NATIONAL MARINE FISHERIES SERVICE
ENDANGERED SPECIES ACT SECTION 7
BIOLOGICAL AND CONFERENCE OPINION

Title:	Biological and Conference Opinion on the Use of Dispersants and In-Situ Burning in the United States (U.S.) Region IV
Consultation Conducted By:	Endangered Species Act Interagency Cooperation Division, Office of Protected Resources, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce
Action Agency:	U.S. Coast Guard Districts 5, 7 and 8, and the Co-Chairs of the Region IV Regional Response Team
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1 INTRODUCTION

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

Section 7(b)(3) of the ESA requires that at the conclusion of consultation and conference, NMFS provides an opinion stating whether the Federal agency's action is likely to jeopardize ESA-listed species or destroy or adversely modify designated critical habitat. If NMFS determines that the action is likely to jeopardize ESA-listed species or destroy or adversely modify designated critical habitat, NMFS provides those reasonable and prudent alternatives that can be taken by the Federal agency or the applicant and allow the action to proceed in compliance with section 7(a)(2) of the ESA. If incidental take is expected, section 7(b)(4) requires NMFS to provide an incidental take statement that specifies the impact of such incidental taking on the species and includes reasonable and prudent measures NMFS considers necessary or appropriate to minimize such impacts and terms and conditions to implement the reasonable and prudent measures.

The action agencies for this consultation are the U.S. Coast Guard (USCG) Districts Five, Seven, and Eight, and the Co-Chairs of the Regional Response Team (RRT) in federal region 4. The RRT proposes the authorization of the use of dispersants and in-situ burning (ISB) in waters of the U.S. Atlantic Ocean off the coast of North Carolina south to Florida and around into the Gulf of Mexico to Mississippi during emergency response actions associated with an oil spill.

This consultation, biological and conference, and incidental take statement, were completed in accordance with section 7(a)(2) of the ESA (16 U.S.C. 1536 (a)(2)), associated implementing regulations (50 C.F.R. §§402.01-402.16)and agency policy and guidance and was conducted by NMFS Office of Protected Resources Endangered Species Act Interagency Cooperation Division (hereafter referred to as "we"). This biological and conference opinion (Opinion) and incidental take statement were prepared by NMFS Office of Protected Resources Endangered Species Act Interagency Cooperation Division in accordance with section 7(b) of the ESA and implementing regulations at 50 C.F.R. Part 402.

This document represents the NMFS' opinion on the effects of the proposed action on ESA-listed species and designated critical habitat. A complete record of this consultation is on file at the NMFS Office of Protected Resources in Silver Spring, Maryland.

1.1 Background

USCG federal Region 4 is comprised of the seven southeastern states (Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, and Tennessee), one commonwealth (Kentucky), and six federally recognized Indian tribes. Within federal region 4, responses to oil discharges and hazardous substance releases are governed by several laws and regulations. The Clean Water Act (CWA), as amended by the Oil Pollution Act of 1990 (OPA 90), deals with oil discharges into navigable waters of the United States. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) establishes the framework for response to hazardous substance releases which threaten human health and the environment. Both statutes mandate the development of contingency plans, and there is significant overlap in the type and scope of information required to do so. Sections 300.210(b) and (c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) require the development of a Regional Contingency Plan (RCP). Section 311(j)(4) of the CWA requires development of an Area Contingency Plan (ACP), capable of removing a worst case oil discharge. In the coastal sections of federal Region 4, the USCG has developed multiple ACPs based on the Captain of the Port (COTP) jurisdictions.

The responsibility for both the RCP and the Inland ACP lies with the Region 4 Regional Response Team (RRT4). This Plan is the policy document for preparedness and response to discharges and releases in federal Region 4, as the RCP is designed to implement the NCP at the Regional level. The RRT4 also serves as the Area Committee for the Inland zone ACP. This RCP/ACP fulfills the requirements of the NCP and the CWA, and also provides for the Regional approach to a response under the National Response Framework (NRF), particularly Emergency Support Function #10 - Hazardous Materials (ESF #10). Subpart J of the NCP provides that the Federal On-Scene Coordinator (FOSC), with the concurrence of the EPA representative to the RRT, and, as appropriate, concurrence of the respective state representative to the RRT and concurrence by the natural resource trustees from the Departments of Commerce and the Interior, may authorize the use of dispersants and ISB. The RRT prepared preauthorization agreements for the use of dispersants and ISB, and received concurrence from the applicable RRT representatives. The preauthorization agreements for dispersant use and ISB are based on the NCP and are in the form of Letters of Agreement for the respective states. The RCP for Region 4 can be found at https://r4.ercloud.org/r4rrt/wp-content/uploads/2018/04/rcp.pdf and includes descriptions of RRT respective agency responsibilities during coordinated responses. Coordination within the RRT included the creation of plans for dispersant use and in-situ burning that are detailed in Section 3.1 of this document. Within pre-approved areas, further coordination on the part of the USCG FOSC with federal and state/territorial resource trustees is not required as long as the RRT and NMFS are notified and the required dispersant and/or ISB protocols (**Appendices A-E**) are followed.

On June 14, 1995, the RRT concluded an ESA section 7 consultation with NMFS for the RRT preauthorization agreement on ISB. On March 24, 1997, the RRT concluded consultation with NMFS for the RRT preauthorization agreement on dispersants. The ESA section 7 consultations for the preauthorization agreements were informal and considered only the potential impacts to ESA-listed whales and sea turtles from the use of these tools during oil spill response. Since the consultations were completed, new species have been listed and critical habitat designated under the ESA. In addition, new information is now available regarding potential impacts to ESA-listed species related to the use of these techniques in oil spill response due to the Deepwater Horizon (DWH) spill and associated response activities. The DWH spill resulted in the use of a large volume of dispersants and numerous ISB operations. This has resulted in new information regarding potential effects of these response tools on ESA-listed species, as well as new information regarding the fate of oil that was not available when the previous consultations were completed.

1.2 Consultation History

In 2014, NMFS Southeast Regional Office (SERO) provided technical assistance to the RRT regarding the initiation of a new consultation for the potential use of dispersants and ISB during oil spill emergency response in the Southeast U.S. In 2015, SERO biologists from the Protected Resources and Habitat Conservation Divisions assisted in the preparation of a Biological Assessment (BA) and Essential Fish Habitat (EFH) Evaluation pursuant to the Magnuson-Stevens Act (MSA) on the use of oil spill dispersants and ISB along with biologists from the U.S. Fish and Wildlife Service.

This Opinion is based on information provided by the RRT, including the *Biological Assessment for the Preauthorized Use of Oil Spill Dispersants and In-Situ Burn Operations for the Region 4 Regional Response Team* (2015) prepared by the RRT 4 Science & Technology Committee Biological Assessment Workgroup. NMFS communications with the RRT regarding this consultation is summarized as follows:

- **July 6, 2015**: NMFS SERO received the ESA section 7 consultation reinitiation request and request to initiate an EFH consultation from the RRT
- **December 22, 2017**: The consultation was transferred from SERO to the Office of Protected Resources (OPR) in Silver Spring, Maryland.
- **December 18, 2019**: RRT4 provided NMFS a supplemental biological assessment.
- **August 6, 2020**: NMFS requested a final list of data/information needs for the consultation.
- **October 20, 2020**: RRT4 provided remaining requested information needs.

- **October 22, 2020**: Initiation of formal consultation letter was sent to RRT4.
- **October 26, 2020**: RRT4 provided a revised draft biological assessment (draft in that conservation measures were not final).
- **November 11, 2020**: The draft description of the proposed action was sent to the action agency for review.
- **December 29, 2020**: The action agency decided to conference on proposed critical habitat for ESA-listed lobed star coral, boulder star coral, mountainous star coral, pillar coral and rough cactus coral. Critical habitat was proposed for designation in November 2020.

2 THE ASSESSMENT FRAMEWORK

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

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

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

This ESA section 7 assessment involves the following steps:

Description of the Proposed Action (Section 3) and *Action Area* (Section 4): We describe the proposed action and associated stressors and describe the action area by the geographic extent of all of the physical, chemical, and biotic effects of the proposed action and those associated stressors caused by the proposed action. This section also includes the avoidance and minimization measures that have been incorporated into the project to reduce the effects to ESA-listed species.

Status of Endangered Species Act Protected Resources (Section 5): We identify the ESA-listed species and designated critical habitat that are likely to co-occur with those stressors in space and time and evaluate the status of those species and habitat. In this Section, we also identify those *Species and Designated Critical Habitat Not Likely to be Adversely Affected* (Section 5.1), and those *Species and Designated Critical Habitat Likely to be Adversely Affected* (Section 5.2).

Environmental Baseline (Section 6): We describe the environmental baseline in the action area as the condition of the ESA-listed species or designated critical habitat prior to considering the consequences to the listed species or critical habitats caused by the proposed action such that this section includes: past and present impacts of Federal, state, or private actions and other human activities in the action area; anticipated impacts of all proposed Federal projects that have already undergone formal or early section 7 consultation; and impacts of state or private actions that are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

To comply with our obligation to use the best scientific and commercial data available, we collected information identified through searches of google scholar, web of science, literature cited sections of peer reviewed articles, species listing documentation, and reports published by government and private entities. This Opinion is based on our review and analysis of various information sources, including:

- Information submitted by the Marine Mammal and Sea Turtle Conservation Division and the applicant
- Government reports (including NMFS biological opinions and stock assessment reports)
- NOAA technical memos
- Peer-reviewed scientific literature

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

Effects of the Action (Section 7) and *Stressors associated with the proposed action* (Section 7.1): We identify the number, age (or life stage), and gender of ESA-listed individuals that are likely to be exposed to the stressors and the populations or subpopulations to which those individuals belong, and identify any consequences of the action. We also consider whether the action "may affect" designated critical habitat. This is our exposure analysis. We evaluate the available evidence to determine how individuals of those ESA-listed species are likely to respond given their probable exposure. We also consider how essential features of critical habitat may respond from exposure to activities that occur as a result of the proposed action. This is our response analyses. We assess the consequences of these responses of individuals that are likely to be exposed to the populations those individuals represent, and the species those populations comprise. We also consider the consequences of the proposed action on the essential habitat features and conservation value of designated critical habitat as a whole.

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

Integration and Synthesis (Section 9): In this section, we integrate the preceding sections in the Opinion to summarize the consequences to ESA-listed species and designated critical habitat under NMFS' jurisdiction.

Conclusion (Section 10); With full consideration of the status of the species and the designated critical habitat, we consider the effects of the action within the action area on populations or subpopulations and on essential habitat features when added to the environmental baseline and the cumulative effects to determine whether the action could reasonably be expected to:

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

If, in completing the last step in the analysis, we determine that the action under consultation is likely to jeopardize the continued existence of ESA-listed species or result in the destruction or adverse modification of designated critical habitat, then we must identify reasonable and prudent alternative(s) to the action, if any, or indicate that to the best of our knowledge there are no reasonable and prudent alternatives. See 50 C.F.R. §402.14(h)(2).

In addition, we include an *Incidental Take Statement* (Section 11) that specifies the amount or extent of take anticipated, reasonable and prudent measures to minimize the impact of the take, and terms and conditions to implement the reasonable and prudent measures. ESA section 7 (b)(4); 50 C.F.R. §402.14 (i). We also provide discretionary *Conservation Recommendations* (Section 12) that may be implemented by the action agency. 50 C.F.R. §402.14 (j). Finally, we identify the circumstances in which *Reinitiation of Consultation* is required (Section 13). 50 C.F.R. §402.16.

2.1 Programmatic Consultation Requirements and Procedures

Programmatic consultations address an agency's multiple actions on a program, region, or other basis usually over an extended period of time. Programmatic consultations allow the Services to consult on the effects of programmatic actions such as: (1) multiple similar, frequently occurring or routine actions expected to be implemented in particular geographic areas; and (2) a proposed program, plan, policy, or regulation providing a framework for future proposed actions (84 FR 44976, August 27, 2019). A programmatic consultation should identify project design criteria (PDCs) or standards that will be applicable to all future projects implemented under the program. Programmatic consultations also include specific elements regarding procedures and reviews for implementation of the program to ensure consistency with ESA section 7 and its implementing regulations. For this consultation, the following elements (further described Section 3, *Description of the Proposed Action*) in are included:

- Non-discretionary PDCs that describe aspects of the proposed action required for all projects implemented under the program, to avoid or minimize adverse effects on listed species and designated critical habitat.
- Procedures for streamlined project-specific consultation.
- Periodic comprehensive review of the program.

Actions outside the scope of this programmatic Opinion will be appropriately evaluated when proposed. If a federal action (as defined in 50 C.F.R. 402.02) may affect listed species or critical habitat and is outside the scope of this Opinion, the action agency would need to initiate a separate ESA consultation, if necessary. Such actions would not be addressed by this Opinion, or any associated incidental take exempted by the ITS. This programmatic consultation is valid indefinitely with annual review by NMFS as described in Section 3.7 or if reinitation triggers (Section 13) occur which could result in modification of this Opinion.

3 DESCRIPTION OF THE ACTION

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies (50 C.F.R. §402.02).

In the offshore waters of the Southeast U.S., oil or other contaminant spills may occur due to accidental groundings from maritime traffic, industrial operations related to oil and gas, through pipelines laid on the bottom of the Gulf of Mexico to shore, from loss of well control or pipeline leaks in the Gulf of Mexico, spills related to major shipping routes, and leakage from motorized recreational and commercial vessels during transit and when docked at piers and in marinas and ports. In addition, from hurricanes and other natural disaster events.

Oil spills may result in exposure to toxic compounds such as polycyclic aromatic hydrocarbons (PAHs) for marine organisms during an oil spill. When an oil spill occurs, the type of oil influences how it will behave in terms of spreading over the water surface versus sinking and the physical characteristics at the site of the spill, such as waves and water temperature, will affect weathering and natural dispersion of the oil. For these reasons, response actions following an oil spill aim to contain and remove the oil as quickly as possible. Response tools are selected based on the type of oil, volume, degree of weathering, and location of the spill. The use of dispersants and ISB may be selected as response tools in order to quickly disperse or remove, respectively, large quantities of oil to reduce the amount of time the oil is present in the environment and associated impacts to marine and coastal organisms and their habitats; and/or to reduce oil concentrations to below toxic thresholds of concerns for present species and resources of concern.

The proposed action includes the use of dispersants and ISB in offshore waters of the Southeastern U.S. The RRT4 proposes the use of dispersants and/or ISB in addition to traditional response measures such as mechanical control and recovery following an oil spill. While the primary preferred method of controlling discharged oil will be physical removal, complete mechanical containment, collection, and removal is not always possible. The use of dispersants and ISB may be considered to prevent a substantial threat to public health or welfare or to minimize the threat of impacts to the environment. The RRT encourages the implementation of a combination of techniques when appropriate and evaluated to minimize the adverse effects of a spill on ESA resources. Other response measures, such as booming related to ISB, and in some cases the use of vessels to implement them are also considered in this Opinion as effects relative to dispersant application and the use of ISB.

Dispersants

The key components of chemical dispersants are one or more surface-active agents (surfactants) that contain molecules with both water-compatible and oil-compatible groups. The molecules reduce the oil/water interfacial surface tension to enable the oil layer to be broken into small droplets with minimal mixing energy. In addition to surfactants, most dispersant formulations also contain a solvent carrier to reduce the viscosity of the surfactant so the chemical can be sprayed uniformly. The solvent may also enhance mixing and penetration of the surfactant into more viscous oils (CRRT Response Technologies Committee 2015).

Chemical dispersants are mixtures of surfactants and solvents designed to reduce the concentration of oil at the water surface by breaking the oil slick into smaller droplets that can be suspended and distributed and subsequently diluted and biologically degraded, throughout the water column. Dispersant application is also used to reduce the amount of oil that may strand in shoreline habitats. The application of dispersants in a typical spill response involves the release of dispersant chemical onto the surface of a spill in open water from deployed vehicles that may include airplanes, boats, or helicopters (Figure 1 and Figure 2). The volume released depends on the carrying capacity of the vehicles. The rate of application is as consistent as possible over a large area in order to make the input of dispersant chemical as uniform as possible though the required volume will vary depending on the size of the slick. Water column concentrations of oil treated with dispersants decline to undetectable levels within hours of dispersant application versus the days of natural dispersion and weathering prior to oil concentrations being undetected in the water column if dispersants are not used (CRRT Response Technologies Committee 2015).

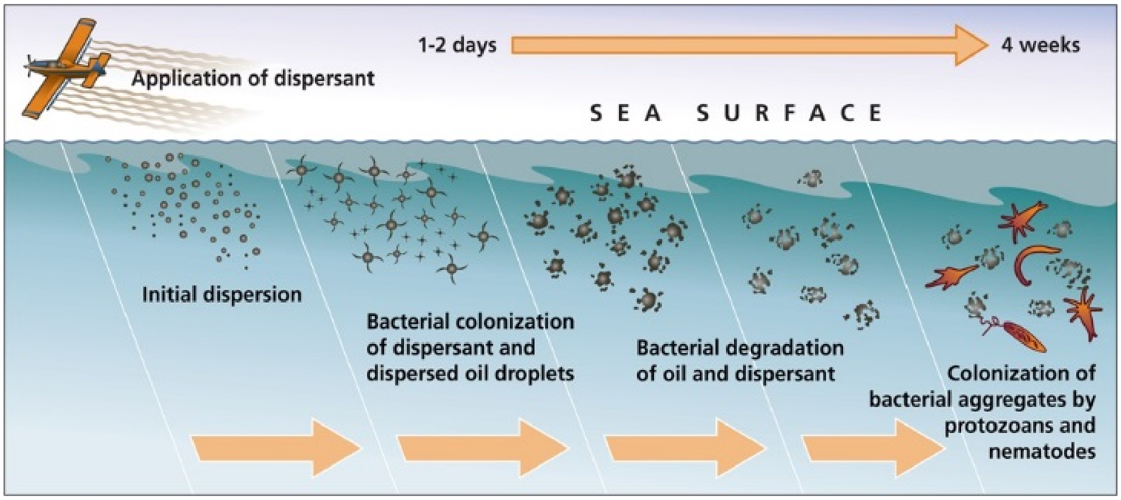

Figure 1. Diagram showing the application of dispersants from an airplane and the expected results (from Schmidt 2010 adapted from Clark 2004).

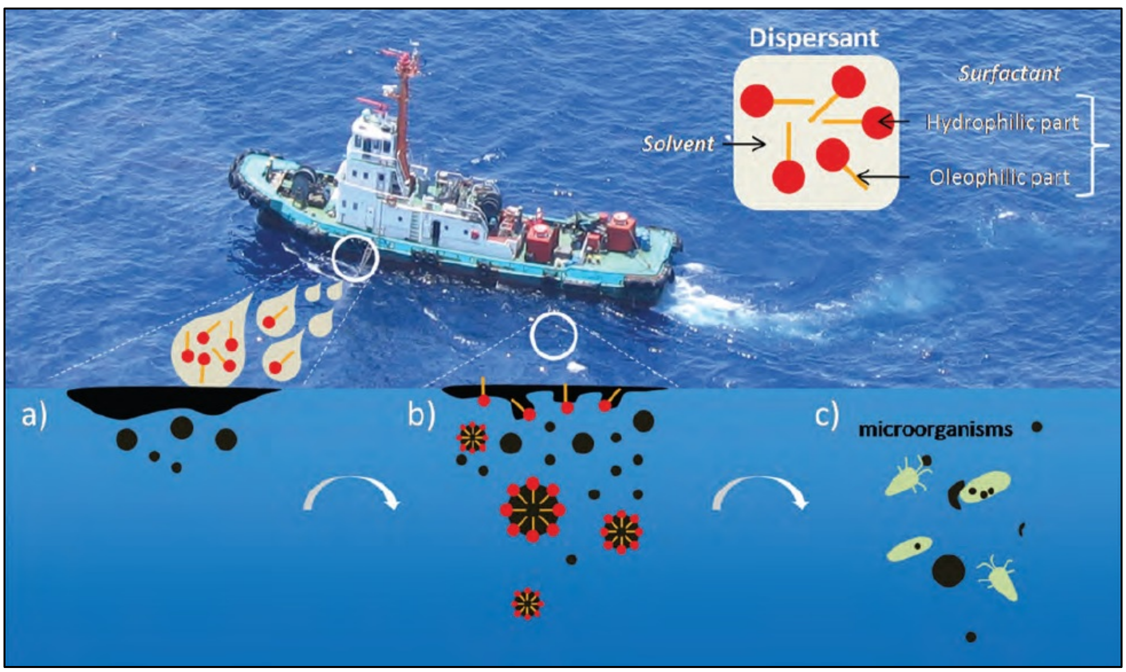

Figure 2. Image showing the application of dispersants from a vessel and the expected results (from Ayles Fernie International Limited taken from ITOPF 2011a)

It is important to understand that the formulations of chemical dispersants authorized for consideration and use in the U.S. are low toxicity and improved from early versions of dispersants that were historically not formulated for low toxicity and in some cases added to the adverse effects of the spilled petroleum product. Modern day dispersants targeted for potential use in the field do not carry the risk, if proper application and dilution are considered (Bejarano 2018). The goal is to disperse oil so that three dimensional spreading occurs in order to reduce concentrations to levels far below toxic threshold concerns, thereby providing a much favorable environmental tradeoff benefit.

In-Situ Burning

A typical in-situ burn (ISB) employs boats towing fire resistant boom in a U-shaped configuration in which oil is collected, towed away from the main slick, and ignited (Figure 3). The configuration is slowly towed during the burn in order to maintain the oil toward the back end of the boom at the minimum thickness necessary to sustain the burn. After the boomed oil is burned, the process is repeated. ISB does not depend on skimming, transfer, and storage equipment for recovered oil and water and has a higher removal efficiency than mechanical removal or dispersants. Burning can be conducted at night. Burns can be halted by releasing the containment boom. In-situ burns at sea are most effective early in a spill response when the oil layer is still thick at the water surface because: 1) the oil slick has not dispersed making the herding process easier, and 2) oil has not yet emulsified which results in a high water content in the oil and makes burning more difficult. Relatively calm wind (less than 15-18 knots [kt] for ignition and 15-25 kt to sustain a burn) and sea conditions (waves less than 3.5 feet [ft]) are also necessary for ISB to be effective.

Figure 3. Photo of an in-situ burn during the Deepwater Horizon spill showing the boom enclosing the burn area (NOAA Office of Response and Restoration)

Sea Turtle Protection Measures Under ISB

Sea turtles impacted by a spill may be captured for relocation and/or for treatment. Capture, relocation, treatment, and release of endangered or threatened sea turtles may occur as a result of oil spill response efforts. These activities were previously consulted on under section 7 of the ESA (ECO #FPR-2016-9168) for NMFS Marine Mammal and Sea Turtle Conservation Division's Section 10(a)(1)(A) Permit by Regulation to authorize response to stranded sea turtles through operation of the Sea Turtle Stranding and Salvage Network (STSSN). The consultation resulted in the issuance of a biological opinion from NMFS on 50 C.F.R §222.310: "Permit Authority for Designated Agents and Employees of Specified Federal and State Agencies." This regulation is a programmatic permit pursuant to ESA section 10(a)(1)(A) to authorize any agent or employee of NMFS, USFWS, USCG, or any other Federal land or water management agency, or any agent or employee of a state agency responsible for fish and wildlife who is designated by his or her agency for such purposes, when acting in the course of his or her official duties, to take endangered sea turtles if such taking is necessary to aid a sick, injured, or entangled or stranded endangered sea turtle or dispose of such specimen or salvage such specimen which may be useful for scientific and educational purposes. Capture and handling of wildlife under NMFS' authority requires training and incident-specific approval and coordination with NMFS STSSN to be conducted lawfully (under the existing ITS from the previous consultation referenced above) following the requirements specified in 50 CFR §223.206(d)(1).

Similarly, 50 C.F.R §223.206(b): "Exceptions to Prohibitions Relating to Sea Turtles; Exception for Injured, Dead, or Stranded Specimens" authorizes any agent or employee of NMFS, USFWS, USCG, or any other Federal land or water management agency, or any agent or employee of a state agency responsible for fish and wildlife who is designated by his or her agency for such purposes, when acting in the course of his or her official duties, to take threatened sea turtles if such taking is necessary to aid a sick, injured, or entangled or stranded threatened sea turtle or dispose of such specimen or salvage such specimen which may be useful for scientific and educational purposes. Handling and resuscitation must be done following the requirements in §223.206(d)(1).

Based on the above, directed take of sea turtles was already consulted on and is authorized by regulation during activities such as oil spill response and is not considered further in this biological and conference opinion.

3.1 Authorities under which the Action will be Conducted

Subpart J of the NCP provides for the RRT representatives for EPA, the affected states (including North Carolina, South Carolina, Georgia, Florida, Alabama and Mississippi in the NCP definition), and natural resource trustees from the Departments of Commerce (DOC) and the Interior (DOI) to review and either approve, disapprove, or approve with modification preauthorization plans for the use of chemical countermeasures for oil spill response. If preauthorization is approved, the Federal On-Scene Coordinator (FOSC) may authorize the use of chemical countermeasures as specified in the plan without obtaining specific concurrences from EPA, the affected states, or DOC and DOI. Spill response situations or scenarios that are not addressed by preauthorization plans are not part of this programmatic consultation and will require individual ESA section 7 consultations.

In 2001, NMFS signed an Inter-agency Memorandum of Agreement (MOA) Regarding Oil Spill Planning and Response Activities under the Federal Water Pollution Control Act's National Oil and Hazardous Substances Pollution Contingency Plan and the ESA (USCG et al. 2001). The 2001 MOA included representatives from the USCG , U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service, Department of Commerce National Oceanic and Atmospheric Administration including NMFS, and Department of the Interior's Office of Environmental Policy.

Figure 4, below, displays the processes involved with pre-spill planning and

Figure 5 represents typical processes for response actions. The US National Response Team (NRT) has other ESA consultation-related resources available at https://nrt.org/Main/Resources.aspx?ResourceType=Endangered%20Species%20Act%20(ESA)%20Section%207&ResourceSection=2.

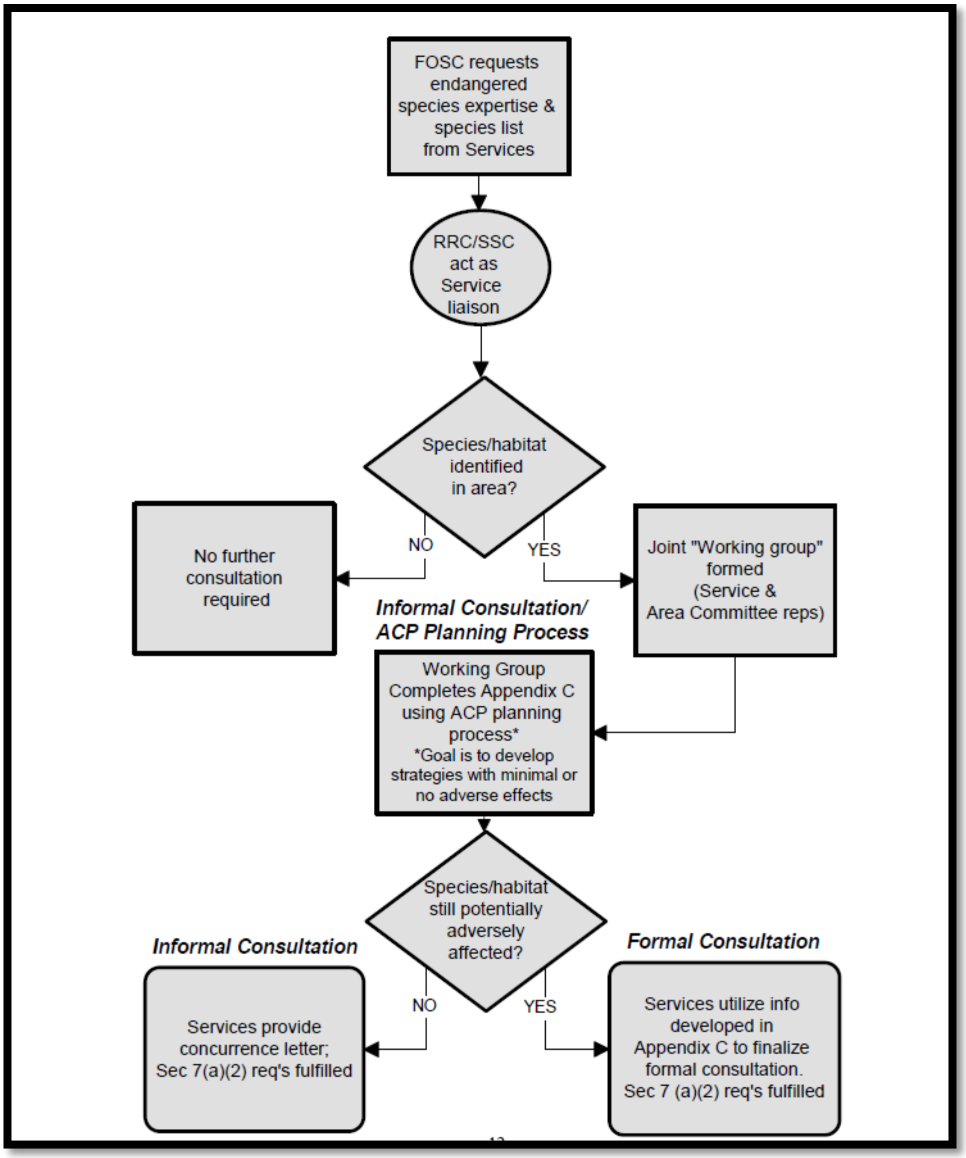

Figure 4. Flowchart displaying Pre-spill planning actions (USCG et al. 2001).

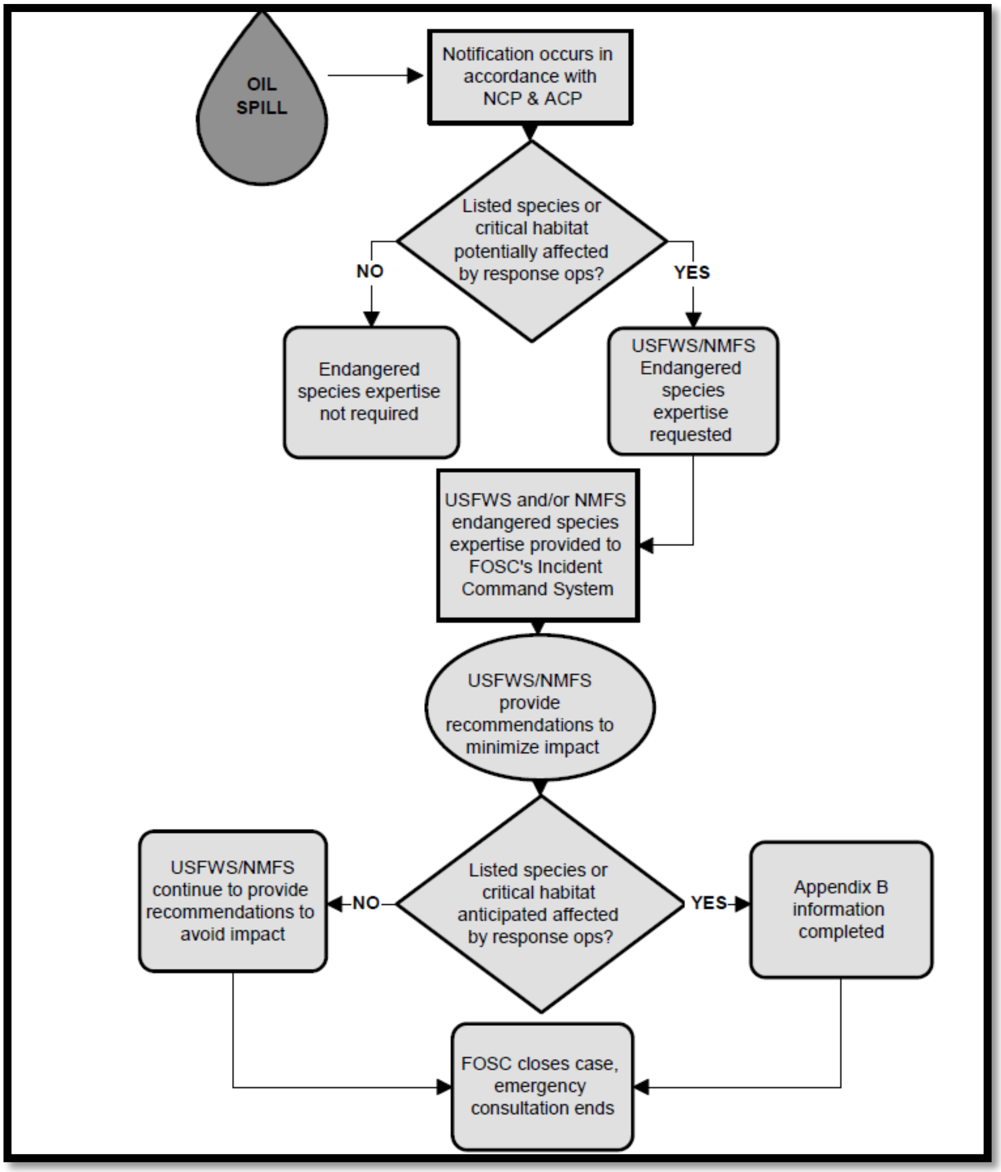

Figure 5. Flowchart displaying response actions (USCG et al. 2001).

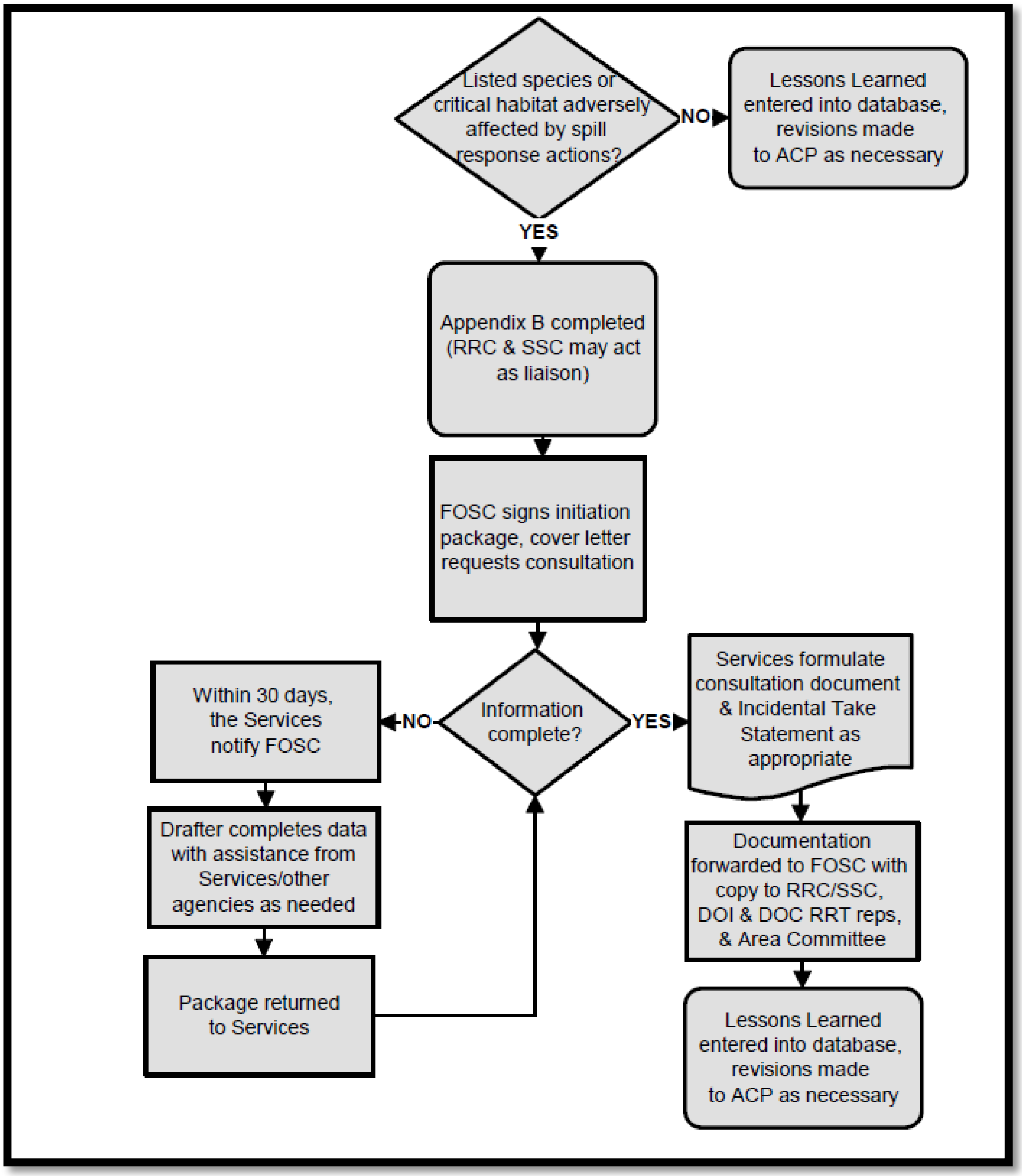

Figure 6. Flowchart displaying post-response actions (USCG et al. 2001).

The following plans include guidance for how the USCG and RRT4 conduct emergency consultations. As noted above, there are national level guidance and forms for advising ESA consultation available at the NRT website: https://nrt.org/Main/Resources.aspx?ResourceType=Endangered%20Species%20Act%20(ESA)%20Section%207&ResourceSection=2. For emergency consultations triggered by requirements under this Opinion, the RRT4 will determine and adopt most relevant and appropriate forms for use.

3.1.1 Dispersant Use Preauthorization Plan

All dispersant operations will be conducted in accordance with policies and protocols set forth in the RRT4 Dispersant Use Preauthorization Plan (DUPP). This preauthorization is limited to surface application of dispersants only (not subsurface, injection, or alternative dispersant applications), and only during daylight hours. Dispersants are chemicals that reduce surface tension between oil and water, leading to oil droplet formation, so that the oil will more readily disperse into the water column. They typically contain surfactants and solvents and are used to entrain oil in the water column to protect shorelines from floating oil, but in turn, increases exposure to underwater organisms. The DUPP will be followed during operations that determine dispersant use to be the best suited response method for containing a spill and its related environmental effects. The final plan, as part of the proposed action, is attached to this consultation (**Appendix C**). This plan may be updated during annual activity reviews (discussed in Section 3.7) with NMFS, as long as the revisions do not change any of the conclusions of this Opinion.

3.1.2 **In-situ Burn Plan**

All in-situ burn operations will be conducted in accordance with policies and protocols set forth in the RRT4 In-Situ Burn Plan (ISBP). In-situ burning of oil in offshore waters can prevent the potentially more devastating impacts of oil on sensitive environments inshore. Effective implementation of ISB requires herding accessible quantities of oil on water to a thickness sufficient to sustain combustion; due to the action of natural dispersion and currents, there may be a limited window of opportunity for in-situ burning to be feasible. This plan covers protocols under which appropriate burning agents are preauthorized for use by the USCG OSC on state and federal ocean waters. The preauthorization for burning agents in the ISBP is in effect for the predesignated USCG FOSC only. The final plan, as part of the proposed action, is attached to this consultation (**Appendix D**). This plan may be updated during annual activity reviews (discussed in Section 3.7) with NMFS, as long as the revisions do not change any of the conclusions of this Opinion.

3.2 Pre-authorized Areas for Dispersant Use and In-situ Burning

The "*Green Zone*" is the area that is pre-authorized for the use of dispersants and ISB and the decision to apply dispersants rests solely with the USCG FOSC. Additionally, per the 2001 MOA, the FOSC must notify the RRT, which then notifies the NOAA Science Support Coordinator (SSC) when a spill occurs. The FOSC must also notify the NMFS Southeast Regional Office at the start of the spill response. The pre-authorized response activities in the *Green Zone* will include required conservation measures/protocols or Project Design Criteria (Section 3.5) agreed to under this consultation for the FOSC and response personnel to follow. The *Green Zone* shown in Figure 11, Section 4 below, includes:

- Waters not classified within a *Yellow Zone* (defined in Section 3.3);
- Waters at least 3 nautical miles (nm) seaward of any shoreline and 9 nm from Florida's Gulf Coastline and are within the U.S. Exclusive Economic Zone (EEZ); and
- Waters beyond the 30-foot (ft) isobaths (approximately 10 meters (m) or 5 fathoms).

3.3 Areas Conditionally Pre-authorized for Dispersant Use and In-situ Burning

The *Light Green Zone,* which is seasonal, under special jurisdiction or conditionally authorized, is shown in Figure 11, Section 4 below and includes:

- Seasonal Critical Habitat- Emergency Consultation is required for areas that are established seasonal critical habitat areas:
    - Loggerhead Sea Turtle Northwest Atlantic Distinct Population Segment (DPS) as described in 79 FR 39855
        - Four segments of critical habitat migratory habitat management units (N-01, N-17, N-18 and N-19) extend through the Green Zone. Heightened awareness of these areas and allowance of conditions for the area as clear migration pathways for responses in waters off North Carolina during April through November, and specifically between April to June, and September to November.
        - Two segments of critical habitat winter management units (N-01 and N-02) for responses in waters off North Carolina during November through April;
        - Two management units (S-01 and S-02) are within the Green Zone for *Sargassum* habitat features. *Sargassum* critical habitat (Figure 7, green polygon) was not included in the Yellow Zone (Section 3.4) because of its transitory nature, however if *Sargassum* is present in the area intended for dispersant use or in-situ burning, then an emergency consultation is required before these response techniques can be used because of the potential presence of juvenile sea turtles.

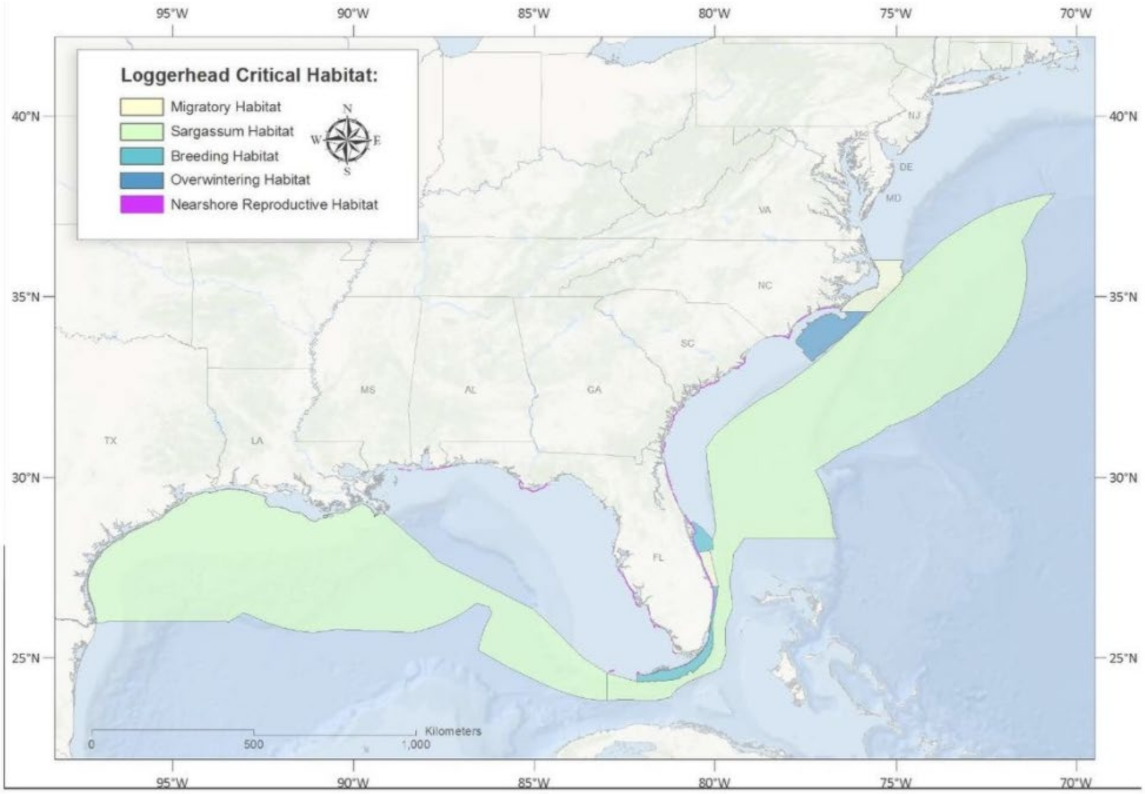

Figure 7. Loggerhead Critical Habitat Map available at https://www.fisheries.noaa.gov/resource/map/loggerhead-turtle-northwest-atlantic-ocean-dps-critical-habitat-map.

- North Atlantic Right Whale
  - One critical habitat (Figure 8) delineated in regard to winter calving- for response actions in offshore waters of North Carolina, South Carolina, Georgia and Florida during November to April (81 FR 4837).

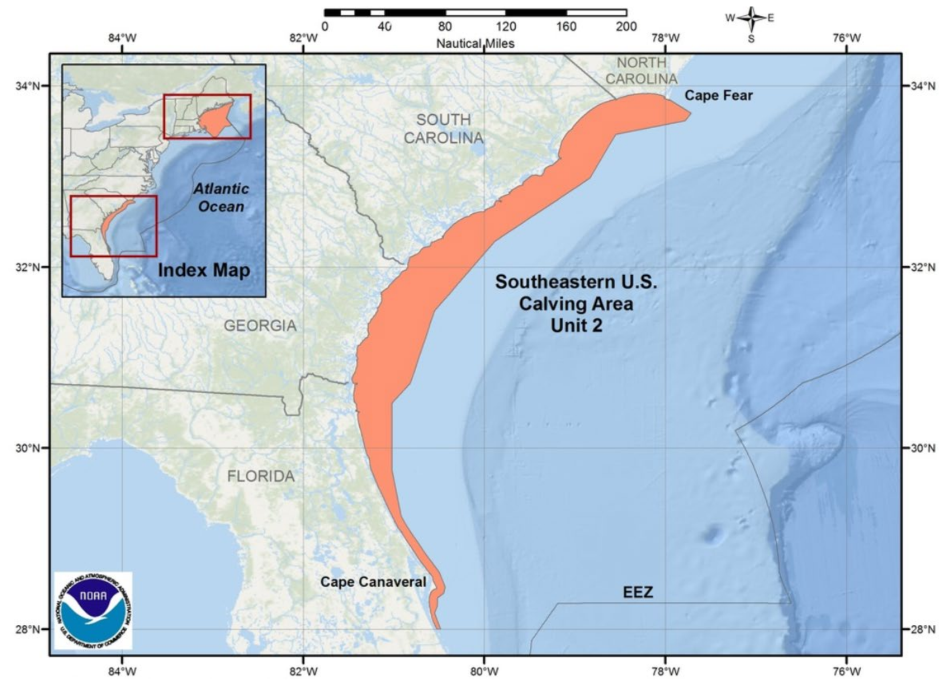

Figure 8. North Atlantic Right Whale Critical Habitat Map available at https://www.fisheries.noaa.gov/resource/map/north-atlantic-right-whale-critical-habitat-map-and-gis-data.

3.4 Areas Not Pre-authorized for Dispersant Use and In-situ Burning

The *Yellow Zone,* which is not pre-authorized for these response methods is shown in Figure 11, Section 3.6 below and includes:

- State waters out to 3 nautical miles (nm) from any shoreline and 9 nm from Florida's Gulf Coastline.
- Non-seasonal Critical Habitat- Emergency consultation is required for the following areas that are established critical habitats:
    - Elkhorn and Staghorn Corals (Figure 9; 73 FR 72210)

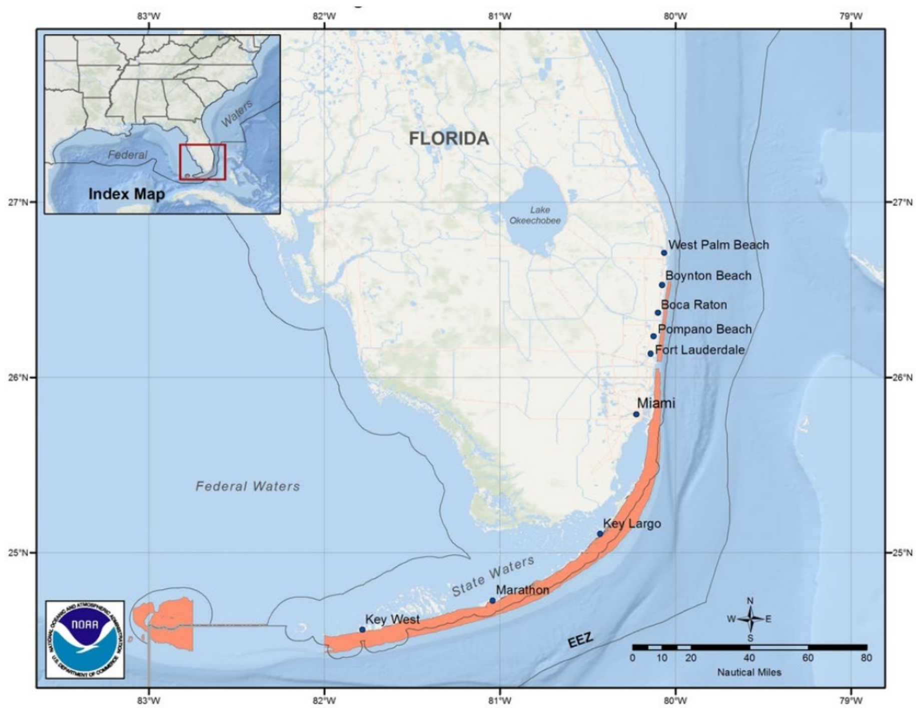

Figure 9. Elkhorn and Staghorn Critical Habitat available at https://www.fisheries.noaa.gov/resource/map/acropora-elkhorn-and-staghorn-coral-critical-habitat-map-and-gis-data.

- Gulf of Mexico subspecies of the Bryde's whale- This whale has not had critical habitat designated, but for the purpose of this consultation, the June 2019 core distribution area (Figure 10) is considered the protected area for this species.

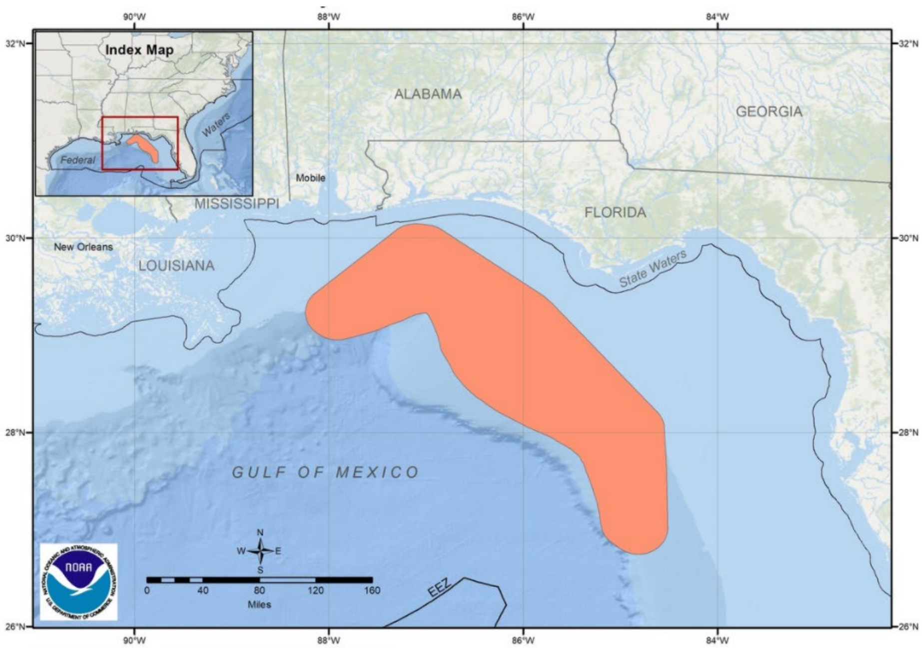

Figure 10. Gulf of Mexico Bryde's whale Core Distribution Area June 2019 available at https://www.fisheries.noaa.gov/resource/map/gulf-mexico-brydes-whale-core-distribution-area-map-gis-data.

3.5 Project Design Criteria

Non-discretionary PDCs have been identified to limit environmental effects of the use of dispersants and ISB during oil spill response, as well as the impacts of associated response activities. These PDCs are taken from the best management practices (BMPs) the RRT provided as part of the consultation documents and emergency consultations that have been completed in the Southeast U.S. These PDCs, when applied to in-water activities associated with oil spill response involving the use of dispersants and ISB, minimize the environmental effects to ESA-listed species and designated critical habitat. The nature of the response will dictate which of the PDCs will be applicable to the activities covered under this consultation.

<u>General PDCs applicable to all activities addressed in this consultation:</u>

1. Compliance with the *Conservation Measures* (i.e., protocols) provided by the RRT is required (**Appendix A**).

2. Compliance with the most current version of DUPP and ISBP (**Appendices C and D**) when dispersants or in-situ burning are used as methods for spill response. These documents will be annually reviewed and updated (see Section 3.6). This may require RRT4 to make associated updates to the regional and area contingency plans, as noted in the *Conservation Measures* (**Appendix A**) and Vessel Strike Avoidance Measures (**Appendix E**).

3. A protected resources observer (i.e., wildlife observer) will be on-site to monitor response impacts, compliance with PDCs, protected species sightings, assist with reporting and prepare daily summaries so that steps can be taken to address issues such as unanticipated impacts to ESA resources that require the implementation of additional measures. NMFS-approved qualifications for this observer are included in **Appendix F**.

4. Observers must not be assigned other duties that could detract from their ability to keep proper lookout for animals. All observers will be equipped with a two-way radio or other dedicated device to communicate sightings. All sightings and associated information (e.g., images) will be reported on the *Marine Species Observation Form* (**Appendix G**) and submitted to NMFS (nmfs.ser.emergency.consult@noaa.gov) with subject line referencing "OPR-2020-02942, Programmatic Consultation") at the end of each day.

5. In-situ burning operations must follow the turtle observer protocol (**Appendix H**).

6. All sea turtle handling shall be conducted according to NMFS guidance. Sea turtle handling and resuscitation requirements are found in **Appendix I** and retrieval protocols are in **Appendix J**.

7. Aircraft hovering will be avoided in areas where sea turtles or marine mammals are sighted. If animals are sighted, an altitude of approximately 200 meters (m) will be maintained and aircraft will circle within visual contact but not directly over marine mammals or sea turtles for up to 15 minutes maximum. Sightings of sea turtles and marine mammals should be reported, including sightings of dead animals.

8. All in-water barriers, including floating oil absorbent material or material placed to stop oil movement, will be made of material in which a sea turtle, marine mammal or other ESA-listed species cannot become entangled, be properly secured with taut lines, and be regularly monitored to ensure ESA-listed species do not become entangled or entrapped. Barriers will be checked daily prior to nightfall to ensure they remain floating and do not create a barrier to animal movement or present an entanglement hazard.

9. Oiled boom and other in-water equipment will be replaced, as quickly as practicable, when observed.

10. All booms and other floating equipment will be anchored in a way that avoids entanglement of protected species. With offshore operations, this may mean continuous anchoring to a vessel to keep the lines tight rather than the bottom of the ocean so as to keep likelihood of entanglement in lines through the water column minimized. However, each scenario is different, so there may be other configurations that would be more effective to reduce dangling or loose lines at the surface or in the water column.

11. If a marine mammal, sea turtle or other ESA-listed species is seen within 0.5 nm/1000 yards of response operations, all appropriate precautions will be implemented. These precautions should include cessation of operation of vessels, installation of booms, or

other in-water actions in proximity of a sea turtle or marine mammal. Activities should not resume until the animal has departed the area on its own.

12. The FOSC will ensure that all personnel involved in response operations receive protected species awareness training to inform them of the potential presence of ESA-listed sea turtles, marine mammals, and fish and the civil and criminal penalties that could result from the harassment, injury, or death of these species.

13. Any collision with and/or injury to any marine mammal or ESA-listed species occurring during the emergency response operation shall be reported immediately according to the requirements in the *Conservation Measures* (**Appendix A**).

14. If at any time during a response operation, the USCG deems it unsafe to continue due to weather conditions or other factors, all in-water equipment will either be removed or securely anchored to the bottom, as appropriate, to ensure the equipment will not present an entanglement hazard to marine life.

15. The post-incident report described in the DUPP and ISBP prepared for a particular response will be provided to NMFS (nmfs.ser.emergency.consult@noaa.gov with "OPR-2020-02942, Programmatic Consultation" referenced in the subject line) no later than 45 days following conclusion of the response activities. This report should include a lessons learned discussion in addition to the after action reporting.

3.6 Project-Specific Review and Consultation

Prior to authorizing the use of dispersants or ISB for a particular spill response activity, the FOSC must complete a project-specific review to ensure all of the relevant PDCs are met.

If the use of dispersants will occur in designated preauthorized areas (Green Zone, Section 3.2) the FOSC may proceed by submitting an emergency consultation request (i.e., notification) to NMFS SERO, as noted in the next paragraph. This notifies SERO of the activity, and if activities rise to the “may affect” level, then emergency consultation would be triggered.

The FOSC will certify compliance with the applicable PDCs along with the information described below to NMFS SERO using SERO's existing emergency consultation email notification system (nmfs.ser.emergency.consult@noaa.gov). The subject line should include a reference to "OPR-2020-02942, Programmatic Consultation with RRT4 for Use of Dispersants and In-Situ Burning" to distinguish the message from other emergency consultation requests. In addition to or as part of the information required by the PDCs discussed above, the submission will include the following information:

1. Date sent to NMFS: This is the date the email was provided to NMFS
2. Location: This is the location of the oil spill

3. Latitude: This is the latitude of the center point of the response area. This shall be formatted in decimal degrees to five places.
4. Longitude: This is the longitude of the center point of the response area. This shall be formatted in decimal degrees to five places. Please provide a negative symbol before the longitude to denote the western hemisphere.
5. Critical habitat unit: This shall be provided in the following acronym style with no spaces or hyphens to allow for accurate sorting. Projects occurring in critical habitat and proposed critical habitat are only authorized if they do not impact the essential features of each critical habitat type:
   - NARW CH (North Atlantic Right Whale critical habitat)
   - LOGG CH (loggerhead sea turtle critical habitat)
   - N/A (not applicable because the project is not located within a critical habitat unit)
6. Whether any of the essential features of critical habitat are located within or adjacent to the response footprint where the use of dispersants or ISB will take place. If yes, list the essential features present and their distance to dispersant release, in-situ burns, and associated response activities. If the project is not in a critical habitat unit, write In Compliance with PDCs.
7. Description of ESA-listed species present within footprints where dispersant use, ISB, and associated response activities, including any associated activities (such as the use of vessels to deploy dispersants or manage a burn area), will take place.
8. All PDCs met: Are all of the applicable PDCs defined in this document being met by the proposed project? Answer yes or no.
9. Response-specific information should also be provided, including copies of any response plans, Special Monitoring of Applied Response Technologies (SMART) monitoring reports, locations of any temporary buoys or other temporary in-water structures, ESA resource surveys and other information that will enable NMFS to determine whether ESA-listed species or their habitat are present and assess the potential risk of proposed response actions to these resources. The information will also enable NMFS to determine whether additional protective measures for avoidance and minimization of effects of a particular oil spill response activity are required.

Note that the existing email, nmfs.ser.emergency.consult@noaa.gov, should be used to provide all of the information requested above. The RRT, in conjunction with the NRT, has an emergency consultation form available at https://nrt.org/Main/Resources.aspx?ResourceType=Endangered%20Species%20Act%20(ESA)%20Section%207&ResourceSection=2 that can also be used to provide this information.

NMFS will assess the individual proposed activity's compliance with the PDCs identified as applicable by the FOSC and ensure that the additive effects of dispersants and/or ISB and associated response activities do not result in adverse effects to protected species. Due to the emergency nature of response actions, the timeframe for a final response will be within 12 hours of receipt of the FOSC or designated representative's email. As noted above, because this email address is for general use by all requiring emergency consultations, the subject line should include a reference to "OPR-2020-02942, Programmatic Formal Conference and Consultation with the USCG for Use of Dispersants and In-Situ Burning" to distinguish the message from other requests. If no notice is given by NMFS within 12 hours of submission of information related to the proposed use of dispersants and/or ISB as part of an oil spill response by the FOSC, compliance is implied. As noted above, this emergency consultation procedure will be required for the use of dispersants and ISB in the Green Zone.

Any activities occurring in Yellow Zones or that cannot comply with the PDCs relevant to the particular response will require individual ESA section 7 consultations and are not covered under this programmatic consultation. The FOSC will coordinate with SERO on these individual actions to determine the emergency consultation procedures to be used based on the location of these actions and the potential effects on ESA resources.

3.7 Programmatic Review

The USCG, RRT4 and NMFS will conduct an annual programmatic review of the use of dispersants and ISB in oil spill response operations only if these response tools have been used by the FOSC, who is advised by RRT4, in a particular year. This review will evaluate, among other things, whether the scope of the activity is consistent with the description of the proposed activities; whether the nature and scale of the effects predicted continue to be valid; whether the PDCs, DUPP and ISBP are being complied with and continue to be appropriate; and whether the response-specific consultation procedures are being complied with and are effective. The process for the programmatic review under ESA may require different approaches or communications from year to year based on the prior year's actions. To assist in this annual review, and required as part of the PDCs (DUPP protocol 4.9 and ISBP protocol 4.12), the FOSC will submit a post-incident report within 45 days following each use of dispersants and/or ISB. If these tools have not been used during a given year, the RRT will send notification of a negative response to NMFS, representing the ESA programmatic review for that year, rather than a report at the end of the corresponding year. RRT4 holds annual meetings (https://www.nrt.org/site/site_profile.aspx?site_id=39) during which they identify updates and develop reports for the prior year. To streamline the programmatic review process, the RRT4 may include a NMFS ESA section 7 consultation biologist in the annual meeting process to address appropriate updates and/or necessary revisions for species managed under the ESA by NMFS. Documentation associated with this programmatic review would allow for adaptive management and potential minor changes to the action or plans that would not result in changes to the effects or conclusions in this Opinion.

4 Action Area

Action area means all areas affected directly, or indirectly, by the Federal action, and not just the immediate area involved in the action (50 C.F.R. §402.02).

The action would occur at any time of year, as it is associated with accidental spills of oil, which cannot be predicted in terms of timing and magnitude. The action would occur offshore in federal waters of North Carolina, South Carolina, Georgia, Florida, Alabama and Mississippi from the state boundary border out to the EEZ. Figure 11 displays the action area and pre-authorized green and unauthorized yellow zone designations. Lighter green areas signify an area that has seasonal (i.e., conditional) authorization as noted in Section 3.2.

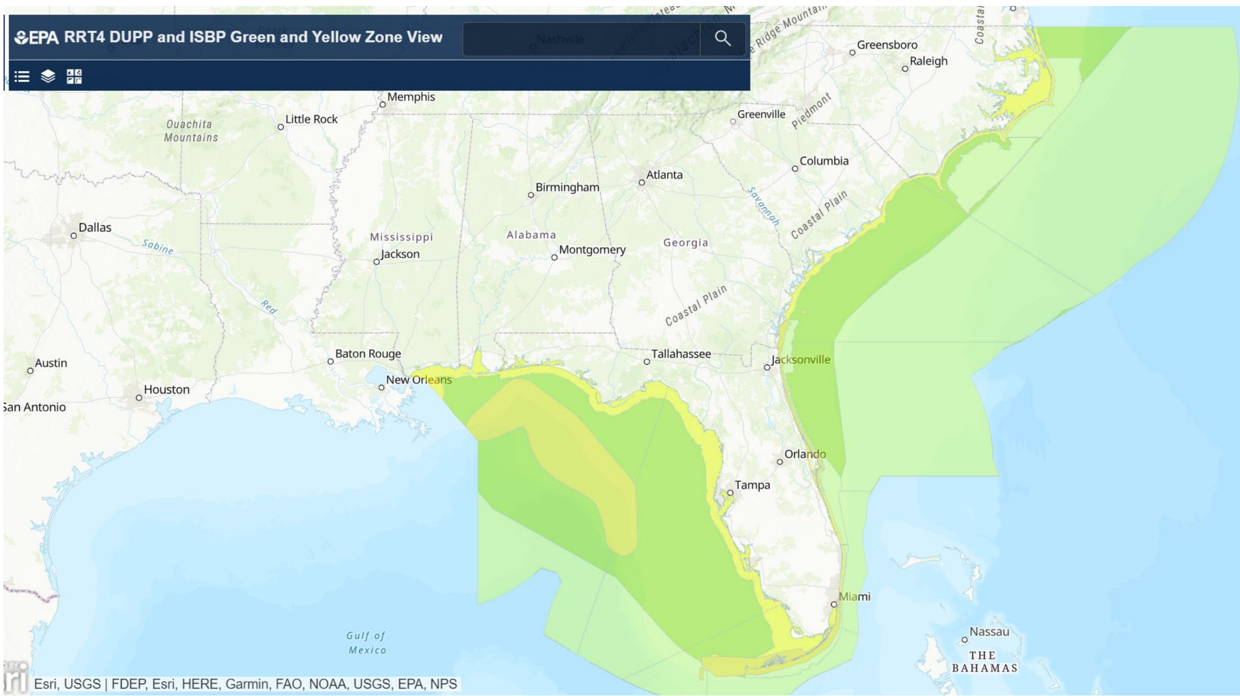

Figure 11. Map displaying the action area including green preauthorized zone, light green seasonal preauthorized zone, and unauthorized yellow zones (darker yellow represents protected areas).

5 Endangered Species Act Protected Resources that may be Affected by the Proposed Action

This section identifies the ESA-listed species that potentially occur within the action area that may be affected by the proposed use of dispersants and/or ISB (Table 1).

Table 1. Threatened and endangered species and critical habitat that may be affected by the Regional Response Team's proposed use of dispersants and/or in-situ burning in federal Region 4.

