adverse modification finding) resulting from the protection of critical habitat constitute the direct compliance costs of designating critical habitat.

In identifying incremental impacts, it is important to consider both economic efficiency and distributional effects resulting from critical habitat designation. Economic efficiency effects generally reflect "opportunity costs" associated with the commitment of resources required to accomplish species and habitat conservation. At the guidance of OMB and in compliance with Executive Order 12866 "Regulatory Planning and Review," federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action. In the context of critical habitat designation, these efficiency effects represent the opportunity costs of resources used or benefits foregone by society as a result of the rule.

In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a federal permitting agency may enter into a consultation with NMFS to ensure that a particular project will not adversely modify critical habitat. The effort required for consultation is an economic opportunity cost because the agency and/or project proponent's time and effort would have been spent in an alternative activity had the particular area not been included in the designation. When compliance activity is not expected to significantly affect markets—that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price—the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.

Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, if a given commercial fishery is precluded from fishing across a large area, the price and quantity of fish on the market may be affected. In this case, changes in economic efficiency (i.e., social welfare) can be measured by considering changes in producer and consumer surplus in the market. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. In the case of the potential critical habitat for the green sea turtle, incremental project modifications are not anticipated to significantly affect activity levels or markets.

OMB encourages federal agencies to consider distributional effects separately from efficiency effects (U.S. Office of Management and Budget 2003). This analysis considers the entities expected to bear the costs associated with the designation, including an assessment of any local or regional impacts of habitat conservation, and a separate analysis of potential impacts to small entities (see Appendix A). Decision-makers can use information on distributional impacts to assess whether the effects of the designation may unduly burden a particular group or economic sector. This

Regional economic impact analysis can provide an assessment of the potential region-specific effects of conservation efforts. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models produce estimates of multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by recreationists) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreationists). These economic data provide a quantitative estimate of the magnitude of employment and revenue shifts in the local economy. Given the limited nature of incremental impacts likely to result from this designation, significant regional impacts are not anticipated and no impact and final demand for goods and services is anticipated.

2.2.3 Direct Impacts

The 2 categories of direct, incremental impacts of critical habitat designation are:

1. The administrative costs of conducting Section 7 consultation; and
2. Implementation of any project modifications recommended through Section 7 consultation to avoid potential destruction or adverse modification of critical habitat.

Section 7(a)(2) of the ESA requires federal agencies to consult with NMFS whenever activities that they undertake, authorize, or fund may affect a listed species or designated critical habitat. In some cases,

consultations will involve NMFS and another federal agency only, such as the U.S. Army Corps of Engineers (USACE). Often, consultations will also include a third party involved in projects, such as the applicant for a CWA Section 404 permit.

During a consultation, NMFS, the federal action agency, and the entity applying for federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or proposed critical habitat. Communication between these parties may occur via written letters, phone calls, in-person meetings, or any combination of these. The duration and complexity of these interactions depends on a number of variables, including the type of consultation, the activity of concern, and the potential effects to the species and designated critical habitat associated with the proposed activity, the federal agency, and whether there is a private applicant involved. Section 7 consultations with NMFS may be either informal or formal, based on the determination of adverse effects to the species or critical habitat.

Informal consultations consist of discussions between NMFS, the action agency, and applicant (if applicable) concerning an action that may affect a listed species or its designated critical habitat, and are designed to identify and resolve potential adverse effects at an early stage in the planning process. Informal consultations are concluded by determining that the action is not likely to adversely affect listed species or designated critical habitat.

By contrast, a ***formal consultation*** is required if the action agency or NMFS determines that a proposed federal action may adversely affect listed species or designated critical habitat. The formal consultation process results in NMFS's determination in its Biological Opinion (BO) of whether the action is likely to jeopardize a listed species or destroy or adversely modify designated critical habitat, and project modification recommendations to avoid or minimize the impacts of those adverse effects. In addition, NMFS may conduct programmatic consultations which address an agency's multiple actions on a program, regional, or other basis.

Programmatic consultations can be used to evaluate the expected effects of groups of related agency actions expected to be implemented in the future, where specifics of individual projects such as project location are not definitively known. Programmatic Consultations allow for streamlined project-specific consultations because much of the effects analysis is completed up front in the Programmatic Opinion. Regardless of the type of consultation or proposed project, Section 7 consultations can require administrative effort on the part of all participants.

As described above, parties involved in Section 7 consultations include NMFS, a federal action agency, and, in some cases, a third-party applicant. While consultations are required for activities that involve a federal nexus and may affect a listed species regardless of whether critical habitat is designated, the additional consideration of critical habitat may increase the effort for consultations if the project or activity in question may affect critical habitat. Administrative efforts for future consultations may therefore include baseline and incremental impacts.

In general, 3 different scenarios associated with the designation of critical habitat may result in incremental administrative consultation costs:

1. **Additional effort to address adverse effects to new critical habitat in a consultation**: Future consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond addressing effects to listed species or existing designated critical habitat. In this case, only the additional administrative effort required solely

to consider effects to green sea turtle critical habitat is considered an incremental impact of the designation.

2. **Reinitiation of consultation to address adverse effects to critical habitat**: Consultations that have already been completed on an ongoing project or activity may require re-initiation to address critical habitat. In this case, costs of re-initiating the consultation, including all associated administrative and conservation effort costs, are considered incremental impacts of the designation.
3. **New consultation resulting entirely from critical habitat designation**: Critical habitat designation may trigger future consultations that may not occur absent the designation (e.g., for an activity for which adverse modification may be an issue, while jeopardy is not). Such consultations, for example, may be triggered in critical habitat areas in which the species are not present, or in areas outside of critical habitat for other listed species. All associated administrative and conservation effort costs of these consultations are considered incremental impacts of the designation.

In addition to administrative costs, Section 7 consultations in proposed critical habitat areas may include additional project modifications recommended specifically to address potential destruction or adverse modification of the new critical habitat. This analysis refers to "project modifications" as a generic term for recommendations NMFS may make to modify projects or activities for the benefit of listed species or their designated critical habitat, or that action agencies or other entities may otherwise undertake to avoid adverse effects of their actions on listed species or their designated critical habitat. The ESA Section 7 Consultation Handbook includes more targeted descriptions for other terminology as follows:

- **Conservation measures** are actions to benefit or promote the recovery of listed species that are included by the federal agency as an integral part of the proposed action. These actions will be taken by the federal agency or applicant, and serve to minimize or compensate for project effects on the species under review. These may include actions taken prior to the initiation of the consultation, or actions which the federal agency or applicant have committed to complete in a biological assessment or similar document.
- **Conservation recommendations** are the Services' non-binding suggestions resulting from formal or informal consultation that: (1) identify discretionary measures that a federal agency can take to minimize or avoid the adverse effects of a proposed action on listed or proposed species, or designated or proposed critical habitat; (2) identify studies, monitoring, or research to develop new information on listed or proposed species, or designated or proposed critical habitat; and (3) include suggestions on how an action agency can assist species conservation as part of their action and in furtherance of their authorities under Section 7(a)(1) of the ESA.
- **Reasonable and prudent measures** are actions the Secretary believes necessary or appropriate to minimize the impacts, i.e., amount or extent, of incidental take. These measures are not imposed for effects to critical habitat; however, they may also reduce the impact of adverse effects to the critical habitat.
- **Reasonable and prudent alternatives** are recommended alternative actions identified during formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that can be implemented consistent with the scope of the federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that the Secretary believes would avoid the likelihood of jeopardizing the continued existence of listed species or the destruction or adverse modification of designated critical habitat (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998).

For future consultations considering jeopardy and adverse modification, the economic impacts of

project modifications undertaken to avoid adverse modification of the potential critical habitat, above and beyond those that would have been undertaken to avoid jeopardy or adverse modification of existing critical habitat for other listed species, are considered incremental impacts of the critical habitat designation.

In some cases, project modifications that are undertaken in order to avoid jeopardy may also avoid adverse modification of critical habitat. That is, while jeopardy and adverse modification are not the same standard, project modifications undertaken to avoid jeopardy may also result in the project avoiding adverse modification of critical habitat. This finding is often true for aquatic and marine species for which the condition of the habitat is inextricably linked to the health of the species. In other words, while avoidance of adverse modification of critical habitat requires protection of essential features, avoiding jeopardy to the species may require protection of these features even absent critical habitat. Listing protections are relevant to the baseline management of activities wherever the listed species are present.

In some cases, the critical habitat impacts may be more readily apparent than the species level effects. For example, turbidity in the water column at a project site may be a concern for the species as well as the critical habitat. NMFS may recommend modifications to such projects to avoid both of these effects. However, measuring the impacts of turbidity on the species may be more difficult than on the habitat itself and, as such, NMFS may be more likely to examine and tie an activity to potential impacts to critical habitat within the Section 7 consultation than to the species. Although the link to adverse modification may be more readily drawn, the outcome of the Section 7 consultation is not expected to be different with or without critical habitat designation. Nonetheless, where adverse modification provides a simpler means to recommend project modifications, but the outcome of consultation is not expected to change as a result of critical habitat designation, we do not assume impacts of the project modifications are incremental to the designation.

2.2.4 Indirect Impacts

The designation of critical habitat may, under certain circumstances, affect actions that do not have a federal nexus and thus are not subject to the provisions of Section 7 under the ESA. Indirect impacts are those sometimes unintended changes in economic behavior that may occur outside of the influence of the ESA, through other federal, state, or local actions, and that are caused by the designation of critical habitat. This section identifies common types of indirect impacts that may be associated with the designation of critical habitat. Importantly, these types of impacts are not always considered incremental. In the case that these types of conservation efforts and economic effects are expected to occur regardless of critical habitat designation, they are appropriately considered baseline impacts in this analysis.

OTHER STATE AND LOCAL LAWS

Under certain circumstances, critical habitat designation may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other state or local laws. In cases where these impacts would not have been triggered absent critical habitat designation, they are considered indirect, incremental impacts of the designation.

ADDITIONAL INDIRECT IMPACTS

In addition to the indirect effects of compliance with other laws or triggered by the designation, project

proponents, land managers and landowners may face additional indirect impacts, including the following:

- **Time Delays** - Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to re-initiate the Section 7 consultation process and/or compliance with other laws triggered by the designation. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
- **Regulatory Uncertainty or Stigma** - NMFS conducts each Section 7 consultation on a case-by-case basis and issues a biological opinion on formal consultations based on species-specific and site-specific information. As a result, government agencies and affiliated private parties who consult with NMFS under Section 7 may face uncertainty concerning whether project modifications will be recommended by NMFS and the nature of these modifications. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation.

2.2.5 Benefits

Under Executive Order 12866, OMB directs federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions. OMB's Circular A-4 distinguishes two types of economic benefits: direct benefits and ancillary benefits. Ancillary benefits are defined as favorable impacts of a rulemaking that are typically unrelated, or secondary, to the statutory purpose of the rulemaking (U.S. Office of Management and Budget 2003).

In the context of the ESA, the primary purpose of a critical habitat designation (i.e., the direct benefit) is the potential to enhance conservation of the species. The published economics literature has also documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species.[2] In its guidance for implementing Executive Order 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research (U.S. Office of Management and Budget 2003).

Critical habitat aids in the conservation of listed species specifically by protecting the essential biological and physical features of critical habitat on which the species' conservation depends. To this end, critical habitat designation can result in maintenance of particular environmental conditions that may generate social benefits aside from the conservation of the species. That is, management actions undertaken to conserve a species or habitat may have coincident, positive social welfare implications, such as increased recreational opportunities in a region.[3] Section 3 addresses the potential benefits of this critical habitat designation.

[2] See, for example, the summary in Richardson, L. and J. Loomis. March 2009. The Total Economic Value of Threatened, Endangered, and Rare Species: An Updated Meta-Analysis. Ecological Economics 68(5): 1535-1548.
[3] See, for example, Barbier, E. B., and authors. May 2011. The value of estuarine and coastal ecosystem services. Ecological Monographs 81(2): 169-193.

2.2.6 Presentation of Results

Impacts are described in present value and annualized terms applying discount rates of 7% in the body of the report. Additionally, tables summarizing impacts to each category of activity provide present value impacts in each unit applying a 3% discount rate for comparison with values calculated at 7%. Present value and annualized impacts are calculated according to the formulas presented in Exhibit 1. Economic impacts of the designation are considered within each of the units being considered for designation and by category of activity.

Ideally, the timeframe of this analysis would be based on the expected time period over which the critical habitat regulation is expected to be in place. Specifically, the analysis would forecast impacts of implementing this designation through species recovery (i.e., when critical habitat is no longer required). Recent guidance from OMB indicates that "if a regulation has no predetermined sunset provision, the agency will need to choose the endpoint of its analysis on the basis of a judgment about the foreseeable future" (U.S. Office of Management and Budget 2011). The "foreseeable future" for this analysis includes, but is not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. Accordingly, this analysis forecasts impacts over a ten-year time horizon. OMB supports this time frame stating that "for most agencies, a standard time period of analysis is ten to 20 years, and rarely exceeds 50 years" (U.S. Office of Management and Budget 2011). Therefore, this analysis considers economic impacts to activities over a ten-year period from 2023 through 2032.

This analysis compares economic impacts incurred in different time periods in present value terms. The present value represents the value of a payment or stream of payments in common dollar terms. That is, it is the sum of a series of past or future cash flows expressed in today's dollars. Translation of economic impacts of past or future costs to present value terms requires the following: a) past or projected future costs of critical habitat designation; and b) the specific years in which these impacts have been or are expected to be incurred. With these data, the present value of the past or future stream of impacts (PVc) from year t to T is measured in 2022 dollars according to the following standard formula:[a]

$$PV_c = \sum_{t}^{T} \frac{C_t}{(1 + r)^{t-2022}}$$

C_t = cost of incremental impacts in year t

r = discount rate[b]

Impacts for each activity are also expressed as annualized values. Annualized values are calculated to provide comparison of impacts across activities with varying forecast periods (T). For this analysis, activities employ a forecast period of ten years, 2016 through 2025. Annualized future impacts (APVc) are calculated by the following standard formula:

$$APV_c = PV_c \left[\frac{r}{1 - (1+r)^{-(N)}} \right]$$

N = number of years in the forecast period (in this analysis, 10 years)

[a] To derive the present value of future impacts to development activities, t is 2023 and T is 2032.

[b] To discount and annualize costs, guidance provided by the OMB specifies the use of a real rate of 7%. In addition, OMB recommends sensitivity analysis using other discount rates such as 3%, which some economists believe better reflects the social rate of time preference. (U.S. Office of Management and Budget, Circular A-4, September 17, 2003, and U.S. Office of Management and Budget, "Draft 2003 Report to Congress on the Costs and Benefits of federal Regulations; Notice," 68 *Federal Register* 5492, February 3, 2003.)

Exhibit 1. PRESENT VALUE AND ANNUALIZED IMPACT CALCULATION FORMULAS

2.3 Activities that may be affected

Activities that federal action agencies propose to authorize, fund, or carry out are subject to ESA Section 7 consultation on critical habitat. That is, such proposed actions that federal action agencies believe may affect listed species or designated critical habitat require Section 7 consultation between the action agency and NMFS to ensure the activities: a) are not likely to jeopardize the continued existence of the species; and b) are not likely to destroy or adversely modify critical habitat.

To identify the types and geographic distribution of activities that may trigger Section 7 consultation for

the potential critical habitat, we reviewed the Section 7 consultation histories of NMFS' New England/Mid-Atlantic, Southeast, West Coast, and Pacific Islands Regions to identify activities previously consulted on in the areas being considered for green sea turtle critical habitat. We also reviewed the Essential Fish Habitat (EHF) consultation history of the West Coast Region. In addition, this analysis conducted stakeholder outreach to identify future activities likely to destroy or adversely modify the green sea turtle critical habitat that may have been omitted by relying on the past Section 7 and EFH consultation histories. Stakeholders included the USACE, U.S. Coast Guard (USCG), Federal Aviation Administration (FAA), U.S. Environmental Protection Agency (EPA), Bureau of Ocean Energy Management (BOEM), and Federal Energy Regulatory Commission (FERC).

Based on this information, the types of activities that have the potential to affect the essential features of the potential critical habitat and involve a federal nexus include the following:

- Coastal and in-water construction, Dredging and sediment disposal, and beach nourishment
- Water quality management (revision of national and state water quality standards, issuance of National Pollutant Discharge Elimination System (NPDES) permits and Total Maximum daily load (TMDL) standards, registrations of pesticides)
- Commercial fisheries management (development of fishery management plans)
- Aquaculture, including any salt-water farming of animals or plants in nearshore or pelagic areas in potential green sea turtle critical habitat areas
- Military activities (all activities undertaken by the Department of Defense, such as training exercise, as well as gunnery exercises performed by the U.S. Coast Guard)
- Shipwreck and Marine Debris Removal
- Scientific Research and Monitoring
- Oil and gas activities, including activities related to exploration of the seafloor for resources using methods such as seismic surveys; construction, operation, and maintenance of platforms and other facilities associated with extraction and transportation of oil and gas resources; and planning for and responding to emergencies such as unexpected releases of oil and gas into the marine environment
- Offshore wind energy development
- Space vehicle launch and reentry
- Protected Area Management (development of management plans for national parks, marine sanctuaries, wildlife refuges, etc.)

These activities are the focus of this analysis as they are the key activities that may present threats to the potential critical habitat.

The remainder of this section provides an overview of each of the activities potentially affected by the potential critical habitat, including:

- A description of how the activity may affect the essential features of the potential critical habitat;
- Discussion of the scope of historical activity within the potential critical habitat;
- Explanation of how the activity is currently managed under the baseline regulatory environment;
- Forecast of future Section 7 consultations on the activity in the areas considered for critical habitat;
- Projection of incremental costs of the potential critical habitat rule to the activity; and
- A summary of key assumptions and uncertainties underlying the consultation and impact projections.

2.3.1 Coastal and In-Water Construction, Dredging and Disposal, and Beach Nourishment

Construction activities in U.S. waters are generally regulated by the USACE, which administers permits through the CWA and the Rivers and Harbors Act. Section 404 of the CWA authorizes USACE to regulate and permit the discharge of dredged or fill material into waters of the United States (33 USC § 1344). Sections 9 and 10 of the Rivers and Harbors Act authorize USACE to regulate and permit activities and structures in or affecting navigable waters of the United States (33 USC §§ 401 et seq. 1938), as amended by the Outer Continental Shelf Lands Act of 1953. This section evaluates the potential effect of critical habitat designation for green sea turtles on nearshore and in-water construction, dredging, disposal of sediment, and beach nourishment activity. Construction activities discussed in this chapter also include transportation (i.e. bridge construction and maintenance) and utility projects permitted or authorized by the U.S. Department of Transportation, as well as the U.S. Coast Guard's (USCG) Aids-to-Navigation program.

2.3.1.1 Description of Threat

Coastal and in-water construction activities, including dredging and disposal and beach nourishment, represent the most frequently occurring potential threat to the potential green sea turtle critical habitat and may affect the migratory, reproductive, and foraging and resting habitats in various ways. Construction (on land and in water) activities may act as deterrents (visual or auditory) to reproductive individuals, preventing their use of preferred areas. Nearshore structures or operations may block the passage of nesting females and post-hatchlings, with post-hatchlings' movement potentially restrained due to disorientation due to lighting, concentration of predators, disruption of wave patterns necessary for orientation, and creation of excessive longshore currents.

Dredging, beach nourishment, pipeline and cable projects, construction of alternate energy structures, shoreline development, pile driving, and building or replacing piers may alter the benthos and modify or destroy eelgrass beds and associated shallow subtidal habitat, resulting in a temporary loss of food resources, which would last until seagrass, macroalgae, and invertebrates are able to recolonize the area. Shoreline development and construction activities result in discharges or run-off, which may contribute to water-quality impairments, while dredging releases contaminants into nearby waters and legacy chemicals back into coastal food webs, some of which accumulate in eelgrass. In addition, large-

scale dredging activities may affect the migratory physical and biological feature (PBF) by blocking reproductive individuals' passage between foraging and nesting areas in narrow, coastal corridors, and creating localized levels of elevated turbidity. This disturbance is not expected to prevent migration but may delay arrival at mating areas and nesting beaches, which could lead to suboptimal productivity. Turtles would likely be able to avoid all impediments in oceanic environments, where migration may take place over a broader area (NMFS 2023).

2.3.1.2 Extent of Activity within Critical Habitat Area

Construction, dredging, disposal, and beach nourishment occurring within the areas being considered for critical habitat designation for the green sea turtle generally have a Federal nexus requiring a Section 7 consultation. These activities typically require permits from the U.S. Army Corps of Engineers (USACE). For example, the USACE's Regulatory Program issues permits under section 404 of the Clean Water Act for discharging dredge or fill materials into waters of the United States. Most construction projects require a section 4040 permit. In addition, the USACE's Civil Works program undertakes projects, such as dredging and beach nourishment, across the study area. USCG maintains thousands of aids to navigation (ATON) within the areas being considered for critical habitat. Associated activities include establishment, maintenance, and removal of ATON.

Review of NMFS' Section 7 consultation history for the years 2012-2021 identified 2,852 Section 7 or, in the case of the East Pacific (EP) DPS, either Section 7 or EFH consultations related to construction, dredging and disposal, and beach nourishment projects that could affect green turtle critical habitat. This figure represents 77 percent of total consultations across all activity categories considered in this analysis. More than 80% of the 2,852 consultations were on in-water and coastal construction projects such as docks and boat ramps, seawalls, marinas, and mooring buoys; 17 percent of the consultations were on dredging projects, and less than two percent, or 47 consultations, were on beach nourishment projects. USACE was the lead Federal agency on more than 2,600, or 92 percent of, consultations on construction, dredging and disposal, and beach nourishment. The U.S. Department of Transportation (USDOT) was the lead Federal agency on approximately 90, or three percent, of consultations, while FEMA and USCG were the lead Federal agencies on approximately 60 and 50 consultations, respectively. The USCG has established and maintains more than 14,000 ATON within the areas being considered for critical habitat. The USCG anticipates the need to establish additional ATON within the potential critical habitat but cannot speculate on the number, timing, or location (personal communication with USCG personnel E. Petras).

The vast majority (87%) of the 2,852 consultations were on activities that occurred within the North Atlantic DPS (NA) DPS, including 1,578 Section 7 consultations (55% of the total) in Florida. Substantial clusters of projects were sited in the main Hawaiian Islands as well (Central North Pacific DPS), while relatively few consultations on projects undertaken or permitted by the USACE in the Central South, Central West Pacific, or South Atlantic DPSs during this period (81 consultations total). However, the majority of projects either permitted or conducted by USACE in the Hawaiian Islands and U.S. Pacific Island territories were handled programmatically under the Standard Local Operating Procedures for Endangered Species in the Central and Western Pacific Region (Pac-SLOPES) programmatic consultation. Similarly, large volumes of USACE regulatory projects occurring in Florida, Puerto Rico, and the USVI that require Section 7 consultation have been handled programmatically under the Jacksonville District Regional Biological Opinion (JAXBO) since 2018, and the Greater Atlantic Regional Fisheries Office (GARFO) NLAA Programmatic Biological Opinion (NLAA Program), published in 2017, has subsumed many projects that would otherwise be subject to informal Section 7 consultation (NMFS 2017b).

USACE REGULATORY PROJECTS

As noted above, this analysis primarily relied upon NMFS' Section 7 consultation history to identify construction-related projects that occurred in – and, if were to occur in the future, may affect – the potential green sea turtle critical habitat. We also queried the USACE Permit Finder database to identify USACE permit applications for projects proposed to be located within the potential critical habitat over the past 10 years (USACE 2022a). The permit data were refined to include only those activities that may affect the areas considered for critical habitat and then compared to NMFS' Section 7 consultation records to assess how accurately NMFS' records capture historical construction activities within the areas proposed for critical habitat designation. With the exception of the EP DPS, this check confirmed the comprehensiveness of the Section 7 consultation history specific to USACE Regulatory-permitted projects.

There has been an increase in the rate of USACE Section 7 consultations considering effects of regulatory projects in the Southern California marine environment on green sea turtles in recent years. However, NMFS believes that USACE may not be fully meeting their Section 7 requirements with respect to potential effects of in-water and coastal construction, dredging, and beach nourishment projects on the green sea turtle in the EP DPS (personal communication with NMFS West Coast Region personnel 2022). As such, the NMFS West Coast Region advised that projects that require Section 7 consultation in the region also generally require Essential Fish Habitat (EFH) consultation. Thus, we rely on EFH consultation rates and locations, together with the Section 7 consultation history, to identify historical construction-related activities that, if they were to occur in the future, may require Section 7 consultation for the green sea turtle and its critical habitat.

USACE CIVIL WORKS PROJECTS

In addition to those activities permitted by the USACE and implemented by other entities, the USACE itself conducts Civil Works activities that may be affected by the potential critical habitat designation. These activities relate largely to the maintenance of navigation channels and ports and harbors through dredging activities, and Federal beach nourishment projects.

The Honolulu USACE district is responsible for the maintenance of 11 commercial harbors (two in Kauai, two in Oahu, two in Maui, two in Molokai, one in Lanai, and two on the Big Island) and 20 small boat harbors (five in American Samoa, two in Guam, three in CNMI, two in Kauai, two in Oahu, one in Maui, one in Lanai, and four on the Big Island) across the main Hawaiian Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands [CNMI]) (USACE 2022b). As maintenance dredging is among the activities included in PacSLOPES, the NMFS Pacific Island Regional Office (PIRO) Section 7 consultation database revealed only three formal consultations and five informal consultations on dredging projects across the Pacific Islands Region from 2012 to 2021. No ongoing Civil Works beach nourishment projects were identified in this region.

The Los Angeles USACE District is responsible for maintenance of navigation in 15 ports and harbors, 13 of which fall within potential critical habitat for green sea turtle (Santa Barbara, Ventura, Port Hueneme, Channel Islands, Marina del Rey, Redondo Beach-King Harbor, Port of Los Angeles, Port of Long Beach, Newport Beach, Dana Point, Oceanside, Mission Bay, and San Diego). The EFH and Section 7 consultation databases for the EP DPS revealed 28 consultations on dredging projects in areas being considered for green sea turtle critical habitat from 2012 to 2021.

In the Caribbean, navigation maintenance and dredging activities in the U.S. Virgin Islands and Puerto

Rico are carried out by the Jacksonville USACE District. Federal harbors in the USVI (St. Thomas Harbor and Christiansted Harbor) have not been actively maintained over the past three decades. Thus, our analysis assumes that they are unlikely to be dredged over the next ten years. Of the Federal harbors in Puerto Rico (Arecibo Harbor, San Juan Harbor, Fajardo Harbor, Guaynes Harbor, Ponce Harbor, and Mayaguez Harbor), only San Juan Harbor has been actively maintained during the period with a frequency of once every five years. However, USACE Civil Works has performed maintenance dredging of both Arecibo and Mayaguez Harbors since 2019, and these two harbors, in addition to San Juan, are included in the 2020 South Atlantic Regional Biological Opinion for Dredging and Material Placement Activities in the Southeast United States (NMFS 2020a). We did not identify any ongoing Civil Works beach nourishment projects in this region.

Ten USACE districts are responsible for navigation maintenance and beach nourishment activities in the areas of the Gulf coast (Galveston, New Orleans, Mobile, and Jacksonville) and the Atlantic coast (Jacksonville, Charleston, Wilmington, Norfolk, Baltimore, Philadelphia, New York) adjacent to potential critical habitat. Many of the Civil Works functions carried out by these districts are covered by the 2020 South Atlantic Regional Biological Opinion (SARBO) and Gulf Regional Biological Opinion (GRBO). In particular, the SARBO and GRBO cover all civil works hopper dredging activities in the Gulf of Mexico and along the Atlantic Coast from Florida to North Carolina. However, civil works dredging and beach nourishment projects that do not use hopper dredges still require individual consultation with NMFS in these regions (NMFS 2007; NMFS 2020a). Only dredging projects involving the use of a mechanical, cutterhead, or low volume hopper dredges may be consulted on programmatically through the 2017 (GARFO) NLAA Program.

The query of NMFS' Section 7 consultation database revealed that USACE completed approximately 450 individual consultations with NMFS from 2012 to 2021 on dredging projects in areas being considered for critical habitat in the NA DPS. This total included more than 420 informal consultations and 23 formal consultations. Nearly 250 of the 450 consultations were on dredging projects occurring in the portions of potential critical habitat from Virginia to Massachusetts, including approximately 70 in New York and 50 in Virginia. Florida accounted for 130 individual consultations on dredging projects, including 117 informal consultations and 13 formal consultations. Many of these projects used the dredged material for beach nourishment, which was the primary activity for 43 individual Section 7 consultations that took place from 2012 to 2021. These included 35 informal and eight formal consultations. Twenty-nine of the 43 consultations were on beach nourishment projects in Florida that fell outside the jurisdiction of SARBO.

2.3.1.3 Regulatory Baseline

For the activities described above, existing regulations, policies, best management practices, and guidelines implemented by Federal and state governments provide a baseline level of protection to green sea turtle habitat even absent designation of critical habitat. Baseline protections related to construction, dredging, and disposal activities afforded the green sea turtle and its habitat are described in this section.

ENDANGERED SPECIES ACT

The Endangered Species Act is the primary source of protection for the green sea turtle and its habitat. The Act provides baseline protection for the green sea turtle under sections 7, 9, and 10. In particular, Section 7 of the Act requires Federal agencies to consult with NMFS to ensure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of the green sea

turtle. Consultation requirements and implementation of conservation recommended due to consultation considering the potential for an activity to result in jeopardy are considered baseline costs of green sea turtle conservation and recovery.

Section 404 of the Clean Water Act gives the USACE permit authority to regulate dredging and other activities that discharge dredged or fill material into the waters of the U.S. Title I of the Marine Protection, Research, and Sanctuaries Act gives the USACE permit authority specifically over the dumping into ocean waters of dredged spoils. This permitting program constitutes a Federal nexus for projects involving dredging and disposal of dredged materials, and triggers Section 7 consultation.

In the past, NMFS has recommended various measures to minimize the impact of construction, dredging, disposal, and beach nourishment projects on the green sea turtle even absent critical habitat designation. Measures regularly recommended by NMFS in consultation to avoid adverse impacts of construction activities include:

- Avoid collisions with turtles;
- Inform construction personnel that turtles are protected under the ESA;
- Ensure that siltation barriers be made of material in which a sea turtle cannot become entangled, be properly secured, and be regularly monitored;
- Construction vessels must operate at “no wake/idle” speeds and follow marked channels;
- Monitor area for turtles and take precautions if turtles are sighted within 100 yards of operation;
- Display educational signage;
- Participate in the sea turtle stranding and salvage network;
- Minimize night time lighting; and
- Reporting requirements (NMFS 2006).

Measures recommended to avoid adverse impacts of dredging and disposal on green sea turtles have included, but are not limited to:

- Restrict hopper dredging to the months of December through March;
- Screen inflow and outflow of dredged material;
- Equipment requirements such as sea turtle deflecting dragheads;
- Vessels used for dredging or material transport should avoid approaching sea turtles closer than 100 yards; and
- Monitoring and reporting requirements (NMFS 1997; NMFS 2007; NMFS 2012).

NMFS has generally suggested these conservation efforts for construction, dredging, and disposal

projects carried out within the areas being considered for green sea turtle critical habitat even absent critical habitat designation. Consequently, this analysis considers implementation of these conservation efforts to constitute baseline costs of conservation for green sea turtles. That is, decisions regarding designation of critical habitat are not expected to affect these conservation efforts or their associated costs.

CLEAN WATER ACT

Section 404 of the CWA requires parties to obtain a permit from the USACE prior to discharging dredge or fill material into "waters of the United States" (16 USC § 1344). Construction, dredging, and disposal activities within the study area are likely to require section 404 permitting. The USACE's review of projects for the issuance of section 404 permits requires Section 7 consultation with the Service to the extent that the project may affect listed species or critical habitat. As part of the section 404 permit process, the USACE reviews the potential effects of the proposed action on plant and animal populations and recommends efforts to avoid adverse effects to these populations in addition to the wetlands themselves. In general, conservation efforts for plants and animals include:

- Select sites or manage discharges to ensure that habitat remains suitable for indigenous species;
- Avoid sites having unique habitat or other value, including habitat of threatened or endangered species;
- Utilize habitat development and restoration techniques to minimize adverse impacts and compensate for destroyed habitat;
- Time discharge to avoid biologically critical time periods; and
- Avoid the destruction of remnant natural sites within areas already affected by development (40 CFR 230.75).

As these conservation efforts would be required by the USACE for section 404 permits regardless of critical habitat designation, impacts of implementing these conservation efforts provide baseline protection to the green sea turtle and its habitat.

NATIONWIDE PERMIT PROGRAM

The Nationwide Permit Program allows the USACE to issue general permits on a nationwide basis for specific categories of activities that involve discharges of dredged and fill material that are determined to only cause minimal environmental effects. In December 2021, the USACE completed reauthorization of 52 existing nationwide permits (NWPs) and issuance of five new NWPs that authorize the discharge of dredged or fill materials into water of the United States through 2026 (86 FR 73522). The Biological Opinion issued by NMFS on the prior reauthorization of the NWP program does not assess the effects of individual discharges authorized by one or more of these permits, but instead is a national-level consultation on an action or series of actions affecting many species, including green sea turtles. Specific uses of these proposed permits would require subsequent consultations by NMFS regions where a proposed activity may affect listed species, and may include specific terms and conditions that protect green sea turtle and its habitat (NMFS 2014a).

SARBO AND GRBO

SARBO and GRBO were issued by NMFS through consultation with the USACE and consider all hopper dredging activity at the regional level, thus providing guidance on how the activities can be implemented to avoid adverse impacts on listed species and critical habitats and avoiding the need for consultation on each individual dredging effort. The 2020 SARBO, which covers maintenance dredging and beach nourishment activities, states that the loss of seagrass will have an insignificant effect on green sea turtles because "dredging and placement activities are limited to activities that are either a continued use of previously dredged areas or material placement locations where seagrasses have previously been removed, or limited to new areas that will avoid seagrasses to the maximum extent practicable." In addition, projects that may generate turbidity must adhere to PDCs intended to minimize the risk of turbidity and sedimentation reaching non-ESA-listed corals, sponges, and other natural resources. New beach nourishment and placement is permitted outside the range of corals if, among other requirements, the "new beach nourishment is limited to placement in areas lacking hard bottom and seagrasses that may be used as foraging or refuge for ESA-listed species" (NMFS 2020a). PDCs identified in the 2020 SARBO that are intended to protect the loss of habitat due to beach nourishment and dredging include:

- Selection and positioning of equipment to minimize the risk of turbidity and sedimentation reaching non-mobile species such as corals and sponges;
- Minimization of turbidity in nearshore waters through the use of methods that promote settlement before water returns to the water body;
- Employment of land-based erosion and sediment control measures to the maximum extent practicable to further control turbidity and marine sedimentation;
- Within the range of Cape Canaveral to Miami-Dade, Florida, and in the U.S. Caribbean, avoidance of removal or placement of materials on nearshore or surf-zone, low profile hardbottom outcroppings, and prohibition against continued maintenance of existing beach nourishment projects unless protection of this type of habitat has already been considered when calculating the equilibrium toe of fill;
- Implementation of a 400-ft. buffer between any equipment used in sand removal projects and any significant non-coral hardbottom areas or bottom structures that serve as attractants to sea turtles for foraging or shelter;
- Minimization of lighting associated with beach nourishment activities conducted at night to reduce potential disorientation effects on female sea turtles approaching nesting beaches and sea turtle hatchlings making their way seaward from their natal beaches;
- Required surveying for the presence of coral hardbottom, to identify where ESA-listed corals may occur and to protect the *Acropora* critical habitat essential feature; and
- Prohibition against dredging that requires the penetration of rock or other hard substrate within the range of ESA-listed corals.

In its present state, GRBO largely covers the types of activities that are covered under the 2020 SARBO, with some exceptions. It is possible that NMFS and USACE will work to broaden the scope of GRBO to encompass all regulatory and civil works activities through Section 7 consultation. In this case, it is likely that a significantly greater share of future USACE-permitted and USACE civil work projects occurring in

the areas being considered for critical habitat designation that overlap with the geographic jurisdiction of GRBO will be covered by GRBO. However, the timing and likelihood of such a revision to GRBO is unknown. For purposes of this analysis, no such revision and expansion in scope is anticipated over the next ten years.

Pac-SLOPES

Completed in 2010, Pac-SLOPES constitutes a set of approved programmatic guidance criteria under which the USACE Honolulu District can issue permits for common nearshore and in-water activities in the Central and Western Pacific Regions (NMFS 2010a). This programmatic consultation covers USACE-permitted activities around the Main Hawaiian Islands, the Northwest Hawaiian Islands, American Samoa, Guam, the Northern Mariana Islands, and the Pacific Remote Island Areas. Coverage is limited to activities on land and within three miles of the shoreline. Pac-SLOPES covers 14 activities, with certain limitations and restrictions, including:

- Site preparation for above- or over-water construction;
- Survey activities;
- Marina or harbor repair & removal;
- Piling repair and removal;
- Buoy installation & repair;
- Maintenance dredging;
- Other minor discharges and dredging/excavation;
- Utility line installation & repair;
- Outfall structure repair & replacement;
- Bank stabilization;
- Stream clearing;
- Road construction, repair, and improvement;
- Bridge repair & replacement; and
- Vessel removal.

All projects proposed for authorization under Pac-SLOPES will undergo review by NMFS to ensure they fit into the range of approved effects. Pac-SLOPES includes comprehensive best management practices (BMPs) that are specific to each of the 14 project types outlined above. These BMPs are intended to minimize the potential for, or effect of, direct and indirect impacts on protected marine species and their habitats.

General conditions required of all projects considered under the programmatic consultation include:

- Limiting project footprints to the minimum necessary to complete the project;
- Consideration of sensitive resource areas;
- Appropriate project timing to minimize effects on ESA-listed species and their habitats;
- Pollution control measures; and
- Stabilization of disturbed areas following cessation of activities.

Furthermore, the following conditions are required of maintenance dredging projects conducted under the programmatic consultation:

- Operation of heavy equipment from above and out of the water;
- Disposal of dredged material at upland sites or at EPA-designated ocean disposal sites;
- Use of appropriate silt containment devices to avoid impacts to the benthic community; and
- No dredging of coral reefs or sites that support submerged aquatic vegetation.

JAXBO

JAXBO covers 10 categories of minor in-water construction activities occurring in Florida and the U.S. Caribbean on sea turtles, including the green sea turtle, as well as several additional ESA-listed species and designated critical habitats (NMFS 2017a). Activities covered under JAXBO include:

- Shoreline stabilization;
- Pile-supported structures and anchored buoys;
- Maintenance, minor, and muck dredging;
- Water-management outfall structures and associated endwalls;
- Scientific survey devices;
- Boat ramps;
- Aquatic habitat enhancement, reestablishment, and restoration activities;
- Transmission and utility lines;
- Marine debris removal; and
- Temporary platforms, fill, and cofferdams.

Prior to authorizing a covered activity under JAXBO, the USACE (or entity with delegated authority) must conduct a project-specific review to ensure that all PDCs are met. Among the PDCs that constitute baseline protections to green sea turtles and their habitat are the following:

- Protected species-related education and monitoring requirements for all personnel associated with a project;

- Maintenance by vessel operators of a minimum distance of 150 ft. from sea turtles;

- Deployment of turbidity control measures, including to ensure species' entry or exit from designated critical habitat is not blocked; and

- Avoidance and minimization, to the extent practicable, of impacts to non-ESA-listed native, non-invasive seagrasses.

PDCs specific to maintenance, minor, and muck dredging include:

- Limiting maintenance dredging of existing areas to the depth and width previously authorized by the USACE or other regulatory authority;

- Disposal of all dredged material in an USACE-verified upland disposal site, EPA- or USACE-designated open water disposal site, or similar approved area;

- Prohibition against the use of in-water disposal sites for dredged material unless the site has previously undergone Section 7 consultation with NMFS;

- Upland disposal of beach quality sand on beaches if placed above the existing MHW, if the grain size analysis indicates that the dredged sand is compatible with the existing beach sand, and if the sand placement does not change the existing waterward extension of the beach; and

- Permissibility of dredging in areas of U.S. Caribbean sea turtle critical habitat, provided the project adheres to all applicable dredging-related PDCs. Projects that are located within the geographic boundaries of U.S. Caribbean sea turtle critical habitat (hawksbill, leatherback, existing green sea turtle) are not covered under the Opinion if non-ESA-listed, native, non-invasive seagrasses are found within the project footprint.

The 2017 NLAA Program identifies a number of PDCs that offer protection to green sea turtles' foraging and migratory habitat, including, but not limited to, the following:

- No work will have an adverse effect on ESA-listed species or designated critical habitat, and no work will cause adverse modification or destruction to proposed critical habitat;

- If it is possible for ESA-listed species to pass through the action area, a zone of passage with appropriate habitat must be maintained; and

- The project may not adversely impact any submerged aquatic vegetation (SAV) (NMFS 2017b).

The PDCs identified in these programmatic Biological Opinions are designed to minimize the potential for projects authorized under the programmatic consultation to impact Endangered Species Act (ESA)-listed marine animals, including green sea turtles, and their habitat. These measures will be implemented as a matter of course according to the existing Biological Evaluation regardless of critical habitat designation. Projects proposed that do not fit within the project types included in the consultation will undergo separate project-specific consultation with NMFS.

FLORIDA STATE PROGRAMMATIC GENERAL PERMIT

Florida State Programmatic General Permit (SPGP VI) conveys general authority from the USACE to the Florida Department of Environmental Protection for authorizing CWA permit requests for the following types of minor work throughout the state with the exception of Monroe County:

- Shoreline stabilization;
- Boat ramps and boat launch areas and structures associated with such ramps or launch areas;
- Docks, piers, associated facilities, and other minor piling supported structures; and
- Maintenance dredging of canals and channels (Florida Department of Environmental Protection 2022).

The State Programmatic General Permit includes specific construction conditions designed to minimize impacts to green sea turtles as well as their foraging and resting habitat, as well as smalltooth sawfish. Specifically,

- The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.
- The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.
- Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.
- All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.
- If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.
- Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division and the

local authorized sea turtle stranding/rescue organization.

- Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation (Florida State Department of Environmental Protection 2006).

MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT

The Marine Protection, Research and Sanctuaries Act (MPRSA), also known as the Ocean Dumping Act, prohibits the dumping of material into the ocean that would unreasonably degrade or endanger human health or the marine environment. The USACE issues permits under MPRSA for ocean dumping using EPA's environmental criteria and subject to EPA's concurrence (EPA 2022a). This regulation would cover off-shore dumping of dredged material, which is considered a threat to the green sea turtle and its habitat.

CALIFORNIA EELGRASS MITIGATION POLICY

In addition, the California Eelgrass Mitigation Policy established an eelgrass survey protocol to evaluate impacts from coastal development projects and mitigation requirements to ensure no net loss of habitat function. Turbidity best monitoring practices are in place to reduce potential deleterious impacts of hydrologic dredging on eelgrass (NOAA Fisheries 2022). These practices include the use of turbidity curtains where appropriate and feasible, use of low impact equipment and methods, limiting activities by tide or day-night windows to limit light degradation within eelgrass habitat, and utilizing 24-hour dredging to reduce the overall duration of work and to take advantage of dredging during dark periods when photosynthesis is not occurring. In addition, compensatory mitigation is required for dredge or fill projects that result in the loss of eelgrass (NOAA Fisheries 2014).

USCG ATON PROGRAM

When establishing, maintaining, or discontinuing ATONs, USCG follows project design criteria intended to prevent or minimize adverse effects to ESA-listed species and critical habitat (NMFS 2018d). These include:

- Use of environmental observers to identify ESA-listed marine species and designated critical habitats.

- Installation of turbidity barriers to minimize sedimentation of adjacent habitats.

- Prohibition against anchoring of vessels on coral habitats and the use of drag hooks where ESA-listed corals are present.

- Maximization of the accuracy of sinker replacements on or near reef and seagrass habitats through utilization of the ship’s most accurate navigation and positioning systems and the careful lowering of sinkers.