Species	ESA Status	Recovery Plan	
Blue whale (*Balaenoptera musculus*)	E – 35 FR 18319, December 2, 1970	07/1998	----
Fin whale (*Balaenoptera physalus*)	E – 35 FR 18319, December 2, 1970	75 FR 47538	----
Sei whale (*Balaenoptera borealis*)	E – 35 FR 18319, December 2, 1970	76 FR 43985	----
Sperm whale (*Physeter macrocephalus*)	E – 35 FR 18319, December 2, 1970	75 FR 81584	----
Gulf of Mexico Bryde's whale (*Balaenoptera edeni*)	E – 84 FR 15446, April 15, 2019	----	**
North Atlantic Right Whale (*Eubalaena glacialis*)	E – 73 FR 12024,	70 FR 32293 08/2004	81 FR 4837
Nassau grouper (*Epinephelus striatus*)	T – 81 FR 42268, June 29, 2016	----	----
Scalloped hammerhead shark (*Sphyrna lewini*), Central and Southwest Atlantic DPS	T – 79 FR 38214, July 3, 2014	----	----
Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) – Carolina DPS	E – 77 FR 5913	----	82 FR 39160
Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) – South Atlantic DPS	E – 77 FR 5913	----	82 FR 39160
Gulf sturgeon (*Acipenser oxyrinchus desotoi*)	T – 56 FR 49653	09/1995	68 FR 13370
Shortnose Sturgeon (*Acipenser brevirostrum*)	E – 32 FR 4001	63 FR 69613 12/1998	----
Largetooth Sawfish (*Pristis pristis*)	E – 76 FR 40822 and E - 79 FR 73977	----	----
Smalltooth Sawfish (*Pristis pectinata*) – U.S. portion of range DPS	E – 68 FR 15674	74 FR 3566 01/2009	74 FR 45353
Oceanic whitetip shark (*Carcharhinus longimanus*)	T – 83 FR 4153	----	----
Giant Manta Ray (*Manta birostris*)	T – 83 FR 2916	----	----

Species	ESA Status	Recovery Plan	Critical Habitat
Sea Turtles			
Green sea turtle (*Chelonia mydas*), North Atlantic Distinct Population Segment (DPS)	T – 81 FR 20057, April 6, 2016 (original listing 1978)	63 FR 28359	63 FR 46693
Green sea turtle (*Chelonia mydas*), South Atlantic DPS	T – 81 FR 20057, April 6, 2016	63 FR 28359	----
Hawksbill sea turtle (*Eretmochelys imbricata*)	E – 35 FR 8491, June 2, 1970	57 FR 167 12/1993	63 FR 46693
Leatherback sea turtle (*Dermochelys coriacea*)	E – 35 FR 8491, June 2, 1970	63 FR 28359	44 FR 17710
Kemp's Ridley sea turtle	E – 35 FR 18319	03/2010 – U.S. Caribbean, Atlantic, and Gulf of Mexico 09/2011	----
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic Ocean DPS	T – 76 FR 58868, September 22, 2011 (original listing 1978)	74 FR 2995	79 FR 39856
Corals			
Elkhorn coral (*Acropora palmata*)	T – 71 FR 26852, May 9, 2006, and 79 FR 53852, September 10, 2014	80 FR 12146	73 FR 72210
Staghorn coral (*Acropora cervicornis*)	T – 71 FR 26852, May 9, 2006, and 79 FR 53852, September 10, 2014	80 FR 12146	73 FR 72210
Lobed star coral (*Orbicella annularis*)	T – 79 FR 53852, September 10, 2014	----	***Proposed 11/27/2020, 85 FR 76302
Boulder star coral (*Orbicella franksi*)	T – 79 FR 53852, September 10, 2014	----	***Proposed 11/27/2020, 85 FR 76302
Mountainous star coral (*Orbicella faveolata*)	T – 79 FR 53852, September 10, 2014	----	***Proposed 11/27/2020, 85 FR 76302

Species	ESA Status	Recovery Plan	Critical Habitat
Pillar coral (*Dendrogyra cylindrus*)	T – 79 FR 53852, September 10, 2014	----	***Proposed 11/27/2020, 85 FR 76302
Rough cactus coral (*Mycetophyllia ferox*)	T – 79 FR 53852, September 10, 2014	----	***Proposed 11/27/2020, 85 FR 76302
Marine Plants			
Johnson's Seagrass (*Halophila johnsonii* Eisman)	T – 63 FR 49035	67 FR 62230	65 FR 17786
T = threatened, E = endangered **Critical habitat is not designated for Gulf of Mexico Bryde's whale, but core distribution area is identified: https://www.fisheries.noaa.gov/resource/map/gulf-mexico-brydes-whale-core-distribution-area-map-gis-data ***https://www.fisheries.noaa.gov/action/proposed-rule-designate-critical-habitat-threatened-caribbean-corals			

The RRT4 determined that the proposed action may affect, but is not likely to adversely affect any of the following species.

5.1 Species and Designated Critical Habitat Not Likely to be Adversely Affected

This category is intended to capture three different circumstances regarding all the effects of an action to a listed species or critical habitat. In order to reach the conclusion of "May affect, not likely to adversely affect," the effects or consequences on the listed species or designated critical habitat are expected to be "discountable, insignificant, or completely beneficial". In order to evaluate the potential effects of an action on listed species or critical habitat, NMFS first considers whether exposure to a stressor, or some reasonable expectation of a co-occurrence, between one or more potential stressors associated with the proposed activities and ESA-listed species or designated critical habitat could occur. If we conclude that an ESA-listed species or designated critical habitat is not likely to be exposed to the proposed activities, we must also conclude that the species or critical habitat is not likely to be adversely affected by those activities.

If it is determined that an exposure could occur, then we consider what the response of ESA-listed species or critical habitat could be to the given exposure. An ESA-listed species or designated critical habitat that is exposed to a potential stressor but is likely to be unaffected by the exposure is also not likely to be adversely affected by the proposed action. We applied these criteria to the ESA-listed species in Table 1 and we summarize our results below.

An action warrants a "may affect, is not likely to adversely affect" finding when its effects are wholly *beneficial, insignificant* or *extremely unlikely to occur*. *Beneficial effects* have an immediate positive effect without any adverse effects to the species or habitat. *Insignificant* *effects* relate to the size of the impact and should never reach the scale where take of a listed species or an impact to the conservation value of a physical or biological feature of critical habitat is expected. Based on best judgment, a reasonable person would not be able to meaningfully measure, detect, or evaluate insignificant consequences on the listed species and critical habitat. Lastly, upon full consideration of the likelihood of co-occurrence of the proposed action and resources protected under the ESA, some effects may be *extremely unlikely to occur*.

5.1.1 **ESA-Listed Whales**

ESA-listed whales that exist in the action area are the toothed sperm whale, and the baleen species including North Atlantic right whale, humpback whale, fin whale, blue whale, sei whale and the Gulf of Mexico Bryde's whale (Table 1).

Effects of Oil: Oil can negatively impact marine mammals if they are exposed to a spill. Oil spills could directly affect ESA-listed whales through various pathways and often animals may be exposed in all pathways at the same time. Exposure pathways include external contact (through the skin and eyes), inhalation, aspiration, and oil ingestion (through oiled prey or accidental oil ingestion). Baleen whales could be affected by ingestion of oil and adherence of oil particles to baleen plates. An investigation of the impacts of exposure of baleen plates of seven species of whales to crude oil, gasoline, and tar showed the structural and chemical integrity of the plates remained constant and any declines in filtration rates through the plates were minor and short-term (Helm et al. 2015).

Disruption of other essential behaviors, such as breeding, communication, and feeding may also occur. External contact with oil can cause irritation of the eyes, skin, and mucus membranes. In addition, oil present around a blowhole or in the mouth could lead to aspiration of oil. External contact can potentially transfer into the bloodstream; however, uptake through the skin has been considered unlikely in healthy cetacean skin in high salinity waters due to the tight intercellular bridges and thick epidermis (O'Hara and O'Shea 2001). The effects of long-term skin exposure that could occur during long duration spills have not been determined, however, oil was applied to the skin of a live, stranded sperm whale and skin lesions formed (Trustees 2016). During the DWH spill, various dolphin species were the most affected. Thirty-three sperm whales were observed with some oil in the deep water area where the spill occurred.

In addition, six percent of the population was determined to have died and five percent of females were determined to have suffered reproductive failure due to oiling (DWH Trustees 2016). The DWH spill exposed an estimated 48 percent (95 percent CI 23-100) and killed an estimated 17 percent (95 percent CI 7-24) of the existing Bryde's whale population (Trustees 2016). However, this spill is not comparable to many of the other oil spills that have occurred in the southeast U.S. to date (**Appendix K**) and there have never been reports of any interactions with or impacts to ESA-listed whales associated with oil spills in the Southeast U.S. other than DWH. Surfacing to breathe in an oil slick where whales could inhale oil and toxic petroleum vapors (Helm et al. 2015) is expected to be the greatest risk to these animals during an oil spill.

Dispersants: There are no studies related to the potential toxicity of dispersants to whales. Whales have a specialized dermis that minimizes adherence of oil to their skin as well as a blubber layer that is expected to protect their thermoregulatory system from the effects of oil (Helm et al. 2015). These characteristics are also expected to protect whales from impacts of dispersants. In addition, the ranges of ESA-listed whales and their presence in the Southeast U.S. means any exposure to oil treated with dispersants would be short-term. The PDCs would ensure that no dispersants are used if whales are present in the area. The area where Gulf of Mexico Bryde's whales are expected is included in the yellow zone.

Because of these combined factors, it is extremely unlikely that the short-term increase in oil availability and toxic effects of oil due to the use of dispersants would result in impacts to ESA-listed whales if dispersants were used during a spill response. PDCs requiring that observers be present and that dispersant application not occur if marine mammals are sighted will protect the animals from potential effects of dispersant application if spills occur in preauthorized areas. Further, as seen in **Appendix K**, oil spills that would require this type of response are infrequent and when paired with the PDCs, whale exposure to dispersed oil is extremely unlikely. Therefore, we believe the effects of dispersant application on ESA-listed whales would be extremely unlikely to occur.

Whales may also suffer indirect effects due to modification of prey availability because of the toxic effects of an oil spill (Ridoux et al. 2004) and ingestion of prey contaminated by oil and dispersed oil. Zooplankton analyses conducted before, during, and after the DWH spill suggested that assemblages of these organisms are largely resistant to impacts (Hernandez et al. 2015) meaning baleen whales may not experience declines in prey due to a spill and the use of dispersants.

Numerous studies have found lethal and sublethal effects to early life stages of fish (prey species) because of dispersed oil (Couillard et al. 2005, Adams et al. 2014, Brette et al. 2014, Brown et al. 2015, van Balen et al. 2015). Patterson III et al. (2015) also found declines in reef fish numbers and biomass with signs of recovery beginning in the fourth year following the DWH spill. Thus, toothed whales could be more affected by oil spills and dispersant use due to declines in prey species.

As noted above, ESA-listed whales are present in offshore U.S. Southeast waters year-round and any exposure to prey exposed to oil treated with dispersants in the case of toothed whales would be short-term. In addition, any loss of prey species in the area of a spill would be a localized effect based on information provided by the action agency (see **Appendix K**). Because of this, it is extremely unlikely that the short-term, localized decrease in prey or exposure to contaminated prey due to the use of dispersants offshore would result in impacts to ESA-listed whales. Plenty of uncontaminated prey would remain available. PDCs requiring that observers be present and that dispersant application not occur if marine mammals are sighted will protect the animals from potential direct and indirect effects of dispersant application. Therefore, we believe the effects of contamination or localized declines in prey as a result of dispersant application on ESA-listed whales would be insignificant.

In-Situ Burning: Whales are at risk from ISB due to the species' need to surface and breathe. If animals surface in the area of the burn, there is the potential for the animals to be injured or killed due to exposure to burning and the smoke from burning. The burn area is kept small in order to control the burn and burning is of short duration (CRRT Response Technologies Committee 2015), which would limit the potential adverse effects to whales. Whales are more likely to be affected by exposure to oil and vapors when surfacing to breathe. The PDCs require that burning not take place in areas where marine mammals have been sighted and that the burn area be relocated or the burn delayed until any animals present leave the area of their own volition. The DWH spill response used ISB on a number of occasions. Mortality of some whale species, including sperm whales were reported but because ISB took place in the most heavily oiled areas during DWH, these mortalities were likely due directly or indirectly to oiling (DWH Trustees 2016). The PDCs also require monitoring before, during, and after a burn using dedicated observers to be sure marine mammals are not present in the burn area. If marine mammals are sighted in the burn area, burning may be stopped or the burn area relocated. As stated above, ESA-listed whale species are present in offshore Southeast U.S. waters year round. The PDCs ensure that there would be little to no risk of exposure to ISB if spills requiring this clean up method occur when animals are present. For all of these reasons, we believe the effects of the use of ISB on ESA-listed whales that would be authorized by the FOSC would be extremely unlikely to occur.

Overflights conducted prior to dispersant application and prior to and during ISB operations, as well as the use of aircraft and vessels during dispersant application and ISB operations, could affect ESA-listed whales due to a temporary and localized increase in noise levels leading to harassment of the animals, causing them to change their behavior such as swimming away from the noise of the vessel or aircraft. The PDCs require that hovering of aircraft in areas where marine mammals are sighted be restricted to 15 minutes and that an altitude of 200 m be maintained in order to reduce the potential for harassment of marine mammals. Therefore, we believe potential harassment of ESA-listed whale species in the offshore waters of federal region 4 associated with overflights related to dispersant use and ISB operations would be insignificant.

The use of vessels during dispersant application and ISB operations could affect ESA-listed whales due to collisions with vessels. There have been a number of oil spills in the action area (see **Appendix K**) and, DWH involved the use of dispersants and ISB with many vessels involved as part of response activities. No vessel collisions or other interactions with marine mammals were reported as part of vessel use during DWH response activities. The PDCs, DUPP and ISBP (**Appendices C, D and E**) require compliance with NOAA's *Vessel Strike Avoidance Measures and Reporting for Mariners* which includes observers continuously monitoring for the presence of marine mammals to ensure that equipment operation is ceased if marine mammals are within 0.5 nautical miles or 1000 yards of this operation. The PDCs also require that no ISB operations take place in areas where marine mammals are sighted. Therefore, we believe the potential for vessel collisions with ESA-whales during dispersant operations and ISB activities in the green zone will be extremely unlikely to occur.

5.1.2 **North Atlantic Right Whale Critical Habitat**

Critical habitat for right whales in the North Atlantic was designated in 1994 and expanded in 2016. Presently, North Atlantic designated critical habitat includes two major units, one of which occurs within the action area: Unit 2 located off the coast of North Carolina, South Carolina, Georgia, and Florida (Figure 8). Unit 2 consists of an important calving area and contains the following physical and biological features essential to the conservation of the species: sea surface conditions associated with Force four or less on the Beaufort Scale, sea surface temperatures of 7 to 17 degrees Celsius, and water depths of six to 28 m, where these features simultaneously co-occur over contiguous areas of at least 231 square nautical miles of ocean waters during the months of November through April. This area is conditionally pre-authorized for dispersant use and ISB as response methods, so these methods would not be used if animals are present. Mariners are required to follow the requirements under NOAA's *Vessel Strike Avoidance Measures and Reporting for Mariners* and report their vessels to the Mandatory Ship Reporting System as they enter the critical habitat. The use of dispersants and ISB as response methods and their resultant potential effects to the critical habitat physical and biological features would be localized and temporary. Therefore, the effects of the use of ISB on North Atlantic right whale critical habitat would be insignificant.

5.1.3 **ESA-listed Fish**

5.1.3.1 Atlantic sturgeon (South Atlantic DPS and Carolina DPS)

Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) are found in river systems of North and South Carolina (Carolina DPS), Georgia and east coastal Florida (South Atlantic). Atlantic sturgeon, like all anadromous fish, are vulnerable to a host of habitat impacts because they use rivers, estuaries, bays, and the ocean at various points of their life. Habitat alterations potentially affecting sturgeon include dam construction and operation, dredging and disposal, and water quality modifications such as changes in levels of DO, water temperature, and contaminants. Atlantic sturgeon designated critical habitat is limited to nearshore and inland waters, mainly outside the action area or areas that would be pre-authorized for dispersant use or ISB.

5.1.3.2 Gulf Sturgeon

The Gulf sturgeon is a subspecies of the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). Gulf sturgeon spawn in freshwater and then migrate to feed and grow in estuarine/marine (brackish/salt) waters. The subspecies' present range extends from Lake Pontchartrain and the Pearl River system in Louisiana and Mississippi respectively, east to the Suwannee River in Florida. They are known to also go into marine nearshore waters to feed during the winter. Gulf sturgeon designated critical habitat is also limited to nearshore and inland waters, mainly outside the action area or areas that would be pre-authorized for dispersant use or ISB.

5.1.3.3 Nassau Grouper

Nassau grouper (*Epinephelus striatus*) occur in southeastern U.S. in nearshore waters around the tip of Florida and into the Caribbean. This reef fish inhabits shallow areas and most of the areas where they are commonly found are outside the range of the green zone action area.

Effects of Oil: ESA-listed fish species may be affected by oil spills. Studies have shown that the exposure of embryos and larvae of pelagic and nearshore species in both cold and warm climates to PAHs from oil results in developmental defects, particularly associated with cardiac development even at low concentrations (Incardona et al. 2005, Carls et al. 2008, Carls and Meador 2009, Hicken et al. 2011, Brette et al. 2014, Incardona et al. 2014). Reduced swimming performance and fin development and decreased hatching success were also observed due to concentrations of different PAHs (Hicken et al. 2011, Adams et al. 2014, Incardona et al. 2014, Brown et al. 2015). Anemia was seen in fish and other animals exposed to DWH oil and there were documented declines in reef fish numbers and biomass on reefs across the Gulf shelf due to the toxic effects of the spill (Patterson III et al. 2015, DWH Trustees 2016).

Dispersants: When toxicity was expressed as a measured concentration of oil in water in dispersed (i.e., oil that has been treated with dispersants) and undispersed oil mixtures, no difference in toxicity was found when fish embryos were exposed to the water accommodated fraction of oil in water and of dispersed oil (Couillard et al. 2005, Adams et al. 2014). Thus, dissolved PAHs are responsible for toxicity in fish although particulate oil can have other effects due to direct contact and uptake in fish tissues (Adams et al. 2014). In an experiment with embryo sheepshead minnow, it was found that even short-term (24-hour) exposure to chemically dispersed oil in early embryonic development can have severe effects on heart development, movement, hatching success and timing, larval survival, and size when hatched (van Balen et al. 2015). The application of dispersants was also found to alter the suite of PAHs in the water column and increase the relative concentrations of high molecular weight PAHs, which are usually less water soluble (Couillard et al. 2005).

ESA-listed fish species may be affected by the use of dispersants. Sturgeon species are expected to spawn in their natal rivers, and the adults that swim into the marine environment are most likely to remain in coastal waters of the restricted yellow zone. Analyses of reef fish following the DWH spill indicate that exposure to PAHs resulted in declines in reef fish numbers and biomass on natural and artificial reefs across the Gulf shelf and food web impacts leading to reduced growth rates following the spill. Stable isotope analysis of reef fish muscle tissue indicates that food web effects persisted into 2014 (Patterson III et al. 2015). Thus, Nassau grouper could be affected by oiling and the use of dispersants during spill response in the Southeast U.S. offshore waters given that this reef fish species may be present on reefs in adult life stages, and embryos and early larval stages may be present on the shelf edge. Most of these habitats are contained in the yellow zone. The yellow zone restricting the use of dispersants to coastal waters will also protect later larval and juvenile life stages of Nassau grouper. Life stages that use deeper waters could be affected, particularly embryo and early larval stages that seem to be most sensitive to PAHs and the use of dispersants that increases the concentrations and availability of PAHs in the water column.

Based on the study by Patterson III et al. (2015), it could take several years for Nassau grouper to recover if the species was to be affected by an oil spill and dispersant use. The PDCs restricting the application of dispersants to particular depths and habitats will minimize the potential effects of dispersant application to various life stages of Nassau grouper. Due to the distribution of Nassau grouper in shallow coastal waters of the southeast U.S., Nassau grouper likely will not be present in an offshore area where dispersant or ISB use may occur.

Historical locations of spills excluded the use of dispersants and ISB in the majority of cases. Further, given the required PDCs to protect the species, and the infrequent occurrence of spills of the magnitude that would require the use of dispersants in the U.S. southeast, the adverse effects of the use of dispersants on Nassau grouper, Atlantic sturgeon, and Gulf sturgeon is extremely unlikely to occur.

In-Situ Burning: There were no documented direct impacts from ISB used during DWH on fish and motile invertebrates, although if these organisms were present in heavy slick areas during burning they would not have been observed due to their small sizes in relation to the size and depth of the slick. As noted, ISB forms tarballs. There were reports of benthic invertebrates, particularly shrimp, being trapped in tarballs in some areas of the Gulf but this type of effect was not reported for fish. Therefore, we believe the effects of in-situ burning on Nassau grouper, Atlantic sturgeon, and Gulf sturgeon is extremely unlikely to occur.

Other response activities associated with the use of dispersants and ISB could affect ESA-listed fish, particularly those that could impact habitat of the species. The omission of nearshore waters from the pre-authorized zones minimizes those potential impacts. Oil spills in the region to occur with magnitude such that nearshore waters could be affected are more likely to occur where there is heavier oil and gas infrastructure, or where shipping lanes occur (see **Appendix K**). Therefore, we believe effects from potential habitat loss or degradation associated with oil response activities during the use of dispersants or ISB to ESA-listed Atlantic and Gulf sturgeon and Nassau grouper in offshore waters of the Southeast U.S. will be insignificant.

5.1.4 **Atlantic and Gulf sturgeon Critical Habitat**

NMFS designated critical habitat for each ESA-listed DPS of Atlantic sturgeon in August 2017 and for Gulf sturgeon in April 2003. Atlantic and Gulf sturgeon designated critical habitat are limited to rivers and nearshore estuarine/marine waters, which are located within the yellow zone and not preauthorized for dispersant use or ISB and effects to the habitat are extremely unlikely. While there could be response operations adjacent to these areas, we expect effects from those operations to be localized and temporary. Therefore, the effects to Atlantic and Gulf sturgeon designated critical habitat from dispersant use and ISB are extremely unlikely to occur.

5.1.5 **ESA-listed Elasmobranchs**

5.1.5.1 Scalloped Hammerhead Shark, Central and Southwest Atlantic Distinct Population Segment

The scalloped hammerhead shark occurs throughout the action area in coastal waters. In the western Atlantic Ocean, the scalloped hammerhead range extends from the northeast coast of the United States to Brazil, including the Gulf of Mexico. It is unclear what the current population size for this species is, but according to the status review report, a population decline is suggested by the past 30 years of catch data (NMFS 2014d).

5.1.5.2 Smalltooth Sawfish and Largetooth Sawfish

ESA-listed smalltooth sawfish (*Pristis pectinata*) and largetooth sawfish (*Pristis pristis*) are bottom-dwelling fish likely to be found mostly in the shallow coastal waters of the yellow zone. Largetooth sawfish have not been found in U.S. waters in 50 years. Small, juvenile smalltooth sawfish are generally restricted to estuarine waters of peninsular Florida, whereas larger adults have a broader distribution and could be found in the southeastern Gulf of Mexico, generally in nearshore waters and out of range of the pre-authorized green zone areas.

Effects of Oil: Sharks, fish and other elasmobranchs are exposed to oil and its associated chemical components in part when water travels across the surface of their gills or when they ingest contaminated prey. Incardona et al. (2014) showed that the exposure of embryos and larvae of large pelagic predators (tuna) to PAHs from oil results in developmental defects, particularly associated with cardiac development. While scalloped hammerhead sharks have live births and therefore go through embryo and larval stages in the adult female, the uptake of oil by the female could affect embryonic development, as could exposure to oil by neonates that are still growing. Sampling of sharks exposed to oil from DWH found physiological signs of elevated PAH exposure but no evidence for chromosomal or higher level impacts to sharks in the northern Gulf of Mexico (Heithaus et al. 2014). Blacknose sharks, which undergo limited seasonal migrations in the Gulf, were found to exhibit greater effects of PAH exposure to oil from DWH, likely due to these sharks remaining in the area over longer periods than other species (Walker 2011).

Dispersants: There are no studies of the effects of dispersants on sharks/elasmobranchs. Given that adult scalloped hammerhead sharks are the species of elasmobranch most likely to be present in deep waters within preauthorized areas, they are the species most likely to be exposed to dispersants. However, because commercial fisheries data indicate that these animals are less frequent in deep waters around the southeast U.S., the exposure of these animals to dispersant applications would be extremely limited, and extent of exposure would be temporary. Because these animals are typically found in areas with shallow waters nearshore where the yellow zone restricts the application of dispersants, they are unlikely to be exposed to dispersant application. Motile prey could be exposed to dispersant application but the limited size of anticipated oil spills in the southeast U.S. given past events that required a response, coupled with the conservation measures (PDCs) applied mean that scalloped hammerhead sharks would still have extensive unaffected prey available. Therefore, we believe the effects of dispersant application on scalloped hammerhead shark and smalltooth sawfish will be insignificant or extremely unlikely to occur, respectively.

In-Situ Burning: There were no documented direct impacts from ISB used during DWH on fish/elasmobranchs, although it is possible that organisms such as sharks were not observed due to the size and depth of the slick. However, because sharks do not need to surface for air, they may not have been exposed to the burning itself. As noted, ISB forms tarballs. Burn residues could be ingested by sharks. However, research on shark exposure to oil from DWH (Heithaus et al. 2014) did not indicate that sampled sharks had tarballs in their gut. As noted above we expect that the scalloped hammerhead shark is the most likely elasmobranch to be in deeper offshore waters, but infrequently encountered. Therefore, we believe the probability of elasmobranchs to be exposed to ISB is low, therefore the effects of in-situ burning on scalloped hammerhead shark and smalltooth sawfish is extremely unlikely to occur.

5.1.6 **Smalltooth Sawfish Critical Habitat**

Critical habitat for smalltooth sawfish was designated in 2009 and includes two major units in south Florida: Charlotte Harbor (221,459 acres) and Ten Thousand Islands/Everglades (619,013 acres). These two units include essential sawfish nursery areas. The locations of nursery areas were determined by analyzing juvenile smalltooth sawfish encounter data in the context of shark nursery criteria (Heupel et al. 2007, Norton et al. 2012). Within the nursery areas, two features were identified as essential to the conservation of the species: red mangroves (*Rhizophora mangle*), and euryhaline habitats with water depths greater than or equal to 0.9 m. The Charlotte Harbor unit includes areas which are moderate to highly developed (Cape Coral, Fort Myers) and includes a highly altered, flow-managed system (Caloosahatchee River). In contrast, the Ten Thousand Island/Everglades unit contains relatively undeveloped, pristine smalltooth sawfish habitat (Poulakis et al. 2011, Poulakis et al. 2014). Smalltooth sawfish designated critical habitat are limited to nearshore waters, which are located mainly within the yellow zone and not preauthorized for dispersant use or ISB. Effects to the habitat are extremely unlikely. While there could be preauthorized response operations adjacent to these areas, we expect effects from those operations to be localized and temporary. Therefore, the effects to smalltooth sawfish designated critical habitat from dispersant use and ISB are insignificant.

5.1.7 **ESA-Listed Corals**

ESA-listed coral species listed in Table 1 that are considered in this Opinion and within the action area are mainly found in shallow water reefs of southern Florida.

Effects of Oil: A study of mature hard coral colonies from the Red Sea found the water-soluble fraction of crude oil did not have a measurable impact on the corals but the dispersants tested had varying levels of toxicity with exposure to some resulting in high survivorship of coral fragments and others complete mortality (Shafir et al. 2007). Fragments were also cultured following acute exposure to oil and dispersed oil-dissolved fractions. Corals that survived exposure continued to live and after a few weeks began growing, though onset of initial tissue growth showed delayed effects of contaminant exposure (Shafir et al. 2007). Similarly, Renegar et al. (2015) found that corals exposed to medium levels of a PAH were able to recover less than two weeks following exposure.

A cellular diagnostic method was used to determine the impacts of an oil spill on hard corals in Micronesia. The studies found changes in cellular physiological condition and reduced genomic integrity that are likely to have sublethal effects and may affect viability of offspring (Downs et al. 2006, Rougee et al. 2006). Coral also demonstrated a dose response with increasing concentrations of the water-soluble fraction of oil leading to biotransformation of cells (Rougee et al. 2006). Thus, while adult corals may survive contaminant exposure from an oil spill and the use of dispersants, there may be effects to growth and reproduction.

Dispersants: A study by Negri and Heyward (2000) found that dispersed oil was slightly more toxic to fertilization than dispersant (Corexit 9527) alone indicating there is an additive effect. This points to a greater risk to spawning corals and larvae because larval metamorphosis was also affected by exposure to dispersed oil (Lane and Harrison 2000, Negri and Heyward 2000). Dispersed oil and dispersant alone dissolved in water were found to be more toxic to coral planulae than dissolved oil alone in a laboratory study with corals from the Great Barrier Reef (Lane and Harrison 2000) and another with stony and soft coral from the Red Sea (Epstein et al. 2000). Epstein et al. (2000) also found that all treatments caused larval morphology deformations, loss of normal swimming behavior, and rapid tissue degeneration as concentrations of oil and dispersed oil water accommodated fractions were increased. Similarly, in a study of two corals from the Florida Keys, including mountainous star coral, regarding the effects of exposure to the water accommodated fraction of oil and dispersed oil on coral planulae, larval survival and settlement were significantly decreased in both constant and spiked exposure experiments as concentrations increased (Goodbody-Gringley et al. 2013). Mountainous star coral planulae larvae were found to be more sensitive than the other non-ESA-listed species tested to oil and dispersed oil water accommodated fractions.

Adult ESA-listed coral colonies are not expected to be exposed to dispersants if used during spill response in the offshore waters of the southeast U.S. Many oil spills that have occurred in the region to date have been in shallow coastal waters (see **Appendix K**). That the yellow zone covers much of the areas where adult corals have settled would restrict dispersant use under the circumstances described in this Opinion in the majority of oil spill scenarios that have occurred in the southeast U.S. in the past, so co-occurrence of corals and preauthorized areas are minimal. If exposure does occur due to transport of dispersed oil into the water column in shallower areas where ESA-listed coral colonies may be present, there could be impacts to the reproductive success of ESA-listed corals based on previous studies of the impacts of dispersants. However, the anticipated use of dispersants is restricted in areas where coral colonies occur and will avoid or minimize the exposure of reproducing adult coral colonies and coral larvae to dispersants. Given the range of ESA-listed corals in the Southeast U.S., and the restricted use of dispersants in areas where corals occur, we believe the effects of the use of dispersants on ESA-listed corals is extremely unlikely to occur.

In-Situ Burning: ISB takes place at the water surface and will not be allowed in coastal areas where there are shallower water depths or where ESA-listed coral colonies are within 30 ft of the surface. ISB is not pre-authorized in the yellow zone. If burning were to take place during coral spawning periods, larvae could be lost in the immediate area of the burn as larvae travel at or near the water surface prior to settling. If tarballs that form as a result of ISB settle to the bottom in areas containing ESA-listed coral colonies, the colonies could be affected. Deep-sea corals were reported to be coated with oil residues, likely including tarballs from the DWH spill but this was at such a large volume as to replace the normal marine bottom with black oil residue, leading to impacts to corals and associated organisms. Tarballs have been found to have toxic properties due to the presence of PAHs but would be expected to have only localized effects on particular coral colonies if tarballs settle on these colonies. Tarballs also form during natural weathering of oil so there is a chance that tarballs would affect ESA-listed coral colonies regardless of whether burning operations take place, although tarballs from burning operations have been found to have different PAH compounds that can be more toxic to some organisms (Shigenaka et al. 2015). The restricted use of ISB in coastal waters, and PDCs restricting areas where in-situ burning will occur are expected to ensure that tarball generation and associated coating of benthic habitats will be minimal. Therefore, we believe the effects of the use of ISB under the conditions described in this consultation on ESA-listed corals is extremely unlikely to occur.

The use of vessels during dispersant application and ISB operations could affect ESA-listed corals due to the potential for accidental groundings, anchor damage and other physical disturbance to ESA-listed coral colonies. No accidental groundings associated with the use of response vessels have been reported in the past as part of response operations. The PDCs require compliance with restrictions on vessel anchoring and operations in shallow waters and waters containing substrate suitable for the growth of ESA-listed corals in order to minimize the potential for accidental groundings and impacts to coral colonies associated with vessel anchoring and lines from vessels. Therefore, we believe the potential effects to ESA-listed corals from vessel operations during dispersant operations and ISB activities in the southeast U.S. will be extremely unlikely to occur.

Other response activities associated with the use of dispersants and ISB could affect ESA-listed corals, particularly the placement of boom. The PDCs include measures to avoid impacts associated with entanglement of lines in ESA-listed corals and guide the placement of anchors to secure the boom such that impacts to ESA-listed coral colonies associated with the installation of anchors is avoided. Therefore, we believe the effects due to the potential for entanglement of lines and boom anchor impacts associated with response activities during the use of dispersants or ISB to ESA-listed corals in the southeast U.S. is extremely unlikely to occur.

5.1.8 Elkhorn and Staghorn Coral Critical Habitat

Critical habitat for elkhorn and staghorn corals in the southeast U.S. are located within the yellow zone and not preauthorized for dispersant use or ISB. The physical feature essential to the conservation of elkhorn and staghorn corals is substrate of suitable quality and availability to support larval settlement and recruitment and reattachment and recruitment of asexual fragments. Substrate of suitable quality and availability is defined as natural consolidated hard substrate or dead coral skeleton that is free from fleshy or turf macroalgae cover and sediment cover.

Dispersants: Dispersant application is not preauthorized in nearshore shallow water areas. Studies have shown that dispersants and dispersed oil are mixed in the upper layer of the water column within a few hours of application and would not reach depths of 30 ft during surface applications of dispersants and subsequent mixing with seawater. We believe the use of dispersants will have no effect on elkhorn and staghorn coral critical habitat because the use of dispersants in surface applications to oil slicks would not affect the essential feature of coral critical habitat because any dispersant not mixing with oil is expected to disperse and become diluted quickly. The ability of elkhorn and staghorn coral sexual and asexual recruits to settle and grow in areas containing the essential feature of coral critical habitat would not be affected by dispersant use.

In-Situ Burning: The formation of tarballs due to in-situ burning could affect the essential feature of coral critical habitat if tarballs coat portions of the habitat, making these areas of habitat unsuitable to settlement by sexual or asexual recruits. The yellow zone where these critical habitats would occur is not preauthorized for ISB. Therefore, we believe the effects of the use of ISB on elkhorn and staghorn coral critical habitat would be insignificant.

The use of vessels during dispersant application and ISB operations could affect elkhorn and staghorn coral critical habitat due to the potential for accidental groundings, anchor damage and other physical disturbance for vessels in transit to or from spill locations. Accidental groundings within elkhorn and staghorn critical habitat associated with the use of response vessels are extremely unlikely because these actions will be conducted offshore and the transits through critical habitat areas will be extremely limited. Therefore, we believe the potential effects to elkhorn and staghorn coral critical habitat from vessel operations during dispersant operations and ISB activities in offshore waters of the Southeast U.S. will be extremely unlikely to occur.

Other response activities associated with the use of dispersants and ISB could affect elkhorn and staghorn coral critical habitat, particularly the placement of boom. The PDCs include measures to avoid impacts associated with entanglement of lines and guide the placement of anchors to secure the boom such that impacts to coral habitat are avoided. Therefore, we believe the effects due to the potential for entanglement of lines and boom anchor impacts associated with response activities during the use of dispersants or ISB to elkhorn and staghorn coral critical habitat in the offshore waters of the southeast U.S. is extremely unlikely to occur.

5.1.9 **Proposed Critical Habitat for ESA-listed Corals**

Critical habitat for lobed star, boulder star, mountainous star, pillar and rough cactus corals has been proposed for designation. The proposed critical habitat designation areas are located within the action area in south Florida and would be located within the yellow zone, which is not preauthorized for dispersant use or ISB. Therefore, anticipated effects for these coral species critical habitats, if designated, would be the same as those described above (Section 5.1.8) for elkhorn and staghorn coral designated critical habitat. For these reasons, effects to the proposed critical habitat for these five coral species would be insignificant or extremely unlikely to occur.

5.1.10 **Johnson's Seagrass and Designated Critical Habitat**

Johnson's seagrass (*Halophila johnsonii* Eiseman) was listed as threatened in 1998 and its range is limited to southeast Florida lagoons.

Dispersants: The results of the Tropical Oil Pollution Investigations in Coastal Systems (TROPICS) study, including surveys conducted for twenty years (USCG et al. 2001, CRRT Response Technologies Committee 2015), provide evidence that seagrass beds are relatively unaffected by the use of dispersants, although the organisms in the seagrass beds may suffer mortality and then show signs of recovery.

In-Situ Burning: The formation of tarballs as a result of ISB could result in impacts to these plants through smothering of benthic habitats or due to the toxicity of tarballs. Based on the small number and extent of oil spills that have occurred to date, tarball generation and associated impacts to benthic habitats will be minimal. Therefore, we believe the effects of the use of ISB on Johnson's seagrass critical habitats would be insignificant.

Vessels: The use of vessels during dispersant application and ISB operations could affect Johnson's seagrass critical habitat due to the potential for accidental groundings, anchor damage and other physical disturbance. No accidental groundings associated with the use of response vessels have been reported in the past as part of response operations. The PDCs prohibit operations in shallow waters to protect coral and seagrass habitats from accidental groundings, vessel anchoring and lines from vessels. Therefore, we believe the potential effects to Johnson's seagrass critical habitat from vessel operations during dispersant operations and ISB activities will be extremely unlikely to occur.

Other response activities associated with the use of dispersants and ISB could affect coral and seagrass habitats, particularly the placement of boom. The PDCs include measures to avoid impacts associated with entanglement of lines in shallower habitat and guide the placement of anchors to secure the boom such that impacts to coral and seagrass habitats associated with the installation of anchors is avoided or minimized. Therefore, we believe the effects due to the potential for entanglement of lines and boom anchor impacts associated with response activities during the use of dispersants or ISB to Johnson's seagrass critical habitat will be extremely unlikely to occur.

This marine plant grows in waters completely within the yellow zone, which is not preauthorized for dispersant use or ISB and effects to the habitat are extremely unlikely. While there could be response operations adjacent to these areas, we expect effects from those operations relating to dispersant use or ISB to be localized and temporary. Therefore, the effects to Johnson's seagrass and its designated critical habitat from dispersant use and ISB are extremely unlikely to occur.

5.1.11 **Green (North Atlantic Distinct Population Segment) Sea Turtle Critical Habitat**

This habitat is completely outside the action area and will not be affected by pre-authorized dispersant use or ISB in the green zone addressed in this Opinion.

5.1.12 **Hawksbill Sea Turtle Critical Habitat**

This habitat is completely outside the action area and will not be affected by pre-authorized dispersant use or ISB in the green zone addressed in this Opinion.

5.1.13 **Leatherback Sea Turtle Critical Habitat**

This habitat is completely outside the action area and will not be affected by pre-authorized dispersant use or ISB in the green zone addressed in this Opinion.

5.2 Status of Species and Critical Habitat Likely to be Adversely Affected

This section identifies the ESA-listed species that potentially occur within the action area and are likely to be adversely affected by the proposed use of dispersants and/or ISB (Table 1). The species and designated critical habitats determined likely to be adversely affected by the proposed action are carried forward through the remainder of this Opinion. The following sections also summarize the biology and ecology of those species and what is known about their life histories in the action area. The status is determined by the level of risk that the ESA-listed species and designated critical habitat face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. The species status section helps to inform the description of the species' current "reproduction, numbers, or distribution" as described in 50 C.F.R §402.02. This section also breaks down the species and designated critical habitats that may be affected by the proposed action, describing whether or not those species and designated critical habitats are likely to be adversely affected by the proposed action. More detailed information on the status and trends of these ESA-listed species, and their biology and ecology can be found in the listing regulations and critical habitat designations published in the Federal Register, status reviews, recovery plans, and on NMFS' Web site: https://www.fisheries.noaa.gov/species-directory/threatened-endangered.

5.2.1 **Sea Turtles**

The five species of sea turtles that may be adversely affected by the proposed action (green, hawksbill, Kemp's ridley, leatherback, and loggerhead) travel widely throughout the South Atlantic, Gulf of Mexico and the Caribbean. These species are highly migratory and therefore could occur within the action area. This section will address threats to all species of sea turtles followed by information on the status and unique threats for each species.

Fisheries

Incidental bycatch in commercial fisheries is identified as a major contributor to past declines, and threat to future recovery, for all of the sea turtle species (NMFS and USFWS 1991b, USFWS and NMFS 1992, NMFS and USFWS 1993, 2008a, NMFS et al. 2011). Domestic fisheries often capture, injure, and kill sea turtles at various life stages. Sea turtles in the pelagic environment are exposed to U.S. Atlantic pelagic longline fisheries. Sea turtles in the benthic environment in waters off the coastal United States are exposed to a suite of other fisheries in federal and state waters. These fishing methods include trawls, gillnets, purse seines, hook-and-line gear (including bottom longlines and vertical lines [e.g., bandit gear, handlines, and rod-reel]), pound nets, and trap fisheries. Refer to the Environmental Baseline section of this Opinion for more specific information regarding federal and state managed fisheries affecting sea turtles within the action area). The Southeast U.S. shrimp fisheries have historically been the largest fishery threat to benthic sea turtles in the southeastern U.S., and continue to interact with and kill large numbers of sea turtles each year.

In addition to domestic fisheries, sea turtles are subject to direct as well as incidental capture in numerous foreign fisheries, further impeding the ability of sea turtles to survive and recover on a global scale. For example, oceanic-stage sea turtles, especially loggerheads and leatherbacks, that circumnavigate the Atlantic are susceptible to international longline fisheries including the Azorean, Spanish, and various other fleets (Aguilar et al. 1994, Bolten et al. 1994, Crouse 1999). Bottom longlines and gillnet fishing is known to occur in many foreign waters, including (but not limited to) the northwest Atlantic, western Mediterranean, South America, West Africa, Central America, and the Caribbean. Shrimp trawl fisheries are also occurring off the shores of numerous foreign countries and pose a significant threat to sea turtles similar to the impacts seen in U.S. waters. Many unreported takes or incomplete records by foreign fleets make it difficult to characterize the total impact that international fishing pressure is having on listed sea turtles. Nevertheless, international fisheries represent a continuing threat to sea turtle survival and recovery throughout their respective ranges.

Non-Fishery In-Water Activities

There are also many non-fishery impacts affecting the status of sea turtle species, both in the ocean and on land. In nearshore waters of the United States, the construction and maintenance of federal navigation channels has been identified as a source of sea turtle mortality. Hopper dredges, which are frequently used in ocean bar channels and sometimes in harbor channels and offshore borrow areas, move relatively rapidly and can entrain and kill sea turtles (NMFS 1997). Sea turtles entering coastal or inshore areas have also been affected by entrainment in the cooling-water systems of electrical generating plants. Other nearshore threats include harassment and/or injury resulting from private and commercial vessel operations, military detonations and training exercises, in-water construction activities, and scientific research activities.

Vessel Strikes

Where there is overlap between vessel traffic and sea turtle habitat, there is threat of vessel strike to sea turtles. High levels of vessel traffic in nearshore areas along the U.S. Atlantic and Gulf of Mexico coasts result in frequent injury and mortality of sea turtles. From 1997 to 2005, nearly 15 percent of all stranded loggerheads in this region were documented as having sustained some type of propeller or collision injury, although it is not known what proportion of these injuries were sustained ante-mortem versus post mortem. According to Reneker et al. (2017), examination of stranded turtles from Mississippi in 2017 showed trauma, primarily from vessel strikes, to be the second largest factor for mortality. In one study from Virginia, Barco et al. (2016) found that all 15 dead loggerhead turtles encountered with signs of acute vessel interaction were apparently normal and healthy prior to human-induced mortality. The incidence of propeller wounds of stranded turtles from the U.S. Atlantic and Gulf of Mexico doubled from about ten percent in the late 1980s to about 20 percent in 2004. Singel et al. (2007) reported a tripling of boat strike injuries in Florida from the 1980's to 2005. Over this time period, in Florida alone over 4,000 (~500 live; ~3500 dead) sea turtle strandings were documented with propeller wounds, which represents 30 percent of all sea turtle strandings for the state (Singel et al. 2007). These studies suggest that the threat of vessel strikes to sea turtles may be increasing over time as vessel traffic continues to increase in the southeastern US and throughout the world.

Coastal Development and Erosion Control

Coastal development can deter or interfere with nesting, affect nesting success, and degrade nesting habitats for sea turtles. Structural impacts to nesting habitat include the construction of buildings and pilings, beach armoring and renourishment, and sand extraction (Lutcavage et al. 1997, Bouchard et al. 1998). These factors may decrease the amount of nesting area available to females and change the natural behaviors of both adults and hatchlings, directly or indirectly, through loss of beach habitat or changing thermal profiles and increasing erosion, respectively (Ackerman 1997, Witherington et al. 2003, 2007). In addition, coastal development is usually accompanied by artificial lighting which can alter the behavior of nesting adults (Witherington 1992) and is often fatal to emerging hatchlings that are drawn away from the water (Witherington and Bjorndal 1991). In-water erosion control structures such as breakwaters, groins, and jetties can impact nesting females and hatchling as they approach and leave the surf zone or head out to sea by creating physical blockage, concentrating predators, creating longshore currents, and disruption of wave patterns.

Environmental Contamination

Multiple municipal, industrial, and household sources, as well as atmospheric transport, introduce various pollutants such as pesticides, hydrocarbons, organochlorides (e.g., dichlorodiphenyltrichloroethane [DDT], PCBs, and perfluorinated chemicals [PFCs]), and others that may cause adverse health effects to sea turtles (Iwata et al. 1993, Grant and Ross 2002, Garrett 2004, Hartwell 2004). Acute exposure to hydrocarbons from petroleum products released into the environment via oil spills and other discharges may directly injure individuals through skin contact with oils (Geraci 1990), inhalation at the water's surface, and ingestion of compounds while feeding (Matkin and Saulitis 1997). Hydrocarbons also have the potential to impact prey populations, and therefore may affect listed species indirectly by reducing food availability in the action area. Oil spills and spill response activities continue to be a threat to sea turtle populations in the Gulf of Mexico.

Juvenile sea turtles include oceanic juveniles (younger juveniles using surface-pelagic habitats) and nearshore benthic-stage juveniles (neritic stage defined by older juveniles using nearshore benthic habitats). Most reports of oiled juveniles are oceanic stage juveniles from convergence zones, ocean areas where currents meet to form collection points for material at or near the surface of the water. These oceanic juveniles spend a greater proportion of their time at the surface than adults; thus, their risk of exposure to floating oil slicks would be increased. In convergence zones off the east coast of Florida, tar was found in the mouths, esophagi, or stomachs of 65 out of 103 post-hatchling loggerheads (Loehefener et al. 1989). In another study (Witherington 1994), 34 percent of post-hatchlings at "weed lines" off the Florida coast had tar in their mouths or esophagi, and over half had tar caked in their jaws. Lutz (1989) reported that hatchlings have been found apparently starved to death, their beaks and esophagi blocked with tarballs.

The April 20, 2010, explosion of the DWH oil rig affected sea turtles in the Gulf of Mexico. There is an on-going assessment of the long-term effects of the spill on Gulf of Mexico marine life, including sea turtle populations. Following the spill, juvenile Kemp's ridley, green, and loggerhead sea turtles were found in *Sargassum* algae mats in the convergence zones, where currents meet and oil collected. Sea turtles found in these areas were often coated in oil and/or had ingested oil.

The Trustees involved with the Natural Resources Damage Assessment conducted a thorough assessment of the effects of the spill and response activities on sea turtles. Assessment activities included boat-based rescues, veterinary assessments, aerial surveys, satellite tracking of live sea turtles, recovery of stranded sea turtles, and movements and/or monitoring of sea turtle nests and nesting females. Oil collected from the rescued turtles was confirmed as DWH oil. They concluded that sea turtles were adversely effected by exposure to DWH oil and response activities (Trustees 2016).

"The Trustees estimated that between 4,900 and up to 7,600 large juvenile and adult sea turtles (Kemp's ridleys, loggerheads, and hardshelled sea turtles not identified to species), and between 55,000 and 160,000 small juvenile sea turtles (Kemp's ridleys, green turtles, loggerheads, hawksbills, and hardshelled sea turtles not identified to species) were killed by the DWH oil spill. Nearly 35,000 hatchling sea turtles (loggerheads, Kemp's ridleys, and green turtles) were also injured by response activities." (Trustees 2016)

The DWH event impacted sea turtles at the population level and shifted the baseline for sea turtles. To read more on the full assessment and the nature and magnitude of effects from the

DWH oil spill, please refer to the PDARP and Final PEIS at http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan.

Oil spills and spill response activities continue to be a threat to sea turtle populations in the Gulf of Mexico.

Marine debris is a continuing problem for sea turtles. Sea turtles living in the pelagic environment commonly eat or become entangled in marine debris (e.g., tar balls, plastic bags/pellets, balloons, and ghost fishing gear) as they feed along oceanographic fronts where debris and their natural food items converge. This is especially problematic for sea turtles that spend all or significant portions of their life cycle in the pelagic environment (i.e., leatherbacks, juvenile loggerheads, and juvenile green turtles).

Climate Change

There is a large and growing body of literature on past, present, and future impacts of global climate change, exacerbated and accelerated by human activities. Some of the likely effects commonly mentioned are sea level rise, increased frequency of severe weather events, and change in air and water temperatures. NOAA's climate information portal provides basic background information on these and other measured or anticipated effects (see http://www.climate.gov).

Climate change impacts on sea turtles currently cannot be predicted with any degree of certainty; however, significant impacts to the hatchling sex ratios of sea turtles may result (NMFS and USFWS 2007d). In sea turtles, sex is determined by the ambient sand temperature (during the middle third of incubation) with female offspring produced at higher temperatures and males at lower temperatures within a thermal tolerance range of 25°-35°C (Ackerman 1997). Increases in global temperature could potentially skew future sex ratios toward higher numbers of females (NMFS and USFWS 2007d).

The effects from increased temperatures may be intensified on developed nesting beaches where shoreline armoring and construction have denuded vegetation. Erosion control structures could potentially result in the permanent loss of nesting beach habitat or deter nesting females (NRC 1990b). These impacts will be exacerbated by sea level rise. If females nest on the seaward side of the erosion control structures, nests may be exposed to repeated tidal overwash (NMFS and USFWS 2007d). Sea level rise from global climate change is also a potential problem for areas with low-lying beaches where sand depth is a limiting factor, as the sea may inundate nesting sites and decrease available nesting habitat (Daniels et al. 1993, Fish et al. 2005, Baker et al. 2006). The loss of habitat as a result of climate change could be accelerated due to a combination of other environmental and oceanographic changes such as an increase in the frequency of storms and/or changes in prevailing currents, both of which could lead to increased beach loss via erosion (Antonelis et al. 2006, Baker et al. 2006).

Other changes in the marine ecosystem caused by global climate change (e.g., ocean acidification, salinity, oceanic currents, dissolved oxygen levels, nutrient distribution, etc.) could influence the distribution and abundance of lower trophic levels (e.g., phytoplankton, zooplankton, submerged aquatic vegetation, crustaceans, mollusks, forage fish, etc.) which could ultimately affect the primary foraging areas of sea turtles.

Other Threats

Predation by various land predators is a threat to developing nests and emerging hatchlings. The major predators of sea turtle nests are mammals, including raccoons, dogs, pigs, skunks, and badgers. Emergent hatchlings are preyed upon by these mammals as well as ghost crabs, laughing gulls, and the exotic South American fire ant (*Solenopsis invicta*). In addition to predation, direct harvest of eggs and adults from beaches in foreign countries continues to be a problem for various sea turtle species throughout their ranges (NMFS and USFWS 2008c).

Diseases, toxic blooms from algae and other microorganisms, and cold stunning events are additional sources of mortality that can range from local and limited to wide-scale and impacting hundreds or thousands of animals.

5.2.2 **Loggerhead Turtles (Northwest Atlantic Ocean Distinct Population Segment)**

The loggerhead sea turtle was listed as a threatened species throughout its global range on July 28, 1978. NMFS and USFWS published a final rule designating nine DPSs for loggerhead sea turtles on September 22, 2011, which became effective October 24, 2011. The Northwest Atlantic (NWA) DPS of loggerhead is the only one that occurs within the action area and therefore is the only one considered in this Opinion.

Species Description and Distribution

Loggerheads are large sea turtles. Adults in the southeast United States average about three feet (92 centimeters) long, measured as a SCL, and weigh approximately 255 pounds (116 kilograms) (Ehrhart and Yoder 1978). Adult and subadult loggerhead sea turtles typically have a light yellow plastron and a reddish brown carapace covered by non-overlapping scutes that meet along seam lines. They typically have 11 or 12 pairs of marginal scutes, five pairs of costals, five vertebrals, and a nuchal (precentral) scute that is in contact with the first pair of costal scutes (Dodd 1988).

The loggerhead sea turtle inhabits continental shelf and estuarine environments throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans (Dodd 1988). Habitat uses within these areas vary by life stage. Juveniles are omnivorous and forage on crabs, mollusks, jellyfish, and vegetation at or near the surface (Dodd 1988). Subadult and adult loggerheads are primarily found in coastal waters and eat benthic invertebrates such as mollusks and decapod crustaceans in hard-bottom habitats.

The majority of loggerhead nesting occurs at the western rims of the Atlantic and Indian Oceans concentrated in the north and south temperate zones and subtropics (NRC 1990a). For the NWA DPS, most nesting occurs along the East coast of the United States, from southern Virginia to Alabama. Additional nesting beaches for this DPS are found along the northern and western Gulf of Mexico, eastern Yucatán Peninsula, at Cay Sal Bank in the eastern Bahamas (Addison and

Morford 1996, Addison 1997), off the southwestern coast of Cuba (Gavilan 2001), and along the coasts of Central America, Colombia, Venezuela, and the eastern Caribbean Islands.

Non-nesting, adult female loggerheads are reported throughout the U.S. Atlantic, Gulf of Mexico, and Caribbean Sea. Little is known about the distribution of adult males who are seasonally abundant near nesting beaches.

The recovery plan for the NWA population of loggerhead sea turtles concluded that there is no genetic distinction between loggerheads nesting on adjacent beaches along the Florida Peninsula (NMFS and USFWS 2008c). It also concluded that specific boundaries for subpopulations could not be designated based on genetic differences alone. Thus, the recovery plan uses a combination of geographic distribution of nesting densities, geographic separation, and geopolitical boundaries, in addition to genetic differences, to identify recovery units. The recovery units are as follows: (1) the Northern Recovery Unit (Florida/Georgia border north through southern Virginia), (2) the Peninsular Florida Recovery Unit (Florida/Georgia border through Pinellas County, Florida), (3) the Dry Tortugas Recovery Unit (islands located west of Key West, Florida), (4) the Northern Gulf of Mexico Recovery Unit (Franklin County, Florida, through Texas), and (5) the Greater Caribbean Recovery Unit (Mexico through French Guiana, the Bahamas, Lesser Antilles, and Greater Antilles) (NMFS and USFWS 2008b). The recovery plan concluded that all recovery units are essential to the recovery of the species. Although the recovery plan was written prior to the listing of the NWA DPS, the recovery units for what was then termed the NWA population apply to the NWA DPS.

Life History Information

The NWA Loggerhead Recovery Team defined the following eight life stages for the loggerhead life cycle, which include the ecosystems those stages generally use: (1) egg (terrestrial zone), (2) hatchling stage (terrestrial zone), (3) hatchling swim frenzy and transitional stage (neritic zone[1]), (4) juvenile stage (oceanic zone), (5) juvenile stage (neritic zone), (6) adult stage (oceanic zone), (7) adult stage (neritic zone), and (8) nesting female (terrestrial zone) (NMFS and USFWS 2008). Loggerheads are long-lived animals. They reach sexual maturity between 20 and 38 years of age, although age of maturity varies widely among populations (Frazer and Ehrhart 1985, NMFS 2001). The annual mating season occurs from late March to early June, and female turtles lay eggs throughout the summer months. Females deposit an average of 4.1 nests within a nesting season (Murphy and Hopkins 1984), but an individual female only nests every 3.7 years on average (Tucker 2010). Each nest contains an average of 100 to 126 eggs (Dodd 1988) which incubate for 42 to 75 days before hatching (NMFS and USFWS 2008b). Loggerhead hatchlings are 1.5 to two inches long and weigh about 0.7 ounces (20 grams).

As post-hatchlings, loggerheads hatched on U.S. beaches enter the "oceanic juvenile" life stage, migrating offshore and becoming associated with *Sargassum* habitats, driftlines, and other

[1] Neritic refers to the nearshore marine environment from the surface to the sea floor where water depths do not exceed 200 meters.

convergence zones (Carr 1986, Witherington 2002, Conant et al. 2009). Oceanic juveniles grow at rates of one to two inches (2.9 to 5.4 centimeters) per year (Snover 2002, Bjorndal et al. 2003) over a period as long as seven to 12 years (Bolten et al. 1998) before moving to more coastal habitats. Studies have suggested that not all loggerhead sea turtles follow the model of circumnavigating the North Atlantic Gyre as pelagic juveniles, followed by permanent settlement into benthic environments (Laurent et al. 1998, Bolten and Witherington 2003). These studies suggest some turtles may either remain in the oceanic habitat in the North Atlantic longer than hypothesized, or they move back and forth between oceanic and coastal habitats interchangeably (Witzell 2002). Stranding records indicate that when immature loggerheads reach 15 to 24 inches (40 to 60 centimeters) SCL, they begin to reside in coastal inshore waters of the continental shelf throughout the U.S. Atlantic and Gulf of Mexico (Witzell 2002).

After departing the oceanic zone, neritic juvenile loggerheads in the NWA inhabit continental shelf waters from Cape Cod Bay, Massachusetts, south through Florida, the Bahamas, Cuba, and the Gulf of Mexico. Estuarine waters of the United States, including areas such as Long Island Sound, Chesapeake Bay, Pamlico and Core Sounds, Mosquito and Indian River Lagoons, Biscayne Bay, Florida Bay, and numerous embayments fringing the Gulf of Mexico, comprise important inshore habitat. Along the Atlantic and Gulf of Mexico shoreline, essentially all shelf waters are inhabited by loggerheads (Conant et al. 2009).

Like juveniles, non-nesting adult loggerheads also use the neritic zone. However, these adult loggerheads do not use the relatively enclosed shallow-water estuarine habitats with limited ocean access as frequently as juveniles. Areas such as Pamlico Sound, North Carolina, and the Indian River Lagoon, Florida, are regularly used by juveniles but not by adult loggerheads. Adult loggerheads do tend to use estuarine areas with more open ocean access, such as the Chesapeake Bay in the U.S. mid-Atlantic. Shallow-water habitats with large expanses of open ocean access, such as Florida Bay, provide year-round resident foraging areas for significant numbers of male and female adult loggerheads (Conant et al. 2009).

Offshore, adults primarily inhabit continental shelf waters, from New York south through Florida, the Bahamas, Cuba, and the Gulf of Mexico. Seasonal use of mid-Atlantic shelf waters, especially offshore New Jersey, Delaware, and Virginia during summer months, and offshore shelf waters, such as Onslow Bay (off the North Carolina coast), during winter months has also been documented (Hawkes et al. 2007, Hawkes et al. 2014). Satellite telemetry has identified the shelf waters along the west Florida coast, the Bahamas, Cuba, and the Yucatán Peninsula as important resident areas for adult female loggerheads that nest in Florida (Foley et al. 2008, Girard et al. 2009, Hart et al. 2012). The southern edge of the Grand Bahama Bank is important habitat for loggerheads nesting on the Cay Sal Bank in The Bahamas, but nesting females are also resident in the bights of Eleuthera, Long Island, and Ragged Islands. They also reside in Florida Bay in the United States. Moncada et al. (2010) report the recapture in Cuban waters of five adult female loggerheads originally flipper-tagged in Quintana Roo, Mexico, indicating that Cuban shelf waters likely also provide foraging habitat for adult females that nest in Mexico.

Status and Population Dynamics

A number of stock assessments and similar reviews (TEWG 1998, 2000, NMFS-SEFSC 2001, Heppell et al. 2003a, NMFS and USFWS 2008b, Conant et al. 2009, NMFS-SEFSC 2009a, TEWG 2009) have examined the stock status of loggerheads in the Atlantic Ocean, but none have been able to develop a reliable estimate of absolute population size.

Numbers of nests and nesting females can vary widely from year to year. Nesting beach surveys, though, can provide a reliable assessment of trends in the adult female population, due to the strong nest site fidelity of female loggerhead sea turtles, as long as such studies are sufficiently long and survey effort and methods are standardized (e.g., (NMFS and USFWS 2008b). NMFS and USFWS (NMFS and USFWS 2008b) concluded that the lack of change in two important demographic parameters of loggerheads, re-migration interval and clutch frequency, indicate that time series on numbers of nests can provide reliable information on trends in the female population.

Peninsular Florida Recovery Unit

The Peninsular Florida Recovery Unit is the largest loggerhead nesting assemblage in theNWA. A near-complete nest census (all beaches including index nesting beaches) undertaken from 1989 to 2007 showed an average of 64,513 loggerhead nests per year, representing approximately 15,735 nesting females per year (NMFS and USFWS 2008b). The statewide estimated total for 2016 was 122,706 nests and 18,631 of those from Florida's Gulf coast (FWRI nesting database).

Since the start of the Florida Index Nesting Beach Survey program in 1989, counts of loggerhead nests on Florida beaches have ranged from a minimum of 28,876 in 2007 to a maximum of 65,807 nests in 2016 (note: these numbers do not represent Florida's total annual nest counts because they are collected only on a subset of beaches and only during a 109-day time window) (FFWCC 2018). Following a 52 percent increase between 1989 and 1998, nest counts declined sharply (53 percent) over nearly a decade (1998-2007). However, annual nest counts showed a strong increase (65 percent) since then (2007-2017) (FFWCC 2018). Index beaches in the Florida Panhandle, which are not part of the set of core beaches, had the second highest loggerhead nest counts in 2017 since these surveys to detect trends began in that area in 1997. Based on the currently available information, NMFS categorizes the loggerhead Northwest Atlantic DPS population trend as being stable (NMFS 2017b).

In addition to the total nest count estimates, the Florida Fish and Wildlife Research Institute uses an index nesting beach survey method. The index survey uses standardized data-collection criteria to measure seasonal nesting and allow accurate comparisons between beaches and between years. This provides a better tool for understanding the nesting trends (Figure 12). FWRI performed a detailed analysis of the long-term loggerhead index nesting data (1989 to 2013) (http://myfwc.com/research/wildlife/sea-turtles/nesting/). Over that time period, three distinct trends were identified. From 1989 to 1998, there was a 30 percent increase that was then followed by a sharp decline over the subsequent decade. Large increases in loggerhead nesting occurred since then. FWRI examined the trend from the 1998 nesting high through 2013 and found the decade-long post-1998 decline had reversed and there was no longer a demonstrable trend.

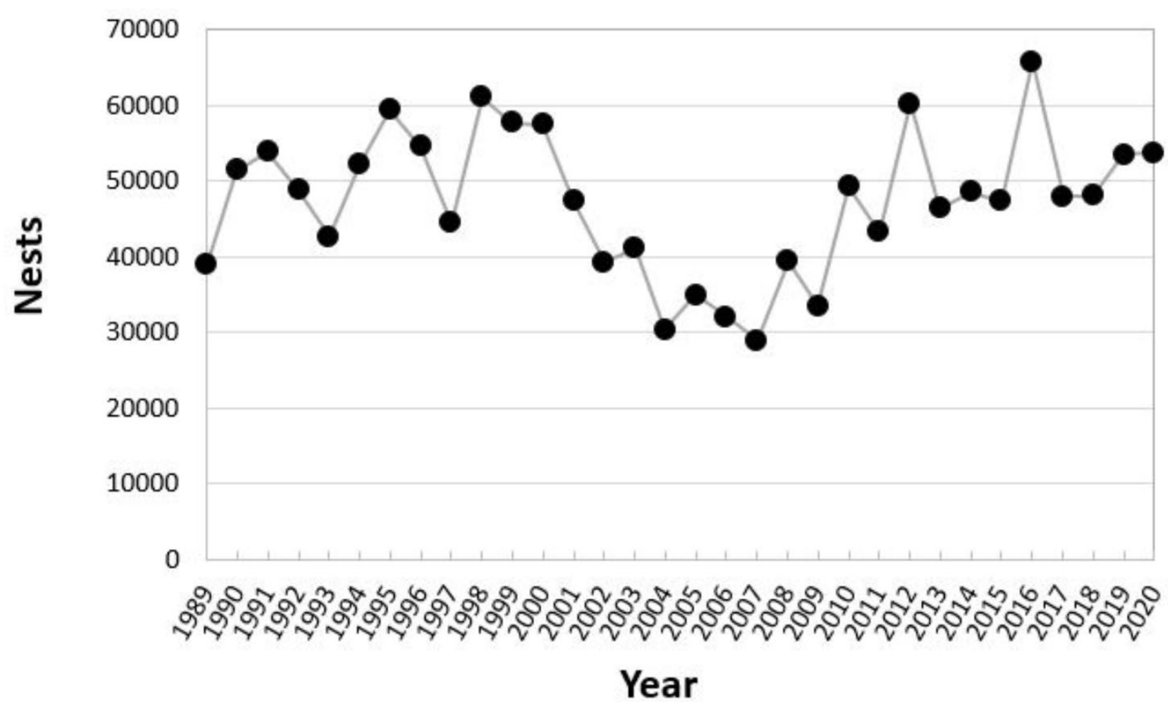

Figure 12. Loggerhead sea turtle nesting at Florida index beaches since 1989. Survey effort remained nearly identical. (Figure from Florida Fish and Wildlife Conservation Commission website on December 31, 2020- http://myfwc.com/research/wildlife/sea-turtles/nesting/).

Northern Recovery Unit

Annual nest totals from beaches within the Northern Recovery Unit averaged 5,215 nests from 1989 to 2008, a period of near-complete surveys of NRU nesting beaches (Georgia Department of Natural Resources [GADNR] unpublished data, North Carolina Wildlife Resources Commission [NCWRC] unpublished data, South Carolina Department of Natural Resources [SCDNR] unpublished data), and represent approximately 1,272 nesting females per year, assuming 4.1 nests per female (Murphy and Hopkins 1984). The loggerhead nesting trend from daily beach surveys showed a significant decline of 1.3 percent annually from 1989 to 2008. Nest totals from aerial surveys conducted by SCDNR showed a 1.9 percent annual decline in nesting in South Carolina from 1980 to 2008. Overall, there is strong statistical data to suggest the Northern Recovery Unite had experienced a long-term decline over that period of time.

Data since that analysis (Table 2) are showing improved nesting numbers and a departure from the declining trend. Georgia nesting has rebounded to show the first statistically significant increasing trend since comprehensive nesting surveys began in 1989 (Mark Dodd, GADNR press release). South Carolina and North Carolina nesting have also begun to show a shift away from the declining trend of the past.

Table 2. Total number of loggerhead nests in the northern recovery unit.

Nests Recorded	2008	2009	2010	2011	2012	2013	
Georgia	1,649	998	1,760	1,992	2,241	2,289	1,196
South Carolina	4,500	2,182	3,141	4,015	4,615	5,193	2,083
North Carolina	841	302	856	950	1,074	1,260	542
Total	6,990	3,472	5,757	6,957	7,930	8,742	3,821

Data from each states' department of natural resources nesting datasets.

South Carolina also conducts an index beach nesting survey similar to the one described for Florida. Although the survey only includes a subset of nesting, the standardized effort and locations allow for a better representation of the nesting trend over time. 2016 had the highest number of nests recorded since the start of the monitoring efforts. These data can be viewed at http://www.dnr.sc.gov/seaturtle/nest.htm.

Other Northwest Atlantic DPS Recovery Units

The remaining three recovery units—Dry Tortugas, Northern Gulf of Mexico, and Greater Caribbean—are much smaller nesting assemblages, but they are still considered essential to the continued existence of the species. Nesting surveys for the Dry Tortugas are conducted as part of Florida's statewide survey program. Survey effort was relatively stable during the nine-year period from 1995 to 2004, although the 2002 year was missed. Nest counts ranged from 168 to 270, with a mean of 246, but there was no detectable trend during this period (NMFS and USFWS 2008b). Nest counts for the Northern Gulf of Mexico are focused on index beaches rather than all beaches where nesting occurs. Analysis of the 12-year dataset (1997 to 2008) of index nesting beaches in the area shows a statistically significant declining trend of 4.7 percent annually. Nesting on the Florida Panhandle index beaches, which represents the majority of Northern Gulf of Mexico nesting, had shown a large increase in 2008, but then declined again in 2009 and 2010 before rising back to a level similar to the 2003 to 2007 average in 2011. Nesting survey effort has been inconsistent among the greater Caribbean nesting beaches, and no trend can be determined for this subpopulation (NMFS and USFWS 2008b). Zurita et al. (Zurita et al. 2003) found a statistically significant increase in the number of nests on seven of the beaches on Quintana Roo, Mexico from 1987 to 2001, where survey effort was consistent during the period. Nonetheless, nesting has declined since 2001, and the previously reported increasing trend appears to not have been sustained (NMFS and USFWS 2008b).

In-water Trends

Nesting data are the best current indicator of sea turtle population trends, but in-water data also provide some insight. In-water research suggests the abundance of neritic juvenile loggerheads is steady or increasing. Although Ehrhart et al. (2007) found no significant regression-line trend in a long-term dataset, researchers have observed notable increases in catch per unit effort (Ehrhart et al. 2007, Epperly et al. 2007, Arendt et al. 2009). Researchers believe that this increase in catch per unit effort is likely linked to an increase in juvenile abundance, although it is unclear whether this increase in abundance represents a true population increase among juveniles or merely a shift in spatial occurrence. Bjorndal et al. (2005), cited in NMFS and USFWS (NMFS and USFWS 2008b), caution about extrapolating localized in-water trends to the broader population and relating localized trends in neritic sites to population trends at nesting beaches. The apparent overall increase in the abundance of neritic loggerheads in the southeastern United States may be due to increased abundance of the largest oceanic/neritic juveniles (historically referred to as small benthic juveniles), which could indicate a relatively large number of individuals around the same age may mature in the near future (TEWG 2009). In-water studies throughout the eastern United States, however, indicate a substantial decrease in the abundance of the smallest oceanic/neritic juvenile loggerheads, a pattern corroborated by stranding data (TEWG 2009).

Population Estimate

The NMFS Southeast Fishery Science Center developed a preliminary stage/age demographic model to help determine the estimated impacts of mortality reductions on loggerhead sea turtle population dynamics (NMFS-SEFSC 2009a). The model uses the range of published information for the various parameters including mortality by stage, stage duration (years in a stage), and fecundity parameters such as eggs per nest, nests per nesting female, hatchling emergence success, sex ratio, and remigration interval. Resulting trajectories of model runs for each individual recovery unit, and the western North Atlantic population as a whole, were found to be very similar. The model run estimates, from the adult female population size for the western North Atlantic (from the 2004-2008 time frame), suggest the adult female population size approximately 20,000 to 40,000 individuals, with a low likelihood of being up to 70,000 (NMFS-SEFSC 2009a). A less robust estimate for total benthic females in the western North Atlantic was also obtained, yielding approximately 30,000 to 300,000 individuals, up to less than one million (NMFS-SEFSC 2009a). A preliminary regional abundance survey of loggerheads within the northwestern Atlantic continental shelf for positively identified loggerhead in all strata estimated about 588,000 loggerheads (interquartile range of 382,000 to 817,000). When correcting for unidentified turtles in proportion to the ratio of identified turtles, the estimate increased to about 801,000 loggerheads (interquartile range of 521,000 to 1,111,000) (NEFSC 2011).

Threats

The threats faced by loggerhead sea turtles are well-summarized in the general discussion of threats in Section 5.2.1. Yet the impact of fishery interactions is a point of further emphasis for this species. The joint NMFS and USFWS Loggerhead Biological Review Team determined that the greatest threats to the NWA DPS of loggerheads result from cumulative fishery bycatch in neritic and oceanic habitats (Conant et al. 2009).

Regarding the impacts of pollution, loggerheads may be particularly affected by organochlorine contaminants; they have the highest organochlorine concentrations (Storelli et al. 2008) and metal loads (D'Ilio et al. 2011) in sampled tissues among the sea turtle species. It is thought that dietary preferences were likely to be the main differentiating factor among sea turtle species. Storelli et al. (2008) analyzed tissues from stranded loggerhead sea turtles and found that mercury accumulates in sea turtle livers while cadmium accumulates in their kidneys, as has been reported for other marine organisms like dolphins, seals, and porpoises (Law et al. 1991a).

Specific information regarding potential climate change impacts on loggerheads is also available. Modeling suggests an increase of two degrees Celsius in air temperature would result in a sex ratio of over 80 percent female offspring for loggerheads nesting near Southport, North Carolina. The same increase in air temperatures at nesting beaches in Cape Canaveral, Florida, would result in close to 100 percent female offspring. Such highly skewed sex ratios could undermine the reproductive capacity of the species. More ominously, an air temperature increase of three degeres Celsius is likely to exceed the thermal threshold of most nests, leading to egg mortality (Hawkes et al. 2007). Warmer sea surface temperatures have also been correlated with an earlier onset of loggerhead nesting in the spring (Weishampel et al. 2004, Hawkes et al. 2007), short inter-nesting intervals (Hays et al. 2002), and shorter nesting seasons (Pike et al. 2006).

5.2.3 **Kemp's Ridley Turtles**

The Kemp's ridley sea turtle was listed as endangered on December 2, 1970, under the Endangered Species Conservation Act of 1969, a precursor to the ESA. Internationally, the Kemp's ridley is considered the most endangered sea turtle (Zwinenberg 1977, Groombridge 1982, TEWG 2000).

Species Description and Distribution

The Kemp's ridley sea turtle is the smallest of all sea turtles. Adults generally weigh less than 100 pounds (45 kilograms) and have a carapace length of around 2.1 feet (65 centimeters). Adult Kemp's ridley shells are almost as wide as they are long. Coloration changes significantly during development from the grey-black dorsum and plastron of hatchlings, a grey-black dorsum with a yellowish-white plastron as post-pelagic juveniles, and then to the lighter grey-olive carapace and cream-white or yellowish plastron of adults. There are two pairs of prefrontal scales on the head, five vertebral scutes, usually five pairs of costal scutes, and generally 12 pairs of marginal scutes on the carapace. In each bridge adjoining the plastron to the carapace, there are four scutes, each of which is perforated by a pore.

Kemp's ridley habitat largely consists of sandy and muddy areas in shallow, nearshore waters less than 120 feet (37 meters) deep, although they can also be found in deeper offshore waters. These areas support the primary prey species of the Kemp's ridley sea turtle, which consist of swimming crabs, but may also include fish, jellyfish, and an array of mollusks.

The primary range of Kemp's ridley sea turtles is within the Gulf of Mexico basin, though they also occur in coastal and offshore waters of the U.S. Atlantic Ocean and occasionally in the Mediterranean Sea which may be due to migration expansion or increased hatchling production (Tomas and Raga 2008). Juvenile Kemp's ridley sea turtles, possibly carried by oceanic currents, have been recorded as far north as Nova Scotia. Historic records indicate a nesting range from Mustang Island, Texas, in the north to Veracruz, Mexico, in the south. Nesting occurs mainly on beaches in the Gulf of Mexico in large aggregations called arribadas[2]. Kemp's ridley sea turtles have also recently been nesting along the Atlantic Coast of the United States, with nests recorded from beaches in Florida, Georgia, and the Carolinas. In 2012, the first Kemp's ridley sea turtle nest was recorded in Virginia. The Kemp's ridley nesting population was exponentially increasing (NMFS et al. 2011), however since 2009 there has been concern over the slowing of recovery (Gallaway et al. 2016a, Gallaway et al. 2016b, Plotkin 2016).

Life History Information

Kemp's ridley sea turtles share a general life history pattern similar to other sea turtles. Females lay their eggs on coastal beaches where the eggs incubate in sandy nests. After 45 to 58 days of embryonic development, the hatchlings emerge and swim offshore into deeper, ocean water where they feed and grow until returning at a larger size. Hatchlings generally range from 1.65 to 1.89 inches (42 to 48 millimeters) straight carapace length, 1.26 to 1.73 inches (32 to 44 millimeters) in width, and 0.3 0.4 pounds (15 to 20 grams) in weight. Their return to nearshore coastal habitats typically occurs around two years of age (Ogren 1989), although the time spent in the oceanic zone may vary from one to four years or perhaps more (TEWG 2000). Juvenile Kemp's ridley sea turtles use these nearshore coastal habitats from April through November, but move towards more suitable overwintering habitat in deeper offshore waters (or more southern waters along the Atlantic coast) as water temperature drops.

The average rates of growth may vary by location, but generally fall within 2.2 to 2.9 ± 2.4 inches per year (5.5 to 7.5 ± 6.2 centimterers per year (Schmid and Woodhead 2000, Schmid and Barichivich 2006)). Age to sexual maturity ranges greatly from five to 16 years, though NMFS et al. (2011) determined the best estimate of age to maturity for Kemp's ridley sea turtles was 12 years. It is unlikely that most adults grow very much after maturity. While some sea turtles nest annually, the weighted mean remigration rate for Kemp's ridley sea turtles is approximately two years. Nesting generally occurs from April to July and females lay approximately 2.5 nests per season with each nest containing approximately 100 eggs (Márquez M. 1994).

Status and Population Dynamics

Of the seven species of sea turtles in the world, the Kemp's ridley has declined to the lowest population level. Most of the population of adult females nest on the beaches of Rancho Nuevo, Mexico (Pritchard 1969). When nesting aggregations at Rancho Nuevo were discovered in 1947,

[2] Arribada is the Spanish word for "arrival" and is the term used for massive synchronized nesting within the genus *Lepidochelys.*

adult female populations were estimated to be in excess of 40,000 individuals (Hildebrand 1963). By the mid-1980s, however, nesting numbers from Rancho Nuevo and adjacent Mexican beaches were below 1,000, with a low of 702 nests in 1985. Yet, nesting steadily increased through the 1990s, and then accelerated during the first decade of the 21st century (Figure 13), which indicates the species is recovering. It is worth noting that when the Bi-National Kemp's Ridley Sea Turtle Population Restoration Project was initiated in 1978, only Rancho Nuevo nests were recorded. In 1988, nesting data from southern beaches at Playa Dos and Barra del Tordo were added. In 1989, data from the northern beaches of Barra Ostionales and Tepehuajes were added, and most recently in 1996, data from La Pesca and Altamira beaches were recorded. Nesting at Rancho Nuevo accounts for just over 81 percent of all recorded Kemp's ridley nests in Mexico. Following a significant, unexplained one-year decline in 2010, Kemp's ridley nests in Mexico reached a record high of 21,797 in 2012 (NPS 2013). In 2013, there was a second significant decline, with 16,385 nests recorded. In 2014, there were an estimated 10,987 nests and 519,000 hatchlings released from three primary nesting beaches in Mexico (NMFS 2015b).

The number of nests in Texas (mainly Padre Island) has increased over the past two decades, with one nest observed in 1985, four in 1995, 50 in 2005, 197 in 2009, 209 in 2012 and 119 in 2014 (NMFS 2015b). Figure 14 shows a trajectory for the animals that nest in Texas similar to those that nest in Mexico.

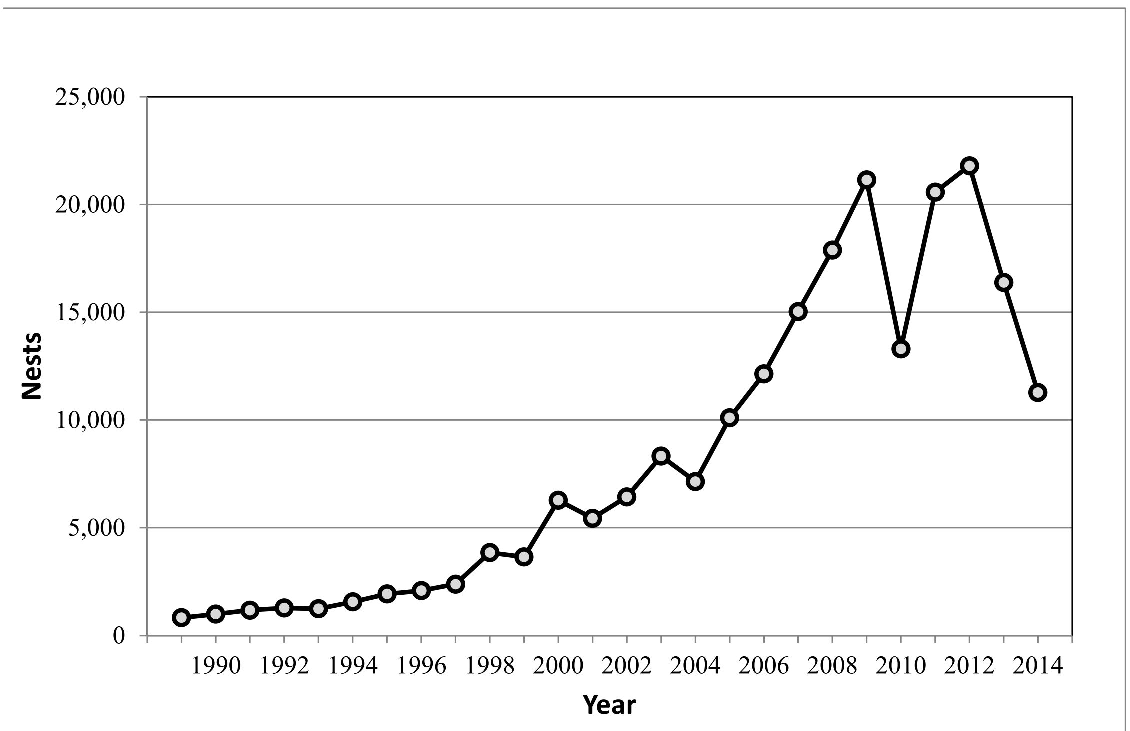

Figure 13. Kemp's ridley nest totals from Mexican beaches (Gladys Porter Zoo nesting database 2014).

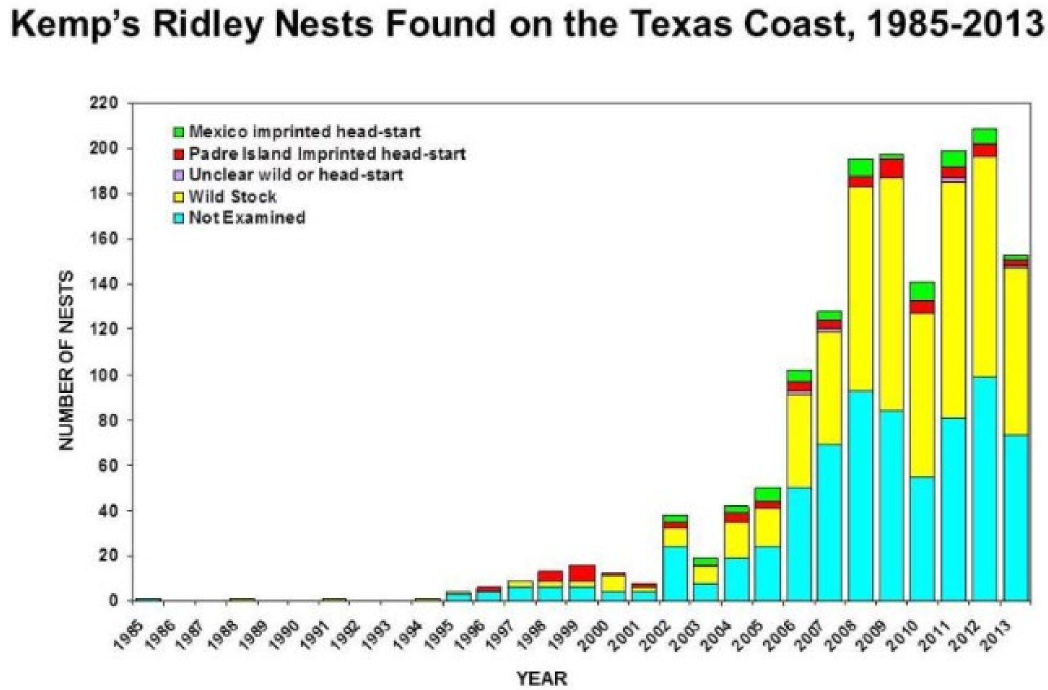

Figure 14. Number of Kemp's ridley nests on Texas beaches (NPS 2013).

Heppell et al. (2005) predicted in a population model that the population is expected to increase at least 12 to 16 percent per year and that the population could attain at least 10,000 females nesting on Mexico beaches by 2015. NMFS et al. (2011) produced an updated model that predicted the population to increase 19 percent per year and attain at least 10,000 females nesting on Mexico beaches by 2011. Approximately 25,000 nests would be needed for an estimate of 10,000 nesters on the beach, based on an average 2.5 nests/nesting female. While counts did not reach 25,000 nests by 2012, it is clear that the population is steadily increasing. The recent increases in Kemp's ridley sea turtle nesting seen in the last two decades is likely due to a combination of management measures including elimination of direct harvest, nest protection, the use of turtle exclusion devices, reduced trawling effort in Mexico and the United States, and possibly other changes in vital rates (TEWG 1998, 2000). The species limited range as well as low global abundance makes it particularly vulnerable to new sources of mortality as well as demographic and environmental randomness, all of which are often difficult to predict with any certainty.

Genetic variability in Kemp's ridley turtles is considered to be high, as measured by heterozygosis at microsatellite loci (NMFS 2011a). Additional analysis of the mitochondrial DNA taken from samples of Kemp's ridley turtles at Padre Island, Texas, showed six distinct haplotypes, with one found at both Padre Island and Rancho Nuevo (Dutton et al. 2006).

Threats

Kemp's ridley sea turtles face many of the same threats as other sea turtle species, including destruction of nesting habitat from storm events, oceanic events such as cold-stunning, pollution (plastics, petroleum products, petrochemicals, etc.), ecosystem alterations (nesting beach development, beach nourishment and shoreline stabilization, vegetation changes, etc.), poaching, global climate change, fisheries interactions, natural predation, and disease. Of the five sea turtle species in the Gulf of Mexico, Kemp's ridley sea turtles are the most vulnerable to threats, especially threats that cause population-level impacts such as the DWH oil spill and response, due to their already low numbers and location of nesting habitat. We discussed some of these threats in section 5.2.1 as relevant to all sea turtle species. The remainder of this section will expand on a few of the aforementioned threats and how they may specifically impact Kemp's ridley sea turtles.

As Kemp's ridley sea turtles continue to recover and nesting arribadas are increasingly established, bacterial and fungal pathogens in nests are also likely to increase. Bacterial and fungal pathogen impacts have been well documented in the large arribadas of the olive ridley at Nancite in Costa Rica (Mo 1988). In some years, and on some sections of the beach, the hatching success can be as low as five percent (Mo 1988). As the Kemp's ridley nest density at Rancho Nuevo and adjacent beaches continues to increase, appropriate monitoring of emergence success will be necessary to determine if there are any density-dependent effects.

NMFS has documented (via the Sea Turtle Stranding and Salvage Network data, http://www.sefsc.noaa.gov/species/turtles/strandings.htm) elevated sea turtle strandings in the Northern Gulf of Mexico. In the first three weeks of June 2010, over 120 sea turtle strandings were reported from Mississippi and Alabama waters, none of which exhibited any signs of external oiling to indicate effects associated with the DWH oil spill event. A total of 644 sea turtle strandings were reported in 2010 from Louisiana, Mississippi, and Alabama waters, 561 (87 percent) of which were Kemp's ridley sea turtles. During March through May of 2011, 267 sea turtle strandings were reported from Mississippi and Alabama waters alone. A total of 525 sea turtle strandings were reported in 2011 from Louisiana, Mississippi, and Alabama waters, with the majority (455) occurring from March through July, 390 (86 percent) of which were Kemp's ridley sea turtles. During 2012, a total of 428 sea turtles were reported from Louisiana, Mississippi, and Alabama waters, though the data are incomplete. Of these reported strandings, 301 (70 percent) were Kemp's ridley sea turtles. These stranding numbers are significantly greater than reported in past years; Louisiana, Mississippi, and Alabama waters reported 42 and 73 sea turtle strandings for 2008 and 2009, respectively. It should be noted that stranding coverage has increased considerably due to the DWH oil spill event.

Nonetheless, considering that strandings typically represent only a small fraction of actual mortality, these stranding events potentially represent a serious impact to the recovery and survival of the local sea turtle populations. While a definitive cause for these strandings has not been identified, necropsy results indicate a significant number of stranded turtles from these events likely perished due to forced submergence, which is commonly associated with fishery interactions (Stacy 2015). Yet, available information indicates fishery effort was extremely limited during the stranding events. It is notable that in both 2010 and 2011 approximately 85 percent of all Louisiana, Mississippi, and Alabama stranded sea turtles were Kemp's ridleys; however, this could simply be a function of the species' preference for shallow, inshore waters coupled with increased population abundance as reflected in recent Kemp's ridley nesting increases.

In response to these strandings, and due to speculation that fishery interactions may be the cause, fishery observer effort was shifted to evaluate the inshore skimmer trawl fishery during the summer of 2012. During May-July of that year, observers reported 24 sea turtle interactions in the skimmer trawl fishery, all but one of which were identified as Kemp's ridleys (one sea turtle was an unidentified hardshell turtle). Encountered sea turtles were all very small, juvenile specimens ranging from 7.6 yo 19.0 inches (19.4 to 48.3 centimeters) curved carapace length (CCL), and all sea turtles were released alive. The small average size of encountered Kemp's ridleys introduces a potential conservation issue, as over 50 percent of these reported sea turtles could potentially pass through the maximum four-inch bar spacing of TEDs currently required in the shrimp fishery. Due to this issue, a proposed 2012 rule to require TEDs in the skimmer trawl fishery (77 FR 27411) was not implemented. Given the nesting trends and habitat utilization of Kemp's ridley sea turtles, it is likely that fishery interactions in the Northern Gulf of Mexico may continue to be an issue of concern for the species, and one that may potentially slow the rate of recovery for Kemp's ridley sea turtles.

While oil spill impacts are discussed generally for all species in Section 5.2.1 specific impacts of the DWH oil spill event on Kemp's ridley sea turtles are considered here. Kemp's ridleys experienced the greatest negative impact stemming from the DWH oil spill event of any sea turtle species. Impacts to Kemp's ridley sea turtles occurred to offshore small juveniles, as well as large juveniles and adults. Loss of hatchling production resulting from injury to adult turtles was also estimated for this species. Injuries to adult turtles of other species, such as loggerheads, certainly would have resulted in unrealized nests and hatchlings to those species as well. Yet, the calculation of unrealized nests and hatchlings was limited to Kemp's ridleys for several reasons. All Kemp's ridleys in the Gulf belong to the same population (NMFS et al. 2011), so total population abundance could be calculated based on numbers of hatchlings because all individuals that enter the population could reasonably be expected to inhabit the northern Gulf of Mexico throughout their lives (DWH Trustees 2015).

A total of 217,000 small juvenile Kemp's ridleys (51.5 percent of the total small juvenile sea turtle exposures to oil from the spill) were estimated to have been exposed to oil. That means approximately half of all small juvenile Kemp's ridleys from the total population estimate of 430,000 oceanic small juveniles were exposed to oil. Furthermore, a large number of small juveniles were removed from the population, as up to 90,300 small juveniles Kemp's ridleys are estimated to have died as a direct result of the exposure. Therefore, as much as 20 percent of the small oceanic juveniles of this species were killed during that year. Impacts to large juveniles (greater than three years old) and adults were also high. An estimated 21,990 such individuals were exposed to oil (about 22 percent of the total estimated population for those age classes); of those, 3,110 mortalities were estimated (or three percent of the population for those age classes). The loss of near-reproductive and reproductive-stage females would have contributed to some extent to the decline in total nesting abundance observed between 2011 and 2014. The estimated number of unrealized Kemp's ridley nests is between 1,300 and 2,000, which translates to between approximately 65,000 and 95,000 unrealized hatchlings (DWH Trustees 2015). This is a minimum estimate, however, because the sublethal effects of the DWH oil spill event on turtles, their prey, and their habitats might have delayed or reduced reproduction in subsequent years, which may have contributed substantially to additional nesting deficits observed following the DWH oil spill event. These sublethal effects could have slowed growth and maturation rates, increased remigration intervals, and decreased clutch frequency (number of nests per female per nesting season). The nature of the DWH oil spill event effect on reduced Kemp's ridley nesting abundance and associated hatchling production after 2010 requires further evaluation. It is clear that the DWH oil spill event resulted in large losses to the Kemp's ridley population across various age classes, and likely had an important population-level effect on the species. Still, we do not have a clear understanding of those impacts on the population trajectory for the species into the future.

5.2.4 Green Turtles (North Atlantic and South Atlantic Distinct Population Segments)

The green sea turtle was listed as threatened under the ESA on July 28, 1978, except for the Florida and Pacific coast of Mexico breeding populations, which were listed as endangered. Of the 11 green sea turtle DPSs that were listed on May 6, 2016, only the North Atlantic DPS and South Atlantic DPS occur within the action area. Three of the green sea turtle DPSs were listed as endangered and the other eight including the North Atlantic DPS and South Atlantic DPS were listed as threatened.

Species Description and Distribution

The green sea turtle is the largest of the hardshell marine turtles, growing to a weight of 350 pounds (159 kilograms) and a straight carapace length of greater than 3.3 feet (one meter). Green sea turtles have a smooth carapace with four pairs of lateral (or costal) scutes and a single pair of elongated prefrontal scales between the eyes. They typically have a black dorsal surface and a white ventral surface, although the carapace of green sea turtles in the Atlantic Ocean has been known to change in color from solid black to a variety of shades of grey, green, or brown and black in starburst or irregular patterns (Lagueux 2001).

With the exception of post-hatchlings, green sea turtles live in nearshore tropical and subtropical waters where they generally feed on marine algae and seagrasses. They have specific foraging grounds and may make large migrations between these forage sites and natal beaches for nesting (Hays et al. 2001). Green sea turtles nest on sandy beaches of mainland shores, barrier islands, coral islands, and volcanic islands in more than 80 countries worldwide (Hirth and USFWS

1997). The two largest nesting populations are found at Tortuguero, on the Caribbean coast of Costa Rica, and Raine Island, on the Pacific coast of Australia along the Great Barrier Reef.

Differences in mitochondrial DNA properties of green sea turtles from different nesting regions indicate there are genetic subpopulations (Bowen et al. 1992, Fitzsimmons et al. 2006). Despite the genetic differences, sea turtles from separate nesting origins are commonly found mixed together on foraging grounds throughout the species' range. Within U.S. waters individuals from both the North Atlantic and South Atlantic DPSs can be found on foraging grounds. While there are currently no in-depth studies available to determine the percent of North Atlantic and South Atlantic DPS individuals in any given location, two small-scale studies provide an insight into the degree of mixing on the foraging grounds. An analysis of cold-stunned green turtles in St. Joseph Bay, Florida (northern Gulf of Mexico) found approximately four percent of individuals came from nesting stocks in the South Atlantic DPS (specifically Suriname, Aves Island, Brazil, Ascension Island, and Guinea Bissau) (Foley et al. 2007). On the Atlantic coast of Florida, a study on the foraging grounds off Hutchinson Island found that approximately five percent of the turtles sampled came from the Aves Island/Suriname nesting assemblage, which is part of the South Atlantic DPS (Bass and Witzell 2000). All of the individuals in both studies were benthic juveniles. Available information on green turtle migratory behavior indicates that long distance dispersal is only seen for juvenile turtles. This suggests that larger adult-sized turtles return to forage within the region of their natal rookeries, thereby limiting the potential for gene flow across larger scales (Monzón-Argüello et al. 2010).

In U.S. Atlantic and Gulf of Mexico waters, green sea turtles are distributed throughout inshore and nearshore waters from Texas to Massachusetts. Principal benthic foraging areas in the southeastern United States include Aransas Bay, Matagorda Bay, Laguna Madre, and the Gulf inlets of Texas (Hildebrand 1982, Doughty 1984, Shaver 1994), the Gulf of Mexico off Florida from Yankeetown to Tarpon Springs (Caldwell and Carr 1957, Carr 1984), Florida Bay and the Florida Keys (Schroeder and Foley 1995), the Indian River Lagoon system in Florida (Ehrhart 1983), and the Atlantic Ocean off Florida from Brevard through Broward Counties (Guseman and Ehrhart 1992, Wershoven and Wershoven 1992). The summer developmental habitat for green sea turtles also encompasses estuarine and coastal waters from North Carolina to as far north as Long Island Sound (Musick and Limpus 1997). Additional important foraging areas in the western Atlantic include the Culebra archipelago and other Puerto Rico coastal waters, the south coast of Cuba, the Mosquito Coast of Nicaragua, the Caribbean coast of Panama, scattered areas along Colombia and Brazil (Hirth 1971), and the northwestern coast of the Yucatán Peninsula.

The complete nesting range of green sea turtles within the southeastern United States includes sandy beaches between Texas and North Carolina, as well as the U.S. Virgin Islands and Puerto Rico (NMFS and USFWS 1991a, Dow et al. 2007). Figure 15 depicts abundance estimates and location of nests. Still, the vast majority of green sea turtle nesting within the southeastern United States occurs in Florida (Johnson and Ehrhart 1994, Meylan et al. 1995). Principal U.S.

nesting areas for green sea turtles are in eastern Florida, predominantly Brevard south through Broward counties. For more information on green sea turtle nesting in other ocean basins, refer to the 1991 publication, *Recovery Plan for the Atlantic Green Turtle* (NMFS and USFWS 1991a) or the 2007 publication, *Green Sea Turtle Five-Year Status Review* (NMFS and USFWS 2007b).

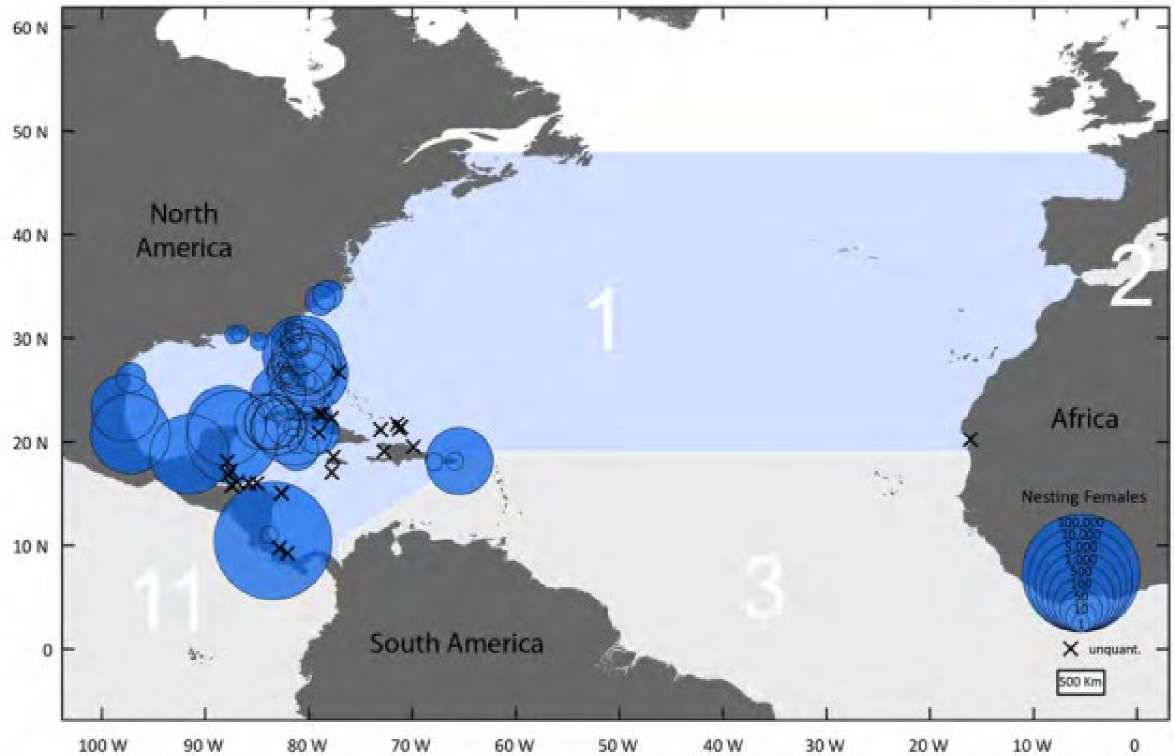

Figure 15. Geographic range of the North Atlantic distinct population segment green turtle, with location and abundance of nesting females. An 'x' signifies nesting sites lacking abundance information and the size of the circle depicts estimated abundance. Figure from (Seminoff et al. 2015a).

Life History

Green sea turtles reproduce sexually, and mating occurs in the waters off nesting beaches. Mature females return to their natal beaches (i.e., the same beaches where they were born) to lay eggs (Balazs 1982, Frazer and Ehrhart 1985) every two to four years while males are known to reproduce every year (Balazs 1983). In the southeastern United States, females generally nest between June and September, and peak nesting occurs in June and July (Witherington and Ehrhart 1989). During the nesting season, females nest at approximately two-week intervals, laying an average of three to four clutches (Johnson and Ehrhart 1996). Clutch size often varies among subpopulations, but mean clutch size is approximately 110 to 115 eggs. In Florida, green sea turtle nests contain an average of 136 eggs (Witherington and Ehrhart 1989). Eggs incubate for approximately two months before hatching. Hatchling green sea turtles are approximately two inches (five centimeters) in length and weigh approximately 0.9 ounces (25 grams). Survivorship at any particular nesting site is greatly influenced by the level of anthropogenic stressors, with the more pristine and less disturbed nesting sites (e.g., along the Great Barrier Reef in Australia) showing higher survivorship values than nesting sites known to be highly disturbed (e.g., Nicaragua (Campbell and Lagueux 2005, Chaloupka and Limpus 2005)).

After emerging from the nest, hatchlings swim to offshore areas and go through a post-hatchling pelagic stage where they are believed to live for several years. During this life stage, green sea turtles feed close to the surface on a variety of marine algae and other life associated with drift lines and debris. his early oceanic phase remains one of the most poorly understood aspects of green sea turtle life history (NMFS and USFWS 2007c). Green sea turtles exhibit particularly slow growth rates of about 0.4 to two inches (one to five centimeters) per year (Green 1993, McDonald-Dutton and Dutton 1998), which may be attributed to their largely herbivorous, low-net energy diet (Bjorndal 1982). At approximately eight to 10 inches (20 to 25 centimteres) carapace length, juveniles leave the pelagic environment and enter nearshore developmental habitats such as protected lagoons and open coastal areas rich in sea grass and marine algae. Growth studies using skeletochronology indicate that green sea turtles in the western Atlantic shift from the oceanic phase to nearshore developmental habitats after approximately five to six years (Zug and Glor 1998, Bresette et al. 2006). Within the developmental habitats, juveniles begin the switch to a more herbivorous diet, and by adulthood feed almost exclusively on seagrasses and algae (Rebel 1974), although some populations are known to also feed heavily on invertebrates (Carballo et al. 2002). Green sea turtles mature slowly, requiring 20 to 50 years to reach sexual maturity (Chaloupka and Musick 1997, Hirth and USFWS 1997).

While in coastal habitats, green sea turtles exhibit site fidelity to specific foraging and nesting grounds, and it is clear they are capable of "homing in" on these sites if displaced (McMichael et al. 2003, Hart et al. 2013). Reproductive migrations of Florida green sea turtles have been identified through flipper tagging and/or satellite telemetry. Based on these studies, the majority of adult female Florida green sea turtles reside in nearshore foraging areas throughout the Florida Keys and in the waters southwest of Cape Sable, with some post-nesting turtles also residing in Bahamian waters as well (NMFS and USFWS 2007c, Hart et al. 2013).

Status and Population Dynamics

Worldwide, nesting data at 464 sites indicate that 563,826 to 564,464 females nest each year (Seminoff et al. 2015a). Compared to other DPSs, the North Atlantic DPS exhibits the highest nester abundance, with approximately 167,424 females at seventy-three nesting sites (Figure 15), and available data indicate an increasing trend in nesting. The largest nesting site in the North Atlantic DPS is in Tortuguero, Costa Rica, which hosts 79 percent of nesting females for the DPS (Seminoff et al. 2015a).

For the North Atlantic DPS, the available data indicate an increasing trend in nesting. There are no reliable estimates of population growth rate for the DPS as a whole, but estimates have been developed at a localized level. Modeling by Chaloupka et al. (2008a) using data sets of 25 years or more show the Florida nesting stock at the Archie Carr National Wildlife Refuge growing at an annual rate of 13.9 percent, and the Tortuguero, Costa Rica, population growing at 4.9 percent.

The North Atlantic DPS has a globally unique haplotype, which was a factor in defining the discreteness of the population for the DPS. Evidence from mitochondrial DNA studies indicates that there are at least four independent nesting subpopulations in Florida, Cuba, Mexico and Costa Rica (Seminoff et al. 2015). More recent genetic analysis indicates that designating a new western Gulf of Mexico management unit might be appropriate (Shamblin et al. 2016).

The South Atlantic DPS nesting data is poor with only occasional or incomplete surveys. Therefore according to the listing rule (80 FR 15271), for 37 of the 51 identified nesting areas of this DPS, we were not able to estimate nesting female abundance, even for relatively large nesting sites such as French Guiana. Of the nesting sites for which an estimate could be derived, three account for the bulk of the nesting: Poilão, Guinea-Bissau (29,016 nesting females); Ascension Island, UK (13,417 nesting females); and the Galibi Reserve, Suriname (9,406 nesting females). There are two sites with >10,000 nesting females (Poilão and Ascension Island); one site with 5,001-10,000 nesting females (Suriname); three sites with 1,001-5,000 nesting females, Trindade Island, Brazil (2,016); Aves Island, Venezuela (2,833); and Matapica Reserve, Suriname (3,661). There are three sites with 501-1,001 nesting females, three sites with 101-500, two sites with 51-100, and 37 unquantified sites. Poilão accounts for almost 46 percent of the total number of nesting females (80 FR 15271). A minimum estimate based on information from the listing rule would be approximately 66,351 nesting females.

The green turtle has a circumglobal distribution, occurring throughout nearshore tropical, subtropical and, to a lesser extent, temperate waters. Green turtles from the North Atlantic DPS originate from the boundary of South and Central America (7.5°N, 77°W) in the south, throughout the Caribbean, the Gulf of Mexico, and the U.S. Atlantic coast to New Brunswick, Canada (48°N, 77°W) in the north. The range of the DPS then extends due east along latitudes 48°N and 19°N to the western coasts of Europe and Africa (Figure 15). Nesting occurs primarily in Costa Rica, Mexico, Florida and Cuba.

In the continental United States, green sea turtle nesting occurs along the Atlantic coast, primarily along the central and southeast coast of Florida where an estimated 200-1,100 females nest each year (Meylan et al. 1994, Weishampel et al. 2003). Occasional nesting has also been documented along the Gulf Coast of Florida (Meylan et al. 1995); in Texas, Georgia and in North Carolina (seaturtle.org accessed on June 19, 2017).

In Florida, index beaches were established to standardize data collection methods and effort on key nesting beaches. Since establishment of the index beaches in 1989, the pattern of green sea turtle nesting has generally shown biennial peaks in abundance with a positive trend during the ten years of regular monitoring (Figure 16). According to data collected from Florida’s index nesting beach survey from 1989 to 2016, green sea turtle nest counts across Florida have increased approximately 100-fold from a low of 267 in the early 1990s to a high of 27,975 in

2015. Green turtle nesting tends to follow a biennial pattern of fluctuation (Figure 16). Modeling by Chaloupka et al. (2008b) using data sets of 25 years or more has resulted in an estimate of the Florida nesting stock at the Archie Carr National Wildlife Refuge growing at an annual rate of 13.9 percent. Apparent increases in nester abundance for the North Atlantic DPS in recent years are encouraging but must be viewed cautiously, as the datasets represent a fraction of a green sea turtle generation, up to 50 years.

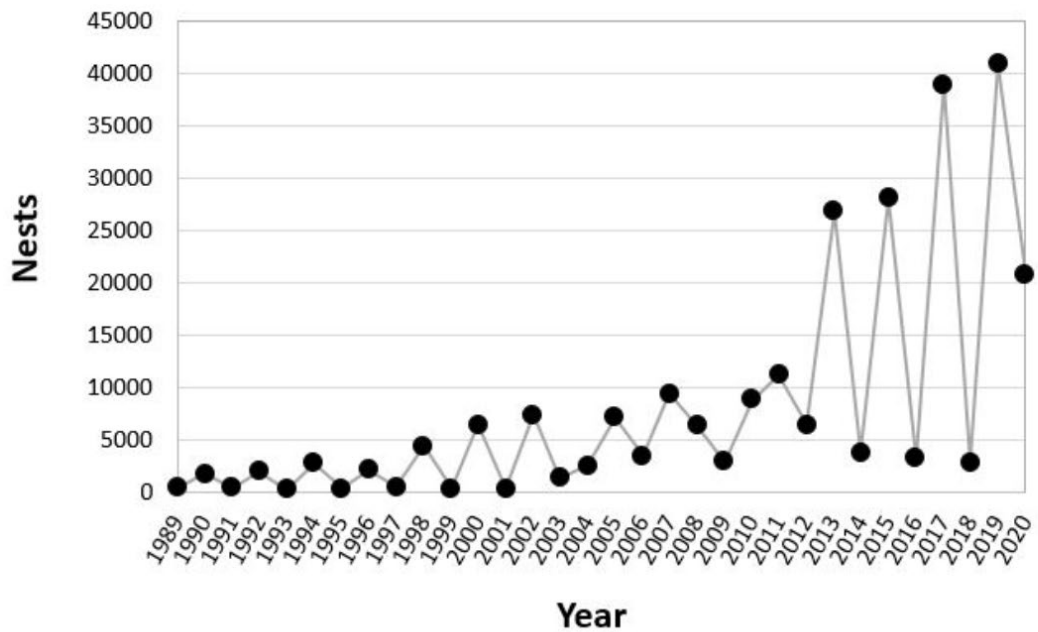

Figure 16. Green sea turtle nesting at Florida index beaches since 1989. Figure from http://myfwc.com/research/wildlife/sea-turtles/nesting/beach-survey-totals/ Accessed December 31, 2020.

Threats

The principal cause of past declines and extirpations of green sea turtle assemblages has been the overexploitation of the species for food and other products. Although intentional take of green sea turtles and their eggs is not extensive within the southeastern United States, green sea turtles that nest and forage in the region may spend large portions of their life history outside the region and outside U.S. jurisdiction, where exploitation is still a threat. While the threats of pollution, habitat loss through coastal development or stabilization, destruction of nesting habitat from storm events, beachfront lighting, poaching, global climate change, fisheries interactions, natural predation, disease and fisheries bycatch continue, the green turtle appears to be somewhat resilient to future perturbations. We discussed some of these in section 5.2.1 as relevant to all sea turtle species, and will discuss the species-specific threats below.

In addition to anthropogenic threats, green sea turtles are susceptible to natural mortality from Fibropapillomatosis (FP) disease. FP results in the growth of tumors on soft external tissues (flippers, neck, tail, etc.), the carapace, the eyes, the mouth, and internal organs (gastrointestinal tract, heart, lungs, etc.) of turtles (Jacobson et al. 1989, Herbst 1994, Aguirre et al. 2002). These tumors range in size from 0.04 inches (0.1 centimeters) to greater than 11.81 inches (30 centimterers) in diameter and may affect swimming, vision, feeding, and organ function (Jacobson et al. 1989, Herbst 1994, Aguirre et al. 2002). Presently, scientists are unsure of the exact mechanism causing this disease, though it is believed to be related to both an infectious agent, such as a virus (Herbst et al. 1995), and environmental conditions (e.g., habitat degradation, pollution, low wave energy, and shallow water (Foley et al. 2005, Jones et al. 2015). Presently, FP is cosmopolitan, but it has been found to affect large numbers of animals in specific areas, including Hawaii and Florida (Jacobson 1990, Jacobson et al. 1991, Herbst 1994).

Cold-stunning is another natural threat to green sea turtles. Although it is not considered a major source of mortality in most cases, as temperatures fall below 46.4 and 50°F (8 and 10°C) turtles may lose their ability to swim and dive, often floating to the surface. The rate of cooling that precipitates cold-stunning appears to be the primary threat, rather than the water temperature itself (Milton and Lutz 2003). Sea turtles that overwinter in inshore waters are most susceptible to cold-stunning because temperature changes are most rapid in shallow water (Witherington and Ehrhart 1989). During January 2010, an unusually large cold-stunning event in the southeastern United States resulted in around 4,600 sea turtles, mostly greens, found cold-stunned, with hundreds found dead or dying (Avens et al. 2012). Several large cold-stunning events occurred in the western Gulf of Mexico in early 2010, early 2011, late 2013 to early 2014, and late 2014 to early 2015 resulting in 464, 1,683, 1,300, and nearly 700 green sea turtles found cold-stunned in Texas, respectively. Some were found dead or died after stranding, while approximately two-thirds were rehabilitated and released (Shaver et al. 2015).

Whereas oil spill impacts are discussed generally for all species, specific impacts of the DWH spill on green sea turtles are considered here. Impacts to green sea turtles occurred to offshore small juveniles only. A total of 154,000 small juvenile greens (36.6 percent of the total small juvenile sea turtle exposures to oil from the spill) were estimated to have been exposed to oil. A large number of small juveniles were removed from the population, as 57,300 small juveniles greens are estimated to have died as a result of the exposure. A total of four nests (580 eggs) were also translocated during response efforts, with 455 hatchlings released (the fate of which is unknown) (DWH Trustees 2015). Additional unquantified effects may have included inhalation of volatile compounds, disruption of foraging or migratory movements due to surface or subsurface oil, ingestion of prey species contaminated with oil and/or dispersants, and loss of foraging resources which could lead to compromised growth and/or reproductive potential. There is no information currently available to determine the extent of those impacts, if they occurred.

While green turtles regularly use the northern Gulf of Mexico, they have a widespread distribution throughout the entire Gulf of Mexico, Caribbean, and Atlantic, and the proportion of the population using the northern Gulf of Mexico at any given time is relatively low. Although it is known that adverse impacts occurred and numbers of animals in the Gulf of Mexico were reduced as a result of the 2010 DWH oil spill, the relative proportion of the population that is expected to have been exposed to and directly impacted by the DWH event, as well as the impacts being primarily to smaller juveniles (lower reproductive value than adults and large juveniles), reduces the impact to the overall population. It is unclear what impact these losses may have caused on a population level, but it is not expected to have had a large impact on the population trajectory moving forward. However, recovery of green turtle numbers equivalent to what was lost in the northern Gulf of Mexico as a result of the spill will likely take decades of sustained efforts to reduce the existing threats and enhance survivorship of multiple life stages (DWH Trustees 2015).

Recovery Goals

See the 1998 and 1991 recovery plans for the Pacific, East Pacific and Atlantic populations of green turtles for complete down-listing/delisting criteria for recovery goals for the species. Broadly, recovery plan goals emphasize the need to protect and manage nesting and marine habitat, protect and manage populations on nesting beaches and in the marine environment, increase public education, and promote international cooperation on sea turtle conservation topics.

5.2.1 **Leatherback Turtles**

The leatherback sea turtle was listed as endangered throughout its entire range on June 2, 1970, under the Endangered Species Conservation Act of 1969.

Species Description and Distribution

The leatherback is the largest sea turtle in the world, with a curved carapace length often exceeding five feet (150 centimeters) and front flippers that can span almost nine feet (270 centimeters) (NMFS and USFWS 1998b). Mature males and females can reach lengths of over six fee (two meters) and weigh close to 2,000 pounds (900 kilograms). The leatherback does not have a bony shell. Instead, its shell is approximately 1.5 inches (four centimeters) thick and consists of a leathery, oil-saturated connective tissue overlaying loosely interlocking dermal bones. The ridged shell and large flippers help the leatherback during its long-distance trips in search of food.

Unlike other sea turtles, leatherbacks have several unique traits that enable them to live in cold water. For example, leatherbacks have a countercurrent circulatory system[3] (Greer et al. 1973), a thick layer of insulating fat (Goff and Lien 1988, Davenport et al. 1990), gigantothermy[4] (Paladino et al. 1990), and they can increase their body temperature through increased metabolic

[3] Countercurrent circulation is a highly efficient means of minimizing heat loss through the skin's surface because heat is recycled. For example, a countercurrent circulation system often has an artery containing warm blood from the heart surrounded by a bundle of veins containing cool blood from the body's surface. As the warm blood flows away from the heart, it passes much of its heat to the colder blood returning to the heart via the veins. This conserves heat by recirculating it back to the body's core.

[4] "Gigantothermy" refers to a condition when an animal has relatively high volume compared to its surface area, and as a result, it loses less heat.

activity (Southwood et al. 2005, Bostrom and Jones 2007). These adaptations allow leatherbacks to be comfortable in a wide range of temperatures, which helps them to travel further than any other sea turtle species (NMFS and USFWS 1995). For example, a leatherback may swim more than 6,000 miles (10,000 kilometers) in a single year (Eckert 2006, Eckert et al. 2006, Benson et al. 2007a, Benson et al. 2011). They search for food between latitudes 71°N and 47°S, in all oceans, and travel extensively to and from their tropical nesting beaches.

While leatherbacks will look for food in coastal waters, they appear to prefer the open ocean at all life stages (Heppell et al. 2003b). Leatherbacks have pointed tooth-like cusps and sharp-edged jaws that are adapted for a diet of soft-bodied prey such as jellyfish and salps. A leatherback's mouth and throat also have backward-pointing spines that help retain jelly-like prey. Leatherbacks' favorite prey (e.g., medusae, siphonophores, and salps) occur commonly in temperate and northern or sub-arctic latitudes and likely has a strong influence on leatherback distribution in these areas (Plotkin 1995). Leatherbacks are known to be deep divers, with recorded depths in excess of a half-mile (Eckert et al. 1989), but they may also come into shallow waters to locate prey items. In the Atlantic Ocean, they are found as far north as the North Sea, Barents Sea, Newfoundland, and Labrador and as far south as Argentina and the Cape of Good Hope, South Africa (NMFS USFWS 2013). In the U.S., important nesting areas include Florida, St. Croix U.S. Virgin Islands, and Puerto Rico. Other islands of the Caribbean south to Brazil and Venezuela are also important nesting areas in the western Atlantic (NMFS USFWS 2013). Figure 17 displays subpopulation nesting areas and ranges.

Genetic analyses using microsatellite markers along with mitochondrial DNA and tagging data indicate there are seven groups or breeding populations in the Atlantic Ocean: Florida, Northern Caribbean, Western Caribbean, Southern Caribbean/Guianas, West Africa, South Africa, and Brazil (TEWG 2007a). General differences in migration patterns and foraging grounds may occur between the seven nesting assemblages, although data to support this is limited in most cases.

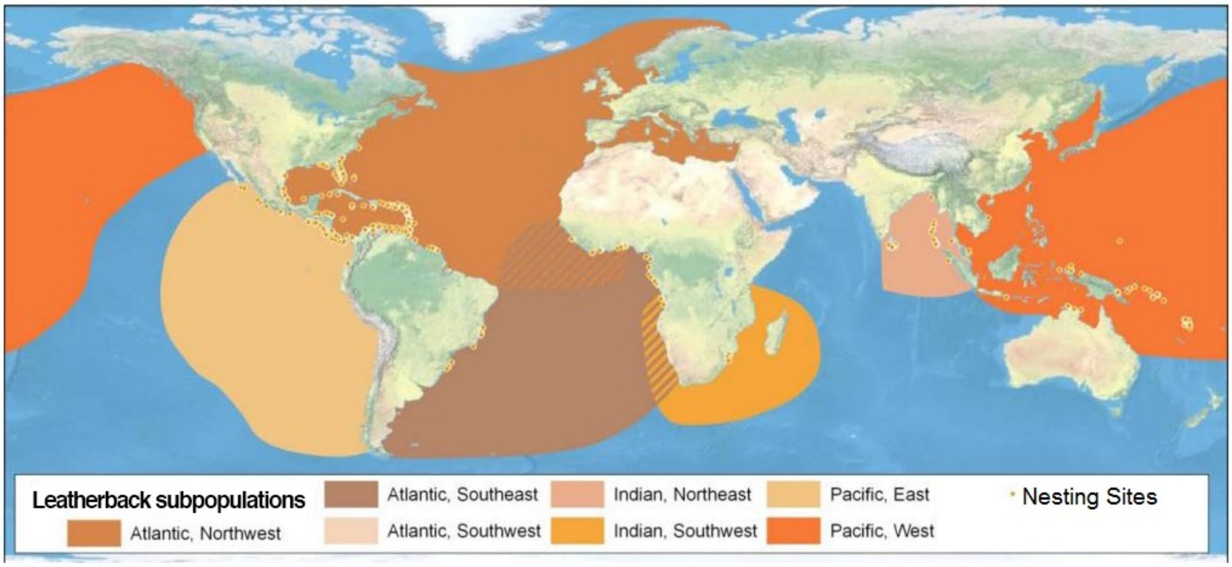

Figure 17. Map identifying the range of the endangered leatherback sea turtle. Adapted from (Wallace et al. 2010).

Life History Information

The leatherback life cycle is broken into several stages: (1) egg/hatchling, (2) post-hatchling, (3) juvenile, (4) subadult, and (5) adult. Leatherbacks are a long-lived species that delay age of maturity, have low and variable survival in the egg and juvenile stages, and have relatively high and constant annual survival in the subadult and adult life stages (Spotila et al. 1996, Crouse 1999, Heppell et al. 1999, Spotila et al. 2000, Chaloupka 2002, Heppell et al. 2003b). While a robust estimate of the leatherback sea turtle's life span does not exist, the current best estimate for the maximum age is 43 (Avens et al. 2009). It is still unclear when leatherbacks first become sexually mature. Age at maturity has been difficult to ascertain, with estimates ranging from five to 29 years (Spotila et al. 1996, Avens et al. 2009). Using skeletochronological data, Avens et al. (2009) estimated that leatherbacks in the western North Atlantic may not reach maturity until 29 years of age, which is longer than earlier estimates of two to three years by Pritchard and Trebbau (1984), of three to six years by Rhodin (1985), of 13 to 14 years for females by Zug and Parham (1996), and 12 to 14 years for leatherbacks nesting in the U.S. Virgin Islands by Dutton et al. (2005). A more recent study that examined leatherback growth rates estimated an age at maturity of 16.1 years (Jones et al. 2011).

The average size of reproductively active females in the Atlantic is generally 5 to 5.5 ft (150 to 162 centimeters) CCL (Hirth et al. 1993, Starbird and Suarez 1994, Benson et al. 2007a). Still, females as small as 3.5 to 4 feet (105 to 125 centimeters) CCL have been observed nesting at various sites (Stewart et al. 2007). In the Atlantic Ocean, equatorial waters appear to be a barrier between breeding populations. In the northwestern Atlantic Ocean, post-nesting female migrations appear to be restricted to north of the Equator but the migration routes vary (Eckert et al. 2012; Saba 2013 as cited in NMFS USFWS 2013). Genetic studies support the satellite telemetry data indicating a strong difference in migration and foraging fidelity between the breeding populations in the northern and southern hemispheres of the Atlantic Ocean (Dutton et al. 2013b; Stewart et al. 2013 as cited in NMFS USFWS 2013).

Female leatherbacks typically nest on sandy, tropical beaches at intervals of one to seven years (McDonald and Dutton 1996, Garcia M. and Sarti 2000, Spotila et al. 2000). Unlike other sea turtle species, female leatherbacks do not always nest at the same beach year after year; some females may even nest at different beaches during the same year (Eckert et al. 1989, Keinath and Musick 1993, Steyermark et al. 1996, Dutton et al. 2005). Individual female leatherbacks have been observed with fertility spans as long as 25 years (Hughes 1996). Females usually lay up to 10 nests during the three to six month nesting season (March through July in the United States), typically eight to 12 days apart, with 100 eggs or more per nest (Matos , Tucker 1988, Eckert et al. 1989, Maharaj 2004, Stewart and Johnson 2006, Eckert et al. 2012). Yet, up to approximately 30 percent of the eggs may be infertile (Matos , MTN 1984, Tucker 1988, Eckert et al. 1989, Maharaj 2004, Stewart and Johnson 2006). The number of leatherback hatchlings that make it out of the nest on to the beach (i.e., emergent success) is approximately 50 percent worldwide (Eckert et al. 2012). Eggs hatch after 60 to 65 days, and the hatchlings have white striping along the ridges of their backs and on the edges of the flippers. Leatherback hatchlings weigh approximately 1.5 to 2 ounces (40 to 50 grams), and are approximately two to three inches (51 to 76 millimeters) in length, with fore flippers as long as their bodies. Hatchlings grow rapidly with reported growth rates for leatherbacks from 2.5 to 27.6 inches (six to 70 centimeters) in length, estimated at 12.6 inches (32 centimeters) per year (Jones et al. 2011).

In the Atlantic, the sex ratio appears to be skewed toward females. The Turtle Expert Working Group (TEWG) reports that nearshore and onshore strandings data from the U.S. Atlantic and Gulf of Mexico coasts indicate that 60 percent of strandings were females (TEWG 2007a). Those data also show that the proportion of females among adults (57 percent) and juveniles (61 percent) was also skewed toward females in these areas (TEWG 2007a). James et al. (2007) collected size and sex data from large subadult and adult leatherbacks off Nova Scotia and also concluded a bias toward females at a rate of 1.86:1.

The survival and mortality rates for leatherbacks are difficult to estimate and vary by location. For example, the annual mortality rate for leatherbacks that nested at Playa Grande, Costa Rica, was estimated to be 34.6 percent in 1993 to 1994 and 34.0 percent in 1994 to 1995 (Spotila et al. 2000). In contrast, leatherbacks nesting in French Guiana and St. Croix had estimated annual survival rates of 91 percent (Rivalan et al. 2005) and 89 percent (Dutton et al. 2005), respectively. For the St. Croix population, the average annual juvenile survival rate was estimated to be approximately 63 percent and the total survival rate from hatchling to first year of reproduction for a female was estimated to be between 0.4 percent and two percent (assuming age at first reproduction is between nine and 13 years (Eguchi et al. 2006)). Spotila et al. (1996) estimated first-year survival rates for leatherbacks at 6.25 percent.

Migratory routes of leatherbacks are not entirely known; however, recent information from satellite tags have documented long travels between nesting beaches and foraging areas in the

Atlantic and Pacific Ocean basins (Ferraroli et al. 2004, Hays et al. 2004, James et al. 2005a, Eckert 2006, Eckert et al. 2006, Benson et al. 2007a, Benson et al. 2011). Leatherbacks nesting in Central America and Mexico travel thousands of miles through tropical and temperate waters of the South Pacific (Eckert and Sarti 1997, Shillinger et al. 2008). Data from satellite tagged leatherbacks suggest that they may be traveling in search of seasonal aggregations of jellyfish (Shenker 1984, Starbird et al. 1993, Bowlby et al. 1994, Suchman and Brodeur 2005, Benson et al. 2007b, Graham 2009).

Status and Population Dynamics

The status of the Atlantic leatherback population has been less clear than the Pacific population, which has shown dramatic declines at many nesting sites (Spotila et al. 2000, Santidrián-Tomillo et al. 2007, Sarti Martínez et al. 2007). This uncertainty has been a result of inconsistent beach and aerial surveys, cycles of erosion, and reformation of nesting beaches in the Guianas (representing the largest nesting area). Leatherbacks also show a lesser degree of nest-site fidelity than occurs with the hardshell sea turtle species. Coordinated efforts of data collection and analyses by the leatherback TEWG have helped to clarify the understanding of the Atlantic population status (TEWG 2007a).

Natal homing, at least within an ocean basin, results in reproductive isolation between five broad geographic regions: eastern and western Pacific, eastern and western Atlantic, and Indian Ocean. Leatherback sea turtles migrate long, transoceanic distances between their tropical nesting beaches and the highly productive temperate waters where they forage, primarily on jellyfish and tunicates. These gelatinous prey are relatively nutrient-poor, such that leatherbacks must consume large quantities to support their body weight. Leatherbacks weigh about 33 percent more on their foraging grounds than at nesting, indicating that they probably catabolize fat reserves to fuel migration and subsequent reproduction (James et al. 2005b, Wallace et al. 2006). Sea turtles must meet an energy threshold before returning to nesting beaches. Therefore, their remigration intervals (the time between nesting) are dependent upon foraging success and duration (Hays 2000, Price et al. 2004).

The Southern Caribbean/Guianas stock is the largest known Atlantic leatherback nesting aggregation (TEWG 2007a). Using nesting females as a proxy for population, the TEWG (2007a) determined that the Southern Caribbean/Guianas stock had demonstrated a long-term, positive population growth rate.

The Florida nesting stock nests primarily along the east coast of Florida. This stock is of growing importance, with total nests between 600 and 700 per year in the 2000s following nesting totals fewer than 100 nests per year in the 1980s (Florida Fish and Wildlife Conservation Commission data available at http://myfwc.com/research/wildlife/sea-turtles/nesting/beach-survey-totals/). Using data from the index nesting beach surveys, the TEWG (TEWG 2007a) estimated a significant annual nesting growth rate of 1.17 percent between 1989 and 2005. FWC Index Nesting Beach Survey Data indicates biennial peaks in nesting abundance beginning in 2007 (Figure 18). A similar pattern was also observed statewide (Table 3). This up-and-down pattern is thought to be a result of the cyclical nature of leatherback nesting, similar to the biennial cycle of green turtle nesting. Overall, the trend shows growth on Florida's east coast beaches.

Table 3. Number of leatherback sea turtle nests in Florida.

Nests Recorded	2010	2011	2012	2013	2016
Index Nesting Beaches	552	625	515	322	319
Statewide	1,334	1,653	1,712	896	1,054

Data from http://myfwc.com/research/wildlife/sea-turtles/nesting/beach-survey-totals/.

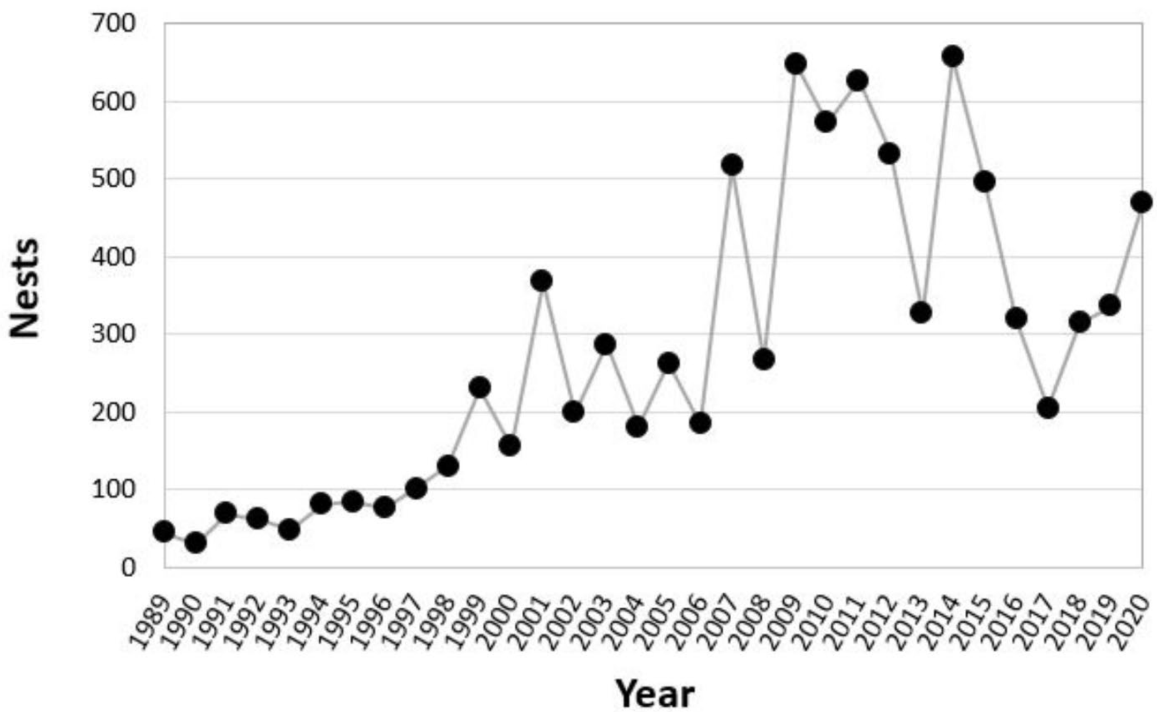

Figure 18. Leatherback sea turtle nesting at Florida index beaches since 1989 to 2020. Figure from http://myfwc.com/research/wildlife/sea-turtles/nesting/beach-survey-totals/ accessed December 31, 2020.

Because the available nesting information is inconsistent, it is difficult to estimate the total population size for Atlantic leatherbacks. Spotila et al. (1996) characterized the entire Western Atlantic population as stable at best and estimated a population of 18,800 nesting females. Spotila et al. (1996) further estimated that the adult female leatherback population for the entire Atlantic basin, including all nesting beaches in the Americas, the Caribbean, and West Africa, was about 27,600 (considering both nesting and interesting females), with an estimated range of 20,082 to 35,133. This is consistent with the estimate of 34,000 to 95,000 total adults (20,000 to 56,000 adult females; 10,000 to 21,000 nesting females) determined by the TEWG (2007a). The latest review by NMFS and USFWS (2013d) suggests the leatherback nesting population is stable in most nesting regions of the Atlantic Ocean.

Threats

Leatherbacks face many of the same threats as other sea turtle species, including destruction of nesting habitat from storm events, oceanic events such as cold-stunning, pollution (plastics, petroleum products, petrochemicals, etc.), ecosystem alterations (nesting beach development, beach nourishment and shoreline stabilization, vegetation changes, etc.), poaching, global climate change, fisheries interactions, natural predation, and disease. We discussed some of these in section 5.2.1 as relevant to all sea turtle species. This section will expand on a few of the aforementioned threats and how they may specifically impact leatherback sea turtles.