- Avoidance of impacts to seagrass hardbottom to the maximum extent practicable during ATON operations.

- When practicable, use of smaller diameter pilings for construction in or close to seagrass,

oysters, hardbottom, and corals.

2.3.1.4 Results of Analysis

Recommended conservation efforts for construction, dredging, and disposal activity in potential critical habitat areas may be requested by NMFS to the extent that protections already anticipated under the baseline for the analysis (i.e., absent critical habitat designation) do not avoid the destruction or adverse modification of critical habitat for the species.

Generally, in-water construction activities are already managed according to best management practices and Biological Opinions, as described above, such that the project is unlikely to require reasonable and prudent alternatives to avoid the destruction or adverse modification of critical habitat. That is, in avoiding take of and jeopardy to sea turtles, these activities are unlikely to destroy or adversely modify critical habitat. Accordingly, we do not anticipate any costs of additional conservation efforts.

Consultations regarding nearshore construction (e.g., marinas and docks), offshore construction (breakwaters, artificial reefs), and dredging and disposal activities are also not likely to generate additional conservation efforts for green sea turtles. NMFS anticipates the conservation efforts made as part of consultations on these projects and activities may be more easily tied to the need to avoid adverse modification because it may be more straightforward for NMFS to relate the activity to the potential for adverse modification than to the potential for jeopardy. The outcome of Section 7 consultation for these activities, however, is not expected to be different with or without critical habitat designation for the green sea turtles. Costs of consultations on these activities are accordingly limited to additional administrative costs of consultation.

Existing PDCs specific to beach nourishment are generally sufficient to ensure that beach nourishment projects do not result in the loss of value of foraging habitat to green sea turtles. For example, in addition to the PDCs identified in the 2020 SARBO, the Florida Department of Environmental Protection's (FDEP) Strategic Beach Management Plan for the Southeast Atlantic Coast Region of Florida, specifies that the "protection of marine turtles and hardbottom habitat are the primary environmental concerns within this subregion" (Florida Department of Environmental Protection 2020). The document addresses beach management plans for 91.1 miles of beaches from Martin County to Miami-Dade County, including 72.1 miles of critically eroded and 48.1 miles of actively managed beaches. Throughout the subregion, "projects have been designed and implemented to avoid or minimize adverse impacts to marine turtles and hardbottom habitat," and "the timing of construction activities has been restricted during the marine turtle nesting season of March 1 through October 31."

As such, NMFS generally does not anticipate critical habitat designation will generate additional conservation efforts for the green sea turtles specific to beach nourishment projects. However, NMFS has expressed concern that proposed beach nourishment projects in potential critical habitat in the EP DPS, as currently planned, do not sufficiently address potential impacts to essential fish habitat (EFH) and ESA-listed species that may occur in the action areas (NOAA 2011; NMFS 2015). USACE Civil Works has not initiated Section 7 consultation on either the San Clemente Shoreline Project or the Encinitas-Solana Beach project, despite NMFS' identification of possible impacts of both projects to green sea turtles and other ESA-listed species. NMFS has also communicated to USACE Civil Works that both projects would likely result in the removal of surfgrass, which is important habitat for green sea turtles. NMFS has further expressed to USACE that surfgrass should be considered a special aquatic site, which is defined in the context of Section 404 of the CWA as a "geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and

easily disrupted ecological values" (U.S. Environmental Protection Agency 2022b), and should therefore be protected against the potentially damaging effects of dredging and beach nourishment activities. While it is possible that surfgrass habitat should receive protections under the baseline, this analysis conservatively assumes that measures implemented to mitigate potential deleterious effects to surfgrass of beach nourishment activities conducted in the EP DPS would represent an incremental cost of green sea turtle critical habitat. Specifically, it is assumed that the costs of monitoring turbidity and sedimentation levels and deploying sediment and turbidity control barriers would be incremental to baseline project costs and directly attributable to the potential critical habitat designation. Absent knowledge of the exact timing and location of all future beach nourishment projects in the EP DPS, this analysis assumes that four such projects will occur over the next 10 years and that each will incur the incremental costs of these project modifications. This volume of projected EP DPS beach nourishment projects that would consider effects to green turtle critical habitat reflects the total number of such projects either completed or in the planning stage during the 2012-2021 time frame.

NMFS currently consults on regulatory construction, dredging, disposal, and beach nourishment projects within the areas being considered for marine critical habitat. Absent a specific forecast of the frequency and locations of such projects over the next ten years, we generally assume that the past rate and location of consultation on construction, dredging, disposal, and beach nourishment actions based on the Section 7 (and, in the case of the EP DPS, EFH) consultation history is generally reflective of the future rate and location of consultations. The one exception to this approach is for construction activities occurring in areas under the JAXBO jurisdiction. Analysis of the numbers of informal consultations indicated a statistically significant decrease in the rate of informal Section 7 consultations on potentially eligible construction projects between the years 2012-2017 and 2018-2021.[4] Projections of future informal consultations on in-water and coastal construction projects in Florida, Puerto Rico, and the USVI are based on the average annual rate of informal consultations in these areas over the last four years of the timeframe of the historical analysis (i.e., when JAXBO went into effect).

As shown in Table 3, we project that NMFS will complete just over 2,506 Section 7 consultations over the next ten years on in-water and coastal construction, dredging and disposal, and beach nourishment activities that consider effects to green sea turtle critical habitat. This total includes approximately 2,172 informal consultations, 318 formal consultations, and 16 programmatic consultations. This analysis conservatively assumes that the potential critical habitat designation would result in the reinitiation of 11 programmatic consultations. The large majority of the 2,506 consultations (1,957), including 280 formal consultations and 14 programmatic consultations, are projected to be on in-water and coastal construction activities, with 498 (including 26 formal and to programmatic) consultations on dredging and disposal activities. We forecast that there will be 51 consultations on beach nourishment activities, including 12 formal consultations.

Approximately 80 percent of the consultations are projected to be on activities occurring in the North Atlantic DPS, with the highest concentration (approximately 1,135 consultations) in Florida. The East Pacific DPS and Central North Pacific DPES are projected to account for 355 and 74 consultations (out of the total of 2,506), respectively, with lower numbers of consultations occurring in the South Atlantic (33), Central West Pacific (15), and Central South Pacific (17) DPSs.

[4] A t-test was used to test for a statistically significant difference in the average annual rate of informal consultations between the two sample time frames.

Table 3. PROJECTED QUANTITY AND DISTRIBUTION OF SECTION 7 CONSULTATIONS ON IN-WATER AND COASTAL CONSTRUCTION, DREDGING AND DISPOSAL, AND BEACH NOURISHMENT ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT AND TYPE (2023- 2032)

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Sargassum	11.0	96.0	0.0	107.0
Massachusetts	0.0	35.8	1.1	36.9
Rhode Island	2.0	11.8	0.1	13.9
Connecticut	0.0	50.8	0.1	50.9
New York	4.0	162.8	0.1	166.9
New Jersey	1.5	73.8	0.6	75.9
Delaware	2.5	17.8	0.6	20.9
Maryland	0.0	14.8	0.1	14.9
Virginia	5.0	94.8	0.1	99.9
NC: Albemarle Sound	0.0	1.4	0.2	1.6
NC: Pamlico, Core, and Back Sounds	2.0	14.4	0.2	16.6
NC: Bogue Snd, White Oak/New/Cape Fear R.	3.0	27.4	0.2	30.6
NC: Currituck Sound	0.0	5.1	0.2	5.3
South Carolina	2.0	28.8	0.6	31.5
Georgia	2.0	29.0	0.6	31.6
Florida	253.0	876.0	5.6	1,134.6
Alabama	1.3	20.6	0.0	21.9
Mississippi	1.3	16.6	0.0	17.9
Louisiana	1.3	17.4	0.0	18.7
Texas (other areas)	1.3	15.3	0.0	16.5
TX: Galveston Bay to Lavaca, Matagorda Bay	1.0	5.0	0.0	6.0
TX: Lavaca, Matagorda Bay to Laguna Madre	0.0	13.0	0.0	13.0
Texas: Laguna Madre	0.0	2.0	0.0	2.0
Mona Island South	0.0	0.1	0.1	0.2
Mona Island North	0.0	0.1	0.1	0.2
Culebra Island	2.0	9.2	0.2	11.4
Puerto Rico: other areas	1.0	29.2	0.2	30.4
Vieques North	0.0	0.8	0.2	1.0
Vieques East	0.0	0.2	0.2	0.4
Vieques South	0.0	0.2	0.2	0.4
Puerto Rico North	3.0	26.7	0.2	29.9
Puerto Rico Guayama	0.0	1.3	0.2	1.5
Puerto Rico Maunabo	0.0	0.7	0.2	0.9
North Atlantic DPS	**300.0**	**1,698.3**	**12.9**	**2,011.1**
St. John, USVI (High)	0.0	0.1	0.1	0.1
St. Thomas, USVI (High)	0.0	1.0	0.1	1.1
St. Croix, USVI (High)	0.0	3.7	0.1	3.8
St. John, USVI (Moderate)	1.0	1.9	0.1	3.0
St. Thomas, USVI (Moderate)	2.0	19.0	0.1	21.1
St. Croix, USVI (Moderate)	0.0	3.7	0.1	3.8
South Atlantic DPS	**3.0**	**29.4**	**0.5**	**32.9**
United States/Mexico border to San Diego Bay	0.0	22.1	0.0	22.1

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
San Diego Bay	0.0	45.8	0.0	45.8
Mission Bay	0.0	3.4	0.0	3.4
Point Loma to (but not incl.) La Jolla Shores	0.0	0.0	0.0	0.0
La Jolla Shores/Cove	0.0	0.0	0.0	0.0
La Jolla Shores to Oceanside (incl. Oceanside)	2.0	6.4	0.0	8.4
Agua Hedionda Lagoon	0.0	6.1	0.0	6.1
Oceanside to San Onofre	0.0	1.7	0.0	1.7
San Onofre	0.0	5.1	0.0	5.1
San Onofre to Newport (incl. Newport Bay)	3.7	86.7	0.0	90.4
Newport to Huntington Beach	0.0	3.4	0.0	3.4
Bolsa Chica Lowlands (Basin)	2.0	0.0	0.0	2.0
Seal Beach Complex	0.0	68.0	0.0	68.0
LA and Long Beach Harbors	0.0	37.4	0.0	37.4
LA and Long Beach Breakwater	0.0	1.7	0.0	1.7
Palos Verdes	0.0	1.7	0.0	1.7
Santa Monica Bay	0.0	18.7	0.0	18.7
Catalina Island	0.0	3.4	0.0	3.4
Channel Islands	0.0	0.0	0.0	0.0
Santa Monica Bay to Point Conception	0.0	35.7	0.0	35.7
East Pacific DPS	**7.7**	**347.3**	**0.2**	**355.2**
Hawai‘i	0.0	5.2	1.0	6.2
Kaho‘olawe	0.0	0.2	0.0	0.2
Lana‘i	0.0	5.2	0.0	5.2
Maui	0.0	12.2	1.0	13.2
Moloka‘i	0.0	0.2	0.0	0.2
O‘ahu	2.5	37.2	0.0	39.7
Niihau	0.0	0.2	0.0	0.2
Kaua‘i	0.5	6.2	0.0	6.7
Nihoa	0.0	0.0	0.0	0.0
Mokumanamana/Necker Island	0.0	0.0	0.0	0.0
Lalo/French Frigate Shoals	0.0	1.0	0.0	1.0
Kamole/Laysan Island	0.0	0.0	0.0	0.0
Kapou/Lisianski Island	0.0	0.0	0.0	0.0
Manawai/Pearl and Hermes Atoll	0.0	0.0	0.0	0.0
Kuaihelani/Midway Atoll	0.0	1.0	0.0	1.0
Hōlanikū/Kure Atoll	0.0	0.0	0.0	0.0
Johnston Atoll	0.0	0.0	0.0	0.0
Central North Pacific DPS	**3.0**	**68.5**	**2.2**	**73.7**
Tinian	0.0	1.0	0.0	1.0
Pagan	0.0	0.0	0.0	0.0
Rota	0.0	0.0	0.0	0.0
Sarigan	0.0	0.0	0.0	0.0
Alamagan	0.0	0.0	0.0	0.0
Aguijan	0.0	0.0	0.0	0.0
Guguan	0.0	0.0	0.0	0.0

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Agrihan	0.0	0.0	0.0	0.0
Saipan	0.0	2.0	0.0	2.0
Wake	0.0	0.0	0.0	0.0
CNMI (other areas)	0.0	0.0	0.0	0.0
Guam	1.0	11.0	0.0	12.0
Central West Pacific DPS	**1.0**	**14.2**	**0.1**	**15.3**
Rose Atoll	0.0	0.2	0.0	0.2
Ta'u	1.0	0.7	0.0	1.7
Ofu and Olosega	0.0	1.7	0.0	1.7
Ofu and Olosega (other areas)	0.0	0.0	0.0	0.0
Palmyra	0.0	0.0	0.0	0.0
Tutuila	2.0	11.2	0.0	13.2
Swains	0.0	0.2	0.0	0.2
Baker	0.0	0.0	0.0	0.0
Howland	0.0	0.0	0.0	0.0
Kingman	0.0	0.0	0.0	0.0
Jarvis	0.0	0.0	0.0	0.0
Central South Pacific DPS	**3.0**	**14.3**	**0.1**	**17.4**
TOTAL	**317.7**	**2,172.0**	**16.0**	**2,505.7**
Fractions of consultations occurred as a result of assigning some consultations to two or more units.				

ADMINISTRATIVE COSTS

The effort required to address adverse effects to the potential critical habitat is assumed to be the same, on average, across categories of activities. Informal consultations are expected to require comparatively low levels of administrative effort, while formal and programmatic consultations are expected to require comparatively higher levels of administrative effort. For all formal and informal consultations, we anticipate that incremental administrative costs will be incurred by NMFS, a federal action agency, and, potentially, a third party. For programmatic consultations, we anticipate that costs will be incurred by NMFS and a federal action agency. Incremental administrative costs per consultation effort are expected on average to be $13,000 for programmatic, $6,600 for formal, and $3,200 for informal consultations (see Table 4).

Table 4. INCREMENTAL COSTS PER CONSULTATION RESULTING FROM THE ADDITIONAL ADMINISTRATIVE EFFORT TO ADDRESS ADVERSE MODIFICATION FOR ACTIVITIES IN THE POTENTIAL CRITICAL HABITAT (2022$)

CONSULTATION TYPE	NMFS	FEDERAL ACTION AGENCY[(1)]	THIRTY PARTY	BIOLOGICAL ASSESSMENT COST	TOTAL COST
Informal	$920	$1,200	$540	$530	$3,200
Formal	$2,100	$2,300	$930	$1,300	$6,600
Programmatic	$6,200	$5,200	N/A	$1,500	$13,000

CONSULTATION TYPE	NMFS	FEDERAL ACTION AGENCY(1)	THIRTY PARTY	BIOLOGICAL ASSESSMENT COST	TOTAL COST

Source: Industrial Economics analysis of full administrative costs which was based on data from the federal Government Schedule Rates, and a review of consultation records from several Service field offices across the country conducted in 2002; revised by NMFS to reflect current federal Government Schedule Rates for the locality pay area of Washington, Baltimore-Arlington, DC-MD-VA (U.S. Office of Personnel Management 2022).

We estimate the incremental administrative costs of Section 7 consultation by applying these per consultation costs to the forecast number of consultations (presented in Table 3); the resulting annualized costs, by unit and activity type, are presented in Table 5. Table 5 also presents the present value (PV) of total projected costs over the ten years, 2023-2032, assuming both a seven percent discount rate and three percent discount rate.

PROJECT MODIFICATION COSTS

As discussed above, this analysis assumes that the potential critical habitat would require that measures be implemented to mitigate potential deleterious effects to surfgrass of beach nourishment activities conducted in the EP DPS and, further, that the costs of these project modifications (conditions monitoring and the deployment of sediment and turbidity control barriers) would be incremental to baseline costs. The per-project costs of conditions monitoring turbidity and sedimentation levels and the deployment of sediment and turbidity control barriers are assumed to be $28,000[5] and $5,900[6], respectively. Table 5 presents a range of costs for units of the East Pacific DPS where beach nourishment projects are forecasted to occur over the next 10 years. The low-end estimate reflects the assumption that no incremental project modifications result from green sea turtle critical habitat, while the high-end estimate includes the additional costs of conditions monitoring and deployment of sediment and turbidity control barriers.

TOTAL COSTS

Incremental costs of green sea turtle critical habitat to in-water and coastal construction, dredging and disposal, and beach nourishment activities are projected to total between $6.5 million and $6.6 million over the next ten years (discounted at seven percent), at an annualized cost of $930,000 to $940,000. The North Atlantic DPS is expected to account for $5.3 million in total costs ($760,000 annualized), with Florida alone accounting for $3.2 million in total costs. Total costs are projected to range between $810,000 and $860,000 in the East Pacific DPS over the next ten years (assuming a 7 percent discount rate),[7] or between $115,000 and $120,000 in annualized costs. These costs are largely driven by the San Onofre to Newport ($210,000 – $230,000 in total costs, $30,000 to $33,000 annualized) and Seal Beach Complex ($150,000 in total costs, $21,000 annualized) units. No individual unit across the South Atlantic, Central North Pacific, Central West Pacific, and Central South Pacific DPSs is projected to account for more than $13,000 in annualized costs (O'ahu). While not shown in Table 5, in-water and coastal construction activities account for $5.2 million of total construction-related (including dredging and

[5] Based on a 2015 Tetra Tech Inc. contract with National Park Service for reef and seagrass monitoring in inshore/nearshore waters of Biscayne National Park and a 2015 Tetra Tech Inc. contract with Great Lakes Dredge and Dock for Port of Miami Expansion, inflated to 2022 dollars; assumes a beach nourishment project lasts five days.

[6] Based on email communication from Tetra Tech to Industrial Economics, Inc., June 15, 2015; reflects the costs for application of barriers for a small project (150 ft. perimeter curtain), inflated to 2022 dollars using the GDP Price Deflator.

[7] U.S. Office of Management and Budget (OMB) guidance states that a discount rates of 7 percent and 3 percent should for regulatory analysis (OMB 2003).

disposal and beach nourishment) costs (discounted at seven percent), with dredging and disposal and beach nourishment accounting for $1.2 million and $140,000 – $150,000 in costs over ten years.

Table 5. PROJECTED INCREMENTAL COSTS (IN 2022 DOLLARS) OF SECTION 7 CONSULTATIONS ON IN-WATER AND COASTAL CONSTRUCTION, DREDGING AND DISPOSAL, AND BEACH NOURISHMENT ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT (2023- 2032)

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Sargassum	$38,000	$260,000	$320,000
Massachusetts	$14,000	$100,000	$120,000
Rhode Island	$5,400	$38,000	$46,000
Connecticut	$16,000	$110,000	$140,000
New York	$54,000	$380,000	$460,000
New Jersey	$26,000	$180,000	$220,000
Delaware	$8,900	$62,000	$76,000
Maryland	$5,000	$35,000	$43,000
Virginia	$34,000	$240,000	$290,000
NC: Albemarle Sound	$930	$6,500	$7,900
NC: Pamlico, Core, and Back Sounds	$6,300	$45,000	$54,000
NC: Bogue Snd, White Oak/New/Cape Fear R.	$11,000	$78,000	$95,000
NC: Currituck Sound	$2,100	$15,000	$18,000
South Carolina	$12,000	$84,000	$100,000
Georgia	$12,000	$85,000	$100,000
Florida	$450,000	$3,200,000	$3,900,000
Alabama	$7,400	$52,000	$63,000
Mississippi	$6,200	$43,000	$53,000
Louisiana	$6,400	$45,000	$55,000
Texas (other areas)	$5,700	$40,000	$49,000
TX: Galveston Bay to Lavaca, Matagorda Bay	$2,300	$16,000	$20,000
TX: Lavaca, Matagorda Bay to Laguna Madre	$4,200	$30,000	$36,000
Texas: Laguna Madre	$740	$5,200	$6,300
Mona Island South	$300	$2,100	$2,600
Mona Island North	$300	$2,100	$2,600
Culebra Island	$4,600	$32,000	$39,000
Puerto Rico: other areas	$10,000	$72,000	$87,000
Vieques North	$610	$4,300	$5,200
Vieques East	$420	$2,900	$3,500
Vieques South	$420	$2,900	$3,500
Puerto Rico North	$11,000	$76,000	$92,000
Puerto Rico Guayama	$770	$5,400	$6,600
Puerto Rico Maunabo	$570	$4,000	$4,900
North Atlantic DPS	**$760,000**	**$5,300,000**	**$6,500,000**
St. John, USVI (High)	$230	$1,600	$2,000
St. Thomas, USVI (High)	$530	$3,700	$4,500
St. Croix, USVI (High)	$1,400	$9,800	$12,000
St. John, USVI (Moderate)	$1,500	$10,000	$13,000
St. Thomas, USVI (Moderate)	$7,500	$53,000	$64,000

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
St. Croix, USVI (Moderate)	$1,400	$9,800	$12,000
South Atlantic DPS	**$13,000**	**$88,000**	**$110,000**
United States/Mexico border to San Diego Bay	$7,000	$49,000	$60,000
San Diego Bay	$14,000	$100,000	$120,000
Mission Bay	$1,100	$7,700	$9,400
Point Loma to (but not incl.) La Jolla Shores	$26	$180	$220
La Jolla Shores/Cove	$26	$180	$220
La Jolla Shores to Oceanside (incl. Oceanside)	$3,400 – $6,800	$24,000 – $47,000	$29,000 – $58,000
Agua Hedionda Lagoon	$2,000	$14,000	$17,000
Oceanside to San Onofre	$560	$4,000	$4,800
San Onofre	$1,600	$11,000	$14,000
San Onofre to Newport (incl. Newport Bay)	$30,000 – $33,000	$210,000-$230,000	$250,000–$280,000
Newport to Huntington Beach	$1,100	$7,700	$9,400
Bolsa Chica Lowlands (Basin)	$1,300	$9,400	$11,000
Seal Beach Complex	$21,000	$150,000	$180,000
LA and Long Beach Harbors	$12,000	$83,000	$100,000
LA and Long Beach Breakwater	$560	$4,000	$4,800
Palos Verdes	$560	$4,000	$4,800
Santa Monica Bay	$5,900	$42,000	$51,000
Catalina Island	$1,100	$7,700	$9,400
Channel Islands	$26	$180	$220
Santa Monica Bay to Point Conception	$11,000	$79,000	$96,000
East Pacific DPS	**$115,000–$120,000**	**$810,000–$860,000**	**$980,000 – $1,050,000**
Hawai‘i	$2,900	$21,000	$25,000
Kaho‘olawe	$75	$530	$640
Lana‘i	$1,700	$12,000	$14,000
Maui	$6,400	$45,000	$55,000
Moloka‘i	$75	$530	$640
O‘ahu	$13,000	$94,000	$110,000
Niihau	$75	$530	$640
Kaua‘i	$2,300	$16,000	$20,000
Nihoa	$36	$250	$300
Mokumanamana/Necker Island	$36	$250	$300
Lalo/French Frigate Shoals	$350	$2,500	$3,000
Kamole/Laysan Island	$36	$250	$300
Kapou/Lisianski Island	$36	$250	$300
Manawai/Pearl and Hermes Atoll	$36	$250	$300
Kuaihelani/Midway Atoll	$350	$2,500	$3,000
Hōlanikū/Kure Atoll	$36	$250	$300
Johnston Atoll	$36	$250	$300
Central North Pacific DPS	**$28,000**	**$200,000**	**$240,000**
Tinian	$350	$2,500	$3,000
Pagan	$36	$250	$300
Rota	$36	$250	$300
Sarigan	$26	$180	$220

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Alamagan	$26	$180	$220
Aguijan	$26	$180	$220
Guguan	$26	$180	$220
Agrihan	$26	$180	$220
Saipan	$670	$4,700	$5,700
Wake	$36	$250	$300
CNMI (other areas)	$26	$180	$220
Guam	$4,200	$29,000	$36,000
Central West Pacific DPS	**$5,400**	**$38,000**	**$46,000**
Rose Atoll	$99	$690	$840
Ta'u	$910	$6,400	$7,800
Ofu and Olosega	$570	$4,000	$4,900
Ofu and Olosega (other areas)	$26	$180	$220
Palmyra	$36	$250	$300
Tutuila	$4,900	$34,000	$42,000
Swains	$99	$690	$840
Baker	$36	$250	$300
Howland	$36	$250	$300
Kingman	$36	$250	$300
Jarvis	$36	$250	$300
Central South Pacific DPS	**$6,800**	**$48,000**	**$58,000**
TOTAL	**$930,000–$940,000**	**$6,500,000 – $6,600,000**	**$7,900,000 – $8,000,000**

2.3.1.5 Assumptions and Limitations

The economic impacts presented in this section are based on a number of assumptions that may affect the estimates. This subsection presents the key assumptions and the extent to which they may lead to under- or over-estimates of the potential incremental impacts of any critical habitat designation. Table 6 describes the key assumptions underlying the analysis of construction-related (inclusive of in-water and coastal construction, dredging and disposal, and beach nourishment) activities and the influence of those assumptions on the results of the analysis. Generally, altering assumptions and uncertainties related to the estimated administrative costs is unlikely to significantly change the findings of this analysis. The most significant uncertainty with respect to the findings relate to the potential for NMFS to provide reasonable and prudent alternatives to the way these types of projects are implemented due to the need to avoid destruction or adverse modification of critical habitat.

Table 6. ASSUMPTIONS AND LIMITATIONS OF ANALYSIS OF INCREMENTAL COSTS OF CRITICAL HABITAT DESIGNATION ON IN-WATER AND COASTAL CONSTRUCTION, DREDGING AND DISPOSAL, AND BEACH NOURISHMENT ACTIVITIES

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
This analysis generally relies on patterns of consultation within the past ten years (2012 to 2021) to	**Unknown.** May overestimate or	**Likely minor.** Data is not available to determine whether construction, dredging, and disposal activities subject to Section 7 consultation (e.g.,

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
forecast future rates of consultation activity. This analysis assumes that past consultations provide a good indication of future activity. The notable exception is the assumption that informal consultations on USACE-permitted in-water and coastal construction projects in Florida and the U.S. Caribbean will occur at the average rate of such consultations over the years 2018-2021, during which JAXBO was in effect.	underestimate incremental impacts.	those carried out or permitted by the USACE) are likely to change over time. To the extent that these activities increase over the next ten years, our analysis may underestimate the potential incremental administrative burden of critical habitat for the green sea turtle. The estimated incremental impacts per consultation are, however, relatively minor and we accordingly do not anticipate variations in consultation rates to significantly change the findings of our analysis. Moreover, this analysis conservatively assumes no future decrease in the rate of informal consultations on construction, dredging, and disposal activities in areas where programmatic consultations have been completed in recent years. To the extent that construction-related activities that previously would have been consulted on through individual informal consultation are handled programmatically, this analysis overstates impacts to these activities.
This analysis relies on patterns of consultation within the past ten years (2012 to 2021) to forecast future locations of consultation activity.	**Unknown.** May overestimate or underestimate incremental impacts in a given area.	**Likely minor.** Although the expected rate of consultation on construction, dredging, and disposal activities is not likely to vary much from year to year, the location of these consultations may change. As a result, relying on the approximate location of past consultation activity may underestimate impacts in certain locations while overestimating impacts in others. Generally, given that these activities tend to be more highly concentrated in more populated areas, we expect that consultations considering effects to green sea turtle critical habitat will continue to be concentrated where they have been in the recent past.
Other than potential project modifications to beach nourishment projects in the East Pacific DPS, critical habitat designation is unlikely to require incremental project modifications resulting from future Section 7 consultations on construction, dredging, and disposal activities.	May result in an **underestimate** of costs**.**	**Potentially major.** Given presently available information, NMFS anticipates that it is unlikely that critical habitat designation will generate additional or different recommendations for conservation efforts for the green sea turtle and its habitat with respect to most construction, dredging, and disposal activities. However, NMFS will review each individual project or activity at the time of consultation to determine whether reasonable and prudent measures are needed to avoid destruction or adverse modification of critical habitat. If NMFS recommends changes to the way these

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
		activities may be implemented in the future because of green sea turtle critical habitat, it would affect the overall findings of this analysis.
This analysis relies to a certain extent on the EFH consultation history in the East Pacific DPS to forecast future rates of Section 7 consultation.	**Unknown.** May overestimate or underestimate incremental impacts.	**Likely minor.** NMFS believes that critical habitat designation in the East Pacific will provide new information about the presence of green sea turtles in the region, which will yield an increase in the number of future Section 7 consultations that consider green sea turtles. The uncertainty associated with this assumption could result in an overestimate or underestimate of incremental impacts.

2.3.2 Water Quality Management – EPA

This activity encompasses efforts by the EPA, states, and territories to establish appropriate water quality standards, as well as ocean discharges and onshore activities that have the potential to affect water quality. This activity also includes the registration of pesticides by the Environmental Protection Agency (EPA). This section evaluates the potential effect of critical habitat designation for green sea turtles on activities that may impact marine water quality other than oil and gas activities, which are discussed in Section 2.3.8.

2.3.2.1 Description of Threat

NMFS' Draft Green Turtle Biological Report identifies marine pollution as a threat to green turtles' reproductive, foraging and resting, and migratory habitats. Pollution from construction, runoff, or outfall can affect foraging habitat by decreasing water clarity and the amount of light penetrating to depth in the water column, which impacts seagrass persistence and distribution. This threat is most common in shallow, enclosed coastal waters, such as Indian River Lagoon, a major juvenile green turtle foraging habitat along the eastern coast of Florida (Gallegos and Kenworthy 1996).

Nutrient pollution, primarily from nitrogen and phosphorous, can contribute to harmful algal blooms (National Ocean Service 2021), which may contribute to the increased occurrence of inflammation and promotion of tumor development (Perrault et al. 2017) and mortality (Walker et al. 2018) and lower reproductive success (Perrault et al. 2016). The most common HAB species, commonly known as the red tide organism, occurs throughout the Gulf of Mexico (GoM), with blooms developing as far as 10 to 40 miles offshore. The harmful effects of HABs on green turtles are particularly a concern in Florida's coastal waters, where more than 70 HAB species have been documented. Omnivorous immature green turtles can ingest these toxins through the consumption of either primary consumers in which toxins have accumulated or benthic algae and seagrasses themselves (Perrault et. al 2020).

2.3.2.2 Extent of Activity within Critical Habitat Area

A review of the Section 7 consultation history from 2012 to 2021 identified 66 consultations related to water quality management activities with action areas overlapping the potential critical habitat. These included 55 informal consultations, five formal consultations, and six programmatic consultations.

Consultations on water quality management activities were most highly concentrated in states and territories that do not maintain oversight of their own National Pollutant Discharge Elimination System (NPDES) programs, including Massachusetts, Puerto Rico, Guam, and American Samoa. There were also 14 consultations between EPA and NMFS on water quality management activities in Florida, which manages its NPDES program. The formal consultations primarily related to water quality management activities occurring in Florida. The programmatic consultations addressed:

- Chesapeake Bay water quality standards;
- USVI water quality standards;
- Industrial stormwater discharges;
- Reissuance of the construction general permit by the EPA; and
- Pesticides general permit for discharge of pollutants into U.S. waters.

2.3.2.3 Regulatory Baseline

The CWA directs states to adopt water quality standards for their waters subject to the CWA. These standards include water quality criteria expressed as constituent levels representing a quality of water that supports a particular designated use. States are required to review applicable water quality standards at least once every three years and, if appropriate, revise or adopt new WQS and submit to EPA for review and approval or disapproval. EPA consults with NMFS on approvals of water quality standard submissions that may affect listed species at this time.

The NPDES program provides a method of achieving water quality standards by regulating point sources of pollution into U.S. waters. States can be granted primacy by EPA to manage NPDES permits, though EPA retains the right to reject state programs and administer permits according to its own standards (EPA 2022c). Table 7 shows the NPDES authorization status for each state and territory considered in this economic analysis. Absent a federal nexus associated with issuance of a permit in the states and territories that manage their own NPDES programs, Section 7 consultation regarding green sea turtle critical habitat is expected to be limited to the triennial review of water quality standards, which involves EPA oversight. In states and territories that lack authorization to manage their own NPDES programs, however, Section 7 consultation would be required to the extent that EPA determines that issuance of individual NPDES permits may affect green sea turtles or the potential critical habitat.

Table 7. NPDES PROGRAM STATUS OF STATES AND U.S. TERRITORIES WITH WATERS COMPRISING AREAS BEING CONSIDERED FOR GREEN SEA TURTLE CRITICAL HABITAT

NPDES PROGRAM STATUS	STATES/TERRITORIES
Fully authorized	Rhode Island Connecticut New Jersey Delaware Maryland Virginia North Carolina South Carolina Georgia Florida Alabama Mississippi

NPDES PROGRAM STATUS	STATES/TERRITORIES
	Louisiana Texas California Hawaii
Partially authorized	USVI
Unauthorized	Massachusetts Puerto Rico American Samoa Guam Johnston Atoll Midway/Wake Islands CNMI
Source: U.S. EPA, NPDES Program Authorizations. 2022.	

As part of the process of reviewing state/tribe-adopted water quality standards for CWA section 303(c) approval, EPA considers levels that would be needed to protect green sea turtles and any other potentially impacted listed species and designated critical habitat. Current water quality standards of states and territories with waters comprising the potential critical habitat include minimum standards for water color and turbidity, nutrient levels, dissolved oxygen levels, discharge temperatures, and toxicity, among other criteria. The standards vary by jurisdiction, but all include as general guidelines the protection of marine waters, specifically aquatic life and habitats.

A biological opinion on water quality standards for the state of Florida specifies area-specific standards for nutrients, including total phosphorus (TP), total Nitrogen (TN), and Chlorophyll-a (Chl-a); dissolved oxygen (DO); and turbidity, developed by the Florida Department of Environmental Protection (FDEP) (NMFS 2016a). The FDEP sub-divided each Florida estuarine system into segments based on physical and other characteristics to determine whether the current conditions were protecting the most sensitive designated uses. Reference conditions were determined using biological data on DO concentration and/or percent saturation, Chl-a concentration, and seagrass indicators, including colonization depth, water clarity, coverage, and extent. Seagrass health and algal blooms are discussed in the opinion with respect to the development of numerical nutrient criteria (NNC), in particular. For example, the opinion specifies that the "Tampa Bay, Clearwater Harbor, Sarasota Bay, and Charlotte Harbor NNC are based on the collaborative research, data, and work of the National Estuary Programs in an effort to improve and restore seagrass." The opinion further notes the links between degraded coastal habitat and pollution and the threat of fibropapillomatosis tumors in green turtles. The opinion concluded that, for those estuary NNC that had not changed from NNC established in 2012, the proposed action was not likely to jeopardize the continued existence or recovery of potentially affected ESA-listed species, including green and other sea turtles and coral species, or destroy or adversely modify potentially affected designated critical habitat, including that of the loggerhead sea turtle. A subsequent biological opinion specifically considered NNC, including TP, TN, and Chl-a, in 42 estuary segments in Florida for which the EPA had changed NNC in 2015 (NMFS 2017c). This opinion also made an NLAA determination for the proposed action, with the exception of the Southwest Fork of the Loxahatchee River. For this segment, the opinion concluded that the proposed action was likely to adversely affect Johnson's seagrass but not expected to jeopardize the continued existence of the species or adversely modify its designated critical habitat.

NMFS' 2019 biological and conference opinion on the effects of EPA issuance of the 2021 Multi-Sector General Permit (MSGP) for stormwater discharges associated with industrial activity, pursuant to the

NPDES, included changes made for the 2021-2026 MSGP permit term, including that permittees:

- 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; and
- 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 (NMFS 2019a).

The biological opinion specifically referenced losses of listed coral and seagrass beds in Puerto Rico from hurricanes, including Hurricane Maria in 2017, which resulted in contamination of nearshore waters due to flooding of terrestrial areas including wastewater treatment plants. The biological opinion further determined that the EPA's reissuance of the MSGP was likely to adversely affect, but not likely to jeopardize the continued existence of the green sea turtle and was not likely to destroy or adversely affect designated critical habitat for the green sea turtle (North Atlantic DPS) of loggerhead sea turtle (Northwest Atlantic DPS).

Through the 2021 Pesticide General Permit (PGP), the EPA authorizes discharges of pesticide pollutants on, over, or near waters of the U.S. over the permit period from 2021 to 2026. The pesticides issued under the PGP are limited to the states and territories that do not manage their own NPDES programs. The EPA's biological evaluation on the PGP and NMFS' opinions on the re-registration of several pesticides established that pesticides applied according to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) labeling adversely affect ESA-listed species and, in many cases, jeopardize the continued existence of ESA-listed species and result in adverse modification of their designated critical habitat (NMFS 2021a). The 2021 PGP specifies reasonable and prudent alternatives (RPAs) designed to mitigate this risk, including:

- The definition of NMFS Listed Resources of Concern, to be referenced by the EPA when determining the potential need for Section 7 consultation with NMFS, was expanded from the 2016 PGP to include "federally-listed endangered and threatened species and federally-designated or proposed critical habitat for which NMFS concluded the draft 2021 PGP, absent any additional mitigating measures, would either likely jeopardize the continued existence of such species or destroy or adversely modify such critical habitat."
- The 2021 PGP must include clear instructions in the Notice of Intent (NOI) application, to be completed by the third party applying to discharge pesticide pollutants, the type of information needed for self-certification to ensure NMFS receives the information necessary to review the NOI. This RPA includes several components designed to streamline and clarify the NOI application process specifically related to ESA Procedures.
- Applicants will be instructed to seek technical support from a NMFS Section 7 biologist if they will potentially discharge residues from the application of piscicides or pesticides that a NMFS biological opinion has determined the labeled use would jeopardize the continued existence of ESA-listed species and/or adversely modify designated critical habitat.
- With input from NMFS, EPA will develop and implement training for PGP Decision-makers that will review EPA's ESA procedures webpage and will integrate the above RPA into its web-based training effort for the 2021 PGP. This element strengthens ESA protections under the PGP by increasing awareness of those making discharges to waters where NMFS Listed Resources of

Concern occur of their need to address effects to ESA species and submit an NOI.

As noted above, EPA considers levels that would be needed to protect green sea turtles and any other potentially impacted listed species and designated critical habitat as part of the process of reviewing state/tribe-adopted water quality standards for CWA section 303(c) approval. Accordingly, the effect of developing water quality standards on green sea turtle critical habitat is a consideration even absent critical habitat designation. Recommendations that result from Section 7 consultation on water quality standards related to multiple species, including the green sea turtle, have the potential to result in more stringent water quality standards in the future. However, this would likely occur regardless of the potential critical habitat designation. Consequently, this analysis concludes that incremental costs of the potential critical habitat rule to activities related to water quality standards will be limited to the additional administrative effort required to consider impacts to the critical habitat through consultations that would occur absent designation.

2.3.2.4 Results of Analysis

This analysis projects that NMFS will complete 66 Section 7 consultations over the next ten years that consider effects of water quality management activities on green sea turtle critical habitat. This total includes 55 informal consultations, five formal consultations, and six programmatic consultations. This analysis further assumes that the potential critical habitat designation would result in the reinitiation of three formal consultations and three programmatic consultations to specifically consider effects to green turtle critical habitat. As shown in Table 8, these consultations are projected to occur primarily in Florida (14 consultations) and in states and territories that do not manage their own NPDES programs (e.g., Massachusetts, Puerto Rico, Guam, American Samoa).

Table 8. PROJECTED QUANTITY AND DISTRIBUTION OF SECTION 7 CONSULTATIONS ON WATER QUALITY MANAGEMENT ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT AND TYPE (2023- 2032)

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Sargassum	0.0	2.0	0.0	2.0
Massachusetts	0.2	6.0	0.8	7.0
Rhode Island	0.0	0.0	0.0	0.0
Connecticut	0.0	0.0	0.0	0.0
New York	0.0	0.0	0.0	0.0
New Jersey	0.0	1.0	0.0	1.0
Delaware	0.0	2.0	0.0	2.0
Maryland	0.0	0.0	0.5	0.5
Virginia	0.0	1.0	0.5	1.5
NC: Albemarle Sound	0.0	0.3	0.0	0.3
NC: Pamlico, Core, and Back Sounds	0.0	0.3	0.0	0.3
NC: Bogue Snd, White Oak/New/Cape Fear R.	0.0	0.3	0.0	0.3
NC: Currituck Sound	0.0	0.0	0.0	0.0
South Carolina	0.0	0.5	0.0	0.5
Georgia	0.0	0.5	0.0	0.5
Florida	4.0	10.0	0.0	14.0
Alabama	0.0	1.3	0.0	1.3
Mississippi	0.0	1.3	0.0	1.3

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Louisiana	0.0	2.3	0.0	2.3
Texas (other areas)	0.0	1.6	0.0	1.6
TX: Galveston Bay to Lavaca, Matagorda Bay	0.0	2.3	0.0	2.3
TX: Lavaca, Matagorda Bay to Laguna Madre	0.0	0.3	0.0	0.3
Texas: Laguna Madre	0.0	0.0	0.0	0.0
Mona Island South	0.0	0.0	0.1	0.1
Mona Island North	0.0	0.0	0.1	0.1
Culebra Island	0.0	0.0	0.2	0.2
Puerto Rico: other areas	0.0	10.0	0.2	10.2
Vieques North	0.0	0.0	0.2	0.2
Vieques East	0.0	1.0	0.2	1.2
Vieques South	0.0	0.0	0.2	0.2
Puerto Rico North	0.0	0.0	0.2	0.2
Puerto Rico Guayama	0.0	0.0	0.2	0.2
Puerto Rico Maunabo	0.0	0.0	0.2	0.2
North Atlantic DPS	**4.4**	**44.0**	**3.2**	**51.6**
St. John, USVI (High)	0.0	0.0	0.2	0.2
St. Thomas, USVI (High)	0.0	0.0	0.2	0.2
St. Croix, USVI (High)	0.0	0.0	0.2	0.2
St. John, USVI (Moderate)	0.0	0.0	0.2	0.2
St. Thomas, USVI (Moderate)	0.0	0.0	0.2	0.2
St. Croix, USVI (Moderate)	0.0	0.0	0.2	0.2
South Atlantic DPS	**0.0**	**0.0**	**1.4**	**1.4**
United States/Mexico border to San Diego Bay	0.0	0.0	0.0	0.0
San Diego Bay	0.0	0.0	0.0	0.0
Mission Bay	0.0	0.0	0.0	0.0
Point Loma to (but not incl.) La Jolla Shores	0.0	0.0	0.0	0.0
La Jolla Shores/Cove	0.0	0.0	0.0	0.0
La Jolla Shores to Oceanside (incl. Oceanside)	0.0	0.0	0.0	0.0
Agua Hedionda Lagoon	0.0	0.0	0.0	0.0
Oceanside to San Onofre	0.0	0.0	0.0	0.0
San Onofre	0.0	0.0	0.0	0.0
San Onofre to Newport (incl. Newport Bay)	0.0	0.0	0.0	0.0
Newport to Huntington Beach	0.0	0.0	0.0	0.0
Bolsa Chica Lowlands (Basin)	0.0	0.0	0.0	0.0
Seal Beach Complex	0.0	0.0	0.0	0.0
LA and Long Beach Harbors	0.0	0.0	0.0	0.0
LA and Long Beach Breakwater	0.0	0.0	0.0	0.0
Palos Verdes	0.0	0.0	0.0	0.0
Santa Monica Bay	0.0	1.0	0.0	1.0
Catalina Island	0.0	0.0	0.0	0.0
Channel Islands	0.0	0.0	0.0	0.0
Santa Monica Bay to Point Conception	0.0	0.0	0.0	0.0
East Pacific DPS	**0.0**	**1.0**	**0.0**	**1.0**
Hawai'i	0.0	0.0	0.0	0.0

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Kahoʻolawe	0.0	0.0	0.0	0.0
Lanaʻi	0.0	0.0	0.0	0.0
Maui	0.0	0.0	0.0	0.0
Molokaʻi	0.0	0.0	0.0	0.0
Oʻahu	0.0	0.0	0.0	0.0
Niihau	0.0	0.0	0.0	0.0
Kauaʻi	0.0	0.0	0.0	0.0
Nihoa	0.0	0.0	0.0	0.0
Mokumanamana/Necker Island	0.0	0.0	0.0	0.0
Lalo/French Frigate Shoals	0.0	0.0	0.0	0.0
Kamole/Laysan Island	0.0	0.0	0.0	0.0
Kapou/Lisianski Island	0.0	0.0	0.0	0.0
Manawai/Pearl and Hermes Atoll	0.0	0.0	0.0	0.0
Kuaihelani/Midway Atoll	0.0	0.0	0.1	0.2
Hōlanikū/Kure Atoll	0.0	0.0	0.0	0.0
Johnston Atoll	0.0	0.0	0.1	0.2
Central North Pacific DPS	**0.1**	**0.0**	**0.3**	**0.3**
Tinian	0.0	0.0	0.1	0.2
Pagan	0.0	0.0	0.1	0.2
Rota	0.0	0.0	0.1	0.2
Sarigan	0.0	0.0	0.0	0.0
Alamagan	0.0	0.0	0.0	0.0
Aguijan	0.0	0.0	0.0	0.0
Guguan	0.0	0.0	0.0	0.0
Agrihan	0.0	0.0	0.0	0.0
Saipan	0.0	1.0	0.1	1.2
Wake	0.0	1.0	0.1	1.2
CNMI (other areas)	0.0	0.0	0.0	0.0
Guam	0.2	4.0	0.8	5.0
Central West Pacific DPS	**0.4**	**6.0**	**1.5**	**7.8**
Rose Atoll	0.0	0.2	0.1	0.4
Ta'u	0.0	0.2	0.1	0.4
Ofu and Olosega	0.0	0.2	0.1	0.4
Ofu and Olosega (other areas)	0.0	0.0	0.0	0.0
Palmyra	0.0	0.0	0.0	0.0
Tutuila	0.0	3.2	0.1	3.4
Swains	0.0	0.2	0.1	0.4
Baker	0.0	0.0	0.0	0.0
Howland	0.0	0.0	0.0	0.0
Kingman	0.0	0.0	0.0	0.0
Jarvis	0.0	0.0	0.0	0.0
Central South Pacific DPS	**0.2**	**4.0**	**0.7**	**4.8**
TOTAL	**5.0**	**55.0**	**7.0**	**67.0**

Fractions of consultations occurred as a result of assigning some consultations to two or more units.