Of all sea turtle species, leatherbacks seem to be the most vulnerable to entanglement in fishing gear, especially gillnet and pot/trap lines. This may be because of their body type (large size, long pectoral flippers, and lack of a hard shell), their attraction to gelatinous organisms and algae that collect on buoys and buoy lines at or near the surface, their method of locomotion, and/or perhaps their attraction to the lightsticks used to attract target species in longline fisheries. From 1990 to 2000, 92 entangled leatherbacks were reported from New York through Maine and many other stranded individuals exhibited evidence of prior entanglement (Dwyer 2004). Zug and Parham (1996) point out that a combination of the loss of long-lived adults in fishery-related mortalities and a lack of recruitment from intense egg harvesting in some areas has caused a sharp decline in leatherback sea turtle populations and represents a significant threat to survival and recovery of the species worldwide.

Leatherback sea turtles may also be more susceptible to marine debris ingestion than other sea turtle species due to their predominantly pelagic existence and the tendency of floating debris to concentrate in convergence zones that adults and juveniles use for feeding and migratory purposes (Shoop and Kenney 1992, Lutcavage et al. 1997). The stomach contents of leatherback sea turtles revealed that a substantial percentage (33.8 percent or 138 of 408 cases examined) contained some form of plastic debris (Mrosovsky et al. 2009). Blocking of the gut by plastic to an extent that could have caused death was evident in 8.7 percent of all leatherbacks that ingested plastic (Mrosovsky et al. 2009). Mrosovsky et al. (2009) also note that in a number of cases, the ingestion of plastic may not cause death outright, but could cause the animal to absorb fewer nutrients from food, eat less in general, etc. – factors which could cause other adverse effects. The presence of plastic in the digestive tract suggests that leatherbacks might not be able to distinguish between prey items and forms of debris such as plastic bags (Mrosovsky et al. 2009). Balazs (1985) speculated that the plastic object might resemble a food item by its shape, color, size, or even movement as it drifts about, and therefore induce a feeding response in leatherbacks.

As discussed in Section 5.2.1, global climate change can be expected to have various impacts on all sea turtles, including leatherbacks. Global climate change is likely to also influence the distribution and abundance of jellyfish, the primary prey item of leatherbacks (NMFS and USFWS 2007e). Several studies have shown leatherback distribution is influenced by jellyfish abundance (e.g., Houghton et al. 2006, Witt et al. 2006, Witt et al. 2007); however, more studies need to be done to monitor how changes to prey items affect distribution and foraging success of leatherbacks so population-level effects can be determined.

Recovery Goals
See the 1998 and 1991 Recovery Plans for the U.S. Pacific and U.S. Caribbean, Gulf of Mexico and Atlantic leatherback sea turtles for complete down listing/delisting criteria for each of their respective recovery goals. The following items were the top five recovery actions identified to support in the Leatherback 5-Year Action Plan:

- Reduce fisheries interactions
- Improve nesting beach protection and increase reproductive output
- International cooperation
- Monitoring and research
- Public engagement

5.2.2 **Hawksbill Turtles**

The hawksbill sea turtle was listed as endangered throughout its entire range on June 2, 1970 under the Endangered Species Conservation Act of 1969, a precursor to the ESA. Critical habitat was designated on June 2, 1998, in coastal waters surrounding Mona and Monito Islands in Puerto Rico.

Species Description and Distribution
Hawksbill sea turtles are small to medium-sized (99 to 150 pounds on average [45 to 68 kilograms]) although females nesting in the Caribbean are known to weigh up to 176 pounds (80 kilograms) (Pritchard et al. 1983). The carapace is usually serrated and has a "tortoise-shell" coloring, ranging from dark to golden brown, with streaks of orange, red, and/or black. The plastron of a hawksbill turtle is typically yellow. The head is elongated and tapers to a point, with a beak-like mouth that gives the species its name. The shape of the mouth allows the hawksbill turtle to reach into holes and crevices of coral reefs to find sponges, their primary adult food source, and other invertebrates. The shells of hatchlings are 1.7 inches (42 millimeters) long, are mostly brown, and somewhat heart-shaped (Hillis and Mackay 1989, Van Dam and Sarti 1989, Eckert 1995).

Hawksbill sea turtles have a circumtropical distribution and usually occur between latitudes 30°N and 30°S in the Atlantic, Pacific, and Indian Oceans. In the western Atlantic, hawksbills are widely distributed throughout the Caribbean Sea, off the coasts of Florida and Texas in the continental United States, in the Greater and Lesser Antilles, and along the mainland of Central America south to Brazil (Lund 1985, Plotkin and Amos 1988, Amos 1989, Groombridge and Luxmoore 1989, Plotkin and Amos 1990, NMFS and USFWS 1998a, Meylan and Donnelly 1999). They are highly migratory and use a wide range of habitats during their lifetimes (Musick and Limpus 1997, Plotkin 2003). Adult hawksbill sea turtles are capable of migrating long distances between nesting beaches and foraging areas. For instance, a female hawksbill sea turtle tagged at Buck Island Reef National Monument (BIRNM) was later identified 1,160 miles (1,866 kilometers) away in the Miskito Cays in Nicaragua (Spotila 2004).

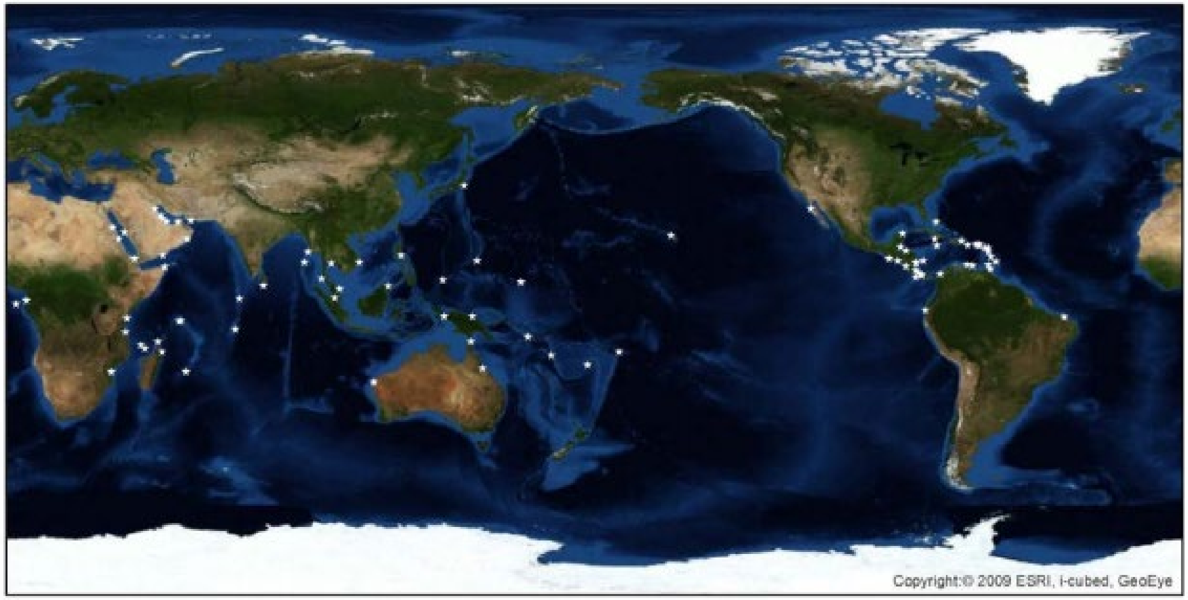

Figure 19. Hawksbill Sea Turtle Global Nesting Distribution. Figure from (NMFS and USFWS 2013a).

Hawksbill sea turtles nest on sandy beaches throughout the tropics and subtropics (Figure 19). Nesting occurs in at least 70 countries, although much of it now only occurs at low densities compared to that of other sea turtle species (NMFS and USFWS 2007b). Surveys at eighty eight nesting sites worldwide indicate that 22,004 to 29,035 females nest annually (NMFS and USFWS 2013a). Nesting sites in the Atlantic and Caribbean have an estimated total number of nesting females annually across 33 sites at 4,867 (i.e., midpoint of range from 3,626 to 6,108) (NMFS and USFWS 2013a). Meylan and Donnelly (1999) believe that the widely dispersed nesting areas and low nest densities is likely a result of overexploitation of previously large colonies that have since been depleted over time. The most significant nesting within the United States occurs in Puerto Rico and the U.S. Virgin Islands, specifically on Mona Island and BIRNM, respectively. Although nesting within the continental United States is typically rare, it can occur along the southeast coast of Florida and the Florida Keys. The largest hawksbill nesting population in the western Atlantic occurs in the Yucatán Peninsula of Mexico, where several thousand nests are recorded annually in the states of Campeche, Yucatán, and Quintana Roo (Garduño-Andrade et al. 1999, Spotila 2004). Hawksbill nesting has also been documented in American Samoa and Guam. More information on nesting in other ocean basins may be found in the five-year status review for the species (NMFS and USFWS 2013a).

Mitochondrial DNA studies show that reproductive populations are effectively isolated over ecological time scales (Bass et al. 1996). Substantial efforts have been made to determine the nesting population origins of hawksbill sea turtles assembled in foraging grounds, and genetic research has shown that hawksbills of multiple nesting origins commonly mix in foraging areas (Bowen and Witzell 1996). Since hawksbill sea turtles nest primarily on the beaches where they were born, if a nesting population is decimated, it might not be replenished by sea turtles from other nesting rookeries (Bass et al. 1996).

Life History Information

Hawksbill sea turtles exhibit slow growth rates although they are known to vary within and among populations from a low of 0.4 to 1.2 inches (one to three centimeters) per year, measured in the Indo-Pacific (Chaloupka and Limpus 1997, Whiting 2000, Mortimer et al. 2002, Mortimer et al. 2003), to a high of two inches (five centimeters) or more per year, measured at some sites in the Caribbean (León and Díez 1999, Díez and Dam 2002). Differences in growth rates are likely due to differences in diet and/or density of sea turtles at foraging sites and overall time spent foraging (Bjorndal and Bolten 2000, Chaloupka et al. 2004). Consistent with slow growth, age to maturity for the species is also long, taking between 20 and 40 years, depending on the region (Chaloupka and Musick 1997, Limpus and Miller 2000). Hawksbills in the western Atlantic are known to mature faster (i.e., 20 or more years) than sea turtles found in the Indo-Pacific (i.e., 30 to 40 years) (Boulan 1983, Boulon 1994, Limpus and Miller 2000, Díez and Dam 2002). Males are typically mature when their length reaches 27 inches (69 centimeters), while females are typically mature at 30 iches (75 centimeters) (Eckert et al. 1992, Limpus 1992).

Female hawksbills return to the beaches where they were born (natal beaches) every two to three years to nest (Witzell 1983, van Dam et al. 1991) and generally lay three to five nests per season (Richardson et al. 1999). Compared with other sea turtles, the number of eggs per nest (clutch) for hawksbills can be quite high. The largest clutches recorded for any sea turtle belong to hawksbills [approximately 250 eggs per nest, (Hirth and Abdel Latif 1980)], though nests in the U.S. Caribbean and Florida more typically contain approximately 140 eggs (USFWS hawksbill fact sheet, http://www.fws.gov/northflorida/SeaTurtles/Turtle percent20Factsheets/hawksbill-sea-turtle.htm). Eggs incubate for approximately 60 days before hatching (USFWS hawksbill fact sheet). Hatchling hawksbill sea turtles typically measure one to two inches (2.5 to five centimeters) in length and weigh approximately 0.5 ounces (15 grams).

Hawksbills may undertake developmental migrations (migrations as immatures) and reproductive migrations that involve travel over many tens to thousands of miles (Meylan 1999a). Post-hatchlings (oceanic stage juveniles) are believed to live in the open ocean, taking shelter in floating algal mats and drift lines of flotsam and jetsam in the Atlantic and Pacific oceans (Musick and Limpus 1997) before returning to more coastal foraging grounds. In the Caribbean, hawksbills are known to almost exclusively feed on sponges (Meylan 1988, van Dam and Díez 1997), although at times they have been seen foraging on other food items, notably corallimorphs and zooanthids (van Dam and Díez 1997, Mayor et al. 1998, León and Díez 2000).

Reproductive females undertake periodic (usually non-annual) migrations to their natal beaches to nest and exhibit a high degree of fidelity to their nest sites. Movements of reproductive males are less certain, but are presumed to involve migrations to nesting beaches or to courtship stations along the migratory corridor. Hawksbills show a high fidelity to their foraging areas as well (van Dam and Díez 1998). Foraging sites are typically areas associated with coral reefs, although hawksbills are also found around rocky outcrops and high energy shoals which are optimum sites for sponge growth. They can also inhabit seagrass pastures in mangrove-fringed bays and estuaries, particularly along the eastern shore of continents where coral reefs are absent (Bjorndal 1997, van Dam and Díez 1998).

Status and Population Dynamics

There are currently no reliable estimates of population abundance and trends for non-nesting hawksbills at the time of this consultation; therefore, nesting beach data is currently the primary information source for evaluating trends in global abundance. In general, hawksbills are doing better in the Atlantic and Indian Ocean than in the Pacific Ocean, where despite greater overall abundance, a greater proportion of the nesting sites are declining.

From 1980 to 2003, the number of nests at three primary Mexico nesting beaches (Rancho Nuevo, Tepehuajes, and Playa Dos) increased 15 percent annually (Heppell et al. 2005); however, due to recent declines in nest counts, decreased survival at other life stages, and updated population modeling, this rate is not expected to continue (NMFS and USFWS 2013a).

In the United States, hawksbills typically laid about 500 to 1,000 nests on Mona Island, Puerto Rico in the past (Diez and van Dam 2007), but after declining, the numbers appear to be increasing in Puerto Rico (NMFS and USFWS 2013a) and Buck Island U.S. Virgin Islands confirmed 86 nests in 2014 (Pollock 2015). Another 56 to 150 nests are typically laid on Buck Island off St. Croix (Meylan 1999b, Mortimer and Donnelly 2008a). Nesting also occurs to a lesser extent on beaches on Culebra Island and Vieques Island in Puerto Rico, the mainland of Puerto Rico, and additional beaches on St. Croix, St. John, and St. Thomas, U.S. Virgin Islands.

With respect to regional trends, nesting populations in the Atlantic (especially in the Insular Caribbean and Western Caribbean Mainland) are generally doing better than those in the Indo-Pacific regions. For instance, nine of the ten sites that showed recent increases are located in the Caribbean. Buck Island and St. Croix’s East End beaches support two remnant populations of between 17 to 30 nesting females per season (Hillis and Mackay 1989, Mackay 2006). The BIRNM had 86 confirmed hawksbill nests in 2014 (Pollock 2015). While the proportion of hawksbills nesting on Buck Island represents a small proportion of the total hawksbill nesting occurring in the greater Caribbean region, Mortimer and Donnelly (2008a) report an increasing trend in nesting at that site based on data collected from 2001 to 2006. The conservation measures implemented when BIRNM was expanded in 2001 most likely explains this increase.

Threats

Hawksbills are currently subjected to the same suite of threats on both nesting beaches and in the marine environment that affect other sea turtles (e.g., interaction with federal and state fisheries, coastal construction, oil spills, climate change affecting sex ratios). We discussed some of these in section 5.2.1 as relevant to all sea turtle species. There are also specific threats that are of special emphasis, or are unique, for hawksbill sea turtles discussed in further detail below.

The historical decline of the species is primarily attributed to centuries of exploitation for the beautifully patterned shell, which made it a highly attractive species to target (Parsons 1972). The fact that reproductive females exhibit a high fidelity for nest sites and the tendency of hawksbills to nest at regular intervals within a season made them an easy target for capture on nesting beaches. The shells from hundreds of thousands of sea turtles in the western Caribbean region were imported into the United Kingdom and France during the nineteenth and early twentieth centuries (Parsons 1972). Additionally, hundreds of thousands of sea turtles contributed to the region's trade with Japan prior to 1993 when a zero quota was imposed (Milliken and Tokunaga 1987), as cited in Brautigram and Eckert (2006).

The continuing demand for the hawksbills' shells as well as other products derived from the species (e.g., leather, oil, perfume, and cosmetics) represents an ongoing threat to its recovery. The British Virgin Islands, Cayman Islands, Cuba, Haiti, and the Turks and Caicos Islands (United Kingdom) all permit some form of legal take of hawksbill sea turtles. In the northern Caribbean, hawksbills continue to be harvested for their shells, which are often carved into hair clips, combs, jewelry, and other trinkets (Márquez M 1990, Stapleton and Stapleton 2006). Additionally, hawksbills are harvested for their eggs and meat, while whole, stuffed sea turtles are sold as curios in the tourist trade. Hawksbill sea turtle products are openly available in the Dominican Republic and Jamaica, despite a prohibition on harvesting hawksbills and their eggs (Fleming 2001). Up to 500 hawksbills per year from two harvest sites within Cuba were legally captured each year until 2008 when the Cuban government placed a voluntary moratorium on the sea-turtle fishery (Carillo et al. 1999, Mortimer and Donnelly 2008a). While current nesting trends are unknown, the number of nesting females is suspected to be declining in some areas (Carillo et al. 1999, Moncada et al. 1999). International trade in the shell of this species is prohibited between countries that have signed CITES, but illegal trade still occurs and remains an ongoing threat to hawksbill survival and recovery throughout its range.

Due to their preference to feed on sponges associated with coral reefs, hawksbill sea turtles are particularly sensitive to losses of coral reef communities. Coral reefs are vulnerable to destruction and degradation caused by human activities (e.g., nutrient pollution, sedimentation, contaminant spills, vessel groundings and anchoring, recreational uses) and are also highly sensitive to the effects of climate change (e.g., higher incidences of disease and coral bleaching) (Wilkinson 2004, Crabbe 2008). Because continued loss of coral reef communities (especially in the greater Caribbean region) is expected to impact hawksbill foraging, it represents a major threat to the recovery of the species.

Recovery Goals

The 1992 and 1998 Recovery Plans for the U.S. Caribbean, Atlantic and Gulf of Mexico, and U.S. Pacific populations of hawksbill sea turtles, respectively, contain complete down listing/delisting criteria for each of their respective recovery goals. The following items were the top recovery actions identified to support in the Recovery Plans:

- Identify important nesting beaches
- Ensure long-term protection and management of important nesting beaches
- Protect and manage nesting habitat; prevent the degradation of nesting habitat caused by seawalls, revetments, sand bags, other erosion-control measures, jetties and breakwaters
- Identify important marine habitats; protect and manage populations in marine habitat
- Protect and manage marine habitat; prevent the degradation or destruction of important [marine] habitats caused by upland and coastal erosion
- Prevent the degradation of reef habitat caused by sewage and other pollutants
- Monitor nesting activity on important nesting beaches with standardized index surveys
- Evaluate nest success and implement appropriate nest-protection on important nesting beaches
- Ensure that law-enforcement activities prevent the illegal exploitation and harassment of sea turtles and increase law-enforcement efforts to reduce illegal exploitation
- Determine nesting beach origins for juveniles and subadult populations

5.3 Critical Habitat Likely to be Adversely Affected

5.3.1 Northwest Atlantic Loggerhead Critical Habitat

As mentioned above, on September 22, 2011, NMFS and USFWS jointly published a Final Rule revising the loggerhead's listing from a single, worldwide threatened species to nine DPSs, with one of those, the NWA DPS, present in the action area of this consultation. At the time the Final Listing Rule was developed, we lacked comprehensive data and information necessary to identify and describe physical or biological features (PBFs) of the terrestrial and marine habitats. As a result, we found designation of critical habitat to be "not determinable" (see 16 USC §1533(b)(6)(C)(ii)) at the time. In the Final Rule, we stated that we would consider designating critical habitat in future rulemakings after a critical habitat review team was convened to assess and evaluate potential critical habitat areas for the DPSs in U.S. waters. The Services published a proposed rule (78 FR 43006) to designate critical habitat for the threatened NWA DPS on July 18, 2013, and a Final Rule was published on July 10, 2014 (79 FR 39855).

We designated 38 marine areas within the NWA DPS as critical habitat (**Figure 20**). Each of these areas consists of a single or a combination of the following habitat types: nearshore reproductive habitat (directly off USFWS-designated critical habitat nesting beaches out to 1 mile [1.6 km]), wintering habitat, breeding habitat, constricted migratory corridors, and *Sargassum* habitat.

Essential Features of Critical Habitat

Essential features are the physical and biological features of the habitat that are essential for the conservation of the species. In the Loggerhead Critical Habitat Rule, the essential features were described first with the PBFs of the habitat that provide the essential habitat function, and then the primary constituent elements (PCEs[5]) that support the habitat functions (Table 4).

[5] Older rules designating critical habitat used the term "primary constituent elements." That term is no longer in the regulations or used in new designations. The terms "physical or biological features" are used now and can be considered equivalent to the older "primary constituent elements."

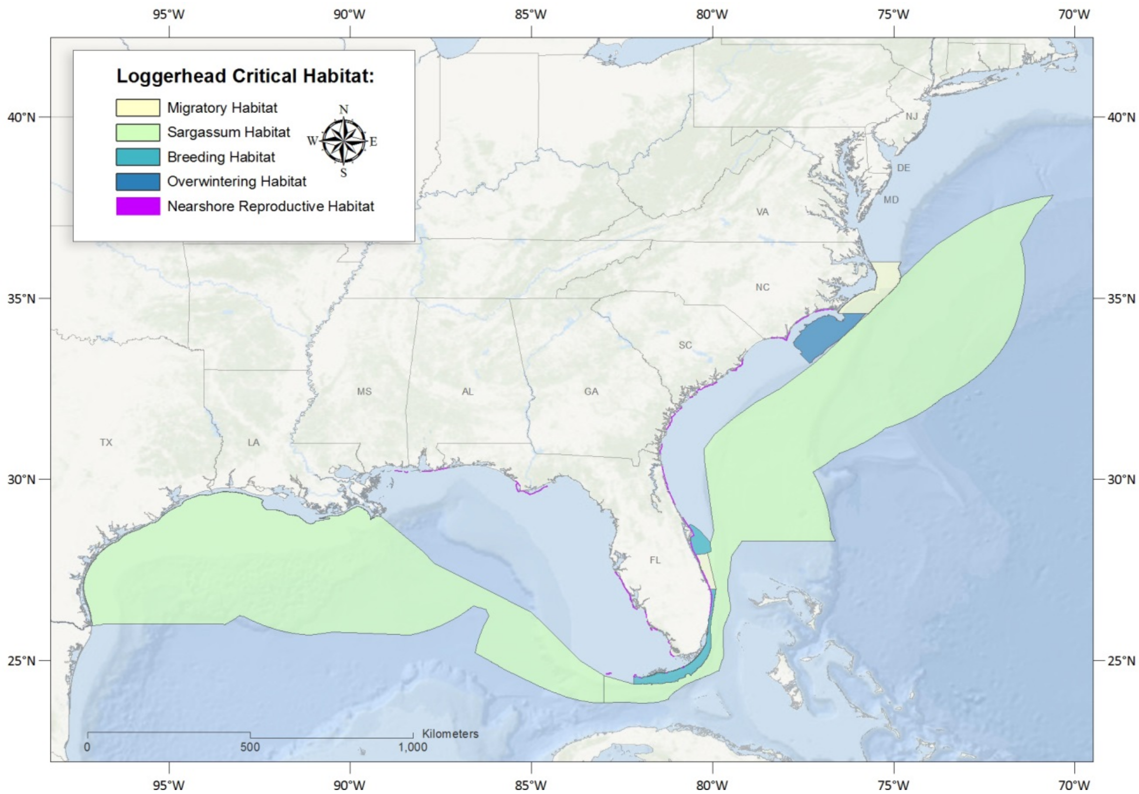

Figure 20. Distribution of critical habitat for the NWA DPS of loggerhead sea turtles.

Table 4. Description of Critical Habitat for the NWA DPS of Loggerhead Sea Turtles.

Habitat Type	Biological Feature(s)	Primary Constituent Elements	Unit Numbers
Nearshore Reproductive	Portion of nearshore waters adjacent to nesting beaches that are used by hatchlings to egress to the open-water environment as well as by nesting females to transit between beach and open water during the nesting season	• Waters directly off the highest density nesting beaches to 1 mile (1.6 km) offshore • Waters sufficiently free of obstructions or artificial lighting to allow transit through the surf zone and outward toward open water • Waters with minimal man-made structures that could promote predators (e.g., submerged offshore structures), disrupt wave patterns necessary for orientation, and/or create excessive longshore currents	LOGG-N-1 through LOGG-N-36

Habitat Type	Physical and Biological Feature(s)	Primary Constituent Elements	Unit Numbers
Winter	Warm water habitat south of Cape Hatteras near the western edge of the Gulf Stream used by concentration of juveniles and adults during the winter months	• Water temperatures above 10°C during colder months of November through April • Continental shelf waters in proximity to the western boundary of the Gulf Stream • Water depths between 20 and 100 meters	LOGG-N-1 LOGG-N-2
Breeding	Areas with high concentrations of both male and female adult individuals during the breeding season	• Concentrations of reproductive males and females • Proximity to primary Florida migratory corridor • Proximity to Florida nesting grounds	LOGG-N-17 LOGG-N-19
Constricted Migratory	High use migratory corridors that are constricted (limited in width) by land on one side and the edge of the continental shelf and Gulf Stream on the other side	• Constricted continental shelf area relative to nearby continental shelf waters that concentrate migratory pathways • Passage conditions to allow for migration to and from nesting, breeding, and/or foraging areas	LOGG-N-1, LOGG-N-17, LOGG-N-18, LOGG-N-19

Habitat Type	Physical and Biological Feature(s)	Primary Constituent Elements	Unit Numbers
Sargassum	Developmental and foraging habitat for young loggerheads where surface waters form accumulations of floating material, especially *Sargassum*	• Convergence zones, surface-water downwelling areas, and other locations where there are concentrated components of the *Sargassum* community in water temperatures suitable for the optimal growth of *Sargassum* and inhabitance of loggerheads • *Sargassum* in concentrations that support adequate prey abundance and cover • Available prey and other material associated with *Sargassum* habitat such as, but not limited to, plants and cyanobacteria and animals endemic to the *Sargassum* community such as hydroids and copepods	LOGG-S-1 LOGG-S-2

Critical Habitat Unit(s) in the Proposed Action Area

The proposed action preauthorized green zone areas will occur within the South Atlantic and Eastern Gulf of Mexico (offshore waters from NC to MS) and overlap with loggerhead critical habitat units. The location of each unit is described below, while the PBFs and PCEs of these habitat types are detailed in Table 3-6 above.

- LOGG-N-1—North Carolina Constricted Migratory Corridor and Northern Portion of the North Carolina Winter Concentration Area. This unit contains constricted migratory and winter habitat. The unit includes the North Carolina constricted migratory corridor and the overlapping northern half of the North Carolina winter concentration area. The constricted migratory corridor off North Carolina consists of waters between 36° N. lat. and Cape Lookout (approximately 34.58° N. lat.) from the edge of the Outer Banks, North Carolina, barrier islands to the 200 m (656 ft) depth contour (continental shelf). The constricted migratory corridor overlaps with the northern portion of winter concentration area off North Carolina. The western and eastern boundaries of winter habitat are the 20 m and 100 m (65.6 and 328 ft) depth contours, respectively. The northern boundary of winter habitat starts at Cape Hatteras (35°16′ N lat.) in a straight latitudinal line between 20 and 100 m (65.6-328 ft) depth contours and ends at Cape Lookout (approximately 34.58° N. lat.).

- LOGG-N-2—Southern Portion of the North Carolina Winter Concentration Area. This unit contains winter habitat only. The boundaries include waters between the 20 and 100 m (65.6 and 328 ft) depth contours between Cape Lookout to Cape Fear. The eastern and western boundaries of winter habitat are the 20 m and 100 m (65.6 and 328 ft) depth contours, respectively. The northern boundary is Cape Lookout (approximately 34.58° N). The southern boundary is a 37.5 km (23.25 mile) line that extends from the 20 m (65.6 ft) depth contour at approximately 33.47° N, 77.58° W (off Cape Fear) to the 100 m (328 ft) depth contour at approximately 33.2° N, 77.32° W.
- LOGG-N-3—Bogue Banks and Bear Island, Carteret and Onslow Counties, North Carolina. This unit contains nearshore reproductive habitat only. The unit consists of nearshore area from Beaufort Inlet to Bear Inlet (crossing Bogue Inlet) from the MHW line seaward 1.6 km.
- LOGG-N-4—Topsail Island and Lea-Huttaf Island, Onslow and Pender Counties, North Carolina. This unit contains nearshore reproductive habitat only. The unit consists of nearshore area from New River Inlet to Rich Inlet (crossing New Topsail Inlet) from the MHW line seaward 1.6 km.
- LOGG-N-5—Pleasure Island, Bald Head Island, Oak Island, and Holden Beach, New Hanover and Brunswick Counties, North Carolina. This unit contains nearshore reproductive habitat only. The unit consists of nearshore area from Carolina Beach Inlet around Cape Fear to Shallotte Inlet (crossing the mouths of the Cape Fear River and Lockwoods Folly Inlet), from the MHW line seaward 1.6 km.
- LOGG-N-6—North, Sand, South and Cedar Islands, Georgetown County, South Carolina; Murphy, Cape, Lighthouse Islands and Racoon Key, Charleston County, South Carolina. This unit contains nearshore reproductive habitat only. The unit consists of nearshore area from North Inlet to Five Fathom Creek Inlet (crossing Winyah Bay, North Santee Inlet, South Santee Inlet, Cape Romain Inlet, and Key Inlet) from the MHW line seaward 1.6 km.
- LOGG-N-7—Folly, Kiawah, Seabrook, Botany Bay Islands, Botany Bay Plantation, Interlude Beach, and Edingsville Beach, Charleston County, South Carolina; Edisto Beach State Park, Edisto Beach, and Pine and Otter Islands, Colleton County, South Carolina. This unit contains nearshore reproductive habitat only. The unit consists of nearshore area from Lighthouse Inlet to Saint Helena Sound (crossing Folly River, Stono, Captain Sam's, North Edisto, Frampton, Jeremy, South Edisto and Fish Creek Inlets) from the MHW line seaward 1.6 km.
- LOGG-N-8—Harbor Island, Beaufort County, South Carolina. This unit contains nearshore reproductive habitat only. The unit consists of nearshore area from Harbor Inlet to Johnson Inlet from the MHW line seaward 1.6 km.
- LOGG-N-9—Little Capers, St. Phillips, and Bay Point Islands, Beaufort County, South Carolina. This unit contains nearshore reproductive habitat only. The unit consists of nearshore area from Pritchards Inlet to Port Royal Sound (crossing Trenchards Inlet and Morse Island Creek Inlet East) from the MHW line seaward 1.6 km.
- LOGG-N-10—Little Tybee Island, Chatham County, Georgia: This unit contains nearshore reproductive habitat only. The boundaries of this unit are from Tybee Creek Inlet to Wassaw Sound from the MHW line seaward 1.6 km.

- LOGG-N-11—Wassaw Island, Chatham County, Georgia: This unit contains nearshore reproductive habitat only. The boundaries of the unit are from Wassaw Sound to Ossabaw Sound from the MHW line seaward 1.6 km.
- LOGG-N-12— Ossabaw Island, Chatham County, Georgia; St. Catherines Island, Liberty County, Georgia; Blackbeard and Sapelo Islands, McIntosh County, Georgia: This unit contains nearshore reproductive habitat only. The boundaries of this unit are nearshore areas from the Ogeechee River to Deboy Sound (crossing St. Catherines Sound, McQueen Inlet, Sapelo Sound, and Cabretta Inlet), extending from the MHW line and seaward 1.6 km.
- LOGG-N-13—Little Cumberland Island and Cumberland Island, Camden County, Georgia: This unit contains nearshore reproductive habitat only. The boundaries of this unit are nearshore areas from St. Andrew Sound to the St. Marys River (crossing Christmas Creek) from the MHW line seaward 1.6 km.
- LOGG-N-14—Southern Boundary of Kathryn Abbey Hanna Park to Mantanzas Inlet, Duval and St. Johns Counties, Florida: This unit contains nearshore reproductive habitat only. The boundaries of the unit are nearshore areas from the south boundary of Kathryn Abbey Hanna Park to Matanzas Inlet (crossing St. Augustine Inlet) from the MHW line seaward 1.6 km.
- LOGG-N-15—Northern Boundary of River to Sea Preserve at Marineland to Granada Blvd., Flagler and Volusia Counties, Florida: This unit contains nearshore reproductive habitat only. The boundaries of the unit are nearshore areas from the north boundary of River to Sea Preserve at Marineland to Granada Boulevard in Ormond Beach from the MHW line seaward 1.6 km.
- LOGG-N-16—Canaveral National Seashore to 28.70° N, 80.66° W near Titusville, Volusia and Brevard Counties, Florida: This unit contains nearshore reproductive habitat only. Boundaries of the unit are nearshore areas from the north boundary of Canaveral National Seashore to 28.70° N, 80.66° W near Titusville (at the start of the Titusville—Floridana Beach concentrated breeding area) from the MHW line seaward 1.6 km.
- LOGG-N-17—Titusville to Floridana Beach Concentrated Breeding Area, Northern Portion of the Florida Constricted Migratory Corridor, Nearshore Reproductive Habitat from 28.70° N, 80.66° W near Titusville to Cape Canaveral Air Force Station; and Nearshore Reproductive Habitat from Patrick Airforce Base and Central Brevard Beaches, Brevard County, Florida: This unit includes overlapping areas of nearshore reproductive habitat, constricted migratory habitat, breeding habitat, and *Sargassum* habitat. The concentrated breeding habitat area is from the MHW line on shore at 28.70° N, 80.66° W near Titusville to depths less than 60 m and extending south to Floridana Beach. This overlaps with waters in the northern portion of the Start Printed Page 39891Florida constricted migratory corridor, which begins at the tip of Cape Canaveral Air Force Station (28.46° N. lat.) and ends at Floridana beach, including waters from the MHW line on shore to the 30 m depth contour. Additionally, the above two habitat areas overlap with two nearshore reproductive habitat areas. The first begins near Titusville at 28.70° N, 80.66° W to the south boundary of the Cape Canaveral Air Force Station/Canaveral Barge Canal Inlet from the MHW line seaward 1.6 km. The second begins at Patrick Air Force Base, Brevard County, through the central Brevard Beaches to Floridana Beach from the MHW line seaward 1.6 km.

- LOGG-N-18—Florida Constricted Migratory Corridor from Floridana Beach to Martin County/Palm Beach County Line; Nearshore Reproductive Habitat from Floridana Beach to the south end of Indian River Shores; Nearshore Reproductive Habitat from Fort Pierce inlet to Martin County/Palm Beach County Line, Brevard, Indian River and Martin Counties, Florida—This unit contains nearshore reproductive habitat and constricted migratory habitat. The unit contains a portion of the Florida constricted migratory corridor, which is located in the nearshore waters from the MHW line to the 30 m depth contour off Floridana Beach to the Martin County/Palm Beach County line. This overlaps with two nearshore reproductive habitat areas. The first nearshore reproductive area includes nearshore areas from Floridana Beach to the south end of Indian River Shores (crossing Sebastian Inlet) from the MHW line seaward1.6 km. The second nearshore reproductive habitat area includes nearshore areas from Fort Pierce inlet to Martin County/Palm Beach County line (crossing St. Lucie Inlet) from the MHW line seaward 1.6 km.
- LOGG-N-19—Southern Florida Constricted Migratory Corridor; Southern Florida Concentrated Breeding Area; and Six Nearshore Reproductive Areas: Martin County/Palm Beach County line to Hillsboro Inlet, Palm Beach and Broward Counties, Florida; Long Key, Bahia Honda Key, Woman Key, Boca Grande Key, and Marquesas Keys, Monroe County, Florida—This unit contains nearshore reproductive habitat, constricted migratory habitat, and breeding habitat. The unit contains the southern Florida constricted migratory corridor habitat, overlapping southern Florida breeding habitat, and overlapping nearshore reproductive habitat. The southern portion of the Florida concentrated breeding area and the southern Florida constricted migratory corridor are both located in the nearshore waters starting at the Martin County/Palm Beach County line to the westernmost edge of the Marquesas Keys (82.17° W. long.), with the exception of the waters under the jurisdiction of NAS Key West. The seaward border then follows the 200 m depth contour to the westernmost edge at the Marquesas Keys. The overlapping nearshore reproductive habitat includes nearshore waters starting at the Martin County/Palm Beach County line to Hillsboro Inlet (crossing Jupiter, Lake Worth, Boyton, and Boca Raton Inlets) from the MHW line seaward 1.6 km; Long Key, which is bordered on the east by the Atlantic Ocean, on the west by Florida Bay, and on the north and south by natural channels between Keys (Fiesta Key to the north and Conch Key to the south), and has boundaries following the borders of the island from the MHW line seaward to 1.6 km; Bahia Honda Key, from the MHW line seaward 1.6 km; 4) Woman Key, from the MHW line and seaward to 1.6 km; 5) Boca Grande Key, from the MHW line seaward to 1.6 km; 6) the Marquesas Keys unit boundary, including nearshore areas from the MHW line seaward to 1.6 km from four islands where loggerhead sea turtle nesting has been documented within the Marquesas Keys: Marquesas Key, Unnamed Key 1, Unnamed Key 2, and Unnamed Key 3.
- LOGG-N-20—Dry Tortugas, Monroe County, Florida: This unit contains nearshore reproductive habitat only. The unit boundary includes nearshore areas from the MHW line and seaward to 1.6 km (1.0 mile) from six islands where loggerhead sea turtle nesting has been documented within the Dry Tortugas. From west to east, these six islands are: Loggerhead Key, Garden Key, Bush Key, Long Key, Hospital Key, and East Key.

- LOGG-N-21—Cape Sable, Monroe County, Florida: This unit contains nearshore reproductive habitat only. The boundaries of the unit are nearshore areas from the MHW line and seaward to 1.6 km from the north boundary of Cape Sable at 25.25° N, 81.17° W to the south boundary of Cape Sable at 25.12° N, 81.07° W.
- LOGG-N-22—Graveyard Creek to Shark Point, Monroe County, Florida: This unit contains nearshore reproductive habitat only. The boundaries of this unit are nearshore areas from Shark Point (25.39° N, 81.15° W) to Graveyard Creek Inlet from the MHW line seaward 1.6 km.
- LOGG-N-23—Highland Beach, Monroe County, Florida: This unit contains nearshore reproductive habitat only. The boundaries of this unit are from First Bay to Rogers River Inlet from the MHW line seaward 1.6 km.
- LOGG-N-24—Ten Thousand Islands North, Collier County, Florida: This unit contains nearshore reproductive habitat only. The unit boundary includes nearshore areas from the MHW line seaward 1.6 km of nine keys where loggerhead sea turtle nesting has been documented within the northern part of the Ten Thousand Islands in Collier County in both the Ten Thousand Islands NWR and the Rookery Bay NERR.
- LOGG-N-25—Cape Romano, Collier County, Florida: This unit contains nearshore reproductive habitat only. The boundaries of the unit are nearshore areas from Caxambas Pass to Gullivan Bay from the MHW line seaward 1.6 km.
- LOGG-N-26—Keewaydin Island and Sea Oat Island, Collier County, Florida: This unit contains nearshore reproductive habitat only. The boundaries of the unit are nearshore areas from Gordon Pass to Big Marco Pass from the MHW line seaward 1.6 km.
- LOGG-N-27—Little Hickory Island to Doctors Pass, Lee and Collier Counties, Florida: This unit contains nearshore reproductive habitat only. The boundaries of the unit are nearshore areas from Little Hickory Island to Doctors Pass (crossing Wiggins Pass and Clam Pass) from the MHW line seaward 1.6 km.
- LOGG-N-28—Captiva Island and Sanibel Island West, Lee County, Florida: This unit contains nearshore reproductive habitat only. The boundaries of the unit are nearshore areas from the north end of Captiva/Captiva Island Golf Club (starting at Redfish Pass and crossing Blind Pass) and along Sanibel Island West to Tarpon Bay Road, from the MHW line seaward 1.6 km.
- LOGG-N-29—Siesta and Casey Keys, Sarasota County; Venice Beaches and Manasota Key, Sarasota and Charlotte Counties; Knight, Don Pedro, and Little Gasparilla Islands, Charlotte County; Gasparilla Island, Charlotte and Lee Counties; Cayo Costa, Lee County, Florida: This unit contains nearshore reproductive habitat only. The boundaries of this unit are nearshore areas from Big Sarasota Pass to Catliva Pass (crossing Venice Inlet, Stump Pass, Gasparilla Pass, and Boca Grande Pass), from the MHW line seaward 1.6 km.
- LOGG-N-30—Longboat Key, Manatee and Sarasota Counties, Florida: This unit contains nearshore reproductive habitat only. The boundaries of this unit are the north point of Longboat Key at Longboat Pass Start Printed Page 39892to New Pass, from the MHW line seaward 1.6 km.
- LOGG-N-31—St. Joseph Peninsula, Cape San Blas, St. Vincent, St. George and Dog Islands, Gulf and Franklin Counties, Florida: This unit contains nearshore reproductive habitat only. The boundaries of this unit are from St. Joseph Bay to St. George Sound

(crossing Indian, West, and East Passes) from the MHW line seaward 1.6 km. LOGG-N-31—St. Joseph Peninsula, Cape San Blas, St. Vincent, St. George and Dog Islands, Gulf and Franklin Counties, Florida. The boundaries of this unit are from St. Joseph Bay to St. George Sound (crossing Indian, West, and East Passes) from the MHW line seaward 1.6 km (Figure 3-8).

- LOGG-N-32—Mexico Beach and St. Joe Beach, Bay and Gulf Counties, Florida. The boundaries of the unit are from the eastern boundary of Tyndall Air Force Base to Gulf County Canal in St. Joseph Bay from the MHW line seaward 1.6 km (Figure 3-8).
- LOGG-N-33—Gulf State Park to Florida/Alabama state line, Baldwin County, Alabama; FL/AL state line to Pensacola Pass, Escambia County, Florida. The boundaries of the unit are nearshore areas from the west boundary of Gulf State Park to the Pensacola Pass (crossing Perido Pass and the Alabama/Florida border) from the MHW line and seaward to 1.6 km (Figure 3-9).
- LOGG-N-34—Mobile Bay Inlet to Little Lagoon Pass, Baldwin County, Alabama. The boundaries of the unit are nearshore areas from Mobile Bay Inlet to Little Lagoon Pass from the MHW line and seaward to 1.6 km (Figure 3-9).
- LOGG-N-35—Petit Bois Island, Jackson County, Mississippi. The boundaries of the unit are nearshore areas from Horn Island Pass to Petit Bois Pass from the MHW line and seaward to 1.6 km (Figure 3-9).
- LOGG-N-36—Horn Island, Jackson County, Mississippi. The boundaries of the unit are nearshore areas from Dog Keys Pass to the eastern most point of the ocean-facing island shore from the MHW line and seaward to 1.6 km (Figure 3-9).
- LOGG-S-1—Atlantic Ocean *Sargassum*: This unit contains *Sargassum* habitat and overlaps with breeding habitat (LOGG-N-17). The western edge of the unit is the Gulf of Mexico-Atlantic border (83° W. long.) from 24.58° N. lat. to 23.82° N. lat. The outer boundary of the unit is the U.S. EEZ, starting at the Gulf of Mexico-Atlantic border (23.82° N. lat., 83° W. long.) and proceeding east and north until the EEZ coincides with the Gulf Stream at 37.84° N. lat., 70.59° W. long. The inner boundary of the unit starts at the Gulf of Mexico-Atlantic border (24.58° N. lat., 83° W. long.) to the outer edge of the breeding/migratory critical habitat (LOGG-N-19) at 24.34° N. lat., 82.16° W. long., along the outer edge of the corridor (following the 200 m depth contour) until it coincides with the breeding habitat off of Cape Canaveral (LOGG-N-17) at 27.97° N. lat., 80.14° W. long., and from there roughly following the velocity of 0.401-0.50 m/second (Ocean Conservancy 2012; PMEL 2012) until it coincides with the outer edge of the EEZ at 37.84° N. lat., 70.59° W. long.
- LOGG-S-2—Gulf of Mexico *Sargassum* (Figure 3-10). The northern and western boundaries of the unit follow the 10-meter depth contour starting at the mouth of South Pass of the Mississippi River proceeding west and south to the outer boundary of the U.S. EEZ. The southern boundary of the unit is the U.S. EEZ from the 10-meter depth contour off of Texas to the Gulf of Mexico-Atlantic border (83°W longitude). The eastern boundary follows the 10-meter depth contour from the mouth of South Pass of the Mississippi River at 28.97°N latitude, 89.15°W longitude, in a straight line to the northernmost boundary of the Loop Current (28°N latitude, 89°W longitude) and along the eastern edge of the Loop Current roughly following the velocity of 0.101-0.20 m/s as depicted by Love et al. (2013) using the Gulf of Mexico summer mean sea surface

currents from 1993-2011, to the Gulf of Mexico-Atlantic border (24.58°N latitude, 83°W longitude).

Activities that could affect the conservation value of this habitat would (1) obstruct the free transit of nesting females and hatchlings through the surf zone and outward to open waters, (2) promote notable increases in predatory species, (3) disrupt wave patterns necessary for hatchling orientation out to open waters, or (4) create excessive longshore currents which could sweep hatchling sea turtles off course as they attempt to reach open waters. Similarly, NMFS is not aware of any actions that have or are currently impacting *Sargassum* in critical habitat since the designation. Projects that would pose threats to this unit would be those impacting (1) convergence zones, downwelling areas, and other locations where there are concentrated components of the *Sargassum* community; (2) the density or concentration of *Sargassum*; or (3) the prey community associated with *Sargassum* habitat.

Threats to Critical Habitat in the Action Area

Potential threats to loggerhead critical habitat in the proposed action area would include any activities that adversely impact the essential features. Such potential threats include:

<u>Artificial lighting</u>
The impacts of artificial lighting are discussed in section 5.2.1 because it relates to direct impacts to individual turtles. Nevertheless, the consistent presence of artificial lighting at nesting beaches can also be considered habitat alteration as it adversely impacts the essential habitat feature of allowing safe and efficient transit through the surf zone to and from open water. While onshore lighting is a threat best addressed through consultation with the USFWS, lighting in nearshore waters is an issue that NMFS addresses as an ongoing threat to loggerhead critical habitat.

<u>Oil Spills</u>
Large scale oil spills can adversely affect the *Sargassum* units of loggerhead critical habitat thereby reducing their ability to provide developmental and foraging habitat for young loggerheads. Surface oils can accumulate in mats of *Sargassum* and affect the prey community that loggerhead turtles rely on. Additionally, oil spill response activities such as the use of dispersants, *in situ* burning, containment booms, and skimmer operations could further affect the essential features of this habitat, by both affecting prey and modifying the concentration of the algal mats.

<u>Seismic Activity</u>

A recent study suggests that seismic airguns may lead to significant mortality of zooplankton, including copepods (McCauley et al. 2017), which can affect the *Sargassum* prey community that juvenile loggerheads rely on. Effects were found out to 1.2 km, the maximum distance that the sonar equipment used in the study was able to detect changes in abundance. McCauley et al.

(2017) note that for seismic activities to have a significant impact on zooplankton at an ecological scale, the spatial or temporal scale must be large in comparison to the ecosystem in question.

6 ENVIRONMENTAL BASELINE

The environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The past and present impacts of Federal, state, or private actions and other human activities in the action area; anticipated impacts of all proposed Federal projects that have already undergone formal or early section 7 consultation; and impacts of state or private actions that are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

The environmental baseline for this Opinion includes several factors and activities that affect the survival and recovery of ESA-listed sea turtles and loggerhead critical habitat in the action area. We describe these below.

6.1 Climate Change

There is a large and growing body of literature on past, present, and future impacts of global climate change, exacerbated and accelerated by human activities. Effects of climate change include sea level rise, increased frequency and magnitude of severe weather events, changes in air and water temperatures, and changes in precipitation patterns, all of which are likely to impact ESA resources. NOAA's climate information portal provides basic background information on these and other measured or anticipated climate change effects (see https://www.climate.gov).

In order to evaluate the implications of different climate outcomes and associated impacts throughout the 21st century, many factors have to be considered. The amount of future greenhouse gas emissions is a key variable. Developments in technology, changes in energy generation and land use, global and regional economic circumstances, and population growth must also be considered.

A set of four scenarios was developed by the Intergovernmental Panel on Climate Change (IPCC) to ensure that starting conditions, historical data, and projections are employed consistently across the various branches of climate science. The scenarios are referred to as representative concentration pathways (RCPs), which capture a range of potential greenhouse gas emissions pathways and associated atmospheric concentration levels through 2100 (IPCC 2014). The RCP scenarios drive climate model projections for temperature, precipitation, sea level, and other variables: RCP2.6 is a stringent mitigation scenario; RCP2.5 and RCP6.0 are intermediate scenarios; and RCP8.5 is a scenario with no mitigation or reduction in the use of fossil fuels. The IPCC future global climate predictions (2014 and 2018) and national and regional climate predictions included in the Fourth National Climate Assessment for U.S. states and territories (2018) use the RCP scenarios.

The increase of global mean surface temperature change by 2100 is projected to be 0.3 to 1.7°C under RCP 2.6, 1.1 to 2.6°C under RCP 4.5, 1.4 to 3.1°C under RCP 6.0, and 2.6 to 4.8°C under RCP8.5 with the Arctic region warming more rapidly than the global mean under all scenarios (IPCC 2014). The Paris Agreement aims to limit the future rise in global average temperature to 2°C, but the observed acceleration in carbon emissions over the last 15 to 20 years, even with a lower trend in 2016, has been consistent with higher future scenarios such as RCP8.5 (Hayhoe et al. 2018).

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

The Atlantic Ocean appears to be warming faster than all other ocean basins except perhaps the southern oceans (Cheng et al. 2017). In the western North Atlantic Ocean surface temperatures have been unusually warm in recent years (Cheng et al. 2017). In the western North Atlantic Ocean surface temperatures have been unusually warm in recent years (Blunden and Arndt 2016). A study by (Polyakov et al. 2009) suggests that the North Atlantic Ocean overall has been experiencing a general warming trend over the last 80 years of 0.031±0.0006 degrees Celsius per decade in the upper 2,000 meters (6,561.7 feet) of the ocean. Additional consequences of climate change include increased ocean stratification, decreased sea-ice extent, altered patterns of ocean circulation, and decreased ocean oxygen levels (Doney et al. 2012). Since the early 1980s, the annual minimum sea ice extent (observed in September each year) in the Arctic Ocean has decreased at a rate of 11 to 16 percent per decade (Jay et al. 2018). Further, ocean acidity has increased by 26 percent since the beginning of the industrial era. A study by (Polyakov et al. 2009) suggests that the North Atlantic Ocean overall has been experiencing a general warming trend over the last 80 years of 0.031±0.0006 degrees Celsius per decade in the upper 2,000 meters (6,561.7 feet) of the ocean. Additional consequences of climate change include increased ocean stratification, decreased sea-ice extent, altered patterns of ocean circulation, and decreased ocean oxygen levels (Doney et al. 2012). Since the early 1980s, the annual minimum sea ice extent (observed in September each year) in the Arctic Ocean has decreased at a rate of 11 to 16 percent per decade (Jay et al. 2018). Further, ocean acidity has increased by 26 percent since the beginning of the industrial era (IPCC 2014) and this rise has been linked to climate change. Climate change is also expected to increase the frequency of extreme weather and climate events including, but not limited to, cyclones, tropical storms, heat waves, and droughts (IPCC 2014).

Climate change has the potential to impact species abundance, geographic distribution, migration patterns, and susceptibility to disease and contaminants, as well as the timing of seasonal activities and community composition and structure (MacLeod et al. 2005, Robinson et al. 2005). Climate change has the potential to impact species abundance, geographic distribution, migration patterns, and susceptibility to disease and contaminants, as well as the timing of seasonal activities and community composition and structure (MacLeod et al. 2005, Robinson et al. 2005, Kintisch 2006, Learmonth et al. 2006, McMahon and Hays 2006, Evans and Bjørge 2013, IPCC 2014). Though predicting the precise consequences of climate change on highly mobile marine species is difficult (Simmonds and Isaac 2007), recent research has indicated a range of consequences already occurring. For example, in sea turtles, sex is determined by the ambient sand temperature (during the middle third of incubation) with female offspring produced at higher temperatures and males at lower temperatures within a thermal tolerance range of 25 to 35°C (Ackerman 1997). Increases in global temperature could skew future sex ratios toward higher numbers of females (NMFS and USFWS 2007aa, 2007fb, 2013ba, 2013cb, 2015a). These impacts will be exacerbated by sea level rise. The loss of habitat because of climate change could be accelerated due to a combination of other environmental and oceanographic changes such as an increase in the frequency of storms and/or changes in prevailing currents, both of which could lead to increased beach loss via erosion (Antonelis et al. 2006, Baker et al. 2006).

Changes in the marine ecosystem caused by global climate change (e.g., ocean acidification, salinity, oceanic currents, dissolved oxygen levels, nutrient distribution) could influence the distribution and abundance of lower trophic levels (e.g., phytoplankton, zooplankton, submerged aquatic vegetation, crustaceans, mollusks, forage fish), ultimately affecting primary foraging areas of ESA-listed species including marine mammals, sea turtles, and fish. Marine species ranges are expected to shift as they align their distributions to match their physiological tolerances under changing environmental conditions (Doney et al. 2012). Hazen et al. (2012) examined top predator distribution and diversity in the Pacific Ocean in light of rising sea surface temperatures using a database of electronic tags and output from a global climate model. They predicted up to a 35 percent change in core habitat area for some key marine predators in the Pacific Ocean, with some species predicted to experience gains in available core habitat and some predicted to experience losses. Notably, leatherback turtles were predicted to gain core habitat area, whereas loggerhead turtles were predicted to experience losses in available core habitat. McMahon and Hays (2006) predicted increased ocean temperatures will expand the distribution of leatherback turtles into more northern latitudes. The authors noted this is already occurring in the Atlantic Ocean. (MacLeod 2009) estimated, based upon expected shifts in water temperature, 88 percent of cetaceans will be affected by climate change, with 47 percent predicted to experience unfavorable conditions (e.g., range contraction). Willis-Norton et al. (2015) acknowledged there will be both habitat loss and gain, but overall climate change could result in a 15 percent loss of core pelagic habitat for leatherback turtles in the eastern South Pacific Ocean.

Similarly, climate-related changes in important prey species populations are likely to affect predator populations. For ESA-listed species that undergo long migrations, if either prey availability or habitat suitability is disrupted by changing ocean temperatures regimes, the timing of migration can change or negatively impact population sustainability (Simmonds and Eliott 2009).

This review provides some examples of impacts to ESA-listed species and their habitats that may occur as the result of climate change. While it is difficult to accurately predict the consequences of climate change to a particular species or habitat, a range of consequences are expected that are likely to change the status of the species and the condition of their habitats.

6.2 Sound

NMFS uses established criteria to predict varying levels of responses of marine species to anthropogenic sound, based upon physical injury, hearing impairment, and behavioral responses. Responses to sound exposure may include lethal or nonlethal injury, temporary or permanent hearing impairment, behavioral harassment and stress, or no apparent response. Contributions to ambient sound levels include vessels, geophysical exploration, and the construction, operational, and decommissioning of offshore structures. NOAA is working cooperatively with the ship-building industry to find technologically-based solutions to reduce the amount of sound produced by commercial vessels. Sound is a stressor that is produced by many activities discussed in the remaining baseline sections below.

6.3 Fisheries Bycatch and Interactions

Commercial and recreational fisheries can result in substantial detrimental impacts on populations of ESA-listed species. Although directed fishing for the species covered in this Opinion is prohibited under the ESA, many are still captured as "bycatch" in fishing operations targeting other species. Bycatch occurs when fishing operations interact with marine mammals, sea turtles, and fish species that are not the target species for commercial sale. Sea turtles and other large marine species are particularly susceptible to entanglement in fishing gear that is being actively fished as well as derelict or "ghost fishing" gear.

6.3.1 **Federal Fisheries**

Commercial and recreational fisheries managed by NMFS under the Magnuson-Stevens Act in the Atlantic and Gulf of Mexico have interacted with sea turtles throughout the past. Sea turtles are more susceptible to interactions with several types of fishing gear in the action area including gillnet, hook-and-line (i.e., vertical line), and trawl gear. For all fisheries for which there is a fishery management plan (FMP) or for which any federal action is taken to manage that fishery, the impacts have been evaluated via section 7 consultation. Past consultations have addressed the effects of federally permitted fisheries on ESA-listed species, sought to minimize the adverse impacts of the action on ESA-listed species, and, when appropriate, have authorized the incidental taking of these species. Formal section 7 consultations have been conducted on the following federal fisheries that operate in the action area: Coastal Migratory Pelagics, Highly Migratory Species (HMS) Atlantic Shark and Smoothhound, Gulf of Mexico Reef Fish, and Southeastern Shrimp Trawl Fisheries.

6.3.1.1 Coastal Migratory Pelagics Fishery

In 2015, NMFS completed a section 7 consultation on the authorization of the coastal migratory pelagics fishery in the Gulf of Mexico and South Atlantic (NMFS 2015a). In the Atlantic and Gulf of Mexico, hook-and-line, gillnet, and cast net gears are used commercially, while the recreational sector uses hook-and-line gear. The hook-and-line effort is primarily trolling. The biological opinion concluded that green, hawksbill, Kemp’s ridley, leatherback, and loggerhead sea turtles as well as smalltooth sawfish and Atlantic sturgeon were likely to be adversely affected by operation of the fishery. However, the action was not expected to jeopardize the continued existence of any of these species and an ITS was provided.

6.3.1.2 Highly Migratory Species Atlantic Shark and Smoothhound Fisheries

These fisheries include commercial shark bottom longline and gillnet fisheries and recreational shark fisheries under the FMP for Atlantic tunas, swordfish, and sharks (HMS FMP). NMFS has formally consulted several times on the effects of HMS shark fisheries on sea turtles (NMFS 2003, 2008, 2012a). NMFS has also authorized a federal smoothhound fishery that will be managed as part of the HMS shark fisheries. NMFS (2012b) analyzed the potential adverse effects from the smoothhound fishery on sea turtles for the first time in 2012. Both bottom longline and gillnet are known to adversely affect sea turtles. From 2007-2011, the sandbar shark research fishery had 100 percent observer coverage, with 4-6 percent observer coverage in the remaining shark fisheries. During that period, ten sea turtle takes (all loggerheads) were observed on bottom longline gear in the sandbar shark research fishery and five were taken outside the research fishery. The five non-research fishery takes were extrapolated to the entire fishery, providing an estimate of 45.6 sea turtle takes (all loggerheads) for non-sandbar shark research fishery from 2007-2010 (Carlson and Gulak 2012, Carlson et al. 2016). No sea turtle takes were observed in the non-research fishery in 2011 (NMFS 2012a). Since the research fishery has a 100 percent observer coverage requirement, those observed takes were not extrapolated (Carlson and Gulak 2012, Carlson et al. 2016). Because few smoothhound trips were observed, no sea turtle captures were documented in the smoothhound fishery.

The most recent ESA section 7 consultation for this fishery was completed on December 12, 2012, on the operation of Atlantic shark and smoothhound fisheries and Amendments 3 and 4 to the Consolidated HMS FMP (NMFS 2012b). The consultation concluded the action was not likely to jeopardize the continued existence of sea turtles. An ITS was provided authorizing 18 takes (nine of which could be lethal) of each species for hawksbill and leatherback sea turtles every three years. Loggerhead, green and Kemp's ridley turtle takes were 126, 57, and 36, respectively.

6.3.1.3 Gulf of Mexico Reef Fish Fishery

The Gulf of Mexico reef fish fishery uses two basic types of gear: spear or powerhead, and hook-and-line gear. Hook-and-line gear used in the fishery includes both commercial bottom longline and commercial and recreational vertical line (e.g., handline, bandit gear, rod-and-reel).

Prior to 2008, the reef fish fishery was believed to have relatively moderate levels of sea turtle bycatch attributed to the hook-and-line component of the fishery (i.e., approximately 107 captures and 41 mortalities annually, all species combined, for the entire fishery) (NMFS 2005a). In 2008, SEFSC observer programs and subsequent analyses indicated that the overall amount and extent of incidental take for sea turtles specified in the incidental take statement of the 2005 opinion on the reef fish fishery had been severely exceeded by the bottom longline component of the fishery: approximately 974 captures and at least 325 mortalities estimated for the period July 2006-2007.

In response, NMFS published an Emergency Rule prohibiting the use of bottom longline gear in the reef fish fishery shoreward of a line approximating the 50-fathom depth contour in the eastern Gulf of Mexico, essentially closing the bottom longline sector of the reef fish fishery in the eastern Gulf of Mexico for six months pending the implementation of a long-term management strategy. The Gulf of Mexico Fishery Management Council (GMFMC) developed a long-term management strategy via a new amendment (Amendment 31 to the Reef Fish FMP). The amendment included: (1) a prohibition on the use of bottom longline gear in the Gulf of Mexico reef fish fishery, shoreward of a line approximating the 35-fathom contour east of Cape San Blas, Florida, from June through August and; (2) a reduction in the number of bottom longline vessels operating in the fishery via an endorsement program and a restriction on the total number of hooks that may be possessed onboard each Gulf of Mexico reef fish bottom longline vessel to 1,000, only 750 of which may be rigged for fishing.

On October 13, 2009, SERO completed an opinion that analyzed the expected effects of the operation of the Gulf of Mexico reef fish fishery under the changes proposed in Amendment 31 (NMFS-SEFSC 2009b). The opinion concluded that sea turtle takes would be substantially reduced compared to the fishery as it was previously prosecuted, and that operation of the fishery would not jeopardize the continued existence of any sea turtle species. Amendment 31 was implemented on May 26, 2010. In August 2011, consultation was reinitiated to address the DWH oil spill and potential changes to the environmental baseline. Reinitiation of consultation was not related to any material change in the fishery itself, violations of any terms and conditions of the 2009 opinion, or an exceedance of the incidental take statement. The resulting September 30, 2011, opinion concluded the operation of the Gulf of Mexico reef fish fishery is not likely to jeopardize the continued existence of any listed sea turtles (NMFS 2011b).

6.3.1.4 Southeastern Shrimp Trawl Fisheries

NMFS has prepared opinions on Gulf of Mexico shrimp trawl fisheries numerous times over the years, most recently in 2014 (NMFS 2014a). The consultation history is closely tied to the lengthy regulatory history governing the use of turtle exclude devices (TEDs) and a series of regulations aimed at reducing potential for incidental mortality of sea turtles in commercial shrimp trawl fisheries. The level of annual mortality described in (NRC 1990c) is believed to have continued until 1992-1994, when U.S. law required all shrimp trawlers in the Atlantic and Gulf of Mexico to use TEDs, allowing at least some sea turtles to escape nets before drowning (NMFS 2002).[6] TEDs approved for use have had to demonstrate 97 percent effectiveness in excluding sea turtles from trawls in controlled testing. These regulations have been refined over the years to ensure that TED effectiveness is maximized through proper placement and installation, configuration (e.g., width of bar spacing), flotation, and more widespread use.

Despite the apparent success of TEDs for some species of sea turtles (e.g., Kemp's ridleys), it was later discovered that TEDs were not adequately protecting all species and size classes of sea turtles. Analyses by Epperly and Teas (2002) indicated that the minimum requirements for the escape opening dimension in TEDs in use at that time were too small for some sea turtles and that as many as 47 percent of the loggerheads stranding annually along the Atlantic and Gulf of Mexico were too large to fit the existing openings. On December 2, 2002, NMFS completed an opinion on shrimp trawling in the southeastern United States (NMFS 2002) under proposed revisions to the TED regulations requiring larger escape openings (68 FR 8456 2003), February 21, 2003). This opinion determined that the shrimp trawl fishery under the revised TED regulations would not jeopardize the continued existence of any sea turtle species. The determination was based in part on the opinion's analysis that shows the revised TED regulations are expected to reduce shrimp trawl related mortality by 94 percent for loggerheads and 97 percent for leatherbacks. In February 2003, NMFS implemented the revisions to the TED regulations.

Although mitigation measures have greatly reduced the impact on sea turtle populations, the shrimp trawl fishery is still responsible for large numbers of turtle mortalities each year. The Gulf of Mexico fleet accounts for a large percentage of the sea turtle bycatch in this fishery. In 2010, the Gulf of Mexico shrimp trawl fishery had an estimated bycatch mortality of 5,166 turtles (18 leatherback, 778 loggerhead, 486 green and 3,884 Kemp's ridley). By comparison, the

[6] TEDs were mandatory on all shrimping vessels. However, certain shrimpers (e.g., fishers using skimmer trawls or targeting bait shrimp) could operate without TEDs if they agreed to follow specific tow-time restrictions.

southeast Atlantic fishery had an estimated bycatch mortality of 1,033 turtles (8 leatherback, 673 loggerhead, 28 green and 324 Kemp's ridley) in 2010 (NMFS 2014b).

On May 9, 2012, NMFS completed a biological opinion that analyzed the implementation of the sea turtle conservation regulations and the authorization of the Southeast U.S. shrimp fisheries in federal waters under the Magnuson-Stevens Act (NMFS 2012c). The opinion also considered a proposed amendment to the sea turtle conservation regulations to withdraw the alternative tow-time restriction at 50 CFR §223.206(d)(2)(ii)(A)(3) for skimmer trawls, pusher-head trawls, and wing nets (butterfly trawls) and instead require all of those vessels to use TEDs. The opinion concluded that the action was not likely to jeopardize the continued existence of any sea turtle species. An ITS was provided that used anticipated trawl effort and fleet TED compliance (i.e., compliance resulting in overall average sea turtle catch rates in the shrimp otter trawl fleet at or below 12 percent) as surrogates for sea turtle takes. On November 21, 2012, NMFS determined that a Final Rule requiring TEDs in skimmer trawls, pusher-head trawls, and wing nets was not warranted and withdrew the proposal. The decision to not implement the Final Rule created a change to the action analyzed in the 2012 opinion and triggered the need to reinitiate consultation. Consequently, NMFS reinitiated consultation on November 26, 2012. Consultation was completed in April 2014; it determined the implementation of the sea turtle conservation regulations and the authorization of the southeast U.S. shrimp fisheries in federal waters under the Magnuson-Stevens Act was not likely to jeopardize the continued existence of any sea turtle species. The ITS maintained the use of anticipated trawl effort and fleet TED compliance as surrogates for numerical sea turtle takes.

6.3.2 **State Fisheries**

Several coastal state fisheries are known to incidentally take listed species, and available information on these fisheries is documented through different agencies (NMFS 2014c). Various fishing methods used in these commercial and recreational fisheries, including trawling, pot fisheries, gillnets, and vertical line are known to incidentally take sea turtles and/or Gulf sturgeon (NMFS 2014c). The past and current effects of state fisheries on listed species are currently not determinable. Most state data are based on extremely low observer coverage or sea turtles were not part of data collection; however, available data provide insight into gear interactions that could occur but are not indicative of the magnitude of the overall problem. The 2001 HMS biological opinion (discussed in the Fisheries Section above) has an excellent summary of turtles taken in state fisheries throughout the action area.

In addition to commercial state fisheries, protected sea turtles can also be incidentally captured by hook and line recreational fishers. Observations of state recreational fisheries have shown that loggerhead, leatherback, Kemp's ridley, and green sea turtles are known to bite baited hooks. Further, observations show that loggerheads and Kemp's ridleys frequently ingest the hooks. Hooked turtles have been reported by the public fishing from boats, piers, beaches, banks, and jetties. A detailed summary of the known impacts of hook-and-line incidental captures to loggerhead sea turtles can be found in the TEWG reports (TEWG 1998, 2000).

6.4 Oil and Gas

Oil and gas operations in the Atlantic and Gulf of Mexico that have been ongoing for more than 50 years involve a variety of activities that adversely affect ESA-listed species, including the sea turtle species considered in this Opinion, in the action area. These activities and resulting impacts include vessels making supply deliveries, seismic surveys, fluid spills, and oil spills and response. To the extent the past, present or anticipated impacts arise from federal actions that are not part of the federal actions under consultation here, they form part of the environmental baseline (e.g., prior spills and response activities).

Natural seeps provide the largest petroleum input to the offshore Gulf of Mexico, about 95 percent of the total. (Mitchell et al. 1999) estimated a range of 280,000-700,000 bbl per year (40,000-100,000 tonnes per year), with an average of 490,000 bbl (70,000 tonnes) for the northern Gulf of Mexico, excluding the Bay of Campeche. Using this estimate and assuming seep scales are proportional to surface area, the (NRC 2003) estimated annual seepage for the entire Gulf of Mexico at about 980,000 bbl (140,000 tonnes) per year, or about three times the estimated amount of oil spilled by the 1989 Exxon Valdez event (about 270,000 bbl) (SteynSteyn 2010) or a quarter of the amount released by the DWH event (4.9 million bbl of oil) (Lubchenco and Sutley 2010). As seepage is a natural occurrence, the rate of approximately 980,000 bbl (140,000 tonnes) per year is expected to remain unchanged into the foreseeable future.

6.5 Vessel Operations

Vessels have the potential to affect sea turtles through collisions with an animal and the production of sound. Vessels operating at high speeds have the potential to strike sea turtles and other marine species with their hulls or propellers. Potential sources of adverse effects from federal vessel operations in the action area include operations of the U.S. Department of Defense (DoD), BOEM/BSEE, Federal Energy Regulatory Commission (FERC), NOAA, and USACE. The Atlantic and Gulf of Mexico are known for a high level of commercial shipping activity and many large ports, especially those with transiting bulk carriers (Wiggins et al. 2016). Within the action area, vessels are the greatest contributors to increases in low-frequency ambient sound in the sea (Andrew et al. 2011). It is predicted that ambient ocean sound will continue to increase at a rate of half a decibel per year (Ross 2005). Sound levels and tones produced are generally related to vessel size and speed. Larger vessels generally emit more sound than smaller vessels, and vessels underway with a full load, or those pushing or towing a load, are noisier than unladen vessels.

6.6 Research Activities

Sea turtles are the focus of research activities authorized by section 10 permits under the ESA. Regulations developed under the ESA allow for the issuance of permits allowing take of certain ESA-listed species for the purposes of scientific research under section 10(a)(1)(a) of the ESA. Authorized activities range from photographing, weighing, and tagging sea turtles incidentally taken in fisheries, to blood sampling, tissue sampling (biopsy), and performing laparoscopy on intentionally captured sea turtles. The number of authorized takes varies widely depending on the research and species involved, but may involve the taking of hundreds of sea turtles annually. Most takes authorized under these permits are expected to be (and are) nonlethal. Before any research permit is issued, the proposal must be reviewed under the permit regulations (i.e., must show a benefit to the species). In addition, since issuance of the permit is a federal activity, issuance of the permit by NMFS or USFWS must also be reviewed for compliance with Section 7(a)(2) of the ESA to ensure that issuance of the permit does not result in jeopardy to the species or adverse modification of its critical habitat.

6.7 Coastal and Marine Development

Coastal navigation channels are often dredged to support commercial shipping and recreational boating. Dredging activities can pose significant impacts to aquatic ecosystems by: (1) direct removal/burial of organisms; (2) turbidity/siltation effects; (3) contaminant re-suspension; (4) sound/disturbance; (5) alterations to hydrodynamic regime and physical habitat; and (6) loss of riparian habitat (Chytalo 1996, Winger et al. 2000).

Marine dredging vessels are common within U.S. coastal waters. Although the underwater sounds from dredge vessels are typically continuous in duration (for periods of days or weeks at a time) and strongest at low frequencies, they are not believed to have any long-term effect on sea turtles. However, the construction and maintenance of federal navigation channels and dredging in sand mining sites ("borrow areas") have been identified as sources of sea turtle mortality. Hopper dredges can lethally harm sea turtles and other marine life by entraining them in dredge drag arms and impeller pumps. Hopper dredges in the dredging mode are capable of moving relatively quickly and can thus overtake, entrain, and kill sea turtles as the suction draghead(s) of the advancing dredge overtakes a resting or swimming organism.

To reduce take of listed species, relocation trawling may be utilized to capture and move sea turtles. In relocation trawling, a boat equipped with nets precedes the dredge to capture sea turtles and then release the animals out of the dredge pathway, thus minimizing or avoiding lethal take. Relocation trawling has been successful and routinely moves sea turtles.

In 2020, NMFS completed a regional biological opinion on dredging and material placement activities in the southeast U.S. that includes impacts to sea turtles and ESA-listed fish and their critical habitat via maintenance dredging. NMFS determined that dredging would adversely affect sea turtles but would not jeopardize their continued existence. An ITS for those species likely to be adversely affected was issued. The critical habitat analysis concluded that impacts would either have no effect or not likely to adversely affect designated critical habitats in the southeast U.S.

6.8 Military Operations

Military testing and training in the action area may also affect ESA-listed species. The Atlantic Fleet Testing and Training along the eastern seaboard and the Gulf of Mexico are used extensively by the Department of Defense for conducting various naval-submarine, naval-surface, air-to-air and air-to-surface operations.

These military readiness (training and testing) activities include the use of active sonar and explosives within existing range complexes and testing ranges, in high seas areas of the Atlantic Ocean along the eastern coast of North America, the Gulf of Mexico, in portions of the Caribbean Sea, at Navy pier side locations, within port transit channels, near civilian ports, and in bays, harbors, and inshore waterways. These military readiness activities are representative of training and testing the Navy has been conducting in the action area for decades.

Formal consultations on overall naval activities in the Atlantic have been completed, including U.S. Navy's Activities in East Coast Training Ranges (June 1, 2011); U.S. Navy Atlantic Fleet Sonar Training Activities (AFAST) (January 20, 2011); Navy AFAST LOA 2012-2014: U.S. Navy active sonar training along the Atlantic Coast and Gulf of Mexico (December 19, 2011); Activities in GOMEX Range Complex from November 2010 to November 2015 (March 17, 2011); Navy's East Coast Training Ranges (Virginia Capes, Cherry Point, and Jacksonville) (June 2010). These opinions concluded that although there is a potential for some naval activities to affect sea turtles, the activities were determined to be not likely to jeopardize the continued existence of any ESA-listed species. On October 22, 2018, NMFS issued a conference and biological opinion on the effects of the Navy’s Atlantic Fleet Training and Testing (AFTT) Phase III activities on ESA-listed resources (NMFS 2018). The AFTT Phase III opinion included an ITS with exempted take for the ESA-listed sea turtles for those programs.

NMFS has completed consultations on Eglin Air Force Base testing and training activities in the Gulf of Mexico. These consultations concluded that the incidental take of sea turtles was likely to occur. These opinions issued incidental take statements for these actions: Eglin Gulf Test and Training Range (NMFS 2004b), the Precision Strike Weapons Tests (NMFS 2005b), the Santa Rosa Island Mission Utilization Plan (NMFS 2005c), Naval Explosive Ordnance Disposal School (NMFS 2004a), Eglin Maritime Strike Operations Tactics Development and Evaluation (NMFS 2013), and Ongoing Eglin Gulf Testing and Training Activities (NMFS 2017a). These consultations determined the training operations would adversely affect sea turtles but would not jeopardize their continued existence.

6.1 Marine Debris

The discharge of debris into the marine environment is a continuing threat to the status of species in the action area, regardless of whether the debris is discharged intentionally or accidentally. Marine debris may originate from a variety of sources, though specific origins of debris are difficult to identify. A 1991 report (GESAMP 1990) indicates that up to 80 percent of marine debris is considered land-based and a worldwide review of marine debris identifies plastic as the primary form (Derraik 2002). Debris can originate from a variety of marine industries including fishing, oil and gas, and shipping. Many of the plastics discharged to the sea can withstand years of saltwater exposure without disintegrating or dissolving. Further, floating materials have been shown to concentrate in ocean gyres and convergence zones where *Sargassum* and consequently juvenile sea turtles are known to occur (Carr 1987).

Marine debris has the potential to impact protected species through ingestion or entanglement (Gregory 2009). Both of these effects could result in reduced feeding, reduced reproductive success, and potential injury, infection, or death. All sea turtles are susceptible to ingesting marine debris, though leatherbacks show a marked tendency to ingest plastic which they misidentify as jellyfish, a primary food source (Balazs 1985). Ingested debris may block the digestive tract or remain in the stomach for extended periods, thereby reducing the feeding drive, causing ulcerations and injury to the stomach lining, or perhaps even providing a source of toxic chemicals (Laist 1987, 1997). Weakened animals are then more susceptible to predators and disease and are also less fit to migrate, breed, or, in the case of turtles, nest successfully (McCauley and Bjorndal 1999, Katsanevakis 2008).

Pollution from a variety of sources including atmospheric loading of pollutants such as PCBs, stormwater from coastal or river communities, and discharges from ships and industries may affect sea turtles, sperm whales, and Gulf sturgeon in the action area. Sources of marine pollution are often difficult to attribute to specific federal, state, local or private actions.

There are studies on organic contaminants and trace metal accumulation in green, leatherback, and loggerhead sea turtles (Aguirre et al. 1994, Caurant et al. 1999, Corsolini et al. 2000). McKenzie et al. (1999) measured concentrations of chlorobiphenyls and organochlorine pesticides in sea turtles tissues collected from the Mediterranean (Cyprus, Greece) and European Atlantic waters (Scotland) between 1994 and 1996. Omnivorous loggerhead turtles had the highest organochlorine contaminant concentrations in all the tissues sampled, including those from green and leatherback turtles (Storelli et al. 2008). It is thought that dietary preferences were likely to be the main differentiating factor among species. Decreasing lipid contaminant burdens with sea turtle size were observed in green turtles, most likely attributable to a change in diet with age. (Sakai et al. 1995) documented the presence of metal residues occurring in loggerhead sea turtle organs and eggs. Storelli et al. (1998) analyzed tissues from 12 loggerhead sea turtles stranded along the Adriatic Sea (Italy) and found that characteristically, mercury accumulates in sea turtle livers while cadmium accumulates in their kidneys, as has been reported for other marine organisms like dolphins, seals, and porpoises (Law et al. 1991b). No information on detrimental threshold concentrations is available and little is known about the consequences of exposure of organochlorine compounds to sea turtles. Research is needed on the short- and long-term health and fecundity effects of chlorobiphenyl, organochlorine, and heavy metal accumulation in sea turtles.

There is not information available to discuss with certainty the possible long-term and trans-generational effects of exposure to pollutants. It is not known if high levels of heavy metals, PCBs, and organochlorines found in prey species accumulate with age and are transferred through nursing. Nevertheless, the accumulation of stable pollutants such as heavy metals, PCBs, chlorinated pesticides [DDT, DDE, etc.], and polycyclic aromatic hydrocarbons [PAHs]) is of concern.

6.2 Natural Disturbances

Hurricanes and large coastal storms can significantly modify both nesting and in-water sea turtle habitat. Beach profiles change in response to wave action and storm-induced erosion on the coast, which can also lead to the loss of nests or the loss of nesting habitat for at least a season if not longer depending on the size of the beach and the extent to which the beach profile is altered. Storms also result in breakage of sessile benthic organisms from extreme wave action and storm surges. Intense storms that cover a broad area can eliminate or damage large expanses of reef or result in blowouts and loss of seagrass habitats. Flooding from tropical storms and hurricanes also cause significant sedimentation of nearshore areas resulting in impacts to benthic habitats used by green and hawksbill sea turtles. In-water habitat for green and hawksbill sea turtles is temporarily lost or temporarily or permanently degraded (depending on the magnitude of the storm).

6.3 Cumulative Anthropogenic Impacts to the Environmental Baseline

As noted in the above section, there are a number of activities that may indirectly affect listed species such as the sea turtles in the action area of this consultation. The impacts from some of these activities are difficult to measure. Where possible, conservation actions are being implemented to monitor or study impacts from these sources. Halpern et al. (2015) scored and additively analyzed 19 common stressors to display areas where global cumulative human impacts were greatest (Figure 21). Impact stressors included artisanal fishing, demersal destructive fishing, demersal non-destructive fishing, high by-catch fishing, inorganic pollution, invasive species, nutrient input, ocean acidification, benthic structures (oil rigs), organic pollution, pelagic high-bycatch fishing, pelagic low-bycatch fishing, ocean-based pollution, population pressure, commercial activity (shipping), climate change via sea surface temperature, and climate change via an ultraviolet index. The selected stressors were not comprehensive for the entire world or for specific regions; however, Figure 21 demonstrates the areas where cumulative impacts are high (i.e., Gulf of Mexico included) and that there are few areas left that have not been affected by humans. The authors noted that marine ecosystems may exhibit threshold responses to intense and cumulative stress that creates non-linear relationships of cumulative impact to ecological condition; therefore not only intensity of stressors but also vulnerability or resilience of ecosystems must be accounted for when examining ecosystem condition (Halpern et al. 2015). Cumulative impact across areas may be much greater (or in rare cases less) than the sum of the individual impacts because of interactive or multiplicative effects (Halpern et al. 2008).

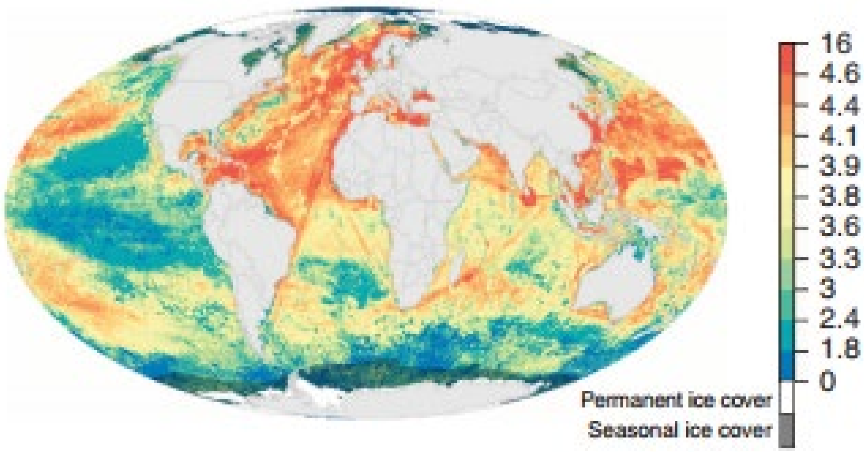

Figure 21. Cumulative human impact to marine ecosystems as of 2013. Figure from Halpern et al. (2015).

6.4 Synthesis of Baseline Impacts

In summary, several factors adversely affect ESA-listed sea turtles and loggerhead critical habitat in the action area. These factors are ongoing and are expected to occur contemporaneously with the action. Fisheries in the action area have the greatest adverse impacts on sea turtles based on stranding data, although there are also records of vessel strikes associated with the operation of recreational vessels. Over recent years, the impacts to sea turtles associated with fisheries may have been reduced through the section 7 consultation process and regulations implementing effective bycatch reduction strategies, such as the requirement of turtle release gear in some fisheries. Climate change and sound are factors likely to continue adversely affecting sea turtles in the action area. Other environmental impacts, including the effects of oil and gas, vessel operation, scientific research, coastal and marine development, military operations, pollution, and natural phenomena had and are expected to continue to have adverse effects on sea turtles in the action area. Based on the information discussed in this section, the environmental baseline for sea turtles in the action area is not pristine and has been degraded by the abovementioned combination of factors.

7 Effects of the Action

"Effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. The jeopardy analysis relies upon the regulatory definition of to "jeopardize the continued existence of a listed species," which is "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species," 50 C.F.R. §402.02. Therefore, the jeopardy analysis considers both survival and recovery of the species.

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

7.1 Stressors Associated with the Action

Stressors are a term used broadly to describe any change in the environment that can elicit a response from a species or features of critical habitat. Oil spill response is generally seen as having long-term beneficial effects in that it removes oil and thus lessens the effects of oil discussed above. However, there are several aspects of response that introduce novel stressors in the interim. Dispersant application on an oil spill and the use of ISB to quickly remove spilled oil from the environment may expose ESA-listed sea turtles, marine mammals, and marine fish to a variety of stressors. The potential stressors we expect to result from the action are direct exposure to dispersants, dispersant effects on prey and habitat, direct exposure to burning, and ISB impacts to prey and habitat. Exposure to activities such as overflights, vessel traffic, and deployment of other response tools such as boom associated with the application of oil dispersant and during ISB is also a potential stressor. Oil recovered, chemically dispersed, or burned off would vary, but planning for such responses is intended to ensure that adequate equipment and resources are available to be quickly deployed in the event a very large spill occurs. See **Appendix K** for maps summarizing recorded spill events for the period from 2002 to 2019, and overlaid on green (pre-authorized) and yellow (not pre-authorized) zones.

Effects of Oil

We discuss effects of oil here because dispersants and ISB would not be proposed but for the response necessary for a large oil spill event. To reiterate, oil spills are not part of the action, but response action is necessary to mitigate effects from a large accidental and unlawful oil spill and may require the use of dispersants and ISB.

Oil is known to cause mortality in marine mammals, sea turtles, and other marine life based on the number that died as a result of exposure to oil during DWH (DWH Trustees 2016). This is one of the few oil spill incidents that resulted in reports of sea turtles being oiled (CRRT Response Technologies Committee 2015), likely due to the relatively small size of other incidents that have occurred in waters of the United States when compared to the DWH incident. Oil spills are thought to have the greatest effect on sea turtle nests due to the impacts of oil exposure on developing embryos and hatchling success. PAHs have been shown to significantly impact sea turtle embryos and hatchlings (CRRT Response Technologies Committee 2015).

Oil spills are well known to damage the environment and kill animals that are directly and indirectly exposed to oil. The capability to survey for, capture, rehabilitate oiled animals, and have immediate access to the necessary resources, directly influences the outcome of the health and survival of oiled animals. From Trustees (2016):

Crude oil contains different compounds of toxic aromatic chemicals that have at least one benzene ring. When crude oil is released, it immediately begins the degradation process, called weathering. Some oil compounds will weather, by evaporation, dispersion into water, or bacterial degradation, while others will not, such as polycyclic aromatic hydrocarbons or PAHs. Different crude oils have different chemical compositions that are governed primarily by the geologic conditions under which they were formed, migrated, and accumulated. These conditions can result in oil from a given location or geologic formation having a unique chemical composition, including specific compounds that help experts distinguish one crude oil from another. The fate and transport of oil and gas after a spill differs. Oils may sink, become entrained in the water column, or surface. The moment oil reaches the surface, it begins to evaporate the aromatic compounds and the remaining heavier compounds react to other environmental conditions (i.e., sun, wind, waves, currents). Natural gas may remain submerged and be degraded by bacteria prior to reaching the surface, depending on the depth of the spill. The same bacteria produce mucus that may form with oil droplets and cause marine oil snow that then settles to the seafloor.

During the DWH spill, injuries and death of various sea turtle species were documented because of oiling and the ingestion of oil based on necropsies performed on dead turtles (DWH Trustees 2016). Loggerhead sea turtles that utilize habitats in areas with heavy tanker traffic were found to contain PAH contamination in their tissues that could affect their fitness (Camacho et al. 2012). The major route of exposure for adult sea turtle ingestion of oil is thought to be buoyant tarballs that form as non-dispersed oil weathers naturally because turtles are known to ingest these tarballs (CRRT Response Technologies Committee 2015).

Lutcavage (1997) observed effects of exposure to weathered crude oil in loggerhead sea turtles that included alteration of blood chemistry, respiration and diving patterns, interference with salt gland functioning, and skin lesions and hypothesized that exposure to fresh oil would have been more harmful to the animals. These effects are likely to apply to other species of sea turtles and make sea turtles more vulnerable to predation and disease.

7.1.1 **Dispersant Application**

Dispersants are a group of chemicals designed to break up oil spills and that generally contain two components: a surfactant and a solvent (ITOPF 2011b). The solvent carries the surfactant through the layer of oil to the oil/water interface. The surfactant reduces the surface tension by binding with both the oil molecules and the water molecules (ITOPF 2011b). Chemical dispersants may be used to promote the breakup of the crude oil into smaller droplets which then may more readily disperse throughout the water column (Fingas 2008). The EPA regulates the use of dispersants[7], and has acknowledged that the environmental effects are largely unknown (Kilduff and Lopez 2011). In the discussion of the effects of oil on listed species above, the trends in the data suggest that although both oil and dispersant have some toxic effects independently, the dispersant-oil mixtures are more toxic to animals (Hansen et al. 2012, Anderson et al. 2014, McIntosh et al. 2014).

The application of dispersants to oil allows small droplets of oil to break away from the larger slick. Since the dispersants are less dense than sea water, the dispersed oil droplets remain positively buoyant (Graham et al. 2016). After dispersant application, a complex, multi-phase mixture of dissolved dispersants, dissolved petroleum hydrocarbons, oil/dispersant droplets, and bulk undispersed oil remains in the water (NRC 2005). Although exposure to thicker slicks of oil is reduced by using dispersants, listed species may continue to be exposed to oil/dispersant mixtures. For very large spills, exposure to oil/dispersant mixtures could be quite high. The use of dispersants in the DWH spill response was unprecedented: 18,379 barrels of dispersant were used subsea, and 25,505 barrels were applied to oil on the surface. In May 2012, the U.S.Government Accountability Office (GAO) released a report on the use of chemical dispersants. Experts, agency officials, and specialists were asked about chemical dispersants and their effectiveness. Those surveyed agreed that while there is a lot of information known about the use and effectiveness of dispersants to break up surface oil, very little is known about the impacts and effectiveness of applying dispersant to subsurface oil (GAO 2012).

Toxicity of dispersed oil in the environment will depend on many factors, including the effectiveness of the dispersant, temperature, salinity, the degree of weathering, type of dispersant and degree of light penetration in the water column (NRC 2005). The GAO (2012) noted that most tests on acute toxicity have shown crustaceans and mollusks are more sensitive than fish, and larval stages of fish are more sensitive than adults. Experts have noted that there are significant data gaps in regards to chronic effects (GAO 2012). Most studies have focused on acute toxicity rather than long-term effects. The lack of information on chronic effects makes it difficult to understand how the entire ecosystem is impacted by chemically dispersed oil and the dispersants themselves over the long term (GAO 2012). Dispersing oil has both positive and negative effects. The positive effect is that the oil, once dispersed, is more available to other degraders and it may prevent a surface slick from reaching shore. The negative effect is that the oil, once dispersed, may be more bioavailable to other organisms, which may temporarily increase its toxicity. Important habitat areas could be avoided or sea turtles could be rescued from the areas that are targeted for dispersants.

A study investigating dispersants showed adverse effects on hatchling sea turtles (Harms et al. 2014). Hatchling sea turtles were exposed to a control, oil, dispersant, and oil/dispersant exposures for one day or four days. Turtles were placed in individual basins and exposed to oil

[7] https://www.epa.gov/emergency-response/dispersing-agents

(Gulf Coast – Mixed Crude Oil Sweet, CAS #8002-05-9, 0.833 mL/L) and/or dispersant (Corexit 9500A, 0.083 mL/L). Hatchlings exposed to both dispersant alone, and the dispersant oil mixture showed greater adverse effects than controls. The animals experienced dehydration, blood chemistry changes, and a failure to gain weight. The adverse effects of exposure were most severe in the combined oil/dispersant exposures at four days (Harms et al. 2014).

Surface application of dispersants can facilitate the movement of a dispersant-oil plume many miles from the point of their use and expose sea turtles and their prey. The bioaccumulation of hydrocarbons at the base of the planktonic food web could increase exposure of higher-trophic-level organisms to dispersant related chemicals, with potentially delayed effects (Wolfe et al. 1998, Abbriano et al. 2011).

Dispersant application may affect prey species used by ESA-listed sea turtles. As noted above, studies have shown that dispersants and dispersed oil are sometimes more toxic to larval stages of marine organisms, than oil alone. Thus, the abundance of prey species of juvenile and adult life stages of ESA-listed sea turtles and marine fish could experience short-term reductions in abundance if dispersants were applied as part of the response to an oil spill.

Other response operations required to deploy dispersants, such as vessels transit and aircraft flying over sites to either survey for animals or deploy dispersants could disturb sea turtles due to the noise generated by vessels and/or aircraft. The use of vessels during dispersant application could affect sea turtles due to the potential for harassment caused by vessel noise and vessel strikes, but these effects would be temporary and localized. No vessel strikes of sea turtles have been reported as part of vessel use during response activities associated with oil spills that have occurred to date in the U.S. Southeast waters.

Toxicity data were provided in the RRT4 BA and are shown in Figure 23. The toxicity of physically dispersed No. 2 fuel (without dispersants) is also displayed as a reference. This figure is displayed over a background of standard toxicity categories used by the EPA. Toxicity LC50 and EC50 categories for aquatic organisms are as follows: Very highly toxic <0.1 mg/L, Highly toxic 0.1-1 mg/L, Moderately toxic >1-10 mg/L, Slightly toxic >10-100 mg/L and Practically nontoxic >100 mg/L. Source: http://www2.epa.gov/pesticide-science-and-assessing-pesticide-risks/technical-overview-ecological-risk-assessment-0

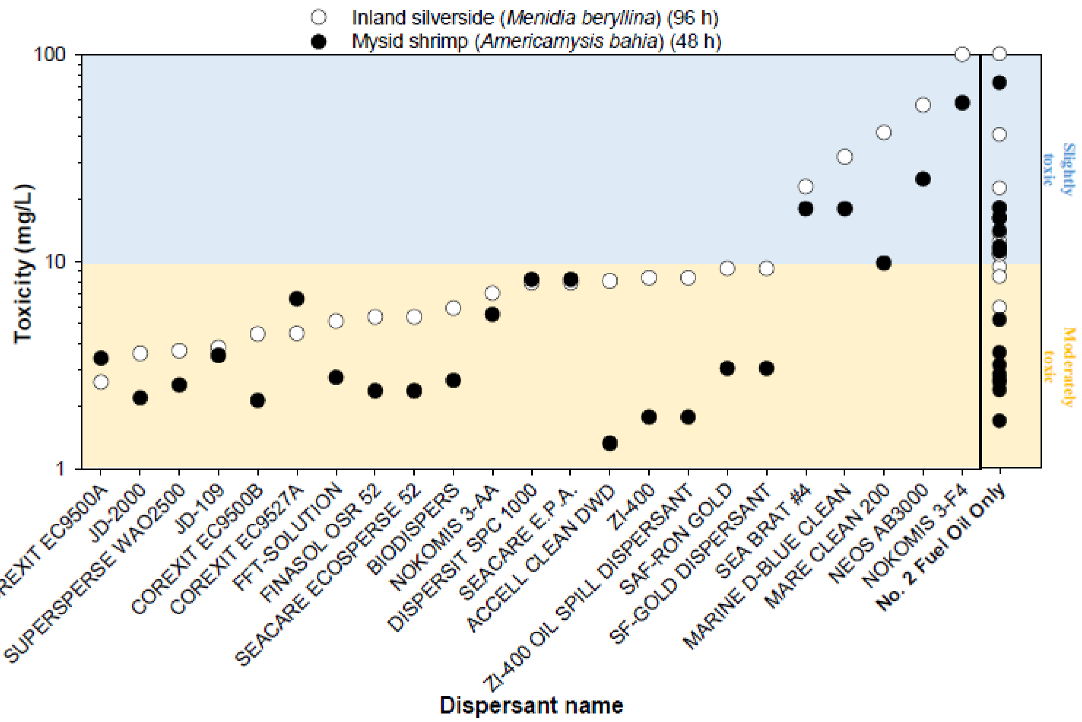

Figure 22. Figure I-1 from the RRT4 BA displaying toxicity data (LC50 values, mg/L or ppm) of No. 2 fuel chemically dispersed with each of the authorized dispersants listed on the Subpart J of the NCP 32 using two standard test species.

Dispersants can directly affect ESA-listed species, such as sea turtles, by irritating skin, by injuring their respiratory system through inhalation (Matkin et al. 2008), and by damaging the gastrointestinal tract, including liver and kidneys, through incidental ingestion and absorption (Geraci 1988). While modern dispersants are generally classified as “slightly” toxic or “practically nontoxic” to aquatic species (Hemmer et al. 2011), studies have shown that a dispersant-oil mix may be more toxic to aquatic species than either crude oil or dispersants alone (Khan and Payne 2005, Schein A. et al. 2009, Luna-Acosta et al. 2011, Rico-Martínez et al. 2013). This is because the application of dispersants to an oil spill increases the amount of oil in the water column, and thus the availability of PAH toxins to marine species (George-Ares and Clark 2000, Ramachandran 2005). There is research including a review document to support the opposite, that synergistic toxicity of oil and dispersants is not apparent, especially in field environments (Fuller et al. 2004, Adams et al. 2014, Bejarano 2018).

Other response activities associated with the use of dispersants could affect sea turtles, particularly through potential entanglement in lines associated with boom and potential habitat loss or degradation. No entanglement or other interactions with sea turtles have been reported as part of past spill response activities in the Southeast U.S.

7.1.2 In-Situ Burning

The effects on sea turtles from *in situ* burning of oil and resultant residues have not been well documented. Effects may result from inhalation of smoke and particulate matter in the air or inadvertent exposure of listed species to oil burning at the surface. A review of smoke inhalation cases in other animals shows that smoke can irritate or inflame airways, denude mucosal surfaces, and cause systemic toxicity which can lead to lung-induced morbidity and potentially mortality (Demling 2008). Animals are submerged a good portion of the time, but could be exposed to hazardous particulates and irritants during breathing periods at the surface. Some adverse effects expected are irritation to the lungs and associated respiratory system, inhalation of hazardous particulates, and changes to blood chemistry.

Tarballs, whether as ISB residues or from natural degradation of spilled oil, ingested by any age class of sea turtle are likely to have a variety of effects, including starvation from gut blockage, decreased absorption efficiency, absorption of toxins, effects of general intestinal blockage (such as local necrosis or ulceration), interference with fat metabolism, and buoyancy problems caused by the buildup of fermentation gases (floating prevents turtles from feeding and increases their vulnerability to predators and boats), among others. Shigenaka and Milton (2003) also noted that for in-situ burning, sea turtles could have impaired lung function from inhalation of smoke, gases and particulates in the air near the burning site or could ingest tar residues (unburned oil) left behind, if not removed properly. While not inherently part of the ISBP, floating residues are typically skimmed and removed from the area following the burn.

During the DWH response, there were concerns that oceanic juvenile sea turtles were inadvertently being concentrated into areas of oil that was being burned off the surface. The rescue of sea turtles in oil that is targeted for *in situ* burns was inhibited by a lack of any response plans that included avoiding adverse impacts of the activity and to rescue sea turtles. Although there is no direct evidence that sea turtles were burned with oil, it is possible that small, heavily oiled turtles went undetected that could have been rescued by wildlife responders. With adequate response planning and monitoring, the potentially adverse effects of *in situ* burning could be more closely monitored, and marine protected species (e.g., sea turtles) could be rescued from certain death.

For this reason, observers must ensure no sea turtles or other protected species are present in areas where burns are planned and burns must be rescheduled or relocated to avoid areas with sea turtles or other protected species. On the other hand, as part of sea turtle conservation measures to be implemented during any planned ISB activities, sea turtles may be captured for treatment if they have been oiled in the area where an in-situ burn may be planned. Dead animals that have suffered mortality as a result of oiling may also be collected. Capture and collection of sea turtles will be part of stranding activities during a response performed by persons authorized by NMFS as part of the STSSN for animals that are in the water. These actions will follow all required measures as described in the conservation measures (**Appendix A**), Sea Turtle Protection Measures under ISB. For this reason, any take related to these capture and collection activities during oil spill response activities prior to an ISB is already exempted under the STSSN consultation and not analyzed in this Opinion.

ISB is not expected to impact sea turtle habitat other than *Sargassum* offshore loggerhead critical habitat because ISB would only be authorized under this consultation in green zones, which conditionally restrict the use of this response in areas where designated critical habitat exists and *Sargassum* is observed during the pre-action flight. The formation of tarballs as a result of in-situ burning could impact the essential feature related to food resources of loggerhead critical habitat through the potential toxicity of tarballs affecting prey. ISB could affect sea turtles due to short-term loss of prey items that are within the surface layer impacted by the burn, or by the layer of residual oil (i.e., tarballs) that sink following the burn (Shigenaka et al. 2015). However, because these prey items are likely to already be oiled, ingestion would likely result in more serious impacts to sea turtles than the loss of a small quantity of prey due to burning. In addition, because sea turtles are more likely to forage below the water surface and be at the surface only to breathe, the majority of prey and forage items are likely to be unaffected by ISB.

While some adverse effects are anticipated to occur to offshore critical habitat for loggerhead sea turtles, due to the expected limited extent of burn operations in the U.S., based on the small number and extent of oil spills that have occurred to date, and the PDCs limiting nearshore use of ISB as a response tool, tarball generation and associated impacts to offshore food resources of sea turtles are expected to be minimal and not significantly affect the value of critical habitat and ability to support loggerhead sea turtles .

Dispersed oil in the water column could have localized lethal effects on the *Sargassum* community. Potential effects on *Sargassum* communities from dispersants, oil and/or oil/dispersant mixtures include: direct mortality due to fouling and smothering, uptake of oil and dispersant toxins, other effects to the fitness of animals due to adverse effects to habitat or adequate food resources, and uptake of oil and dispersants into tissues which would lower plant stress tolerance. However, oil spills could have a greater direct effect on *Sargassum*-related prey availability that could slow growth of animals or other lethal effects. If the oil and oil dispersant mixture were to reach shorelines, benthic communities and seagrass communities could be affected (Gilfillan et al. 1985). Although much of the oil that reached nearshore habitats during DWH was likely dispersed offshore, only 60 of 4,850 water samples and six of 412 sediment samples detected dispersant. None of the concentrations of dispersant-related chemicals found in the samples exceeded the benchmarks for toxicity (OSAT 1 2010). Therefore, it is not likely that use of dispersants would be present in concentrations that would pose any significant risk to offshore habitats due to the rapid dilution potential in deeper water. The use of dispersants are helpful for controlling areas of large spills, and when applied in appropriate concentrations to preauthorized areas and under conservation measures herein, would not be any more toxic to sea turtles or loggerhead critical habitat than the existing oil that spilled.

7.2 Exposure Analysis

In the sections above, we described the stressors resulting from the use of dispersants and/or ISB as response tools for oil spills in the offshore waters of the Southeast U.S. from North Carolina to Mississippi. In the following section, we consider the exposures that could cause an effect on ESA-listed species that are likely to co-occur with the actions' effects on the environment in space and time, and identify the nature of that co-occurrence. We consider the frequency and intensity of exposures that could cause an effect on sea turtles and, as possible, the number, age or life stage, and gender of the individuals likely to be exposed to the actions' effects and the population(s) or subpopulation(s) those individuals represent. We also consider the responses of individual sea turtles to exposures and the potential reduction in fitness associated with these responses.

According to the RRT4 biological assessment (BA), a complete exposure pathway to dispersants or chemically dispersed oil can only occur when all of the following elements are present:

1. An oil spill incident requiring the use of dispersants resulting in chemically dispersed oil in the water column;

2. Media (i.e., water, air, or sediment) must be present for dispersants and/or chemically dispersed oil to travel;

3. Listed species, designated critical habitat or EFH must be present and come into direct contact with dispersants and/or chemically dispersed oil; and

4. A pathway of exposure leading to direct contact the body (i.e., ingestion, inhalation, and dermal contact and absorption).

According to the RRT4 BA, a complete exposure pathway to in-situ burning (including combustion byproducts) and burn residues can only occur when all of the following elements are present:

1. An oil spill incident requiring in-situ burning resulting in exposure to the combustion byproducts and burn residues;

2. Media (i.e., water, air, or sediment) must be present for the combustion byproducts and burn residues to travel;

3. Listed species, designated critical habitat or EFH must be present and come into direct contact with the combustion byproducts and burn residues; and

4. A pathway of exposure leading to direct contact the body (i.e., ingestion, inhalation, and dermal contact and absorption)

Based on the summary of historical spills from RRT4 BA, cumulative discharge incidents of oil in the U.S. have decreased in both volume and frequency over the past 40 years (Figure 23; see also **Appendix K**). As shown in Figure 23, most of these spill events were located in inland or coastal areas, which would be in the yellow zone and not preauthorized for the use of dispersants or ISB under this Opinion (see also **Appendix K**). According to the RRT4 BA, “This trend suggests improved reporting and discharge control practices, possibly related to regulatory changes from the Oil Pollution Act of 1990 (33 U.S.C. 2701-2761) which amended the Clean Water Act (33 U.S.C. 1251-1387) to address preventing and responding to oil pollution incidents.”

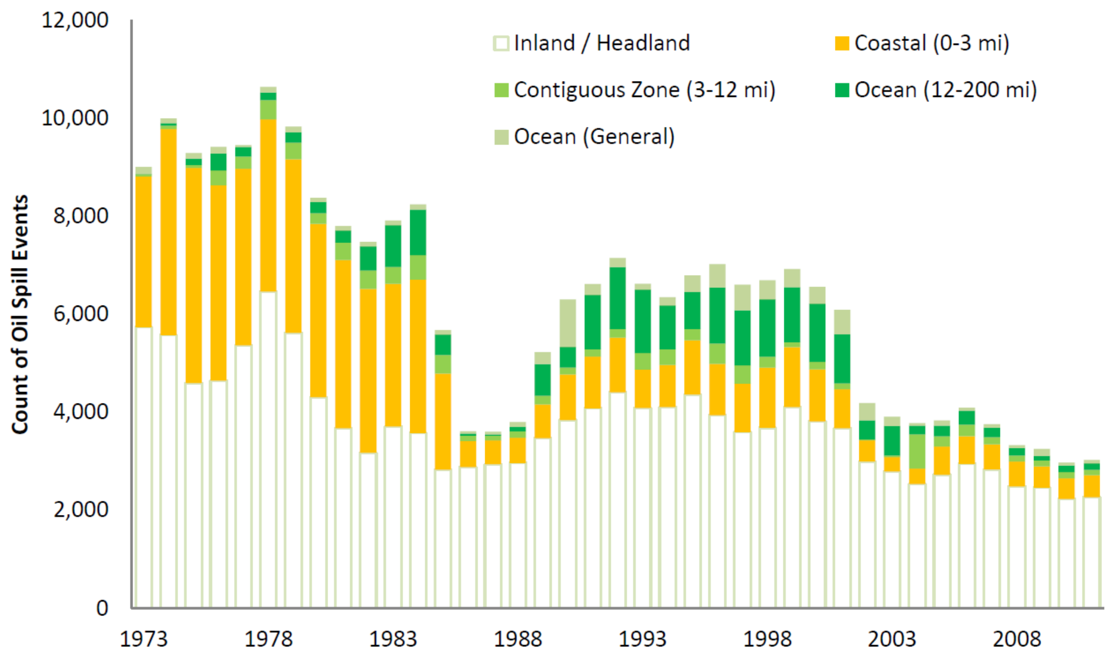

Figure 23. Count of U.S. Oil Spill Events by Waterway Category from 1973-2011 (RRT4 BA 2020).

As shown in Table 6, the majority of the oil spill events that occur in federal region 4 are less than 100 gallons in volume. Total spill events over 10,000 gallons in volume range from zero to six per year since 2002, or an average per year between two and three events. The likelihood for the use of dispersants or ISB as response methods generally fall into this largest category of greater than 10,000 gallons. These data represent all of District 8, which encompasses areas beyond the action area covered in this zone, and areas that may be heavy with oil and gas development (more likely area with potential to have larger oil spill occurrence). Hence, the number of events represented in the largest spill size category is an overestimate for the area to be preauthorized under this Opinion. Based on information from the BA and in **Appendix K** of this Opinion, we expect that many spills occurring within the green zone would be events in the less than 10,000 gallons category, and very few occurrences in the larger spill category, which are those that would need consideration for dispersant use or ISB preauthorized in this Opinion.

Table 5. Annual Total Count of Oil Spill Events in USCG Districts 5, 7 and 8 by Spill Size (RRT4 BA).

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
USCG District 5																			
Events <100 gal	373	342	244	230	245	254	174	222	183	155	203	204	153	149	135	177	172	153	**3,768**
Events 100-1,000 gal	18	24	17	16	7	16	9	10	16	10	9	9	6	5	6	5	6	5	**194**
Events 1,000-10,000 gal	3	1	2	2	2	3	5	3	3	3	2	2	1	2	0	1	2	2	**39**
Events >10,000 gal	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	**3**
USCG District 7																			
Events <100 gal	414	311	244	316	308	345	304	363	368	312	336	389	397	311	365	327	295	350	**6,055**
Events 100-1,000 gal	16	19	7	15	15	14	14	11	13	12	13	13	13	8	10	9	11	4	**217**
Events 1,000-10,000 gal	5	2	5	3	1	1	4	2	1	2	2	1	2	0	1	4	2	0	**38**
Events >10,000 gal	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
USCG District 8																			
Events <100 gal	1,776	1,831	1,860	1,693	1,989	1,748	1,535	1,352	1,326	1,414	1,393	1,345	1,239	969	1,004	1,101	1,174	1,133	**25,882**
Events 100-1,000 gal	90	76	76	61	101	66	53	54	55	52	48	43	35	29	32	43	53	46	**1,013**
Events 1,000-10,000 gal	14	12	17	18	19	12	9	10	9	6	11	17	7	5	15	12	19	14	**226**
Events >10,000 gal	2	0	1	2	5	1	1	1	2	0	0	2	1	1	4	4	5	3	**35**
Total Events <100 gal	**2,563**	**2,484**	**2,348**	**2,239**	**2,542**	**2,347**	**2,013**	**1,937**	**1,877**	**1,881**	**1,932**	**1,938**	**1,789**	**1,429**	**1,504**	**1,605**	**1,641**	**1,636**	**35,705**
Total Events 100-1,000 gal	**124**	**119**	**100**	**92**	**123**	**96**	**76**	**75**	**84**	**74**	**70**	**65**	**54**	**42**	**48**	**57**	**70**	**55**	**1,424**
Total Events 1,000-10,000 gal	**22**	**15**	**24**	**23**	**22**	**16**	**18**	**15**	**13**	**11**	**15**	**20**	**10**	**7**	**16**	**17**	**23**	**16**	**303**
Total Events >10,000 gal	**3**	**0**	**2**	**2**	**6**	**1**	**1**	**1**	**2**	**0**	**0**	**2**	**1**	**1**	**5**	**4**	**6**	**3**	**40**

Juvenile, sub-adult and adult sea turtles may be present in the areas preauthorized for use of dispersants and ISB under this Opinion. The greatest number of incidents resulting in oil spills occur either in shallow water areas where dispersant use and ISB are prohibited, or in offshore waters where density of turtles is likely to be fewer and more sparse than those on the shelf. That is, with the exception of *Sargassum* convergence zones, where juvenile and sub-adult sea turtles are likely to have higher densities. Because of the location of all of these historical incidents large enough to require dispersant use or ISB, very few would have fallen within the preauthorized zones. Of the 40 reported incidents large enough to require dispersants or ISB, a small number of those resulted in the use of dispersants or ISB as response strategies.

Therefore, a limited number of incidents would be expected to result in the potential for exposure of various life stages of sea turtles and loggerhead critical habitat. Because of the rarity and uncertainty of oil spills of the size and volume to the extent to necessitate consideration of use of dispersants or ISB likely to occur on an annual basis, information from past incidents, and the small number of responses using dispersants and/or ISB from which to draw data, we are unable to estimate the number of animals that could be affected during a response where dispersants and/or ISB are used. Due to the uncertainty of timing, location and magnitude of a spill, this also does not allow for an estimation of critical habitat area that could be potentially affected. The PDCs include restrictions preventing the use of dispersants in shallow water areas that would prohibit use of dispersants or ISB in areas containing the essential features of NWA loggerhead sea turtle critical habitat under this consultation.

7.2.1 Other Potential Effects to Sea Turtles from Aerial and Vessel Operations

Response-associated aerial and vessel operations that could result in noise disturbances to sea turtles, which could hear low-flying aircraft if they are at or near the water surface, but overflights during spill response would be short in duration and the PDCs require that the amount of time spent in an area where sea turtles are sighted be limited. Sea turtles spend only three to six percent of their time at the sea surface and overflights do not generate sound levels that result in harm to sea turtles (Laney and Cavanagh 2000). Sea turtles may rely more on visual cues rather than auditory ones (Hazel et al. 2007), meaning the shadow created on the water may cause sea turtles to react, rather than exposure to aircraft noise.

In terms of vessel movement, Hazel et al. (2007) reported that sea turtles were more likely to flee from slower-moving vessels than from vessels operating at faster speeds, meaning that collisions with fast-moving vessels were more likely. While vessel collisions with sea turtles are known to occur, there are no reports of vessel collisions occurring as a result of past response activities for oil spills that have occurred in the Southeast U.S. (**Appendix K**). Moreover, the PDCs require compliance with BMPs designed to minimize potential impacts of vessel operation on sea turtles during response activities. Therefore, we believe the potential adverse effects to sea turtles as a result of aircraft and vessel operations during dispersant application or the use of ISB in the Southeast U.S. will largely be avoided. Other response activities associated with the use of dispersants and ISB that could affect hawksbill, green, and leatherback sea turtles, particularly boom deployment, the PDCs include measures to avoid impacts associated with entanglement in lines associated with boom. No entanglement or other injuries to sea turtles have been reported as part of past incidents in the Southeast U.S. The PDCs also include measures to minimize potential impacts to loggerhead sea turtle critical habitat. In addition, based on the size and number of past incidents, any securing of boom would be very limited in extent, leaving large areas of habitat available to sea turtles. Therefore, we believe the potential adverse effects of response activities associated with dispersant use in the offshore waters of Southeast U.S. federal region 4 such as boom deployment on sea turtles and loggerhead critical habitat will be minor and not significantly affect the fitness of individual sea turtles.

7.3 Mitigation to Minimize or Avoid Exposure

Several aspects of the proposed action are designed to minimize ESA-listed species' exposure to the potential stressors associated with the proposed use of dispersants and ISB in the U.S. Southeast. These were described and included in the PDCs for this programmatic consultation (Section 3.5 and **Appendices A-E**).

7.4 Response Analysis

Given the potential for exposure to stressors associated with the proposed action discussed above, in this section we describe the range of ESA-listed sea turtle responses that may result, specifically from stressors associated with the use of dispersants and ISB in federal region 4. All five species listed in Section 5.2 and loggerhead critical habitat can be found in the offshore waters of the Gulf of Mexico and Atlantic. For the purposes of consultation, our assessment considers the potential lethal, sub-lethal (or physiological), or behavioral responses that might reduce the fitness of individuals or adversely affect PBFs of offshore loggerhead critical habitat.

7.4.1 **Dispersant Use**

Sea turtles would be affected by an oil spill and associated use of dispersants only if these occurred when and where individual turtles are present. Higher densities of turtles are expected in nearshore waters where dispersants are not preauthorized. Deeper convergence zones often host *Sargassum* mats that serve as habitat for a higher number of juvenile turtles, or the spill could occur in deep waters where adults may be foraging and transiting in lower densities. Since 2002 there have been 40 spills in federal region 4 large enough to require the use of dispersants or ISB (see **Appendix K)**. Some larger spills occur in nearshore or coastal areas where the preauthorization agreements and the PDCs would prohibit the use of dispersants. The PDCs also require that no dispersant be applied within 0.5 nm of areas where sea turtles have been sighted, allowing a potential buffer around the area for dispersant dilution, which minimizes direct exposure of sea turtles to dispersants.

There are no studies regarding the actual effects of dispersants on sea turtles. Based on observations of sea turtles in areas where dispersant application has taken place, it is thought that they are not directly affected by dispersants. The greatest impact to sea turtles is likely to be a short-term decrease in prey items, and depending on the toxicity of the dispersant used there could be effects to prey species, such as squid as prey for leatherback turtles. However, dispersants do not mix throughout the entire water column so not all prey items would be affected and a source of unaffected prey would remain available for sea turtle foraging. The PDCs require that observers be present to ensure no sea turtles are in areas where dispersant application may occur and to continue watching for sea turtles during any dispersant application to ensure exposure of turtles to dispersants is minimized. Given the required PDCs, the fact that sea turtles are generally present in lower numbers in deeper waters, and the rarity of incidents resulting in oil spills (**Appendix K**), we do not anticipate that the use of dispersants will result in a reduction in fitness of sea turtles.

There is also no evidence that dispersants are toxic to sea turtles and, given that they become undetectable in the water column within hours of application, any exposure would be very short-term. Foraging habitat and prey items consumed by adult and juvenile green and hawksbill sea turtles are not likely to be affected by the use of dispersants because green and hawksbill sea turtles are largely benthic feeders. Leatherback sea turtles feed on soft-bodied open ocean prey, like squid and jellyfish, and can make deep foraging dives. It is very unlikely that dispersants would affect leatherback turtle prey species because of the likelihood of the dilution of dispersants reducing toxicity of the chemicals before getting into the depths where leatherback turtles are known to feed. Dispersants are applied at the water surface and studies have shown that dispersed oil generally mixes into the first 5 m of the water column (Joeckel et al. 2011, Bejarano et al. 2013, CRRT Response Technologies Committee 2015). The PDCs restrict the use of dispersants to waters that are 30 ft (9 m) in depth or that have foraging coral habitats within 30 ft of the water surface. These restrictions are protective of green and hawksbill sea turtle foraging habitat in shallow waters such as seagrass beds and colonized hard bottom, preventing direct exposure to dispersants and also reducing the possibility of ingestion of prey that has been exposed to dispersants. Loggerhead and Kemp's ridley sea turtles are the most likely to have prey species affected because they both are known to feed in Sargassum areas or seek prey that exist in the water column. The PDCs require consultation if Sargassum is present within conditionally preauthorized green areas. This would avoid exposure of dispersants to loggerhead and Kemp's ridley sources of prey. Based on information from the DWH spill, mortality of sea turtles was caused by exposure to oil or oiled prey and not to dispersants, as there is no evidence that the use of dispersants contributed to any mortalities (DWH Trustees 2016). Therefore, dispersant use as part of response operations is not expected to reduce the fitness of individual sea turtles in shallow yellow zones, or specifically in green preauthorization zones for dispersant application by avoiding areas within 0.5 nm of where sea turtles have been sighted; or prior to application, consulting NMFS if Sargassum is observed in areas being considered for dispersant use. This would also avoid effects to the essential PBFs of loggerhead critical habitat.

7.4.2 **In-Situ Burning**

The DWH spill response used in-situ burning on 411 individual areas (Shigenaka et al. 2015). While mortality of large numbers of sea turtles, particularly juveniles but also adults were reported as part of DWH, the majority of these deaths are thought to be from oiling (DWH Trustees 2016). Response activities such as in-situ burning may have contributed to some mortality of animals if they were trapped in the burn area, but because in-situ burning took place in the most heavily oiled areas during DWH, any turtles that were burned were likely already dead or dying due to exposure to oil (DWH Trustees 2016). The PDCs in this Opinion require that sea turtle observers look for sea turtles prior to any burn operation and that sea turtle rescue be conducted prior to any burn operation. This monitoring for sea turtles and rescue or collection of dead specimens prior to ISB is expected to result in take. As described in section 3 subheading "Sea Turtle Protection Measures Under ISB", this take is covered under other authorities and not considered under this Opinion. Burn operations are planned in heavily oiled areas, not in areas with minimal surface oil. Of the incidents resulting in southeastern U.S. oil spills, ISB might have been appropriate for consideration as a response option in those that took place offshore. The PDCs require that no burning operations take place at night and that unoiled or lightly oiled *Sargassum* where juveniles may be present not be burned. Further, ISB will not be conducted in nearshore waters including those with depths less than 30 ft where other sea turtle habitat is likely to occur, which will further minimize the potential for sea turtles to be present in areas where in-situ burning will occur in the southeast U.S.

Anemia was seen in fish and other animals exposed to DWH oil (Patterson III et al. 2015, DWH Trustees 2016). As noted, in-situ burning forms tarballs, and benthic invertebrates, particularly shrimp, being trapped in tarballs in some areas of the Gulf were reported. Therefore, prey items of different life stages of sea turtles could be affected by ISB residue, particularly tarballs, although this effect would be minimal for prey species that are in the water column. This means that effects could be greater for specific prey depending on the extent of tarball production from the use of ISB and the transport of these tarballs to areas used for foraging by sea turtles. Given the PDCs and zone restrictions for use of ISB, we expect that effects to prey and foraging habitat of sea turtles would be minimal because there would be plenty of other habitat areas available for sea turtles to forage. In-situ burning takes place at the water surface and will not be allowed in depths less than 30 ft. Deep-sea corals were reported to be coated with oil residues, likely including tarballs from the DWH spill but this was at such a large volume as to replace the normal marine bottom with black oil residue, leading to impacts to corals and associated organisms. The likelihood of a spill size requiring ISB that could occur in the southeast U.S. based on past events and PDCs restricting areas where and when in-situ burning will occur are expected to ensure that tarball generation and associated coating of benthic habitats with oil will be minimal. ISB is prohibited within 0.5 nm of sea turtle individuals or where *Sargassum* critical habitat is observed. Therefore, we do not expect the use of ISB during spill response will result in a decrease in fitness of individual sea turtles.

7.5 Risk Analysis

In this section we assess the consequences of the responses to the individuals that have been exposed, the populations those individuals represent, and the species those populations comprise. Whereas the Response Analysis identified the potential responses of ESA-listed species exposed to activities associated with the proposed action, this section summarizes our analysis of the expected risk to individuals, populations, and species given the expected exposures and responses of ESA-listed species.

We measure risks to individuals of endangered or threatened species using changes in the individuals' fitness, which may be indicated by changes in the individual's growth, survival, annual reproductive success, and lifetime reproductive success. When we do not expect ESA-listed animals exposed to an action's effects to experience reductions in fitness, we would not expect the action to have adverse consequences on the viability of the populations those individuals represent or the species those populations comprise.

As discussed throughout Section 7, we do not expect the use of dispersants or ISB as oil spill response tools in the federal region 4 in the areas and following the PDCs described in this consultation to result in a reduction in fitness for sea turtles or designated critical habitat that is not caused by the oil spill event itself. Instead, we expect the use of dispersants and ISB to quickly remove large amounts of oil from the marine environment, thereby reducing the risk of exposure to oil on sea turtles and their habitats and prey and resulting in a benefit to sea turtles. We expect that the PDCs and conservation measures will further reduce potential risk. Thus, the activities proposed under this consultation are not expected to have population or species-level effects. Therefore, we conclude that there will be no reduction in population viability for loggerhead (NWA DPS), Kemp's ridley, leatherback, green (North and South Atlantic DPS), and hawksbill sea turtles or loggerhead designated critical habitat as a result of dispersant use and/or ISB under the conditions described in this programmatic consultation under which these response tools may be preauthorized. Because the proposed action is not likely to have a measurable effect on population size and is not likely to reduce the population viability of these species, we conclude that the proposed action is not likely to reduce the viability of loggerhead (NWA DPS), Kemp's ridley, leatherback, green (North and South Atlantic DPS) or hawksbill sea turtles and will not adversely affect loggerhead critical habitat.

8 CUMULATIVE EFFECTS

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

During this consultation, we searched for information on future state, tribal, local, or private (non-federal) actions reasonably certain to occur in the action area. We did not find any information about non-federal actions other than actions already described in the *Environmental Baseline* (Section 6), which we expect will continue in the future. Non-federal activities anticipated to continue into the future include commercial and recreational fishing, vessel traffic, oil and gas activities, scientific research, ocean sound, and pollution. An increase in these activities could similarly increase their effect on ESA-listed resources and for some, an increase in the future is considered reasonably certain to occur. Given current trends in global population growth, threats associated with climate change, pollution, fisheries, bycatch, aquaculture, vessel strikes and approaches, and sound are likely to continue to increase in the future, although any increase in effect may be somewhat countered by an increase in conservation and management activities. In contrast, more historic threats such as sea turtle harvest are likely to remain low or potentially decrease. Thus, this consultation assumed effects of non-Federal actions in the future would be similar to those in the past.

9 INTEGRATION AND SYNTHESIS

The *Integration and Synthesis* section is the final step in our assessment of the risk posed to species and critical habitat because of implementing the proposed action. In this section, we add the *Effects of the Action* (Section 7) to the *Environmental Baseline* (Section 6) and the *Cumulative Effects* (Section 8). Combining these elements, we formulate the agency's biological and conference Opinion as to whether the proposed action is likely to: (1) reduce appreciably the likelihood of both the survival and recovery of an ESA-listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. In this case, we consider the impacts of the action on the survival and recovery of loggerhead (NWA DPS), Kemp's ridley, leatherback, green (North and South Atlantic DPS), and hawksbill sea turtles. We also consider the impacts of the action on the value of loggerhead designated critical habitat. This assessment is made in full consideration of the Status of the Species (Section 5).

The following discussions separately summarize the probable risks the proposed action poses to the sea turtle species that are likely to be exposed. These summaries integrate the exposure profiles presented previously with the results of our response analyses for each of the actions considered in this Opinion.

The RRT proposes authorization of the use of dispersants and ISB in preauthorized green zone areas and conditionally in some green zone areas (provided notification and the required PDCs can be met). The action area includes offshore federal waters of North Carolina, South Carolina, Georgia, Florida, Alabama and Mississippi from the state boundary border out to the EEZ. Dispersant application and ISB operations would also require aerial and vessel operations. No mortalities of ESA-listed sea turtles are anticipated. Any capture of sea turtles completed prior to ISB operations would be captured to rescue and rehabilitate sea turtles in oiled areas in compliance with NMFS STSSN requirements and federal regulations associated with sea turtle capture and resuscitation (Section 3, Sea Turtle Protection Measures under ISB).

9.1 Kemp's Ridley Sea Turtle

The preauthorized use of dispersants and/or ISB in the offshore waters of the southeast U.S. during response activities is not expected to result in a reduction in the number and distributions of Kemp's ridley sea turtles.

In 2014, there were an estimated 10,987 Kemp's ridley nests from three primary nesting beaches in Mexico (NMFS 2015b). Based on an average 2.5 nests per nesting female, this corresponds to 4,395 nesting females. In 2017, index nesting beaches in Mexico and in Texas reached the highest record of nests (22,415) since 1965 for Kemp's ridley turtles (Caillouet Jr. et al. 2018). If we used the 2014 nesting estimate and with the knowledge that Kemp's ridley adult females return to natal beaches to nest every two years, on average, we double this number (i.e., 8,790) to estimate the total number of adult females. To get to the total adult and neritic population size, we need to add adult males and neritic juveniles to the estimate of adult females. If females comprise 76 percent of the population (Gallaway et al. 2013), the number of adults (females and males) is estimated at 11,566. NMFS et al. (2011) determined the best estimate of age to maturity for Kemp's ridley sea turtles was 12 years. Based on this information, the neritic juvenile life stage would include most Kemp's ridleys ranging in age from about two to four years old (i.e., when they return to nearshore waters after concluding their oceanic phase) to about 12 years old when they become adults. Gallaway et al. (2013) used a demographic model to estimate the total population of age 2+ Kemp's ridley sea turtles at 248,307 in 2012. While this estimate may include some oceanic juveniles that are older than two years, since Kemp's ridley turtles typically return to nearshore coastal habitats around age two (Ogren 1989), the majority of the estimated 248,307 turtles are likely either neritic juvenile or adults. No reduction in numbers is anticipated as part of the proposed action. As noted previously, any mortalities of sea turtles are anticipated to be from exposure to oil and not from response activities. Therefore, no reduction in reproduction is expected as a result of the action. It is expected that any reductions in reproduction would occur due to the impacts of exposure to oil rather than response activities.

Because we do not anticipate a significant reduction in numbers or reproduction of this species as a result of the action, a reduction in the likelihood of survival for Kemp's ridley sea turtles is not expected.

9.2 Loggerhead Sea Turtle

The preauthorized use of dispersants and/or ISB in the offshore waters of the Southeast U.S. during response activities is not expected to result in a reduction in the number and distributions of loggerhead sea turtles from the NWA DPS.

A preliminary regional abundance survey of loggerheads within the northwestern Atlantic continental shelf, corrected for unidentified turtles in proportion to the ratio of identified turtles, estimates about 801,000 loggerheads (NMFS-NEFSC 2011). More recent nesting data indicate that nesting in Georgia, South Carolina, and North Carolina is now on an upward trend. The NWA DPS of loggerhead sea turtles are at continued risk from loss of nesting habitat, reduced nest counts, and continued mortality of juveniles and adults from fishery bycatch. No reduction in numbers is anticipated as part of the proposed action. As noted previously, any mortalities of sea turtles are anticipated to be from exposure to oil and not from response activities. Therefore, no reduction in reproduction is expected as a result of the proposed action.

Because we do not anticipate a significant reduction in numbers or reproduction of this species as a result of the action, a reduction in the likelihood of survival for loggerhead sea turtles in the wild is not expected.

9.3 Designated Critical Habitat for the Northwest Atlantic DPS loggerhead sea turtle

As identified in Section 5.3, for the NWA DPS of loggerhead turtles (marine portions within NMFS' jurisdiction) critical habitat found within the action area that could be affected includes breeding, constricted migratory, and *Sargassum* habitats. We determined that the effects of response activities resulting from the proposed action are not likely to adversely affect the essential physical and biological features (PBFs) of loggerhead critical habitat. To conduct our destruction or adverse modification analysis, we must consider the essential physical and biological features of loggerhead critical habitat described above in Section 5.3, and evaluate the effects of the proposed action on those essential features, both in the short-term and long-term.

Loggerhead *Sargassum* habitat is described as developmental and foraging habitat for young loggerheads where surface waters form accumulations of floating material, especially *Sargassum*. PBFs that support this habitat are (1) convergence zones, surface-water downwelling areas, the margins of major boundary currents (Gulf Stream), and other locations where there are concentrated components of the *Sargassum* community in water temperatures suitable for the optimal growth of *Sargassum* and inhabitance of loggerheads; (2) *Sargassum* in concentrations that support adequate prey abundance and cover; (3) available prey and other material associated with *Sargassum* habitat including, but not limited to, plants and cyanobacteria and animals native to the *Sargassum* community such as hydroids and copepods; and (4) sufficient water depth and proximity to available currents to ensure offshore transport (out of the surf zone), and foraging and cover requirements by *Sargassum* for post-hatchling loggerheads (i.e., greater than 10 meters depth).

Sargassum habitat is vulnerable to oil spills and spill response related to the action. Oil can be carried by currents into convergence zones where *Sargassum* is also accumulating. Physical processes, such as convergent currents and fronts that play a role in transporting, retaining, and concentrating *Sargassum*, are the same processes that act to concentrate oil, thus increasing the exposure of *Sargassum* associated organisms to oil. Indeed, *Sargassum* habitats could act as a natural boom to contain spilled oil. Oiled *Sargassum* would be then removed from the environment (as part of clean-up response activity) along with the associated prey community. Consequently, reductions in this habitat are likely with any oil spill. The amount and breadth of the reduction depends on the location of the spill and is proportional to the size and the seasonal timing of the spill.

The DWH oil spill resulted in the loss of approximately 23 percent of the *Sargassum* in the northern Gulf of Mexico (at the time of the spill) due to direct exposure to DWH oil on the ocean surface (Trustees 2016). The loss of *Sargassum* habitat during DWH was likely exacerbated by the use of oil dispersants (Powers et al. 2013). However, with the implementation of the PDCs, the use of dispersants and ISB would be restricted when *Sargassum* is observed in spill areas.

Given its fast growth rate, continuous motion, and somewhat ephemeral nature, we would expect a relatively high turnover rate for *Sargassum* patches under normal conditions. *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 through new growth. While the adverse effects of a major oil spill on *Sargassum* communities within a given annual life cycle (described above) are well documented, the longer-term impacts in subsequent years or decades are not known. Although nearly one-quarter of all *Sargassum* habitat in the northern Gulf of Mexico was heavily exposed to oil after the 2010 DWH spill, follow-up aerial surveys in 2011 and 2012 documented a four-fold increase in *Sargassum* abundance since DWH. These results suggest that *Sargassum* can repopulate in the Gulf of Mexico within a year or two of a very large oil spill.

Nearshore reproductive habitat is not likely to be adversely affected by the proposed action because it is in the yellow zone that is not preauthorized. Breeding and migratory habitats are not likely to be adversely affected because of the PDCs that prohibit the use of dispersants or ISB within 0.5 nm of individual turtles. Further, we expect the adverse effects to *Sargassum* habitat from the proposed action to remain at a level that does not exceed the ability of *Sargassum* to grow new patches and counter those effects.

We believe the proposed action is not reasonably expected, directly or indirectly, to appreciably diminish, the value of designated critical habitat for the NWA DPS loggerhead sea turtles. Hence, the effects of the proposed action would not rise to the level of destruction or adverse modification of critical habitat.

9.4 North and South Atlantic Distinct Population Segment Green Sea Turtle

The preauthorized use of dispersants and/or ISB in the offshore waters of the southeast U.S. during response activities is not expected to result in a reduction in the number or distributions of green sea turtles from the North or South Atlantic DPS.

The 2007 5-year status review for green turtles states that of the seven green sea turtle nesting concentrations in the Atlantic Basin for which abundance trend is available, all were determined to be either stable or increasing (NMFS and USFWS 2007a). Additionally, the 2014 status review for green sea turtles, which also suggested possible DPSs, determined that there were over 167,000 nesting females in the North Atlantic DPS and over 63,000 in the South Atlantic DPS (NMFS and USFWS 2015). These estimates did not include multiple smaller sites for which nesting data were not available. All major nesting populations in the North Atlantic DPS demonstrate long-term increases in abundance (Seminoff et al. 2015b). Compared to other DPSs, the North Atlantic DPS exhibits the highest nester abundance, with approximately 167,424 annual nesting females (Seminoff et al. 2015a). This underestimates the number of adult females since mature females return to their natal beaches to lay eggs every two to four years (Balazs 1983). The total adult and neritic population size of this DPS, which includes inter-nesting females, adult males, and neritic juveniles is, therefore, likely several times larger than the 167,424 estimate of annual nesting females. Compared to the total adult and neritic juvenile population size, the estimated number of adults or neritic juveniles that would likely be killed or seriously injured (363) annually is extremely small. Data availability for the South Atlantic DPS is poor with 37 of the 51 identified nesting sites not having sufficient data to estimate the number of nesters or trends (Seminoff et al. 2015b). No reduction in numbers is anticipated as part of the proposed action. As noted previously, any mortalities of sea turtles are anticipated to be from exposure to oil and not from response activities. Therefore, no reduction in reproduction is expected as a result of the action. It is expected that any reductions in reproduction would occur due to the impacts of exposure to oil rather than response activities.