As noted above, NMFS does not anticipate that critical habitat designation will generate additional conservation efforts for the green sea turtles specific to water quality management activities. As such, incremental costs are anticipated to be limited to the additional administrative effort required to consider effects to the critical habitat of water quality management activities in consultations that would occur absent designation. As shown in Table 9, incremental costs of green sea turtle critical habitat to water quality management activities is projected to total $240,000 over ten years (discounted at seven percent), or $34,000 in annualized costs. Impacts are expected to be highest in units of the North Atlantic DPS ($160,000 over ten years, discounted at seven percent), with combined impacts in Florida, Massachusetts, and Puerto Rico of $102,000. Impacts are low across units of the South Atlantic, East Pacific, and Central North Pacific DPSs. Incremental costs in Guam and Tutuila are projected to total $23,000 and $10,000 over ten years.

Table 9. PROJECTED INCREMENTAL COSTS (IN 2022 DOLLARS) OF SECTION 7 CONSULTATIONS ON WATER QUALITY MANAGEMENT ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT (2023- 2032)

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Sargassum	$630	$4,400	$5,400
Massachusetts	$4,000	$28,000	$34,000
Rhode Island	$0	$0	$0
Connecticut	$0	$0	$0
New York	$0	$0	$0
New Jersey	$320	$2,200	$2,700
Delaware	$630	$4,400	$5,400
Maryland	$640	$4,500	$5,500
Virginia	$960	$6,700	$8,200
NC: Albemarle Sound	$110	$740	$900
NC: Pamlico, Core, and Back Sounds	$110	$740	$900
NC: Bogue Snd, White Oak/New/Cape Fear R.	$110	$740	$900
NC: Currituck Sound	$0	$0	$0
South Carolina	$160	$1,100	$1,300
Georgia	$160	$1,100	$1,300
Florida	$7,100	$50,000	$61,000
Alabama	$390	$2,800	$3,400
Mississippi	$390	$2,800	$3,400
Louisiana	$710	$5,000	$6,100
Texas (other areas)	$500	$3,500	$4,300
TX: Galveston Bay to Lavaca, Matagorda Bay	$740	$5,200	$6,300
TX: Lavaca, Matagorda Bay to Laguna Madre	$110	$740	$900
Texas: Laguna Madre	$0	$0	$0
Mona Island South	$110	$800	$980
Mona Island North	$110	$800	$980
Culebra Island	$230	$1,600	$2,000
Puerto Rico: other areas	$3,400	$24,000	$29,000
Vieques North	$230	$1,600	$2,000
Vieques East	$540	$3,800	$4,600
Vieques South	$230	$1,600	$2,000

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Puerto Rico North	$230	$1,600	$2,000
Puerto Rico Guayama	$230	$1,600	$2,000
Puerto Rico Maunabo	$230	$1,600	$2,000
North Atlantic DPS	**$23,000**	**$160,000**	**$200,000**
St. John, USVI (High)	$210	$1,500	$1,800
St. Thomas, USVI (High)	$210	$1,500	$1,800
St. Croix, USVI (High)	$210	$1,500	$1,800
St. John, USVI (Moderate)	$210	$1,500	$1,800
St. Thomas, USVI (Moderate)	$210	$1,500	$1,800
St. Croix, USVI (Moderate)	$210	$1,500	$1,800
South Atlantic DPS	**$1,300**	**$9,000**	**$11,000**
United States/Mexico border to San Diego Bay	$0	$0	$0
San Diego Bay	$0	$0	$0
Mission Bay	$0	$0	$0
Point Loma to (but not incl.) La Jolla Shores	$0	$0	$0
La Jolla Shores/Cove	$0	$0	$0
La Jolla Shores to Oceanside (incl. Oceanside)	$0	$0	$0
Agua Hedionda Lagoon	$0	$0	$0
Oceanside to San Onofre	$0	$0	$0
San Onofre	$0	$0	$0
San Onofre to Newport (incl. Newport Bay)	$0	$0	$0
Newport to Huntington Beach	$0	$0	$0
Bolsa Chica Lowlands (Basin)	$0	$0	$0
Seal Beach Complex	$0	$0	$0
LA and Long Beach Harbors	$0	$0	$0
LA and Long Beach Breakwater	$0	$0	$0
Palos Verdes	$0	$0	$0
Santa Monica Bay	$320	$2,200	$2,700
Catalina Island	$0	$0	$0
Channel Islands	$0	$0	$0
Santa Monica Bay to Point Conception	$0	$0	$0
East Pacific DPS	**$320**	**$2,200**	**$2,700**
Hawai‘i	$0	$0	$0
Kaho‘olawe	$0	$0	$0
Lana‘i	$0	$0	$0
Maui	$0	$0	$0
Moloka‘i	$0	$0	$0
O‘ahu	$0	$0	$0
Niihau	$0	$0	$0
Kaua‘i	$0	$0	$0
Nihoa	$0	$0	$0
Mokumanamana/Necker Island	$0	$0	$0
Lalo/French Frigate Shoals	$0	$0	$0
Kamole/Laysan Island	$0	$0	$0
Kapou/Lisianski Island	$0	$0	$0

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Manawai/Pearl and Hermes Atoll	$0	$0	$0
Kuaihelani/Midway Atoll	$340	$2,400	$2,900
Hōlanikū/Kure Atoll	$0	$0	$0
Johnston Atoll	$340	$2,400	$2,900
Central North Pacific DPS	**$690**	**$4,800**	**$5,900**
Tinian	$340	$2,400	$2,900
Pagan	$340	$2,400	$2,900
Rota	$340	$2,400	$2,900
Sarigan	$0	$0	$0
Alamagan	$0	$0	$0
Aguijan	$0	$0	$0
Guguan	$0	$0	$0
Agrihan	$0	$0	$0
Saipan	$660	$4,600	$5,600
Wake	$660	$4,600	$5,600
CNMI (other areas)	$0	$0	$0
Guam	$3,300	$23,000	$28,000
Central West Pacific DPS	**$5,700**	**$40,000**	**$48,000**
Rose Atoll	$470	$3,300	$4,000
Ta'u	$470	$3,300	$4,000
Ofu and Olosega	$470	$3,300	$4,000
Ofu and Olosega (other areas)	$0	$0	$0
Palmyra	$0	$0	$0
Tutuila	$1,400	$10,000	$12,000
Swains	$470	$3,300	$4,000
Baker	$0	$0	$0
Howland	$0	$0	$0
Kingman	$0	$0	$0
Jarvis	$0	$0	$0
Central South Pacific DPS	**$3,300**	**$23,000**	**$28,000**
TOTAL	**$34,000**	**$240,000**	**$290,000**

2.3.2.5 Assumptions and Limitations

Table 6 describes the key assumptions underlying the analysis of water quality management activities and the influence of those assumptions on the results of the analysis.

Table 10. ASSUMPTIONS AND LIMITATIONS OF ANALYSIS OF INCREMENTAL COSTS OF CRITICAL HABITAT DESIGNATION ON WATER QUALITY MANAGEMENT ACTIVITIES

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
This analysis generally relies on patterns of consultation within the past ten years (2012 to 2021) to	**Unknown.** May overestimate or	**Likely minor.** Data are not available to determine whether water quality management activities subject to Section 7 consultation are

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
forecast future rates of consultation activity. This analysis assumes that past consultations provide a good indication of future activity.	underestimate incremental impacts.	likely to change over time. To the extent that these activities increase over the next ten years, our analysis may underestimate the potential incremental administrative burden of critical habitat for the green sea turtle.
This analysis relies on patterns of consultation within the past ten years (2012 to 2021) to forecast future locations of consultation activity.	**Unknown.** May overestimate or underestimate incremental impacts in a given area.	**Likely minor.** Information is not available to determine, for example, whether changes will occur over the next ten years to states' or territories' NPDES program authorization statuses. However, the administrative costs of Section 7 consultation on the effects of state or territorial water quality standards on critical habitat are low and would not significantly affect total impacts of the potential critical habitat.
Conservation measures beyond those currently prescribed will not be recommended in consultation.	May result in an **underestimate** of costs.	**Likely minor**. It is unlikely that additional measures will be necessary to avoid impacts to green sea turtle habitat beyond those currently provided to the green turtle; however, to the extent that new projects require additional conservation measures, this analysis may be understating future costs.

2.3.3 Fishery Management – NMFS

There are a number of fisheries within the potential critical habitat which are regulated through Fishery Management Plans (FMPs) developed under the Magnuson-Stevens Fishery Conservation and Management Act. The FMPs are designed and implemented by NMFS through regional Fisheries Management Councils. The development and revision of FMPs constitutes the basis for the continued operation of Federal fisheries and provides the primary Federal nexus through which Section 7 consultations on fisheries would occur.

The New England Fishery Management Council (NEFMC) manages FMPs for fisheries in federal waters including, but not limited to, those off the coasts of Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut. The Mid-Atlantic Fishery Management Council (MAFMC) develops management plans for 15 species of fish and shellfish off the coast of the Mid-Atlantic region. MAFMC-managed FMPs include several whose management extends to waters off the North Carolina coast. The South Atlantic Fishery Management Council manages FMPs for fisheries in federal waters from North Carolina south to the east coast of Florida. The Gulf of Mexico Fishery Management Council manages FMPs for fisheries in federal waters off the west coast of Florida. The Caribbean Fishery Management Council manages fisheries in federal waters off Puerto Rico and the USVI. Island-based FMPs for Puerto Rico, St. Croix, and St. Thomas and St. John are under development but have not yet been approved. The Pacific Fishery Management Council manages fisheries in federal waters including, but not limited to, those off the west coast of California, and the Western Pacific Fishery Management Council (WPRFMC) manages fisheries seaward of state/territorial waters of Hawai'i and the U.S. Pacific Islands. Beginning in the 1980s, WPRFMC managed fisheries through separate species-based fishery management plans (FMPs): the Bottomfish and Seamount Groundfish FMP, the Crustaceans FMP, the Precious Corals FMP, the

Coral Reef Ecosystems FMP, and the Pelagic FMP. In 2010, WPRFMC began moving towards an ecosystem-based approach to fisheries management and restructured its management framework from species-based FMPs to place-based fishery ecosystem plans (FEPs). WPRFMC currently has five place-based FEPs, one each for Hawaii, American Samoa, the Mariana Archipelago (Guam and CNMI), the PRIA, and Pacific pelagic fisheries.

This section focuses on the potential impacts of critical habitat designation for the green sea turtle on fisheries managed by the FMCs. We identify the scope of commercial fishing activities that threaten the PBFs of the potential green sea turtle critical habitat; evaluate the extent to which existing protections adequately prevent the destruction of, or adverse modification to, the PBFs; and calculate the incremental administrative costs to commercial fishing activity of designation of critical habitat.

2.3.3.1 Description of Threat

The 1991 Recovery Plan for the U.S. Population of Atlantic Green Turtle identifies commercial fishing as an activity that has contributed to the loss of marine habitat and presents a key threat to the recovery of the species, and NMFS has identified fishing activities as a potential threat to the PBFs of green sea turtle critical habitat across all six DPSs. According to the Draft Biological Report, fishing has the potential to affect the PBFs of important habitat for the green sea turtle by disrupting or damaging foraging habitat or blocking or impeding efficient passage of turtles. Fishing activities may reduce food resources (i.e., invertebrates) through competition and benthos modification (e.g., bottom trawling), and associated vessel activities may modify seagrass beds through propeller scarring, anchoring, and groundings (NMFS 2023).

The three recovery plans for the green sea turtle (Atlantic, East Pacific, and Pacific populations) identify fisheries employing a wide variety of gear types as threatening the recovery of green sea turtles, primarily through species entanglement in fishing gear. In the Atlantic, these fisheries include trawl fisheries (e.g., shrimp trawls); purse seine fisheries (e.g., menhaden and sardine); hook and line fisheries (e.g., commercial and recreational fisheries targeting reef fish); gill net fisheries (e.g., king mackerel); pound net fisheries (e.g., inshore bays and sounds in NC, VA, NY and RI); longline fisheries (e.g., swordfish); and trap fisheries (e.g., lobsters) (USFWS and NMFS 1991). Gulf fisheries that could threaten the PBFs of the potential critical habitat are managed under the aquaculture, coastal migratory pelagic (CMP), essential fish habitat (EFH), red drum, reef fish, shrimp, and spiny lobster FMPs.

NMFS's biological opinion on the authorization of ten northeast fisheries states that fisheries using fixed gear (e.g., gillnets and pots/traps) could alter the habitat conditions needed for efficient passage of loggerheads through migratory habitat if the gear is arranged closely together within the designated habitat (NMFS 2021b). In the Pacific, sea turtles are accidentally taken in several commercial, subsistence, and recreational fisheries. These include purse seines, haul seines, beach seines, bottom longlines, surface longlines, hook and line, gillnets, and driftnets (USFWS and NMFS 1998a; USWFS and NMFS 1998b).

Of the commercial fisheries identified as potential recovery threats to the green sea turtles, only those with the potential to adversely affect the PBFs of critical habitat are relevant to this analysis. In addition, fishing activities with a federal nexus have limited potential to affect green sea turtle critical habitat because large portions of the areas considered for designation are in state or territorial waters. The shoreward boundary of the U.S. Exclusive Economic Zone (EEZ), where Federal fisheries operate, is three nautical miles (nm) throughout most of the areas considered for critical habitat designation. The only exceptions in the North Atlantic DPS are Texas, the west coast of Florida, and Puerto Rico, where state

jurisdiction extends from the coastline to nine nm offshore. At Tinian, federal waters extend to the shoreline around certain lands leased by the DOD. In the PRIA, the Federal government manages submerged lands and marine resources from the shoreline to 200 nautical miles.

Fisheries that occur in state waters may also pose a threat to the recovery of the green turtle; however, NMFS may only influence fishing activities taking place in state waters if a Federal nexus exists. A Federal nexus may exist because an activity involves Federal funding or requires a Federal permit – situations that do not generally apply to the operation of state-managed commercial fisheries. It may also exist if NMFS issues a Federal ESA regulation restricting certain fishing practices (for example, as occurred in the Virginia pound net fishery).

As noted above, there is limited overlap between areas considered for green turtle critical habitat and waters in which federally managed fisheries occur. The North Atlantic DPS has the most extensive overlap between areas being considered for critical habitat and federally managed waters. These areas include waters off the Atlantic coast, most of the GoM, and two areas off the west coast of Puerto Rico that are located within or adjacent to the Tourmaline Bank and Abrir La Sierra Bank spawning areas. State waters comprise all areas considered for critical habitat in the South Atlantic DPS. The western portion of the East Pacific DPS's Migratory Corridor unit is in Federal waters. In the Central North Pacific DPS, Central West Pacific DPS, and Central South Pacific DPS, all potential critical habitat areas are located either in state or territorial waters (i.e. within the 3 nm boundary) or in areas where commercial fishing is prohibited. Thus, the only potential routes of effect of Pacific Island fisheries on the potential critical habitat are those associated with fishing vessels transiting through the critical habitat. Existing prohibitions against commercial fishing are documented in Section 2.3.3.3.

2.3.3.2 Extent of Activity within Critical Habitat Area

Since 2012, NMFS has conducted Section 7 consultations on numerous fisheries operating on the Atlantic coast and in the Gulf of Mexico that represent potential threats to the continued existence of green sea turtles. These fisheries include:

- the American lobster fishery;
- the Atlantic sea scallop fishery;
- the Atlantic bluefish fishery;
- the spiny dogfish fishery;
- the monkfish fishery;
- the northeast multispecies fishery;
- the Atlantic squid, mackerel and butterfish fishery;
- the summer flounder, scup, and black sea bass fishery;
- the skate fishery;
- the golden crab fishery;

- the northeast tilefish fishery;
- the Atlantic pelagic longline fishery;
- the coastal migratory pelagics fishery;
- the South Atlantic snapper-grouper fishery;
- the Southeast Atlantic and Gulf of Mexico shrimp fisheries;
- the spiny lobster fisheries in the Gulf of Mexico and South Atlantic;
- the Virginia pound net fishery;
- the Gulf of Mexico stone crab fishery; and
- the Gulf of Mexico reef fish fishery.

NMFS issued a biological opinion in 2021 on the authorization of ten fisheries that operate in U.S. EEZ waters from Maine through Key West, Florida that considered effects to both listed turtles and their habitat (NMFS 2021b).[8] The biological opinion noted that the fisheries may potentially alter benthic habitats but that the fisheries do not operate in areas used by green turtles for foraging on seagrass. The Opinion further concluded that loggerhead turtle critical habitat is not likely to be adversely affected by the fisheries. This and other biological opinions considering the effects of fisheries activities on loggerhead turtle critical habitat provide insight into a likely effects determination of impacts of the ten fisheries on the potential green turtle critical habitat. Specifically, the Opinion noted the following:

- Setting and hauling gear and fishing vessel movements are not expected to significantly alter the PBFs of the critical habitat areas to levels that would affect life history patterns of individual turtles or the health of prey species found in these habitats;
- The fisheries will not result in obstructions or manmade structures that will alter the physical environment of the nearshore reproductive habitat;
- The the gears used in the fisheries are not expected to meaningfully alter the passage conditions that allow for migration to/from nesting, breeding, and foraging habitats;
- Commercial fishing gear used by the fisheries may have some interactions with *Sargassum* during deployment and retrieval, but the effects are expected to be temporary and isolated in nature;
- Any disruption of *Sargassum* habitat resulting from vessel traffic associated with the fisheries is not of sufficient magnitude to significantly affect the distribution of *Sargassum* mats; and
- The fisheries will not affect the availability of material associated with *Sargassum* because they

[8] The ten fisheries considered in this biological opinion include the American lobster, Atlantic bluefish, Atlantic deep-sea red crab, mackerel/squid/butterfish, monkfish, Northeast multispecies, Northeast skate complex, spiny dogfish, summer flounder/scup/black sea bass, and Jonah crab fisheries.

do not target or harvest smaller prey species or *Sargassum*.

Similarly, a Biological Opinion on the Atlantic Sea Scallop Fishery Management Plan concluded that the fishery – specifically, the setting and hauling gear and fishing vessel movements – is not likely to adversely affect loggerhead turtle critical habitat (NMFS 2021c). The Opinion notes that:

- The gears used in the fishery are not expected "to meaningfully alter the passage conditions that allow for migration to/from nesting, breeding, and foraging habitats"; and

- The fishery will not affect the availability of material associated with Sargassum because it does not target or harvest Sargassum, and the amount of Sargassum removed through entanglement/ensnarement in the gear itself is likely to be minimal.

The southeast U.S. shrimp fisheries occur in waters that overlap with winter habitat, breeding habitat, constricted migratory habitat, and *Sargassum* habitat areas designated as critical habitat for loggerhead turtles. However, NMFS' 2021 biological opinion concluded that the fisheries are unlikely to affect the primary constituent elements, including breeding and/or foraging areas for constricted migratory habitat and concentrated components of the *Sargassum* community in waters suitable for the optimal growth of *Sargassum* and inhabitance of loggerhead sea turtles (NMFS 2021d).

The vast majority of the fishable habitat in Federal waters off Puerto Rico is located off the west coast. These areas include those waters in and adjacent to the Tourmaline Bank and Abrir La Sierra Bank red hind spawning areas being considered for green turtle critical habitat. The deep-water snapper and grouper, spiny lobster, pelagic fish, queen conch, reef fish, and deepwater pelagic commercial fisheries occur in Federal waters considered for critical habitat designation. The most common gears used in these areas are bottom lines, SCUBA, troll lines, and fish pots (NMFS 2019a). NMFS' most recent biological opinions evaluating the effects of the continued authorization of the U.S. Caribbean reef fish fishery and the U.S. Caribbean spiny lobster fishery both concluded that the fisheries' continued authorization is not likely to jeopardize the continued existence of green turtles and is not likely to adversely affect existing critical habitat for green, hawksbill, or leatherback sea turtles (Ibid). Fishing for queen conch occurs mainly via hand harvest. Previous consultations determined that ESA-listed species in the action area were not likely to be adversely affected by this fishery.

The West Coast Coastal Pelagic Species (CPS), Highly Migratory Species (HMS), and Groundfish fisheries occur in the portion of the East Pacific DPS migratory corridor unit that extends into Federal waters. CPS species include Pacific sardine, Pacific mackerel, jack mackerel, northern anchovy, market squid, and krill. CPS live in the water column, as opposed to living near the sea floor, at depths from the surface to 1,000 meters (547 fathoms) deep, typically above the continental shelf. CPS are primarily caught using "round haul" gear such as purse seine nets, drum seines, lampara nets, and dip nets (NOAA Fisheries 2022a). HMS species include Pacific tunas, swordfish, sharks, and billfish. Gears used in this fishery include harpoon, pelagic longline, drift gillnet, and purse seine gears. Species fished for in the West Coast groundfish fishery include 90 different types of roundfish, flatfish, rockfish, sharks, and skates, most of which live on or near the bottom of the ocean. Fishermen catch them year-round using a variety of gear types, including trawl nets, gillnets, longline, troll, jig, rod and reel, vertical hook-and-line, pots (also called traps), and other gear (NMFS 2012; NMFS 2019).

A 2012 Biological Opinion on the continuing operation of the Pacific Groundfish Fishery concluded that the fishery is not likely to destroy or adversely modify designated critical habitat of the leatherback sea turtle, specifically the occurrence of prey species of sufficient condition, distribution, diversity, and

abundance to support individual as well as population growth, reproduction, and development (NMFS 2012). While west coast leatherback sea turtle critical habitat does not overlap with the migratory corridor of the potential critical habitat, and the effects determination was based on the level of bycatch of jellyfish , the determination provides insight into the likely effects of the groundfish fishery on green sea turtle critical habitat.

2.3.3.3 Regulatory Baseline

The ESA provides significant baseline protection to the green sea turtle and its habitat. Section 7 of the Act requires Federal agencies to consult with NMFS to ensure that any action authorized, funded, or carried out by that agency will not likely jeopardize the continued existence of any endangered or threatened species.

REGULATORY MEASURES FOR SEA TURTLES

Numerous efforts are ongoing to reduce threats to listed sea turtles. The majority of these activities are related to regulations that have been implemented to reduce the potential for incidental mortality of sea turtles from commercial fisheries. Among these measures are the following:

- Required use of turtle excluder devices (TEDs) by skimmer trawls, pusher-head trawls, and wing nets (butterfly trawls) participating in the southeastern U.S. shrimp fisheries (81 FR 91097, February 14, 2017).[9]
- Approved turtle excluder device (50 CFR 223.207)
- Special requirements for fishing activities to protect endangered sea turtles (50 CFR 224.104)
- Alignment of Atlantic sea scallop TDD and chain mat regulated areas (80 FR 22119, April 21, 2015)
- Annual determination for sea turtle observer requirement for 2015 (80 FR 14319, March 19, 2015)
- Amendment of Virginia pound net regulations (80 FR 6925, February 9, 2015)
- Revised limits on sea turtle interactions in Hawaii shallow-set longline fishery (77 FR 60637, October 4, 2012)
- Revised turtle excluder device (TED) requirements on shrimp and summer flounder trawls to allow the use of new materials and to modify existing approved TED designs (77 FR 29905, May 21, 2012)
- Framework adjustment to the Atlantic sea scallop fishery management plan (Framework 23) to minimize impacts on sea turtles through the requirement of a turtle deflector dredge (77 FR 20728, April 6, 2012)
- 2009 Modifications to the Chain Mat Regulations (74 FR 46930, September 14, 2009)

[9] Regulations are itemized and available at https://www.fisheries.noaa.gov/protected-resource-regulations?title=turtle.

- Observer requirement for fisheries to monitor sea turtle bycatch (72 FR 43176, August 3, 2007)
- Virginia pound net modified leader requirements (71 FR 36024, June 23, 2006)
- Atlantic highly migratory species pelagic longline (69 FR 40734, July 6, 2004)
- TED double cover flap modification (69 FR 31035, June 2, 2004)
- Virginia pound net leader prohibitions/restrictions (69 FR 24997, May 5, 2004)
- Western Pacific highly migratory species (HMS) pelagic longline final rule (69 FR 17329, April 2, 2004)
- California pelagic longline (69 FR 11540, March 11, 2004)
- California/Oregon drift gillnet (68 FR 69962, December 16, 2003)
- TED opening (68 FR 8456, February 21, 2003)
- Virginia/North Carolina large mesh gillnet (71 FR 24776, April 26, 2006)
- Pamlico Sound gillnet final rule (67FR 56931, September 6, 2002)

RULES PROTECTING SARGASSUM HABITAT

The Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act provide additional conservation consideration and protection for habitats identified as important to marine and anadromous fish species. Specifically, Federal action agencies which fund, permit, or carry out activities that may adversely modify EFH must consult with NMFS on the potential impacts of the action on EFH. NMFS may then provide advisory recommendations on how to limit impacts to the habitat (NMFS 2010b.).

Sargassum is identified as Essential Fish Habitat in both the Gulf of Mexico and in the South Atlantic. In addition, EFH for the Sargassum fishery itself was defined as anywhere that Sargassum occurs in the Exclusive Economic Zone (EEZ) under the South Atlantic Fishery Management Council's jurisdiction, and in the state waters of North Carolina, South Carolina, Georgia, and the east coast of Florida. In addition, the distribution of *Sargassum* in the same geographic area is designated as an EFH Habitat Area of Particular Concern. As a federally-managed habitat, research on the production, distribution and protection of *Sargassum* is encouraged (SAFMC 2002).

In addition to protections stemming from its designation as EFH for a number of managed species, *Sargassum* is also offered some baseline protection through the Fishery Management Plan for Pelagic Sargassum Habitat of the South Atlantic Region. The Sargassum FMP was developed to impose strong limitations on the commercial harvest of Sargassum. The FMP prohibited the harvest of Sargassum south of the NC/SC state boundary, implemented a total allowable catch of 5,000 pounds (wet weight) per year, limited harvest to November through June to protect turtles, required observers onboard any vessel harvesting Sargassum, prohibited harvest within 100 miles of shore, and implemented harvesting gear specifications (SAFMC 2022).

ADDITIONAL REGULATIONS BENEFITTING SEA TURTLES AND THEIR HABITAT

In addition to the rules and conditions designed specifically for the benefit of sea turtles, green sea turtles and their habitat are offered baseline protections via regulations that have been promulgated pursuant to the listing and subsequent development of Take Reduction Plans for other species. Specifically, gear modifications, seasonal and area closures, and other regulations designed to reduce the impacts of commercial fishing activities (especially entanglements) on marine mammals, including the bottlenose dolphin[10], harbor porpoise[11], false killer whales[12], and Atlantic large whales[13] (right whale, fin whale, minke whale, and humpback whale) all provide some conservation benefit to the green sea turtle and its habitat within the area being considered for critical habitat designation. For example, in Federal waters of the Tourmaline Bank and Abrir La Sierra red hind spawning areas, all fishing is prohibited from December 1 until the last day of February. In addition, there are year-round prohibitions in these areas against the use of pots, traps, bottom longlines, and gill and trammel nets.

In waters containing the portion of the East Pacific DPS migratory corridor unit in Federal waters, restrictions include, but are not limited to, the following (Protected Seas 2022):

- Fishing with dredge gear is prohibited, due to the unit's occurrence within the Groundfish Essential Fish Habitat area.

- It is illegal to take any marine mammal or endangered and threatened species, including seagrass, without a permit.

- To protect endangered loggerhead sea turtles from entangling and drowning in drift gillnets, fishing with, setting, or hauling back drift net gear is prohibited from June 1 through August during a forecasted, or occurring, El Niño event.

In addition, the California Eelgrass Mitigation Policy established an eelgrass survey protocol to evaluate impacts from coastal development projects and mitigation requirements to ensure no net loss of habitat function. Turbidity best monitoring practices are in place to reduce potential deleterious impacts of hydrologic dredging on eelgrass (NOAA Fisheries 2022).

In the Pacific Islands DPSs, commercial fishing is prohibited in the following areas:

- Papahanaumokuakea Marine National Monument (PMNM), including the Nihoa, Mokumanamana/Necker Island, Lalo/French Frigate Shoals, Kamole/Laysan Island, Kapou/Lisianski Island, Manawai/Pearl and Hermes Atoll, Kuaihelani/Midway, and Hōlanikū/Kure Atoll units (The White House 2016);

- Johnston Island National Wildlife Refuge, which includes the Johnston Atoll unit;

[10] For details on existing regulations pursuant to the Bottlenose Dolphin Take Reduction Plan, see http://www.nmfs.noaa.gov/pr/interactions/trt/bdtrp.htm.

[11] For details on existing regulations pursuant to the Harbor Porpoise Take Reduction Plan, see http://www.nero.noaa.gov/protected/porptrp/.

[12] For details on regulations pursuant to the False Killer Whale Take Reduction Plan, see https://www.fisheries.noaa.gov/national/marine-mammal-protection/false-killer-whale-take-reduction#false-killer-whale-take-reduction.

[13] For details on existing regulations pursuant to the Atlantic Large Whale Take Reduction Plan, see http://www.nero.noaa.gov/Protected/whaletrp/.

- Rose Atoll National Wildlife Refuge; which includes the Rose Atoll unit; and
- Pacific Remote Islands Marine National Monument, which includes the Howland, Baker, Jarvis, Wake, Palmyra, and Kingman units.

NMFS also conducts education and outreach activities to reduce the threats to ESA-listed turtles and other protected species. For example, NMFS has been active in public outreach to fishermen about handling and resuscitation techniques for sea turtles, and educates recreational fishermen and boaters on how to avoid interactions with these species. The NMFS-managed Sea Turtle Stranding and Salvage Network (STSSN) does not directly reduce the threats to sea turtles. However, the extensive network of STSSN participants along the Atlantic and Gulf of Mexico coasts not only collects data on dead sea turtles, but also rescues and rehabilitates live stranded turtles, reducing mortality of injured or sick animals. Data collected by the STSSN are used to monitor stranding levels, to identify areas where unusual or elevated mortality is occurring, and to identify sources of mortality. These data are also used to monitor incidence of disease, study toxicology and contaminants, and conduct genetic studies to determine population structure.

Given the extent of baseline protections afforded the essential features of the potential critical habitat, this analysis concludes that incremental costs of the potential critical habitat to activities related to federal fishery management will be limited to the additional administrative effort required to consider impacts to the critical habitat through consultations that would occur absent designation.

2.3.3.4 Results of Analysis

This analysis projects that NMFS will complete 74 Section 7 consultations related to fishery management activities over the next ten years that consider effects on green sea turtle critical habitat. This total includes 22 formal consultations and 52 informal consultations. This analysis also assumes that the 22 formal consultations would include reinitiations of five prior formal consultations. As shown in Table 11, projected consultations on fishery management involving the potential critical habitat are highly concentrated in the North Atlantic DPS. This DPS is projected to account for 57 of the 74 consultations, including 13 of the 22 formal consultations. The Central North Pacific DPS (eight projected consultations) is the only other DPS where more than three consultations on fishery management activities are projected to occur over the next ten years. However, as noted above, no federal fisheries operate within the areas being considered for critical habitat in the Central North Pacific DPS, thus limiting potential routes of effect to those associated with fishing vessels traversing the critical habitat.

Table 11. PROJECTED QUANTITY AND DISTRIBUTION OF SECTION 7 CONSULTATIONS ON FISHERY MANAGEMENT ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT AND TYPE (2023- 2032)

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Sargassum	2.4	6.0	0.0	8.4
Massachusetts	0.5	2.7	0.0	3.2
Rhode Island	0.5	2.7	0.0	3.2
Connecticut	0.5	2.7	0.0	3.2
New York	0.5	3.7	0.0	4.2
New Jersey	0.5	2.7	0.0	3.2
Delaware	0.5	3.0	0.0	3.5

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Maryland	0.5	3.0	0.0	3.5
Virginia	1.5	4.0	0.0	5.5
NC: Albemarle Sound	0.0	1.1	0.0	1.1
NC: Pamlico, Core, and Back Sounds	0.0	1.1	0.0	1.1
NC: Bogue Snd, White Oak/New/Cape Fear R.	0.0	1.1	0.0	1.1
NC: Currituck Sound	0.0	0.1	0.0	0.1
South Carolina	0.1	1.8	0.0	1.9
Georgia	0.1	1.8	0.0	1.9
Florida	3.4	3.3	0.0	6.7
Alabama	0.4	0.0	0.0	0.4
Mississippi	0.4	0.0	0.0	0.4
Louisiana	0.4	0.0	0.0	0.4
Texas (other areas)	0.3	0.0	0.0	0.3
TX: Galveston Bay to Lavaca, Matagorda Bay	0.3	0.0	0.0	0.3
TX: Lavaca, Matagorda Bay to Laguna Madre	0.3	0.0	0.0	0.3
Texas: Laguna Madre	0.0	0.0	0.0	0.0
Mona Island South	0.0	0.3	0.0	0.3
Mona Island North	0.0	0.3	0.0	0.3
Culebra Island	0.0	0.3	0.0	0.3
Puerto Rico: other areas	0.0	0.3	0.0	0.3
Vieques North	0.0	0.3	0.0	0.3
Vieques East	0.0	0.3	0.0	0.3
Vieques South	0.0	0.3	0.0	0.3
Puerto Rico North	0.0	0.3	0.0	0.3
Puerto Rico Guayama	0.0	0.3	0.0	0.3
Puerto Rico Maunabo	0.0	0.3	0.0	0.3
North Atlantic DPS	**13.0**	**44.1**	**0.0**	**57.1**
St. John, USVI (High)	0.0	0.3	0.0	0.3
St. Thomas, USVI (High)	0.0	0.3	0.0	0.3
St. Croix, USVI (High)	0.0	0.3	0.0	0.3
St. John, USVI (Moderate)	0.0	0.3	0.0	0.3
St. Thomas, USVI (Moderate)	0.0	0.3	0.0	0.3
St. Croix, USVI (Moderate)	0.0	0.3	0.0	0.3
South Atlantic DPS	**0.0**	**1.9**	**0.0**	**1.9**
United States/Mexico border to San Diego Bay	2.0	1.0	0.0	3.0
San Diego Bay	0.0	0.0	0.0	0.0
Mission Bay	0.0	0.0	0.0	0.0
Point Loma to (but not incl.) La Jolla Shores	0.0	0.0	0.0	0.0
La Jolla Shores/Cove	0.0	0.0	0.0	0.0
La Jolla Shores to Oceanside (incl. Oceanside)	0.0	0.0	0.0	0.0
Agua Hedionda Lagoon	0.0	0.0	0.0	0.0
Oceanside to San Onofre	0.0	0.0	0.0	0.0
San Onofre	0.0	0.0	0.0	0.0
San Onofre to Newport (incl. Newport Bay)	0.0	0.0	0.0	0.0
Newport to Huntington Beach	0.0	0.0	0.0	0.0

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Bolsa Chica Lowlands (Basin)	0.0	0.0	0.0	0.0
Seal Beach Complex	0.0	0.0	0.0	0.0
LA and Long Beach Harbors	0.0	0.0	0.0	0.0
LA and Long Beach Breakwater	0.0	0.0	0.0	0.0
Palos Verdes	0.0	0.0	0.0	0.0
Santa Monica Bay	0.0	0.0	0.0	0.0
Catalina Island	0.0	0.0	0.0	0.0
Channel Islands	0.0	0.0	0.0	0.0
Santa Monica Bay to Point Conception	0.0	0.0	0.0	0.0
East Pacific DPS	**2.0**	**1.0**	**0.0**	**3.0**
Hawai‘i	0.5	0.5	0.0	1.0
Kaho‘olawe	0.5	0.5	0.0	1.0
Lana‘i	0.5	0.5	0.0	1.0
Maui	0.5	0.5	0.0	1.0
Moloka‘i	0.5	0.5	0.0	1.0
O‘ahu	0.5	0.5	0.0	1.0
Niihau	0.5	0.5	0.0	1.0
Kaua‘i	0.5	0.5	0.0	1.0
Nihoa	0.0	0.0	0.0	0.0
Mokumanamana/Necker Island	0.0	0.0	0.0	0.0
Lalo/French Frigate Shoals	0.0	0.0	0.0	0.0
Kamole/Laysan Island	0.0	0.0	0.0	0.0
Kapou/Lisianski Island	0.0	0.0	0.0	0.0
Manawai/Pearl and Hermes Atoll	0.0	0.0	0.0	0.0
Kuaihelani/Midway Atoll	0.0	0.0	0.0	0.0
Hōlanikū/Kure Atoll	0.0	0.0	0.0	0.0
Johnston Atoll	0.0	0.0	0.0	0.0
Central North Pacific DPS	**4.0**	**4.0**	**0.0**	**8.0**
Tinian	0.1	0.0	0.0	0.1
Pagan	0.1	0.0	0.0	0.1
Rota	0.1	0.0	0.0	0.1
Sarigan	0.1	0.0	0.0	0.1
Alamagan	0.1	0.0	0.0	0.1
Aguijan	0.1	0.0	0.0	0.1
Guguan	0.1	0.0	0.0	0.1
Agrihan	0.1	0.0	0.0	0.1
Saipan	0.1	0.0	0.0	0.1
Wake	0.1	0.0	0.0	0.1
CNMI (other areas)	0.1	0.0	0.0	0.1
Guam	0.1	0.0	0.0	0.1
Central West Pacific DPS	**1.0**	**0.0**	**0.0**	**1.0**
Rose Atoll	0.4	0.2	0.0	0.6
Ta'u	0.4	0.2	0.0	0.6
Ofu and Olosega	0.4	0.2	0.0	0.6
Ofu and Olosega (other areas)	0.0	0.0	0.0	0.0

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Palmyra	0.0	0.0	0.0	0.0
Tutuila	0.4	0.2	0.0	0.6
Swains	0.4	0.2	0.0	0.6
Baker	0.0	0.0	0.0	0.0
Howland	0.0	0.0	0.0	0.0
Kingman	0.0	0.0	0.0	0.0
Jarvis	0.0	0.0	0.0	0.0
Central South Pacific DPS	**2.0**	**1.0**	**0.0**	**3.0**
TOTAL	**22.0**	**52.0**	**0.0**	**74.0**
Fractions of consultations occurred as a result of assigning some consultations to two or more units.				

As noted above, NMFS does not anticipate that critical habitat designation will generate additional conservation efforts for the green sea turtles specific to fishery management activities. As such, incremental costs are anticipated to be limited to the additional administrative effort required to consider effects to the critical habitat of fisheries management activities in consultations that would occur absent designation. As shown in Table 9, incremental costs of green sea turtle critical habitat to federal fisheries management activities are projected to total $240,000 over ten years (discounted at seven percent), or $34,000 in annualized costs. Impacts are expected to be highest in units of the North Atlantic DPS ($180,000 over ten years, discounted at seven percent). Projected annualized incremental costs are no higher than $3,900 for any of the other five DPSs.