Because we do not anticipate a significant reduction in numbers or reproduction of this species as a result of the action, a reduction in the likelihood of survival for North and South Atlantic DPS green sea turtles in the wild is not expected.

9.5 Leatherback Sea Turtle

The preauthorized use of dispersants and/or ISB in the offshore waters of the southeast U.S. during response activities is not expected to result in a reduction in the distribution of leatherback sea turtles.

The Leatherback TEWG estimates there are between 34,000 to 95,000 total adults (20,000 to 56,000 adult females; 10,000 to 21,000 nesting females) in the North Atlantic. Of the five leatherback populations or groups of populations in the North Atlantic, three show an increasing or stable trend (Florida, Northern Caribbean, and Southern Caribbean). There is not enough information available on the West African population to conduct a trend analysis and a slight decline in annual population growth rate was detected for the Western Caribbean (TEWG 2007b). It is expected that any reductions in numbers or reproduction of leatherback sea turtles would occur due to the impacts of exposure to oil rather than response activities.

Because we do not anticipate a significant reduction in numbers or reproduction of this species as a result of the action, a reduction in the likelihood of survival for leatherback sea turtles in the wild is not expected.

9.6 Hawksbill Sea Turtle

The preauthorized use of dispersants and/or ISB in the offshore waters of the southeast U.S. during response activities is not expected to result in a reduction in the number and distribution of hawksbill sea turtles.

There are currently no reliable estimates of population abundance and trends for non-nesting hawksbills at the time of this consultation. Therefore, nesting beach data is currently the primary information source for evaluating trends in abundance. Mortimer and Donnelly (2008b) found that for nesting populations in the Atlantic, nine of the ten sites with recent data (the past 20 years) show nesting increases. Surveys at 88 nesting sites worldwide indicate that 22,004 – 29,035 females nest annually (NMFS and USFWS 2013a). From 1980 to 2003, the number of nests at three primary nesting beaches increased 15 percent annually. However, recent declines in nest counts, decreased survival at other life stages, and updated population modeling, indicate this rate is not expected to continue though in general, hawksbills are doing better in the Atlantic and Indian Ocean than in the Pacific Ocean where a greater proportion of nesting sites are declining. Mortimer and Donnelly (2008b) found that for nesting populations in the Atlantic, nine of the ten sites with recent data (within the past 20 years) showed nesting increases. It is expected that any reductions in numbers and resultant reductions in reproduction of hawksbill sea turtles would occur due to the impacts of exposure to oil rather than response activities.

Because we do not anticipate a significant reduction in numbers or reproduction of this species as a result of the action, a reduction in the likelihood of survival for Hawksbill sea turtles in the wild is not expected.

10 Conclusion

After reviewing the current status of the ESA-listed species, the environmental baseline within the action area, the effects of the action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of loggerhead (NWA

DPS), Kemp's ridley, hawksbill, leatherback, or green (North and South Atlantic DPS) sea turtles. Additionally, it is NMFS' biological opinion that the action is not likely to destroy or adversely modify designated critical habitat for the NWA DPS of loggerhead sea turtle.

11 Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. NMFS further defines harm as an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering (50 CFR 222.102).

NMFS has not defined "harass" under the ESA by regulation. However, on October 21, 2016, NMFS issued interim guidance on the term "harass," defining it as to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering." For this consultation, we rely on this definition of harass when assessing effects to ESA-listed species.

Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this incidental take statement. Incidental take statements serve a number of functions, including identifying reasonable and prudent measures (RPMs) that will minimize the impact of anticipated take. For this consultation, no incidental take of ESA-listed species is anticipated or authorized because the take that will occur was authorized under the STSSN consultation and/or would be covered under 50 CFR 223.206 (b). Therefore, no RPMs are provided for this consultation because directed take of sea turtles captured for relocation or rehabilitation outside planned ISB areas, for treatment or for analysis of dead animals is covered under the existing STSSN consultation. Appropriate measures to avoid take of ESA-listed species are reflected in the PDCs for this programmatic consultation.

12 Conservation Recommendations

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

We believe the following conservation recommendations would further the conservation of ESA-listed species considered in this opinion for federal Region 4:

1. The RRT should develop, in coordination with NMFS resource manager partners, industry and academia, a science plan to determine the fate and effect of oil, dispersed oil, ISB, and tarballs from ISB that could be implemented should a spill occur in federal Region 4. The science plan should focus on impacts to ESA-listed species and their habitat.
2. The RRT should ensure that all conservation measures identified during consultation are incorporated into the regional and area contingency plans, annexes, operational plans, incident action plans, ISBP, DUPP, ICS-204s, Safe Work Practices, etc. as relevant to the area/region for any incident. Specifically the RRT should ensure:
   a. Protection of sea turtles and marine mammals from dispersants, in situ burns, boom deployment, and other response activities;
   b. Planning with authorized wildlife responders, rehabilitators, and stranding networks ;
   c. Annual updates for a communications plan with NMFS during a response specifically regarding impacts to ESA-listed species and designated critical habitat;
   d. Access to local and/or readily available resources needed to be mobilized during a response;
   e. Availability of staging areas to treat animals prior to transport to long-term care facilities;
   f. Access to resources available to survey for all group types of oiled animals (e.g., marine mammals, sea turtles, etc.);
   g. Resources are available to retrieve and transport dead oiled animals;
   h. Availability of resources to rescue or capture live animals;
   i. Availability of resources to treat and rehabilitate protected species;
   j. Adequate resources to medically sample and complete diagnostics on oiled animals; and
   k. Planning to rapidly train and increase the number of authorized wildlife responders during large spills.
3. As recommended in Shigenaka et al. (2015), RRT and USCG should incorporate pre- and post-burn sample collection, archiving, and analysis into planning for response using ISB.
4. Recommend that the FOSC has natural resources training for awareness of observing offshore resources in advance of and for the purpose of the pre-activity survey flight.
5. Recommend consideration of the suite of collection techniques (e.g., mesh netting) that could effectively remove residues or tarballs that would otherwise sink during and/or following an in-situ burn operation.

In order for NMFS' Office of Protected Resources Endangered Species Act Interagency Cooperation Division to be kept informed of actions minimizing or avoiding adverse effects on, or benefiting, ESA-listed species or their designated critical habitat, the FOSC and/or RRT should notify the Endangered Species Act Interagency Cooperation Division of any conservation recommendations implemented in their final action.

13 Reinitiation Notice

This concludes formal consultation on the preauthorization of the use of dispersants and ISB as oil spill response tools during spill response in the offshore waters of the southeast U.S. by the USCG and RRT4. Consistent with 50 C.F.R. §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if:

(1) If take occurs as a result of response actions involving dispersant application or ISB, such as by vessel strikes.
(2) If sea turtles suffer mortality due to mishandling during rescue and recovery efforts associated with the use of ISB as a response tool.
(3) New information reveals effects of the agency action that may affect ESA-listed species or critical habitat in a manner or to an extent not previously considered.
(4) The identified action is subsequently modified in a manner that causes an effect to ESA-listed species or designated critical habitat that was not considered in this Opinion.
(5) A new species is listed or critical habitat designated under the ESA that may be affected by the action.

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15 APPENDICES

These appendices may be revised during programmatic annual review processes as long as the revisions do not change the analyses or conclusions of the Opinion.

15.1 Appendix A. Conservation Measures and Protocols for the Use of Dispersants and In-situ Burning

15.1.1 Dispersant Use Preauthorization Plan (DUPP) Protocols

The Regional Response Team 4 (RRT4) Dispersant Use Preauthorization Plan (DUPP) contains protocols which must be followed as part of the conditions for preauthorization. These requirements can be regarded as initial control measures developed in consideration of a dispersant operation. These control measures are then augmented by the conservation measures developed in consideration of the potential biological impacts.

Conservation/Protection Measures identified during consultation

Additional recommended measures must be taken by USCG to prevent risk of any injury to wildlife, especially endangered or threatened species; critical habitat; and essential fish habitat are to be identified through the formal consultation process. The conservation measures provided herein have been identified in consultation with NOAA, NMFS, USFWS, SAFMC, GMFMC, EPA, and USCG. These measures must be employed where the conditions identified by the service agency apply. These conservation measures can be added to regional & area contingency plans, operational plans, incident action plans, ICS-204s, Safe Work Practices, etc, as appropriate for the management of the incident.

Table IV-6. ESA and EFH Conservation Measures for Management of Dispersant Operations

	Plans identify dispersant operations checklists for decision making and organizational structure for dispersant operations at the field level, including reference to the RRT4 Dispersant Use Preauthorization Plan and the Selection Guide for Oil Spill Countermeasures.	RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt Links to Area Contingency Plans are listed in the Web Resources section of that RRT4 webpage.	FOSC RRT4
Scientific & Trustee Resource Management Support	**Close coordination with NOAA Scientific Support Coordinator, trustees (DOC & DOI), and resource protection managers will occur in the development and implementation of incident specific dispersant operations in the "green zone".** All responses where dispersant use has been determined to be an effective strategy for the mitigation of oil spill impacts will involve the support of respective trustees at the local, state, and federal level, and notably the assigned NOAA scientific support coordinator for the response. Notification of the trustees is required when parameters for preauthorized use are met under the DUPP. Emergency consultation is required when parameters for preauthorization are not met, or when called for under specific protocols of the DUPP, or when ESA resources are spotted in the target application area. Within the Incident Command Post, there must be close coordination between Planning/Environmental Unit and Operations/Dispersant Management/Team(s).	**NMFS Emergency Consultation** **Email:** nmfs.ser.emergency.consult@noaa.gov **For ESA concerns:** protected resources division at 727-824-5312 **For EFG concerns:** habitat conservation division at 727-824-5317 ***Phone numbers are staffed during business hours only.*** *Collision and reporting hotlines are staffed 24 hours/day and are listed in DUPP – Vessel Operations* Sea Turtle Guidelines: https://www.fisheries.noaa.gov/resource/document/guidelines-oil-spill-response-and-natural-resource-damage-assessment-sea-turtles NOAA Field Assessment and Science Techniques (FAST) Forms and Guidance Documents: https://www.diver.orr.noaa.gov/web/guest/field-forms-and-templates	FOSC RRT4 DOC (NOAA NMFS)
Preauthorized Dispersants & Pre-determined Locations of Dispersant Operations	Approved dispersants may be used in designated preapproved zones in the RRT4 area of operation, which includes marine waters off the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi out to the Exclusive Economic Zone boundary. The state territorial boundary is typically 3 nautical miles, with the exception of the west coast of Florida where state waters extend out to 9 nautical miles in certain areas. Designated preapproved zones in the RRT4 are termed *Green Zone*s.	NCP Subpart J Product Schedule is published by EPA and found at: https://www.epa.gov/emergency-response/national-contingency-plan-subpart-j Maps of Green and Yellow Zones are provided in the RRT4 plans at https://r4.ercloud.org/r4rrt. Interactive maps of these zones are posted to the "Jurisdictional Boundaries" map in the interactive maps section of that RRT4 website.	FOSC RRT4 RP DOC (NOAA NMFS)

Table IV-7. ESA and EFH Conservation Measures for Vessel Operations in Support of Dispersant Operations

Category	Measures	Documentation or Contact	Duty
NOAA's Vessel Strike Avoidance Measures and Reporting for Mariners	**In order to avoid causing injury or death to marine mammals and sea turtles the following measures should be taken when consistent with safe navigation:** 1. Vessel operators and crews shall maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species. 2. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel (see sighting report requirements at right). 3. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible. 4. When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area. 5. Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures should always be exercised. The vessel shall attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible. 6. Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel and when safety permits, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area. **Additional Requirements for the North Atlantic Right Whale** 1. If a sighted whale is believed to be a North Atlantic right whale, federal regulation requires a minimum distance of 500 yards be maintained from the animal (50 CFR 224.103 (c)). 2. Vessels entering North Atlantic right whale critical habitat are required to report into the Mandatory Ship Reporting System. 3. Mariners shall check with various communication media for general information regarding avoiding ship strikes and specific information regarding North Atlantic right whale sighting	See **15.5Appendix E: Vessel Strike Avoidance Measures and** Reporting for Mariners *NMFS Southeast Region Vessel Strike Avoidance Measures and Reporting for Mariners; revised February 2008* **Marine Mammal Viewing Guide:** https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/archive/dolphinsmart/pdfs/turtle_guide.pdf • To report dead, injured or entangled dolphins, whales, seals or sea turtles in the Southeast U.S., Puerto Rico and the U.S. Virgin Islands to: 1-877-WHALE-HELP (1-877-942-5343) • Report right whale sightings in the Southeast U.S. to: 1-877-942-5343 or U.S. Coast Guard Channel 16 • To report potential violation of the Endangered Species Act or Marine Mammal Protection Act, contact NOAA's Office of Law Enforcement: 1-800-853-1964 **NMFS Southeast Regional Office Marine Mammal Hotline** **Phone:** 877-433-8299 (24hrs) **Email:** takereport.nmfsser@noaa.gov **Stranding networks for sea turtles, whales, and marine animals:** https://www.fisheries.noaa.gov/report **Interactive Right Whale Sighting Map:**	FOSC RP

Category	Measures	Documentation or Contact	Duty
	locations. These include NOAA weather radio, U.S. Coast Guard NAVTEX broadcasts, and Notices to Mariners. Commercial mariners calling on United States ports should view the most recent version of the NOAA/USCG produced training CD entitled "A Prudent Mariner's Guide to Right Whale Protection" (contact the NMFS Southeast Region, Protected Resources Division for more information regarding the CD). 4. Injured, dead, or entangled right whales should be immediately reported to the U.S. Coast Guard via VHF Channel 16. **Injured or Dead Protected Species Reporting** Vessel crews shall report sightings of any injured or dead protected species immediately, regardless of whether the injury or death is caused by your vessel. Reporting should include notification to the NMFS Southeast Regional Office Marine Mammal Hotline (takereport.nmfsser@noaa.gov)	https://apps-nefsc.fisheries.noaa.gov/psb/surveys/MapperiframeWithText.html	
ESA-Listed Marine Species within 100 yards	If a sea turtle or marine mammal or other ESA-listed marine species (e.g., giant manta ray, etc.) is observed, all appropriate precautions shall be implemented to ensure its protection. Precautions may include possible delay of the operation, or implementation of hazing, moving or other strategies in consultation with the appropriate resource protection manager. If practicable, vessel operations should cease if a marine mammal approaches within 50 yards of the vessel until the marine mammal moves away from the operational area of its own volition.	See Guidelines for Distances at https://www.fisheries.noaa.gov/topic/marine-life-viewing-guidelines#guidelines-&-distances	FOSC RP
Collision with Marine Mammal or Sea Turtle	Any collision with and/or injury to a marine mammal or sea turtle shall be reported. Marine mammal should be reported immediately to the NMFS Southeast Regional Office by phone and email, using the attached Ship Strike Reporting form (see Appendix G). Sea turtle collisions should be reported to the local stranding network contact for sea turtles.	**NMFS Southeast Regional Office Marine Mammal Hotline** **Phone:** 877-433-8299 (24hrs) **Email:** takereport.nmfsser@noaa.gov **Stranding networks for sea turtles, whales, and marine animals:** https://www.fisheries.noaa.gov/report	FOSC RP
Manatee Collision or Stranding	Any collision with or stranding of a manatee should be reported to USFWS and applicable U.S. State trustee, department of wildlife or natural resources. In addition, the local authorized sea turtle and marine mammal stranding/rescue organizations should also be notified.	**U.S. Fish and Wildlife Service, North Florida Ecological Services Office:** (904) 731-3332 **Florida Fish and Wildlife Conservation Commission:** Report accidents online or call 888-404-FWCC (888-404-3922). Cellular	FOSC RP

Category	Measures	Documentation or Contact	Duty
		phone users can also call *FWC or #FWC, or send a text to Tip@MyFWC.com	
Nighttime Lighting	Nighttime lighting should be minimized so as not to attract sea turtles or manta rays to the response area.		FOSC RP

Table IV-8. ESA and EFH Conservation Measures for Survey Flights in Support of Dispersant Operations

Category	Measures	Documentation or Contact	Duty
Pre-action On-Site Survey Flight	When possible and/or advised by the Natural resource trustees, from DOI, DOC, or the affected State(s) or their associated resource management agencies or other designee they select, will provide a natural resource specialist to survey the dispersant application area(s) for presence of resources of concern, and to observe and document the results and any effects that may influence continued or modified dispersant use. At a minimum, SMART Tier 1 protocols must be implemented during any dispersant operations. The FOSC will use recommended monitoring procedures provided in Appendix IX of the DUPP of this plan. When possible, natural resource trustees will provide a specialist in surveying of marine mammals/turtles, pelagic/migratory birds, and ESA-listed marine species. On-site surveys will be discussed with appropriate federal, state, and local trustees; measures will be taken to prevent impacts to wildlife, especially threatened and endangered species, listed critical habitats, and essential fish habitats.	See **DUPP Protocols 4.6** (RRT Observers) and **4.8** (Monitoring) RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt **NMFS Southeast Regional Office** consultation contact information provided in row below and 24hr Marine Mammal Hotline at 877-433-8299. Can also contact the NOAA SSC to reach NFMS after hours. Special Monitoring of Applied Response Technologies (SMART) documentation is available at https://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/resources/smart.html	FOSC RP DOC (NOAA NMFS)
Survey Flights during Dispersant Operations	Survey flights in the area of application will be conducted in accordance with the Air Operations Branch within the incident command system, and all operational guidance and site safety plan during dispersant operations. Prior to and in preparation of any spill response, all spotters and observers should be trained in looking for offshore biological resources. This will ensure stronger mindfulness for the potential presence of these resources in the response area. Observers and spotters should also be trained in the minimum separation distances. In the event that ESA-listed marine species are found in the target application area, emergency consultation with the NMFS Southeast Regional Office should be initiated.	See **DUPP Appendix XV. Dispersant Observation Job Aid** RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt Minimum separation distance for dispersant operations from ESA-listed marine species is 0.5 nautical miles (1,000 yards) Guidelines for *observation* distances are located at: https://www.fisheries.noaa.gov/topic/marine-life-viewing-guidelines#guidelines-&-distances **NMFS Emergency Consultation** **Email:** nmfs.ser.emergency.consult@noaa.gov **For ESA concerns:** protected resources division at 727-824-5312 **For EFG concerns:** habitat conservation division at 727-824-5317 ***Phone numbers are staffed during business hours only***	FOSC RP DOC (NOAA NMFS)

Category	Measures	Documentation or Contact	Duty
Air Operations Best Management Practices	Avoid hovering or landing of aircraft near posted or known bird sites. Similarly, avoid hovering aircraft at low altitudes over known protected bird sites. Consider proximity of bird locations when selecting take-off and landing sites. Unless previously authorized, overflights to identify locations of oiled wildlife should not fly below 500 feet over Wildlife Refuges, Management Areas, bird rookeries, or National Parks without prior authorization from the land manager or Natural Resource Trustee. Unless previously authorized, all other aircraft are requested to maintain a minimum altitude of 2,000 feet above the surface of lands and waters of such areas. Federal Aviation Administration (FAA) Advisory Circular (AC 91-36C), "Visual Flight Rules (VFR) Near Noise Sensitive Areas," defines the surface as: the highest terrain within 2,000 feet laterally of the route of flight, or the uppermost rim of a canyon or valley. All aircraft flying over water are to be aware of marine mammals/sea turtles, and report sightings in accordance with the DUPP. Note: Dead wildlife spotted from aircraft should be reported to the appropriate agency and/or hotline. Dead marine mammals should be reported to the NMFS SERO.	**FAA AC 91-36C** https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/23155 *(was cancelled on 9/17/2004 but remains a recommended BMP in the absence of a replacement advisory)* **NMFS Southeast Regional Office Marine Mammal Hotline** **Phone:** 877-433-8299 (24hrs)	FOSC RP
Marine Mammals and Sea Turtles	Watch for marine mammals and sea turtles while operating vessels or aircraft involved directly or in support of dispersant operations. Record and report each sighting event, including GPS location, species (if known) and description of the encounter in accordance with DUPP (see Appendix C). Report large whale sighting events to the NMFS SERO. Practice minimum separation distances from marine mammals and sea turtles is 0.5 nautical miles (1,000 yards). No dispersant application operations should be conducted within 0.5 nautical miles of marine mammals and sea turtles identified through aerial spotting. Avoid applications such that spray could be blown onto marine mammals or sea turtles.	See **Appendix G.** Error! Reference source not found. **NMFS Southeast Regional Office Marine Mammal Hotline:** **Phone:** 877-433-8299 (24hrs) Minimum separation distance for dispersant operations from ESA-listed marine species is 0.5 nautical miles (1,000 yards) Guidelines for *observation* distances are located at: https://www.fisheries.noaa.gov/topic/marine-life-viewing-guidelines#guidelines-&-distances	FOSC RP DOC (NOAA NMFS)
Birds	Watch for and avoid rafting or flocking birds while operating vessels or aircraft involved directly or in support of dispersant operations, including when conditions can cause spray to reach rafting birds. Record and report each sighting event, including GPS location, species (if known) and description of the encounter in accordance with DUPP (see **Error! Reference source not found.**).	See Error! Reference source not found.Error! Reference source not found. See **DUPP page VII-7**	FOSC RP

Category	Measures	Documentation or Contact	Duty
	No approved dispersant application operations should be conducted within 0.5 nautical miles (1,000 yards) of rafting birds.	RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt	DOI (US FWS)
West Indian Manatee	**Awareness** Instruct all personnel associated with vessel operations of the potential presence of manatees and the need to avoid collisions, or to the extent possible, close proximity, to manatees. All personnel are responsible for observing water-related activities for the presence of manatees. If manatees are seen within 100 yards, all appropriate precautions shall be implemented to ensure their protection. **Manatees within 50 feet or if contact seems likely or imminent.** As a general precaution, no operation of any moving equipment within 50 feet of a manatee, or if contact seems likely or imminent. Activities will not resume until the manatee(s) has departed the project area on its own, or by direction from the appropriate resource protection manager. **Collisions with Manatee** Any collision with and/or injury to a manatee shall be reported immediately to the appropriate resource manager.	**U.S. Fish and Wildlife Service, North Florida Ecological Services Office:** (904) 731-3332 **Florida Fish and Wildlife Conservation Commission:** Report accidents online or call 888-404-FWCC (888-404-3922). Cellular phone users can also call *FWC or #FWC, or send a text to Tip@MyFWC.com	FOSC RP DOC (NOAA NMFS) DOI (US FWS)

Table IV-9. ESA and EFH Conservation Measures for Essential Fish Habitat during Dispersant Operations

Category	Measures	Documentation or Contact	Duty
Avoidance of Sargassum and Drift Algae	When possible and practicable, avoid known or observed areas of *Sargassum*. Watch for *Sargassum*/drift algae while operating vessels or aircraft involved directly or in support of dispersant operations. Record and report each sighting event, including GPS location, species (if known) and description of the encounter in accordance with the DUPP (see Appendix C). Reporting should include notification to the NMFS Southeast Regional Office Marine Mammal Hotline.	See **Appendix G.** Error! Reference source not found.Error! Reference source not found. See **DUPP Section 3.2.A(1)** and **DUPP Protocol 4.7** RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt **NMFS Southeast Regional Office Marine Mammal Hotline** **Phone:** 877-433-8299 (24hrs) **Email:** takereport.nmfsser@noaa.gov	FOSC RP DOC (NOAA NMFS)
Coastal Wetlands	As a standard, preauthorization for use of dispersants or chemical agents is not granted for use in, on, or over waters containing reefs; waters designated as marine reserves; mangrove areas; or waters in coastal wetlands; these cases require case-by-case consultation with prior and express concurrence of the state/commonwealth/territory and EPA, in consultation with DOC and DOI. Coastal wetlands are identified as including: • Submerged algae beds (rocky or unconsolidated bottom) • Submerged seagrass beds • Coral reefs	See **DUPP Section 3.2.E** and **DUPP Protocol 4.7** RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt	FOSC RP
Avoidance of Sargassum and Drift Algae	When possible and practicable, avoid known or observed areas of *Sargassum*. Watch for *Sargassum*/drift algae while operating vessels or aircraft involved directly or in support of dispersant operations. Record and report each sighting event, including GPS location, species (if known) and description of the encounter in accordance with the DUPP (see Appendix C). Reporting should include notification to the NMFS Southeast Regional Office Marine Mammal Hotline.	See **Appendix G.** Error! Reference source not found.Error! Reference source not found. See **DUPP Section 3.2.A(1)** and **DUPP Protocol 4.7** RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt **NMFS Southeast Regional Office Marine Mammal Hotline**	FOSC RP DOC (NOAA NMFS)

Category	Measures	Documentation or Contact	Duty
		Phone: 877-433-8299 (24hrs) **Email:** takereport.nmfsser@noaa.gov	
Coastal Wetlands	As a standard, preauthorization for use of dispersants or chemical agents is not granted for use in, on, or over waters containing reefs; waters designated as marine reserves; mangrove areas; or waters in coastal wetlands; these cases require case-by-case consultation with prior and express concurrence of the state/commonwealth/territory and EPA, in consultation with DOC and DOI. Coastal wetlands are identified as including: • Submerged algae beds (rocky or unconsolidated bottom) • Submerged seagrass beds • Coral reefs	See **DUPP Section 3.2.E** and **DUPP Protocol 4.7** RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt	FOSC RP
Avoidance of *Sargassum* and Drift Algae	When possible and practicable, avoid known or observed areas of *Sargassum*. Watch for *Sargassum*/drift algae while operating vessels or aircraft involved directly or in support of dispersant operations. Record and report each sighting event, including GPS location, species (if known) and description of the encounter in accordance with the DUPP (see Appendix C). Reporting should include notification to the NMFS Southeast Regional Office Marine Mammal Hotline.	See **Appendix G.** Error! Reference source not found. See **DUPP Section 3.2.A(1)** and **DUPP Protocol 4.7** RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt **NMFS Southeast Regional Office Marine Mammal Hotline** **Phone:** 877-433-8299 (24hrs) **Email:** takereport.nmfsser@noaa.gov	FOSC RP DOC (NOAA NMFS)
Coastal Wetlands	As a standard, preauthorization for use of dispersants or chemical agents is not granted for use in, on, or over waters containing reefs; waters designated as marine reserves; mangrove areas; or waters in coastal wetlands; these cases require case-by-case consultation with prior and express concurrence of the state/commonwealth/territory and EPA, in consultation with DOC and DOI. Coastal wetlands are identified as including: • Submerged algae beds (rocky or unconsolidated bottom)	See **DUPP Section 3.2.E** and **DUPP Protocol 4.7** RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt	FOSC RP

Category	Measures	Documentation or Contact	Duty
	• Submerged seagrass beds • Coral reefs		

15.1.2 **Conservation Measures for In-Situ Burn Plan**

Preauthorized *In-Situ* Burning Protocols & Protective Measures

The ISBP contains protocols which must be followed as part of the conditions for preauthorization. The protocols for preauthorized *in-situ* burning are provided in the RRT4 ISBP (Appendix D).

The ISBP contains protocols which must be followed as part of the conditions for preauthorization. These requirements can be regarded as initial control measures developed in consideration of an *in-situ* burn operation. These control measures are then augmented by the conservation measures developed in consideration of the potential biological impacts.

Conservation/Protection Measures identified during the Biological Assessment

Additional recommended measures must be taken to prevent risk of any injury to wildlife, especially endangered or threatened species; critical habitat; and essential fish habitat are to be identified through the formal consultation process. The conservation measures provided herein have been identified in consultation with NOAA, NMFS, USFWS, SAFMC, GMFMC, EPA, and USCG. These measures must be employed where the conditions identified by the service agency apply. These conservation measures can be added to regional & area contingency plans, operational plans, incident action plans, ICS-204s, Safe Work Practices, etc, as appropriate for the management of the incident.

Table IV-10. ESA and EFH Conservation Measures for Management of *In-Situ* Burning Operations

Category	Measures	Documentation or Contact	Duty
Regional & Area Contingency Plan	Identify *in-situ* burn operations checklists located within regional and area contingency plans, including RRT4 In-Situ Burn Plan for decision making and organizational structure for *in-situ* burn operations.	RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt Links to Area Contingency Plans are listed in the Web Resources section of that RRT4 webpage.	FOSC
Scientific & Trustee / Resource Management Support	**Close coordination with NOAA Scientific Support Coordinator, trustees (DOC & DOI), and resource protection managers will occur in the development and implementation of incident specific *in-situ* burn operations in the "green zone".** All responses where *in-situ* burn operational use has been determined to be an effective strategy for the mitigation of oil spill impacts will involve the support of respective trustees at the local, state, and federal level, and notably the assigned NOAA scientific support coordinator for the response; and will further require either a notification (within preauthorized area) or emergency consultation (not within preauthorized area) with the RRT4. When *in-situ* burning is proposed, due consideration shall be given to the trajectory of the oil, smoke, and any burn residue considering surface, sub-surface and air transport. If resources in adjacent areas are at risk, consultation with the trustees must be conducted. Within the Incident Command Post, close coordination between Planning/Environmental Unit and Operations/In-Situ Burn Management/Team(s) is necessary	**NMFS Emergency Consultation** **Email:** nmfs.ser.emergency.consult@noaa.gov **For ESA concerns:** protected resources division at 727-824-5312 **For EFG concerns:** habitat conservation division at 727-824-5317 ***Phone numbers are staffed during business hours only*** Sea Turtle Guidelines: https://www.fisheries.noaa.gov/resource/document/guidelines-oil-spill-response-and-natural-resource-damage-assessment-sea-turtles NOAA Field Assessment and Science Techniques (FAST) Forms and Guidance Documents: https://www.diver.orr.noaa.gov/web/guest/field-forms-and-templates	FOSC RRT4 DOC (NOAA NMFS)
Approved Chemical Agents and Preauthorized Locations for In-situ burn Operations	Chemical agents listed on the NCP product schedule for *in-situ* burning may be used in designated preapproved zones in the RRT4 area of operation, which includes marine waters off the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi out to the Exclusive Economic Zone boundary. The state territorial boundary is typically 3 nautical miles seaward from any land, with the exception of the west coast of Florida where state waters extend out to 9 nautical miles seaward from any land in certain areas. Designated preapproved zones in the RRT4 are termed *green or Yellow Zones*.	NCP Subpart J Product Schedule is published by EPA and found at: https://www.epa.gov/emergency-response/national-contingency-plan-subpart-j Maps of Green and Yellow Zones are provided in the RRT4 plans at: https://r4.ercloud.org/r4rrt. Interactive maps of these zones are posted to the "Jurisdictional Boundaries" map in the interactive maps section of that RRT4 website.	FOSC RRT4 DOC (NOAA NMFS)

Table IV-11. ESA and EFH Conservation Measures for Safety of Humans and Fish, Wildlife, and Habitat during *In-Situ* Burning Operations

Category	Measures	Documentation or Contact	Duty
Operational Monitoring Requirements	For safety, effects to any natural resources of concern, and for fate and transport of smoke and burn residue (including sinking of residue), operational monitoring is required. Documentation of any observable post-burn effects such as fish or wildlife mortalities or sub-lethal effects is advised.	See **ISBP Appendix E.** RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt	FOSC RP DOC (NOAA NMFS)
Air Monitoring Plan Considerations.	Decisions to burn or not to burn oil in areas considered case-by-case are made on the basis of the potential for humans to be exposed to the smoke plume, and pollutants associated with it. PM-10 exposure is generally limited to 150 micrograms per cubic meter. Smoke plume modeling is done to predict which areas might be adversely affected. In addition, in-situ burning responses require downwind air monitoring for PM-10. Aerial surveys are also conducted prior to initiating a burn to minimize the chance that concentrations of mammals, turtles and birds are in the operational area and affected by the response. **Safety Note Regarding PM-10.** In-situ burning generates a thick black smoke that contains primarily particulates, soot, and various gases (carbon dioxide, carbon monoxides, water vapor, nitrous oxides and PAHs). The components of the smoke are similar to those of car exhaust. Of these smoke constituents, small particulates less than 10 microns in diameter, known as PM-10, (which can be inhaled deeply into the lungs) are considered to pose the greatest risk to humans and nearby wildlife. For this reason, in-situ burning is discouraged where the plume may reach any populated areas. All other areas are considered on a case-by-case basis.	See **USCG *In-Situ* Burn Manual (Report No. CG-D-06-03)** **Table 15. Estimates for maximum downwind extent of PM-10 particulates** https://apps.dtic.mil/dtic/tr/fulltext/u2/a418267.pdf	FOSC RP DOC (NOAA NMFS)
SMART protocols	Special Monitoring of Applied Response Technologies (SMART) procedures for *in-situ* burning are not tiered as they are for dispersant use. SMART protocols for ISB recommend that sampling is conducted for particulates at sensitive downwind sites prior to the burn (to gather background data) and after the burn has been initiated. Data on particulate levels are recorded and the Scientific Support Team forwards the data and recommendations to the Unified Command.	Special Monitoring of Applied Response Technologies (SMART) documentation is available at https://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/resources/smart.html	FOSC RP DOC (NOAA NMFS)

Category	Measures	Documentation or Contact	Duty
Pre-action: **On-Site Survey Flight**	Prior to commencing *in-situ* burn operations, an on-site survey will be conducted for effects to any natural resources of concern, in consultation with natural resource specialists, to determine if: • Any threatened or endangered species are present in the projected operation areas or otherwise at risk from operations. • Any endangered species critical habitats are present in the projected application areas, and the potential increased risks associated with respective species or special features to those habitats; in order to determine if additional measures might be necessary to minimize impacts. • What essential fish habitats are present in the projected application areas, in order to determine if additional measures might be necessary to minimize impacts. On-site surveys will be discussed with appropriate federal, state, and local trustees; measures will be taken to prevent impacts to wildlife, especially threatened and endangered species, listed critical habitats, and essential fish habitats. When possible and/or advised by the Natural resource trustees, from DOI, DOC, or the affected State(s) or their associated resource management agencies or other designee they select, will provide a natural resource specialist to participate in the survey. Local Area Contingency Plans, Environmental Sensitivity Indexes, and Geographic Response Plans for the area shall also be consulted to help determine what resources are present	See **ISBP Protocol 4.5** RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt Links to Area Contingency Plans are listed in the Web Resources section of that RRT4 webpage. **Notify the NMFS Southeast Regional Office Marine Mammal Hotline for large whale siting:** **Phone:** 877-433-8299 (24hrs) **NMFS Emergency Consultation** **Email:** nmfs.ser.emergency.consult@noaa.gov **For ESA concerns:** protected resources division at 727-824-5312 **For EFG concerns:** habitat conservation division at 727-824-5317 ***Phone numbers are staffed during business hours only***	FOSC RP DOC (NOAA NMFS) DOI (US FWS)
Survey Flights during In-situ burn Operations	Survey flights in the area of application, in accordance with operational guidance and site safety plan, will be conducted during *in-situ* burn operations to not only evaluate effectiveness of operations, but also to identify any threatened or endangered species in the area of *in-situ* burn operations. Record and report each sighting event, including GPS location, species (if known) and description of the encounter on the Marine Species Observation Form (Appendix G). All in-situ burn operational flights must be in accordance with and approved by the flight ops chief. Prior to and in preparation of any spill response, it is recommended that all spotters and observers be trained in looking for offshore biological resources. This will ensure stronger mindfulness for the	See **Appendix G.** Error! Reference source not found. Minimum separation distance for ISB operations from ESA-listed marine species is 0.5 nautical miles (1,000 yards) Guidelines for *observation* distances are located at: https://www.fisheries.noaa.gov/topic/marine-life-viewing-guidelines#guidelines-&-distances	FOSC RP

Category	Measures	Documentation or Contact	Duty
	potential presence of these resources in the response area. Observers and spotters should also be trained in the minimum separation distances.		
Post Burn Survey	A survey should be conducted in the burn area after the burn is complete. Dead or affected marine mammals should be reported to the NMFS SERO. All ESA-listed species should be counted, dead specimens collected, and post-activity reported to NMFS SERO via email. Contact the Environmental Unit to report any sea turtle or marine mammal that is impacted by burn operations or that has signs of oil impacts also report this to the Wildlife Branch as quickly as possible. Affected sea turtles should be reported to the nearest stranding network contact for sea turtles. All affected wildlife shall be documented and reported to the Environmental Unit and Wildlife Branch as soon as practicable.	**NMFS Southeast Regional Office Marine Mammal Hotline** **Phone:** 877-433-8299 (24hrs) **Email:** takereport.nmfsser@noaa.gov **Stranding networks for sea turtles, whales, and marine animals:** https://www.fisheries.noaa.gov/report	FOSC RP DOC (NOAA NMFS)
Air Operations Best Management Practices	All in-situ burn flights must be in accordance with and with approval from flight ops chief. All flight restrictions should be disseminated and communicated by the flight ops chief prior to any crews deploying. The Environmental Unit can assist the flight ops chief in identifying environmental restrictions, but other flight restrictions from operational or regulatory issues are also likely to be valid, including implementation of the following best management practices if applicable to the operation: • Avoid hovering or landing of aircraft near posted or known bird sites • Unless previously authorized, overflights to identify locations of oiled wildlife should not fly below 500 feet over Wildlife Refuges, Management Areas, bird rookeries, or National Parks without prior authorization from the land manager or Natural Resource Trustee. • Unless previously authorized, all other aircraft are requested to maintain a minimum altitude of 2,000 feet above the surface of lands and waters of such areas. Federal Aviation Administration (FAA) Advisory Circular (AC 91-36C), "Visual Flight Rules (VFR) Near Noise Sensitive Areas," defines the surface as: the highest terrain within 2,000 feet laterally of the route of flight, or the uppermost rim of a canyon or valley. • All aircraft flying over water are to be aware of marine mammals/sea turtles, and report sightings. • Dead wildlife spotted from aircraft should be reported to the appropriate agency and/or hotline. Dead marine mammals should be reported to the NMFS SERO.	**FAA AC 91-36C** https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/23155 *(was cancelled on 9/17/2004 but remains a recommended BMP in the absence of a replacement advisory)* **NMFS Southeast Regional Office Marine Mammal Hotline** **Phone:** 877-433-8299 (24hrs)	FOSC RP

Category	Measures	Documentation or Contact	Duty
Post Burn Survey	A survey should be conducted in the burn area after the burn is complete. Dead or affected marine mammals should be reported to the NMFS SERO. All ESA-listed species should be counted, dead specimens collected, and post-activity reported to NMFS SERO via email. Contact the Environmental Unit to report any sea turtle or marine mammal that is impacted by burn operations or that has signs of oil impacts also report this to the Wildlife Branch as quickly as possible. Affected sea turtles should be reported to the nearest stranding network contact for sea turtles. All affected wildlife shall be documented and reported to the Environmental Unit and Wildlife Branch as soon as practicable.	**NMFS Southeast Regional Office Marine Mammal Hotline** **Phone:** 877-433-8299 (24hrs) **Email:** takereport.nmfsser@noaa.gov **Stranding networks for sea turtles, whales, and marine animals:** https://www.fisheries.noaa.gov/report	FOSC RP DOC (NOAA NMFS)
Air Operations Best Management Practices	All in-situ burn flights must be in accordance with and with approval from flight ops chief. All flight restrictions should be disseminated and communicated by the flight ops chief prior to any crews deploying. The Environmental Unit can assist the flight ops chief in identifying environmental restrictions, but other flight restrictions from operational or regulatory issues are also likely to be valid, including implementation of the following best management practices if applicable to the operation: • Avoid hovering or landing of aircraft near posted or known bird sites • Unless previously authorized, overflights to identify locations of oiled wildlife should not fly below 500 feet over Wildlife Refuges, Management Areas, bird rookeries, or National Parks without prior authorization from the land manager or Natural Resource Trustee. • Unless previously authorized, all other aircraft are requested to maintain a minimum altitude of 2,000 feet above the surface of lands and waters of such areas. Federal Aviation Administration (FAA) Advisory Circular (AC 91-36C), "Visual Flight Rules (VFR) Near Noise Sensitive Areas," defines the surface as: the highest terrain within 2,000 feet laterally of the route of flight, or the uppermost rim of a canyon or valley. • All aircraft flying over water are to be aware of marine mammals/sea turtles, and report sightings. • Dead wildlife spotted from aircraft should be reported to the appropriate agency and/or hotline. Dead marine mammals should be reported to the NMFS SERO.	**FAA AC 91-36C** https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/23155 *(was cancelled on 9/17/2004 but remains a recommended BMP in the absence of a replacement advisory)* **NMFS Southeast Regional Office Marine Mammal Hotline** **Phone:** 877-433-8299 (24hrs)	FOSC RP

Table IV-12. ESA and EFH Conservation Measures for Vessel Operations in support of *In-Situ* Burning Operations

Category	Measures	Documentation or Contact	Duty
NOAA's Vessel Strike Avoidance Measures and Reporting for Mariners	**In order to avoid causing injury or death to marine mammals and sea turtles the following measures should be taken when consistent with safe navigation:** 1. Vessel operators and crews shall maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species. 2. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel (see sighting report requirements at right). 3. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible. 4. When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area. 5. Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures should always be exercised. The vessel shall attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible. 6. Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel and when safety permits, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area. **Additional Requirements for the North Atlantic Right Whale** 1. If a sighted whale is believed to be a North Atlantic right whale, federal regulation requires a minimum distance of 500 yards be maintained from the animal (50 CFR 224.103 (c)). 2. Vessels entering North Atlantic right whale critical habitat are required to report into the Mandatory Ship Reporting System. 3. Mariners shall check with various communication media for general information regarding avoiding ship strikes and specific information regarding North Atlantic right whale sighting	See **Appendix E. Appendix E: Vessel Strike Avoidance Measures and Reporting for Mariners** *NMFS Southeast Region Vessel Strike Avoidance Measures and Reporting for Mariners; revised February 2008* **Marine Mammal Viewing Guide:** https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/archive/dolphinsmart/pdfs/turtle_guide.pdf • To report dead, injured or entangled dolphins, whales, seals or sea turtles in the Southeast U.S., Puerto Rico and the U.S. Virgin Islands to: 1-877-WHALE-HELP (1-877-942-5343) • Report right whale sightings in the Southeast U.S. to: 1-877-942-5343 or U.S. Coast Guard Channel 16 • To report potential violation of the Endangered Species Act or Marine Mammal Protection Act, contact NOAA's Office of Law Enforcement: 1-800-853-1964 **Stranding networks for sea turtles, whales, and other protected marine animals (e.g., giant manta ray, oceanic whitetip shark):** https://www.fisheries.noaa.gov/report **Interactive Right Whale Sighting Map:** https://apps-nefsc.fisheries.noaa.gov/psb/surveys/MapperiframeWithText.html	FOSC RP

Category	Measures	Documentation or Contact	Duty
	locations. These include NOAA weather radio, U.S. Coast Guard NAVTEX broadcasts, and Notices to Mariners. Commercial mariners calling on United States ports should view the most recent version of the NOAA/USCG produced training CD entitled "A Prudent Mariner's Guide to Right Whale Protection" (contact the NMFS Southeast Region, Protected Resources Division for more information regarding the CD). 4. Injured, dead, or entangled right whales should be immediately reported to the U.S. Coast Guard via VHF Channel 16. **Injured or Dead Protected Species Reporting** Vessel crews shall report sightings of any injured or dead protected species immediately, regardless of whether the injury or death is caused by your vessel. Reporting should include notification to the NMFS Southeast Regional Office Marine Mammal Hotline (takereport.nmfsser@noaa.gov)		
ESA-Listed Marine Species Avoidance Distance	Prior to and in preparation of any spill response, it is recommended that all spotters and observers be trained in looking for offshore biological resources. This will ensure stronger mindfulness for the potential presence of these resources in the response area. Observers and spotters should also be trained in the minimum separation distances.	See **Appendix G.** Error! Reference source not found. Minimum separation distance for ISB operations from ESA-listed marine species is 0.5 nautical miles (1,000 yards) Guidelines for *observation* distances are located at: https://www.fisheries.noaa.gov/topic/marine-life-viewing-guidelines#guidelines-&-distances	FOSC RP
Collision with Marine Mammal or Sea Turtle	Any collision with and/or injury to a marine mammal or sea turtle shall be reported immediately to the NMFS SERO Southeast Regional Office by email using the vessel strike reporting procedures (Appendix E).	**NMFS Southeast Regional Office Marine Mammal Hotline** **Phone:** 877-433-8299 (24hrs) **Email:** takereport.nmfsser@noaa.gov See **Appendix E. Appendix E: Vessel Strike Avoidance Measures and** Reporting for Mariners *NMFS Southeast Region Vessel Strike Avoidance Measures and Reporting for Mariners; revised February 2008*	FOSC RP

Category	Measures	Documentation or Contact	Duty
Manatee Collision or Stranding	Any collision with or stranding of a manatee should be reported to USFWS and applicable U.S. State trustee, department of wildlife or natural resources. In addition, the local authorized sea turtle and marine mammal stranding/rescue organizations should also be notified.	**U.S. Fish and Wildlife Service, North Florida Ecological Services Office:** (904) 731-3332 **Florida Fish and Wildlife Conservation Commission:** Report accidents online or call 888-404-FWCC (888-404-3922). Cellular phone users can also call *FWC or #FWC, or send a text to Tip@MyFWC.com	FOSC RP
Marine Mammals and Sea Turtles	Watch for and avoid marine mammals and sea turtles while operating vessels or aircraft involved directly or in support of *in-situ* burn operations. Record and report each sighting event, including GPS location, species (if known), description of the encounter as well as photographs and video with date and time stamping. Have a trained observer (if available, see Appendix F) or a crew member dedicated to looking for sea turtles and marine mammals during burn operations and record each sighting event using **Error! Reference source not found.Error! Reference source not found.**. The observer or crew member should be looking for marine mammals and sea turtles that may be affected by the burn or are impacted by oil. A survey for marine mammals/sea turtles must be conducted by the ignitor vessel by a designated observer or other personnel as assigned. The sea turtle and marine mammal observer on the ignition vessel will monitor the following areas prior to the burn: • The area in front of the collection vessels, • The oil concentrated in the boom, and • Any oil trailing behind the boom. Observers will submit a Marine Species Observation Form (Appendix G) with images and videos to the Environmental Unit RAR Specialist at the end of each burn day.	See **Appendix G.** Error! Reference source not found.Error! Reference source not found. **NMFS Southeast Regional Office Marine Mammal Hotline** **Phone:** 877-433-8299 (24hrs) **Email:** takereport.nmfsser@noaa.gov **Stranding networks for sea turtles, whales, and marine animals:** https://www.fisheries.noaa.gov/report	FOSC RP DOC (NOAA NMFS)

Category	Measures	Documentation or Contact	Duty
	If marine mammals/sea turtles are sighted in the *in-situ* burn safety zone, measures must be taken to prevent harm such as implementing sea turtle retrieval protocols, relocating the burn area, or standing down until the animals exit the area. Dead or affected marine mammals and ESA-listed species should be reported to the NMFS SERO. Dead or affected sea turtles should be reported to the nearest stranding network contact for sea turtles.		
ALL STOP/Avoid ESA-Listed Marine Species	If possible, watch for and avoid burn operations where ESA-listed marine species have been spotted. If an ESA-listed marine species l is spotted during operations, stop the operations if possible, until the animal is outside the operations area (consider moving burn location, or other strategies moving hazing in consult with resource managers.)	Minimum separation distance for ISB operations from ESA-listed marine species is 0.5 nautical miles (1,000 yards) Guidelines for *observation* distances are located at: https://www.fisheries.noaa.gov/topic/marine-life-viewing-guidelines#guidelines-&-distances	FOSC RP
Comatose Sea Turtles	If a turtle appears to be comatose (unconscious), crews should attempt to revive it before release per 66 CFR 67495, December 31, 2001. Place the turtle on its plastron (lower shell) and elevate the hindquarters several inches to permit the lungs to drain off water. A comatose but live sea turtle may, in some cases, exhibit absolutely no movement or signs of life (no muscle reflexes). In other cases, an unconscious turtle may show some evidence of eyelid or tail movement when touched. Sea turtles may take some time to revive; do not give up too quickly. The Environmental Unit should be staffed with a Section 7 RAR Specialist and Wildlife Group for recovery who can be contacted to advice while comatose sea turtles are being handled. Regulations allow holding a sea turtle on deck up to 24 hours for resuscitation purposes without a permit. Even turtles successfully resuscitated benefit from being held as long as possible to allow toxins that built up as a result of stress to dissipate from the body. Keep the skin, and especially the eyes, moist while the turtle is on deck by covering the animal's body with a wet towel, periodically spraying it with water, or by applying petroleum jelly to its skin and carapace.	See **Appendix I.** Error! Reference source not found. and **Appendix J.** Error! Reference source not found.	FOSC RP DOC (NOAA NMFS)
Sea Turtle Rescue Vessels	If possible, send wildlife rescue vessels (with trained rescue personnel if available) into the projected burn area to search for and rescue turtles in accordance with the attached Sea Turtle Observer and Retrieval protocols (Appendix J).	See Error! Reference source not found.Error! Reference source not found. and Error! Reference source not found.Error! Reference source not found.	DOC (NOAA NMFS)

Category	Measures	Documentation or Contact	Duty
	Feasibility will depend on the size of the projected area and whether material has already been boomed or otherwise collected. If conditions on the burn platform allow (e.g. size and space of vessel), without risk to human safety, collect live and dead sea turtles according to the attached Sea Turtle Retrieval Protocols.	**Stranding networks for sea turtles, whales, and marine animals:** https://www.fisheries.noaa.gov/report	DOI (US FWS)
Deceased ESA-Listed Marine Species	Any dead ESA-listed marine species should be counted and collected if possible. Contact the Environmental Unit to report any animal that is impacted by burn operations or that has signs of oil impacts also report this to the Wildlife Branch as quickly as possible. Dead or affected sea turtles should be reported to the nearest stranding network contact for sea turtles.	**Stranding networks for sea turtles, whales, and marine animals:** https://www.fisheries.noaa.gov/report	DOC (NOAA NMFS) DOI (US FWS)
Birds	Watch for and avoid rafting or flocking birds while operating vessels or aircraft involved directly or in support of dispersant operations, including when conditions can cause spray to reach rafting birds. Record and report each sighting event, including GPS location, species (if known) and description of the encounter in accordance with ISBP (see Appendix D).	See Error! Reference source not found.Error! Reference source not found. See **DUPP page VII-7** RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt	FOSC RP DOI (US FWS)
West Indian Manatee	**Awareness** Instruct all personnel associated with vessel operations of the potential presence of manatees and the need to avoid collisions, or to the extent possible, close proximity, to manatees. All personnel are responsible for observing water-related activities for the presence of manatees. If manatees are seen within 100 yards, all appropriate precautions shall be implemented to ensure their protection. **Manatees within 50 feet or if contact seems likely or imminent.** As a general precaution, no operation of any moving equipment within 50 feet of a manatee, or if contact seems likely or imminent. Activities will not resume until the manatee(s) has departed the project area on its own, or by direction from the appropriate resource protection manager. **Collisions with Manatee**	**U.S. Fish and Wildlife Service, North Florida Ecological Services Office:** (904) 731-3332 **Florida Fish and Wildlife Conservation Commission:** Report accidents online or call 888-404-FWCC (888-404-3922). Cellular phone users can also call *FWC or #FWC, or send a text to Tip@MyFWC.com	FOSC RP

Category	Measures	Documentation or Contact	Duty
	Any collision with and/or injury to a manatee shall be reported immediately to the appropriate resource manager.		
Nighttime Lighting	Nighttime lighting should be minimized so as not to attract sea turtles or manta rays to the response area.		FOSC RP

Table IV-13. ESA and EFH Conservation Measures in Essential Fish Habitat for *In-Situ* Burning Operations

Category			
	Avoid burning unoiled or lightly oiled *Sargassum*. Watch for *Sargassum*/drift algae while operating vessels or aircraft involved directly or in support of *in-situ* burn. Record and report each sighting event, including GPS location, species (if known) and description of the encounter.	See Error! Reference source not found.Error! Reference source not found. See **ISBP Section 3.2.A(1)** and **ISBP Protocol 4.8** RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt	FOSC RP
Coastal Wetlands	As a standard, preauthorization for use of chemical agents is not used in, on, or over waters containing reefs; waters designated as marine reserves; mangrove areas; or waters in coastal wetlands. These cases require incident specific review with the commonwealth/territory and EPA, and in consultation with DOC and DOI. Coastal wetlands are identified as including: • Submerged algae beds (rocky or unconsolidated bottom) • Submerged seagrass beds • Coral reefs	See **ISBP Section 3.2.D** and **ISBP Protocol 4.8** RRT4 plans, policies and guidance are available at https://r4.ercloud.org/r4rrt	FOSC RP

15.2 Appendix B: Endangered Species Act Consultation for Emergency Responses

The policy for conducting emergency consultations in the Southeast can be found at https://www.fisheries.noaa.gov/content/endangered-species-act-emergency-consultations-southeast.

15.3 Appendix C: Dispersant Use Pre-authorization Plan

The most current version of this plan, which may be updated annually, will be posted at https://r4.ercloud.org/r4rrt/.

Region IV Regional Response Team Dispersant Use Preauthorization Plan (DUPP)

January 27, 2021

Region IV Regional Response Team Science & Technology Committee:

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Record of Changes

Change Number	Effective Date	Date Entered	Entered By	Page Check

Letter of Promulgation

From: Region IV Regional Response Team

To: Distribution

Subject: LETTER OF PROMULGATION

The Federal Region 4 Regional Response Team (RRT4), in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan [40 CFR Part § 300.910], grants preauthorization to the FOSC for dispersant use as defined by the "Dispersant Use Preauthorization Plan" (DUPP) in responding to any oil pollution within the following area:

> From the 30 foot isobath and at least three nautical miles seaward of the nearest shoreline (9 nautical miles seaward of the west coast of Florida shoreline) to the Exclusive Economic Zone boundary.

This plan hereby replaces any other policies, guidelines or plans now in force regarding preauthorized use of dispersants that were issued by RRT4.

Preauthorization as defined in this plan is contingent on the evaluation of natural resources with formal assessments conducted under Section 7(a)(2) of the Endangered Species Act (ESA), Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and Section 106 of the National Historic Preservation Act (NHPA) with consultations from U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS) and the Advisory Council on Historic Preservation (ACHP).

The protocols described within of the DUPP must be fully complied with in order to meet the requirements of preauthorization.

This plan cannot be changed or altered without notice and opportunity for comment provided to each signatory official or designated representative to the RRT4. Any signatory official or designated representative to the RRT4 can petition the RRT4 to amend or revise the plan and/or withdraw approval at any time

A copy of this letter should be retained in the front of this plan.

DATE of EFFECT: ____________________

U.S. Environmental Protection Agency RRT IV Co-Chair: ____________________

U.S. Coast Guard RRT IV Co-Chair: ____________________

Encl: RRT IV Dispersant Use Preauthorization Plan

Distribution List

Copies of this plan and subsequent changes will be distributed as follows:

COAST GUARD
Commandant (CG-533)
LANTAREA OPCEN
National Strike Force Coordination Center
Atlantic Strike Team
Gulf Strike Team
CGD Seven (Drm)
CGD Seven (cc)
CGD Eight (Drm)
CGD Five (Drm)
Sector North Carolina Sector Charleston
MSU Savannah
Sector Jacksonville
Sector St. Petersburg
Sector Miami
Sector Mobile
Sector Key West

STATE AND LOCAL AGENCIES
State of North Carolina, RRT IV representative
State of South Carolina, RRT IV representative
State of Georgia, RRT IV representative
State of Florida, RRT IV representative
State of Alabama, RRT IV representative
State of Mississippi, RRT IV representative

NON-GOVERNMENT AGENCIES
Marine Spill Response Corporation, SE region
Clean Caribbean Corporation
Chevron Oil
Shell Oil

FEDERAL AGENCIES
U.S. EPA Region IV
U.S. Department of the Interior Region IV
U.S. Department of Commerce Region IV
U.S. Fish and Wildlife Service Region IV
National Marine Fisheries Service Region IV
NOAA National Marine Sanctuaries, Florida Keys National Marine Sanctuary
U. S. National Park Service Region IV
Bureau of Indian Affairs (BIA)
Eastern Region – Nashville
Bureau of Ocean Energy Management (BOEM)
BOEM New Orleans
Bureau of Safety and Environmental Enforcement (BSEE)
NOAA National Marine Sanctuaries, Grays Reef National Marine Sanctuary
NOAA HAZMAT Reference Library Seattle, Washington
NOAA Biological Assessment Team, Seattle, Washington
NOAA HAZMAT USCG Commandant (G-MEP)
NOAA Scientific Support Coordinator, CGD Seven

If you would like to be added to this distribution list please contact the Region IV Regional Response Team *Science* and Technology Chairperson or your agency representative to the regional response team.

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Glossary of Acronyms

AC	Area Committee
ACHP	Advisory Council on Historic Preservation
ACOE	Army Corps of Engineers
ACP	Area Contingency Plan
AEGL	Acute Exposure Guideline Levels
AFTT	Atlantic Fleet Training and Testing
AL	State of Alabama
API	Oil Gravity
ADIOS2	Automated Data Inquiry for Oil Spills
ATSDR	Agency for Toxic Substances and Disease Registry
AVHRR	Advanced High Resolution Radiometer
BMP	Best Management Practices
BNP	Biscayne National Park
BSEE	Bureau of Safety and Environmental Health
CAPS	CAPS Rule 33 CFR § 155
CCW	Carolina Capes Water
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHA	U.S. Coast Guard Sector Charleston (Charleston, South Carolina)
CG-INV	United States Coast Guard, Office of Investigations & Compliance Analysis
CRRC	Coastal Response Research Center
CWA	Clean Water Act
DMF	Division of Marine Fisheries
DMP2	NOAA Dispersant Mission Planner
DOC	Department of Commerce
DOI	Department of the Interior
DOSS	Dioctyl sodium sulfosuccinate
DOT	Department of Transportation
DPnB	Dipropylene Plycol n-Butyl ether
DPS	Distinct Population Segment
DUECCG	RRT4 Dispersant Use Expedited Concurrence and Consultation Guide
DUOPIG	Dispersant Use Operational Planning and Implementation Guidance
DUPP	Dispersant Use Preauthorization Plan
DWH	Macondo/Deepwater Horizon/MC252Oil Spill
EC50	Median Effects Concentration
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EFH-FMP	Essential Fish Habitat Fishery Management Plan
EFH-HAPC	Essential Fish Habitat-Habitat Areas of Particular Concern
EPA	U. S. Environmental Protection Agency
ERPG	Emergency Response Planning Guidelines
ESA	Endangered Species Act
EEZ	Exclusive Economic Zone
ESI	Environmental Sensitivity Index
EWS	Early Warning System

FAA	Federal Aviation Administration
FCW	Florida Current Water
FEIS	Fleet Training and Testing Environmental Impact Statement
FL	State of Florida
FLDEP	Florida Department of Environmental Protection
FMC	Fishery Management Council
FOSC	Federal On-Scene Coordinator
FWC	Florida Fish and Wildlife Commission
FWS	Fish and Wildlife Service
GA	State of Georgia
GADNR	Georgia Department of Natural Resources
GC/FID	Gas Chromatography/Flame Ionization Detector
GC/MS	Gas Chromatography/Mass Spectroscopy
GERG	Geochemical and Environmental Research Group
GIS	Geographic Information System
GNOME	General NOAA Oil Modeling Environment
GMFMC	Gulf of Mexico Fishery Management Council
GMFMC	Gulf of Mexico Fishery Management Council
GPS	Global Positioning System
GRNMS	Gray's Reef National Marine Sanctuary
GSW	Gulf Stream Water
GW	Georgia Water
HAZWOPER	Hazardous Waste Operations and Emergency Response
HC	Hazard Concentration
HC5	5th Percentile Hazard Concentration
IAP	Incident Action Plan
ICP	Incident Command Post
ICS	Incident Command System
ICW	Intracoastal Waterway
IPCC	Intergovernmental Panel on Climate Change
IRL	Indian River Lagoon
ISB	*In-Situ* Burning
JAX	U.S. Coast Guard Sector Jacksonville (Jacksonville, Florida)
JSL	Johnson-Sea-Link
KYW	U.S. Coast Guard Sector Key West (Key West, Florida)
LC50	Median Lethal Concentration
LOA	Letter of Agreement
LOA	Letter of Authorization
MA	State of Massachusetts
MASW	Mid-Atlantic Shelf Water
Mgal	Million gallons
MIA	U.S. Coast Guard Sector Miami (Miami, FL)
MISLE	Marine Information for Safety and Law Enforcement
MLW	Mean Low Water
MMHSRP	Marine Mammal Health and Stranding Response Program
MMPA	Marine Mammal Protection Act
MMPD	Maximum Most Probably Discharge
MMSN	Marine Mammal Stranding Network

MOB	U.S. Coast Guard Sector Mobile (Mobile, Alabama)
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSRC	Marine Spill Response Corporation
NAAQS	National Ambient Air Quality Standards
NC	State of North Carolina
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIMS	National Incident Management System
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOAA-OLE	NOAA Fisheries Office of Law Enforcement
NOAA-GC	NOAA Fisheries Office of General Counsel
NOS	National Ocean Service
NPS	National Park Service
NRC	National Response Center
NRC	National Research Council
NRDA	Natural Resource Damage Assessment
NRF	National Response Framework
NRS	National Response System
NRT	National Response Team
OCS	Outer Continental Shelf
OECD	Organization for Economic Co-operation and Development
OEIS	Oversees Environmental Impact Statement
OPA90	Oil Pollution Act of 1990
OPAREA	Operational Area
ORR-ARD	Response and Restoration, Assessment and Restoration Division
ORR-ERD	Response and Restoration, Emergency Response Division
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
OSLTF	Oil Spill Liability Trust Fund
OSRP	Oil Spill Response Plans
PAH	Polycyclic Aromatic Hydrocarbon
PCE	Primary Constituent Element
PEL	Permissible Exposure Limits
RAR	Resources at Risk
RCP	Regional Contingency Plan
REL	Recommended Exposure Limits
RP	Responsible Party
RPI	Research Planning, Inc.
RPIC	Responsible Party Incident Commander
RRT	Regional Response Team
RRT4	Region 4 Regional Response Team
RRT6	Region 6 Regional Response Team
SAB	South Atlantic Bight
SAV	Submerged Aquatic Vegetation
SAV	U.S. Coast Guard Marine Safety Unit Savannah (Savannah, Georgia)

SAFMC	South Atlantic Fishery Management Council
SC	State of South Carolina
SCDNR	South Carolina Department of Natural Resources
SCMARP	South Carolina Marine Artificial Reef Program
SFR	Sport Fish Restoration
SMART	Special Monitoring and Applied Response Technologies
SMART	Special Monitoring of Applied Response Technologies
SMZ	Special Management Zone
SSC	Scientific Support Coordinator
SSD	Species Sensitivity Distributions
SSW	Slope Sea Water
SOSC	State On-scene Coordinator
STEL	Short-term Exposure Limit
STP	U.S. Coast Guard Sector St. Petersburg (St. Petersburg, Florida)
TAC	Total Allowable Catch
TAMU	Texas A&M University
TEEL	Temporary Emergency Exposure Limit
THC	Total Hydrocarbon Content
TPH	Total Petroleum Hydrocarbons
TVRP	Tank Vessel Response Plan
UC	Unified Command
USA	United States of America
USACOE	United States Army Corps of Engineers
USCG	United States Coast Guard
USDOI	United States Department of the Interior
USFWS	U. S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VCW	Virginia Coastal Water
VFR	Visual Flight Rules
WCD	Worst Case Discharge
WBUC	Western Boundary Under-Current

1. Introduction

Following an oil spill, response actions should be designed to minimize environmental impact. While physical control and recovery techniques are the traditional response measures, other countermeasures may also need to be considered. Dispersant use is not intended to exclude or replace the use of mechanical, in-situ burn, or other open water cleanup methods, but to enable and encourage the use of appropriate techniques to minimize the impacts of an oil spill.

The underlying precept of preauthorization is that dispersing all or part of the slick in offshore waters may prevent the potentially more devastating impacts of oil on sensitive environments. Effective use of dispersants has a limited window of opportunity due to weathering characteristics of oils, which are rapidly affected by the physical environment. Therefore, the application of dispersants often requires that preauthorization for dispersant use be given prior to an incident.

2. Preauthorization Plan

The Dispersant Use Preauthorization Plan (DUPP) describes the Federal Region 4 Regional Response Team (RRT4) policies and protocols for dispersants developed under the authorities described in the NCP 40 CFR 300.910(a). The objective of this document is to provide for meaningful, environmentally safe, and effective dispersant operation under parameters that have been established by the RRT4 member agencies.

2.1. Preauthorization Policy

RRT4 policy for preauthorization of dispersants is limited to preauthorization for surface application of dispersants consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Subpart J.

Preauthorization is contingent on the evaluation of natural resources with formal assessments conducted under Section 7(a)(2) of the Endangered Species Act (ESA), Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and Section 106 of the National Historic Preservation Act (NHPA) with consultations from U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS) and the Advisory Council on Historic Preservation (ACHP). Within areas designated in Section 3.1 of this plan, further consultation by the U.S. Coast Guard (USCG) Federal On-Scene Coordinator (FOSC) is not required for initial application of dispersants, as long as the appropriate RRT4 agencies are immediately notified and the protocols within Section 4 of this plan are followed.[1]

2.2. Authority for Preauthorization

Subpart J of the NCP provides that the RRT4 representatives from the U.S. Environmental Protection Agency (EPA), U.S. Department of Commerce (DOC), U.S. Department of Interior (DOI) and the affected state(s) may preauthorize the use of chemical agents for oil spill response [40 CFR 300.910(a)]. Commandant, U.S. Coast Guard, has pre-designated the USCG Captains of the Port as FOSCs for coastal spills; and has delegated authority and responsibility for compliance with Section 311 of the Federal Water Pollution Control Act, as amended, to them. The EPA, DOI, and DOC have delegated their authority for approval of preauthorization of dispersants to their RRT4 representatives.

RRT4 representatives from the states of North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi have been delegated authority by their respective agencies or state governments to represent natural resource concerns and to serve as consultants to the FOSC on these matters.

2.3. Scope of Preauthorization

Offshore dispersant application to remediate oil spills will be conducted in accordance with the policies and protocols set forth in this plan. Approval for preauthorization of dispersants is granted solely to the USCG FOSC and may not be further delegated.

[1] Certain protocols of Section 4 describe circumstances for which consultation with the service agencies becomes necessary for dispersant use.

Preauthorization is limited to geographical boundaries described in the Green Zone of Section 3.1 in this plan, but is also further limited to initial application activities defined by method and resource:

2.3.A. Method Limitation – Surface Application

Preauthorization is limited to application of dispersants to surface waters using aircraft or vessel spraying systems. Subsurface, injection, or alternative dispersant application methods that do not meet these criteria are not approved by the RRT4 for preauthorized use.

2.3.B. Resource Limitation – Contracts

The Responsible Party is limited to dispersant resources identified in their Vessel and Facility Response Plan required under 33 CFR § 155 ("CAPS Rule"). Contracted dispersant operations shall have the organization and capability to provide the first application of dispersant over the designated response zone as rapidly as possible. However, the ability of the FOSC to exercise preauthorized use of dispersants will not be limited by the responsible party's requirement for pre-established contracts.

2.4. Authority to Discontinue Use

The use of dispersants will be discontinued immediately when directed by the FOSC.

Preauthorization for FOSC authority to use dispersants may be temporarily withdrawn if an RRT4 representative whose agency is a signatory to this plan (USCG, EPA, DOI, DOC, or an affected state) notifies RRT4 that their agency's approval for the plan has been suspended. Such notification may be verbal but must be followed by written and signed documentation to the RRT4 co-chairs. These agencies and all other RRT4 member agencies retain the authority to convene RRT4 to discuss concerns about the response. Inability to provide opportunity for observation of dispersant application under Protocol 4.6 of this plan should not be cited as a cause for suspension of dispersant application.

Concurrently, the DOI or DOC may advise the FOSC that the consultation provided to this preauthorization plan is inadequate or inapplicable to the response. In this event, an emergency consultation must be completed according to the DUECCG (see Attachment C.) for dispersant operations to continue.

2.5. Multi-Jurisdictional Responses

Concerns over dispersant operations which may impact adjacent State, special Federal management jurisdictions, or Federal regions will be addressed by the Liaison Officer (LOFR) of the responding Incident Management Team (IMT) and mediated by the RRT(s) if necessary.

3. Zones

Dispersant operations will be conducted within the jurisdiction of RRT4 in accordance with the policies and protocols set forth in this plan.

Two Zones, Green and Yellow, have been established to delineate locations and conditions under which dispersant application operations may take place. Preauthorization for dispersant use is limited to the geographical boundaries outlined in the Green Zone only.

3.1. Green Zone – Preauthorized Dispersant Use

The Green Zone is defined as any offshore waters within Federal Region 4 for which ALL of the following conditions apply:

3.1.A. Other Zone

The waters are not classified within a "Yellow" Zone as defined under Section 3.2;

3.1.B. Distance

The waters are at least three nautical miles seaward of any shoreline (and is nine nautical miles from the West Coast of Florida) and are within the United States' Exclusive Economic Zone (EEZ); and,

3.1.C. Depth

The waters are beyond the 30-foot isobath (approximately 10 meters or 5 fathoms).

Within Green Zones, the USCG, EPA, DOC and DOI natural resource trustees, and the state(s) agree that the decision to apply dispersants rests solely with the USCG FOSC, and that no further approval, concurrence or consultation on the part of the USCG or the USCG FOSC with EPA, DOC and DOI natural resource trustees, or the state(s) is required for dispersant application.

All dispersant operations within the Green Zone will be conducted in accordance with the policies and protocols set forth in this plan.

3.1.D. Special Case for West Coast of Florida

Florida state waters extend seaward into the Gulf of Mexico to a distance of nine nautical miles and do not include any preauthorized dispersant use areas.

3.2. Yellow Zone – Dispersant Use Not Preauthorized

The Yellow Zone is defined as any area within Federal Region 4 for which ANY of the following conditions apply:

3.2.A. Special Jurisdiction

The area is under special management jurisdiction. This includes any waters designated as marine reserves, state parks, National Marine Sanctuaries, National or State Wildlife Refuges, or units of the National Park Service;

3.2.A(1) Critical Habitat – Seasonal

Proposed or designated critical habitat components which reflect seasonal use are not inherently part of the *Yellow Zone*; however, special Emergency Consultation is required under DUPP Protocol 4.7 for application in a geographic area which meets all the criteria of a *Green Zone* in 3.1 and is also within a proposed or designated Critical Habitat which reflects seasonal use.

Known critical habitats that meet these criteria are:

- Loggerhead Sea Turtle Northwest Atlantic Distinct Population Segment (DPS)
  - Four segments of critical habitat management units (N-01, N-02, N-17, N-18 and N-19; 79 FR 39856) extend through the *Green Zone* due to migratory habitat features.
  - Two management units (S-01 and S-02; 79 FR 39856) are within the *Green Zone* for *Sargassum* habitat features.
- North Atlantic Right Whale
  - One critical habitat delineated in regard to winter calving (81 FR 4837).

3.2.A(2) Critical Habitat – Non-Seasonal

Proposed or designated critical habitat components which are not limited to seasonal use are part of the *Yellow Zone*

Known critical habitats that meet these criteria and would otherwise be within the geographic boundaries of the Green Zone [Sections 3.1.B through 3.1.D] are:

- Elkhorn and Staghorn Corals
  - One critical habitat delineated in regard to marine habitat (73 FR 72210)
- Gulf of Mexico subspecies of the Bryde's Whale
  - Although the Gulf of Mexico subspecies of the Bryde's Whale does not have a designated Critical Habitat. The RRT4, in consultation with NOAA NMFS, will consider the core distribution area published by NOAA in June of 2019[2] as part of the *Yellow Zone* for the DUPP

3.2.B. State Jurisdiction

The area is under state jurisdiction;

3.2.C. Distance

The area is within three nautical miles of a shoreline (or is within nine nautical miles from the Florida Gulf coastline);

3.2.D. Depth

The waters are within the 30 foot isobath (approximately 10 meters or 5 fathoms); and,

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[2] Gulf of Mexico Bryde's Whale Core Distribution Area Map & GIS Data - https://www.fisheries.noaa.gov/resource/map/gulf-mexico-brydes-whale-core-distribution-area-map-gis-data

3.2.E. Habitats

> The waters are in mangrove or coastal wetland ecosystems, or directly over living coral communities or hard bottom communities. Coastal wetlands include submerged algal beds and submerged sea grass beds.

If the FOSC determines that use of dispersants may be beneficial in response to a release or discharge within the Yellow zone, concurrence from the EPA and affected states as well as consultation the DOI and DOC will be needed [40CFR300.910(b)]. The FOSC will submit a request for concurrence to the RRT4 representatives of the EPA and the affected state(s) and request for emergency consultation to DOI and DOC. Procedures and requirements for dispersant use in the Yellow zone are set forth in the RRT4 DUECCG (see Attachment C.).

4. Protocols

The following requirements apply to the application of dispersants under the permissible conditions described within this plan. It will be the FOSC's responsibility to ensure that these requirements are accomplished as part of the incident-specific response operation:

4.1. Justifiable Use

Dispersants will only be used when they are considered appropriate for the response circumstance and are expected to provide a net environmental benefit.

Where a FOSC employs the use of dispersants to prevent or substantially reduce a hazard to human life according to the authority under 40CFR300.910(d), only Protocols 4.4 and 4.9 within this plan will be considered applicable.

4.2. RRT Notification

The USCG agrees that if a decision has been made to use dispersants under the preauthorization conditions and requirements described within this document, the USCG FOSC will notify RRT4 as soon as practicable[3], after the approval has been given by the FOSC to the Responsible Party (RP) . Notification will include, at a minimum, a *completed Incident Specific Dispersant Use Form* listed in Appendix IV with the FOSC's signature.

4.3. Evaluation of Continued Use

The FOSC agrees to make every effort to continuously evaluate the decision to use dispersants. Provided dispersant application is successful according to Special Monitoring and Applied Response Technologies (SMART) Tier I monitoring, no RRT4 approval will be required for additional sorties and passes for dispersant application.

The FOSC must be able to address the decision elements in Appendix IV (Dispersant Use Decision and Implementation Element) when evaluating the applicability of dispersants as a response option.

4.4. Health and Safety

The USCG FOSC must comply with applicable Occupational Safety and Health Administration (OSHA) regulations.

4.5. Daylight Operations

Dispersant application operations should be conducted during daylight hours only.

4.6. RRT Observers

Barring any unforeseen circumstances (such as time constraints, safety considerations, or logistical concerns) the FOSC will make a reasonable effort to provide designated representatives from the USCG, EPA, DOI, DOC and the affected state(s) with an opportunity to observe dispersant application operations. An inability to provide this opportunity will not, however, be cause for immediate cessation of application operations.

[3] A copy of the notification form should also be provided to nmfs.ser.emergency.consult@noaa.gov

4.7. Emergency Consultation for Critical Habitats

In the event that dispersant application is planned or considered within, or adjacent to, a proposed or designated Critical Habitat which meets the criteria of Section 3.2.A(1), an Emergency Consultation shall be initiated with the DOC through the NOAA Scientific Support Coordinator (SSC) to narrowly address the species, habitat, and type of habitat (e.g. *Sargassum*, calving, etc.) which may be at risk.

4.8. Monitoring

Monitoring will be conducted, where feasible, in order to assess the effectiveness and/or other conditions of dispersant application and to document results. At a minimum, SMART Tier 1 protocols must be implemented during any dispersant operations. The FOSC will use recommended monitoring procedures provided in Appendix IX of this plan. When possible, natural resource trustees will provide a specialist in surveying of marine mammals/turtles and pelagic/migratory birds.

4.9. Final Report

Any use of dispersants requires that a post-incident report be provided by the FOSC, or a designated member of the FOSC's staff, within 45 days of completing dispersant application operations. Recommendations for changes or modification to this Dispersant Use Plan may be presented in the report, if appropriate. The report will be provided to RRT4 co-chairs, the RRT4 Science & Technology committee chair, and may be presented at a RRT4 meeting. Required criteria for the final report are outlined in Appendix X.

4.10. Product Schedule

Unless otherwise directed, only those products specifically listed in the EPA's NCP Product Schedule of dispersants and which are considered appropriate by the FOSC for existing environmental and physical conditions will be considered for use during dispersant application operations; information about the Product Schedule is provided in Appendix XVIII.

This protocol does not supersede the FOSC's authority for use of "any dispersant… to prevent or substantially reduce a hazard to human life," under 40 CFR 300.910(d).

4.11. Endangered Species Act (ESA) and Essential Fish Habitat (EFH) Consultation

Preauthorization is contingent on the evaluation of natural resources with formal assessments conducted under Section 7(a)(2) of the ESA and Section 305(b) of the MSA, with consultations from USFWS and NMFS. The location of Biological Assessment and accompanying consultations are provided in Appendix III of this plan. In the event that consultations are missing, inapplicable, and/or determined by the service agency (USFWS or NMFS) to be inadequate, dispersant use is not preauthorized and an informal emergency consultation shall be initiated prior to beginning dispersant application.

The consultations will provide a list of recommended measures that must be taken to prevent risk of any injury to wildlife, especially endangered or threatened species. These measures must be employed where the conditions identified by the service agency apply.

4.12. Consideration of Trajectory

When dispersant application is proposed in a preauthorized zone that is adjacent or very near the zone boundary, due consideration shall be given to the trajectory of the dispersed oil. If the FOSC finds that the state or federal resources in adjacent areas would be at risk, consultation with the resource trustee must be conducted.

4.13. National Historic Preservation Act (NHPA) Consultation

Preauthorization is contingent on the evaluation of historic sites with formal assessments conducted under Section 106 of the National Historic Preservation Act (NHPA). The Assessment and accompanying consultation is provided in Attachment C. of this plan. In the event that consultations are inapplicable and/or determined by the service agency (ACHP) to be inadequate, dispersant use is not preauthorized and an informal emergency consultation shall be initiated prior to beginning dispersant application.

The consultations will provide a list of recommended measures that must be taken to prevent risk of any damage to historic sites. These measures must be employed where the conditions identified by the service agency apply.

5. Signature Page

I hereby attest and declare that by my signature that I approve this plan for dispersant use as presented herein for the agency or government I represent on the Federal Region 4 Regional Response Team (RRT4).

United States Coast Guard — Date
Region 4 Response Team Co-chair

United States Environmental Protection Agency — Date
Region 4 Response Team Co-chair

U.S. Department of the Interior — Date
Region 4 Response Team representative

U.S. Department of Commerce — Date
Region 4 Response Team representative

State of North Carolina — Date
Region 4 Response Team representative

State of South Carolina — Date
Region 4 Response Team representative

State of Georgia Date
Region 4 Response Team representative

State of Florida Date
Region 4 Response Team representative

State of Alabama Date
Region 4 Response Team representative

State of Mississippi Date
Region 4 Response Team representative

Appendix I. Dispersant Application Zone Maps

In general, preauthorization exists 3 nautical miles seaward of any land providing that the water depth is at least 30 feet deep. Within the State of Florida, preauthorization exists 9-nautical miles seaward of land on the Florida Gulf Coast and 3-nautical miles seaward on the eastern coast and Florida Keys. Some special management areas are however, excluded from preauthorization. Any preauthorization granted within state's waters will be addressed in a separate Letter of Agreement between the state, The USCG, the EPA, DOI, and DOC. The maps contained in this section serve as a general reference to indicate locations, distance from shore, and distance from the 30 foot contour for the preauthorized zones throughout Federal Region IV.

- Sector North Carolina
- Sector Charleston
- Sector Jacksonville
- Sector Miami
- Sector Key West
- Sector St. Petersburg
- Sector Mobile

Figure I-1. Dispersant Use Preauthorization Plan Green and Yellow Zone for Sector North Carolina

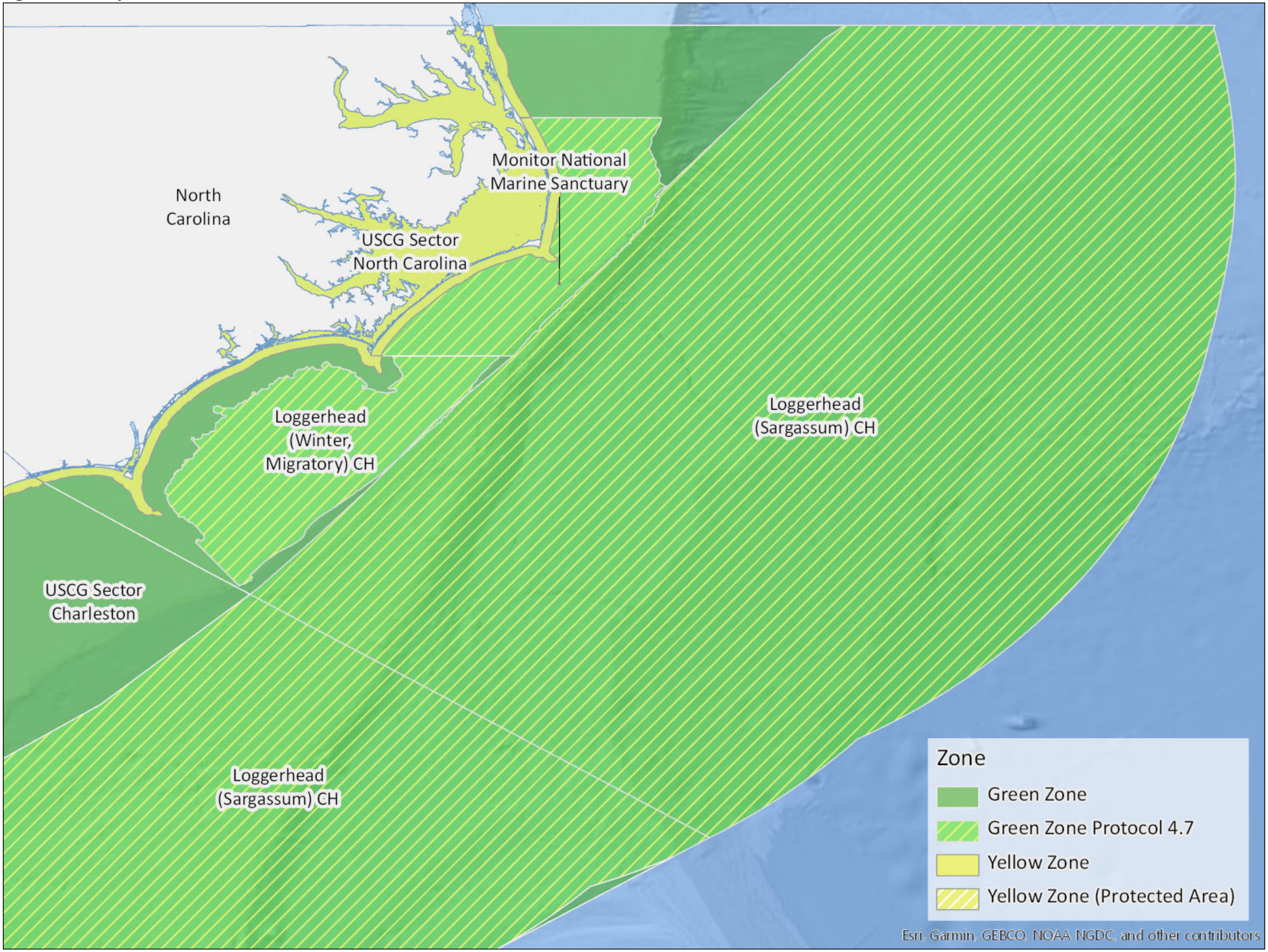


Figure I-2. Dispersant Use Preauthorization Plan Green and Yellow Zone for Sector Charleston

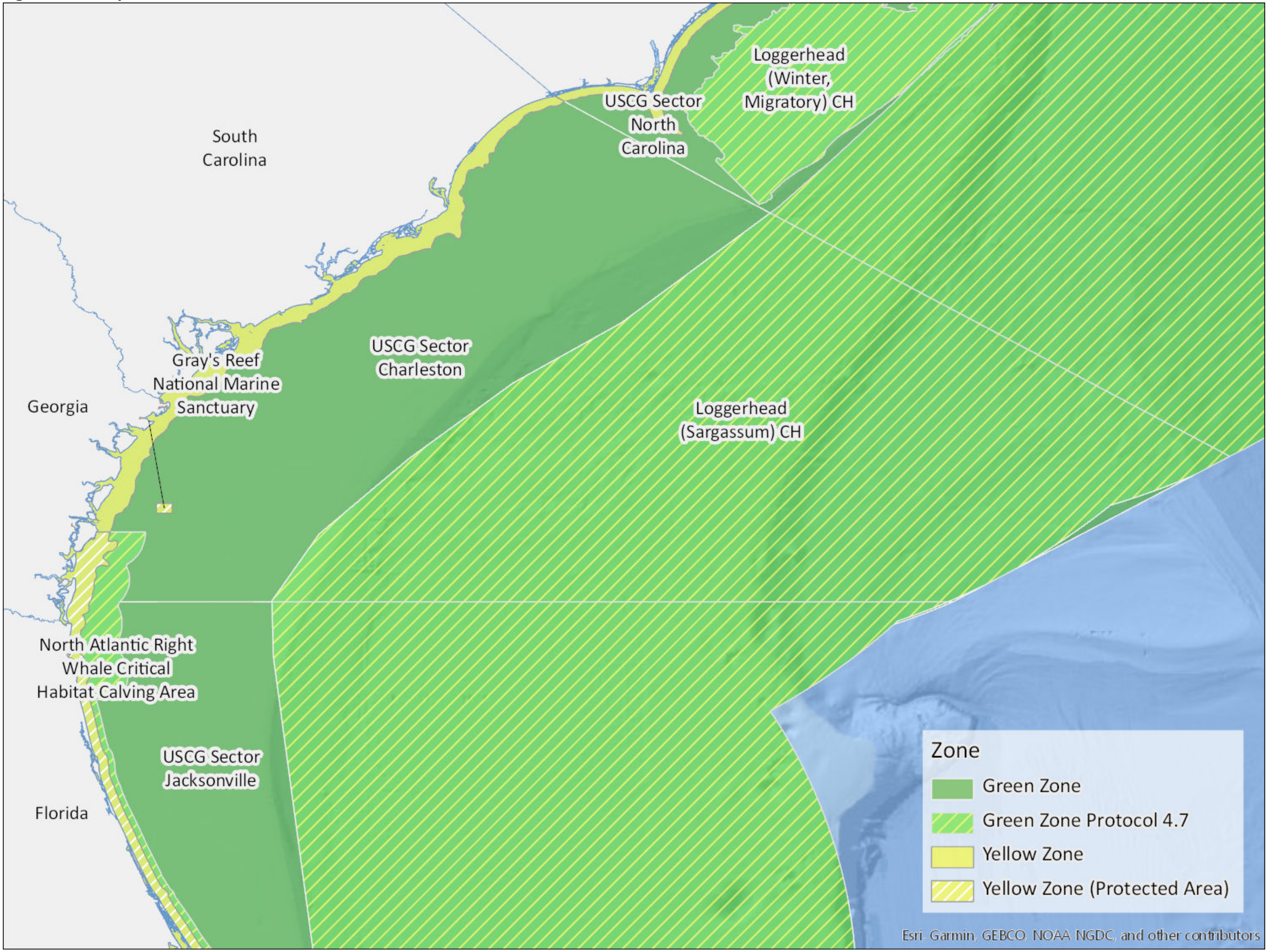


Figure I-3. Dispersant Use Preauthorization Plan Green and Yellow Zone for Sector Jacksonville

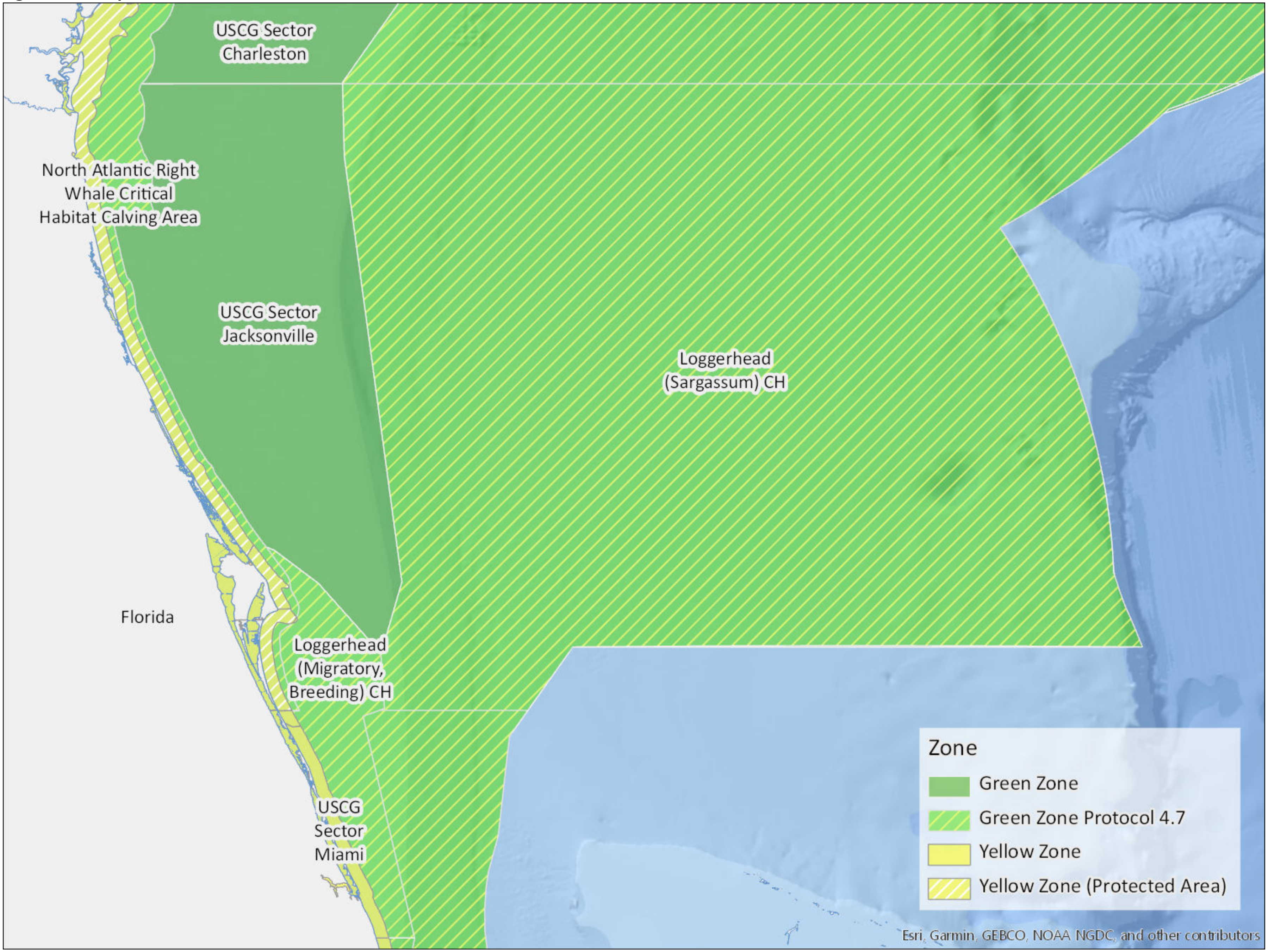


Figure I-4. Dispersant Use Preauthorization Plan Green and Yellow Zone for Sector Miami and Sector Key West

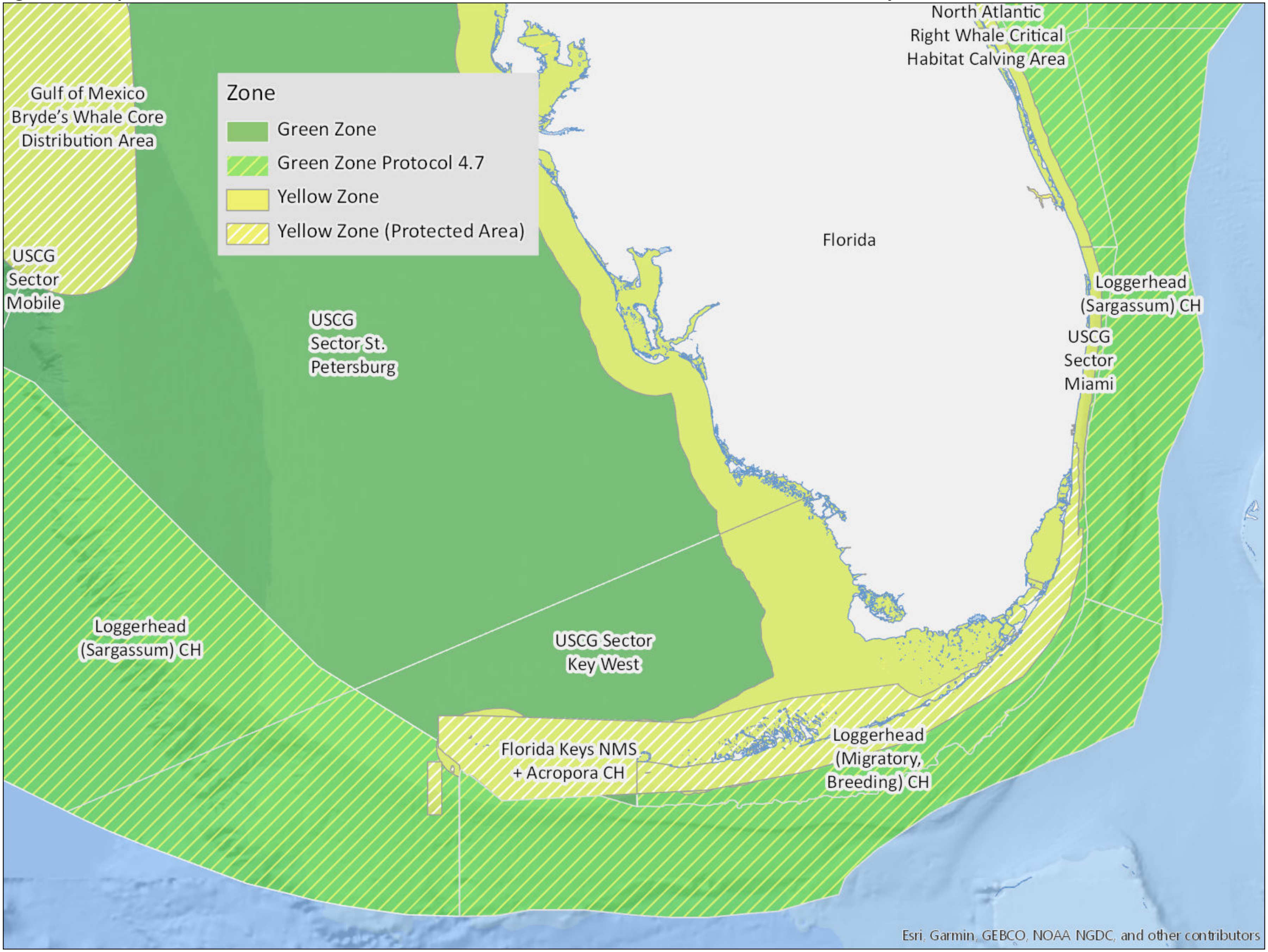


Figure I-5. Dispersant Use Preauthorization Plan Green and Yellow Zone for Sector Saint Petersburg

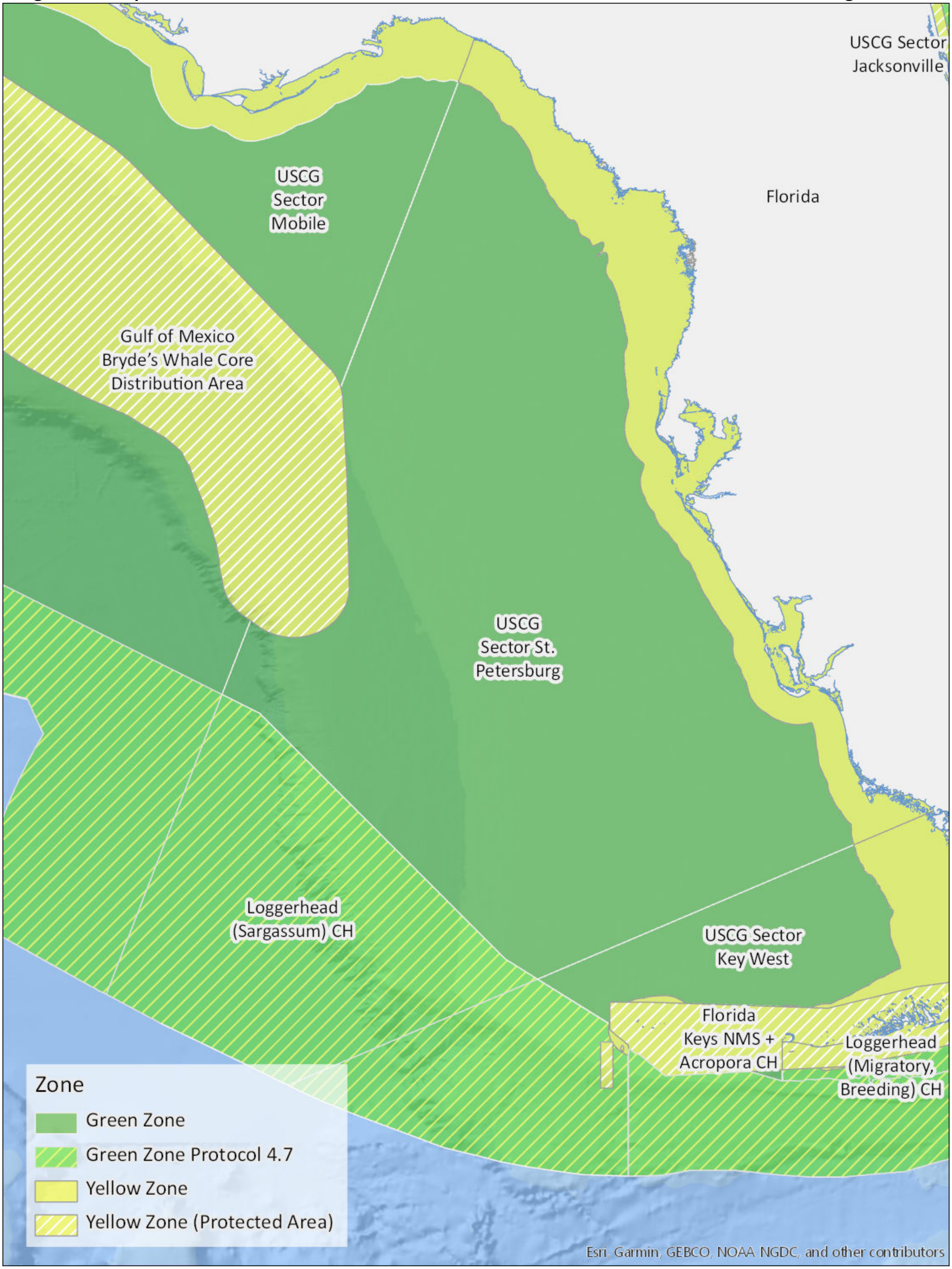
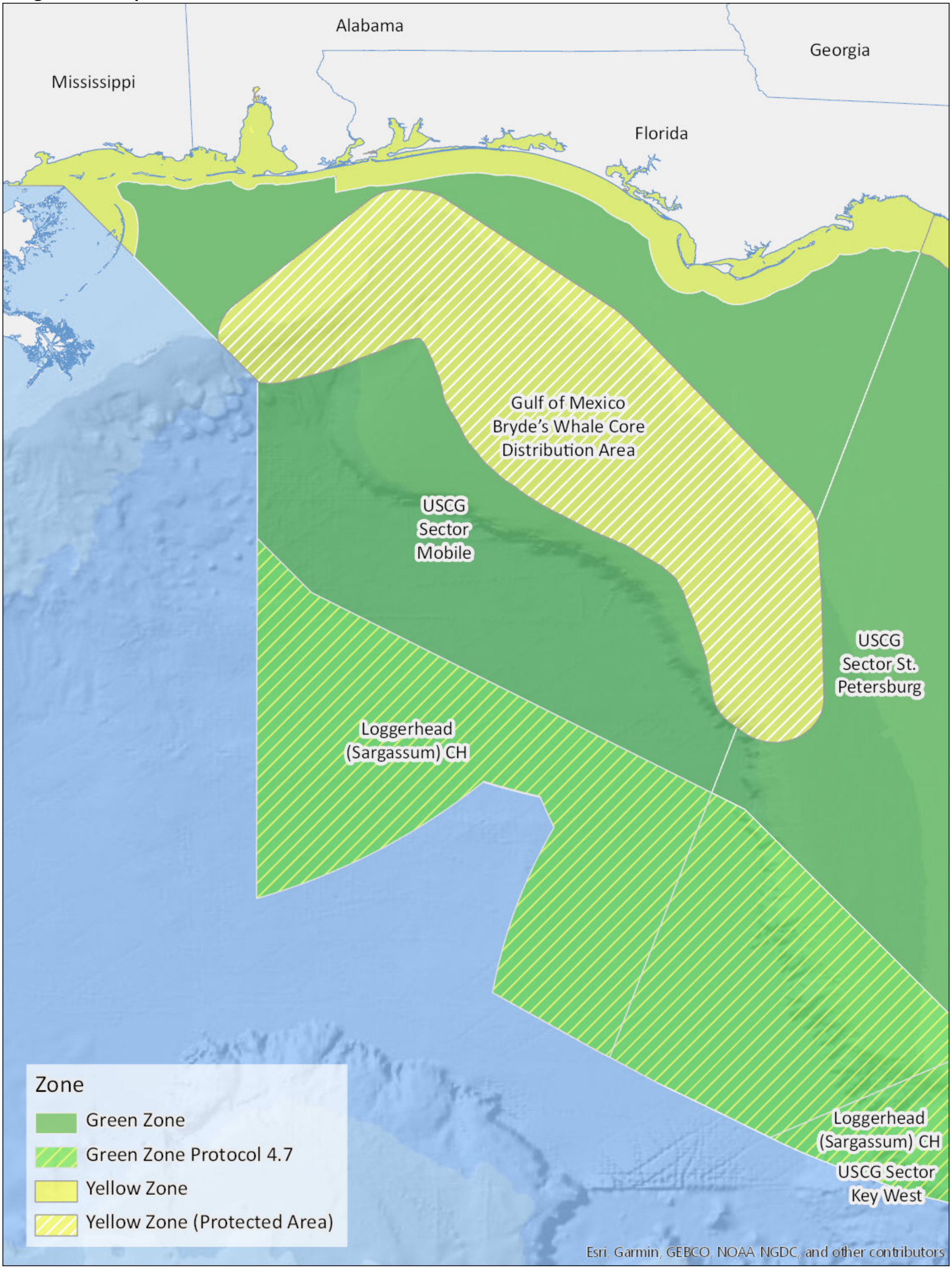


Figure I-6. Dispersant Use Preauthorization Plan Green and Yellow Zone for Sector Mobile



Appendix II. Letters of Agreement

Where applicable, other State and Federal Trustee documents relevant to dispersant-use decisions have also been included. Until such time as an LOA or other policy document is completed for use of dispersants within a State's waters or specially managed Federal Resource, dispersant use decisions will be made on a case-by-case basis, in accordance with this Region IV Dispersant Use Plan and the National Contingency Plan.

Additional information on emergency consultation under Section 7 of the Endangered Species Act can be found at the National Response Team website: https://nrt.org (look under Resources > Guidance, Technical Assistance & Planning > Endangered Species Act (ESA) Section 7)

Appendix III. Location of Biological Assessments, Consultations, and Biological Opinions Pertaining to the RRT4 DUPP

An electronic copy of the latest and most updated Biological Assessment and Consultations pertaining to the RRT4 DUPP will be posted at the following webpage:

https://nrt.org/rrt4plans

The signed copy of the Biological Assessment and Consultations pertaining to the RRT4 DUPP as well as the signed copy of the of the DUPP will be stored by the office of the USCG RRT4 co-chair or by the USCG RRT4 coordinator.

Appendix IV. Dispersant Use Decision and Implementation Elements

The following eleven elements should be evaluated by the FOSC during the dispersant asset deployment and prior to initiating dispersant application.

A record should be generated by the FOSC's staff to document that all elements within this Appendix have been addressed as part of the requirement under *Protocol 4.3 Evaluation of Continued Use.*

1) Is the spill/oil dispersible?[4]

Oil is generally dispersible if:

- API Gravity is more than 17
- Pour Point is less than 10 F (5.5 C) below ambient temperature
- Viscosity is less than 10,000 centistokes

2) Have environmental tradeoffs of dispersant use indicated that use should be considered?[5]

3) Is the chosen dispersant likely to be effective?[6]

Consider:

- effectiveness of dispersant application to the oil;
- dispersant-to-oil application ratio;
- oil slick thickness;
- distribution of oil slick on the water;
- droplet size distribution in aerial spray;
- oil viscosity;
- energy input;
- suspended particles in water (sedimentation);
- weathering of oil;
- emulsification of oil;
- oil composition;
- dispersant composition;
- water salinity;
- temperature; and
- dispersant type compatible with application means

[4] Some modern dispersants may be formulated to be effective on a wider range of oil properties. The choices of dispersants listed on the NCP's National Product Schedule are limited. To answer this question, look at which dispersant would the most effective given the type of oil.

[5] Dispersant toxicity assessment information found in biological assessments and consultations with DOI and DOC will provide direction for this decision. The Scientific Support Coordinator(s) will be able to interpret this information for operational recommendations.

[6] A preliminary effectiveness test such as the standard flask swirling method is highly recommended.

4) Can dispersant application be conducted safely and effectively given the physical environment?

Environmental parameters:

- winds ≤ 25 knots
- visibility ≥ 3 nautical miles
- ceiling ≥ 1000 feet
- operations during daylight hours only

5) Are sufficient equipment and personnel available to conduct aerial dispersant application operations within the window of opportunity?[7]

6) Has a Site Safety Plan for dispersant operations been completed?

7) Is the spill/oil to be dispersed within a Pre-Approved Zone?

See Sections 3.1 and 3.2 of the DUPP

8) If the spill/oil is NOT in a Pre-Approved Zone, has approval been granted?[8]

See 3 of the DUPP. Submit *Appendix IV -* ***Error! Not a valid bookmark self-reference.*** and *Appendix VIII - Dispersant Use Form - Supplemental* to RRT4 with request for approval.

9) Is the necessary equipment and trained personnel available to conduct the recommended monitoring operations?[9]

The recommended monitoring protocol in the RRT4 is the Special Monitoring for Advanced Response Technologies or SMART. The Gulf Strike Team or Atlantic Strike Team is available to support and provide monitoring assistance

10) Has the overflight to assure that endangered species are not in the application area been conducted?[10]

11) Has a Dispersant Operations Plan been completed?[11]

[7] Refer to elements and position descriptions under the Dispersant Operations Group Supervisor in the Operations Section…Other tools are available to assess this such as the NOAA Dispersant Mission Planner

[8] Dispersant use in non-approved areas must be requested by the FOSC and approved by EPA and the affected state(s) after consultation with DOC and DOI.

[9] It may not be appropriate to base Go/No Go or continue/discontinue decisions solely on results from SMART monitoring. The SSCs should be utilized to interpret monitoring results and provide operational recommendations.

[10] Protocol 4.11 in the RRT4 Dispersant Use Plan requires the FOSC to determine if any threatened or endangered species are present in the projected application area or otherwise at risk from dispersant operations.

[11] Attached within this guidance a Dispersant Operations Plan template.

Appendix V. Incident Specific Dispersant Use Form

For use with both Dispersant Use Preauthorization Plan (DUPP) and Dispersant Use Expedited Concurrence and Consultation Guide (DUEPPG)

Incident Specific Dispersant Use Form

This form must be used to document activation of preauthorization for dispersant use by the USCG Federal OSC. This form will also be used to inform the RRT concerning the activation of this authority. For documentation of preauthorization activation, only those fields for which relevant information is available must be completed. For dispersant use in areas or conditions for which preauthorization has not been granted, all fields in this form as well as relevant fields in the *Dispersant Expedited Concurrence and Consultation Supplemental Form* in Appendix VII must be completed and submitted to the RRT.

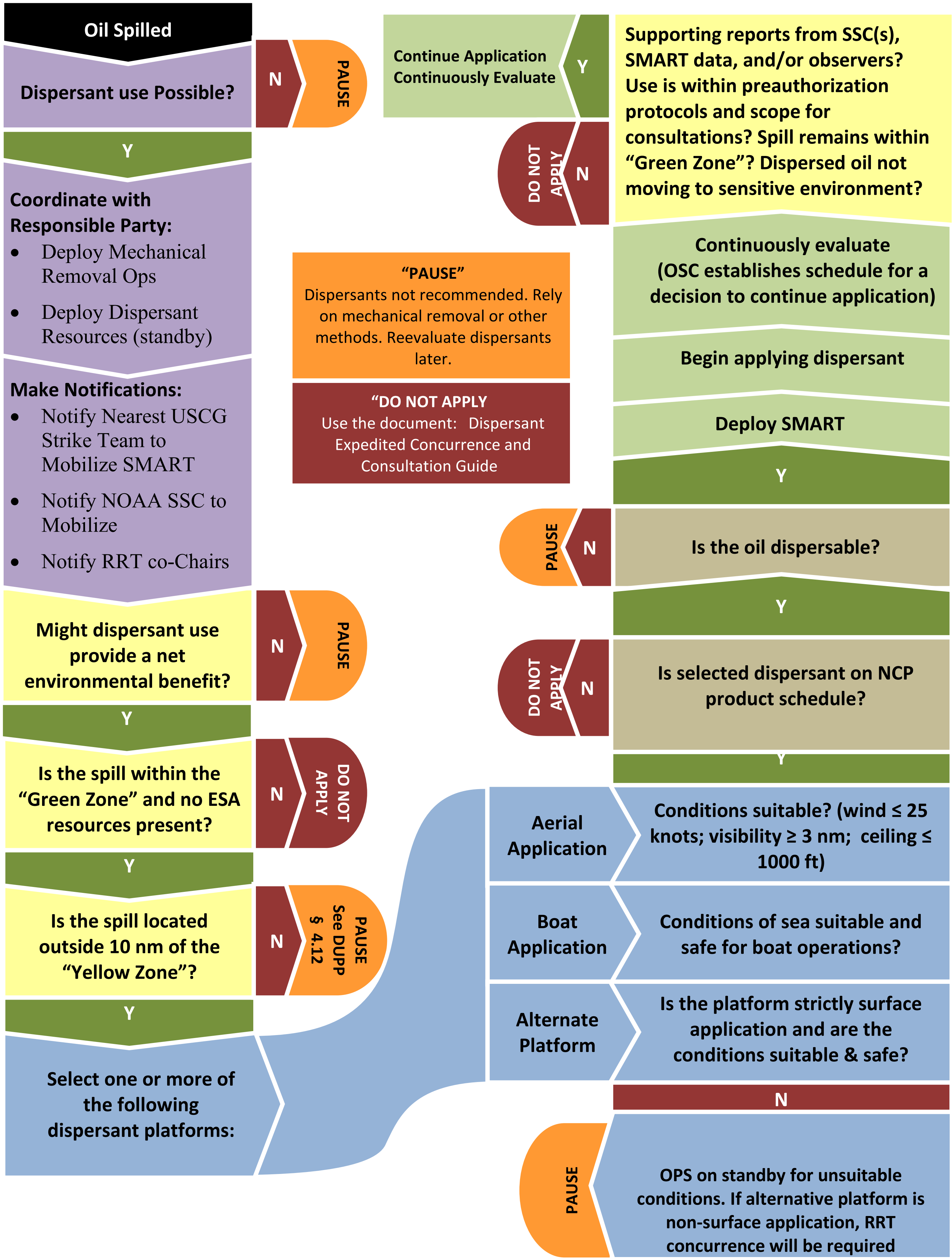
Bracketed "[ ]" numbers are references to informational material in Appendix VI. The information is color-coordinated with the forms and flow charts of Appendices V through VII in order to identify corresponding subject material.

Incident Name:				Vessel/Facility Name:			
Time Report:	Date:		Time (24 hr):		Time Zone:		
Time Spill Occurred:	Date:		Time (24 hr):		Time Zone:		
Location of Spill:	Address:				Block Name:		
	Latitude:		Longitude:		Block Number:		
	Distance from Shoreline:		Jurisdiction:	☐ Federal ☐ State	[1] Is Dispersant Use Probable? [12]	☐ Yes ☐ No	
[1.A] Responsible Party:		[1.A.i] Deploy Dispersant Resources:	☐ Y	[1.A.ii] Deploy Mechanical Removal Ops:	☐ Y		
RP IC:	Name:		Affiliation:				
	Phone:		Has Dispersant Contractor Available?	☐ Yes ☐ No			
Acting FOSC:	Name:		Agency:				
	Phone:		Email:				
[1.B] Notification Time:	[1.B.i]USCG NSF GST:		[1.B.ii] RRT:		[1.B.iii] NOAA SSC:		
Type of Release:	☐ Instantaneous ☐ Continuous	Product(s) Released:	☐ Heavy Crude ☐ Bunker C (#6)	☐ Medium Crude ☐ Diesel (#2)	☐ Jet Fuels/Gasoline ☐ Other		
Type of Incident:	☐ Grounding ☐ Transfer Ops	☐ Explosion ☐ Vessel Accident	☐ Aircraft Accident ☐ Drilling Accident	☐ Blowout ☐ Pipeline	☐ Other		
Substance Name:							
Est. Spilled Amount:		Est. Flow Rate:					
		Est. Potential Spill Amount:					
Oil Condition:	Emulsification?	☐Y ☐N	Fresh Oil Present?	☐Y ☐N	>2-3mm (0.1") thickness?	☐Y ☐N	
	Degree of Weathering:	☐ Mild	☐ Moderate	☐ Significant			
Current Weather:	☐ Clear ☐ Partly Cloudy	☐ Overcast ☐ Rain/Snow	☐ Fog ☐ Inversion	Wind Speed:			
				Wind Direction (from):			
Sea	Water Depth:		Water Temperature:	☐ºC ☐ºF	Air Temp:	☐ºC ☐ºF	
	Current Direction:		Wave Height:		Visibility:		
	Current Speed:		Tidal Condition:		Ceiling:		
[2.A] FOSC Determines that Dispersants will Provide Net Environmental Benefit:	☐Y ☐N	[2.B] Spill location within the Green Zone?	☐Y ☐N	[2.C] Spill location is >10 nautical miles from Yellow Zone?	☐Y ☐N		
[3] Dispersant Platform	[3A.i] Aerial		[3.A.ii] Boat		[3.A.iii] Other		
	Wind ≤ 25 kt?	☐Y ☐N	Sea state safe for boat ops?:	☐Y ☐N	Is a surface application method?	☐Y ☐N	
	Visibility ≥ 3 nm?	☐Y ☐N					
	Ceiling ≥ 1000 ft?	☐Y ☐N			Conditions safe for operations?	☐Y ☐N	
	[4.E] If conditions not met; operations will be on weather delay						
Dispersant Provider:	Name:		Estimated Time On-Site:				
	Type:		Point of Contact:				
Dispersant:	Product Name:		Manufacturer:				
	Qty. Available:		[4.A] On Product Schedule?	☐Y ☐N			
[4.B] Is Oil Dispersible:	☐Y ☐N	API Gravity (>17):		Viscosity (<10,000 cSt):			
		Pour Point (<10ºF/5.5ºC):		24hr % Evaporation:			
[5] Time of activation:		[5.A] SMART Deployed?	☐ Tier I ☐ Tier II ☐ Other	Monitoring Resources Deployed:			
[5.B] Platform(s) Selected:				Wildlife Observation Resources On-Site:			

[12] The question of whether dispersant use is probable is not the same as deciding to deploy or to use dispersants. During the course of completing this form or at a later time, the FOSC will determine whether dispersants will be used. However, deployment of resources is encouraged if the probability of use exists.

Appendix VI. Dispersant Use Form – Flow Diagram

For use with both Dispersant Use Preauthorization Plan (DUPP) and Dispersant Use Expedited Concurrence and Consultation Guide (DUEPPG)


Oil Spilled
Dispersant use Possible?
N
PAUSE
Y
Coordinate with Responsible Party:
• Deploy Mechanical Removal Ops
• Deploy Dispersant Resources (standby)
Make Notifications:
• Notify Nearest USCG Strike Team to Mobilize SMART
• Notify NOAA SSC to Mobilize
• Notify RRT co-Chairs
Might dispersant use provide a net environmental benefit?
N
PAUSE
Y
Is the spill within the "Green Zone" and no ESA resources present?
N
DO NOT APPLY
Y
Is the spill located outside 10 nm of the "Yellow Zone"?
N
PAUSE See DUPP § 4.12
Y
Select one or more of the following dispersant platforms:
Aerial Application
Conditions suitable? (wind ≤ 25 knots; visibility ≥ 3 nm; ceiling ≤ 1000 ft)
Boat Application
Conditions of sea suitable and safe for boat operations?
Alternate Platform
Is the platform strictly surface application and are the conditions suitable & safe?
N
PAUSE
OPS on standby for unsuitable conditions. If alternative platform is non-surface application, RRT concurrence will be required
Y
Is selected dispersant on NCP product schedule?
N
DO NOT APPLY
Y
Is the oil dispersable?
N
PAUSE
Y
Deploy SMART
Begin applying dispersant
Continuously evaluate (OSC establishes schedule for a decision to continue application)
Supporting reports from SSC(s), SMART data, and/or observers? Use is within preauthorization protocols and scope for consultations? Spill remains within "Green Zone"? Dispersed oil not moving to sensitive environment?
N
DO NOT APPLY
Y
Continue Application Continuously Evaluate
"PAUSE"
Dispersants not recommended. Rely on mechanical removal or other methods. Reevaluate dispersants later.
"DO NOT APPLY
Use the document: Dispersant Expedited Concurrence and Consultation Guide

Appendix VII. Dispersant Use Form – Info Table

For use with both Dispersant Use Preauthorization Plan (DUPP) and Dispersant Use Expedited Concurrence and Consultation Guide (DUEPPG)

Dispersant Use Form – Additional Information Table

The Dispersant Use Form must be used to document activation of preauthorization for dispersant use by the USCG Federal OSC. Bracketed “[ ]” numbers in the form are references to informational material in this Additional Information Table.

The section titles in this table and color coordination additionally coincides with a flow chart in Appendix VI.

[1]	DISPERSANT USE PROBABLE? FOSC determines whether dispersant use is probable. This does not indicate that a decision to apply dispersants has been made. FOSC begins preparation for activation of dispersant use: FOSC assures proper notifications are made to RRT, SSC, and USCG NSF GST FOSC begins completing the Dispersant Use Information Form FOSC ensures that Dispersant Use Operations Plan is being prepared by RP [YES] Go to Section [2] [NO] Go to Section [PAUSE]
[1.A]	
[1.A.i]	DEPLOY DISPERSANT RESOURCES Ask RP if dispersant application assets are on alert or are being mobilized • If dispersant use is probable or even possible, FOSC and RP are encouraged to ensure that assets are made ready pending evaluation of preauthorization by the FOSC Proceed to Section [1.A.ii]
[1.A.ii]	DEPLOY MECHANICAL REMOVAL OPS Determine whether mechanical removal operations have been deployed, weather allowing Proceed to Section [1.B]
[1.B]	NOTIFICATIONS These are not formal notifications and this process does not necessitate briefing, reporting concurrence, consultation, activation, or convening to- or from- or of- these resources. The purpose of this step is to inform these partners as soon as possible that the potential for dispersant use exists. Proceed to Section [1.B.i]
[1.B.i]	NOTIFY GST Notify USCG NSF GST to begin preparing and deploy SMART monitoring assets to the Site if

	dispersant use is likely • Every attempt should be made to implement the on-water monitoring component of the Proceed to Section [1.B.ii]
[1.B.ii]	NOTIFY RRT Notify RRT if dispersant use is probable • Provide completed form to RRT within 1 hour of notification • Record the time at which notification was made Proceed to Section [1.B.iii]
[1.B.iii]	NOTIFY SSC Notify NOAA SSC if dispersant use is probable • The SSC will begin to coordinate services that can provide trajectory and environmental fate analysis • Record the time at which notification was made Proceed to Section [2]

[2]	Pre-Approved Dispersant Operations Activation Evaluation Proceed to Section [2.A]
[2.A]	NET ENVIRONMENTAL BENEFIT Does the FOSC expect the use of dispersants in this case to provide a net environmental benefit? • This is related directly to Protocol 4.3 • Criteria for the decision is at the discretion of the FOSC using available information regarding the specific response and consultation information within the plan [YES] Go to Section [2.B] [NO] Go to Section [PAUSE]
[2.B]	LOCATED IN GREEN ZONE Two Zones, Green and Yellow, have been established to delineate locations and conditions under which dispersant application operations may take place. Preauthorization for dispersant use is limited to the geographical boundaries outlined in the Green Zone only and were federally protected (ESA)

	resources are not observed. [YES] Go to Section [2.C] [NO] Go to Section [PREAUTHORIZATION **DOES NOT** APPLY]

Green Zone	Yellow Zone
Offshore waters for which ***ALL*** of the following conditions apply:	Offshore waters for which ***ANY*** of the following conditions apply:
Other Zone The waters are not classified within a "Yellow" Zone as defined under section 3.2; *Distance* The waters are at least three nautical miles seaward of any shoreline (and is nine nautical miles from the West Coast of Florida) and are within the United States' Exclusive Economic Zone (EEZ); and, *Depth* The waters are beyond the 30 foot isobath (approximately 10 meters or 5 fathoms).	*Special Jurisdiction* The area is under special management jurisdiction. This includes any waters designated as marine reserves, State Parks, National Marine Sanctuaries National or State Wildlife Refuges, or units of the National Park Service; *State Jurisdiction* The area is under state jurisdiction; *Distance* The area is within three nautical miles of a shoreline (or is within nine nautical miles from the Florida Gulf coastline); *Depth* The waters are within the 30 foot isobath (approximately 10 meters or 5 fathoms); and, *Habitats* The waters are in mangrove or coastal wetland ecosystems, or directly over living coral communities or hard bottom communities. Coastal wetlands include submerged algal beds and submerged sea grass beds. *Critical Habitat – Non-Seasonal* Proposed or designated critical habitat components which are not limited to seasonal use and are otherwise in the geographic boundary of the *Green Zone.* This includes: • Elkhorn and Staghorn Corals (73 FR 72210) • Gulf of Mexico subspecies of the Bryde's Whale core distribution

Critical Habitat – Seasonal

Proposed or designated critical habitat components which reflect seasonal use are not inherently part of the Yellow Zone; however, special Emergency Consultation is required under DUPP Protocol 4.7. This includes:

- Loggerhead Sea Turtle Northwest Atlantic Distinct Population Segment (DPS) (79 FR 39856) due to migratory habitat features and Sargassum habitat features
- North Atlantic Right Whale regarding winter calving (81 FR 4837).

[2.C]	PROXIMITY TO YELLOW ZONE

	Is the spill location at least 10 nautical miles (the "dispersant operational area") from the Yellow Zone defined in the preauthorization plan? Plot the position of the spill on the appropriate nautical chart; draw a circle about the spill source with a 10 nautical mile radius as a worst-case scenario for surface movement. Hash mark any area within the circle that is in waters less than 30 feet deep or 3 nautical miles from shore. What is left is considered the "dispersant operational area". [YES] Go to Section [3] [NO] Go to Section [PREAUTHORIZATION **MAY NOT** APPLY]

[3]	DIPSERSANT PLATFORMS Considering the amount of oil spilled the location of the operational area, volume of available dispersants to be used, and the timeframe in which the required equipment can be on-scene, what is the most effective application platform? More than one platform type may be considered. Aerial Application Go to Section [3.A.i] Boat Application Go to Section [3.A.ii] Alternate Application Go to Section [3.A.iii]
[3.A.i]	AERIAL APPLICATION Aerial Application operational required conditions: • Winds less than or equal to 25 knots, and • Visibility greater than or equal to 3 nautical miles, and • Ceiling greater than or equal to 1,000 feet [YES] Go to Section [4.A] [NO] Go to Section [3.B] If on-scene weather was available from the spiller on initial telephone contact use that information to complete this section and assume for planning purposes that it will remain the same during the timeframe in which this decision is operating. At the earliest opportunity, contact the SSC for detailed weather, but do not delay this decision process for the SSC weather input (Note: All dispersant operations are carried out during daylight hours only).
[3.A.ii]	BOAT APPLICATION Wave height such that the boats to be used for the dispersant application can conduct an effective and safe spray operation? [YES] Go to Section [4.A] [NO] Go to Section [3.B] If on-scene weather was available from the spiller on initial telephone contact use that information to

	complete this section and assume for planning purposes that it will remain the same during the timeframe in which this decision is operating. At the earliest opportunity, contact the SSC for detailed weather, but do not delay this decision process for the SSC weather input (Note: dispersant operations are carried out during daylight hours only).
[3.A.iii]	OTHER ALTERNATIVE PLATFORM Discuss potential application alternatives with spiller's representative and Scientific Support Coordinator (SSC). Any alternative method used under preauthorization is strictly limited to application of dispersants to the surface water. The FOSC should also confirm that the weather and sea conditions are suitable and safe for the alternative method implementation. [YES] Go to Section [4.A] [NO] Go to Section [3.B]
[3.B]	Notify the spiller's representative that the dispersant use decision has been delayed until the weather improves, and that the Dispersant Spray Operation is to be placed on a standby status. Consult with RRT members. Contact the USCG Co-chair at notify EPA, DOI, DOC and the affected state(s) that dispersants are being considered, but delayed due to weather. When the weather is beginning to improve, restart this evaluation process. Proceed to Section [PAUSE]

	DISPERSANT ON NCP PRODUCT SCHEDULE Is the dispersant to be used listed on the NCP Product Schedule and considered appropriate for existing environmental and physical conditions? [YES] Go to Section [4.B] [NO] Go to Section [PREAUTHORIZATION **DOES NOT** APPLY]
[4.B]	OIL DISPERSIBILITY Does available technical information suggest that dispersion is likely given the spilled oil, anticipated oil weathering, and selected dispersant? Use the RRT IV DUP and any technical sources such as the SSC to make this assessment. Oil is generally dispersible if: • API Gravity > 17 • Pour Point < [Ambient temperature - 10°F (5.5°C)] • Viscosity < 10,000 centistokes [YES] Go to Section [5] [NO] Go to Section [PAUSE]

	Dispersibility is also affected by the properties of a specified dispersant product.

[5]	ACTIVATE PREAUTHORIZATION Must adhere to all policies and protocols of the RRT Preauthorization Plan. Proceed to Section [5.A]
[5.A]	DEPLOY SMART MONITORING The SMART controller/observer should be over the spray site before the start of the operation. If possible, a DOI/DOC-approved marine mammal/turtle and pelagic/migratory birds survey specialist should accompany the SMART observer, but the operation will not be delayed for that individual. Note: The purpose of SMART monitoring is to confirm best professional advice related to the potential success of dispersant use. Given the uncertainty involved relating to physical and environmental condition, oil weathering, and dispersant and oil interaction, rely on positive feedback from the monitors to continue dispersant application. Proceed to Section [5.B]
[5.B]	DISPERSANT APPLICATION Safety: • Personal protective equipment for personnel on-site will conform to the appropriate dispersant's MSDS Aerial Application: • If dispersant platform is an aircraft, spray aircraft will maintain a minimum 1000-foot horizontal separation from rafting flocks of birds. Caution will be taken to avoid spraying over marine mammals and marine turtles. Boat Application: • If the system involves spray arms or booms that extend out over the edge of the boat and have fan type nozzles that spray a fixed pattern of dispersant, the following ASTM standards apply: o ASTM F 1413 Standard Guide for Oil Spill Dispersant Application Equipment: Boom and Nozzle Systems. o ASTM F 1460 Standard Practice for Calibrating Oil Spill Dispersant Application Equipment Boom and Nozzle Systems o ASTM F 1737 Standard Guide for Use of Oil Spill Dispersant Application Equipment During Spill Response: Boom and Nozzle Systems.

	Fire Monitor Application: • If the system involves the use of a fire monitor and or fire nozzle to apply the dispersants, a straight and narrow "firestream" flow of dispersant directly into the oil is to be avoided. The following ASTM standards apply: o ASTM F 2465 Standard Guide for Oil Spill Dispersant Application Equipment: Single-point Spray Systems Other Alternate Platform: • If an alternative dispersant platform is used, the Operation Plan should include dispersant application guidelines. The FOSC is to notify the RRT as soon as practicable after the approval is given to the RP. Reevaluation process will begin at Section [2.A]

[PAUSE]
In this case or at the present time, dispersant use is either inappropriate for this response or will probably not be considered to be effective relative to the effort required. Concentrate efforts on Mechanical and/or in-situ burn operations. Reconsider dispersant use at a later time if the field situation changes. If the spill is located within 10 nm of the Yellow Zone, the FOSC should consider the potential trajectory of the dispersed oil according to protocol 4.12 within the DUPP. If the FOSC finds that the State or Federal resources in adjacent areas would be at risk, consultation with the resource trustee must be conducted.

[DO NOT APPLY]
The present scenario does not qualify for preauthorized use of dispersants under the policies and protocols of the RRT Preauthorization Plan. Contact the RRT and SSC. May pursue dispersant use under procedures outlined in the RRT4 DUECCG.

Appendix VIII. Dispersant Use Form - Supplemental

For use with Dispersant Use Expedited Concurrence and Consultation Guide (DUECCG, see Attachment C.)

Dispersant Expedited Concurrence and Consultation Supplemental Form

This form must be used, in conjunction with the Dispersant Use Form (Appendix V), to request RRT concurrence for use of dispersants by the USCG Federal OSC. RRT concurrence and consultation with DOI and DOC is necessary for use of dispersants where preauthorization does not apply. These forms will inform the RRT of pertinent situation and response actions being taken in addition to ensuring that the protocols within the RRT Dispersant Expedited Concurrence and Consultation Policy are being met.

Inadequacy of Other Options	
Yes: ☐ No: ☐ N/A: ☐ List:	Reasons why mechanical removal of oil or other removal options are not feasible or optimal on their own to protect resources at risk.
Dispersant Availability and Timeliness	
Yes: ☐ No: ☐ N/A: ☐ Estimate of Quantity Available: Summary of Equipment Available:	Confirm that a sufficient quantity of dispersant material and application equipment is available… To make a significant impact on the spilled product; and, To be deployable within the proposed time frame
Evaluation of Leading Edge and Trajectory	
Complete: ☐ N/A: ☐ Location of Leading Edge: Proposed Time of First Application:	Identify, with the best information available, the estimated location of the leading edge of the spill at the proposed time of the first dispersant application (Lat/Long, proximity to shore). Coordinate with the NOAA SSC, the RP, or other information sources to estimate the location of the leading edge of the spill at the proposed time of the first application of dispersants.