Table 12. PROJECTED INCREMENTAL COSTS (IN 2022 DOLLARS) OF SECTION 7 CONSULTATIONS ON FISHERY MANAGEMENT ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT (2023- 2032)

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Sargassum	$3,600	$25,000	$31,000
Massachusetts	$1,300	$9,500	$12,000
Rhode Island	$1,300	$9,500	$12,000
Connecticut	$1,300	$9,500	$12,000
New York	$1,700	$12,000	$14,000
New Jersey	$1,300	$9,500	$12,000
Delaware	$1,500	$10,000	$12,000
Maryland	$1,500	$10,000	$12,000
Virginia	$2,400	$17,000	$21,000
NC: Albemarle Sound	$380	$2,700	$3,200
NC: Pamlico, Core, and Back Sounds	$380	$2,700	$3,200
NC: Bogue Snd, White Oak/New/Cape Fear R.	$380	$2,700	$3,200
NC: Currituck Sound	$63	$440	$540
South Carolina	$720	$5,100	$6,200
Georgia	$720	$5,100	$6,200
Florida	$4,100	$29,000	$35,000
Alabama	$390	$2,800	$3,400
Mississippi	$390	$2,800	$3,400

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Louisiana	$390	$2,800	$3,400
Texas (other areas)	$300	$2,100	$2,500
TX: Galveston Bay to Lavaca, Matagorda Bay	$300	$2,100	$2,500
TX: Lavaca, Matagorda Bay to Laguna Madre	$300	$2,100	$2,500
Texas: Laguna Madre	$0	$0	$0
Mona Island South	$99	$690	$840
Mona Island North	$99	$690	$840
Culebra Island	$99	$690	$840
Puerto Rico: other areas	$99	$690	$840
Vieques North	$99	$690	$840
Vieques East	$99	$690	$840
Vieques South	$99	$690	$840
Puerto Rico North	$99	$690	$840
Puerto Rico Guayama	$99	$690	$840
Puerto Rico Maunabo	$99	$690	$840
North Atlantic DPS	**$26,000**	**$180,000**	**$220,000**
St. John, USVI (High)	$99	$690	$840
St. Thomas, USVI (High)	$99	$690	$840
St. Croix, USVI (High)	$99	$690	$840
St. John, USVI (Moderate)	$99	$690	$840
St. Thomas, USVI (Moderate)	$99	$690	$840
St. Croix, USVI (Moderate)	$99	$690	$840
South Atlantic DPS	**$590**	**$4,200**	**$5,000**
United States/Mexico border to San Diego Bay	$1,600	$11,000	$14,000
San Diego Bay	$0	$0	$0
Mission Bay	$0	$0	$0
Point Loma to (but not incl.) La Jolla Shores	$0	$0	$0
La Jolla Shores/Cove	$0	$0	$0
La Jolla Shores to Oceanside (incl. Oceanside)	$0	$0	$0
Agua Hedionda Lagoon	$0	$0	$0
Oceanside to San Onofre	$0	$0	$0
San Onofre	$0	$0	$0
San Onofre to Newport (incl. Newport Bay)	$0	$0	$0
Newport to Huntington Beach	$0	$0	$0
Bolsa Chica Lowlands (Basin)	$0	$0	$0
Seal Beach Complex	$0	$0	$0
LA and Long Beach Harbors	$0	$0	$0
LA and Long Beach Breakwater	$0	$0	$0
Palos Verdes	$0	$0	$0
Santa Monica Bay	$0	$0	$0
Catalina Island	$0	$0	$0
Channel Islands	$0	$0	$0
Santa Monica Bay to Point Conception	$0	$0	$0
East Pacific DPS	**$1,600**	**$11,000**	**$14,000**
Hawai‘i	$490	$3,400	$4,200

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Kahoʻolawe	$490	$3,400	$4,200
Lanaʻi	$490	$3,400	$4,200
Maui	$490	$3,400	$4,200
Molokaʻi	$490	$3,400	$4,200
Oʻahu	$490	$3,400	$4,200
Niihau	$490	$3,400	$4,200
Kauaʻi	$490	$3,400	$4,200
Nihoa	$0	$0	$0
Mokumanamana/Necker Island	$0	$0	$0
Lalo/French Frigate Shoals	$0	$0	$0
Kamole/Laysan Island	$0	$0	$0
Kapou/Lisianski Island	$0	$0	$0
Manawai/Pearl and Hermes Atoll	$0	$0	$0
Kuaihelani/Midway Atoll	$0	$0	$0
Hōlanikū/Kure Atoll	$0	$0	$0
Johnston Atoll	$0	$0	$0
Central North Pacific DPS	**$3,900**	**$27,000**	**$33,000**
Tinian	$55	$390	$470
Pagan	$55	$390	$470
Rota	$55	$390	$470
Sarigan	$55	$390	$470
Alamagan	$55	$390	$470
Aguijan	$55	$390	$470
Guguan	$55	$390	$470
Agrihan	$55	$390	$470
Saipan	$55	$390	$470
Wake	$55	$390	$470
CNMI (other areas)	$55	$390	$470
Guam	$55	$390	$470
Central West Pacific DPS	**$660**	**$4,600**	**$5,600**
Rose Atoll	$330	$2,300	$2,800
Ta'u	$330	$2,300	$2,800
Ofu and Olosega	$330	$2,300	$2,800
Ofu and Olosega (other areas)	$0	$0	$0
Palmyra	$0	$0	$0
Tutuila	$330	$2,300	$2,800
Swains	$330	$2,300	$2,800
Baker	$0	$0	$0
Howland	$0	$0	$0
Kingman	$0	$0	$0
Jarvis	$0	$0	$0
Central South Pacific DPS	**$1,600**	**$11,000**	**$14,000**
TOTAL	**$34,000**	**$240,000**	**$290,000**

2.3.3.5 Assumptions and Limitations

Table 13 describes the key assumptions underlying the analysis of federal fisheries management activities and the influence of those assumptions on the results of the analysis.

Table 13. ASSUMPTIONS AND LIMITATIONS OF ANALYSIS OF INCREMENTAL COSTS OF CRITICAL HABITAT DESIGNATION ON FISHERY MANAGEMENT ACTIVITIES

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
The frequency of new fishing related consultations is constant and is comparable to the average rate of consultations in recent years.	**Unknown**. May overestimate or underestimate incremental impacts.	**Likely minor**. The future growth or decline pattern of fishing activity is not known.
Consultations on fishing activities that historically have not considered impacts to green sea turtles will not begin to consider impacts to green sea turtles following critical habitat designation.	May result in an **underestimate** of costs.	**Likely minor**. Most fisheries impacting turtles consult already and additional modifications are unlikely.
Conservation measures (e.g., gear restrictions, seasonality restrictions) beyond those currently prescribed will not be recommended in consultation.	May result in an **underestimate** of costs.	**Likely minor**. It is unlikely that additional measures will be necessary to avoid impacts to green sea turtle habitat beyond those currently provided to the turtle; however, to the extent that new projects require additional conservation measures, this analysis may be understating future costs.

2.3.4 Aquaculture – NMFS

NMFS is responsible for considering and preventing and/or mitigating the potential adverse environmental impacts of planned and existing marine aquaculture facilities in federal waters (NOAA 2011). Aquaculture activities considered in this chapter include any salt-water farming of animals or plants in nearshore or pelagic areas in potential critical habitat areas. This section first describes potential threats to green sea turtle critical habitat posed by aquaculture activities. It next describes the extent of historical and ongoing marine aquaculture activity in potential critical habitat areas, as well as anticipated new development. It next discusses baseline regulation of these activities, including conservation measures and best management practices already in place that address potential impacts of aquaculture projects on sea turtles. Next discussed are the anticipated impacts of critical habitat designation on future aquaculture activity and administrative effort for Section 7 consultations that include critical habitat, including the resulting forecast of economic impacts across the study area. This section concludes by identifying assumptions and limitations underlying the analysis of impacts.

2.3.4.1 Description of Threat

NMFS (2023) identifies aquaculture as an activity that may pose a threat to the essential features of the potential critical habitat across all six DPSs. Aquaculture activities such as net pens and fixed structures that can affect the efficient passage of turtles and reduce food resources are identified as potential threats to the reproductive and migratory essential features of green sea turtle habitat, as are "cage-on-bottom," "shell-on-bottom," or "floating cage operations," which could negatively impact seagrass

foraging habitat.[14] Large-scale aquaculture activities, in particular, have the potential to block the passage of nesting females, post-hatchlings, and other individuals. Aquaculture activities are also relevant to the potential designation of critical habitat because they may displace food resources, such as seagrass beds. On the other hand, in Hawaii and potential other critical habitat areas in the Pacific, NMFS indicates that aquaculture pens may promote algae production and improve foraging resources for green sea turtles. Notably, net pen farming has exhibited no growth in the U.S. in recent years, largely due to social, legal, and regulatory constraints (Knapp and Rubino 2016). There is one almaco jack net pen farm in Hawai'i (NMFS 2021e) that is located further offshore than the seaward extent of areas being considered for critical habitat around Hawai'i.

Table 14. SPECIFIC AQUACULTURE-RELATED THREATS TO GREEN SEA TURTLE PBFs

TURTLE BEHAVIOR	POTENTIAL PHYSICAL AND BIOLOGICAL FEATURES OF CRITICAL HABITAT	POTENTIAL AQUACULTURE-RELATED THREAT TO SPECIES
Reproduction	Dark and unobstructed waters directly adjacent to nesting beaches.	Large-scale operations may block or impede efficient passage of turtles.
Foraging	Sufficient food resources and refugia (including concentrated *Sargassum* communities).	Activities may reduce water quality or increase turbidity; Activities may impact seagrass beds.
Migration	Sufficiently unobstructed waters that allow for copulation and unrestricted transit between nesting and foraging areas.	Large-scale operations may block or impede efficient passage of turtles.
Source: Draft Biological Report for the Designation of Marine Critical Habitat for Six Distinct Population Segments of the Green Turtle, *Chelonia mydas.*		

2.3.4.2 Extent of Activity within Critical Habitat Area

Marine (i.e., salt water) aquaculture is an economically important and growing industry in the United States. Despite total U.S. aquaculture production (by volume) remaining relatively constant since 2004, production of oysters in the nearshore marine environment has exhibited growth in recent years, increasing from 14,536 metric tons in 2009 to 19,192 metric tons in 2019 (NMFS 2021e). Table 17 identifies the total marine aquaculture production (volume and value) in the United States by species group. Most of this activity (approximately 80 percent by value in 2019) is related to production of bivalves such as oysters, clams, and mussels in protected inland waters of bays and estuaries and other nearshore areas that are largely outside of the potential areas of green sea turtle critical habitat.

Table 15. TOTAL VOLUME AND VALUE OF MARINE AQUACULTURE BY SPECIES, 2019

SPECIES	POUNDS (THOUSANDS)	DOLLARS (THOUSANDS)
Salmon	31,931	64,262
Clams	10,714	122,038
Mussels	952	11,479
Oysters	42,311	221,217

[14] "Cage-on-bottom" methods of growing shellfish involve placement of cages directly on the substrate and growth of the animals within mesh bags within the cage. "Shell-on-bottom" culture involves growing shellfish (primarily oysters) directly on the substrate without a cage. "Floating cage" operations have shellfish growing in cages that are floating at the surface of the water. (Pangea Shellfish Company. The Different Methods of Growing Oysters. http://www.pangeashellfish.com/blog/the-different-methods-of-growing-oysters.

SPECIES	POUNDS (THOUSANDS)	DOLLARS (THOUSANDS)
Shrimp	4,486	11,215
Total	**90,394**	**430,211**
Source: NMFS. 2020. Fisheries of the United States: 2019.		

NMFS conducted 109 Section 7 consultations between 2012 and 2021 on aquaculture projects occurring within potential green sea turtle critical habitat. More than two-thirds of these consultations were on aquaculture activities occurring in the Greater Atlantic Region, from Virginia to Massachusetts, with another quarter of consultations on projects in the Southeast Region. There were 15 consultations on aquaculture activities off the coast of Florida over this timeframe, including three programmatic consultations on live rock aquaculture activities occurring in state waters. The Pacific Islands Region accounted for four consultations, including two in Hawai'i and two in Saipan, and four additional aquaculture projects were handled programmatically through PacSLOPES. Aquaculture was also included in the GARFO 2017 NLAA Programmatic consultation on USACE-permitted projects determined not likely to adversely affect ESA-listed species or designated critical habitat. Informal consultations constituted 106 of the 109 aquaculture-specific consultations (excluding the PacSLOPES and GARFO NLAA programmatics). NMFS was the lead action agency on the one formal consultation on the development of a pilot coral nursery on Saipan as well as five informal consultations.

Presently, there are no operational finfish or shellfish aquaculture facilities offshore in U.S. Federal waters, though operations for growing "live rock" occur in federal waters off of Florida. However, a proposed finfish aquaculture pilot project that would be located in federal waters, approximately 45 nm southwest of Sarasota, FL, is in the permitting stage, with the USACE working to issue a Section 10 permits. The project would consist of a single submersible cage, with a goal of producing 80,000 pounds of Almaco jack over the 12-month trial period. An additional project that would be located in federal waters, approximately 23 nm southeast of Pensacola, FL, is a proposed commercial-scale finfish aquaculture operation consisting of a 12 net pen system that, when at full-scale operation, would produce approximately 3.9 million pounds of Red drum annually. The project proponent, Manna Fish Farms, submitted EPA and USACE permit applications in April 2022. An Environmental Impact Statement may be required under the National Environmental Policy Act (NEPA), in which case NMFS would be the lead federal agency for the NEPA review (Richard 2022). The Pacific Ocean Aquafarms project proposed off of Southern CA would grow 11 million pounds (5,000 metric tons) of California yellowtail (*Seriola dorsalis*) at full production.

As mentioned previously, marine aquaculture is a growing industry in the U.S., and development of appropriate technologies to expand open water and offshore aquaculture is being actively promoted by the U.S. federal government.[15] Because of the anticipated growth in this industry, the present scope, scale, and location of large-scale aquaculture facilities with the potential to disrupt transit may not be entirely reflective of the potential future scope of this activity in potential areas of green sea turtle critical habitat. In particular, ongoing interest and progress in both the Gulf of Mexico and Southern California suggest that aquaculture activities in these regions are likely to expand beyond current levels within the next 10 years.

[15] NOAA Fisheries, Aquaculture Office Priorities. Viewed at https://www.fisheries.noaa.gov/national/aquaculture/office-aquaculture-priorities on August 4, 2022.

Section 7 of Executive Order (E.O.) 13921 on Promoting American Seafood Competitiveness and Growth mandates that NMFS, in consultation with other Federal agencies and regional FMCs, and in coordination with State and tribal governments, shall identify Aquaculture Opportunity Areas, or defined geographic area that has been evaluated to determine its potential suitability for commercial aquaculture.

NMFS is currently developing PEISs to consider identifying one or more AOAs in U.S. federal waters of Southern California and the Gulf of Mexico. Areas under consideration overlap with potential green sea turtle critical habitat in both regions. The areas under consideration were selected based on results of a comprehensive spatial modeling study published by the National Centers for Coastal Ocean Science and other sources of information. The areas, each of which covers between 500 and 2,000 acres, were selected based on consideration of administrative borders, military interests, potential impacts to navigation and transportation, energy and industry infrastructure, commercial and recreational fishing, natural and cultural resources, and oceanography.

NMFS published a Notice of Intent (NOI) in the Federal Register in May 2022 announcing the preparation of the Southern California AOA PEIS, with the goal of identifying potentially suitable AOAs for finfish, shellfish, macroalgae, or multi-species aquaculture. According to the NOI, NMFS is considering four preliminary alternatives for analysis in the PEIS:

1. No Action Alternative: no AOA would be identified in Southern California.
2. Federal waters offshore of Santa Barbara and Ventura Counties in the Santa Barbara Channel.
3. Federal waters offshore of Los Angeles County in Santa Monica Bay.
4. Federal waters in both the Santa Barbara Channel and Santa Monica Bay (NOAA Fisheries 2022c).

Areas under consideration for AOAs in the Southern California Study Areas range in depth from 10 m to 150 m and are a maximum 25 nm from shore. Any aquaculture project located in waters between 10 m and 20 m depth under alternatives 2-4 could potentially impact green sea turtle foraging critical habitat.

NMFS published a NOI in the Federal Register in June 2022 announcing the preparation of the Gulf of Mexico AOA PEIS, with the goal of identifying areas that may be suitable for development of all types of aquaculture projects, including finfish, macroalgae, shellfish, or a combination of species (NMFS 2022). NMFS is considering nine preliminary options for AOA locations in Federal waters of the Gulf of Mexico. The areas range in depth from 50 m to 150 m and would all overlap with *Sargassum* habitat.

Potential future AOA locations that could overlap with areas being considered for green sea turtle critical habitat include waters in the Western Pacific, the USVI and Puerto Rico, and waters off of Florida (NOAA Fisheries 2021).

2.3.4.3 Regulatory Baseline

Marine aquaculture projects require a permit from the U.S. Army Corps of Engineers (USACE), under Section 10 of the Rivers and Harbors Act of 1899, for the creation of any obstruction to navigation (33 U.S.C. 403). If an aquaculture facility does not interfere with navigation, the USACE will not require a Section 10 permit, but will, if relevant conditions are satisfied, issue a Letter of Permission that states the USACE has reviewed the applicant's proposal and will allow the proposed activities to occur as

proposed. This permitting system constitutes a federal nexus for marine aquaculture projects (NMFS 2010c). Thus, all aquaculture projects within or affecting green sea turtle critical habitat have the potential to be subject to Section 7 consultation that considers the potential for adverse modification of critical habitat.

Under Section 404 of the Clean Water Act (CWA), a Section 404 permit, or verification under an established Nationwide Permit, is required from the USACE for discharges of dredged or fill material into U.S. waters. Under Sections 402 and 403 of the CWA, a National Pollutant Discharge Elimination System (NPDES) permit must be obtained from the U.S. Environmental Protection Agency (EPA) for the discharge of pollutants into U.S. waters (NOAA Fisheries 2022e). The EPA may also require an Ocean Discharge Permit, under authority provided by the Ocean Dumping Act, to permit the dumping into U.S. oceans of material that will not unreasonably degrade or endanger human health or the marine environment, ecosystems, or economic potentialities (33 U.S.C. 1412).

National Environmental Policy Act review is required for any project that requires a federal permit. The burden lies with the federal agency proposing the action (such as permit or license issuance) to identify environmental impacts, to minimize those impacts, and to explore alternatives that may be less environmentally damaging (342 U.S.C. 4321).

For projects located in state waters, individual states may require additional permits depending on the project characteristics, such as size and location. For example, in the State of Hawaii, Aquaculture Facility Licenses are required for operators taking regulated marine life from the ocean with the intention of raising the marine life for commercial purposes. Conservation District Use permits are required for projects located within state-designated Conservation Districts. These permits require operators to meet certain qualifications or agree to specific conditions that minimize the impacts of the project on the environment (NMFS 2014b).

USACE's Nationwide Permit (NWP) 48 authorizes commercial shellfish aquaculture activities that require Department of the Army permits under Section 404 of the CWA and/or Section 10 of the Rivers and Harbors Act of 1899. NWP 48 outlines a number of broadly applicable General Conditions, including General Condition 18 "Endangered Species" which identifies that no activity is authorized under the NWP "which is likely to directly or indirectly destroy or adversely modify the critical habitat of [threatened or endangered species identified under the ESA]" (USACE 2017). USACE's NWP 55, which authorizes seaweed and bivalve mariculture activities, and NWP 56, which authorizes finfish mariculture activities, each include General Conditions that similarly provide for the protection of critical habitat and ESA-listed species (USACE 2021a; USACE 2021b).

Additionally, individual USACE districts may elect to identify other regional conditions that establish particular requirements for individual geographies. In New York, the Corps does not allow aquaculture activities located within Essential Fish Habitat to be placed in areas of submerged aquatic vegetation (SAV) (i.e., seagrass beds). Any activity within 50 feet of these SAV habitats requires a Pre-Construction Notification.[16] In Virginia, Corps Regional Permit 19 for aquaculture does not allow for aquaculture

[16] Buffalo & New York Districts Final Regional Conditions, Water Quality Certification and Coastal Zone Concurrence for the 2017 Nationwide Permits for New York State Expiration March 18, 2022. Commercial Shellfish Aquaculture NWP 48, New York District Only Permit-specific Regional Conditions (c) and (d).

activity within SAV based on mapping done by the Virginia Institute of Marine Science.[17]

Aquaculture projects permitted under the Programmatic General Permit South Atlantic Jacksonville (SAJ)-99 for live rock and marine shellfish aquaculture in jurisdictional waters of the state of Florida must deploy materials associated with live rock or marine shellfish aquaculture activities such that they remain in place during storm events and do not damage adjacent SAV or natural hardbottom communities. In addition, a site evaluation report completed as part of the lease approval process must demonstrate that the proposed site avoids impacts to naturally occurring hard bottom habitat and SAV and mangrove (minimum 50 ft setback from the preceding). New Aquaculture Use Zones or leases are allowed within loggerhead critical habitat under PGP SAJ-99 provided the aquaculture systems are set perpendicular to the nesting beach to reduce effects on hatchling egress to the open water and the transit of nesting females to and from the beach. Additionally, the linear footage of the part of the aquaculture system that is parallel to the beach may not be more than 10 percent of the linear footage of the critical habitat unit's nesting beach (NMFS 2015d).

2.3.4.4 Results of Analysis

We do not anticipate measurable economic impacts on the aquaculture industry due to designation of green sea turtle critical habitat for the reasons described below:

- Aquaculture activity in general is limited in potential marine areas of green sea turtle critical habitat.
- Of the activity occurring in potential critical habitat areas, only a very few select activities are using, or have the potential to use, the types of technologies that are likely to impede passage and present a threat to passage within the potential green sea turtle critical habitat.
- For both large-scale aquaculture operations that may impede passage, or bottom-based and floating cage operations that may impact seagrass beds, NMFS does not anticipate recommending any project modifications relative to green sea turtle critical habitat beyond the safeguards and protections already in place.

It is not possible to predict with certainty the extent to which interest in offshore marine aquaculture in areas considered for green sea turtle critical habitat will develop over the next ten years or what new technologies will emerge that may require additional management consideration to address potential threats to green sea turtle critical habitat. In particular, there is considerable uncertainty regarding the extent to which aquaculture projects will be sited, permitted, and constructed over the next ten years within the Southern California and Gulf of Mexico Study Areas and, further, the extent to which any such projects would affect potential green sea turtle critical habitat. However, given existing protections in place under the baseline for this analysis, NMFS does not anticipate that additional project modifications will be required to avoid destruction or adverse modification of potential green sea turtle critical habitat. As such, in the case future aquaculture operations are proposed within potential critical habitat areas, we expect impacts would most likely be limited to additional administrative costs as part of future Section 7 consultations.

Absent information on the specific location of future projects, the demand for new facilities and the locations of those facilities are expected to be similar to patterns seen in recent years, with minor

[17] US Army Corps of Engineers, Norfolk District. Regional Permit 19. Section V. Activity Specific Special Conditions, Activity 6 Aquaculture or mariculture activities, Condition (b).

exceptions. Designation of critical habitat for the green sea turtle is not expected to trigger additional Section 7 consultations that would not have occurred absent designation. This analysis therefore assumes that the history of past consultations on aquaculture projects and related activities provides an accurate basis for projections of future consultations on aquaculture activities that require NMFS action relating to the green sea turtle. Exceptions are in federal waters off of Southern California and the Gulf of Mexico, where aquaculture development over the next ten years could be spurred as a result of efforts to identify AOAs.

Overall, we project that approximately 117 Section 7 consultations considering effects of aquaculture-related activities to potential green sea turtle critical habitat will occur over the next ten years. As shown in Table 18, we anticipate these will include 114 informal consultations, two programmatic consultations, and one formal consultation. Aquaculture activities occurring in the North Atlantic DPS are projected to account for 107 of the 114 consultations, including both programmatic consultations. We forecast that five consultations on aquaculture activities will occur across East Pacific DPS units and that the remaining five consultations will be on aquaculture projects in Saipan (three) and Hawai'i (two). These projections largely reflect historical rates of consultations on aquaculture activities within the areas being considered for critical habitat, except for the East Pacific DPS. For this DPS, we assume that ongoing efforts to spur commercial aquaculture growth through the identification and development of AOAs will result in four more informal consultations than would be projected based on historical rates of consultation alone.

Table 16. PROJECTED QUANTITY AND DISTRIBUTION OF SECTION 7 CONSULTATIONS ON AQUACULTURE ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT AND TYPE (2023- 2032)

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Sargassum	0.0	1.4	0.0	1.4
Massachusetts	0.0	20.0	0.0	20.0
Rhode Island	0.0	3.0	0.0	3.0
Connecticut	0.0	16.0	0.0	16.0
New York	0.0	10.5	0.0	10.5
New Jersey	0.0	9.5	0.0	9.5
Delaware	0.0	0.0	0.0	0.0
Maryland	0.0	12.0	0.0	12.0
Virginia	0.0	3.0	0.0	3.0
NC: Albemarle Sound	0.0	0.0	0.0	0.0
NC: Pamlico, Core, and Back Sounds	0.0	1.0	0.0	1.0
NC: Bogue Snd, White Oak/New/Cape Fear R.	0.0	1.0	0.0	1.0
NC: Currituck Sound	0.0	0.0	0.0	0.0
South Carolina	0.0	3.0	0.0	3.0
Georgia	0.0	2.0	0.0	2.0
Florida	0.0	13.6	2.0	15.6
Alabama	0.0	1.8	0.0	1.8
Mississippi	0.0	1.8	0.0	1.8
Louisiana	0.0	1.8	0.0	1.8
Texas (other areas)	0.0	1.8	0.0	1.8
TX: Galveston Bay to Lavaca, Matagorda Bay	0.0	0.6	0.0	0.6

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
TX: Lavaca, Matagorda Bay to Laguna Madre	0.0	0.6	0.0	0.6
Texas: Laguna Madre	0.0	0.4	0.0	0.4
North Atlantic DPS	**0.0**	**105.0**	**2.0**	**107.0**
South Atlantic DPS	**0.0**	**0.0**	**0.0**	**0.0**
United States/Mexico border to San Diego Bay	0.0	0.2	0.0	0.2
San Diego Bay	0.0	0.2	0.0	0.2
Mission Bay	0.0	0.2	0.0	0.2
Point Loma to (but not incl.) La Jolla Shores	0.0	0.2	0.0	0.2
La Jolla Shores/Cove	0.0	0.2	0.0	0.2
La Jolla Shores to Oceanside (incl. Oceanside)	0.0	0.2	0.0	0.2
Agua Hedionda Lagoon	0.0	0.2	0.0	0.2
Oceanside to San Onofre	0.0	0.2	0.0	0.2
San Onofre	0.0	0.2	0.0	0.2
San Onofre to Newport (incl. Newport Bay)	0.0	0.2	0.0	0.2
Newport to Huntington Beach	0.0	0.2	0.0	0.2
Bolsa Chica Lowlands (Basin)	0.0	0.2	0.0	0.2
Seal Beach Complex	0.0	0.2	0.0	0.2
LA and Long Beach Harbors	0.0	0.2	0.0	0.2
LA and Long Beach Breakwater	0.0	0.2	0.0	0.2
Palos Verdes	0.0	0.2	0.0	0.2
Santa Monica Bay	0.0	0.2	0.0	0.2
Catalina Island	0.0	1.2	0.0	1.2
Channel Islands	0.0	0.2	0.0	0.2
Santa Monica Bay to Point Conception	0.0	0.2	0.0	0.2
East Pacific DPS	**0.0**	**5.0**	**0.0**	**5.0**
Hawai'i	0.0	2.0	0.0	2.0
Central North Pacific DPS	**0.0**	**2.0**	**0.0**	**2.0**
Saipan	1.0	2.0	0.0	3.0
Central West Pacific DPS	**1.0**	**2.0**	**0.0**	**3.0**
Central South Pacific DPS	**0.0**	**0.0**	**0.0**	**0.0**
TOTAL	**1.0**	**114.0**	**2.0**	**117.0**
Fractions of consultations occurred as a result of assigning some consultations to two or more units.				

As noted above, NMFS does not anticipate that critical habitat designation will generate additional conservation efforts for the green sea turtles specific to aquaculture activities. As such, incremental costs are anticipated to be limited to the additional administrative effort required to consider effects to the critical habitat of aquaculture activities in consultations that would occur absent designation. As shown in Table 19, incremental costs of green sea turtle critical habitat to aquaculture activities are projected to total $280,000 over ten years (discounted at seven percent), or $40,000 annualized. Impacts are expected to be heavily concentrated in units of the North Atlantic DPS ($260,000 over ten years, discounted at seven percent), particularly in Florida ($57,000), Massachusetts ($44,000), Connecticut ($35,000), and Maryland, New York, and New Jersey (each greater than $20,000). Projected total incremental costs are no higher than $11,000 over 10 years (discounted at seven percent) for any of the other five DPSs.

Table 17. PROJECTED INCREMENTAL COSTS (IN 2022 DOLLARS) OF SECTION 7 CONSULTATIONS ON AQUACULTURE ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT (2023- 2032)

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Sargassum	$460	$3,200	$3,900
Massachusetts	$6,300	$44,000	$54,000
Rhode Island	$950	$6,700	$8,100
Connecticut	$5,100	$35,000	$43,000
New York	$3,300	$23,000	$28,000
New Jersey	$3,000	$21,000	$26,000
Delaware	$0	$0	$0
Maryland	$3,800	$27,000	$32,000
Virginia	$950	$6,700	$8,100
NC: Albemarle Sound	$0	$0	$0
NC: Pamlico, Core, and Back Sounds	$320	$2,200	$2,700
NC: Bogue Snd, White Oak/New/Cape Fear R.	$320	$2,200	$2,700
NC: Currituck Sound	$0	$0	$0
South Carolina	$950	$6,700	$8,100
Georgia	$630	$4,400	$5,400
Florida	$8,100	$57,000	$69,000
Alabama	$580	$4,100	$4,900
Mississippi	$580	$4,100	$4,900
Louisiana	$580	$4,100	$4,900
Texas (other areas)	$580	$4,100	$4,900
TX: Galveston Bay to Lavaca, Matagorda Bay	$190	$1,300	$1,600
TX: Lavaca, Matagorda Bay to Laguna Madre	$190	$1,300	$1,600
Texas: Laguna Madre	$140	$990	$1,200
North Atlantic DPS	**$37,000**	**$260,000**	**$320,000**
South Atlantic DPS	**$0**	**$0**	**$0**
United States/Mexico border to San Diego Bay	$63	$440	$540
San Diego Bay	$63	$440	$540
Mission Bay	$63	$440	$540
Point Loma to (but not incl.) La Jolla Shores	$63	$440	$540
La Jolla Shores/Cove	$63	$440	$540
La Jolla Shores to Oceanside (incl. Oceanside)	$63	$440	$540
Agua Hedionda Lagoon	$63	$440	$540
Oceanside to San Onofre	$63	$440	$540
San Onofre	$63	$440	$540
San Onofre to Newport (incl. Newport Bay)	$63	$440	$540
Newport to Huntington Beach	$63	$440	$540
Bolsa Chica Lowlands (Basin)	$63	$440	$540
Seal Beach Complex	$63	$440	$540
LA and Long Beach Harbors	$63	$440	$540
LA and Long Beach Breakwater	$63	$440	$540
Palos Verdes	$63	$440	$540
Santa Monica Bay	$63	$440	$540
Catalina Island	$380	$2,700	$3,200

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Channel Islands	$63	$440	$540
Santa Monica Bay to Point Conception	$63	$440	$540
East Pacific DPS	**$1,600**	**$11,000**	**$13,000**
Hawai'i	$630	$4,400	$5,400
Central North Pacific DPS	**$630**	**$4,400**	**$5,400**
Saipan	$1,300	$9,100	$11,000
Central West Pacific DPS	**$1,300**	**$9,100**	**$11,000**
Central South Pacific DPS	**$0**	**$0**	**$0**
TOTAL	**$40,000**	**$280,000**	**$350,000**

2.3.4.5 Assumptions and Limitations

Table 6 describes the key assumptions underlying the analysis of aquaculture activities and the influence of those assumptions on the results of the analysis.

Table 18. ASSUMPTIONS AND LIMITATIONS OF ANALYSIS OF INCREMENTAL COSTS OF CRITICAL HABITAT DESIGNATION ON AQUACULTURE ACTIVITIES

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
Outside of the Gulf of Mexico and the East Pacific DPS, the frequency of new aquaculture projects is constant and the rate of consultation is comparable to the average rate of consultations in recent years.	**Unknown**. May overestimate or underestimate incremental impacts.	**Likely minor**. The future growth or decline pattern of the aquaculture industry is not known.
Project modifications beyond those currently prescribed will not be recommended in consultation.	May result in an **underestimat**e of costs.	**Likely minor**. It is unlikely that additional measures will be necessary to avoid impacts to green sea turtle critical habitat beyond those currently provided to the turtle; however, to the extent that new projects require additional conservation efforts, this may be understating future costs.

2.3.5 Military Activities – DOD

Military activities encompass all activities conducted by the Department of Defense (DOD). A number of military bases support sea turtle nesting beaches across the U.S. While some DOD activities are land-based, other military activities, such as naval sonar and other training, explosive exercises, and dredging and construction, may occur offshore in the marine habitat. As such, military lands that may utilize marine habitat occur in all DPSs except the South Atlantic DPS. This section evaluates the potential effect of critical habitat designation for the green sea turtle on military activities that have the potential to affect the critical habitat. The Section 7 consultation implications of USCG gunnery exercises (GUNEX) are also considered in this section.

2.3.5.1 Description of Threat

NMFS states that noise pollution from military activities, in addition to construction and shipping activities, may act as a deterrent to reproductive turtles and could prevent use of the area for courtship, copulation, or nesting (NMFS 2023). Large structures or excessive noise from military vessel activities may affect the turtles' migratory habitat by forcing them off the most direct routes, thus requiring longer migrations. Military activities may also act as deterrents (visual or auditory) to reproductive individuals, preventing their use of preferred areas. Military training and testing exercises that involve the use of explosives or other live-fire exercises may result in the loss of habitat, as can removal or remediation of unexploded ordnance (UXO) on the seafloor. U.S. military expansion in the Central West Pacific DPS region includes relocation of thousands of military personnel to Guam and increased training exercises in the CNMI (CNMI Coastal Resources Management Office, 2011; Congressional Research Service 2019; Leggate 2022). In CNMI, the majority of the nesting beaches on Tinian are on military-leased land, where the potential for construction impacts exists (NMFS 2023). For these reasons, the reproductive PBFs for green sea turtles may require special management considerations or protection related to military activities.

2.3.5.2 Extent of Activity within Critical Habitat Area

NMFS' Section 7 consultation history for the years 2012-2021 reflects the broad scope of activities undertaken by DOD that may affect potential green sea turtle critical habitat. Just over half of the 199 Section 7 consultations related to military activities that could affect green turtle critical habitat were on in-water and coastal construction projects, including transportation-related and shoreline and bank stabilization projects. These included five formal consultations and four programmatic consultations. However, maintenance dredging is among the activities included in a programmatic consultation on recurring activities at Navy installations located within San Diego Bay and a programmatic consultation on recurring activities at Mid-Atlantic and Northeast Navy installations (NMFS 2021f). Consultations on military training and testing activities accounted for 42 of the 199 consultations, including four formal consultations and two programmatic consultations. Dredging (primarily maintenance dredging) accounted for an additional 24 consultations, including four formal consultations. Activities on research, UXO remediation, and water quality projects accounted for most of the remaining military-related consultations.

Consultations with the Navy constituted more than three-quarters of the 199 consultations, including seven formal consultations, 140 informal consultations, and five programmatic consultations. As shown in Table 20, consultations with the Air Force (22) and USCG (16) accounted for most of the remaining military-related consultations. Nearly half of the 199 consultations were on military activities occurring within areas of the North Atlantic DPS, as shown in Table 21. The North Atlantic DPS also accounted for five of the nine formal consultations and three of the six programmatic consultations on military activities. The remaining consultations were split between the East Pacific (39.5 consultations), North Pacific (44), and West Pacific (24.5) DPSs.

Table 19. SECTION 7 CONSULTATIONS ON MILITARY ACTIVITIES THAT COULD AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY MILITARY BRANCH (2012-2021)

DOD/DHS BRANCH	FORMAL	INFORMAL	PROGRAMMATIC	TOTAL
US Navy	7.0	140.0	5.0	**152.0**
US Air Force	2.0	19.0	1.0	**22.0**
USCG	0.0	16.0	0.0	**16.0**

DOD/DHS BRANCH	FORMAL	INFORMAL	PROGRAMMATIC	TOTAL
US Marine Corps	0.0	6.0	0.0	**6.0**
US Army	0.0	3.0	0.0	**3.0**
Total	**9.0**	**184.0**	**6.0**	**199.0**
Source: Analysis of NMFS' Section 7 consultation history.				

Table 20. SECTION 7 CONSULTATIONS ON MILITARY ACTIVITIES THAT COULD AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY DPS (2012-2021)

DPS	FORMAL	INFORMAL	PROGRAMMATIC	TOTAL
North Atlantic	5.0	83.0	3.0	**91.0**
East Pacific	1.5	37.0	1.0	**39.5**
North Pacific	0.5	42.5	1.0	**44.0**
West Pacific	2.0	21.5	1.0	**24.5**
South Atlantic	0.0	0.0	0.0	**0.0**
South Pacific	0.0	0.0	0.0	**0.0**
Total	**9.0**	**184.0**	**6.0**	**199.0**
Note: Fractions of consultations occur as a result of distributing some consultations across multiple DPSs. Source: Analysis of NMFS' Section 7 consultation history.				

DOD installations are present in all DPSs except the South Atlantic DPS and South Pacific DPS. Table 22 summarizes the locations of 62 coastal military installations that have the potential to affect green sea turtle critical habitat areas. While all of the installations in Table 22 are considered to have the potential to affect green sea turtles because of their geographic location, some installations may be carrying out current activities that would affect potential critical habitat, while others may not.

Table 21. MILITARY INSTALLATIONS WITHIN POTENTIAL GREEN SEA TURTLE CRITICAL HABITAT

DPS	STATE/ TERRITORY	MILITARY INSTALLATION	BRANCH	INRMP[18] IN PLACE?
North Atlantic	RI	Naval Station Newport	US Navy	No
	NY	Fort Hamilton	US Army	No
	NJ	Naval Weapons Station Earle	US Navy	Yes
	MD	Naval Air Station Patuxent River	US Navy	Yes
	MD	Naval Support Activity Annapolis	US Navy	No
	VA	Joint Base Langley - Eustis	US Air Force / US Army	Yes
	VA	Joint Expeditionary Base Little Creek - Fort Story	US Navy / US Marine Corps	Yes
	VA	Naval Air Station Oceana	US Navy	Yes
	VA	Naval Support Activity Hampton Roads	US Navy	Yes
	VA	Naval Air Station Oceana Dam Neck	US Navy	Yes
	VA	Naval Station Norfolk	US Navy	Yes
	VA	Naval Weapons Station Yorktown	US Navy	Yes
	NC	Auxiliary Landing Field Bogue	US Marine Corps	No
	NC	Dare County Range	US Air Force	No
	NC	Harvey Point	US Navy	No
	NC	Marine Corps Air Station Cherry Point	US Marine Corps	Yes
	NC	Marine Corps Base Camp Lejeune	US Marine Corps	Yes
	NC	Military Ocean Terminal Sunny Point	US Army	No
	NC	Point Of Marsh Target	US Marine Corps	No
	SC	Marine Corps Air Station Beaufort	US Marine Corps	No
	SC	Marine Corps Recruit Depot Parris Island	US Marine Corps	Yes
	SC	Joint Base Charleston	US Navy	Yes
	GA	Naval Submarine Base Kings Bay	US Navy	Yes
	FL	Patrick Space Force Stn./Cape Canaveral Space Force Stn.	US Space Force	Yes
	FL	Eglin Air Force Base	US Air Force	Yes
	FL	Hurlburt Field	US Air Force	Yes

[18] Integrated Natural Resource Management Plans (INRMPs) are discussed in section 2.3.5.2.

DPS	STATE/ TERRITORY	MILITARY INSTALLATION	BRANCH	INRMP[18] IN PLACE?
	FL	MacDill Air Force Base	US Air Force	Yes
	FL	Homestead Air Reserve Base	US Air Force	No
	FL	Naval Air Station Key West	US Navy	Yes
	FL	Naval Air Station Pensacola	US Navy	Yes
	FL	Naval Station Mayport	US Navy	Yes
	FL	Naval Station Panama City	US Navy	Yes
	FL	Tyndall Air Force Base	US Air Force	Yes
	MS	Keesler Air Force Base	US Air Force	No
	MS	Naval Construction Battalion Center Gulfport	US Navy	No
	TX	Naval Air Station Corpus Christi	US Navy	Yes
	PR	Fort Allen	US Army	No
	PR	Fort Buchanan	US Army	No
	PR	Muniz Air National Guard Base	US Air Force	Yes
East Pacific	CA	Camp Pendleton	US Marine Corps	Yes
	CA	Naval Base Ventura County Point Mugu	US Navy	Yes
	CA	Naval Base Coronado	US Navy	Yes
	CA	Naval Base Point Loma	US Navy	Yes
	CA	Naval Base San Diego	US Navy	Yes
	CA	Naval Weapons Station Seal Beach	US Navy	Yes
	CA	Naval Auxiliary Landing Field San Clemente Island	US Navy	Yes
	CA	Naval Base Ventura County San Nicolas Island	US Navy	Yes
North Pacific	Oahu	Joint Base Pearl Harbor - Hickman	US Air Force / US Navy	Yes
	Oahu	Bellows Air Force Base	US Air Force	Yes
	Oahu	Kahuku Training Area	US Army	No
	Oahu	Makua Military Reserve	US Army	No
	Oahu	Marine Corps Base Hawaii	US Marine Corps	Yes
	Kauai	Pacific Missile Range Facility, Barking Sands	US Navy	Yes
West Pacific	Wake Island	Wake Island Airfield	US Air Force	Yes

DPS	STATE/ TERRITORY	MILITARY INSTALLATION	BRANCH	INRMP[18] IN PLACE?
	Guam	Andersen Air Force Base (Joint Region Marianas)	US Air Force	Yes
	Guam	Naval Base Guam (Joint Region Marianas)	US Navy	Yes
	CNMI	Farallon de Medinilla (Joint Region Marianas)	US Navy	Yes
	CNMI	Tinian (Joint Region Marianas)	US Navy	Yes

2.3.5.3 Regulatory Baseline

The Sikes Act Improvements Act of 1997 requires military installations to work with the U.S. Fish and Wildlife Service and state fish and wildlife agencies to prepare and implement an Integrated Natural Resources Management Plan (INRMP). The purpose of the INRMP is to provide for:

- Conservation and rehabilitation of natural resources on military installations;
- Sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping, and nonconsumptive uses; and
- Subject to safety requirements and military security, public access to military installations to facilitate the use of the resources (16 USC § 670a).

Section 318 of the Fiscal Year 2004 Defense Authorization Act revised the Endangered Species Act provisions related to the DOD. Specifically, section 4(a)(3) of the Act includes the following:

> "(B)(i) The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such a plan provides a benefit to the species for which critical habitat is being proposed for designation.
>
> (ii) Nothing in this paragraph affects the requirement to consult under Section 7(a)(2) with respect to an agency action (as that term is defined in that section).
>
> (iii) Nothing in this paragraph affects the obligation of the Department of Defense to comply with section 9, including the prohibition preventing extinction and taking of endangered species and threatened species."

As shown in Table 22, we identified 42 of the 58 U.S. military installations located within or adjacent to potential green sea turtle critical habitat as having existing INRMPs. It is possible that additional IMRMPs exist that we were not able to locate. There is variation in the extent to which these INRMPs address affects of activities occurring at the installations on green sea turtles, specifically, and identify measures intended to protect green sea turtles. In general, INRMPs that prescribe conservation efforts for the listed species do not explicitly consider marine habitat (i.e., most are focused on the conservation of nesting beaches).

In addition to protections afforded green sea turtles through INRMPs, several programmatic Biological Opinions provide for the Navy and Air Force to conduct on a programmatic basis a wide range of activities in areas that overlap considerably with potential green sea turtle critical habitat. on military activities have evaluated effects of various proposed military actions on sea turtles as well as sea turtle habitat. These opinions consider potential threats to green sea turtles and, in some cases, to marine and beach sea turtle habitat, and identify standard operating procedures (SOPs) and mitigation measures designed to reduce the threat of take of sea turtles and other protected marine species and of deleterious impacts to the protected species' habitats. For example, the Biological Opinion on Navy Mariana Islands Training and Testing Activities (MITT), which concludes that impacts of explosions on green sea turtles' prey are insignificant, identifies the following SOPs and mitigation measures designed to avoid or reduce environmental impacts to sea turtles and marine mammals (NMFS 2020b):

- Utilization of formally qualified and trained watch personnel to reduce the potential for vessel strikes;

- Restriction of weapons firing activities that involve the use of explosive munitions to reduce the potential for physical disturbance and strike, entanglement, and ingestion of applicable targets and any associated decelerators/parachutes;

- Hydrographic surveying prior to amphibious assault and amphibious raid training activities involving beach landings by large amphibious vehicles to avoid grounding on coral and hard bottom substrate; and

- Use of beach observers during amphibious landings at Reserve Craft Beach, located within Apra Harbor, Guam, to restore the beach to its original condition following exercises.

The Biological Opinion on U.S. Navy Hawaii-Southern California Training and Testing (HSTT) evaluates effects to ESA-listed species and designated critical habitat of a suite of military readiness training and testing activities – including the use of sonar and explosives – occurring in an action area including the Hawaii Range Complex, Southern California Range Complex, San Diego Bay, and other locations in Hawaii and Southern California (NMFS 2018a). The Opinion concluded that the proposed action is not anticipated to result in appreciable reductions in overall reproduction, abundance, or distribution of either the Central North Pacific DPS or East Pacific DPS of green sea turtles, and is not expected to cause an appreciable reduction in the likelihood of survival and recovery of either DPS. The Opinion identified many of the same SOPs and mitigation measures prescribed in the Navy MITT Biological Opinion that offer protections to green sea turtles, including those related to vessel, weapons firing, target deployment, and towed-in water device safety. The Opinion also specifies that the Navy must perform soft starts to pile driving operations to allow marine mammals and sea turtles to move away from the sound source before the impact pile driving increases to full operating capacity.

The Biological and Conference Opinion on Navy Atlantic Fleet Training and Testing (AFTT) activities provides for the programmatic authorization of military readiness training and testing activities conducted in areas of the western Atlantic Ocean along the east coast of North America, portions of the Caribbean Sea, and the Gulf of Mexico (NMFS 2018b). These activities include, but are not limited to, the firing by water surface ship crews of medium- and high-caliber guns and air-to-air and surface-to-air missiles at air targets; amphibious assault and raid exercises that involve the movement of forces from amphibious ships at sea to shore; deployment of chaff (pieces of aluminum, plastic, or fiberglass) into the water to disrupt threat targeting and missile guidance radars; underwater repair and construction; underwater mine disabling; and ship shock trials, which consist of a series of underwater detonations that send shock waves through the ship's hull to simulate near misses during combat. The Opinion identified vessel strikes as the primary threat of these activities to green sea turtles, with a worst case scenario of 55 green sea turtles killed from vessel strikes over a five-year period, but that the activities are not expected to reduce the reproduction, numbers, or distribution of the North Atlantic DPS of the species. The Opinion further evaluated the potential threat of the proposed action on loggerhead sea turtle critical habitat, determining that, while loggerhead critical habitat may be affected by sonar and other transducers, vessel noise, weapon noise, and explosives, these stressors are not anticipated to affect nearshore reproductive, winter, and breeding critical habitat since the proposed activities are will not occur in these areas. This determination suggests that impacts of the proposed action to nearshore (0-20 m depth) critical habitat for the green sea turtle would be limited. The Opinion determined that constricted migratory and *Sargassum* critical habitat for loggerhead sea turtles may be affected by these

stressors but concluded that the common stressor of noise produced by sonar and other transducers, vessels, weapons, and explosives is not likely to have significant effects on passage conditions to allow for migration to and from nesting, breeding, and/or foraging areas. The Opinion cited the frequency of these activities, their temporary nature, their relatively small footprint at any given time compared to the amount of available migratory habitat, and the distribution of these activities across a large geographic area as rationale for this determination. The Opinion concluded that the proposed action may affect, but is not is likely to adversely affect, designated constricted migratory critical habitat for the Northwest Atlantic Ocean DPS of loggerhead sea turtles and identified the following SOPs designed to provide for safety and mission success and the conservation of whales, sea turtles, and other protected biological resources:

- The use of lookouts for a variety of purposes, including observing for the presence of biological resources;
- Implementation of mitigation zones around specific activities wherein the activity will be ceased or modified if a marine mammal enters the area;
- Powering down of sonar, halting of explosions, or maneuvering of a vessel in response to a sighting of an applicable biological resource (e.g., ESA-listed species); and
- Suspension or alteration of an activity based on applicable mitigation measures when a marine mammal or sea turtle is sighted, until the animal has left the mitigation zone.

Training and testing exercises carried out by the Air Force through its Eglin Gulf Testing and Training Range (EGTTR) activities would overlap with both nearshore and *Sargassum* critical habitat in areas of the eastern GoM that are being considered for green sea turtle critical habitat but that are outside loggerhead sea turtle critical habitat (NMFS 2017g). EGTTR activities include, but are not limited to, air-to-surface firing or dropping of bombs, missiles, rockets, and gunnery rounds, some of which detonate at or below the water surface; and training activities including air-to-surface gunnery, small diameter bomb, and missile proficiency training in nearshore waters. A programmatic Biological Opinion on EGTTR activities concluded that the effects from ongoing EGTTR activities continuing into the reasonably foreseeable future would not be expected, directly or indirectly, to appreciably reduce the likelihood of recovery of North Atlantic DPS green sea turtles, despite the likely mortality of small numbers of the turtles. The Opinion identified the following operational measures intended to reduce the likelihood of adverse impacts to protected marine resources, including:

- Pre-mission monitoring by trained observers to (1) evaluate the mission site for environmental suitability, and (2) verify that the zone of influence is free of visually detectable sea turtles and potential sea turtle indicators as well as marine mammals;
- Post-mission monitoring to determine the effectiveness of pre-mission mitigation by reporting sightings of any dead or injured sea turtles and marine mammals;
- Delay or rescheduling of air-to-surface missions when sea state conditions limit observers' ability to locate marine species at or near the surface, per the discretion of protected species observers or a Lead Biologist; and
- Limiting air-to-surface missions to no earlier than two hours after sunrise and no later than two hours prior to sunset to ensure adequate daylight for pre- and post-mission monitoring, with the

exception of specific gunnery missions.

NMFS' Programmatic Biological Opinion on the Underwater Investigation and Removal/Remedial Activities in UXO 16, Vieques, Puerto Rico, issued in 2020, identifies potential threats to the North Atlantic and South Atlantic DPSs of green sea turtles of activities related to the remediation/removal of unexploded ordnance (UXO) (NMFS 2020c). The Opinion concludes that proposed actions in the areas surrounding the former NASD and former VNTR could result in limited take of adult, juvenile, and hatchling green sea turtles but that no reduction in the distribution or current geographic range of green sea turtles from either DPS is expected from the anticipated take. The Navy has developed SOPs in coordination with NMFS that minimize the effects to seagrass from propeller scarring and to benthic habitat from anchoring and excavation in seagrass and unconsolidated bottom required to remove munitions and explosives. As part of the proposed action, divers are to check areas where vessels will anchor to verify that no coral habitats are present. As a result of these measures, NMFS believes the proposed action will not result in the decreased likelihood of green sea turtles' recovery and will not jeopardize the continued existence of green sea turtles.

The Programmatic Consultation on waterfront structure maintenance and new construction projects conducted by the Navy at Naval Base San Diego, Naval Base Coronado, and Naval Base Point Loma evaluated the potential threat of a suite of activities on green sea turtles, concluding that the proposed action may affect, but is not likely to adversely affect, green sea turtles (NMFS 2017d). Activities covered under the proposed 5-year Maintenance and Construction Program include pier, pile, and bulkhead repairs; fendering system repairs; utility line repairs; riprap, armor stone, and soil replacement/installation; underwater range maintenance; maintenance dredging; security barrier repair; and the use of means and materials to complete all maintenance and repair activities. The Program includes several PDCs intended to mitigate the risk of proposed activities resulting in the take of sea turtles or adversely affecting their habitat:

- Maintenance of a 20 m buffer around sea turtles and marine mammals to avoid collisions;
- Operation of vessels associated with construction projects at "no wake/idle" speeds while in construction areas and while in water depths where the draft of the vessels provide less than a four foot clearance from the bottom;
- Adherence to eelgrass monitoring requirements put forth in the California Eelgrass Mitigation Policy (CEMP);
- Mitigation of impacts to eelgrass habitat in accordance with CEMP;
- Pre-construction surveying of project areas for the presence of *Caulerpa taxifolia* (a species of green seaweed), in accordance with the Caulerpa Control Protocol;
- Restriction of new mooring and anchoring operations to areas in which suitable submerged aquatic vegetated (SAV) habitat is absent;
- Implementation of environmentally sensitive options, to the greatest extent practicable, for all mooring and anchoring operations in shallow waters that can support suitable SAV habitat; and
- Transportation to, and disposal at, an appropriate upland disposal site of construction-related debris.

A Programmatic Consultation on the Navy's 2021 NLAA Program identifies PDCs to be applied to a suite of activities carried out by the Navy on a recurring basis at 13 installations located along the Atlantic coast, from Virginia to Connecticut (NMFS 2021f). Activities covered under the NLAA Program include routine maintenance dredging, including disposal of dredged material and beach nourishment; maintenance of existing and/or construction of pile supported structures such as docks, piers, fenders, ramps, and bridges; maintenance of existing and/or construction of transportation and development projects including, but not limited to, roads, bridges, and culverts; habitat improvement projects; and bank stabilization and similar projects. Projects are eligible for consultation under the NLAA Program provided they do not introduce any new stressors or any new direct or indirect effects to ESA-listed species or habitat that are not considered in the PDC section of the Programmatic. Among the PDCs outlined in the Programmatic are:

- No work will adversely affect ESA-listed species or designated critical habitat, and no work will cause adverse modification of destruction to the potential critical habitat;
- If it possible for ESA-listed species to pass through the action area, a zone of passage with appropriate habitat for ESA-listed species must be maintained; and
- Effects of the project will not significantly modify habitat or impair essential behavioral patterns including breeding, feeding, or sheltering to habitats such as submerged aquatic vegetation that are used by ESA-listed species.

2.3.5.4 Results of Analysis

In general, the types of threats associated with particular military activities on marine critical habitat would also likely be threats to the individual green sea turtle. As such, it is likely that NMFS will continue to work with the DOD and USCG to address these threats as part of future consultations on military activities, regardless of critical habitat designation. The additional consideration of critical habitat will likely add administrative effort to these consultations. It is unlikely, however, that the designation will affect the conservation efforts NMFS will recommend as part of those consultations. In some cases, additional conservation efforts could be requested for green sea turtle critical habitat for installations conducting activities that may adversely affect green sea turtle critical habitat. In particular, seagrass mitigation, vessel speed restrictions, and/or requests for educational activities could be requested by NMFS in cases where an installation is conducting activities that might affect the green sea turtle critical habitat PBFs. To the extent that such measures are added to INRMPs in order that installations be excluded from critical habitat, the costs of these actions could be considered incremental impacts of critical habitat designation.

Specific future changes to INRMPs or other potential conservation efforts by military installations for green sea turtles are not known at this time. This report includes a projection of the administrative costs associated with inclusion of green sea turtle critical habitat in future consultation actions based on the past rate of consultation activity related to military activities. The forecast assumes a lower rate of informal consultations in Mid-Atlantic and Northeast units of the North Atlantic DPS on recurring activities addressed by the 2021 Navy NLAA Program.

Overall, we project that approximately 168 Section 7 consultations considering effects of military activities to potential green sea turtle critical habitat will occur over the next ten years. As shown in Table 24, we anticipate these consultations will be distributed fairly evenly across the North Atlantic (62 consultations), East Pacific (39), Central North Pacific (43), and Central West Pacific (23) DPSs.

Table 22. PROJECTED QUANTITY AND DISTRIBUTION OF SECTION 7 CONSULTATIONS ON MILITARY ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT AND TYPE (2023- 2032)

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Sargassum	1.0	1.0	1.0	3.0
Massachusetts	0.0	0.6	0.2	0.8
Rhode Island	0.0	0.6	0.2	0.8
Connecticut	0.0	0.6	0.2	0.8
New York	0.0	0.6	0.2	0.8
New Jersey	0.0	0.6	0.2	0.8
Delaware	0.0	0.6	0.2	0.8
Maryland	0.0	0.6	0.2	0.8
Virginia	2.0	6.6	0.2	8.8
NC: Albemarle Sound	0.0	2.0	0.0	2.0
NC: Pamlico, Core, and Back Sounds	0.0	0.0	0.0	0.0
NC: Bogue Snd, White Oak/New/Cape Fear R.	0.0	2.0	0.0	2.0
NC: Currituck Sound	0.0	0.0	0.0	0.0
South Carolina	0.0	2.5	0.1	2.6
Georgia	0.0	2.5	0.1	2.6
Florida	1.0	20.0	0.1	21.1
Alabama	0.0	0.5	0.0	0.5
Mississippi	0.0	0.5	0.0	0.5
Louisiana	0.0	0.5	0.0	0.5
Texas (other areas)	0.0	0.5	0.0	0.5
TX: Galveston Bay to Lavaca, Matagorda Bay	0.0	0.0	0.0	0.0
TX: Lavaca, Matagorda Bay to Laguna Madre	0.0	0.0	0.0	0.0
Texas: Laguna Madre	0.0	0.0	0.0	0.0
Mona Island South	0.0	0.0	0.0	0.0
Mona Island North	0.0	0.0	0.0	0.0
Culebra Island	0.0	0.0	0.0	0.0
Puerto Rico: other areas	0.0	7.0	0.0	7.0
Vieques North	0.0	2.0	0.0	2.0
Vieques East	0.0	0.0	0.0	0.0
Vieques South	0.0	3.0	0.0	3.0
Puerto Rico North	0.0	0.0	0.0	0.0
Puerto Rico Guayama	0.0	0.0	0.0	0.0
Puerto Rico Maunabo	0.0	0.0	0.0	0.0
North Atlantic DPS	**4.0**	**55.0**	**3.0**	**62.0**
South Atlantic DPS	**0.0**	**0.0**	**0.0**	**0.0**
United States/Mexico border to San Diego Bay	0.1	1.0	0.0	1.1
San Diego Bay	0.1	32.0	1.0	33.1
Mission Bay	0.1	0.0	0.0	0.1
Point Loma to (but not incl.) La Jolla Shores	0.0	0.0	0.0	0.0
La Jolla Shores/Cove	0.0	0.0	0.0	0.0
La Jolla Shores to Oceanside (incl. Oceanside)	0.0	0.0	0.0	0.0
Agua Hedionda Lagoon	0.0	0.0	0.0	0.0
Oceanside to San Onofre	0.0	0.0	0.0	0.0

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
San Onofre	0.0	0.0	0.0	0.0
San Onofre to Newport (incl. Newport Bay)	0.0	0.0	0.0	0.0
Newport to Huntington Beach	0.0	0.0	0.0	0.0
Bolsa Chica Lowlands (Basin)	0.0	0.0	0.0	0.0
Seal Beach Complex	1.0	1.0	0.0	2.0
LA and Long Beach Harbors	0.0	1.0	0.0	1.0
LA and Long Beach Breakwater	0.0	0.0	0.0	0.0
Palos Verdes	0.0	0.0	0.0	0.0
Santa Monica Bay	0.0	0.0	0.0	0.0
Catalina Island	0.0	0.0	0.0	0.0
Channel Islands	0.0	2.0	0.0	2.0
Santa Monica Bay to Point Conception	0.0	0.0	0.0	0.0
East Pacific DPS	**1.4**	**37.0**	**1.0**	**39.4**
Hawai‘i	0.1	1.0	0.0	1.1
Kaho‘olawe	0.1	0.0	0.0	0.1
Lana‘i	0.0	0.0	0.0	0.1
Maui	0.1	0.0	0.0	0.1
Moloka‘i	0.0	0.0	0.0	0.1
O‘ahu	0.1	39.0	0.0	39.1
Niihau	0.1	0.0	0.0	0.1
Kaua‘i	0.1	2.0	0.0	2.1
Nihoa	0.0	0.0	0.0	0.0
Mokumanamana/Necker Island	0.0	0.0	0.0	0.0
Lalo/French Frigate Shoals	0.0	0.0	0.0	0.0
Kamole/Laysan Island	0.0	0.0	0.0	0.0
Kapou/Lisianski Island	0.0	0.0	0.0	0.0
Manawai/Pearl and Hermes Atoll	0.0	0.0	0.0	0.0
Kuaihelani/Midway Atoll	0.0	0.0	0.0	0.0
Hōlanikū/Kure Atoll	0.0	0.0	0.0	0.0
Johnston Atoll	0.0	0.0	0.0	0.0
Central North Pacific DPS	**0.6**	**42.5**	**0.0**	**43.1**
Tinian	0.1	2.5	0.0	2.6
Pagan	0.1	0.0	0.0	0.1
Rota	0.1	0.0	0.0	0.1
Sarigan	0.1	0.0	0.0	0.1
Alamagan	0.1	0.0	0.0	0.1
Aguijan	0.1	0.0	0.0	0.1
Guguan	0.1	0.0	0.0	0.1
Agrihan	0.1	0.0	0.0	0.1
Saipan	0.1	0.5	0.0	0.6
Wake	0.0	2.0	0.0	2.0
CNMI (other areas)	0.0	0.0	0.0	0.0
Guam	1.0	16.0	0.0	17.0
Central West Pacific DPS	**2.0**	**21.2**	**0.0**	**23.2**
Central South Pacific DPS	**0.0**	**0.3**	**0.0**	**0.3**

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
TOTAL	**8.0**	**156.0**	**4.0**	**168.0**
Fractions of consultations occurred as a result of assigning some consultations to two or more units.				

As noted above, NMFS does not anticipate that critical habitat designation will generate additional conservation efforts for the green sea turtles specific to military activities. As such, incremental costs are anticipated to be limited to the additional administrative effort required to consider effects to the critical habitat of military activities in consultations that would occur absent designation. As shown in Table 25, incremental costs of green sea turtle critical habitat to military activities are projected to total $460,000 over ten years (discounted at seven percent), or $66,000 in annualized costs. Impacts are expected to be highest in units of the North Atlantic DPS ($190,000 over ten years, discounted at seven percent), but the East Pacific ($110,000), Central North Pacific ($100,000), and Central West Pacific ($61,000) DPSs also account for substantial portions of total costs.

Table 23. PROJECTED INCREMENTAL COSTS (IN 2022 DOLLARS) OF SECTION 7 CONSULTATIONS ON MILITARY ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT (2023- 2032)

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Sargassum	$3,500	$25,000	$30,000
Massachusetts	$730	$5,100	$6,200
Rhode Island	$730	$5,100	$6,200
Connecticut	$730	$5,100	$6,200
New York	$730	$5,100	$6,200
New Jersey	$730	$5,100	$6,200
Delaware	$730	$5,100	$6,200
Maryland	$730	$5,100	$6,200
Virginia	$3,900	$28,000	$34,000
NC: Albemarle Sound	$680	$4,800	$5,800
NC: Pamlico, Core, and Back Sounds	$54	$380	$460
NC: Bogue Snd, White Oak/New/Cape Fear R.	$680	$4,800	$5,800
NC: Currituck Sound	$54	$380	$460
South Carolina	$1,000	$7,000	$8,600
Georgia	$1,000	$7,000	$8,600
Florida	$7,200	$50,000	$61,000
Alabama	$160	$1,100	$1,300
Mississippi	$160	$1,100	$1,300
Louisiana	$160	$1,100	$1,300
Texas (other areas)	$160	$1,100	$1,300
TX: Galveston Bay to Lavaca, Matagorda Bay	$0	$0	$0
TX: Lavaca, Matagorda Bay to Laguna Madre	$0	$0	$0
Texas: Laguna Madre	$0	$0	$0
Mona Island South	$0	$0	$0
Mona Island North	$0	$0	$0
Culebra Island	$0	$0	$0

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Puerto Rico: other areas	$2,200	$16,000	$19,000
Vieques North	$630	$4,400	$5,400
Vieques East	$0	$0	$0
Vieques South	$950	$6,700	$8,100
Puerto Rico North	$0	$0	$0
Puerto Rico Guayama	$0	$0	$0
Puerto Rico Maunabo	$0	$0	$0
North Atlantic DPS	**$28,000**	**$190,000**	**$240,000**
South Atlantic DPS	**$0**	**$0**	**$0**
United States/Mexico border to San Diego Bay	$490	$3,500	$4,200
San Diego Bay	$13,000	$90,000	$110,000
Mission Bay	$180	$1,200	$1,500
Point Loma to (but not incl.) La Jolla Shores	$0	$0	$0
La Jolla Shores/Cove	$0	$0	$0
La Jolla Shores to Oceanside (incl. Oceanside)	$0	$0	$0
Agua Hedionda Lagoon	$0	$0	$0
Oceanside to San Onofre	$0	$0	$0
San Onofre	$0	$0	$0
San Onofre to Newport (incl. Newport Bay)	$0	$0	$0
Newport to Huntington Beach	$0	$0	$0
Bolsa Chica Lowlands (Basin)	$0	$0	$0
Seal Beach Complex	$970	$6,800	$8,300
LA and Long Beach Harbors	$320	$2,200	$2,700
LA and Long Beach Breakwater	$0	$0	$0
Palos Verdes	$0	$0	$0
Santa Monica Bay	$0	$0	$0
Catalina Island	$0	$0	$0
Channel Islands	$630	$4,400	$5,400
Santa Monica Bay to Point Conception	$0	$0	$0
East Pacific DPS	**$15,000**	**$110,000**	**$130,000**
Hawai‘i	$440	$3,100	$3,800
Kaho‘olawe	$130	$910	$1,100
Lana‘i	$49	$350	$420
Maui	$130	$910	$1,100
Moloka‘i	$39	$280	$340
O‘ahu	$12,000	$87,000	$110,000
Niihau	$130	$910	$1,100
Kaua‘i	$760	$5,300	$6,500
Nihoa	$10	$67	$82
Mokumanamana/Necker Island	$10	$67	$82
Lalo/French Frigate Shoals	$10	$67	$82
Kamole/Laysan Island	$10	$67	$82
Kapou/Lisianski Island	$10	$67	$82
Manawai/Pearl and Hermes Atoll	$10	$67	$82
Kuaihelani/Midway Atoll	$10	$67	$82

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Hōlanikū/Kure Atoll	$10	$67	$82
Johnston Atoll	$10	$67	$82
Central North Pacific DPS	**$14,000**	**$100,000**	**$120,000**
Tinian	$940	$6,600	$8,100
Pagan	$160	$1,100	$1,300
Rota	$160	$1,100	$1,300
Sarigan	$150	$1,000	$1,200
Alamagan	$150	$1,000	$1,200
Aguijan	$150	$1,000	$1,200
Guguan	$150	$1,000	$1,200
Agrihan	$150	$1,000	$1,200
Saipan	$310	$2,200	$2,700
Wake	$640	$4,500	$5,500
CNMI (other areas)	$0	$0	$0
Guam	$5,700	$40,000	$49,000
Central West Pacific DPS	**$8,700**	**$61,000**	**$74,000**
Rose Atoll	$10	$67	$82
Ta'u	$10	$67	$82
Ofu and Olosega	$10	$67	$82
Ofu and Olosega (other areas)	$0	$0	$0
Palmyra	$10	$67	$82
Tutuila	$10	$67	$82
Swains	$10	$67	$82
Baker	$10	$67	$82
Howland	$10	$67	$82
Kingman	$10	$67	$82
Jarvis	$10	$67	$82
Central South Pacific DPS	**$96**	**$670**	**$820**
TOTAL	**$66,000**	**$460,000**	**$560,000**

2.3.5.5 Assumptions and Limitations

Table 26 describes the key assumptions underlying the analysis of aquaculture activities and the influence of those assumptions on the results of the analysis.

Table 24. ASSUMPTIONS AND LIMITATIONS OF ANALYSIS OF INCREMENTAL COSTS OF CRITICAL HABITAT DESIGNATION ON MILITARY ACTIVITIES

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
The frequency of new consultations for military activities is constant and is comparable to the average rate of consultations in recent years.	**Unknown.** May overestimate or underestimate incremental impacts.	**Likely minor.** The future growth or decline pattern of consultations on military activities is not known. Because of continued growth in military activities in the Central West Pacific region, consultation forecasts may be low for that region.

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
Any increase in the level of sea turtle conservation efforts that could result from consideration of green sea turtle critical habitat is not quantified.	May result in an **underestimate** or **overestimate** of costs.	**Potentially moderate.** To the extent that military installations modify INRMPs to incorporate potential green sea turtle critical habitat and add conservation efforts, costs in this report would be underestimated. However, to the extent that DoD installations request and are granted national security exclusions, this analysis would be overstating impacts by including the incremental administrative costs of consultations on military activities that, by virtue of the exclusions, would not be subject to consultation.

2.3.6 Shipwreck and Marine Debris Removal – USCG, NOAA

Under section 19 of the Rivers and Harbors Appropriations Act, USACE has the authority to undertake projects to remove and dispose of derelict objects such as sunken vessels and waterfront debris if they are determined to be obstructions to navigation (33 USC § 401). USACE's Nationwide Permit 22 authorizes temporary structures or minor discharges of dredged or fill material required for the removal of wrecked, abandoned, or disabled vessels, or the removal of man made obstructions to navigation. The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if the activity is conducted in a special aquatic site, including coral reefs and wetlands (86 FR 73522).

USCG is responsible for implementing the Oil Pollution Act by responding to vessel groundings that present the risk of an oil spill. Prior to responding to an incident, the USCG typically conducts an emergency consultation with NMFS to reduce impacts to listed species. In addition, NOAA conducts extensive marine debris removal activities through the Office of Response and Restoration's Marine Debris Program, as authorized by Congress through the Marine Debris Act. These activities include:

- Outreach and education initiatives designed to prevent marine debris;
- Community-based marine debris removal projects
- Research projects to enhance understanding and mitigation of the effects of marine debris, focusing on marine debris monitoring, fishing gear improvement and alternatives, life cycle analysis, chemical impacts, and economic impacts; and
- Emergency response activities to address marine debris generated by natural disasters (NOAA Office of Response and Restoration 2022).

USACE has jurisdiction over the removal of abandoned and derelict vessels when a vessel sinks in or impacts a navigable channel. It may conduct a channel survey to determine whether the vessel constitutes an obstruction to navigation. The location of the vessel with respect to the navigation channel will determine whether further USACE involvement in removal is warranted. FEMA is involved

with abandoned and derelict vessels via the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), which gives FEMA the responsibility of coordinating the federal government's response to disasters. FEMA may assign another federal agency to remove eligible vessels when the state and local governments certify that they lack the capability to perform or contract for the work. Additionally, FEMA may reimburse applicants for the cost of vessel removal and disposal through grant assistance (42 U.S.C. 5121).

2.3.6.1 Description of Threat

NMFS (2022) identifies anthropogenic marine debris, including marine debris removal, as a threat to the foraging and resting EFs of the potential critical habitat. Surface convergence zones that aggregate food resources for green turtles aggregate pollutants, and the Hawaiian Archipelago, specifically, is surrounded by three areas of concentrated marine debris aggregations. The removal of at-sea marine debris, which frequently co-occurs with Sargassum, often focuses on collection of materials at or near the sea surface. Such activity could negatively impact Sargassum habitat used by sea turtles. In addition, ship groundings damage reef habitat and spill fuel and other contaminants, presenting a threat to both green turtles and the quality of their foraging habitat. The method of removal of fuel, oil, industrial waste, and other pollutants from a grounded vessel could be more or less detrimental depending on the properties of the pollutants and the hydrodynamics of the system.

2.3.6.2 Extent of Activity within Critical Habitat Area

NOAA's Marine Debris Program publishes Emergency Response Guides and Regional Action Plans to provide specific direction for coordinating local, state, and federal response to acute marine debris events. Action Plans provide a strategic framework for partners across a specific state or region to address the problem of marine debris. Among the Guides and Plans currently in place are the California Ocean Litter Prevention Strategy, Long Island Sound Marine Debris Action Plan, U.S. Virgin Islands Marine Debris Action Plan, Gulf of Mexico Alliance Regional Action Plan, Virginia Marine Debris Reduction Plan, Hawai'I Marine Debris Action Plan, Florida Marine Debris Reduction Plan, and Southeast Marine Debris Action Plan. In addition, the Office of Response and Restoration is currently supporting the following active removal projects (National Ocean Service 2022):

- Assessment and removal of derelict crab pots from a recreational fishery in Delaware;
- Removal of more than 40 abandoned and derelict vessels from the Central and Southeast regions of the North Carolina Coast due to damage caused by Hurricane Florence;
- Collection and recycling of fishing gear in the Gulf of Mexico and the Mexican Caribbean, removal of debris from marine protected areas, and promotion of education;
- Collaboration with the Mississippi State University Coastal Research and Extension Center and partners to Removal of derelict vessels and other large marine debris from the lower Pascagoula River, and monitoring for ecosystem recovery;
- Removal of derelict fishing gear and other large marine debris from remote coastlines on the islands of Kaua'i, Maui, and Hawai'i Island;
- Systematic location and removal of derelict blue crab traps in coastal waters from Matagorda Bay to Aransas Bay, Texas during the annual crab season closure;
- Removal of derelict fishing gear from from the waters around Puerto Rico and building capacity

within the U.S. Virgin Islands to address marine debris in the region; and

- Collaboration between the National Marine Sanctuary Foundation and local dive operators to remove harmful marine debris from the Florida Keys National Marine Sanctuary, while engaging the local community to prevent future debris.

The query of NMFS' Section 7 consultation databases for consultations occurring from 2012 to 2021 yielded 62 informal consultations on shipwreck and marine debris-related activities that could affect green sea turtle critical habitat. These included 28 consultations, including 24 emergency consultations, on which USCG was the consulting agency. These consultations were on activities related to the removal or salvage of grounded or beached vessels and emergency response activities in the wake of natural disasters. NOAA was the lead Federal consulting agency on 26 consultations, including several emergency consultations, with the vast majority related to debris removal activities. USACE was the consulting agency on five of the remaining eight informal consultations, with three of these consultations related to artifact recovery operations. Table 26 presents a summary of these consultations by consultation type and DPS. The North Atlantic DPS accounted for nearly three-quarters (45.4) of the 62 consultations. Twenty of the consultations were on activities in Florida, with another 10 occurring in the Virginia to Massachusetts unit.

Table 25. CONSULTATIONS ON SHIPWRECK AND MARINE DEBRIS REMOVAL ACTIVITIES THAT MAY AFFECT POTENTIAL GREEN SEA TURTLE CRITICAL HABITAT AREAS, BY DPS AND CONSULTATION TYPE (2012 – 2021)

DPS	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
North Atlantic	0.0	45.4	0.0	45.4
South Atlantic	0.0	3.6	0.0	3.6
East Pacific	0.0	1.0	0.0	1.0
North Pacific	0.0	6.0	0.0	6.0
West Pacific	0.0	4.0	0.0	4.0
South Pacific	0.0	2.0	0.0	2.0
Total	**0.0**	**62.0**	**0.0**	**62.0**

Source: NMFS SERO's Section 7 consultation database.
Fractions of consultations occurred as a result of assigning some consultations to two or more units.

2.3.6.3 Regulatory Baseline

Some baseline protection for potential critical habitat is provided by the National Response Team's (NRT) guidance for federal On-Scene Coordinators and Area Committees that develop solutions for the abatement of pollution from abandoned vessels and examine options applicable to the removal and disposition of abandoned vessels. According to the NRT's guidance, in situations where grounded vessels may damage coral, seagrass, or other sensitive marine habitats, resource trustees should be incorporated into any response planning to help educate others and help protect sensitive species and ecosystems. The Guidance notes that oil pollution may not always be the primary environmental concern associated with grounded vessels, specifically when sensitive or protected marine resources may be damaged (U.S. Environmental Protection Agency 2014). In addition, the Coral Reef Task Force and Injury Resource Tools Working Group, through NOAA's Office of Response and Restoration, funded the development of Rapid Assessment Protocols for Small Vessel Groundings. The Protocols include assessment of initial damages to coral, hardbottom, and seagrass habitats from small vessel groundings,

and development of appropriate injury categories for seagrass and hardbottom habitats (Michel et al. 2008).

OR&R's abandoned and derelict vessel removal efforts are designed to avoid the physical destruction of sensitive marine and coastal habitats due to the dispersal of oil and toxic chemicals still on board, the generation of marine debris, and the spread of derelict nets and fishing gear that entangle and endanger marine life (NOAA Office of Response and Restoration 2019). OR&R similarly emphasizes minimization of environmental impacts of debris removal in debris removal programs that it leads and funds (NOAA Office of Response and Restoration 2021).

2.3.6.4 Results of Analysis

Due to baseline protections in place for green sea turtles and sensitive habitats, as well as the consistent determination by NMFS that activities related to shipwreck and marine debris removal are not likely to adversely affect ESA-protected resources, the potential critical habitat is not expected to result in the need for project modifications to these activities beyond those already in place. As a result, the incremental costs of green sea turtle critical habitat designation relative to shipwreck and marine debris removal activities are anticipated to be limited to the administrative costs of considering green sea turtle critical habitat in Section 7 consultations.

This economic analysis relied on historical Section 7 consultation data to project the rate and geographic distribution of future consultations considering effects of scientific research and monitoring and environmental restoration activities on the potential critical habitat. This analysis assumes that future consultations considering effects to the potential critical habitat would occur absent designation because of the presence of green sea turtles in the potential critical habitat areas. Without knowledge of the location and timing of future consultations on shipwreck and marine debris activities that would consider effects to green sea turtle critical habitat, we assume that the future rate and geographical distribution of consultations will be similar to rate and distribution of consultations occurring over the 2012-2021 timeframe. Thus, we project that 62 informal consultations on shipwreck and marine debris removal activities will occur over the next ten years within areas being considered for critical habitat, with approximately 46 of these consultations occurring across North Atlantic DPS units (including 20 consultations on activities in Florida). None of the other five DPSs is projected to account for more than six consultations over the ten years.

Given our assumptions regarding incremental costs of considering critical habitat in a consultation that would occur absent the critical habitat, we project that total incremental impacts of the potential critical habitat to shipwreck and marine debris removal activities will be $140,000 over the next ten years (discounted at seven percent), or $20,000 in annualized costs. Total impacts in Florida would be highest ($44,000 over ten years, discounted at seven percent). Total impacts over ten years are not anticipated to exceed $7,500 for any other critical habitat unit. Table 28 summarizes the total projected administrative costs of these consultations over the ten-year forecast period, 2023-2032, by DPS.

Table 26. INCREMENTAL COSTS OF GREEN SEA TURTLE CRITICAL HABITAT DESIGNATION TO SHIPWRECK AND MARINE DEBRIS REMOVAL ACTIVITIES, 2023-2032 (2022$)

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Sargassum	$950	$6,700	$8,100
Massachusetts	$1,100	$7,500	$9,100

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Rhode Island	$120	$830	$1,000
Connecticut	$120	$830	$1,000
New York	$430	$3,000	$3,700
New Jersey	$430	$3,000	$3,700
Delaware	$430	$3,000	$3,700
Maryland	$430	$3,000	$3,700
Virginia	$120	$830	$1,000
NC: Albemarle Sound	$0	$0	$0
NC: Pamlico, Core, and Back Sounds	$0	$0	$0
NC: Bogue Snd, White Oak/New/Cape Fear R.	$0	$0	$0
NC: Currituck Sound	$0	$0	$0
South Carolina	$320	$2,200	$2,700
Georgia	$320	$2,200	$2,700
Florida	$6,300	$44,000	$54,000
Alabama	$0	$0	$0
Mississippi	$0	$0	$0
Louisiana	$0	$0	$0
Texas (other areas)	$0	$0	$0
TX: Galveston Bay to Lavaca, Matagorda Bay	$320	$2,200	$2,700
TX: Lavaca, Matagorda Bay to Laguna Madre	$0	$0	$0
Texas: Laguna Madre	$0	$0	$0
Mona Island South	$340	$2,400	$2,900
Mona Island North	$340	$2,400	$2,900
Culebra Island	$340	$2,400	$2,900
Puerto Rico: other areas	$650	$4,600	$5,600
Vieques North	$20	$140	$170
Vieques East	$340	$2,400	$2,900
Vieques South	$340	$2,400	$2,900
Puerto Rico North	$340	$2,400	$2,900
Puerto Rico Guayama	$340	$2,400	$2,900
Puerto Rico Maunabo	$20	$140	$170
North Atlantic DPS	**$14,000**	**$100,000**	**$120,000**
St. John, USVI (High)	$120	$880	$1,100
St. Thomas, USVI (High)	$120	$880	$1,100
St. Croix, USVI (High)	$120	$880	$1,100
St. John, USVI (Moderate)	$120	$880	$1,100
St. Thomas, USVI (Moderate)	$440	$3,100	$3,800
St. Croix, USVI (Moderate)	$120	$880	$1,100
South Atlantic DPS	**$1,100**	**$7,500**	**$9,100**
United States/Mexico border to San Diego Bay	$0	$0	$0
San Diego Bay	$0	$0	$0
Mission Bay	$0	$0	$0
Point Loma to (but not incl.) La Jolla Shores	$0	$0	$0
La Jolla Shores/Cove	$0	$0	$0
La Jolla Shores to Oceanside (incl. Oceanside)	$0	$0	$0

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Agua Hedionda Lagoon	$0	$0	$0
Oceanside to San Onofre	$0	$0	$0
San Onofre	$0	$0	$0
San Onofre to Newport (incl. Newport Bay)	$0	$0	$0
Newport to Huntington Beach	$0	$0	$0
Bolsa Chica Lowlands (Basin)	$0	$0	$0
Seal Beach Complex	$0	$0	$0
LA and Long Beach Harbors	$0	$0	$0
LA and Long Beach Breakwater	$0	$0	$0
Palos Verdes	$0	$0	$0
Santa Monica Bay	$0	$0	$0
Catalina Island	$0	$0	$0
Channel Islands	$320	$2,200	$2,700
Santa Monica Bay to Point Conception	$0	$0	$0
East Pacific DPS	**$320**	**$2,200**	**$2,700**
Hawai‘i	$200	$1,400	$1,700
Kaho‘olawe	$120	$830	$1,000
Lana‘i	$200	$1,400	$1,700
Maui	$200	$1,400	$1,700
Moloka‘i	$120	$830	$1,000
O‘ahu	$750	$5,300	$6,400
Niihau	$120	$830	$1,000
Kaua‘i	$200	$1,400	$1,700
Nihoa	$0	$0	$0
Mokumanamana/Necker Island	$0	$0	$0
Lalo/French Frigate Shoals	$0	$0	$0
Kamole/Laysan Island	$0	$0	$0
Kapou/Lisianski Island	$0	$0	$0
Manawai/Pearl and Hermes Atoll	$0	$0	$0
Kuaihelani/Midway Atoll	$0	$0	$0
Hōlanikū/Kure Atoll	$0	$0	$0
Johnston Atoll	$0	$0	$0
Central North Pacific DPS	**$1,900**	**$13,000**	**$16,000**
Tinian	$320	$2,200	$2,700
Pagan	$0	$0	$0
Rota	$0	$0	$0
Sarigan	$0	$0	$0
Alamagan	$0	$0	$0
Aguijan	$0	$0	$0
Guguan	$0	$0	$0
Agrihan	$0	$0	$0
Saipan	$0	$0	$0
Wake	$0	$0	$0
CNMI (other areas)	$0	$0	$0
Guam	$950	$6,700	$8,100

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Central West Pacific DPS	**$1,300**	**$8,900**	**$11,000**
Rose Atoll	$0	$0	$0
Ta'u	$0	$0	$0
Ofu and Olosega	$0	$0	$0
Ofu and Olosega (other areas)	$0	$0	$0
Palmyra	$160	$1,100	$1,300
Tutuila	$320	$2,200	$2,700
Swains	$0	$0	$0
Baker	$0	$0	$0
Howland	$0	$0	$0
Kingman	$160	$1,100	$1,300
Jarvis	$0	$0	$0
Central South Pacific DPS	**$630**	**$4,400**	**$5,400**
TOTAL	**$20,000**	**$140,000**	**$170,000**

2.3.6.5 Assumptions and Limitations

Table 25 describes the key assumptions underlying the analysis of shipwreck and marine debris removal activities and the influence of those assumptions on the results of the analysis.

Table 27. ASSUMPTIONS AND LIMITATIONS OF ANALYSIS OF INCREMENTAL COSTS OF CRITICAL HABITAT DESIGNATION ON SHIPWRECK AND MARINE DEBRIS REMOVAL ACTIVITIES

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
The frequency of new consultations related to shipwreck and marine debris removal activities is constant and is equivalent to the average rate of consultations in recent years.	**Unknown.** May overestimate or underestimate incremental impacts.	**Likely minor.** The future growth or decline pattern of consultations related to shipwreck and marine debris removal is not known.
Project modifications beyond those currently prescribed will not be recommended in consultation.	May result in an **underestimate** of costs.	**Likely minor.** It is unlikely that additional project modifications will be necessary to avoid impacts to green sea turtle habitat beyond those currently implemented to protect the turtles themselves; however, to the extent that new projects require additional modifications, this estimate may be an underestimate of future costs.

2.3.7 Scientific Research and Monitoring and Environmental Restoration – NOAA

NOAA conducts scientific research and issues permits for various research and monitoring activities throughout the potential critical habitat. NMFS may issue directed take permits through section

10(a)(1)(A) of the ESA to study species listed under the ESA or to enhance or aid the recovery of endangered species. NMFS may also issue permits to take endangered or threatened marine species incidentally to an otherwise lawful activity under section 10(a)(1)(B) of the ESA. Issuance of these permits constitutes a Federal nexus and triggers consultation on potentially affected listed species.

NOAA also issues permits for restoration projects undertaken by NMFS and other NOAA agencies. In support of mandates of the MSA and ESA, NOAA's Office of Habitat Conservation conducts activities designed to protect and restore fisheries, recover protected species, and maintain resilient coastal ecosystems and communities. Among the Office's key initiatives are conducting large-scale wetland restoration in Louisiana, restoring the GoM, and recovering habitats after disasters (NOAA Fisheries, Office of Habitat Conservation 2022a).

2.3.7.1 Description of Threat

NOAA conducts research and monitoring activities that may affect potential critical habitat, including installation of scientific instrumentation; deployment of nets and other marine resource collection devices; and research, restoration, and relocation of corals. However, these activities usually have a minor footprint, including to reefs, which are important foraging habitat to green sea turtles. For example, NOAA collects continuous measurements of environmental conditions influencing coral reefs from platforms such as pylons, moored buoys, and underwater instruments. Divers and underwater researchers directly observe the biological, physical, and chemical conditions of coral reef ecosystems (NOAA 2022), with little or no disturbance to coral reefs. Additionally, strict protocols are typically observed during fieldwork permitted by NOAA to ensure minimal disturbance to the environment.

Temporary disturbance to or permanent removal of green turtle foraging and resting and migratory habitat may result from activities undertaken through incidental take permits. Examples of these activities include oil and gas development, exploration, production, and abandonment projects; geophysical surveys for other energy and scientific research projects; pile driving associated with construction projects; and explosive structure removal. A habitat conservation plan must accompany an application for an ESA incidental take permit. The habitat conservation plan helps ensure that the effects of the authorized incidental take are minimized or mitigated to the maximum extent practicable (NOAA Fisheries 2022 d).

2.3.7.2 Extent of Activity within Critical Habitat Area

The query of NMFS' Section 7 consultation databases for consultations occurring from 2012 to 2021 yielded 189 consultations on scientific research and monitoring and environmental restoration activities that could affect green sea turtle critical habitat. Table 26 presents a summary of these consultations by consultation type and DPS. Seven of the 136 consultations on activities related to scientific research and monitoring were programmatic consultations, 24 were formal consultations, and the remaining 105 were informal consultations. The North Atlantic DPS accounted for 61.4 (44%) of the 136 consultations, while the North Pacific, West Pacific, and South Pacific DPSs accounted for approximately 39.4 (29%), 12.7 (9%), and 12.1 (9%) consultations, respectively.

A 2017 Biological Opinion on the reissuance of a permit for scientific research on sea turtles in the GoM concluded that the research activities are not likely to adversely affect designed critical habitat for loggerhead sea turtles, in part because of permit conditions serving to mitigate the effect of research on aquatic vegetation (NMFS 2017e). A Biological Opinion on the issuance of a permit for research on sea turtles in the coastal waters of Puerto Rico concluded that, while green sea turtles are likely to be adversely affected, designated critical habitat for green sea turtles in the coastal waters surrounding Isla

de Culebra is not likely to be adversely affected (NMFS 2017f). The Opinion noted that:

- Capture of targeted species will be performed by hand or net and all research activities will take place aboard vessels so that no activity would adversely affect the shelter and dietary components of the sea turtles or the physical features of the designated critical habitat;
- The applicant will keep boat speeds to a minimum in shallow areas to not disturb the sea bed; and
- Boats will be tied up to existing buoys and piers, and if anchoring is necessary, will be done in sand.

Of the consultations on environmental restoration projects, 7 were formals and 46 were informals. The 7 formal consultations were primarily related to restoration activities in the GoM in response to the Deepwater Horizon oil spill. Restoration projects historically occurring within the areas considered for critical habitat include those targeted at beaches, reefs, specific animal habitats, and habitats and infrastructure impacted by the Deepwater Horizon oil spill and natural disasters.

Table 28. CONSULTATIONS ON SCIENTIFIC RESEARCH AND MONITORING AND ENVIRONMENTAL RESTORATION ACTIVITIES THAT MAY AFFECT POTENTIAL GREEN SEA TURTLE CRITICAL HABITAT AREAS, BY DPS AND CONSULTATION TYPE (2012 – 2021)

DPS	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
North Atlantic	23.2	88.4	2.9	114.4
South Atlantic	1.8	1.6	0.6	3.9
East Pacific	2.3	3.0	1.1	6.4
North Pacific	1.4	36.3	1.7	39.4
West Pacific	1.2	11.3	0.3	12.7
South Pacific	1.3	10.4	0.4	12.1
Total	**31.0**	**151.0**	**7.0**	**189.0**

Source: NMFS SERO's Section 7 consultation database.
Fractions of consultations occurred as a result of assigning some consultations to two or more units.

2.3.7.3 Regulatory Baseline

As noted above, strict protocols are typically observed during field work permitted by NOAA and the Department of the Interior to ensure minimal disturbance to the environment. Therefore, scientific research and monitoring activities are unlikely to adversely modify the potential critical habitat. Each environmental restoration project undertaken by NOAA requires an assessment of its environmental impacts, in accordance with the requirements of the National Environmental Policy Act (NEPA), to ensure that all impacts are fully considered. For NOAA actions, this assessment must also comply with NOAA's policies, requirements, and procedures for complying with NEPA (NOAA Fisheries, Office of Habitat Restoration 2022b).

2.3.7.4 Results of Analysis

Due to the extensive protections already in place for green sea turtles and their habitat, including baseline protocols and regulations specific to scientific research and monitoring and environmental

restoration activities, the potential critical habitat is not expected to result in the need for pro for these activities beyond those already in place. As a result, the incremental costs of green sea turtle critical habitat designation relative to scientific research and monitoring and environmental restoration activities are anticipated to be limited to the administrative costs of considering green sea turtle critical habitat in Section 7 consultations.

This economic analysis relied on historical Section 7 consultation data to forecast the rate and geographic distribution of future consultations considering effects of scientific research and monitoring and environmental restoration activities on the potential critical habitat. It assumes that future consultations considering effects to the potential critical habitat would occur absent designation because of the presence of green sea turtles in the potential critical habitat areas. Without knowledge of the location and timing of future consultations on scientific research and monitoring and environmental restoration activities that would consider effects to green sea turtle critical habitat, we assume that the future rate and distribution of consultations will be similar to rate and distribution of consultations occurring over the 2012-2021 timeframe.

This analysis projects that NMFS will complete 134 Section 7 consultations related to scientific research and monitoring and environmental restoration activities over the next ten years that consider effects on green sea turtle critical habitat. This total includes 24 formal consultations, eight programmatic consultations, and 102 informal consultations. This analysis also assumes these totals include the reinitiation of four programmatic consultations and three formal consultations, all but one of which relate to scientific research activities undertaken by NMFS. As shown in Table 31, the North Atlantic DPS is projected to account for the largest share of consultations (approximately 59 over ten years), with the Central North Pacific (39 consultations), Central West Pacific (14), and Central South Pacific (12) DPSs accounting for most of the other consultations.

Table 29. PROJECTED QUANTITY AND DISTRIBUTION OF SECTION 7 CONSULTATIONS ON SCIENTIFIC RESEARCH AND MONITORING AND ENVIRONMENTAL RESTORATION ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT AND TYPE (2023- 2032)

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Sargassum	0.2	3.0	0.0	3.2
Massachusetts	0.9	3.1	0.3	4.3
Rhode Island	0.9	1.1	0.3	2.3
Connecticut	0.9	0.6	0.3	1.8
New York	0.5	1.3	0.3	2.1
New Jersey	1.5	6.3	0.3	8.1
Delaware	0.5	2.3	0.3	3.1
Maryland	0.5	0.3	0.3	1.1
Virginia	0.5	2.3	0.3	3.1
NC: Albemarle Sound	1.1	1.3	0.1	2.4
NC: Pamlico, Core, and Back Sounds	0.1	0.3	0.1	0.4
NC: Bogue Snd, White Oak/New/Cape Fear R.	0.1	0.3	0.1	0.4
NC: Currituck Sound	0.1	0.0	0.1	0.1
South Carolina	0.6	0.0	0.1	0.7
Georgia	1.6	0.0	0.1	1.7
Florida	1.4	12.5	0.1	14.0

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Alabama	0.4	0.4	0.0	0.8
Mississippi	0.4	0.4	0.0	0.8
Louisiana	0.4	0.4	0.0	0.8
Texas (other areas)	0.2	0.4	0.0	0.6
TX: Galveston Bay to Lavaca, Matagorda Bay	2.2	1.1	0.0	3.3
TX: Lavaca, Matagorda Bay to Laguna Madre	0.2	1.1	0.0	1.3
Texas: Laguna Madre	0.2	0.0	0.0	0.2
Mona Island South	0.1	0.0	0.0	0.2
Mona Island North	0.1	0.0	0.0	0.2
Culebra Island	0.2	0.0	0.0	0.2
Puerto Rico: other areas	0.2	0.0	0.0	0.2
Vieques North	0.2	0.0	0.0	0.2
Vieques East	0.2	0.0	0.0	0.2
Vieques South	0.2	0.0	0.0	0.2
Puerto Rico North	0.2	0.0	0.0	0.2
Puerto Rico Guayama	0.2	0.0	0.0	0.2
Puerto Rico Maunabo	0.2	0.0	0.0	0.2
North Atlantic DPS	**16.5**	**38.8**	**4.1**	**59.4**
St. John, USVI (High)	0.2	0.0	0.0	0.3
St. Thomas, USVI (High)	0.2	0.0	0.0	0.3
St. Croix, USVI (High)	0.2	0.0	0.0	0.3
St. John, USVI (Moderate)	0.2	1.0	0.0	1.3
St. Thomas, USVI (Moderate)	0.2	0.0	0.0	0.3
St. Croix, USVI (Moderate)	0.2	0.0	0.0	0.3
South Atlantic DPS	**1.3**	**1.3**	**0.3**	**2.8**
United States/Mexico border to San Diego Bay	0.1	2.1	0.1	2.2
San Diego Bay	0.1	0.1	0.1	0.2
Mission Bay	0.1	0.1	0.1	0.2
Point Loma to (but not incl.) La Jolla Shores	0.1	0.1	0.1	0.2
La Jolla Shores/Cove	0.1	0.1	0.1	0.2
La Jolla Shores to Oceanside (incl. Oceanside)	0.1	0.1	0.1	0.2
Agua Hedionda Lagoon	0.1	0.1	0.1	0.2
Oceanside to San Onofre	0.1	0.1	0.1	0.2
San Onofre	0.1	0.1	0.1	0.2
San Onofre to Newport (incl. Newport Bay)	0.1	0.1	0.1	0.2
Newport to Huntington Beach	0.1	0.1	0.1	0.2
Bolsa Chica Lowlands (Basin)	0.1	0.1	0.1	0.2
Seal Beach Complex	0.1	0.1	0.1	0.2
LA and Long Beach Harbors	0.1	0.1	0.1	0.2
LA and Long Beach Breakwater	0.1	0.1	0.1	0.2
Palos Verdes	0.1	0.1	0.1	0.2
Santa Monica Bay	0.1	0.1	0.1	0.2
Catalina Island	0.1	0.1	0.1	0.2
Channel Islands	0.1	0.1	0.1	0.2
Santa Monica Bay to Point Conception	0.1	0.1	0.1	0.2

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
East Pacific DPS	**2.4**	**3.0**	**1.2**	**6.6**
Hawai‘i	0.0	5.4	0.0	5.4
Kaho‘olawe	0.0	0.3	0.0	0.3
Lana‘i	0.0	1.3	0.0	1.3
Maui	0.0	1.8	0.0	1.8
Moloka‘i	0.0	0.3	0.0	0.3
O‘ahu	1.0	5.8	0.0	6.8
Niihau	0.0	0.4	0.0	0.4
Kaua‘i	0.0	0.3	0.0	0.3
Nihoa	0.0	2.5	0.2	2.7
Mokumanamana/Necker Island	0.0	2.5	0.2	2.7
Lalo/French Frigate Shoals	0.0	2.5	0.2	2.7
Kamole/Laysan Island	0.0	2.2	0.2	2.4
Kapou/Lisianski Island	0.0	4.2	0.2	4.4
Manawai/Pearl and Hermes Atoll	0.0	2.2	0.2	2.4
Kuaihelani/Midway Atoll	0.0	2.2	0.2	2.4
Hōlanikū/Kure Atoll	0.0	2.2	0.2	2.4
Johnston Atoll	0.0	0.4	0.0	0.4
Central North Pacific DPS	**1.3**	**36.3**	**1.7**	**39.3**
Tinian	0.0	0.3	0.0	0.3
Pagan	0.0	0.3	0.0	0.3
Rota	0.0	0.3	0.0	0.3
Sarigan	0.0	0.3	0.0	0.3
Alamagan	0.0	0.3	0.0	0.3
Aguijan	0.0	0.3	0.0	0.3
Guguan	0.0	0.3	0.0	0.3
Agrihan	0.0	0.3	0.0	0.3
Saipan	1.0	0.3	0.0	1.3
Wake	0.0	0.3	0.0	0.3
CNMI (other areas)	0.0	0.0	0.0	0.0
Guam	0.0	9.5	0.0	9.6
Central West Pacific DPS	**1.2**	**12.3**	**0.3**	**13.8**
Rose Atoll	0.4	0.7	0.0	1.1
Ta'u	0.0	0.4	0.0	0.5
Ofu and Olosega	0.0	0.4	0.0	0.5
Ofu and Olosega (other areas)	0.0	0.0	0.0	0.0
Palmyra	0.0	3.8	0.0	3.8
Tutuila	0.4	1.7	0.0	2.1
Swains	0.4	0.7	0.0	1.1
Baker	0.0	0.8	0.0	0.8
Howland	0.0	0.8	0.0	0.8
Kingman	0.0	0.8	0.0	0.8
Jarvis	0.0	0.3	0.0	0.3
Central South Pacific DPS	**1.2**	**10.4**	**0.4**	**12.1**
TOTAL	**24.0**	**102.0**	**8.0**	**134.0**

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Fractions of consultations occurred as a result of assigning some consultations to two or more units.				

As noted above, NMFS does not anticipate that critical habitat designation will generate additional conservation efforts for the green sea turtles specific to scientific research and monitoring or environmental restoration activities. As such, incremental costs are anticipated to be limited to the additional administrative effort required to consider effects to the critical habitat of these activities in consultations that would occur absent designation. As shown in Table 32, incremental costs of green sea turtle critical habitat to federal fisheries management activities are projected to total $630,000 over ten years (discounted at seven percent), or $90,000 in annualized costs. Impacts are expected to be highest in units of the North Atlantic DPS ($380,000 over ten years, discounted at seven percent). Total projected costs are also driven by impacts associated with consultations in the Central North Pacific ($110,000 in total costs, discounted at seven percent), East Pacific ($44,000), Central West Pacific ($38,000), and Central South Pacific ($36,000) DPSs. Other than Florida, no individual unit of the potential critical habitat is projected to account for more than $4,100 in annualized costs.

Table 30. PROJECTED INCREMENTAL COSTS (IN 2022 DOLLARS) OF SECTION 7 CONSULTATIONS ON SCIENTIFIC RESEARCH AND MONITORING AND ENVIRONMENTAL RESTORATION ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT (2023- 2032)

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Sargassum	$2,100	$15,000	$18,000
Massachusetts	$2,000	$14,000	$17,000
Rhode Island	$1,400	$9,500	$12,000
Connecticut	$1,200	$8,400	$10,000
New York	$1,200	$8,400	$10,000
New Jersey	$4,100	$29,000	$35,000
Delaware	$1,500	$11,000	$13,000
Maryland	$880	$6,100	$7,500
Virginia	$1,800	$13,000	$16,000
NC: Albemarle Sound	$1,200	$8,800	$11,000
NC: Pamlico, Core, and Back Sounds	$590	$4,200	$5,000
NC: Bogue Snd, White Oak/New/Cape Fear R.	$930	$6,600	$8,000
NC: Currituck Sound	$170	$1,200	$1,500
South Carolina	$580	$4,100	$4,900
Georgia	$1,200	$8,700	$11,000
Florida	$9,600	$67,000	$82,000
Alabama	$3,800	$27,000	$33,000
Mississippi	$3,800	$27,000	$33,000
Louisiana	$3,500	$25,000	$30,000
Texas (other areas)	$3,600	$26,000	$31,000
TX: Galveston Bay to Lavaca, Matagorda Bay	$3,200	$22,000	$27,000
TX: Lavaca, Matagorda Bay to Laguna Madre	$1,300	$8,800	$11,000
Texas: Laguna Madre	$260	$1,800	$2,200

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Mona Island South	$190	$1,400	$1,600
Mona Island North	$190	$1,400	$1,600
Culebra Island	$230	$1,600	$2,000
Puerto Rico: other areas	$2,400	$17,000	$21,000
Vieques North	$230	$1,600	$2,000
Vieques East	$230	$1,600	$2,000
Vieques South	$230	$1,600	$2,000
Puerto Rico North	$550	$3,800	$4,700
Puerto Rico Guayama	$230	$1,600	$2,000
Puerto Rico Maunabo	$230	$1,600	$2,000
North Atlantic DPS	**$55,000**	**$380,000**	**$470,000**
St. John, USVI (High)	$380	$2,600	$3,200
St. Thomas, USVI (High)	$380	$2,600	$3,200
St. Croix, USVI (High)	$380	$2,600	$3,200
St. John, USVI (Moderate)	$690	$4,900	$5,900
St. Thomas, USVI (Moderate)	$380	$2,600	$3,200
St. Croix, USVI (Moderate)	$380	$2,600	$3,200
South Atlantic DPS	**$2,600**	**$18,000**	**$22,000**
United States/Mexico border to San Diego Bay	$910	$6,400	$7,800
San Diego Bay	$280	$2,000	$2,400
Mission Bay	$280	$2,000	$2,400
Point Loma to (but not incl.) La Jolla Shores	$280	$2,000	$2,400
La Jolla Shores/Cove	$280	$2,000	$2,400
La Jolla Shores to Oceanside (incl. Oceanside)	$280	$2,000	$2,400
Agua Hedionda Lagoon	$280	$2,000	$2,400
Oceanside to San Onofre	$280	$2,000	$2,400
San Onofre	$280	$2,000	$2,400
San Onofre to Newport (incl. Newport Bay)	$280	$2,000	$2,400
Newport to Huntington Beach	$280	$2,000	$2,400
Bolsa Chica Lowlands (Basin)	$280	$2,000	$2,400
Seal Beach Complex	$280	$2,000	$2,400
LA and Long Beach Harbors	$280	$2,000	$2,400
LA and Long Beach Breakwater	$280	$2,000	$2,400
Palos Verdes	$280	$2,000	$2,400
Santa Monica Bay	$280	$2,000	$2,400
Catalina Island	$280	$2,000	$2,400
Channel Islands	$280	$2,000	$2,400
Santa Monica Bay to Point Conception	$280	$2,000	$2,400
East Pacific DPS	**$6,300**	**$44,000**	**$54,000**
Hawai‘i	$1,800	$13,000	$15,000
Kaho‘olawe	$200	$1,400	$1,700
Lana‘i	$510	$3,600	$4,400
Maui	$670	$4,700	$5,700
Moloka‘i	$200	$1,400	$1,700
O‘ahu	$3,200	$23,000	$28,000

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Niihau	$230	$1,600	$1,900
Kaua'i	$200	$1,400	$1,700
Nihoa	$1,100	$7,600	$9,200
Mokumanamana/Necker Island	$1,100	$7,600	$9,200
Lalo/French Frigate Shoals	$1,100	$7,600	$9,200
Kamole/Laysan Island	$980	$6,900	$8,300
Kapou/Lisianski Island	$1,600	$11,000	$14,000
Manawai/Pearl and Hermes Atoll	$980	$6,900	$8,300
Kuaihelani/Midway Atoll	$980	$6,900	$8,300
Hōlanikū/Kure Atoll	$980	$6,900	$8,300
Johnston Atoll	$240	$1,700	$2,000
Central North Pacific DPS	**$16,000**	**$110,000**	**$140,000**
Tinian	$200	$1,400	$1,700
Pagan	$200	$1,400	$1,700
Rota	$200	$1,400	$1,700
Sarigan	$130	$890	$1,100
Alamagan	$130	$890	$1,100
Aguijan	$130	$890	$1,100
Guguan	$130	$890	$1,100
Agrihan	$130	$890	$1,100
Saipan	$860	$6,100	$7,400
Wake	$210	$1,500	$1,800
CNMI (other areas)	$39	$280	$330
Guam	$3,100	$22,000	$27,000
Central West Pacific DPS	**$5,500**	**$38,000**	**$47,000**
Rose Atoll	$570	$4,000	$4,800
Ta'u	$240	$1,700	$2,100
Ofu and Olosega	$240	$1,700	$2,100
Ofu and Olosega (other areas)	$39	$280	$330
Palmyra	$1,300	$9,200	$11,000
Tutuila	$880	$6,200	$7,500
Swains	$570	$4,000	$4,800
Baker	$370	$2,600	$3,100
Howland	$370	$2,600	$3,100
Kingman	$370	$2,600	$3,100
Jarvis	$210	$1,500	$1,800
Central South Pacific DPS	**$5,200**	**$36,000**	**$44,000**
TOTAL	**$90,000**	**$630,000**	**$770,000**

2.3.7.5 Assumptions and Limitations

Table 33 describes the key assumptions underlying the analysis of activities related to scientific research and monitoring and environmental restoration and the influence of those assumptions on the results of the analysis.

Table 31. ASSUMPTIONS AND LIMITATIONS OF ANALYSIS OF INCREMENTAL COSTS OF CRITICAL HABITAT DESIGNATION ON SCIENTIFIC RESEARCH AND MONITORING AND ENVIRONMENTAL RESTORATION ACTIVITIES

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
The frequency of new consultations related to scientific research and monitoring and environmental restoration is constant and is equivalent to the average rate of consultations in recent years.	**Unknown.** May overestimate or underestimate incremental impacts.	**Likely minor.** The future growth or decline pattern of consultations related to scientific research and monitoring and environmental restoration is not known.
Project modifications beyond those currently prescribed will not be recommended in consultation.	May result in an **underestimate** of costs.	**Likely minor.** It is unlikely that additional measures will be necessary to avoid impacts to green sea turtle habitat beyond those currently provided to the turtle; however, to the extent that new projects require additional conservation measures, this estimate may be an underestimate of future costs.

2.3.8 Oil and Gas Activities

BOEM is responsible for managing oil and gas resources on the Outer Continental Shelf (OCS) in Federal waters (i.e., that are more than three nautical miles offshore). Offshore oil and gas development includes activities related to exploration of the seafloor for resources using methods including seismic surveys. They also include construction, operation, and maintenance of platforms and other facilities associated with extraction and transportation of the resources as well as planning for and responding to emergencies including unexpected releases of oil and gas into the marine environment.

Areas of the potential critical habitat overlap BOEM's Western Gulf of Mexico, Central Gulf of Mexico, Eastern Gulf of Mexico, Straits of Florida, South Atlantic, Mid-Atlantic, and North Atlantic planning areas. Overlap between the Southern California planning area and potential migration critical habitat is very limited. Currently, Federal oil and gas exploration and production activities occur in the Western and Central Gulf of Mexico planning areas, as well as in the Southern California planning area. The Atlantic planning areas do not currently produce any oil or gas, but the South and Mid-Atlantic areas are being considered for potential future development; permits for seismic activity in the South Atlantic area are currently under review (BOEM 2022a).

The Federal Energy Regulatory Commission (FERC) is responsible for authorizing the siting and construction of onshore and near-shore LNG import or export facilities under Section 3 of the Natural Gas Act. Under Section 7 of the Natural Gas Act, FERC also issues certificates of public convenience and necessity for LNG facilities engaged in interstate natural gas transportation by pipeline (FERC 2022a).

The USCG and Maritime Administration (MARAD) issue licenses for the construction, operation, and decommissioning of deepwater ports (DWP) for the transportation of crude oil for export to the global market, under the authority of the Deepwater Port Act of 1974. In addition, the USCG is responsible for implementing the Oil Pollution Act by responding to vessel groundings that present the risk of an oil

spill. Prior to responding to an incident, the USCG typically conducts an emergency consultation with NMFS to reduce impacts to listed species.

This section discusses the potential impacts of green turtle critical habitat on oil and gas exploration and development, construction and operation, and emergency response activities permitted, authorized, or undertaken by BOEM, FERC, and USCG.

2.3.8.1 Description of Threat

The Recovery Plan for the U.S. Population of the Atlantic Green Turtle, which addresses the North Atlantic DPS of green turtles, identifies several threats to marine habitat from oil and gas activities. These include offshore oil and gas development, oil spills, drilling mud disposal, disposal of other toxic materials, pipeline networks associated with oil and gas fields, onshore production facilities, increased vessel traffic, domestic garbage disposal, and explosive removal of obsolete platforms (USFWS and NMFS 1991).

According to NMFS' Biological Opinion on the Federally Regulated Oil and Gas Program in the Gulf of Mexico, vessels conducting oil and gas operations in the GoM may come in direct contact with *Sargassum*, affecting prey availability for juvenile green turtles. Marine debris accidentally lost offshore (e.g., plastic strapping, various wood items, smaller plastics) may become entangled with *Sargassum* critical habitat. As a result of the use of a dispersant in response to an oil spill, *Sargassum* can be sunk, thus removing the habitat. Removal of large numbers of individual clumps, patches, or lines of Sargassum through sinking could reduce concentrations that support adequate prey abundance and cover. The Biological Opinion further notes that "much of the Sargassum critical habitat within the northern GoM is at risk of oil exposure considering (1) the large spatial overlap between Sargassum critical habitat and oil and gas leasing areas and (2) the physical processes bringing both surface oil and Sargassum together" (NMFS 2020d). In addition, hull fouling and ballast water exchange may result in the introduction or transfer of non-native species, which may outcompete native species within Sargassum-dominated drift communities. Oil spills are noted as a potential threat to the availability of suitable food and shelter throughout areas of the potential critical habitat with the foraging and resting EF (NMFS 2023).

In a Draft Biological Opinion on the deepwater oil exportation port construction, operation, and decommissioning for two proposed Deepwater ports in GoM waters near the Galveston/Freeport area, NMFS identified a crude oil spill as the only route of effect from the proposed ports likely to adversely affect ESA-listed species. Potential sources of spills include the deepwater port platform and structures, vessels, and pipelines. The Opinion determined that a Worst Credible Oil Spill Discharge from the SPOT DWP is likely to adversely affect two EFs of loggerhead sea *Sargassum* critical habitat: *Sargassum* in concentrations that support adequate prey abundance and cover; and available prey and other material associated with *Sargassum* habitat including, but not limited to, plants and cyanobacteria and animals native to the *Sargassum* community. The Opinion further notes that some reduction of patch concentration and prey availability could result from oil spill cleanup activities such as containment of *Sargassum* patches within booms or skimmers, application of dispersants, and in-situ burning. The Opinion concludes, however, that *Sargassum* habitat that is lost due to an oil spill will likely be replaced over time by the combination of movement by unexposed (or lightly exposed) existing patches and new growth and, further, that a potential oil spill is not expected to affect this critical habitat unit's long-term ability to support adequate prey abundance and cover for loggerhead turtles (NMFS 2022a). NMFS has also concluded that the use of dispersants to control areas of large spills, when applied in appropriate concentrations to preauthorized areas, would not be any more toxic to sea turtles or loggerhead critical

habitat than the existing spilled oil (NMFS 2021g). Consultations between USCG and NMFS on offshore LNG ports historically have been informals because of the relatively minor threat posed to the environment by spilled LNG, which evaporates and leaves behind no residues (personal communication with USCG personnel M. Perera 2022).

2.3.8.2 Extent of Activity within Critical Habitat Area

The GoM is the primary source of offshore oil and gas for the U.S., generating about 97% of all U.S. OCS oil and gas production. For oil and gas leasing purposes, the Gulf of Mexico is divided into three geographic leasing areas: the Western Planning Area (WPA), the Central Planning Area (CPA), and the Eastern Planning Area (EPA). The WPA covers approximately 28.58 million acres (115.7 thousand km^2) and is located 10.4 mi (16.7 km) offshore Texas and extends seaward to the limits of the U.S. EEZ. It is bounded on the west and north by the federal-state boundary offshore Texas and on the south by the maritime boundary with Mexico. The eastern boundary begins at the offshore boundary between Texas and Louisiana and proceeds southeasterly (BOEM 2022b).

As of July 2022, there were 213 active leases in the WPA, including 34 producing leases. The CPA covers approximately 66.45 million acres (268.9 thousand km^2) and is located 3.5 mi offshore Louisiana, Mississippi, and Alabama and extends seaward to the limits of the EEZ. As of February 2022, there were 1,711 active leases in the CPA (BOEM 2022b). Exhibit 2 shows the locations of active oil and gas leases in the CPA and WPA, including active leases that are located within the potential critical habitat, as well as Planning Area boundaries and overlap of the potential critical habitat with existing loggerhead sea turtle critical habitat. The Eastern Planning Area (EPA) covers approximately 64.56 million acres (261.3 thousand km^2) and is located 10 miles (16 km) offshore Florida. The Gulf of Mexico Energy Security Act of 2006 established restrictions on oil and gas leasing in a portion of the Central Gulf of Mexico Planning Area and most of the Eastern Gulf of Mexico Planning Area through June 30, 2022. These areas were further withdrawn from disposition until June 30, 2032, by Presidential Memorandum, in September, 2020. Separate Presidential Memoranda issued in 2022 withdrew additional areas of the U.S. OCS from leasing disposition through June 20, 2032. These areas include the South Atlantic and Straits of Florida Planning Areas and the portion of the Mid Atlantic Planning Area south of the northern boundary of North Carolina BOEM 2022c).

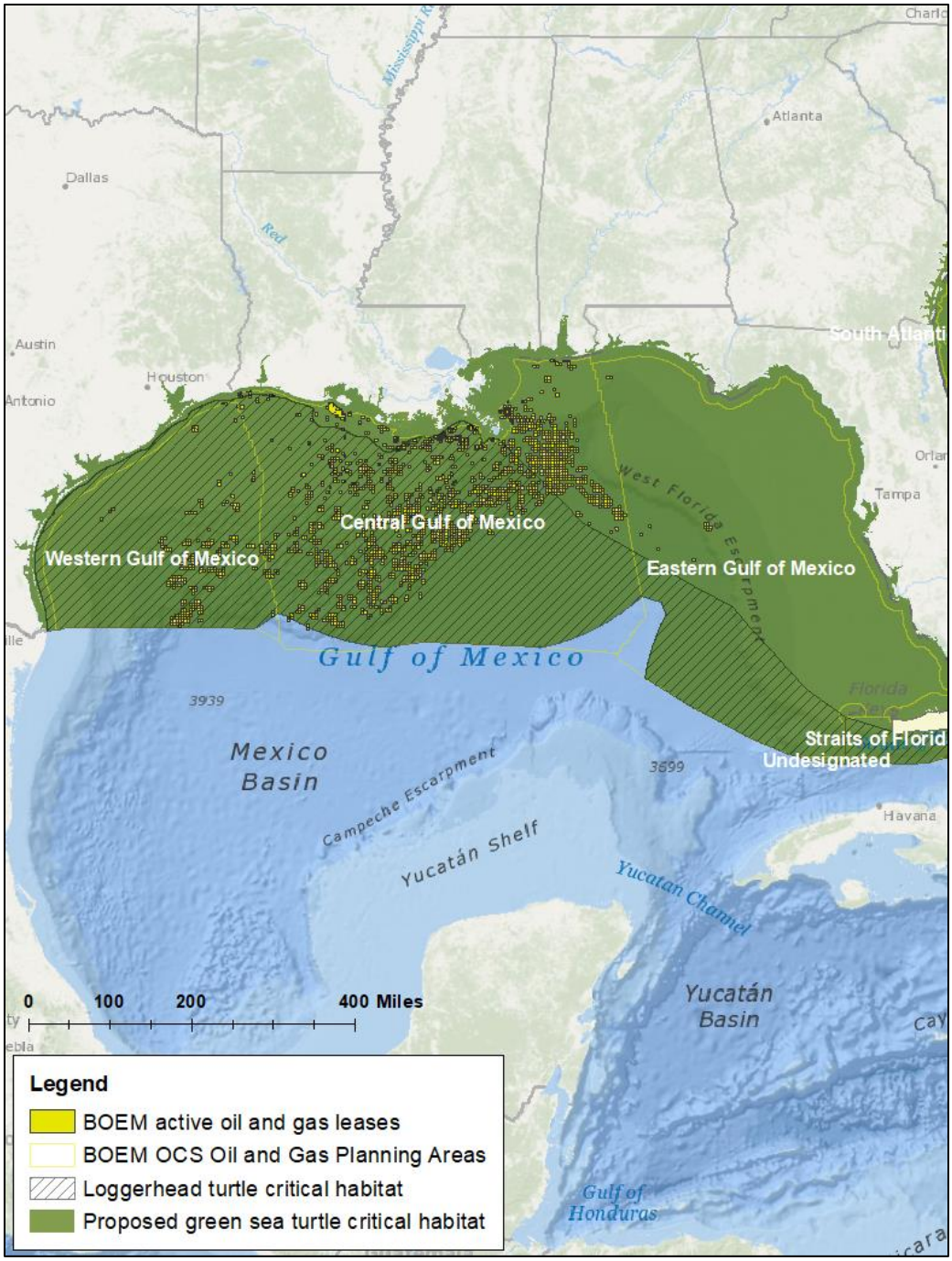

Exhibit 2. BOEM ACTIVE OIL AND GAS LEASES AND PLANNING AREAS IN THE GULF OF MEXICO

BOEM plans offshore Federal oil and gas leases on a five-year cycle. The lease plans require BOEM to consider the environmental effects of developing oil and gas operations in the plan area through development of a NEPA Environmental Impact Statement (EIS). On July 1, 2022, the DOI made available for public comment the Proposed Program for the 2023-2028 National Outer Continental Shelf Oil and Gas Leasing Program (National OCS Program) and the Draft Programmatic Environmental Impact Statement for the 2023-2028 Program (Draft PEIS). The Proposed Program includes no more than ten potential lease sales in the GoM, and no lease sales are proposed for the Atlantic or Pacific planning

areas during the five-year period (BOEM 2022d).

Of the eight existing U.S. LNG export terminals, seven are located in areas considered for critical habitat. These include five terminals in coastal waters of the central and western GoM and one each in Atlantic waters off the coasts of Maryland and Georgia. Three export terminals located in coastal GoM waters off of Louisiana (2) and Texas (1) have been approved and are under construction, and 12 GoM terminals are approved but not yet under construction. Of these 12, one is a deepwater port with joint jurisdiction under MARAD and USCG. An additional seven LNG export terminal projects in coastal waters off of Louisiana and Texas have applications pending with FERC, and two projects in Louisiana are in the pre-filing stage. There are two LNG import terminal projects in the GoM that have been approved but not yet constructed and one proposed LNG import terminal project that would be constructed in waters off of San Juan, Puerto Rico (FERC 2022b). The timeframe in which construction of LNG projects begins following authorization varies and depends greatly on investor funding (personal communication with FERC personnel J. Yuan). In addition to the LNG export and import terminals, four deepwater port projects for oil export are under review by USCG and MARAD, and three deepwater oil import or export ports have been approved and constructed (U.S. Department of Transportation, MARAD 2022). USCG currently is engaged in formal consultation with NMFS on three deepwater ports, and four are expected to be operational within the next four years. The frequency of deepwater port applications submitted to USCG has been inconsistent historically; it is common for four or five years to elapse between applications (personal communication with USCG personnel M. Perera 2022).

The query of NMFS' Section 7 consultation databases for consultations occurring from 2012 to 2021 yielded 71 consultations on oil and gas activities that could affect green sea turtle critical habitat, including seven programmatic consultations, 3 formal consultations, and 61 informal consultations. The programmatic consultations related to oil and gas activities in the GoM, geophysical and geotechnical surveys for sand resources in the Atlantic and GoM, the use of dispersants and in-situ burning in response to oil spills, and a Deepwater Horizon Programmatic Damage Assessment and Restoration Plan. FERC was the lead Federal agency on 29 consultations on activities related to LNG pipelines, liquefaction facilities, and offshore terminals. Most of USCG's 23 consultations were on oil spill response activities, including both preparation and emergency response. BOEM was the lead Federal agency on 10 oil and gas consultations, including 4 programmatic and three formal consultations. Table 26 presents a summary of these consultations by consultation type and DPS. Reflecting the high volume of oil and gas activity in the GoM, the North Atlantic DPS accounted for more than 90 percent of Section 7 consultations in the areas considered for critical habitat from 2012 to 2021. Approximately 48 of the 64.8 consultations assigned to the North Atlantic DPS occurred on activities in waters off of GoM states. The remaining oil and gas-related consultations were distributed across all of the other DPSs except the South Pacific DPS and were related to oil spill planning and emergency response; seismic testing; and LNG pipeline, liquefaction, and offshore port activities.

Table 32. CONSULTATIONS ON OIL AND GAS ACTIVITIES THAT MAY AFFECT POTENTIAL GREEN SEA TURTLE CRITICAL HABITAT AREAS, BY DPS AND CONSULTATION TYPE (2012 – 2021)

DPS	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
North Atlantic	3.0	56.4	5.4	64.8
South Atlantic	0.0	1.6	0.6	2.2
East Pacific	0.0	1.0	1.0	2.0
North Pacific	0.0	1.0	0.0	1.0

DPS	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
West Pacific	0.0	1.0	0.0	1.0
South Pacific	0.0	0.0	0.0	0.0
Total	**3.0**	**61.0**	**7.0**	**71.0**

Source: NMFS SERO's Section 7 consultation database.
Fractions of consultations occurred as a result of assigning some consultations to two or more units.

2.3.8.3 Regulatory Baseline

Existing regulations, policies, best management practices, and guidelines implemented by Federal and state governments provide a baseline level of protection to the green sea turtle and its habitat absent designation of critical habitat. Baseline protections accorded to the green sea turtle and its habitat are described in this section.

FEDERAL REGULATIONS

The green sea turtle was listed as threatened under the ESA on July 28, 1979, except for the breeding populations in Florida and the Pacific coast of Mexico, which were listed as endangered (43 FR 32800, July 28, 1978). The ESA provides significant baseline protections to the green sea turtle and its habitat. Under Section 7, a Federal agency is required to consult with NMFS to ensure that actions authorized, funded, or carried out by that agency are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of their critical habitat. Additionally, in 1998, critical habitat for green sea turtles was designated in the coastal waters of Culebra Island, Puerto Rico (63 FR 46693). Since the species was listed in 1979, NMFS has consulted on offshore oil and gas activities that potentially threaten green sea turtles. These consultations have resulted in regulations and management practices that provide significant protection to green sea turtles and their habitat.

NMFS regularly recommends a variety of conservation measures to protect green sea turtles and their habitat, without a critical habitat designation. These recommendations are supported by regulations and industry management practices and include: timing restrictions on decommissioning of platforms, oil spill response plans, avoiding sensitive habitats (such as migratory or breeding areas), avoiding pollution discharges, avoiding excessive noise when turtles are present, requiring turtle surveyors during all oil and gas activity operations, and avoiding pollution during normal operations and requiring extensive and immediate cleanup after spills or blowouts (NMFS 2014c).

Additionally, NMFS regularly prepares biological opinions that provide for conservation efforts and best management practices that protect green sea turtles and their habitat from threats posed by oil and gas activities (e.g. seismic surveys, drilling operations, decommissioning). For example, in a 2018 biological opinion on BOEM's issuance of oil and gas permits for geological and geophysical seismic surveys of the Atlantic coast, BOEM proposed restricting airgun surveys in certain time-area closures, specific seismic airgun survey protocols, and vessel strike avoidance and marine debris awareness measures. NMFS further recommended that BOEM require that the geological and geophysical companies:

- Pause operations when sea turtles are present within a 500-meter exclusion zone, and
- Implement the use of turtle guards that have both a deflector and an exclusion element that would likely reduce or even eliminate entanglements in tail buoys (NMFS 2018c).

In a prior Opinion, NMFS recommended that the geological and geophysical companies compile information to improve estimates of the number of sea turtles likely exposed to sounds from seismic surveys and to assess the cumulative impacts of the noise on the distribution, abundance, and ecology of sea turtles (NMFS 2015e). In addition, NMFS asks for agencies to report the results of their surveys, research, and other activities to help the agency continue to develop conservation efforts most effective for the species.

BOEM also issues notices to lessees and operators (NTL), which outline requirements and clarifications to Federal regulations. These NTLs provide operators a better understanding of the scope and meaning of a regulation by explaining BOEM interpretations of a requirement. A number of these NTLs provide guidance for operators in avoiding and mitigating potentially adverse interactions with green sea turtles. For example, under 2012-JOINT-G02 vessels conducting seismic surveys are directed to use ramp-up procedures and minimum sound source, as well as to perform species observation and reporting for protected species (BOEM and BSEE 2012). Additionally, MMS NTL 2009-G39 provides guidance on the avoidance and protection of biologically sensitive features and areas when conducting OCS operations in water depths less than 300 meters. Specifically for oil and gas activities, this includes prohibiting the use of anchors, chains, cables, or wire ropes on rigs and vessels that could cause impacts to potentially sensitive biological features (Mineral Management Service 2010).

In addition to recommendations from NMFS, the U.S. EPA, under requirements of NEPA, also provides some baseline conservation measures for the green sea turtle (42 USC § 4321). NEPA requires Federal agencies and others using Federal funds or assets to assess the environmental impacts of major Federal projects or decisions such as issuing permits, spending Federal money, or affecting Federal lands. An EIS or an Environmental Assessment (EA) is prepared and made available for public comment for projects that the Federal agency views as having potentially significant environmental impacts. Oil and gas activities have typically been subject to NEPA, and associated EISs have considered potential environmental impacts, including impacts on green sea turtles.

Furthermore, oil and gas activities located in Federal waters are subject to a number of laws, rules, and regulations that manage the oil and natural gas resources of the OCS, and provide protections for green sea turtles, including those presented in Table 35. These regulations offer habitat protection for green sea turtles regardless of critical habitat designation

Table 33. BASELINE FEDERAL REGULATIONS RELATED TO OIL AND GAS ACTIVITIES THAT PROVIDE PROTECTIONS TO GREEN SEA TURTLES

REGULATION	DESCRIPTION OF PROTECTION
Title 30, Mineral Resources, Part 250 Oil and Gas and Sulfur Operations in the OCS	Subpart C – Pollution Prevention and control –requires operators to not endanger the marine environment and wildlife during operations via unauthorized discharge of pollutants into the offshore waters, prohibits the creation of unreasonable risk to marine habitat and aquatic life, and requires the proper disposal and use of materials, equipment, tools, containers, and other items (Section 250.300). Subpart Q implements stringent requirements to consider and observe and avoid turtles when decommissioning any oil or gas structure.
The Outer Continental Shelf Lands Act (OCSLA)	Provides guidelines for implementing an OCS oil and gas exploration and development program, and also for protecting human, marine, and coastal environments. For example, under the OCSLA Section 1346, the Secretary

REGULATION	DESCRIPTION OF PROTECTION
	of the Interior must conduct a study of any area or region included in any oil and gas lease sale or other lease in order to establish information needed for assessment and management of environmental impacts on the human, marine, and coastal environments. This requirement includes considering effects and impacts on green sea turtles and its habitat.
Coastal Zone Management Act	Requires that Federal actions that affect the natural resources of a state's coastal zone be consistent with the enforceable policies of a federally-approved state coastal zone management plan. As such, oil and gas developments will be required to obtain a Coastal Consistency Determination.

STATE REGULATIONS

In addition to Federal regulations, states enact regulations for offshore oil and gas activity. These vary by state and are based largely on the presence of an oil and gas industry. States without current and proposed oil and gas activities in their waters generally do not have regulations related to oil and gas activity. However, some states without any current or proposed oil activity in their waters do have relevant regulations to protect green sea turtles. For example, Virginia prohibits any oil and gas activity within 50 miles of the Atlantic shoreline (Code of Virginia §67-300). Table 36 identifies regulations regarding oil and gas activities that afford protection to green sea turtles in states with current oil and gas activity.

Table 34. BASELINE STATE REGULATIONS RELATED TO OIL AND GAS ACTIVITIES THAT PROVIDE PROTECTIONS TO GREEN SEA TURTLES

STATE	REGULATION/AGENCY	DESCRIPTION OF PROTECTION
Florida	Florida Statutes, Title XXVIII - Natural Resources, Conservation reclamation and Use, Chapter 377 – Energy Resources	Prohibits a person drilling for or producing oil or gas from polluting land or water, damaging aquatic or marine life, wildlife, or allowing any extraneous matter to enter or damage any mineral or freshwater-bearing information. Also requires all spill or leakage to be reported to the division.[19]
Alabama	Alabama Department of Environmental Management's (ADEM) Division 8 Regulations	Broad protections to wildlife habitat of endangered species. [20]
	Alabama's Department of Conservation and Natural Resources (ADCNR)	Broad regulation that prohibits interference with wildlife habitat and natural behavior.[21]
Mississippi	Mississippi's Oil and Gas Board (MOGB) Rule OS-8	Broad protections to all aquatic life by prohibiting operators from polluting water or damaging aquatic

[19] Florida Statutes 2022. Title XXVIII 377.371

[20] ADEM 335-8-2-.01; ADEM 335-8-2-.08

[21] ADCNR 220-3-.33

STATE	REGULATION/AGENCY	DESCRIPTION OF PROTECTION
		life through disposal of oil, operational drilling muds, detergents and dispersants, or solid wastes.[22]
Louisiana	Louisiana's Department of Environmental Quality's Pollution Discharge Elimination System (LPDES) Permit LAG260000	Requires testing of all releases to the marine environment. The permit prohibits oil and gas operators from discharging any drilling fluids or cuttings, any operation-produced waters into state or Federal wildlife management areas or areas of ecological significance, or within 1,300 feet of an active seagrass bed.[23]
Texas	Railroad Commission of Texas Oil and Gas Division	Requires offshore oil and gas operators to minimize pollution that may adversely affect wildlife, plants, or human life.[24]
	Texas Administrative Code under the Parks and Wildlife Department and the General Land Office	Requires all entities to minimize impact to wildlife, require unauthorized discharge plans, and take into consideration impacts on listed endangered and threatened species.[25]
California	California Code of Regulations under California State Lands Commission	Prohibits pollution and contamination of the ocean and tidelands and requires each lessee to prepare and maintain a current oil spill contingency plan.[26]

2.3.8.4 Results of Analysis

The conservation efforts NMFS would most likely recommend to avoid potential jeopardy to green sea turtles or other listed species, or adverse modification of loggerhead sea turtle or other existing critical habitat, would also likely result in the activities avoiding adverse modification of the potential critical habitat. We also anticipate that any future consultations on green sea turtle critical habitat would already be undertaken due to the need to consider effects on the species. We therefore do not anticipate that critical habitat designation would result in direct impacts on oil and gas activities beyond the potential for additional administrative effort as part of future consultations that would occur absent designation, and that incremental impacts of the potential critical habitat to oil and gas activities would be limited to the additional administrative effort required to consider green sea turtle critical habitat in future Section 7 consultations.

Projections of future consultations were developed based on personal communications with BOEM, FERC, USCG, and NMFS Section 7 biologists, as well as review of NMFS' Section 7 consultation history. We conservatively assume that critical habitat designation for the green sea turtle will require reinitiation of three programmatic consultations related to oil spill response, geophysical and

[22] State of Mississippi, State Oil and Gas Board. 2020. Statutes, Rules of Procedure, Statewide Rules and regulations, Rule OS-8: Prevention of Waste, Including Pollution, and Waste Disposal.

[23] Louisiana Department of Environmental Quality. 2020. Water Discharge Permit: Master General Permit Number LAG260000.

[24] Railroad Commission of Texas Oil and Gas Division. 2022. Oil and Gas Monitoring and Enforcement Plan, Fiscal Year 2023. Accessed September 19, 2022.

[25] Texas Administrative Code Title 31 Part 1 (19)(B) Rule 19.13 (c)(11); Title 31, Part 2, Chapter 65, (G), Rule 65.171 (b) (1)-(2).

[26] California Code of Regulations Title 2 (Administration), Division 3 (State Property Operations), Chapter 1 (State Lands Commission), Article 3.4. (Oil and Gas Drilling Production Operations: Pollution Control).

geotechnical surveys, and oil and gas activities in the GoM. As shown in Table 31, we project that 70 consultations on oil and gas activities will consider effects to green sea turtle critical habitat over the next ten years. This total includes three formal consultations, eight programmatic consultations, and 59 informal consultations. The North Atlantic DPS is projected to account for approximately 64, or just over 90 percent, of the 70 consultations.

Table 35. PROJECTED QUANTITY AND DISTRIBUTION OF SECTION 7 CONSULTATIONS ON OIL AND GAS ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT AND TYPE (2023- 2032)

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Sargassum	1.0	6.0	1.3	8.3
Massachusetts	0.0	0.2	0.0	0.2
Rhode Island	0.0	0.2	0.0	0.2
Connecticut	0.0	0.2	0.0	0.2
New York	0.0	1.2	0.0	1.2
New Jersey	0.0	0.2	0.0	0.2
Delaware	0.0	0.2	0.0	0.2
Maryland	0.0	0.2	0.0	0.2
Virginia	0.0	1.2	0.0	1.2
NC: Albemarle Sound	0.0	0.0	0.0	0.1
NC: Pamlico, Core, and Back Sounds	0.0	0.0	0.0	0.1
NC: Bogue Snd, White Oak/New/Cape Fear R.	0.0	0.0	0.0	0.1
NC: Currituck Sound	0.0	0.0	0.0	0.1
South Carolina	0.0	1.0	0.1	1.1
Georgia	0.0	1.0	0.1	1.1
Florida	1.0	4.0	0.5	5.5
Alabama	0.0	7.5	0.5	8.0
Mississippi	0.0	7.5	0.5	8.0
Louisiana	0.0	7.5	0.5	8.0
Texas (other areas)	0.0	7.8	0.4	8.2
TX: Galveston Bay to Lavaca, Matagorda Bay	0.0	5.3	0.4	5.7
TX: Lavaca, Matagorda Bay to Laguna Madre	0.0	0.3	0.4	0.7
Texas: Laguna Madre	0.0	0.0	0.2	0.2
Mona Island South	0.0	0.1	0.1	0.2
Mona Island North	0.0	0.1	0.1	0.2
Culebra Island	0.0	0.1	0.1	0.2
Puerto Rico: other areas	1.0	1.1	0.1	2.2
Vieques North	0.0	0.1	0.1	0.2
Vieques East	0.0	0.1	0.1	0.2
Vieques South	0.0	0.1	0.1	0.2
Puerto Rico North	0.0	0.1	0.1	0.2
Puerto Rico Guayama	0.0	1.1	0.1	1.2
Puerto Rico Maunabo	0.0	0.1	0.1	0.2
North Atlantic DPS	**3.0**	**54.6**	**6.3**	**63.9**
St. John, USVI (High)	0.0	0.2	0.1	0.4
St. Thomas, USVI (High)	0.0	0.2	0.1	0.4

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
St. Croix, USVI (High)	0.0	0.2	0.1	0.4
St. John, USVI (Moderate)	0.0	0.2	0.1	0.4
St. Thomas, USVI (Moderate)	0.0	0.2	0.1	0.4
St. Croix, USVI (Moderate)	0.0	0.2	0.1	0.4
South Atlantic DPS	**0.0**	**1.4**	**0.8**	**2.1**
United States/Mexico border to San Diego Bay	0.0	0.0	0.1	0.1
San Diego Bay	0.0	0.0	0.1	0.1
Mission Bay	0.0	0.0	0.1	0.1
Point Loma to (but not incl.) La Jolla Shores	0.0	0.0	0.1	0.1
La Jolla Shores/Cove	0.0	0.0	0.1	0.1
La Jolla Shores to Oceanside (incl. Oceanside)	0.0	0.0	0.1	0.1
Agua Hedionda Lagoon	0.0	0.0	0.1	0.1
Oceanside to San Onofre	0.0	0.0	0.1	0.1
San Onofre	0.0	0.0	0.1	0.1
San Onofre to Newport (incl. Newport Bay)	0.0	0.0	0.1	0.1
Newport to Huntington Beach	0.0	0.0	0.1	0.1
Bolsa Chica Lowlands (Basin)	0.0	0.0	0.1	0.1
Seal Beach Complex	0.0	0.0	0.1	0.1
LA and Long Beach Harbors	0.0	1.0	0.1	1.1
LA and Long Beach Breakwater	0.0	0.0	0.1	0.1
Palos Verdes	0.0	0.0	0.1	0.1
Santa Monica Bay	0.0	0.0	0.1	0.1
Catalina Island	0.0	0.0	0.1	0.1
Channel Islands	0.0	0.0	0.1	0.1
Santa Monica Bay to Point Conception	0.0	0.0	0.1	0.1
East Pacific DPS	**0.0**	**1.0**	**1.0**	**2.0**
Hawai‘i	0.0	0.1	0.0	0.1
Kaho‘olawe	0.0	0.1	0.0	0.1
Lana‘i	0.0	0.1	0.0	0.1
Maui	0.0	0.1	0.0	0.1
Moloka‘i	0.0	0.1	0.0	0.1
O‘ahu	0.0	0.1	0.0	0.1
Niihau	0.0	0.1	0.0	0.1
Kaua‘i	0.0	0.1	0.0	0.1
Nihoa	0.0	0.0	0.0	0.0
Mokumanamana/Necker Island	0.0	0.0	0.0	0.0
Lalo/French Frigate Shoals	0.0	0.0	0.0	0.0
Kamole/Laysan Island	0.0	0.0	0.0	0.0
Kapou/Lisianski Island	0.0	0.0	0.0	0.0
Manawai/Pearl and Hermes Atoll	0.0	0.0	0.0	0.0
Kuaihelani/Midway Atoll	0.0	0.0	0.0	0.0
Hōlanikū/Kure Atoll	0.0	0.0	0.0	0.0
Johnston Atoll	0.0	0.0	0.0	0.0
Central North Pacific DPS	**0.0**	**1.0**	**0.0**	**1.0**
Tinian	0.0	0.1	0.0	0.1

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Pagan	0.0	0.1	0.0	0.1
Rota	0.0	0.1	0.0	0.1
Sarigan	0.0	0.1	0.0	0.1
Alamagan	0.0	0.1	0.0	0.1
Aguijan	0.0	0.1	0.0	0.1
Guguan	0.0	0.1	0.0	0.1
Agrihan	0.0	0.1	0.0	0.1
Saipan	0.0	0.1	0.0	0.1
Wake	0.0	0.0	0.0	0.0
CNMI (other areas)	0.0	0.0	0.0	0.0
Guam	0.0	0.5	0.0	0.5
Central West Pacific DPS	**0.0**	**1.0**	**0.0**	**1.0**
Central South Pacific DPS	**0.0**	**0.0**	**0.0**	**0.0**
TOTAL	**3.0**	**59.0**	**8.0**	**70.0**
Fractions of consultations occurred as a result of assigning some consultations to two or more units.				

As noted above, NMFS does not anticipate that critical habitat designation will generate additional conservation efforts for the green sea turtles specific to oil and gas activities. As such, incremental costs are anticipated to be limited to the additional administrative effort required to consider effects to the critical habitat of oil and gas activities in consultations that would occur absent designation. As shown in Table 38, incremental costs of green sea turtle critical habitat to oil and gas activities are projected to total $250,000 over ten years (discounted at seven percent), or $36,000 in annualized costs. Incremental costs are highly concentrated in the North Atlantic DPS ($220,000 over ten years, discounted at seven percent), particularly in the *Sargassum* habitat unit and the units comprising GoM waters. Projected annualized incremental costs are no higher than $1,900 for any of the other five DPSs.

Table 36. PROJECTED INCREMENTAL COSTS (IN 2022 DOLLARS) OF SECTION 7 CONSULTATIONS ON OIL AND GAS ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT (2023- 2032)

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Sargassum	$5,800	$41,000	$50,000
Massachusetts	$75	$520	$640
Rhode Island	$75	$520	$640
Connecticut	$75	$520	$640
New York	$390	$2,700	$3,300
New Jersey	$75	$520	$640
Delaware	$75	$520	$640
Maryland	$75	$520	$640
Virginia	$390	$2,700	$3,300
NC: Albemarle Sound	$80	$560	$680
NC: Pamlico, Core, and Back Sounds	$80	$560	$680
NC: Bogue Snd, White Oak/New/Cape Fear R.	$80	$560	$680

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
NC: Currituck Sound	$80	$560	$680
South Carolina	$600	$4,200	$5,100
Georgia	$600	$4,200	$5,100
Florida	$2,800	$20,000	$24,000
Alabama	$3,300	$23,000	$28,000
Mississippi	$3,300	$23,000	$28,000
Louisiana	$3,300	$23,000	$28,000
Texas (other areas)	$3,200	$22,000	$27,000
TX: Galveston Bay to Lavaca, Matagorda Bay	$2,400	$17,000	$20,000
TX: Lavaca, Matagorda Bay to Laguna Madre	$810	$5,700	$6,900
Texas: Laguna Madre	$430	$3,000	$3,700
Mona Island South	$260	$1,800	$2,200
Mona Island North	$260	$1,800	$2,200
Culebra Island	$260	$1,800	$2,200
Puerto Rico: other areas	$1,200	$8,700	$11,000
Vieques North	$260	$1,800	$2,200
Vieques East	$260	$1,800	$2,200
Vieques South	$260	$1,800	$2,200
Puerto Rico North	$260	$1,800	$2,200
Puerto Rico Guayama	$580	$4,000	$4,900
Puerto Rico Maunabo	$260	$1,800	$2,200
North Atlantic DPS	**$32,000**	**$220,000**	**$270,000**
South Atlantic DPS	**$1,900**	**$13,000**	**$16,000**
East Pacific DPS	**$1,600**	**$11,000**	**$14,000**
Central North Pacific DPS	**$320**	**$2,200**	**$2,700**
Central West Pacific DPS	**$320**	**$2,200**	**$2,700**
Central South Pacific DPS	**$0**	**$0**	**$0**
TOTAL	**$36,000**	**$250,000**	**$310,000**

2.3.8.5 Assumptions and Limitations

Table 39 describes the key assumptions underlying the analysis of oil and gas activities and the influence of those assumptions on the results of the analysis.

Table 37. ASSUMPTIONS AND LIMITATIONS OF ANALYSIS OF INCREMENTAL COSTS OF CRITICAL HABITAT DESIGNATION ON OIL AND GAS ACTIVITIES

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
Critical habitat designation is unlikely to change the conservation efforts recommended to avoid adverse effects on the green sea turtles and its habitat as part of future Section 7 consultations.	May result in an **underestimate** of costs.	**Likely minor**. Given presently available information, NMFS anticipates that it is unlikely that critical habitat designation will generate additional or different recommendations for

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
		conservation efforts for the green sea turtle and its habitat with respect to oil and gas activities. However, NMFS will review each project or activity at the time of consultation to determine whether a reasonable and prudent alternative is needed to avoid destruction or adverse modification of critical habitat.
The frequency of new consultations related to oil and gas activities is comparable to the average rate of consultations in recent years.	May result in an **overestimate** of costs.	**Likely minor.** This analysis conservatively assumes that a comparable number of consultations on non-scheduled activities, such as those that occurred in response to the Deepwater Horizon oil spill, will occur over the next ten years. Given the unlikelihood of such an event occurring over the next ten years, this assumption may overestimate the number of future consultations on oil and gas activities that consider green sea turtle critical habitat and, as a result, incremental costs to oil and gas activities.
This analysis assumes that the existing programmatic consultations in the Gulf of Mexico (covering all oil and gas related activities) and in the Atlantic Planning Region (covering seismic activity) will be re-initiated as a result of critical habitat designation for green sea turtles.	May result in an **overestimate** of costs.	**Likely minor**. Due to the relatively recent re-initiation of consultations on oil spill response, geophysical and geotechnical surveys, and oil and gas activities in the GoM, as well as the fact that these reinitiated consultations considered effects to loggerhead sea turtle critical habitat, the administrative effort likely associated with a re-initiation caused by the designation of critical habitat for green sea turtle would be minor.

2.3.9 Offshore Wind Energy Projects

Renewable energy projects on the Outer Continental Shelf (OCS) are managed by BOEM. This section quantifies the potential impacts of a critical habitat designation for green sea turtle on offshore wind energy activities in the study area, including wind exploration, siting, and production activities.

2.3.9.1 Description of Threat

NMFS (2023) identifies several potential threats of renewable energy activities to the potential critical habitat. Alternative energy structures such as installation of turbines, wind farms, and means to convert wave or tidal energy into power may:

- Threaten the condition, distribution, diversity, abundance, and density of underwater refugia or food resources;
- Impact nearshore reproductive habitat by obstructing or contaminating access to and from nesting beaches during construction;
- Impede transit of green turtles through migratory habitat during both construction and operation.

While the placement of wind turbines may not overlap with the potential critical habitat areas, there is still potential for overlap between the cables that extend from the offshore substations to the onshore sites. In addition, wind wakes that may result when turbines are extracting wind energy can alter the ocean surface forcing and have shown shifts in upwelling and downwelling. The pile structures create turbulence in water current flow by creating mixing and altering stratification. These effects have implications on the factors for convergence in *Sargassum* habitat. The extent to which a particular farm may influence the immediate and surrounding areas is unknown (personal communication with NMFS personnel S. Dahl 2022; personal communication with NMFS personnel L. Avens 2022).

2.3.9.2 Extent of Activity within Critical Habitat Area

Active and proposed wind energy leases exist in Federal waters off the coasts of Massachusetts, Rhode Island, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina. These include 16 wind lease sales by BOEM since 2013 and three noncompetitive leases. Additionally, in June 2014, BOEM issued a lease for marine hydrokinetic testing offshore Florida to evaluate the potential for ocean currents to be used to power underwater turbines (BOEM 2022e). In state waters, Massachusetts, Rhode Island, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida, Texas, California, Hawaii, and Puerto Rico currently have offshore renewable energy projects or are considering their development.

BOEM announced in July 2022 that it is seeking public comment on two draft Wind Energy Areas (WEAs) in the GoM. Both WEAs lie within the BOEM Gulf of Mexico Call Area, which is contained within the boundaries of the potential critical habitat (BOEM 2022f). The first draft WEA is located approximately 24 nm off the coast of Galveston, TX, and covers a total of 546,645 acres. The second draft WEA is located approximately 56 nm off the coast of Lake Charles, LA, and covers a total of 188,023 acres. The draft WEAs represent a reduction of the footprint of the 30-million acre Gulf of Mexico Call Area that the Department of the Interior announced for public comment in October 2021. Boundaries of the WEAs were identified with the goal of avoiding potential impacts on other ocean uses and resources, such as commercial and recreational fishing, maritime navigation, military activities, marine protected species, and existing infrastructure (U.S. Department of the Interior 2022). In addition to the draft WEAs, BOEM has prepared a draft Environmental Assessment (EA) covering the entire Call Area to consider the potential impacts from site characterization (e.g., marine mammal surveys) and site assessment (e.g. installation of meteorological buoys) activities expected to take place following lease issuance.

Two Hawaii call areas, Oahu North and Oahu South, are located in Federal waters off O'ahu. All three

California call areas are located in Federal waters north of the potential critical habitat for the East Pacific DPS. To date, no wind energy leases have occurred in either the Gulf of Mexico or Hawaii Call Areas (BOEM 2022g). As such, this analysis focuses on potential impacts of the potential critical habitat on wind energy projects along the Atlantic coast.

The query of NMFS' Section 7 consultation databases for consultations occurring from 2012 to 2021 yielded 17 consultations on wind energy development activities, including one programmatic consultation, 9 formal consultations, and 7 informal consultations. The programmatic consultation related to data collection and site survey activities for renewable energy on the Atlantic OCS. Sixteen of the 17 consultations were on wind energy development activities on the Atlantic OCS, with one informal consultation on marine archaeological and geophysical data collection activities in Cameron County, Texas.

2.3.9.3 Regulatory Baseline

Existing regulations, policies, best management practices, and guidelines implemented by the Federal and state governments provide a baseline level of protection to the green sea turtle and its habitat absent designation of critical habitat. These regulations, management practices, and guidelines address: use of habitat, activity that may alter or destroy sensitive habitats (i.e., breeding and winter habitats), and activity that may impede migration in migratory corridors.

The Energy Policy Act of 2005 authorized the development of regulations for the OCS Renewable Energy Program. This regulatory framework establishes a process for environmental review of proposed offshore wind projects. Each project is subject to a review under the National Environmental Policy Act (NEPA) as well as consultation with NMFS under the ESA (BOEM 2022h). NEPA requires Federal agencies and others using Federal funds or assets to assess the environmental impacts of major Federal projects or decisions such as issuing permits, spending Federal money, or affecting Federal lands. An environmental assessment (EA) is prepared and made available for public comment for projects that the Federal agency views as having potentially significant environmental impacts. These assessments also determine whether an Environmental Impact Statement (EIS) is necessary. Offshore renewable energy activities have typically been subject to NEPA, and associated EAs for site assessment and site characterization have considered potential environmental impacts, including impacts on sea turtles.

The Final EIS (FEIS) for the South Fork Farm and South Fork Export Cable Project, a 132-megawatt wind farm to be located at Montauk Point, New York, notes that heat from buried cables could affect algal cover and, therefore, green sea turtle foraging opportunities. The FEIS concludes, however, the temperature of the substrate at the surface of the seabed is not anticipated to increase markedly because the cables would be buried to a depth of six feet and/or covered with concrete protection (BOEM 2021b).

The Final EA developed for commercial and research wind lease and grant issuance and site assessment activities on the Atlantic OCS of the New York Bight considered the effects of high-resolution geophysical surveys, geotechnical surveys, deployment and retrieval of met buoys, and vessel traffic on NMFS-managed ESA species, including green sea turtles, as well as whether these activities would adversely modify the critical habitat of the Northwest Atlantic DPS of the loggerhead sea turtle. NMFS concurred with BOEM's determination that the Proposed Action is not likely to adversely affect any listed species, including sea turtles, nor is it likely to adversely affect critical habitat of the loggerhead sea turtle (BOEM 2021c).

As discussed in Section 2.3.9.2, NMFS and BOEM have participated in Section 7 consultations on the issuance of commercial wind leases and site assessment activities on the Atlantic OCS. These consultations have occurred concurrently with the NEPA EAs for the respective activities. A biological opinion on commercial wind lease issuance and site assessment activities on the Atlantic OCS in Massachusetts, Rhode Island, New York, and New Jersey Wind Energy Areas included the following project design criteria to avoid adverse effects of the project on sea turtles:

- Maintaining a vessel separation distance of 50 meters or greater from any sighted sea turtle;
- Maintaining a 200-meter exclusion zone during geotechnical surveys or geophysical surveys where acoustic devices are operating at frequencies below 200 kHz, and monitoring of this exclusion zone by a protected species observer for at least 60 minutes prior to ramp up of the survey equipment;
- Immediate shutdown of the surveying equipment if a sea turtle is spotted by a protected species observer within the exclusion zone;
- Establishment of a 1,000-meter radius exclusion zone for sea turtles around each pile driving site, with sea turtle presence determined by two protected species observers; and
- Implementation of a "soft start," an initial set of 3 strikes from the impact hammer at 40 percent energy with a one minute waiting period between subsequent 3 strike sets, at the beginning of each pile installation to allow sea turtles to vacate the area prior to the commencement of pile driving activities (NMFS 2013).

A biological opinion on a Virginia Offshore Wind Technology Advancement Project established similar mitigation measures, as well as the following:

- Restricting pile driving for Inward Battered Guide Structures foundation installation to daylight hours, unless ceasing the pile driving activity would compromise human health or environmental safety and/or the integrity of the project; and
- Prohibiting pile driving activities from November 1 to April 30 if the noise generated during impact pile driving exceeds defined harassment thresholds, as determined by field verification (NMFS 2016b).

A programmatic consultation on offshore wind site assessment activities in the North Atlantic Planning Area, Mid-Atlantic Planning Area, and South Atlantic Planning area was completed in 2021. The consultation covers geophysical and geotechnical surveys and the deployment, operation, and retrieval of environmental data collection buoys occurring in these Planning Areas from June 2021 through June 2031. The programmatic Biological Opinion concluded that any effects of the assessment activities to loggerhead turtle critical habitat will be insignificant and are not likely to adversely affect the critical habitat. Best Management Practices (BMPs) identified in the Opinion include:

- Avoidance during vessel anchoring and any seafloor-sampling activities of all seafloor areas with consolidated seabed features, including coral reefs and shallow/mesophotic reefs and, to the extent practicable, all sensitive live bottom habitats, including eelgrass;
- Minimization of propeller wash and seafloor disturbance by vessels operating in coastal waters;

- Implementation of marine trash and debris awareness and prevention activities;
- Establishment of a Clearance Zone extending at least 500 m in all directions around all vessels operating sources at less than 180 kHz;
- Use of Protected Species Observers and dual thermal/high definition cameras to detect the presence of protected species;
- Voluntary implementation of a pause in sparker operations for all vessels operating in nearshore critical habitat for loggerhead sea turtles from April 1 to September 30;
- Cessation of sparker operation if a sea turtle is observed within a 100 m Clearance Zone; and
- Mandatory recording and reporting of survey activities and information on listed species in a format approved by BOEM and NMFS (NMFS 2021h).

BOEM additionally has statutory obligations under the Outer Continental Shelf Lands Act (43 USC 1337) to ensure that any activities it authorizes protect the environment and conserve natural resources. This includes the evaluation of impacts to marine mammals and sea turtles. According to 30 CFR 585.610(a)(8) (SAP) and 30 CFR 585.626(b)(15) (COP) applicants must submit with SAPs and COPs "proposed measures for avoiding, minimizing, reducing, eliminating, and monitoring environmental impacts." Under BOEM's regulations, plans must describe and consider protected resources, conditions, and activities that could be affected by proposed activities.[27] Any plan must also demonstrate that it is prepared to use best management practices (BMPs) in executing its plan (BOEM, Office of Renewable Energy Programs 2019).[28] BOEM has identified several BMPs for marine mammal and sea turtle surveys that are listed in Table 38.

Table 38. BOEM IDENTIFIED BEST MANAGEMENT PRACTICES FOR SEA TURTLES

PHASE	CONSIDERATION OF SEA TURTLES
Site Assessment	Applicants shall evaluate sea turtle use of the proposed project area and design the project to minimize and mitigate the potential for harassment or disturbance. The amount and extent of ecological baseline data required will be determined on a project-by-project basis.
Site Assessment, Construction, and Operation	Applicants shall minimize potential vessel impacts to sea turtles by requiring project-related vessels to follow the NMFS Regional Viewing Guidelines while in transit. Operators shall be required to undergo training on applicable vessel guidelines.
Construction	Applicants shall make efforts to minimize disruption and disturbance to marine life from sound emissions, such as pile driving, during construction activities.
	Applicants shall locate cable landfalls and onshore facilities so as to avoid impacts to beaches known to be seasonal sea turtle habitat.
Sources:	

[27] See SAP- 30 CFR 585.610(b)(5), 585.611(a),(b)(3), (5) and (7); COP - 30 CFR 585.626(a)(3), 585.627(a)(3), (5), and (7); and GAP - 30 CFR 585.645(a)(5), 585.646(c), (e) and (g)

[28] 30 CFR 585.606(a)(6); 585.621(f); 585.641(4)

PHASE	CONSIDERATION OF SEA TURTLES
Minerals Management Service (currently, BOEM). 2007. Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternative Use of Facilities on the Outer Continental Shelf: Final Environmental Impact Statement. October.	

2.3.9.4 Results of Analysis

In general, the conservation efforts NMFS would recommend to avoid potential adverse effects on critical habitat would also likely be recommended so that the activities avoid adverse effects on the species. That is, the protections that would be sought under critical habitat designation would most likely be recommended by NMFS in the baseline for renewable energy consultations. As such, it is unlikely that the presence of critical habitat would change the ultimate outcome of consultations on such projects (i.e., the conservation efforts NMFS recommends are unlikely to be different with critical habitat). BOEM generally requires that operators practice avoidance as a first step to avoid interaction with the green sea turtle. A potential conservation effort that could be requested for critical habitat for renewables projects could include implementation of time windows for construction activities, as was considered for the loggerhead sea turtle. However, NMFS generally recommends time windows for construction activities for the benefit of sea turtles even absent critical habitat designation and thus it does not anticipate that the designation of critical habitat would increase these time windows.

The recent creation of a new Federal-State Offshore Wind Implementation Partnership intended to accelerate the growing offshore wind industry along the East Coast, as well as the Inflation Reduction Act's provision of significant tax and other governmental incentives to the renewable energy industry, signal that investment in wind energy projects will increase over the next ten years (The White House 2022, HR 5376 EAS). BOEM projections indicate that approximately 20 wind energy projects along the Atlantic coast, from Massachusetts to North Carolina, will be constructed and operational by 2030 (BOEM 2021b). However, the level and timing of future Section 7 consultations on offshore wind and other renewable energy developments in potential critical habitat areas are uncertain, and many of the projects that BOEM forecasts to come online within the next ten years have already completed Section 7 consultations as part of the permitting process. For the purposes of this analysis, we assume that the rate of Section 7 consultations between BOEM and NMFS on offshore wind energy activities over the next ten years will be equivalent to that over the previous ten years. Moreover, for reasons identified throughout this section, all consultations over the next ten years on offshore wind energy projects considering effects to green sea turtle critical habitat are projected to occur in units of the North Atlantic DPS. As shown in Table 41, nearly all forecasted consultations on offshore wind development activities over the next ten years are in units along the Atlantic coast.

Table 39. PROJECTED QUANTITY AND DISTRIBUTION OF SECTION 7 CONSULTATIONS ON RENEWABLE ENERGY ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT AND TYPE (2023- 2032)

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Sargassum	0.0	0.0	0.0	0.0
Massachusetts	2.8	0.0	0.1	2.8
Rhode Island	0.8	0.0	0.1	0.8
Connecticut	0.0	0.0	0.1	0.1

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
New York	0.3	0.0	0.1	0.3
New Jersey	0.3	1.0	0.1	1.3
Delaware	0.0	0.0	0.1	0.1
Maryland	0.0	1.0	0.1	1.1
Virginia	2.0	0.0	0.1	2.1
NC: Albemarle Sound	0.0	0.1	0.0	0.1
NC: Pamlico, Core, and Back Sounds	1.0	0.1	0.0	1.1
NC: Bogue Snd, White Oak/New/Cape Fear R.	0.0	0.1	0.0	0.1
NC: Currituck Sound	1.0	0.1	0.0	1.1
South Carolina	0.5	1.3	0.1	1.9
Georgia	0.5	1.3	0.1	1.9
Florida	0.0	2.0	0.1	2.1
Alabama	0.0	0.0	0.0	0.0
Mississippi	0.0	0.0	0.0	0.0
Louisiana	0.0	0.0	0.0	0.0
Texas (other areas)	0.0	0.0	0.0	0.0
TX: Galveston Bay to Lavaca, Matagorda Bay	0.0	0.0	0.0	0.0
TX: Lavaca, Matagorda Bay to Laguna Madre	0.0	0.0	0.0	0.0
Texas: Laguna Madre	0.0	2.0	0.0	2.0
North Atlantic DPS	**9.0**	**9.0**	**1.0**	**19.0**
South Atlantic DPS	**0.0**	**0.0**	**0.0**	**0.0**
East Pacific DPS	**1.0**	**0.0**	**0.0**	**1.0**
Central North Pacific DPS	**0.0**	**0.0**	**0.0**	**0.0**
Central West Pacific DPS	**0.0**	**0.0**	**0.0**	**0.0**
Central South Pacific DPS	**0.0**	**0.0**	**0.0**	**0.0**
TOTAL	**9.0**	**9.0**	**1.0**	**19.0**

Fractions of consultations occurred as a result of assigning some consultations to two or more units.

As shown in Table 43, incremental costs of green sea turtle critical habitat to offshore wind activities are projected to total $9,800 over ten years (discounted at seven percent), or $1,400 in annualized costs.

Table 40. PROJECTED INCREMENTAL COSTS (IN 2022 DOLLARS) OF SECTION 7 CONSULTATIONS ON OFFSHORE WIND DEVELOPMENT ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT (2023- 2032)

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Sargassum	$0	$0	$0
Massachusetts	$2,000	$14,000	$17,000
Rhode Island	$710	$5,000	$6,000
Connecticut	$210	$1,500	$1,800
New York	$380	$2,700	$3,200
New Jersey	$690	$4,900	$5,900
Delaware	$210	$1,500	$1,800

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Maryland	$530	$3,700	$4,500
Virginia	$2,200	$15,000	$19,000
NC: Albemarle Sound	$80	$560	$680
NC: Pamlico, Core, and Back Sounds	$1,400	$9,800	$12,000
NC: Bogue Snd, White Oak/New/Cape Fear R.	$80	$560	$680
NC: Currituck Sound	$1,400	$9,800	$12,000
South Carolina	$1,300	$9,100	$11,000
Georgia	$1,300	$9,100	$11,000
Florida	$850	$5,900	$7,200
Alabama	$0	$0	$0
Mississippi	$0	$0	$0
Louisiana	$0	$0	$0
Texas (other areas)	$0	$0	$0
TX: Galveston Bay to Lavaca, Matagorda Bay	$0	$0	$0
TX: Lavaca, Matagorda Bay to Laguna Madre	$0	$0	$0
Texas: Laguna Madre	$630	$4,400	$5,400
North Atlantic DPS	**$14,000**	**$98,000**	**$120,000**
South Atlantic DPS	**$0**	**$0**	**$0**
East Pacific DPS	**$660**	**$0**	**$660**
Central North Pacific DPS	**$0**	**$0**	**$0**
Central West Pacific DPS	**$0**	**$0**	**$0**
Central South Pacific DPS	**$0**	**$0**	**$0**
TOTAL	**$14,000**	**$98,000**	**$120,000**

2.3.9.5 Assumptions and Limitations

Table 43 describes the key assumptions underlying the analysis of wind energy development activities and the influence of those assumptions on the results of the analysis.

Table 41. ASSUMPTIONS AND LIMITATIONS OF ANALYSIS OF INCREMENTAL COSTS OF CRITICAL HABITAT DESIGNATION ON RENEWABLE ENERGY ACTIVITIES

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
Critical habitat designation is unlikely to change the conservation efforts NMFS recommends as part of future Section 7 consultations on offshore wind energy projects.	May result in an **underestimate** of costs.	**Likely minor**. Offshore renewable energy projects are subject to significant scrutiny with respect to potential environmental impacts, including marine habitat. Given presently available information, NMFS anticipates that it is unlikely that critical habitat designation will generate additional or different recommendations for conservation efforts for the green sea turtle and its habitat with

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
		respect to offshore wind energy activity. However, NMFS will review each individual project or activity at the time of consultation to determine whether a reasonable and prudent alternative is needed to avoid destruction or adverse modification of critical habitat.
The rate of consultation on offshore wind projects is comparable to the average rate of consultations in recent years.	**Unknown**. May overestimate or underestimate incremental impacts.	**Likely minor**. The future growth or decline pattern of the offshore wind industry is not known. While wind energy development in the GoM appears likely, the timing of the development is unknown.

2.3.10 Other Activities

2.3.10.1 Space Launch and Reentry Vehicle Operations

Commercial vehicle space travel is an emerging industry with operations in the Atlantic Ocean, Pacific Ocean, and Gulf of Mexico. Potential threats to green sea turtles and their habitat include impact by fallen objects, including spacecraft, rocket parts, and radiosonde; entanglement in unrecovered parachutes and parafoils, ingestion of material from unrecovered parachutes, parafoils, and weather balloon fragments; exposure to hazardous materials, and vessel strike. For the most part, these threats are primarily to green sea turtles themselves and are therefore considered under the baseline.

The Federal Aviation Administration (FAA) issues licenses or permits to commercial space applicants and specifically for SpaceX Starship-Super Heavy operations launched from Boca Chica, Texas. The U.S. Space Force's (USSF) conducts launch operations from Cape Canaveral Space Force Station (Florida) and Vandenberg Space Force Base (Florida), including the action of leasing launch complexes to commercial launch operators. The National Aeronautics and Space Administration (NASA) conducts launch, landing, and recovery operations from Kennedy Space Center (Florida) and Wallops Flight Facility (Virginia), including the action of leasing launch complexes and launch-related infrastructure to commercial launch operators (NMFS 2022b). In January 2022, NMFS issued a programmatic concurrence letter to the FAA's Office of Commercial Space Transportation that provides for the FAA, USSF, and NASA to consult with NMFS on these types of operations on a programmatic basis.

The programmatic consultation identifies several PDCs that serve to reduce the risk of these activities adversely affecting both green sea turtles and their habitat. These include:

- Launch activities, including suborbital landings and splashdowns, and orbital reentry activities will occur at least 5 nm offshore the coast of the U.S. or islands, and no landings are to occur in coral reef areas;
- Education and observation requirements to protect ESA-listed and MMPA-protected species;

- Vessel speed and distance requirements to avoid impacts with sea turtles and other ESA-listed and MMPA-protected species; and

- Adherence to a Hazardous Material Emergency Response Plan in the event of a failed launch operation.

The action area identified in the programmatic consultation overlaps with loggerhead sea turtle critical habitat in the GoM and Atlantic Ocean, including overlapping areas of nearshore reproductive habitat, constricted migratory habitat, breeding habitat, and *Sargassum* habitat. NMFS concurred with the FAA, NASA, and the USSF that the proposed action may affect, but is not likely to adversely affect, all ESA-listed species that occur within and designated critical habitat that overlaps with the action area, including green sea turtles and loggerhead sea turtle critical habitat. This analysis therefore assumes that incremental costs of green sea turtle critical habitat to space vehicle launch and reentry operations would be limited to the administrative costs of considering impacts to the critical habitat in a future reinitiation of the programmatic consultation. The forecasted costs of reinitiation of the programmatic consultation are distributed across the Laguna Madre, Florida, and Virginia units. One informal consultation is also projected to occur in Guam, where there was an informal consultation on commercial space launch and reentry in 2020. This analysis projects that incremental costs of the potential critical habitat to commercial space vehicle launch and reentry activities would total $20,000 over the next ten years (discounted at seven percent), or $2,900 in annualized costs.

2.3.10.2 Federal Protected Area Management

A number of protected areas overlap with the specific areas under consideration for green sea turtle critical habitat. These protected areas include federal marine sanctuaries, parks, monuments, and wildlife refuges. The primary threat to the potential critical habitat associated with protected areas relates to human use of the areas. Many of the protected areas overlapping the potential critical habitat are popular tourist destinations for activities such as boating, fishing, and diving. As a result, there is the potential for inadvertent damage to seagrass beds from chain scour, vessel anchoring or grounding, and certain fishing practices.

Table 44 lists some of these protected areas as well as the associated management agency, and, where readily available, a list of existing measures that may be protective of green sea turtles and their habitat. These protected areas are guided by formal management plans implemented by federal agencies. When a federal agency is involved, such as the National Park Service, revisions to these management plans may require Section 7 consultation. From 2012 to 2021, protected area management led to four programmatic consultations and 75 informal consultations across all areas under consideration for green sea turtle critical habitat. NOAA has primary responsibility for management of marine areas of the Papahanaumokuakea Marine National Monument (PMNM), created in 2006 through Presidential Proclamation 8031 and significantly expanded in size in 2016 through Presidential Proclamation 8112 (The White House 2016). A programmatic consultation is in place that allows for the streamlined permitting of scientific research, marine debris removal, and Native Hawaiian practices within the PMNM. No formal consultations resulted from federal protected area management activities over the years 2012-2021. Other than NOAA, the National Park Service (NPS) and Fish and Wildlife Service (FWS) are the federal agencies that manage areas and activities within the potential critical habitat that historically have been subject to Section 7 consultation with NMFS.

Table 42. FEDERAL PROTECTED AREAS WITHIN THE POTENTIAL CRITICAL HABITAT

PROTECTED AREA	LAND MANAGER	KEY BASELINE PROTECTIONS
Florida Keys National Marine Sanctuary	NOAA, National Marine Sanctuaries	Prohibited: Dredging, drilling, or otherwise altering the seabed; removing, injuring or possessing coral or live rock; operating a vessel in such a manner as to strike or otherwise injure coral, seagrass, or other mobile organisms attached to the seabed, or cause prop scarring.[1]
Biscayne National Park	National Park Service	Several areas are closed year-round to public entry to protect sensitive resources and wildlife. Beaching or anchoring of vessels is prohibited in several areas of the Park. Areas of the park are designated as noncombustion engine use zones where vessel speeds and types of boats entering the areas are limited, thus reducing boat traffic overall and reducing impacts associated with boat traffic such as scarring of seagrass beds. It is anticipated that commercial fishing in the park will eventually be phased out parkwide.
Dry Tortugas National Park	National Park Service	Prohibits extractive activities in the Research Natural Area, including fishing; commercial fishing within Dry Tortugas National Park is prohibited; fish traps in the Tortugas region are prohibited; boats may only anchor on sand within one nautical mile of the Fort Jefferson Harbor Light; and vessel discharges are prohibited.[3]
Flower Garden Banks National Marine Sanctuary	National Marine Sanctuaries	Prohibited: Vessel discharges; "taking" any turtle or marine mammal within the Sanctuary; injuring or removing, or attempting to injure or remove, any coral or other bottom formation; drilling into, dredging, or otherwise altering the seabed of the Sanctuary; possessing or using any fishing gear other than conventional hook and line gear; and anchoring any vessel within the Sanctuary.[4]
Buck Island Reef National Monument	National Park Service	Prohibited: dredging and filling; boat operation that damages underwater features; and anchoring other than in deep sand bottom areas.[5]
Virgin Islands National Park	National Park Service	Prohibited: dredging and filling; boat operation that damages underwater features; and anchoring except in emergency situations.[6]
Virgin Islands Coral Reef National Monument	National Park Service	Prohibited: Collecting coral, dead or alive; dredging, excavating, or filling operations; and anchoring is restricted.[7]
Papahanau-mokuakea Marine National Monument	NOAA, Fish and Wildlife Service	Permitted activities: Limited to management activities by jurisdictional agencies, research, education, Native Hawaiian practices, and a small number of recreational trips to historical sites at Midway Atoll. All commercial development and commercial fishing is prohibited.

PROTECTED AREA	LAND MANAGER	KEY BASELINE PROTECTIONS
Pacific Remote Islands Marine National Monument	NOAA, Fish and Wildlife Service, DoD (Wake and Johnston Atolls only)	All commercial fishing is prohibited. Noncommercial fishing is permitted as long as it is managed as a sustainable activity. Scientific exploration and research activities are permitted within the Monument, as permitted by NOAA or FWS.[8]
Rose Atoll Marine National Monument	NOAA, Fish and Wildlife Service, DoD, Department of State, Government of American Samoa	Injury, destruction, or removal of any feature of the Monument is prohibited, except as permitted by FWS or NOAA for scientific research purposes. All commercial fishing is prohibited. Noncommercial and traditional indigenous fishing may be permitted. [9]
Sources: [1] 15 CFR 922.163, [2] 16 USC § 410gg, [3] 36 CFR 7.274, [4] 15 CFR 922.122., [5] 36 CFR 7.73., [6] 36 CFR 7.74., [7] 36 CFR 7.46., [8] 79 FR 58645. [9] 74 FR 1577.		

Given the extensive baseline protections in place in federally protected areas that overlap with areas being considered for green sea turtle critical habitat, this analysis assumes that the potential designation will not result in the need for additional project modifications. As such, projected incremental costs of the rule to federally protected area management activities are limited to the administrative effort required to consider green sea turtle critical habitat in future consultations that would occur absent the designation.

This analysis projects that NMFS will complete 70 Section 7 consultations related to protected area management activities over the next ten years that consider effects on green sea turtle critical habitat. This total includes four programmatic consultations and 66 informal consultations. As shown in Table 45, the North Atlantic DPS (36 consultations) and Central North Pacific DPS (21 consultations) are projected to account for the large majority of the total.

Table 43. PROJECTED QUANTITY AND DISTRIBUTION OF SECTION 7 CONSULTATIONS ON FEDERAL PROTECTED AREA MANAGEMENT ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT AND TYPE (2023- 2032)

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Sargassum	0.0	2.0	0.0	2.0
Massachusetts	0.0	0.1	0.0	0.1
Rhode Island	0.0	0.1	0.0	0.1
Connecticut	0.0	0.1	0.0	0.1
New York	0.0	8.1	0.0	8.1
New Jersey	0.0	0.1	0.0	0.1
Delaware	0.0	0.1	0.0	0.1
Maryland	0.0	0.1	0.0	0.1
Virginia	0.0	1.1	0.0	1.1

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
NC: Albemarle Sound	0.0	1.0	0.0	1.0
NC: Pamlico, Core, and Back Sounds	0.0	4.0	0.0	4.0
NC: Bogue Snd, White Oak/New/Cape Fear R.	0.0	1.0	0.0	1.0
NC: Currituck Sound	0.0	0.0	0.0	0.0
South Carolina	0.0	0.5	0.0	0.5
Georgia	0.0	0.5	0.0	0.5
Florida	0.0	9.0	1.0	10.0
Alabama	0.0	0.8	0.0	0.8
Mississippi	0.0	0.8	0.0	0.8
Louisiana	0.0	0.8	0.0	0.8
Texas (other areas)	0.0	0.8	0.0	0.8
TX: Galveston Bay to Lavaca, Matagorda Bay	0.0	1.0	0.0	1.0
TX: Lavaca, Matagorda Bay to Laguna Madre	0.0	1.0	0.0	1.0
Texas: Laguna Madre	0.0	0.0	0.0	0.0
Mona Island South	0.0	0.0	0.0	0.0
Mona Island North	0.0	0.0	0.0	0.0
Culebra Island	0.0	0.0	0.0	0.0
Puerto Rico: other areas	0.0	1.0	1.0	2.0
Vieques North	0.0	0.0	0.0	0.0
Vieques East	0.0	0.0	0.0	0.0
Vieques South	0.0	0.0	0.0	0.0
Puerto Rico North	0.0	0.0	0.0	0.0
Puerto Rico Guayama	0.0	0.0	0.0	0.0
Puerto Rico Maunabo	0.0	0.0	0.0	0.0
North Atlantic DPS	**0.0**	**34.0**	**2.0**	**36.0**
St. John, USVI (High)	0.0	0.0	0.0	0.0
St. Thomas, USVI (High)	0.0	0.0	0.0	0.0
St. Croix, USVI (High)	0.0	0.0	0.0	0.0
St. John, USVI (Moderate)	0.0	2.0	0.0	2.0
St. Thomas, USVI (Moderate)	0.0	0.0	0.0	0.0
St. Croix, USVI (Moderate)	0.0	0.0	0.0	0.0
South Atlantic DPS	**0.0**	**2.0**	**0.0**	**2.0**
United States/Mexico border to San Diego Bay	0.0	0.0	0.0	0.0
San Diego Bay	0.0	1.0	0.0	1.0
Mission Bay	0.0	0.0	0.0	0.0
Point Loma to (but not incl.) La Jolla Shores	0.0	0.0	0.0	0.0
La Jolla Shores/Cove	0.0	0.0	0.0	0.0
La Jolla Shores to Oceanside (incl. Oceanside)	0.0	0.0	0.0	0.0
Agua Hedionda Lagoon	0.0	0.0	0.0	0.0
Oceanside to San Onofre	0.0	0.0	0.0	0.0
San Onofre	0.0	0.0	0.0	0.0
San Onofre to Newport (incl. Newport Bay)	0.0	0.0	0.0	0.0
Newport to Huntington Beach	0.0	0.0	0.0	0.0
Bolsa Chica Lowlands (Basin)	0.0	0.0	0.0	0.0
Seal Beach Complex	0.0	2.0	0.0	2.0

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
LA and Long Beach Harbors	0.0	0.0	0.0	0.0
LA and Long Beach Breakwater	0.0	0.0	0.0	0.0
Palos Verdes	0.0	0.0	0.0	0.0
Santa Monica Bay	0.0	0.0	0.0	0.0
Catalina Island	0.0	0.0	0.0	0.0
Channel Islands	0.0	1.0	0.0	1.0
Santa Monica Bay to Point Conception	0.0	0.0	0.0	0.0
East Pacific DPS	**0.0**	**4.0**	**0.0**	**4.0**
Hawai‘i	0.0	1.0	0.0	1.0
Kaho‘olawe	0.0	0.0	0.0	0.0
Lana‘i	0.0	0.0	0.0	0.0
Maui	0.0	0.0	0.0	0.0
Moloka‘i	0.0	1.0	0.0	1.0
O‘ahu	0.0	3.0	0.0	3.0
Niihau	0.0	0.0	0.0	0.0
Kaua‘i	0.0	0.0	0.0	0.0
Nihoa	0.0	1.4	0.1	1.5
Mokumanamana/Necker Island	0.0	0.9	0.1	1.0
Lalo/French Frigate Shoals	0.0	3.4	0.1	3.5
Kamole/Laysan Island	0.0	0.9	0.1	1.0
Kapou/Lisianski Island	0.0	1.9	0.1	2.0
Manawai/Pearl and Hermes Atoll	0.0	0.9	0.1	1.0
Kuaihelani/Midway Atoll	0.0	2.9	1.1	4.0
Hōlanikū/Kure Atoll	0.0	0.9	0.1	1.0
Johnston Atoll	0.0	1.0	0.0	1.0
Central North Pacific DPS	**0.0**	**19.0**	**2.0**	**21.0**
Tinian	0.0	0.0	0.0	0.0
Pagan	0.0	0.0	0.0	0.0
Rota	0.0	0.0	0.0	0.0
Sarigan	0.0	0.0	0.0	0.0
Alamagan	0.0	0.0	0.0	0.0
Aguijan	0.0	0.0	0.0	0.0
Guguan	0.0	0.0	0.0	0.0
Agrihan	0.0	0.0	0.0	0.0
Saipan	0.0	1.0	0.0	1.0
Wake	0.0	0.0	0.0	0.0
CNMI (other areas)	0.0	0.0	0.0	0.0
Guam	0.0	3.0	0.0	3.0
Central West Pacific DPS	**0.0**	**4.0**	**0.0**	**4.0**
Rose Atoll	0.0	0.2	0.0	0.2
Ta'u	0.0	0.2	0.0	0.2
Ofu and Olosega	0.0	0.2	0.0	0.2
Ofu and Olosega (other areas)	0.0	0.0	0.0	0.0
Palmyra	0.0	1.0	0.0	1.0
Tutuila	0.0	1.2	0.0	1.2

UNIT	NUMBER OF FORMAL CONSULTATIONS	NUMBER OF INFORMAL CONSULTATIONS	NUMBER OF PROGRAMMATIC CONSULTATIONS	TOTAL
Swains	0.0	0.2	0.0	0.2
Baker	0.0	0.0	0.0	0.0
Howland	0.0	0.0	0.0	0.0
Kingman	0.0	0.0	0.0	0.0
Jarvis	0.0	0.0	0.0	0.0
Central South Pacific DPS	**0.0**	**3.0**	**0.0**	**3.0**
TOTAL	**0.0**	**66.0**	**4.0**	**70.0**
Fractions of consultations occurred as a result of assigning some consultations to two or more units.				

As shown in Table 46, incremental costs of green sea turtle critical habitat to protected area management activities are projected to total $220,000 over ten years (discounted at seven percent), or $31,000 in annualized costs. Impacts are expected to be highest in the North Atlantic DPS ($110,000) and Central North Pacific DPS ($78,000) over ten years (discounted at seven percent).

Table 44. PROJECTED INCREMENTAL COSTS (IN 2022 DOLLARS) OF SECTION 7 CONSULTATIONS ON PROTECTED AREA MANAGEMENT ACTIVITIES THAT MAY AFFECT GREEN SEA TURTLE CRITICAL HABITAT, BY UNIT (2023- 2032)

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Sargassum	$630	$4,400	$5,400
Massachusetts	$39	$280	$340
Rhode Island	$39	$280	$340
Connecticut	$39	$280	$340
New York	$2,600	$18,000	$22,000
New Jersey	$39	$280	$340
Delaware	$39	$280	$340
Maryland	$39	$280	$340
Virginia	$360	$2,500	$3,000
NC: Albemarle Sound	$320	$2,200	$2,700
NC: Pamlico, Core, and Back Sounds	$1,300	$8,900	$11,000
NC: Bogue Snd, White Oak/New/Cape Fear R.	$320	$2,200	$2,700
NC: Currituck Sound	$0	$0	$0
South Carolina	$160	$1,100	$1,300
Georgia	$160	$1,100	$1,300
Florida	$5,400	$38,000	$46,000
Alabama	$240	$1,700	$2,000
Mississippi	$240	$1,700	$2,000
Louisiana	$240	$1,700	$2,000
Texas (other areas)	$240	$1,700	$2,000
TX: Galveston Bay to Lavaca, Matagorda Bay	$320	$2,200	$2,700
TX: Lavaca, Matagorda Bay to Laguna Madre	$320	$2,200	$2,700
Texas: Laguna Madre	$0	$0	$0
Mona Island South	$0	$0	$0
Mona Island North	$0	$0	$0

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Culebra Island	$0	$0	$0
Puerto Rico: other areas	$2,900	$20,000	$25,000
Vieques North	$0	$0	$0
Vieques East	$0	$0	$0
Vieques South	$0	$0	$0
Puerto Rico North	$0	$0	$0
Puerto Rico Guayama	$0	$0	$0
Puerto Rico Maunabo	$0	$0	$0
North Atlantic DPS	**$16,000**	**$110,000**	**$140,000**
St. John, USVI (High)	$0	$0	$0
St. Thomas, USVI (High)	$0	$0	$0
St. Croix, USVI (High)	$0	$0	$0
St. John, USVI (Moderate)	$630	$4,400	$5,400
St. Thomas, USVI (Moderate)	$0	$0	$0
St. Croix, USVI (Moderate)	$0	$0	$0
South Atlantic DPS	**$630**	**$4,400**	**$5,400**
United States/Mexico border to San Diego Bay	$0	$0	$0
San Diego Bay	$320	$2,200	$2,700
Mission Bay	$0	$0	$0
Point Loma to (but not incl.) La Jolla Shores	$0	$0	$0
La Jolla Shores/Cove	$0	$0	$0
La Jolla Shores to Oceanside (incl. Oceanside)	$0	$0	$0
Agua Hedionda Lagoon	$0	$0	$0
Oceanside to San Onofre	$0	$0	$0
San Onofre	$0	$0	$0
San Onofre to Newport (incl. Newport Bay)	$0	$0	$0
Newport to Huntington Beach	$0	$0	$0
Bolsa Chica Lowlands (Basin)	$0	$0	$0
Seal Beach Complex	$630	$4,400	$5,400
LA and Long Beach Harbors	$0	$0	$0
LA and Long Beach Breakwater	$0	$0	$0
Palos Verdes	$0	$0	$0
Santa Monica Bay	$0	$0	$0
Catalina Island	$0	$0	$0
Channel Islands	$320	$2,200	$2,700
Santa Monica Bay to Point Conception	$0	$0	$0
East Pacific DPS	**$1,300**	**$8,900**	**$11,000**
Hawai‘i	$320	$2,200	$2,700
Kaho‘olawe	$0	$0	$0
Lana‘i	$0	$0	$0
Maui	$0	$0	$0
Moloka‘i	$320	$2,200	$2,700
O‘ahu	$950	$6,700	$8,100
Niihau	$0	$0	$0
Kaua‘i	$0	$0	$0

UNIT	ANNUALIZED COSTS	TOTAL COSTS, 2023-2032 (7% DISCOUNT RATE)	TOTAL COSTS, 2023-2032 (3% DISCOUNT RATE)
Nihoa	$760	$5,300	$6,400
Mokumanamana/Necker Island	$600	$4,200	$5,100
Lalo/French Frigate Shoals	$1,400	$9,700	$12,000
Kamole/Laysan Island	$600	$4,200	$5,100
Kapou/Lisianski Island	$910	$6,400	$7,800
Manawai/Pearl and Hermes Atoll	$600	$4,200	$5,100
Kuaihelani/Midway Atoll	$3,800	$27,000	$32,000
Hōlanikū/Kure Atoll	$600	$4,200	$5,100
Johnston Atoll	$320	$2,200	$2,700
Central North Pacific DPS	**$11,000**	**$78,000**	**$95,000**
Tinian	$0	$0	$0
Pagan	$0	$0	$0
Rota	$0	$0	$0
Sarigan	$0	$0	$0
Alamagan	$0	$0	$0
Aguijan	$0	$0	$0
Guguan	$0	$0	$0
Agrihan	$0	$0	$0
Saipan	$320	$2,200	$2,700
Wake	$0	$0	$0
CNMI (other areas)	$0	$0	$0
Guam	$950	$6,700	$8,100
Central West Pacific DPS	**$1,300**	**$8,900**	**$11,000**
Rose Atoll	$63	$440	$540
Ta'u	$63	$440	$540
Ofu and Olosega	$63	$440	$540
Ofu and Olosega (other areas)	$0	$0	$0
Palmyra	$320	$2,200	$2,700
Tutuila	$380	$2,700	$3,200
Swains	$63	$440	$540
Baker	$0	$0	$0
Howland	$0	$0	$0
Kingman	$0	$0	$0
Jarvis	$0	$0	$0
Central South Pacific DPS	**$950**	**$6,700**	**$8,100**
TOTAL	**$31,000**	**$220,000**	**$270,000**

3 Economic Benefits

3.1 Introduction

The previous chapters of this report evaluate the potential impacts that may be generated by the designation of marine critical habitat for the green sea turtle. This chapter considers the potential economic benefits resulting from the designation. First, we introduce economic methods employed to quantify benefits of species and habitat conservation, and discuss the availability of existing literature to support valuation in the context of this rulemaking. We then provide a qualitative description of the potential categories of ancillary benefits that may result from green turtle conservation activities.

Past critical habitat designations have identified three broad categories of other relevant impacts: conservation benefits, both to the species and to society, and impacts on governmental or private entities that are implementing existing management plans that provide benefits to the listed species.

3.2 Conservation Benefits

The primary intended benefit of critical habitat is to support the conservation of threatened and endangered species, such as the green sea turtle.[29] Thus, attempts to develop monetary estimates of the benefits of critical habitat designation would focus on the public's willingness-to-pay to achieve the conservation benefits to the species resulting from this designation.

Quantification and monetization of species conservation benefits requires two primary pieces of information: (1) data on the incremental change in green sea turtle population or in the probability of recovery that is expected to result from the designation; and (2) data on the public's willingness-to-pay for this incremental change. Neither data element is readily available for this analysis; thus, we do not quantify or monetize the conservation benefits of a critical habitat designation.

Determining the incremental effect of critical habitat on sea turtle conservation and recovery is complicated. Such an evaluation would require the ability to isolate and quantify the effect of the designated critical habitat separately from all other ongoing or planned conservation efforts for the species, such as the protections afforded the species due to Sections 7, 9 and 10 of the Act under the listing of the species, the implementation of Recovery Plans, and other regulatory or voluntary protection and requirement efforts benefitting the species.

In addition, a major limitation with respect to distinguishing the incremental effect of the designation on the conservation and recovery of the green sea turtle is the significant uncertainty regarding how NMFS may differently regulate particular activities to avoid destruction or adverse modification of critical habitat. As described in Sections 2.3.1 to 2.3.10 of this analysis, in most cases, critical habitat is not expected to change how a project or activity is implemented. In some limited instances, however, NMFS

[29] The term "conservation" means "the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary" (16 U.S.C. 1532).

may determine that a project or activity is likely to destroy or adversely modify critical habitat and recommend a reasonable and prudent alternative, above and beyond what would be recommended to avoid jeopardy or take of the species. For example, Section 2.3.1 describes the uncertainty regarding potential additional conservation efforts associated with beach nourishment projects in the EP DPS. Projects for which critical habitat will result in additional conservation efforts are likely to generate economic benefits in terms of increased conservation and recovery potential for green sea turtles.

Even in the case that enough information existed to determine the effect of critical habitat designation on the conservation and recovery of the sea turtles, it is uncertain whether the existing economics literature would support valuation of that change. While a number of published studies estimate the value the public places on protecting various species of sea turtles,[30] none of these studies specifically estimates the value of the types of incremental changes in recovery probability that could result from the designation.

SUMMARY OF BENEFITS DISCUSSION

Given the uncertainty regarding conservation efforts that may be triggered by this rule, we are unable to quantify the benefits. This section therefore provides an overview of economic literature on the benefits of the overall conservation of the green sea turtle. The economic benefits described are not benefits specifically of this rulemaking.

The primary goal of critical habitat designation is to support long-term conservation and recovery of the green sea turtle. Conservation efforts potentially triggered by this rule would result in benefits, including use benefits (e.g., wildlife-viewing), non-use benefits (e.g., existence values), and ancillary ecosystem service benefits (e.g., enhanced habitat conditions for other marine species).

Absent information on the incremental change in green sea turtle populations or recovery potential associated with the designation of critical habitat, this analysis is unable to apply the available literature to quantify or monetize associated incremental use and non-use economic benefits. This literature suggests, however, that green sea turtles have value to people nationally.

In the remainder of this section, we provide a more detailed description of the economic techniques that economists would employ to monetize these types of conservation benefits. We also present a brief review of the existing literature valuing sea turtle protection. These studies provide evidence that the public may have a positive value for efforts that will increase the recovery probability of the species. However, for the reasons described above, they cannot be applied to quantify the incremental economic benefits resulting from critical habitat designation.

3.2.1 ECONOMIC METHODS USED TO MEASURE USE AND NON-USE VALUES OF SPECIES AND HABITAT CONSERVATION

Various economic benefits, measured in terms of social welfare (i.e., people's well-being as measured in terms of producer and consumer surplus) or regional economic performance (e.g., regional income or

[30] See, for example, Hamed, A., and authors. 2016. How Much Are Floridians Willing to Pay for Protecting Sea Turtles from Sea Level Rise? Environmental Management 57(1):176-88.

employment), may result from conservation efforts for listed species. The benefits can be placed into two broad categories: (1) those associated with the primary goal of species conservation (i.e. direct benefits), and (2) those additional beneficial services that derive from the conservation efforts but are not the purpose of the ESA (i.e., ancillary benefits, such as improved water quality).

Because the purpose of the ESA is to provide for the conservation of endangered and threatened species and their ecosystems, the benefits of actions taken under the ESA are often measured in terms of the value placed by the public on species preservation (e.g., avoidance of extinction, and/or increase in a species' population). Such social welfare values for a species may reflect both use and non-use values for the species. Use values derive from a direct use for a species, such as commercial harvesting or recreational wildlife-viewing opportunities. Non-use values are not derived from direct use of the species, but instead reflect the utility the public derives from knowledge that a species continues to exist (e.g., existence or bequest values).

As a result of actions taken to preserve endangered and threatened species, such as habitat management, various other benefits may accrue to the public. Conservation efforts may result in improved environmental quality, which in turn may have collateral human health or recreational use benefits. In addition, conservation efforts undertaken for the benefit of a threatened or endangered species may enhance shared habitat for other wildlife. Such benefits may result from modifications to projects, or may be collateral to such actions. For example, in the case that critical habitat designation limits ocean disposal of dredged material, water quality conditions may improve in the area.

Economists apply a variety of methodological approaches in estimating both use and non-use values for species and for habitat improvements, including stated preference and revealed preference methods. Stated preference techniques include such tools as the contingent valuation method, conjoint analysis, or contingent ranking methods. In simplest terms, these methods employ survey techniques, asking respondents to state what they would be willing to pay for a resource or for programs designed to protect that resource. A substantial body of literature has been developed that describes the application of this technique to the valuation of natural resource assets.[31]

More specific to use values for species or habitats, revealed preference techniques examine individuals' behavior in markets in response to changes in environmental or other amenities (i.e., people "reveal" their value through their behavior). For example, travel cost models are frequently applied to value access to recreational opportunities, as well as to value changes in the quality and characteristics of these opportunities. Basic travel cost models are rooted in the idea that the value of a recreational resource can be estimated by analyzing the travel and time costs incurred by individuals visiting the site. Another revealed preference technique is hedonic analysis, which is often employed to determine the effect of site-specific characteristics on property values.

3.2.2 USE AND NON-USE VALUATION STUDIES

Numerous published studies estimate individuals' willingness-to-pay to protect endangered species.[32] The economic values reported in these studies reflect various groupings of benefit categories (including

[31] Add references.

[32] See, for example, the summary in Richardson, L. and J. Loomis. March 2009. The Total Economic Value of Threatened, Endangered, and Rare Species: An Updated Meta-Analysis. Ecological Economics 68(5): 1535-1548.

both use and non-use values). For example, these studies assess public willingness-to-pay for wildlife-viewing opportunities, for the option of seeing or experiencing the species in the future, to assure that the species will exist for future generations, and simply knowing a species exists, among other values.

An ideal study to estimate economic benefits of critical habitat designation for the green sea turtle would be specific to a potential critical habitat area, the policy question at hand (implementation of the specific conservation efforts associated with critical habitat designation), and the relevant population holding such values (e.g., citizens of the United States). No such study has been undertaken to date for the green sea turtle or for other types of sea turtles.

Absent primary research specific to the policy question (benefits of critical habitat designation for the green sea turtle), resource management decisions can often be informed by applying the results of existing valuation research to a new policy question − a process known to economists as benefit transfer. Benefit transfer involves the application of unit value estimates, functions, data, and/or models from existing studies to estimate the benefits associated with the resource under consideration.

The OMB has written guidelines for conducting credible benefit transfers (68 FR 58366). The important steps in the OMB guidance are: (1) specify the value to be estimated for the rulemaking; and (2) identify appropriate studies to conduct benefits transfer based on the following criteria:

- The selected studies should be based on adequate data, sound and defensible empirical methods and techniques;
- The selected studies should document parameter estimates of the valuation function;
- The study and policy contexts should have similar populations (e.g., demographic characteristics). The market size (e.g., target population) between the study site and the policy site should be similar;
- The good, and the magnitude of change in that good, should be similar in the study and policy contexts;
- The relevant characteristics of the study and policy contexts should be similar;
- The distribution of property rights should be similar so that the analysis uses the same welfare measure (i.e., if the property rights in the study context support the use of willingness-to-accept measures while the rights in the rulemaking context support the use of willingness-to-pay measures, benefits transfer is not appropriate); and
- The availability of substitutes across study and policy contexts should be similar.

3.2.3 AVAILABLE LITERATURE VALUING SEA TURTLE POPULATIONS

We undertook a literature review to identify existing research regarding the use and non-use values the public holds for conserving the green sea turtle in the U.S. This search identified few studies focusing on sea turtles in the U.S., though none specific to green sea turtles. Studies specific to green sea turtles were focused in Taiwan and the Galapagos and studies focused on ecotourism benefits of other sea turtles were conducted in Australia, Costa Rica, and other countries not relevant to this rulemaking.

A study by Whitehead (1993) applies contingent valuation methods to elicit information on the public's value to reduce the risk of loggerhead sea turtle extinction to zero for the next 25 years. North Carolina household respondents were asked to contribute to a fund that would reduce risk of extinction to zero. The results indicate the mean willingness-to-pay for a loggerhead protection program that would preclude extinction of the species for 25 years is $10.98 (1991 dollars) per North Carolina household (this equates to $23.36 in 2022 dollars).[33]

Wallmo and Lew (2012) evaluated people's preferences to downlist eight threatened and endangered marine species, including the loggerhead sea turtle. The focus of the study was to determine if some marine taxa are more valuable than others to the public in the United States. Respondents to the stated preference choice experiment were asked about their willingness-to-pay for different additional protection actions for a variety of species with the understanding that the protection actions would achieve specified downlisting objectives (i.e., downlisting from endangered to threatened or recovered). The researchers found a positive willingness-to-pay to improve the status of all species, and identified significant differences in the relative willingness-to-pay estimates. Values range across species from mean willingness-to-pay for recovery of $51.91 (for Puget Sound Chinook salmon) to $91.83 (for North Atlantic right whale) U.S dollars (2022 dollars) per household every year for ten years. The mean willingness-to-pay for recovering the loggerhead was $56.06.[34]

Hamed et al. (2016) assessed WTP of residents of two Florida communities, Cocoa Beach and Oviedo, to protect sea turtle nesting habitat from the threat of sea level rise. Using an open-ended, dichotomous choice contingent valuation method, the study estimated the WTP of households from these cities to protect sea turtle habitat to be between $53 and $72 (2022 dollars) per household every year for five years. Study findings also included positive correlations between WTP and respondents' perception of the trustworthiness and efficiency of the party which will implement the conservation measures, their confidence in the conservation methods used, and whether respondents perceived sea turtles having an effect on their lives; and a negative correlation between WTP and age.

A study by Grafeld et al. (2016) used discrete choice, non-market valuation to assess SCUBA divers' preferences for ecological attributes of coral reef systems in Guam. Based on results of in-person surveys administered to 220 adults, 24 percent of whom were Guam residents and 76 percent of whom were non-residents, the study revealed that divers WTP increased the most ($43.65, 2022 dollars) when both sharks and turtles were present and $20.21 when turtles alone were present. WTP for all other attributes (varying fish biomass levels, fish species diversity, presence of Napoleon wrasse (*Cheilinus undulatus*), Napoleon wrasse size, presence of sharks alone, and presence of turtles alone) were lower. However, the attribute for which respondents indicated the second-highest WTP was presence of sea turtles alone.

The identified studies do not support a benefit transfer based analysis to quantify benefits of a critical habitat designation. Even assuming studies focused on willingness-to-pay for loggerhead sea turtle conservation would be appropriate to evaluate green sea turtle conservation, information on the effect of critical habitat is insufficient to support a benefit transfer analysis. Appropriate allocation of benefits would require modeling changes in green sea turtle populations over time, or changes in the probability

[33] Whitehead, John. 1993. Total Economic Values for Coastal and Marine Wildlife: Specification, Validity, and Valuation Issues. *Marine Resource Economics* 8:119-132.

[34] Wallmo, Kristy and Daniel K. Lew. 2012. Public Willingness to Pay for Recovering and Downlisting Threatened and Endangered Marine Species. *Conservation Biology* 48(5):830-839. Dollar estimates converted from 2011 to 2017 dollars using the CPI inflation index.

or timing of recovery, in response to the incremental conservation efforts (if any) associated with critical habitat designation. The timing and extent to which the green sea turtle populations would be expected to recover, and the extent to which this recovery would be associated with critical habitat-related conservation efforts, are, however, unknown. Absent this information, it is not feasible to conduct a credible benefit transfer analysis that quantifies economic benefits of this rulemaking. The information in this discussion is therefore provided for context and to demonstrate that the public holds a positive value for conservation of sea turtles.

As described above, an ideal study for estimating economic use and non-use values of critical habitat designation would be specific to the species in question (or would address a closely related species), would consider valuation in a context close to the policy issues in question (i.e., economic benefits of implementing the conservation efforts associated with designating critical habitat for green sea turtle), and would address a relevant population holding these values. The studies identified and described above are specific to the loggerhead sea turtle, and address willingness-to-pay across relevant populations but do not consider values of the specific conservation efforts that may be associated with critical habitat designation. Wallmo and Lew (2012) estimate the value to U.S. households of recovering loggerhead populations. While these values are relevant to critical habitat (in this case, for the loggerhead sea turtles), they are not benefits expected to result specifically from a critical habitat designation. The estimates represent social welfare benefits of recovery of the species; critical habitat supports recovery of the species but does not in and of itself lead to recovery. The benefits described in this study are associated with the full suite of regulatory and voluntary conservation actions that ultimately lead to recovery of the loggerhead sea turtle population.

A study by Richardson and Loomis (2009) estimates a model (i.e., a willingness-to-pay function) to value threatened or endangered species based on estimates from multiple studies. This type of study is referred to as a "meta-analysis."[35] A stated purpose of the model is to inform critical habitat designations for listed species. The meta-analysis is based on 31 studies with 67 willingness-to-pay observations published from 1985 to 2005 evaluating economic values of endangered, threatened or rare species primarily applying contingent valuation methods. The economic values expressed in the studies that inform the model reflect primarily recreational use, as well as nonuse values. Some of the studies, however, are solely focused on the nonuse component of the economic value. The species included in the study are primarily marine and riverine species (whales, dolphins, seals, otters, sea lions, sea turtles, salmon and other listed fish species), but include some avian and other species, including sea turtles. The study referenced in the meta-analysis is the Whitehead (1993) study described above.

A key variable required for the resulting willingness-to-pay function is the change in the species population levels resulting from the rule. Thus, absent the information on the effect of a potential critical habitat designation on green sea turtle populations, the Richardson and Loomis model does not provide a means to estimate the incremental benefit of the rule in terms of the public's willingness-to-pay. Overall, the studies identified through our literature review, and included in the Richardson and Loomis model, provide some indication of the values people hold for listed species, including sea turtle populations.

[35] Richardson, Leslie and John Loomis. 2009. The Total Economic Value of Threatened, Endangered and Rare Species: An Updated Meta-Analysis. *Ecological Economics*: 1535-1548. This paper updates a 1996 study on the same topic by Loomis and White (Loomis, John and D.S. White. Economic Benefits of Rare and Endangered Species: A Meta-Analysis. Ecological Economics (1996): 197-206).

ECOSYSTEM SERVICE BENEFITS RELATED TO CRITICAL HABITAT DESIGNATION FOR THE GREEN SEA TURTLE

Benefits beyond use and non-use values may also be achieved through a species listing or designation of critical habitat. For example, the public may hold a value for habitat conservation, beyond its willingness-to-pay for conservation of a specific species. Studies have estimated the public's willingness-to-pay for wildlife management and preservation programs, and for marine species protection in general. These studies do not provide values that can be used to establish the incremental values associated with this critical habitat designation, however.

The potential ecosystem service benefits of the rule are difficult to discern as NMFS has identified that, in most cases, critical habitat designation would not change the conservation efforts recommended in the marine habitat for the green sea turtles. Accordingly, we are not able to determine ancillary ecosystem service benefits of the rule.

Appendix A. Impacts on Small Entities

The Regulatory Flexibility Act (RFA) establishes a principle that agencies shall endeavor, consistent with the objectives of a rule and applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration. A draft Initial Regulatory Flexibility Analysis (IRFA) was prepared for this proposed rule pursuant to Sec. 603 of the RFA. An IRFA does not contain any decision criteria; instead, the purpose of an IRFA is to inform the agency, as well as the public, of the expected economic impacts of the proposed action and to ensure that the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the proposed action and applicable statutes.

This analysis considers the extent to which the potential economic impacts associated with the designation of critical habitat for the green sea turtle could be borne by small businesses. Information for this analysis was gathered from the Small Business Administration (SBA) and the Dun and Bradstreet Hoovers database.

The analysis of impacts to small entities relies on the estimated incremental impacts resulting from the proposed critical habitat designation. Incremental impacts are detailed in the Draft Economic Analysis.

Summary of Findings

Exhibit A-1 presents a summary of estimated impacts to small entities. The maximum total annualized impacts to small entities are estimated to be $132,722, which represents 10.2 percent of the quantified annualized incremental impacts forecasted to result from the proposed rule. With the exception of approximately $6,800 in potential annualized costs of project modifications to beach nourishment projects in the East Pacific DPS, these costs reflect administrative efforts to consider potential for adverse modification as part of future ESA Section 7 consultations. The $132,722 in costs are specific to construction activities, for which this IRFA assumes all incremental third party costs of this rule will be borne by small entities. For purposes of this analysis, we define construction activities as a broad category to include dredging and disposal and beach nourishment.

This IRFA considered potential impacts to small entities involved in the other activity categories likely to be impacted by this rule (*i.e.*, commercial fishing, oil and gas, renewable energy, aquaculture, military activities, space launches and reentry, water quality management, shipwreck and marine debris removal, scientific research and monitoring and environmental restoration, and Federal protected area management) but determined that the costs expected to be borne by these small entities would be negligible. Specifically, the annualized incremental costs that may be borne by small entities in industries involved in these activities is estimated to be less than $1,100, even under a conservative scenario that assumes that a single small entity bears all third party costs associated with a particular activity category. Moreover, for each of these activities, two or fewer consultations are anticipated per year across all areas under consideration for green turtle critical habitat. The analysis, therefore, focused on

the costs of consultations on construction activities, which occur more frequently within the critical habitat area.

This IRFA assumes that third party impacts to construction activities are borne by small entities in construction industries that obtain funds or permits from federal agencies that consult with NMFS regarding green turtle critical habitat in the next ten years. Given the uncertainty regarding which small entities in a given industry will need to consult with NMFS, this analysis estimates impacts to small entities under two different scenarios. These scenarios are intended to reflect the range of uncertainty regarding the number of small entities that may be affected by the designation and the potential impacts of critical habitat designation on their annual revenues.

Under Scenario 1, this analysis assumes that all third parties participating in future consultations are small, and that incremental impacts are distributed evenly across small entities equivalent in number to the number of consultations forecasted to occur annually on construction activities. Scenario 1 accordingly reflects a high estimate of the number of potentially affected small entities and a low estimate of the potential effect in terms of impacts as percent of revenue. Under Scenario 1, approximately 211 consultations on construction activities are anticipated to occur annually across all impacted regions, and 211 entities will each incur $629 in annualized costs. These annualized impacts are estimated to make up less than 0.1% of average annual revenues of the affected small entities.

Under Scenario 2, this analysis assumes that third party costs of all 211 annual consultations on construction-related activities are borne by a single small entity. This method almost certainly understates the number of small entities affected but overstates the impacts to the single entity, assuming the quantified costs calculated in the economic analysis represent a complete accounting of the costs potentially borne by third party private entities involved in impacted construction activities. Scenario 2 assumes $132,722 in annualized impacts would be borne by a single small entity. This equates to 9.8 percent of estimated average annual revenues of small companies involved in relevant construction activities across all jurisdictions comprising the potential critical habitat. It is important to note, however, that this scenario is not feasible, as it requires that a single small entity be involved in all 211 construction projects potentially subject to Section 7 consultation annually. In addition, it is likely that a substantial portion of the costs assumed to be borne by small entities would be passed along to project proponents.

EXHIBIT A-1. SUMMARY OF ESTIMATED IMPACTS TO SMALL ENTITIES BY JURISDICTION

Metric	Estimate
Total annualized impacts of the Rule to small entities[1]	$132,722
Estimated average annual revenues for small entities[2]	$1,357,306

Estimated number of small entities conducting activities in critical habitat areas being considered	4,961
Scenario 1: Assumes that all small entities bear an equal share of costs	
Estimated maximum number of small entities subject to consultation annually[3]	211.1
Percent of small businesses potentially subject to incremental costs	4.3%
Estimated impact per small entity	$629
Estimated impact per small entity as a percentage of revenues	0.05%
Scenario 2: Assumes that one small entity bears all costs	
Estimated impact per small entity	$132,722
Estimated impact per small entity as a percentage of revenues	9.8%

Notes:

1. These values represent total administrative costs expected to be borne by third parties in affected industries.
2. The quantity and revenues for small entities were estimated through queries of the Dun and Bradstreet Hoovers Database. Small entities were identified based on the industry-specific criteria outlined in Exhibit A-2.
3. The estimated maximum number of small entities subject to consultation annually reflects the total number of consultations forecasted to occur annually within each industry. This assumes that each consultation within an industry is conducted by a unique small entity.

While these scenarios present a range of potentially affected entities and the associated revenue effects in, we expect the actual number of small entities affected and revenue effects will be somewhere in the middle. In other words, some subset of the small entities greater than 1 and less than 211 will

participate in Section 7 consultations on green turtle critical habitat and bear associated impacts annually.

IRFA Requirements

The Regulatory Flexibility Act, passed in 1980, requires Federal agencies to consider the impacts of proposed regulations on small entities. When a proposed regulation is published for public comment in the *Federal Register*, it must be accompanied by an IRFA. As described in 5 U.S. Code § 603, each IRFA is required to contain:

1. "a description of the reasons why action by the agency is being considered;

2. a succinct statement of the objectives of, and legal basis for, the proposed rule;

3. a description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply;

4. a description of the projected reporting, recordkeeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;

5. an identification, to the extent practicable, of all relevant Federal rules which may duplicate, overlap or conflict with the proposed rule." (5 USC § 603)

Additionally, each IRFA is required to contain "a description of any significant alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities."

Why Action by the Agency Is Being Considered

On April 6, 2016, the NMFS and the Fish and Wildlife Service published a final rule (81 FR 20057) to list 11 green turtle Distinct Population Segments as threatened or endangered. As a requirement of the ESA, critical habitat must be designated for all species listed as threatened or endangered (50 CFR 424.12). Designation of critical habitat is being proposed in order to fulfill this legal requirement of the ESA.

Objectives of and Legal Basis for the Proposed Rule

The objective of this critical habitat rule is to use the best scientific data available to designate critical habitat for the green sea turtle, which is listed as threatened under the ESA. The designation is designed to meet the conservation needs of the green sea turtle and ultimately aid in species recovery. The ESA defines critical habitat as:

1. "The specific areas within the geographical area currently occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (i) essential to the conservation of the species and (ii) that may require special management considerations or protection, and;

2. Specific areas outside the geographical area occupied by a species at the time it is listed upon a determination by the Secretary that such areas are essential for the conservation of the species." (50 CFR 424.02)

Summary of Significant Issues Raised in Public Comment in Response to the IRFA

This IRFA has not yet been reviewed for public comment.

Description and Estimate of the Number of Small Entities to which the Proposed Rule Will Apply

The RFA defines three types of small entities:

- **Small Business**. Section 601(3) of the RFA defines a small business according to the definition of a small business concern provided in Section 3 of the Small Business Act (SBA). The SBA broadly defines a small business concern as a business which is "independently owned and operated and which is not dominant in its field of operation." (15 USC § 632) The SBA provides industry-specific criteria based on either revenues or number of employees that delineate which businesses meet this definition.

- **Small Organization**. Section 601(4) of the RFA defines a small organization as a non-profit enterprise that is independently owned and operated and not dominant in its field.

- **Small Governmental Jurisdiction**. Section 601(5) of the RFA defines a small government jurisdiction as a government of a county, city, town, township, village, school district, or special district, with a population less than 50,000.

The RFA requires consideration of direct impacts to small entities that may result from the proposed rule. For critical habitat designation, all potential direct impacts are incurred through the Section 7 consultation process. Though Section 7 of the ESA only applies to activities with a federal nexus, small entities may be involved through projects that are funded or permitted through federal agencies.

Indirect impacts of critical habitat are unintended changes in economic behavior that may occur outside of the ESA, through other federal or non-federal actions, and that are caused by the designation of critical habitat. Economic effects expected to occur regardless of critical habitat designation are considered baseline impacts. While it is possible that indirect impacts to small entities may occur as a result of the proposed rule, these impacts are not quantified in this IRFA.

The regulatory mechanism through which critical habitat protections are enforced is Section 7 of the ESA, which directly regulates only those activities carried out, funded, or permitted by a federal agency. By definition, federal agencies are not considered small entities, although the activities they may fund or permit may be proposed or carried out by small entities. Given the SBA guidance described above, this analysis considers the extent to which this designation could potentially affect small entities, regardless of whether these entities would be directly regulated by proposed rule or by a delegation of impact from the directly regulated entity.

This IRFA focuses on identifying small entities that may bear the incremental impacts of this rulemaking. In addition to the administrative costs of participating in consultations, Section 2.3 of the draft economic

analysis identifies the following economic activities as potentially requiring ESA Section 7 consultation because they may affect the essential features of green turtle critical habitat. These activities are:

- Coastal and In-water Construction
- Dredging and Disposal
- Beach Nourishment
- Water Quality Management
- Aquaculture
- Military Activities
- Shipwreck and Marine Debris Removal
- Scientific Research and Monitoring
- Oil and Gas Activities
- Offshore Wind Energy
- Space Launch and Reentry Vehicle Operations
- Protected Area Management

Though there is significant uncertainty regarding which future Section 7 consultations will involve third parties, the activity categories described in Section 2.3 of the draft economic analysis provide some indication of the probability of third party involvement. Given the uncertainty regarding the proportion of consultations on construction activities that will involve third parties, this analysis conservatively assumes that all future consultations on these activities will involve third parties and that all of these third parties will be small entities.

Exhibit A-2 lists potentially affected industries by NAICS code and SBA size standard. Consultation can result in two primary costs:

- **Administrative Costs**. Section 7 consultations are likely to involve written and verbal communication with NMFS and other Federal action agencies. The cost associated with these administrative efforts is estimated separately for informal, formal, and programmatic consultations.

- **Project Modifications**. As explained in the draft economic analysis, minimal incremental project modifications are expected to result from this designation due to the considerable baseline protections existing for the green sea turtle and the essential features of the potential critical habitat.

Ideally, this IRFA would directly identify the number of small entities which may be affected by authorizing or funding federal agencies' consultation with NMFS regarding potential effects of projects

and activities on green turtle critical habitat. However, significant uncertainty exists regarding what future projects may involve which small entities. Absent specific knowledge regarding which small entities may engage in consultation with NMFS over the next ten years, this analysis relies on industry and location-specific information on small businesses available through the Dun and Bradstreet Hoovers database. Exhibit A-2 summarizes the NAICS codes that were identified as relevant to the major activity categories discussed above. The Dun and Bradstreet database was used to identify small businesses classified with these NAICS codes that operate within counties or territories that share a coastline with the potential critical habitat. Approximately 70 counties or territories that share a coastline with the proposed critical habitat have populations of less than 50,000, so potential exists for small governmental jurisdictions to be impacted as a result of the critical habitat designation. However, as noted above, most incremental impacts are borne by NMFS and other Federal agencies and not by governmental jurisdictions. Moreover, analysis of relevant Section 7 consultations over the past ten years revealed no consultations in which small government entities were involved.

EXHIBIT A-2. INDUSTRIES MOST AFFECTED BY THE PROPOSED RULE AND A DESCRIPTION OF THE INDUSTRY SECTORS ENGAGED IN THOSE ACTIVITIES

Major Relevant Activity	Description of Included Industry Sectors	NAICS Code	SBA Size Standard
Coastal & In-Water Construction	County Governments (to the extent that they undertake bridge-building or other construction activities)	N/A	Population of 50,000
	Highway, Street, and Bridge Construction— This industry comprises establishments primarily engaged in the construction of highways (including elevated), streets, roads, airport runways, public sidewalks, or bridges.	237310	$39,500,000
	Other Heavy and Civil Engineering Construction— This industry comprises establishments primarily engaged in heavy and engineering construction projects (excluding highway, street, bridge, and distribution line construction).	237990	$39,500,000

Source: (U.S. Small Business Administration 2019)

Description of Reporting and Recordkeeping Efforts

The Proposed Rule does not require "reporting" or "recordkeeping" efforts as defined by the Paperwork Reduction Act. However, designation of critical habitat will require federal agencies to consult with NMFS regarding any potential impacts to critical habitat from federal actions, and project modifications or monitoring to address such impacts, which a third party may carry out. This process is likely to involve communication with NMFS and federal funding or authorizing agencies through letters, phone calls, or in-person meetings.

Identification of Relevant Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rule

The proposed rule will not duplicate or conflict with any other laws or regulations. However, the protection of listed species and habitat under critical habitat may overlap other sections of the ESA. For instance, listing of the threatened green turtle under the ESA already requires federal agencies to consult with NMFS to avoid jeopardy to the species. However, this analysis only examines the incremental impacts to small entities from the proposed critical habitat rule.

Description of Alternatives to the Proposed Rule Which Accomplish the Objectives and Which Minimize Impacts on Small Entities

The RFA requires consideration of alternative rules that would minimize impacts to small entities. We considered the following alternatives when developing the proposed critical habitat rule.

Alternative 1: No Action Alternative

We considered the alternative of not designating any additional critical habitat for green turtles. This alternative would impose no additional economic, national security or other relevant impacts. However, after compiling and reviewing the biological information for these DPSs, we rejected this alternative because it would violate Section 4 of the ESA, which specifically requires that we designate critical habitat to the maximum extent prudent and determinable based on consideration of the best available scientific information.

Alternative 2: Preferred Alternative

Under this alternative, we would designate a subset of the specific areas meeting statutory definition of critical habitat and is the preferred alternative. As stated previously, under Section 4(b)(2) of the ESA, NMFS has the discretion to exclude a particular area from designation as critical habitat even though it meets the definition of "critical habitat" if the benefits of exclusion (*i.e.*, the impacts that would be avoided if an area was excluded from the designation) outweigh the benefits of designation (*i.e.*, the conservation benefits to the green turtle DPS if an area was designated), so long as exclusion of the area will not result in extinction of the species. Exclusion under Section 4(b)(2) of the ESA of one or more of the areas considered for designation would reduce the total impacts of designation. This alternative - which is the approach taken in the proposed rule - would result in a critical habitat designation that provides for the conservation of the species while potentially reducing the economic, national security, and other relevant impacts on entities. The preferred alternative was selected because it best implements the critical habitat provisions of the ESA by including the well-defined environmental features essential to the species' conservation, and because this alternative would reduce the economic impacts on entities relative to an alternative that encompasses a larger geographical area.

Alternative 3: Different Geographic Boundaries

Under this alternative, we would propose to designate all areas meeting the ESA Section 3 definition of critical habitat. However, following our consideration of probable national security, economic, and other relevant impacts of designating all the specific areas, we rejected this alternative. In particular, and as described in our Draft Sections 4(a)(3) and 4(b)(2) Report, we determined that the benefits of excluding some specific areas outweighed the conservation benefits of designating those specific areas, and thus, pursuant to section 4(b)(2) of the ESA, we are exercising our discretion to propose to exclude some of the specific areas for each of the three DPSs (see NMFS 2019b).

Appendix B. Data and Assumptions for Estimating Administrative Costs of Section 7 Consultations

This analysis projected administrative costs of Section 7 consultations based on a model developed by Industrial Economics, Incorporated (IEc) in 2002 to inform economic analyses of critical habitat rules. Considered by NMFS to represent the best available information on administrative costs for its critical habitat rulemakings, the model's development relied on interviews with Federal agency staff with significant experience implementing Section 7 consultations and has been adjusted over the course of dozens of rulemakings, as appropriate, by NMFS biologists and Federal agency staff.

The estimated level of effort for time spent in consultations reflects Federal agency staff estimates of hours or days spent by task and consultation type, as well as the staff level (in terms of the Federal General Schedule (GS) level) typically assigned to these tasks. To account for variable complexity across consultations, the interviewees described time estimates and GS level assignments at low and high levels of effort for each consultation type. Separately, the model considers the number of hours and hourly rate to conduct Biological Assessments.

Wages for Federal agency employees reflect the midpoint between Step 1 and Step 10 within each GS level using the GS Hourly Rates and assume an overhead multiplier of 2.5.

Exhibit B.1 describes the resulting key assumptions related to total hours and wage level for consultations that consider both the listing of the species (jeopardy) and critical habitat (adverse modification). Costs to consider adverse modification alone are assumed 25 percent of total consultation costs. The consultation costs in Table 4 of this analysis reflect the average of the low and high levels of effort by consultation type and entity.

Exhibit B.1. INCREMENTAL ADMINISTRATIVE COST ASSUMPTIONS

Consultation Type	Effort Level	FWS/NMFS		Federal Action Agency		Third Party		Biological Assessments	
		Total Hours	GS Level	Total Hours	GS Level	Total Hours	GS Level	Total Hours	GS Level
Technical Assistance	Low	5	GS-10			6	$110		
	High	13	GS-10			15	$110		
Informal Consultation	Low	19	GS-10			12	$110	0	$100
	High	45	GS-12	56	GS-12	29	$110	40	$100
Formal Consultation	Low	45	GS-12	56	GS-12	29	$110	56	$100
	High	74	GS-13	94	GS-12	41	$110	56	$100
Programmatic Consultation	Low	200	GS-11	160	GS-11			56	$100
	High	280	GS-11	240	GS-11			56	$100

Source: Industrial Economics, Incorporated. Final Economic Analysis of Critical Habitat Designation for Humpback Whales. 2020.

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33 USC § 1412. Dumping Permit Program.

33 USC § 401 et seq. 1938. Protection of Navigable Waters and of Harbor and River Improvements Generally.

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