General Adequacy of Dispersant Spray System and Personnel Competency	
Confirmed: ☐ With Exceptions: ☐ List Exceptions:	In addition to any other requirements of the RRT6 NSE EAP, the general criteria for evaluating the suitability for use of any dispersant system should be the ability of the party or parties that are requesting approval to demonstrate to the satisfaction of the FOSC, the following: That the application system has been… ○ Specifically designed for its intended purpose; or, ○ If not specifically designed for dispersant use, has been used previously and was deemed to be effective and appropriate, and will be used again in a similar manner; or, ○ By some other specific means documentation or experience reasonably deemed to be effective and appropriate under the circumstances. That the design and operation of the application system can reasonably be expected to apply the chemical dispersant in a manner consistent with the dispersant manufacturers' recommendation, especially with regard to dosage rates, and concentrations. That the operation will be supervised or coordinated by personnel that have experience, knowledge, specific training, and/or recognized competence with chemical dispersants and the type of system to be used.
Aerial Application Operational and Technical Issues	
Confirmed: ☐ With Exceptions: ☐ N/A: ☐ List Exceptions:	In the case of Aerial Application of dispersants: The FOSC must ensure that the RP's dispersant operation provides for a dispersant controller who is over the spray zone(s) in separate aircraft from the dispersant aircraft. The controller must be qualified and be able to direct the dispersant aircraft in carrying out the near shore dispersant operation inclusive of avoiding the spraying of birds), marine mammals and turtles that may be in the area. Aircraft spray systems must be capable of producing dispersant droplet sizes that provide for optimal dispersant effectiveness (generally 250-500 µm, but follow manufacturer and ASTM guidance)
Boat Application Operational Technical Issues	
Confirmed: ☐ With Exceptions: ☐ N/A: ☐ List Exceptions:	If the system involves spray arms or booms that extend out over the edge of a boat and have fan type nozzles that spray a fixed pattern of dispersant, the dispersant operator has confirmed that application will comply with the following ASTM standards as appropriate: ASTM F 1413-92 "Standard Guide for Oil Spill Dispersant Application Equipment: Boom and Nozzle Systems ASTM F 1460-93 Standard Practice for Calibrating Oil Spill Dispersant Application Equipment Boom and Nozzle Systems ASTM F 1737-96 Standard Guide for Use of Oil Spill Dispersant Application Equipment during Spill Response: Boom and Nozzle Systems

<table>
<tr><td colspan="2">Fire Monitor Operational and Technical Issues</td></tr>
<tr><td>Confirmed: ☐ With Exceptions: ☐
N/A: ☐</td><td rowspan="2">If the system involves the use of a fire monitor and or fire nozzle to apply the dispersants from a boat, the dispersant operator has confirmed that application will comply with the following:
A straight and narrow "firestream" flow of dispersant directly into the oil is to be avoided. At such a time as applicable ASTM standards are finalized, they should be complied with appropriately relative to the process and potential dispersant application described herein.
The specific fire monitor system(s) intended for use must have been specifically designed for dispersant application and/or must have been specifically calibrated via field trial for dispersant use.</td></tr>
<tr><td>List Exceptions:</td></tr>
<tr><td colspan="2">SMART Deployment</td></tr>
<tr><td>Tier I: ☐ Tier II: ☐ Tier III: ☐ N/A: ☐</td><td rowspan="3">The FOSC must activate the Special Monitoring of Applied Response Technologies (SMART) Program monitoring team. Every attempt should be made to implement the on-water monitoring component of the SMART monitoring protocols in every dispersant application. At a minimum, Tier 1 (visual) monitoring must occur during any dispersant operations approved. Tier 2 or Tier 3 sampling may be required for reapplications.</td></tr>
<tr><td>Smart Resources Deployed:</td></tr>
<tr><td>List Exceptions:</td></tr>
<tr><td colspan="2">SMART Controller/Observer</td></tr>
<tr><td>Confirmed: ☐ With Exceptions: ☐ N/A: ☐</td><td rowspan="3">The SMART controller/observer must be flying over the response zone to visually assess effectiveness of the dispersant applications, and to look out for marine animals.</td></tr>
<tr><td>Asset Deployed and POC:</td></tr>
<tr><td>List Exceptions:</td></tr>
<tr><td colspan="2">DOI / DOC Representative</td></tr>
<tr><td>Confirmed: ☐ With Exceptions: ☐ N/A: ☐</td><td rowspan="3">When possible DOI/DOC will provide a specialist in aerial surveying of marine mammals/turtles and pelagic/migratory birds who will accompany the SMART controller/observer.</td></tr>
<tr><td>Asset Deployed and POC:</td></tr>
<tr><td>List Exceptions:</td></tr>
</table>

<table>
<tr><th colspan="5">Emergency Consultations</th></tr>
<tr><td>DOI Notified?</td><td>Yes: ☐ No: ☐</td><td>Emergency Consult Initiated?</td><td>Yes: ☐ No: ☐</td><td rowspan="8">RRT representatives of DOI and DOC were notified and, if listed species and/or critical habitat are present in the area, or could be present, emergency consultation has been initiated. FWS and NMFS representatives have provided recommendations to avoid and/or minimize impacts to listed species and/or critical habitat, advised the FOSC whether incidental take related to response actions is anticipated, and, if so, advised the FOSC to document incidental take for use in formal consultation post-response. Both the FOSC and FWS/NMFS representatives maintain records of oral and written communications.</td></tr>
<tr><td colspan="3">DOI ESA Checklist Completed?[13]</td><td>Yes: ☐ No: ☐ N/A: ☐</td></tr>
<tr><td>DOC Notified?</td><td>Yes: ☐ No: ☐</td><td>Emergency Consult Initiated?</td><td>Yes: ☐ No: ☐</td></tr>
<tr><td colspan="3">DOC ESA Checklist Completed?[14]</td><td>Yes: ☐ No: ☐ N/A: ☐</td></tr>
<tr><td colspan="3">DOC EFH Checklist Completed?[15]</td><td>Yes: ☐ No: ☐ N/A: ☐</td></tr>
<tr><td>Historic Preservation Officer(s) Notified?</td><td>Yes: ☐ No: ☐</td><td>Emergency Consult Initiated?</td><td>Yes: ☐ No: ☐</td></tr>
<tr><td colspan="3">NHPA Consult Checklist Completed?[16]</td><td>Yes: ☐ No: ☐ N/A: ☐</td></tr>
</table>

[13] Checklist not yet available. Under development.

[14] See NMFS Emergency Consultation for Endangered Species and Essential Fish Habitat. https://www.nrt.org/sites/52/files/NEWnmfs_emergency_consultation_form%20ESA%20&%20EFH%20request%20form.pdf

[15] See NMFS Emergency Consultation for Endangered Species and Essential Fish Habitat. https://www.nrt.org/sites/52/files/NEWnmfs_emergency_consultation_form%20ESA%20&%20EFH%20request%20form.pdf

[16] See Attachment 7 to the *Region 4 Regional Response Team Guidelines for the Programmatic Agreement on Protection of Historic Properties and Cultural Resources During Emergency Response Under the National Oil and Hazardous Substances Pollution Contingency Plan*. May 9, 2002. https://www.nrt.org/sites/52/files/1-RRT4HistoricPropertiesGuide.doc

Endangered Species Act[17] DOI			
DOI POC: Name:		Affiliation:	**Phone:**
Resources at Risk if oil is NOT dispersed			
Aquatic	**Time to Impact**	**Terrestrial**	**Time to Impact**
What are the specific aquatic resources deemed to be at risk from the non-chemically dispersed spilled product?	What is the estimated time of impact to the resource(s) identified?	What are the specific terrestrial resources deemed to be at risk from the shoreline impact of the non-chemically dispersed spilled product?	What is the estimated time of impact to the resource(s) identified?
List:	Estimate for each:	List:	Estimate for each:

Environmental Benefit /Trade Offs		
Does it appear that dispersants can be applied at this location in a manner that will likely achieve the desired environmental benefit for the identified RARs?	Yes: ☐ No: ☐	If yes, document reason:
Are there any specifically known resources in the area targeted for dispersant use that might be negatively impacted by application of chemical dispersants?	Yes: ☐ No: ☐	If yes, list:
Are negative impacts to resources anticipated to be great enough to offset the benefit to the resources identified above?	Yes: ☐ No: ☐	If yes, document reason:

Recommended measures to prevent risk of injury or damage to wildlife or habitats
List:

Recommended Avoidance Areas	
Given an assessment of the above items, what are the proposed avoidance areas and minimum allowable proximity to these areas of the dispersant platform while spraying?: Review should ensure that the avoidance area is ABSOLUTELY NECESSARY and is not otherwise covered under the recommended measures above Factors to be considered (including, but not necessarily limited to the following) ○ Wind speed and direction ○ Type and geometry of shoreline ○ Accuracy of spray ○ Anticipated proximity of oil to shoreline ○ Shoreline use or resources at risk from overspray	Is the following avoidance area(s) absolutely necessary to protect resources and protective measures listed above are not otherwise sufficient? Yes: ☐ No: ☐ List:

[17] Section 7(a)(2) of the Endangered Species Act (ESA) [16 U.S.C. § 1536(a)(2)] requires Federal agencies to consult with the National Marine Fisheries Service (NMFS) and/or the United States Fish and Wildlife Service (USFWS) if they are proposing an action that may affect listed species.

<table>
<tr><th colspan="6">Endangered Species Act[18] DOC
DOC POC: Name: Affiliation: Phone:</th></tr>
<tr><td colspan="6">Resources at Risk if oil is NOT dispersed</td></tr>
<tr><td>Aquatic</td><td>Time to Impact</td><td colspan="3">Terrestrial</td><td>Time to Impact</td></tr>
<tr><td>What are the specific aquatic resources deemed to be at risk from the non-chemically dispersed spilled product?</td><td>What is the estimated time of impact to the resource(s) identified?</td><td colspan="3">What are the specific terrestrial resources deemed to be at risk from the shoreline impact of the non-chemically dispersed spilled product?</td><td>What is the estimated time of impact to the resource(s) identified?</td></tr>
<tr><td>List:</td><td>Estimate for each:</td><td colspan="3">List:</td><td>Estimate for each:</td></tr>
<tr><td colspan="6">Environmental Benefit /Trade Offs</td></tr>
<tr><td colspan="2" rowspan="2">Does it appear that dispersants can be applied at this location in a manner that will likely achieve the desired environmental benefit for the identified RARs?</td><td>Yes: ☐</td><td colspan="3" rowspan="2">If yes, document reason:</td></tr>
<tr><td>No: ☐</td></tr>
<tr><td colspan="2" rowspan="2">Are there any specifically known resources in the area targeted for dispersant use that might be negatively impacted by application of chemical dispersants?</td><td>Yes: ☐</td><td colspan="3" rowspan="2">If yes, list:</td></tr>
<tr><td>No: ☐</td></tr>
<tr><td colspan="2" rowspan="2">Are negative impacts to resources anticipated to be great enough to offset the benefit to the resources identified above?</td><td>Yes: ☐</td><td colspan="3" rowspan="2">If yes, document reason:</td></tr>
<tr><td>No: ☐</td></tr>
<tr><td colspan="6">Recommended measures to prevent risk of injury or damage to wildlife or habitats</td></tr>
<tr><td colspan="6">List:</td></tr>
<tr><td colspan="6">Recommended Avoidance Areas</td></tr>
<tr><td colspan="2" rowspan="2">Given an assessment of the above items, what are the proposed avoidance areas and minimum allowable proximity to these areas of the dispersant platform while spraying?:
Review should ensure that the avoidance area is ABSOLUTELY NECESSARY and is not otherwise covered under the recommended measures above
Factors to be considered (including, but not necessarily limited to the following)
o Wind speed and direction
o Type and geometry of shoreline
o Accuracy of spray
o Anticipated proximity of oil to shoreline
o Shoreline use or resources at risk from overspray</td><td colspan="4">Is the following avoidance area(s) absolutely necessary to protect resources and protective measures listed above are not otherwise sufficient?
Yes: ☐ No: ☐</td></tr>
<tr><td colspan="4">List:</td></tr>
</table>

[18] Section 7(a)(2) of the Endangered Species Act (ESA) [16 U.S.C. § 1536(a)(2)] requires Federal agencies to consult with the National Marine Fisheries Service (NMFS) and/or the United States Fish and Wildlife Service (USFWS) if they are proposing an action that may affect listed species.

Essential Fish Habitats[19] DOC					
DOC POC:	Name:		Affiliation:		Phone:

Resources at Risk if oil is NOT dispersed	
Aquatic	**Time to Impact**
What are the specific aquatic resources deemed to be at risk from the non-chemically dispersed spilled product?	What is the estimated time of impact to the resource(s) identified?
List:	Estimate for each:

Environmental Benefit /Trade Offs		
Does it appear that dispersants can be applied at this location in a manner that will likely achieve the desired environmental benefit for the identified RARs?	Yes: ☐ No: ☐	If yes, document reason:
Are there any specifically known resources in the area targeted for dispersant use that might be negatively impacted by application of chemical dispersants?	Yes: ☐ No: ☐	If yes, list:
Are negative impacts to resources anticipated to be great enough to offset the benefit to the resources identified above?	Yes: ☐ No: ☐	If yes, document reason:

Recommended measures to prevent risk of injury or damage to wildlife or habitats
List:

Recommended Avoidance Areas	
Given an assessment of the above items, what are the proposed avoidance areas and minimum allowable proximity to these areas of the dispersant platform while spraying?: Review should ensure that the avoidance area is ABSOLUTELY NECESSARY and is not otherwise covered under the recommended measures above Factors to be considered (including, but not necessarily limited to the following) ○ Wind speed and direction ○ Type and geometry of shoreline ○ Accuracy of spray ○ Anticipated proximity of oil to shoreline ○ Shoreline use or resources at risk from overspray	Is the following avoidance area(s) absolutely necessary to protect resources and protective measures listed above are not otherwise sufficient? Yes: ☐ No: ☐ List:

[19] Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) [16 U.S.C. 1855(b))] requires that Federal agencies must consult with the NMFS if they are proposing an action that may affect essential fish habitat (EFH).

<table>
<tr><td colspan="6">National Historic Preservation Act20 ACHP</td></tr>
<tr><td>ACHP POC: Name:</td><td></td><td>Affiliation:</td><td></td><td>Phone:</td><td></td></tr>
<tr><td colspan="6">Resources at Risk if oil is NOT dispersed</td></tr>
<tr><td>Aquatic</td><td>Time to Impact</td><td colspan="3">Terrestrial</td><td>Time to Impact</td></tr>
<tr><td>What are the specific aquatic resources deemed to be at risk from the non-chemically dispersed spilled product?</td><td>What is the estimated time of impact to the resource(s) identified?</td><td colspan="3">What are the specific terrestrial resources deemed to be at risk from the shoreline impact of the non-chemically dispersed spilled product?</td><td>What is the estimated time of impact to the resource(s) identified?</td></tr>
<tr><td>List:</td><td>Estimate for each:</td><td colspan="3">List:</td><td>Estimate for each:</td></tr>
<tr><td colspan="6">Environmental Benefit /Trade Offs</td></tr>
<tr><td colspan="2" rowspan="2">Does it appear that dispersants can be applied at this location in a manner that will likely achieve the desired environmental benefit for the identified RARs?</td><td>Yes: ☐</td><td colspan="3" rowspan="2">If yes, document reason:</td></tr>
<tr><td>No: ☐</td></tr>
<tr><td colspan="2" rowspan="2">Are there any specifically known resources in the area targeted for dispersant use that might be negatively impacted by application of chemical dispersants?</td><td>Yes: ☐</td><td colspan="3" rowspan="2">If yes, list:</td></tr>
<tr><td>No: ☐</td></tr>
<tr><td colspan="2" rowspan="2">Are negative impacts to resources anticipated to be great enough to offset the benefit to the resources identified above?</td><td>Yes: ☐</td><td colspan="3" rowspan="2">If yes, document reason:</td></tr>
<tr><td>No: ☐</td></tr>
<tr><td colspan="6">Recommended measures to prevent risk of injury or damage to wildlife or habitats</td></tr>
<tr><td colspan="6">List:</td></tr>
<tr><td colspan="6">Recommended Avoidance Areas</td></tr>
<tr><td colspan="2" rowspan="2">Given an assessment of the above items, what are the proposed avoidance areas and minimum allowable proximity to these areas of the dispersant platform while spraying?:
Review should ensure that the avoidance area is ABSOLUTELY NECESSARY and is not otherwise covered under the recommended measures above
Factors to be considered (including, but not necessarily limited to the following)
○ Wind speed and direction
○ Type and geometry of shoreline
○ Accuracy of spray
○ Anticipated proximity of oil to shoreline
○ Shoreline use or resources at risk from overspray</td><td colspan="4">Is the following avoidance area(s) absolutely necessary to protect resources and protective measures listed above are not otherwise sufficient?
Yes: ☐ No: ☐</td></tr>
<tr><td colspan="4">List:</td></tr>
</table>

[20] Section 106 of the National Historic Preservation Act (NHPA) [16 U.S.C. 470(f)] requires Federal agencies to consult with the Advisory Council on Historic Preservation (ACHP) if they are proposing an action that may affect historic properties.

Appendix IX. Dispersant Use Monitoring

This appendix addresses the recommended process of RRT4 for monitoring dispersant effectiveness during application. Given the problems associated with estimating dispersant effectiveness, and myriad factors affecting the effectiveness of dispersant application in the field, RRT4 has developed the following as a recommended method of monitoring dispersant use results.

1. SMART Protocols

RRT4 endorses the monitoring procedures currently being supported by the U.S. Coast Guard National Strike Force (NSF) and believes that at this time, they offer the best available methods for estimating real-time dispersant effectiveness in the field. RRT4 therefore recommends that all efforts be made to implement their monitoring procedures. RRT4 does not, however, believe that these protocols can consistently and accurately provide definitive "Go/No-Go", "Continue/Discontinue" data to the FOSC, and therefore does not require that the results of the monitoring protocol necessarily dictate whether or not dispersant operations will continue. An inability to perform monitoring protocols will not necessarily be grounds for cessation of dispersant operations. It should be noted that these monitoring recommendations are not intended to serve as a means of monitoring for natural resource impacts or damages to the environment.

The NSF's program is designed to allow timely use of this response tool and provide monitoring results to the FOSC and the Federal and State Trustees involved in the response. This program is designed for the assets and logistical capabilities that are provided in this region by the U.S. Coast Guard NSF and the National Oceanic and Atmospheric Administration (NOAA) Scientific Support Coordinator's (SSC) scientific support team.

The NSF has been chosen because of their proven ability to quickly respond to the FOSC's technical needs during an oil spill incident with properly trained and equipped personnel and logistical support. Having a government agency accomplish this task is partially dictated by the operational need for such monitoring data sets to remain in the public domain to ensure availability and objective presentation of the data to the FOSC.

The NSF, or designee, will perform the actual on-site monitoring to collect the raw data with the guidance of the SSC's scientific support team. The SSC scientific support team, as delineated in current SMART protocols, will assist in monitoring, analysis of the data, and forwarding of the results to the FOSC as soon as is practicable.

The monitoring program is designed to enhance the FOSC's decision making process during the use of dispersants in fulfillment of his/her responsibility to insure appropriate and timely response to mitigate the effects of oil spills, as established by the Clean Water Act and defined by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300.

2. Subsurface Application Monitoring

Where subsea dispersants are applied, additional monitoring efforts should be implemented in addition to applicable SMART Protocols. RRT4 currently endorses the National Response Team (NRT) Subsea Dispersant Monitoring and Assessment Guidance as the most effective framework for designing a site-specific subsea dispersant monitoring plan. Monitoring will be conducted using best available technologies and shall include only those elements of the NRT Guidance which are applicable and necessary, as determined by the FOSC with concurrence from RRT4.

The NRT Guidance describes general objectives for monitoring vessels, monitoring and sampling equipment resources, reporting recommendations, and evaluation criteria to determine cessation of subsea dispersant applications, if necessary. The NRT Guidance also calls for the preparation of an Incident-Specific Resources at Risk Plan, a Subsea Dispersant Application Monitoring Plan (including Sediment, Water, and Air sampling/monitoring), and a Quality Assurance Project Plan (QAPP). These plans would be incident-specific and prepared, as necessary and by the responsible party, when necessitated by the duration and scope of the response.

3. Augmented Monitoring

Monitoring activities will include simultaneous efforts from multiple disciplines and objectives, the quantity and scope of which will scale with the severity of the discharge. These activities may exceed or augment protocols set forth in SMART or the NRT Subsea Dispersant Monitoring and Assessment Guidance. For complex responses with monitoring activities exceeding several weeks, RRT4 should convene to address where opportunities for consolidation of resources and reporting exist. RRT4 will ensure consistency with federal and industry benchmarks and standards, which include:

- Fine scale plume sampling and analytical methodologies that accurately characterize the plume; e.g. Polycyclic Aromatic Hydrocarbon (PAH), Total Petroleum Hydrocarbons (TPH), and water-accommodated fraction, with respect to chemical constituents of concern that are directly relevant for ecological risk assessments.
- In-situ methods (CDOM fluorometry, normal light transmissometry, and laser light backscatter) that are capable of providing semi-quantitative analysis for oil/gas and constituents of concern. These methods require sample water to pass directly though the instrument, so they are inefficient for large-scale survey work, such as to determine the extent of a subsurface plume.
- Utilization of ROVs and UAVs to deliver analytical packages autonomously and/or remotely when surface conditions may be unsuitable for a surface-support vessel. Underwater vehicles and gliders, for example, can be outfitted for quantifying oil and gas in the water column.

4. References and Additional Information

National Oceanographic and Atmospheric Administration Oil Spill Response. *Special Monitoring of Applied Response Technology*. (2010). Silver Spring, Maryland: U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration. NOAA fact sheet. Online access: http://www.noaa.gov/factsheets/new%20version/smart.pdf

Payne, J. R., French-McCay, D., Mueller, C., Jayko, K., Terrill, E., Carter, M., et al. (2007). *Evaluation of Field-Collected Drifter and In Situ Fluorescence Data Measuring Subsurface Dye Plume Advection/Dispersion and Comparisons to High-Frequency Radar-Observation*

System Data for Dispersed Oil Transport Modeling. Durham, New Hampshire: Coastal Response Research Center.

U.S. Coast Guard, National Oceanic and Atmospheric Administration, U.S. Environmental Protection Agency, Centers for Disease Control and Prevention, Minerals Management Service. *Special Monitoring of Applied Response Technologies,* SMART. (2006). Seattle, Washington: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of Response and Restoration. Online Access: http://docs.lib.noaa.gov/noaa_documents/648_SMART.pdf

Appendix X. Dispersant Use Final Report Requirements

Any use of dispersants requires that a Dispersant Use Final Report be provided by the FOSC, or a designated member of the FOSC's staff, within 45 days of completing dispersant operations. Recommendations for changes or modification to this Dispersant Use Plan may be presented in the report, if appropriate. *This report will be presented at a Region4 Regional Response Team meeting, if so requested by the RRT4.*

The report must include, at minimum, the following criteria:

i. Incident Overview
ii. Oil Slick Trajectory and Behavior
iii. Justification for Dispersant Use
iv. Chronology (Date and Time) of Dispersant-Related Events
v. Overview of Dispersant Operations
vi. Overview of Dispersant Monitoring
vii. Completed Dispersant Preauthorization Initial Call Checklist and OSC Dispersant Use Checklist

There no standardized format for report submission and the contents of the report will be incident-specific according to the circumstances and special issues surrounding the response. The following subsections are suggested criteria to consider when developing the Dispersant use Final Report:

i. Incident Overview

- Description of initial report (date, time, source, etc.)
- Spill source
- Spill location
- Estimated quantity & potential quantity
- Environmental conditions

ii. Oil Slick Trajectory and Behavior

- Expected movement of slick
- Expected weathering and behavior of product
- Observations of same

iii. Justification for Dispersant Use

- Potential impact areas and their respective sensitivities to impact
- Within preauthorization zone for RRT IV
- Potential for use of other recovery methods (e.g., mechanical recovery, in-situ burning)

- Weather and sea state

iv. Chronology (Date and Time) of Dispersant-Related Events

- OSC notification of spill
- Reconnaissance aircraft requested
- Reconnaissance aircraft "wheels up"
- Gulf Strike Team alerted for SMART
- SMART en-route
- Reconnaissance aircraft on-scene and reports
- RP requested use of dispersants
- Source and field sample requested by USCG
- Dispersant use approved under preauthorization guidelines
- Dispersant contractor notified
- Dispersant stock requested
- Dispersant stock en-route
- Dispersant stocks arrive at airport/dock
- Spotter aircraft "wheels up"
- Dispersant aircraft/boat "wheels up"/left dock
- SMART vessel launch
- Spotter aircraft on-scene
- Dispersant aircraft/boat on-scene
- SMART vessel on-scene
- Source and "in-water" sample collected
- SMART sampling begins
- First application
- Spotter aircraft opinion of efficacy
- SMART sampling results (go/no go)
- SMART sampling begins, again
- Second application
- Spotter aircraft opinion of efficacy
- SMART sampling results (go/no go)
- Additional applications, Spotter aircraft opinions, and SMART sampling (as required)
- Termination of dispersant operation

v. Overview of Dispersant Operations

- Amounts, times, types, and dosage rates of dispersants applied
- Record of specific locations where dispersants have been applied
- Any extenuating circumstances affecting the deployment of any element (spotters, dispersant, SMART, etc.)
- Estimates and observations of efficacy
- Any discrepancies between estimates
- Any discrepancies between observations

vi. Overview of Dispersant Monitoring

- Documentation of monitoring activities for dispersant effectiveness, wildlife, observation of specific buffer zones, etc.
- Any sightings of pelagic/migratory birds, sea turtles, or marine mammals
- Documentation of any wildlife incidents
- Records from SMART protocol implementation, findings, and subsequent recommendations; as well as records from any additional monitoring activities that may have been implemented
- Account of any procedures or activities that were affected, examined, or otherwise discussed as part of consultation efforts with DOI, DOC, EPA, or affected states

vii. Completed Dispersant Preauthorization Initial Call Checklist and OSC Dispersant Use Checklist

viii. Points of Contact to Request for Additional Information

- Parties may request additional information (e.g., pilot's logs, SMART logs, and SMART data) by contacting the FOSC for the particular spill/release response activity
- Information requested will be provided within 30 to 60 days following the request

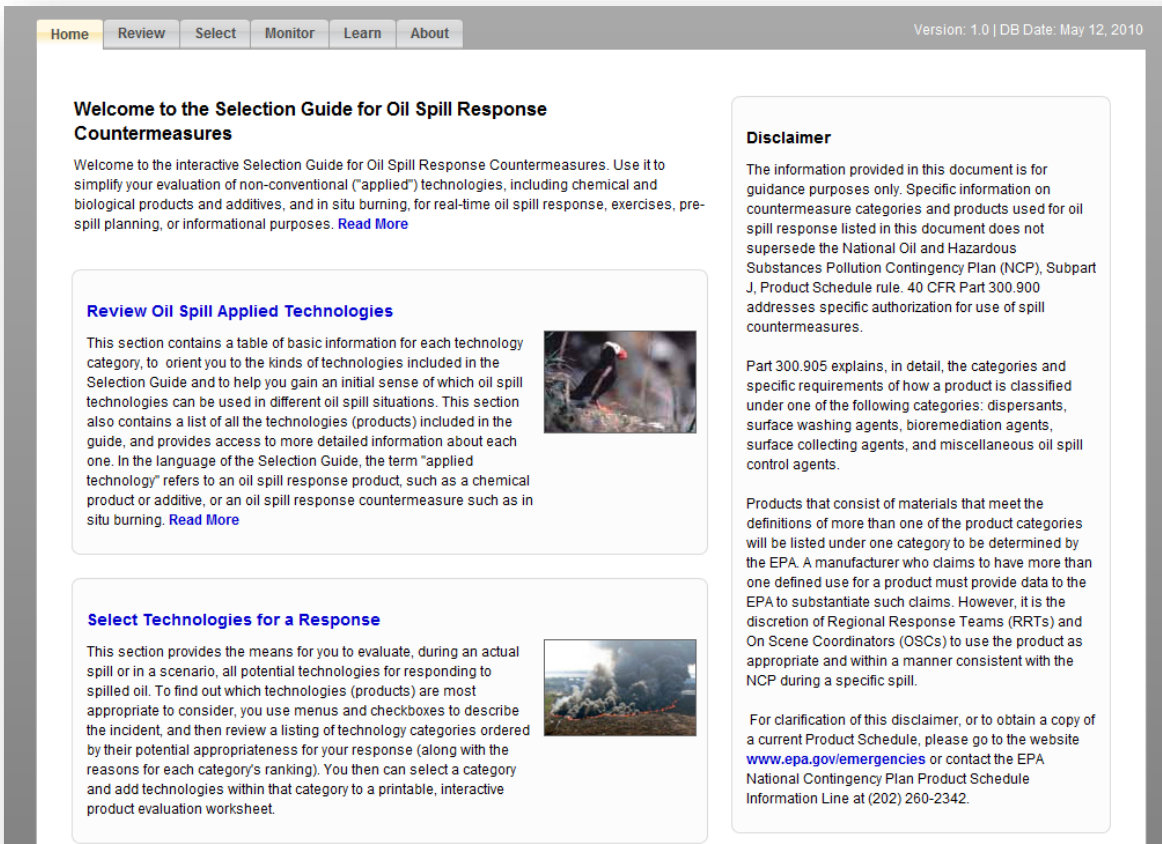
Appendix XI. National List of Dispersants Approved for Use

The National Contingency Plan Product Schedule (40 CFR 300.905) is updated and published at the end of each calendar year. The latest Product Schedule can be found on EPA's webpage (http://www.epa.gov/oem/docs/oil/ncp/schedule.pdf) along with a Technical Notebook that is also updated annually. The listing of a product on the NCP Product Schedule does not constitute approval of the product.

Appendix XII. Selection Guide

Current lists of dispersants can be located from the Selection Guide for Oil Spill Response Countermeasures at http://epasg.genwest.com/index.html#.

The Selection Guide contains a table of basic information for each spill response technology, including dispersants, to orient the reader to the kinds of technologies that can be used in different oil spill situations. The Selection Guide also contains a list of all the technologies (products) included in the guide, and provides access to more detailed information about each one. In the language of the Selection Guide, the term "applied technology" refers to an oil spill response product, such as a chemical product or additive, or an oil spill response countermeasure such as in situ burning.



Home | Review | Select | Monitor | Learn | About

Version: 1.0 | DB Date: May 12, 2010

Welcome to the Selection Guide for Oil Spill Response Countermeasures

Welcome to the interactive Selection Guide for Oil Spill Response Countermeasures. Use it to simplify your evaluation of non-conventional ("applied") technologies, including chemical and biological products and additives, and in situ burning, for real-time oil spill response, exercises, pre-spill planning, or informational purposes. Read More

Review Oil Spill Applied Technologies

This section contains a table of basic information for each technology category, to orient you to the kinds of technologies included in the Selection Guide and to help you gain an initial sense of which oil spill technologies can be used in different oil spill situations. This section also contains a list of all the technologies (products) included in the guide, and provides access to more detailed information about each one. In the language of the Selection Guide, the term "applied technology" refers to an oil spill response product, such as a chemical product or additive, or an oil spill response countermeasure such as in situ burning. Read More

Select Technologies for a Response

This section provides the means for you to evaluate, during an actual spill or in a scenario, all potential technologies for responding to spilled oil. To find out which technologies (products) are most appropriate to consider, you use menus and checkboxes to describe the incident, and then review a listing of technology categories ordered by their potential appropriateness for your response (along with the reasons for each category's ranking). You then can select a category and add technologies within that category to a printable, interactive product evaluation worksheet.

Disclaimer

The information provided in this document is for guidance purposes only. Specific information on countermeasure categories and products used for oil spill response listed in this document does not supersede the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Subpart J, Product Schedule rule. 40 CFR Part 300.900 addresses specific authorization for use of spill countermeasures.

Part 300.905 explains, in detail, the categories and specific requirements of how a product is classified under one of the following categories: dispersants, surface washing agents, bioremediation agents, surface collecting agents, and miscellaneous oil spill control agents.

Products that consist of materials that meet the definitions of more than one of the product categories will be listed under one category to be determined by the EPA. A manufacturer who claims to have more than one defined use for a product must provide data to the EPA to substantiate such claims. However, it is the discretion of Regional Response Teams (RRTs) and On Scene Coordinators (OSCs) to use the product as appropriate and within a manner consistent with the NCP during a specific spill.

For clarification of this disclaimer, or to obtain a copy of a current Product Schedule, please go to the website www.epa.gov/emergencies or contact the EPA National Contingency Plan Product Schedule Information Line at (202) 260-2342.

Walker, A. H., Michel, J., Benggio, B., McKetrick, B., Scholz, D., Boyd, J., et al. (2003, January). *Selection Guide for Oil Spill Applied Technologies, Volume I - Decision Making.* Retrieved December 2012, from http://archive.orr.noaa.gov/book_shelf/676_SelGuide.pdf

Appendix XIII. Technical Product Bulletins

All available technical product bulletins for dispersants on the current EPA product schedule are contained herein. Inclusion of these bulletins in this Region IV Dispersant Policy does not constitute endorsement of these products.

The listing of a product on the Product Schedule does NOT mean that EPA approves, recommends, licenses, certifies, or authorizes the use of the product on an oil discharge. The listing means only that data have been submitted to EPA as required by Subpart J of the National Contingency Plan, Section 300.915 (Source: 40 CFR §300.920 (e)).

- Alphabetical List of NCP Product Schedule Products with Links to Technical Product Summaries

  http://www.epa.gov/emergencies/content/ncp/product_schedule.htm

- Product Categories under NCP Subpart J

  http://www.epa.gov/emergencies/content/ncp/categories.htm

  Includes regulatory definitions of five product types: Bioremediation Agents, Dispersants, Surface Collecting Agents, Surface Washing Agents, and Miscellaneous Oil Spill Control Agents. These definitions can also be found under the definitions section in the NCP (40 CFR 300.5).

- NCP Product Schedule Toxicity and Effectiveness Summaries

  http://www.epa.gov/emergencies/content/ncp/tox_tables.htm

  Includes toxicity (LC50) and effectiveness tables for the five product types: Bioremediation Agents, Dispersants, Surface Collecting Agents, Surface Washing Agents, and Miscellaneous Oil Spill Control Agents.

National Contingency Plan Product Schedule Information Line

The National Contingency Plan (NCP) Product Schedule Information Line is available for more information on NCP Subpart J requirements: (202) 260-2342 (phone)

Appendix XIV. Dispersants Available for Response in Federal Region 4

The September 2016 version of the EPA NCP Product Schedule lists a total of 19 dispersants that have met the submission requirements of 40 CFR 300.915(a) and 40 CFR 300.920(a). Confirmed dispersant resources staged within or near Federal Region 4 consists mostly of Nalco Environmental Solutions, LLC, COREXIT® EC9500A (formerly COREXIT 9500) (see Table XIV-1). While RRT4 does not promote or favor any brand or dispersant product, it is reasonable to anticipate that the most likely product to be deployed in a preauthorization capacity will be EC9500A. By November of 2015, at least one contract company operating within or near Federal Region 4 is stockpiling Advanced BioCatalytics Corp., Accell Clean® DWD.

Table XIV-1. Dispersant Resources Available In, or Near, Federal Region 4

<table>
<tr><th>Product</th><th>Storage Method</th><th>Location</th><th>Unit</th><th>Aircraft</th></tr>
<tr><td>Accell Clean DWD</td><td>5,000 gal (approx.) [21]</td><td rowspan="3">Houma, LA</td><td rowspan="3">Clean Gulf Associates [22]</td><td rowspan="4">(1) Basler-67 (modified DC-3), and (2) DC-3; operated by Airborne Support Inc. (also has spotter aircraft)</td></tr>
<tr><td>COREXIT EC9527A</td><td>4 x 330-gal totes</td></tr>
<tr><td rowspan="9">COREXIT EC9500A</td><td>33,000 gal</td></tr>
<tr><td>31,961 gal</td><td>Houma, LA</td><td>Airborne Support, Inc. [23]</td></tr>
<tr><td>493 x 330-gal totes</td><td>Fort Lauderdale, FL</td><td>Oil Spill Response Ltd. (formerly Clean Caribbean) [24]</td><td>ADDS-pack payload operated by Clean Caribbean utilizes C-130H on contract</td></tr>
<tr><td>36 x 330 gal totes</td><td rowspan="2">Kiln, MS</td><td rowspan="6">Marine Spill Response Corp. [25]</td><td rowspan="6">C-130A operated by Marine Spill Response Corp. locations in Kiln, MS; and Mesa, AZ

King Air BE-90 operated by Marine Spill Response Corp. locations in Kiln, MS; San Juan, PR; and Salisbury, MD.</td></tr>
<tr><td>4,129 gal in 5k-gal ISO Tank</td></tr>
<tr><td>35 x 330-gal totes</td><td>Galveston, TX</td></tr>
<tr><td>10 x 330-gal totes</td><td>Ingleside, TX</td></tr>
<tr><td>21 x 330-gal totes</td><td>Savannah, GA</td></tr>
<tr><td>16 x 330-gal totes</td><td>Tampa, FL</td></tr>
</table>

[21] Began adding to Clean Gulf Associates stockpile in November, 2015; M. Huyser confirmed with CGA by email
[22] Information confirmed over phone by M. Huyser with Clean Gulf Associates, September 30, 2015
[23] Information confirmed by M. Huyser with Clean Gulf Associates by phone, September 30, 2015
[24] Information confirmed by M. Huyser with Oil Spill Response Ltd. by phone, September 25, 2015
[25] Information confirmed by M. Huyser with Marine Spill Response Corp. by email, September 28, 2015

Appendix XV. Guidance - Gaining Consensus for Dispersant Use

Seeking Approval for Dispersants

Common goals for dispersant use in spill response include reducing the time an oil slick may persist on the water surface, decreasing the likelihood that oil will emulsify or become stranded on sensitive shorelines, and gaining a net environmental benefit by increasing overall spill response effectiveness. These goals are achieved to maximum result when dispersants are used in the early stages of the response, when the oil is fresh, before the slick has spread too thin, and before the slick approaches shallow, near shore areas or stands on sensitive shorelines.

Gaining approval for and implementing the application of dispersants as part of an oil spill response can be slowed if the net environmental benefit discussions have not taken place with environmental authorities or the public, and by lack of pre-planning and coordination with operators of dispersant application equipment and dispersant stockpile managers. This section outlines the key steps that can facilitate the approval process in areas where dispersant use is appropriate, and ensure dispersant applications can be implemented quickly and effectively and sustained once approved. This approach is intended to be a generic, international approach to dispersant use that could be considered during any incident and applied consistent with any local, regional or national regulations.

Considerations for Gaining Consensus on Dispersant Use

1) Understand the relevant facts regarding spill incident specifics;

- Is the oil dispersible with the types of dispersants available for use?
- Is there dispersant application equipment that can be mobilized within the window of opportunity for dispersing the oil?
- What are the realistic expectations for mechanical containment and recovery of the slick?

2) Understand regulatory requirements and limits associated with dispersant use;

- Are there pre-approved areas for dispersant use?
- Will dispersant use require submittal of an application to relevant authorities?
- Are there pre-existing regulatory constraints on dispersant use or specific prohibitions?
- What are the processes for submitting applications to gain approval for exemptions from these local constraints or prohibitions?

3) Determine if conditions are conductive for effective use of dispersants;

- Is mixing energy from waves and currents 30 feet depth, where dilution is rapid?
- Does NEBA support use of dispersants in shallow water, near shore areas?

4) Discuss with environmental authorities tradeoffs of dispersant use as part of the spill response and determine where dispersants can yield Net Environmental Benefit;

- What offshore, near shore, and on-shore ecological resources are at risk of oiling with and without the use of dispersants?
- What are the expected effectiveness estimates and associated environmental impacts for other types of response alternatives (mechanical containment and recovery, burning, no-response)?
- Compared to the other response alternatives, can dispersants reduce the risk of oiling to sensitive ecological resources (highly valued, slow to recover) against a tradeoff of potentially higher exposures for less sensitive water column organisms (more rapid recovery, more abundant, less valued)?

5) Use trajectory modeling and mass balance estimates to help gain estimates of the magnitude of tradeoffs for response operations with and without dispersant use;

- Use a model to demonstrate areas where shoreline stranding will occur
- Associate those areas with ecological resources at risk
- Use model outputs, mass balance calculations, environmental sensitivity maps, photos or charts, etc, to show how dispersant use can change the impact of the spill in terms of amount of oil stranding on shorelines, the length of shoreline where oil strands, the sensitive and non-sensitive shoreline areas where shoreline oiling may occur, etc.

6) Gain agreement with environmental authorities that dispersant use in specific areas or as part of specific strategies will provide net environmental benefit and convey agreement to Incident Command;

- Consider a range of dispersant use strategies from strategic to tactical (vessel and aircraft systems) that will minimize overall environmental impacts and optimize dispersant applications
- Attack leading edges as slick approaches shorelines,
- Consider use of dispersants to treat oil that escapes mechanical containment
- In advance of deteriorating weather conditions, allow rapid encounter rate of dispersant application to treat large portions of slick in short time period, compared to extended response time required for mechanical equipment.
- Convey agreement on dispersant use to Incident Command in terms of approval letter signed by authorities or written recommendation from incident planning section

7) Develop an operational plan for dispersant utilization consistent with priorities and constraints agreed to environmental authorities;

- Operational plan includes maps and GPS details to delineate intended zones for dispersant operations
- List precautions and restrictions (buffer zones, no-fly zones, daylight operations only) used to protect human and ecological resources from overspray and spray drift
- List monitoring efforts that must be in place to ensure dispersant operations comply with restrictions and are effective in dispersing oil (visual observations may be sufficient,

along with presence of trained spill monitors and wildlife biologist in monitoring aircraft or vessels stationed in the operation zone)

- Ensure operations can comply with constraints/requirements to test for dispersant effectiveness on daily or operational period frequency to ensure continued effectiveness over multi-day operations

8) Ensure dispersant use agreement and operational plans are communicated to all interested parties

- Share information with public affairs
- Ensure technical support staff available at public meetings and press briefings to help explain rationale for dispersant use

Implementing an Efficient and Effective Dispersant Operation:

1) Ensure operations staff participates in and/or are kept abreast of discussions regarding dispersant use approvals;

- Ensure all health and safety issues, PPE, training, decontamination, and mobilization/demobilization have been considered and are consistent with MSDS (Material Data Safety Sheets) and all industry/government health and safety requirements.
- Communicate with field crew regarding the rationale used to impose any use restrictions, buffer zones etc, that were incorporated into operations plans to help ensure operational compliance
- Cooperation between field operations and incident leadership are key to ensuring any planned operation does not commence before all approvals and conditions of operation have been met
- Means to meet commitments for monitoring (as required: visual only, photographic, independent observers, water sampling) must be in place
- Procedures to ensure some form of communications between dispersant application equipment and other field operations must be in place

2) Operations can work to mobilize and pre-stage application equipment and dispersant stockpiles in anticipation of approval;

- In order to expedite implementation, having equipment and supplies at the ready are crucial to timely operational effectiveness
- Be cautious that advance work to mobilize and position field crews is not perceived as ignoring or undermining the importance of approval from authorities, and that all field crews understand that advance work is being done with operational commitments contingent on regulatory/Incident Command approval

3) Operations/field crews responsible to ensure operational safety factors and constraints have been developed and communicated before commencement of dispersant application;

- Ensure operations conducted within weather and visibility conditions safe for aerial and on-water operations
- Visibility window for aerial operations should be consistent with visual flight rules (VFR)
- Daylight operations window (sunrise to sunset) should be part of VFR, and consideration for use of dispersant operations during nighttime would require highly sophisticated technical support and equipment
- Buffer zones and no-fly areas should be set in place with proper authorities
- Communications plans and contingencies should be established

4) Daily operational log should be maintained and all reporting requirements met;

- Documentation of times, amounts, types, dosage rates of dispersants applied
- Documentation of specific locations where dispersants have been applied
- Documentation of monitoring records for dispersant effectiveness, wildlife hazing, observation of specified buffer zones, etc.
- Video and photographic records of area should be kept before and after operations

5) On a daily basis or for each operational period, review safety issues and operational constraints/restrictions with field teams before dispersant application equipment deployed;

- Ensure all field crews are kept appraised of work conditions and requirements for continued safety and compliance with area restrictions on dispersant applications.

6) Coordination and information exchange with Incident Command, Natural Resource Agencies, and Environmental or Public Interest Groups;

- Ensure the incident leadership and operations teams are up to date on operational plans and any issues regarding approvals, access to dispersant stockpiles and equipment, and implementation plans
- Work with public affairs and communications team to ensure technical support experts are available to answer questions of media and public at press conferences and briefings
- Ensure appropriate technical and operational individuals involved with dispersant issues are identified to public affairs and communications facilitators so they can be contacted when questions arise.
- Anticipate issues and develop public relations messages to address common issues associated with dispersant use, for use in response to incident specific issues and questions

Appendix XVI. Guidance - Example Public Relations Messages

Response to Concerns of Toxicity of Dispersed Oil to Marine Life.

Net Environmental Benefit Analysis (NEBA) is an assessment tool commonly employed to weigh the advantages and disadvantages associated with use of oil spill response options such as mechanical containment and recovery, in situ burning, and dispersants. These types of analyses repeatedly demonstrate that dispersant use is favored as a primary response option in areas where water depths exceed 30 feet and distances from shorelines exceed a few (2 to 5) kilometers. In such areas, mixing and dilution can rapidly reduce concentrations of dispersed oil to levels that are no longer a threat to aquatic organisms. This environmental risk to the water column community is much less than the risks to birds, mammals, and coastal and shoreline communities posed by oil slicks persisting on the water surface.

The benefits that dispersants can offer in areas less than 30 feet water depth or closer than 2 kilometers from shore or will depend on the value of the near shore environmental resources being threatened by any spill (wildlife, sea grass beds, sensitive inertial habitats, marshes, potential for persistence in the area, or re-distribution of the oil to other areas, etc.). If more detailed and site-specific assessment of the tradeoffs shows that dispersing the oil in shallower, near shore areas could provide an overall benefit to the environmental even though such action may pose a short-term, increased risk to aquatic life, dispersants may be approved for use in these near shore, shallow water areas.

The potential impact to marine life exposed to dispersed oil is much more limited compared to the longer-term impacts that occur after shorelines have been oiled. Dispersants are designed to combine with oil floating on the surface of water, reduce the resistance to droplet formation, and break up the oil slick into micron-size droplets that move into the water column to be diluted to non-toxic concentrations, and ultimately biodegraded. This process greatly reduces potential exposure of birds and marine mammals that might encounter a persistent oil slick and prevents oil slicks from stranding on shorelines, which prolongs environmental exposures and greatly complicates cleanup activities. The benefits of modern dispersants are widely recognized and have been documented in various forms over the past several years, beginning with a review by the U.S. National Academy of Sciences in 1989[26].

The evaluations of risks to marine life have included consideration of the following frequently asked questions:

Potential Effects Limited to the Most Sensitive Species and the Most Sensitive Life stages in the immediate area of the dispersed oil.

Potential effects on marine life exposed to dispersed oil will be limited to the most sensitive species and the most sensitive life stages that are in the immediate area of the oil slick when it is dispersed. Examples of concern are the eggs and larvae of sensitive species of fish, shrimp,

[26] National Research Council. (1989). *Using Oil Dispersants on the Sea.* Washington, DC: The National Academies Press.

oysters or mussels. All species will not be affected; some are naturally resistant to these types of exposures.

Dispersed Oil Concentrations are Quickly Reduced.

Within 1-2 hours after the oil has been dispersed, waves and currents will have diluted the concentration of dispersed oil in the water column to very low levels, below those of toxicity concerns for most marine life. Marine bacteria will colonize the small droplets of oil. The microbes will biodegrade the oil over the next few days to 2 weeks.

Adult and Juvenile Fish, Shrimp, Crabs, Mollusks are not Likely to be affected.

In the immediate area of the dispersed oil, adult and juveniles of most species of fish, shrimp, crabs and mollusks will not receive exposures of sufficient duration, nor at sufficient concentration to result in toxic effects. No long-term effects on fishery populations are expected, or have been reported from spills where dispersants have been used.

Safe to Eat?

The short exposure duration will also prevent fishery resources in the area from accumulating significant quantities of oil. This minimizes the potential that fisheries resources would be contaminated to the extent that they would not be suitable for human consumption, or pose a threat to the ecological food chain. In areas where dispersants are used, local officials assess the potential level of concern over food safety and develop appropriate plans as necessary to evaluate the quality of fishery resources harvested for consumption after the incident is over.

Spraying of Dispersants on or Near Wildlife Populations.

Care is taken to avoid dispersant applications in the vicinity of concentrated populations of birds and marine mammals, and to minimize their exposure from wind drift of applied dispersant. Commonly, birds and marine mammals leave an oil spill area when aerial surveillance or on-water response equipment arrives. Additional efforts, called animal hazing, can be utilized under the supervision of wildlife biologists to scare animals from the areas where dispersants are used. The major concern for these animals is getting them to leave the oiled areas in order to avoid direct contact with the oil.

Effectiveness of Dispersant taken from Older Stockpiles.

Dispersant stockpiles are maintained, monitored and tested to ensure that they retain their effectiveness for use in emergency situations. Many dispersants have a shelf-life of 20 to 30 years, helping ensure confidence that applications will be effective when dispersants are sourced from older stockpiles.

Appendix XVII. Guidance - When Surface Dispersants Can Make a Difference

Dispersant Effectiveness per Single Pass of application equipment	Conditions that allow expectations of this level of effectiveness	Advantages of dispersant use at this level of effectiveness	Negatives of dispersants at this level of effectiveness
Highly Effective (>75%) Anticipate oil slick will be completely removed from area with normal operations	- Highly amenable oil; relatively fresh - API Gravity >27 - Sea state >1m, ---- High mixing energy, energetic chop	High mixing energy ensures full and rapid dispersion into water column Oil droplets remain entrained in water column, dilute rapidly with continuous mixing energy Surface dwelling wildlife protected from encounter with persistent oils Shoreline protected from impact of oil stranding on beaches or in marshes Waste quantities from shoreline clean-up, which can reach 10 times the spilled oil volume, are kept to a minimum Oil that has been treated with dispersant, even if undispersed, is less likely to adhere to environmental surfaces Increased biodegradation of oil droplets with high surface: volume ratios Lighter oils require less dispersant to achieve effective dispersion More rapid oil slick encounter rate than other spill response methods	Pelagic organisms experience transient exposure to oil/dispersant mixture within dispersed oil plume Requires sufficient depth to rapidly dilute large volumes of oil May restrict water use for industrial/commercial uses while plume is in the vicinity of the intakes May not be justified in areas of intensive mariculture Spray drift or inappropriate application may expose wildlife populations unnecessarily, so may not provide net environmental benefits

Dispersant Effectiveness per Single Pass of application equipment	Conditions that allow expectations of this level of effectiveness	Advantages of dispersant use at this level of effectiveness	Negatives of dispersants at this level of effectiveness
Mostly Effective (50-75%) Anticipate oil slick will be completely removed from areas with additional pass	- Oil weathering - API >15and <27 - Sea state >0.3 m < 1m); light mixing energy and chop - Oil Slick fragmented, imperfect targeting	Removal of 50-75% of the oil in only a single pass significantly reduces the potential impact upon the shoreline Waste quantities from shoreline clean-up, which can reach 10 times the spilled oil volume, will be kept to a minimum Oil that has been treated with dispersant, even if undispersed, less likely to adhere to environmental surfaces so readily Increased biodegradation of oil droplets due to high surface: volume ratios More rapid oil slick encounter rate than other spill response methods Dispersants slow emulsification process and, in some cases, can reverse it	Pelagic organisms experience transient exposure to oil/dispersant mixture within dispersed oil plume Dilution will be slower due to lower mixing energy Weathering increases the time needed for the dispersant and oil reaction to take place Beach protection strategies must be considered May restrict water use for industrial/commercial uses while plume is in the vicinity of the intakes May not be justified in areas of intensive mariculture Spray drift or inappropriate application may expose wildlife populations unnecessarily, so may not provide net environmental benefits
Less Effective (25-50%) Anticipate that large portion of slick will be removed from area with multiple applications	- Heavily weathered oils or heavy fuels - API Grav < 15, - Oil emulsified - Minimal sea state, minimal chop, cold temperatures - Oil Slick highly fragmented; imperfect targeting	Removal of up to 50% of the oil in only a single pass could still significantly reduce impacts on the shoreline Oiled waste streams significantly reduced Oil that has been treated with dispersant, even if undispersed, less likely to adhere to environmental surfaces Treated but undispersed oil is still likely to disperse when the sea state and winds increase Dispersants slow emulsification process and, in some cases, can reverse it	Oil droplets may not remain dispersed if the energy level is too low Dispersant may be washed off the oil before it has dispersed the oil Dilution will be slower due to less energy Beach protection strategies must be considered Spray drift or inappropriate application may expose wildlife populations unnecessarily; may not provide net environmental benefits

Dispersant Effectiveness per Single Pass of application equipment	Conditions that allow expectations of this level of effectiveness	Advantages of dispersant use at this level of effectiveness	Negatives of dispersants at this level of effectiveness
Minimally Effective (<25%) Needs to be assessed in light of NEBA. Anticipate portions of slick will persist, but volumes may reduced	- API Gravity <10, Bunker C - Highly weathered, viscous and emulsified oils - Sea energy too low	Can be dispersed but only with extensive multiple applications of very high dispersant quantities Oil that has been treated with dispersant, even if undispersed, is less likely to adhere to environmental surfaces so readily Does not compromise mechanical recovery methods, which are highly efficient in calm waters so untreated oil will still be recoverable Treated but undispersed oil may still disperse when the sea state and winds increase	Insufficient mixing energy to initiate dispersion Undispersed but treated oil may raise concerns on the potential effectiveness of certain mechanical recovery options Resources needed for dispersant operations diverted away from other response methods offering greater potential efficiency Beach protection strategies must be considered

Appendix XVIII. National Product Schedule: Listed Dispersants Approved for Use

The National Contingency Plan Product Schedule (40 CFR 300.905) is updated and published at the end of each calendar year. The latest Product Schedule can be found on EPA's webpage (http://www.epa.gov/oem/docs/oil/ncp/schedule.pdf) along with a Technical Notebook that is also updated annually. The listing of a product on the NCP Product Schedule does not constitute approval of the product.

Attachment A. Examples of Fresh Crude Oil Properties

Taken from: Ross, Sy, (March 1997). Guide for Estimating the Chemical Dispersibility of Freshly Spilled Oil Spills. *S.L. Ross Environmental Research*. Retrieved from http://www.slross.com/publications/slr/DispersantGuideInDegreesCelcius.pdf

Examples of Fresh Crude Oil Properties

Common Name	Country of Origin	°API Grav	Specific Gravity	Pour Point °C	Viscosity		Dispersibility
					cP @ 21°C	cS t@ 37.8°C	
Aboozar	Iran	26.9	0.893	-34	37	20	**3**
Abu Al Bu Khoosh	Abu Dhadi, U.A.E.	31.6	0.867	-32	11	8	**3**
Alaska North Slope	USA	26.5	0.896	-18	29	17	**3**
Algerian Blend	Algeria	45.5	0.799	-29	-	8	**1**
Algerian Condensate	Algeria	65.0	0.720	-62	-	4	**1**
Amna	Libya	36.1	0.844	21	35	18	**2W**
Arabian Light	Saudi Arabia	33.4	0.858	-34	10	7	**3**
Arabian Medium (Khursaniya	Saudi Arabia	30.8	0.872	-15	16	11	**3**
Arabian Medium (Zuluf/Marja	Saudi Arabia	31.1	0.870	-29	19	13	**3**
Arabian Heavy	Saudi Arabia	27.9	0.888	-19	37	21	**3**
Ardjuna	Indonesia	36.0	0.845	26	-	4	**4**
Argyll	North Sea	38.0	0.843	6	9	6	**2W**
Arun Condensate	Indonesia	54.0	0.763	-48	-	1	**1**
Ashtart	Tunisia	30.0	0.876	13	24	-	**3W**
ASMB	Canada	37.2	0.839	-8	8	-	**2**
Attaka/Bedak	Indonesia	42.3	0.814	-23	2	7	**2**
Auk	North Sea	37.2	0.838	10	-	6	**2W**
Bachaquero	Venezuela	16.8	0.954	-23	1030	308	**4**
Bachaquero Heavy	Venezuela	12.8	0.980	-4	3420	962	**4**
Bahia	Brazil	35.2	0.849	38	-	20	**4**
Bahrgansar/Nowruz	Iran	27.1	0.892	-33	-	23	**3**
Bakr	Egypt	20.0	0.934	7	-	163	**3W**
Basrah Heavy	Iraq	24.7	0.905	-30	50	27	**3**
Basrah Light	Iraq	33.7	0.857	-10	11	8	**3**
Basrah Medium	Iraq	31.1	0.870	-30	22	14	**3**
Bass Strait	Australia	45.0	1.076	16	-	36	**2W**
BCF 13	Venezuela	12.9	0.980	-4	-	8630	**4**
BCF 17	Venezuela	16.9	0.954	-23 to -9(?)	1800	309	**4**
BCF 22	Venezuela	22.0	0.922	-51	-	63	**3**
BCF 24	Venezuela	24.0	0.910	-51	105	45	**3**

Examples of Fresh Crude Oil Properties

Common Name	Country of Origin	°API Grav	Specific Gravity	Pour Point °C	Viscosity cP @ 21°C	Viscosity cS t@ 37.8°C	Dispersibility
Beatrice	UK	38.7	0.831	13	13	10	**2W**
Bekapai	Indonesia	40.0	0.825	-21 to -9(?)	-	2	**2**
Belayim	Egypt	27.5	0.889	-16 to +6(?)	51	20	**3**
Berri	Saudi Arabia	37.8	0.838	-32	6	5	**2**
Beryl	North Sea	37.5	0.837	-1	-	3	**2**
Beta	USA	16.5	0.956	-9	700	-	**4**
Bintulu	Malaysia	28.1	0.886	-6	10	6	**3**
Bombay High	India	39.4	0.828	7 to 30(?)	6	4	**2W**
Bonny Light	Nigeria	36.0	0.845	-3 to +15(?)	6	4	**2W**
Bonny Medium	Nigeria	25.2	0.903	-24	18	13	**3**
Boscan	Venezuela	10.2	0.999	13	-	20000	**4**
Bow River Heavy	Canada (Alberta)	26.7	0.894	-50	34	21	**3**
Brass River	Nigeria	41.9	0.816	2 to 7	4	21	**2W**
Brega	Libya	40.4	0.823	-1	6	4	**2**
Brent	UK	38.2	0.837	-3 to +7	6	5	**2W**
Bu Attifel	Libya	40.6	0.822	41	28	14	**4**
Buchan	North Sea	33.7	0.856	6	20	-	**3W**
Bunju	Indonesia	32.2	0.864	17	-	3	**3W**
Burgan	Neutral Zone	23.3	0.913	-21	72	46	**3**
Caban Blend	Guatemala	26.5	0.896	10	-	17	**3W**
Cabinda	Angola	32.5	0.863	18	-	22	**3W**
California API 15	USA	13.3	0.977	-9	5000	-	**4**
Camar	Indonesia	36.6	0.842	32	-	24	**4**
Ceuta	Venezuela	31.8	0.867	-37	-	13	**3**
Ceuta Export	Venesuela	27.8	0.888	-54	15	12	**3**
Cinta	Indonesia	32.0	0.865	43	-	74	**3W**
Cormorant North	North Sea	34.9	0.850	12	-	7	**3W**
Cormorant South	North Sea	35.7	0.846	-6	-	6	**2**
Djeno Blend	Congo	26.9	0.893	3	93	43	**3**
Dorrood (Darius)	Iran	33.6	0.857	-21	-	7	**3**

Examples of Fresh Crude Oil Properties

Common Name	Country of Origin	°API Grav	Specific Gravity	Pour Point °C	Viscosity		Dispersibility
					cP @ 21°C	cS t@ 37.8°C	
Dos Cuadras	USA	25.7	0.900	-32	40	-	**3**
Dubai	Dubai	31.1	0.870	-9	11	8	**3**
Dukhan	Qatar	40.9	0.820	-15	7	6	**2**
Dunlin	North Sea	34.9	0.850	6	-	6	**3W**
Duri	Sumatra	20.6	0.930	14	515	250	**2W**
East Texas	USA (Texas)	37.0	0.839	2	7	5	**2**
Ekofisk	Norway	43.4	0.809	-12	4	2	**2**
El Morgan	Egypt	32.3	0.864	7	0	11	**3W**
Emeraude	Congo	23.6	0.912	-39	208	52	**3**
Eocene	Neutral Zone	18.6	0.942	-29	783	334	**3**
Erawan Condensate	Thailand	54.8	0.760	-46	0	3	**1**
Es Sider	Libya	37.0	0.840	9	9	7	**2W**
Escravos	Nigeria	36.2	0.844	-12	6	5	**2**
Espoir	Ivory Coast	31.4	0.869	-15	13	35	**3**
Eugene Is. Blk 32		36.9	0.840	0	11	-	**2**
Eugene Is. Blk 43	USA	36.9	0.840	7	8	-	**2W**
Fateh	Dubai, U.A.E.	31.1	0.870	-9	12	9	**3**
Federated Pipieline	Alberta, Canada	39.7	0.826	-10	4	3	**2**
Flotta	North Sea	35.9	0.845	-23	10	6	**2**
Forcados Blend	Nigeria	29.7	0.877	-20	8	6	**3**
Foroozan (Fereidoon)	Iran	31.3	0.869	-37	15	-	**3**
Forties	UK	36.6	0.842	-3	7	5	**2**
Fulmar	North Sea	39.3	0.828	-12	-	3	**2**
Galeota Mix	Trinidad	32.8	0.861	-15	7	5	**3**
Gamba	Gabon	31.8	0.867	23	78	3	**3W**
Gippsland Mix	Australia	44.4	0.804	16	-	2	**2W**
Gorm	North Sea	33.9	0.855	-37	-	6	**3**
Grand Isle	Louisiana, USA	34.2	0.853	-15	13	9	**3**
Green Canyon Block 65	USA	19.5	0.937	-28	150	-	**3**
Green Canyon Block 109	USA	27.0	0.892	-31	33	-	**3**

Examples of Fresh Crude Oil Properties

Common Name	Country of Origin	°API Grav	Specific Gravity	Pour Point °C	Viscosity cP @ 21°C	Viscosity cS t@ 37.8°C	Dispersibility
Guanipa	Venezuela	30.3	0.874	-29	20	12	**3**
Gulf Alberta	Alberta, Canada	35.1	0.849	-28	-	6	**2**
Gulf of Suez	Egypt	31.9	0.866	2	-	10	**3**
Gulfaks	Norway	31.1	0.870	-34	10	12	**3**
Handil	Indonesia	33.0	0.860	29	-	5	**4**
Heavy Lake Mix	Venezuela	17.4	0.950	-12	-	631	**3**
Hondo	USA	19.2	0.939	-15	600	-	**3**
Hout	Neutral Zone	32.8	0.861	-25	11	7	**3**
Hutton	North Sea	30.5	0.873	-3	-	12	**3**
Iranian Light	Iran	33.8	0.856	-34 to -29	11	7	**3**
Iranian Heavy	Iran	31.0	0.876	-21	17	7	**3**
Iranian Norwuz	Iran	17.7	0.948	-26	-	285	**3**
Isthmus	Mexico	32.8	0.861	-26	12	8	**3**
Isthmus/Maya Blend	Mexico	26.0	0.898	-26	-	45	**3**
Jatibarang	Indonesia	28.9	0.882	43	-	-	**4**
Jobo/Morichal	Venezuela	12.4	0.983	-1 to +32	-	3850-20300	**4**
Khafji	Neutral Zone	28.5	0.884	-35	26	17	**3**
Kirkuk Blend	Iraq	35.1	0.849	-22	7	6	**2**
Kole	Cameroon	34.9	0.860	-7	11	5	**3**
Kuwait	Kuwait	31.4	0.872	-15	16	11	**3**
Labuan	Malaysia	32.2	0.864	9	4	3	**3W**
Laguna	Venezuela	11.5	0.990	9	-	6670	**4**
Lagunillas	Venezuela	16.0	0.959	-1	0	521	**4**
Lagunillas Heavy	Venezuela	17.0	0.952	-34	773	314	**4**
Laiang	Indonesia	39.7	0.827	-12	-	5	**2**
Largo Treco	Venezuela	26.7	0.894	-40	59	33	**3**
Largomedio	Venezuela	31.5	0.868	-26	18	11	**3**
Leona	Venezuela	24.1	0.909	-32	75	29	**3**
Lloydminister Blended	Alberta, Canada	20.7	0.929	-32	-	109	**3**
Loreto	Peru	34.0	0.855	1	16	6	**3**

Examples of Fresh Crude Oil Properties

Common Name	Country of Origin	°API Grav	Specific Gravity	Pour Point °C	Viscosity		Dispersibility
					cP @ 21°C	cS t@ 37.8°C	
Louisiana	USA	34.6	0.852	-28	7	-	**3**
Louisiana Light Sweet	Louisiana, USA	36.1	0.844	-37	6	5	**2**
LSWR	Indonesia	24.2	0.909	38	-	330	**4**
Lucina	Gabon	39.5	0.827	15	-	10	**2W**
Lucula	Angola	33.6	0.857	-8	36	-	**3**
Main Pass Block 37	USA	38.7	0.831	-3	6	-	**2**
Main Pass Block 306	USA	32.8	0.861	-51	8	-	**3**
Malongo	Angola	31.1	0.870	21	50	-	**3W**
Mandji	Gabon	30.0	0.876	9	34	19	**3W**
Margham	UAR	50.4	0.778	-46	-	4	**1**
Magnus	North Sea	39.3	0.828	-3	5	-	**2**
Maureen	North Sea	35.6	0.847	7	16	-	**2W**
Maya	Mexico	22.0	0.922	-18	223	78	**3**
Menemota	Venezuela	20.0	0.934	-32	-	54	**3**
Merey	Venezuela	18.0	0.946	-32	937	289	**3**
Mesa	Venezuela	32.8	0.861	-15	14	9	**3**
Minas	Indonesia	35.0	0.850	35	23	24	**4**
Miri Light	Malaysia	32.6	0.862	0	-	3	**3**
Missis.Canyon Block 194	USA	35.4	0.848	-40	6	-	**2**
Montrose	North Sea	39.9	0.825	-3	5	4	**2**
Morichal	Venezuela	12.0	0.986	-1	-	20	**4**
Mubarek	Sharjah, U.A.E.	37.0	0.839	-12	-	4	**2**
Murban	Abu Dhabi	40.5	0.828	-24	5	4	**2**
Murchison	North Sea	38.0	0.834	7	-	4	**2W**
Nigerian Condensate	Nigeria	40.9	0.821	-40	-	4	**2**
Nigerian Medium	Nigeria	25.2	0.903	-27	-	13	**3**
Ninian	UK	35.6	0.847	2	10	7	**2**
North Rumaila	Iraq	33.7	0.860	-19	11	9	**3**
Oficina	Venezuela	33.3	0.858	-48	9	6	**3**
Oman	Oman	36.3	0.843	-26	11	6	**2**

Examples of Fresh Crude Oil Properties

Common Name	Country of Origin	°API Grav	Specific Gravity	Pour Point °C	Viscosity		Dispersibility
					cP @ 21°C	cS t@ 37.8°C	
Oquendjo	Gabon	35.7	0.846	-15	-	8	**2**
Oriente	Ecuador	29.2	0.881	-4	20	16	**3**
Oseberg	Norway	34.6	0.852	-9	8	-	**3**
Ostrica	Louisiana, USA	32.0	0.865	-12	12	8	**3**
Palanca	Angola	40.0	0.825	-3 to +10(?)	6	4	**2W**
Panuco	Mexico	12.8	0.981	2	-	4790	**4**
Pennington	Nigeria	36.6	0.842	6	-	4	**2W**
Pilon	Venezuela	13.7	0.975	-12 to -4	4180	1950	**4**
Piper	North Sea	35.0	0.849	-9	6	4	**2**
Platform B	Trinidad	28.5	0.884	10	-	5	**3W**
Point Arguello	USA	21.5	0.925	-12	400	-	**3**
Point Arguello Light	USA	30.4	0.874	-22	17	-	**3**
Rangely	USA	33.6	0.857	-9	25	-	**3**
Qatar Marine	Qatar	36.0	0.844	-16	8	7	**2**
Qua Ibo	Nigeria	35.8	0.846	8	6	5	**2W**
Quiriquire	Venezuela	16.1	0.845	-29	-	189	**4**
Rainbow	Alberta, Canada	40.7	0.821	3	-	5	**2**
Rangeland South	Alberta, Canada	39.5	0.827	-40	5	3	**2**
Ras Gharib	Egypt	21.5	0.924	2	247	88	**3**
Ras Lanuf	Libya	36.9	0.840	7	-	5	**2W**
Ratawi	Neutral Zone	23.5	0.912	-9	91	40	**2**
Rio Zulia	Columbia	40.8	0.821	27	-	5	**4**
Rostam	Iran	35.9	0.845	-23	5	4	**2**
Sahara Blend	Algeria	44.6	0.803	-39	4	4	**2**
Salmon (Sassan)	Iran	33.9	0.855	-21	9	7	**3**
San Joachim	Venezuela	41.5	0.818	24	-	2	**4**
San Joaquin Valley	USA	15.7	0.961	-9	1550	318	**4**
Santa Clara	USA	22.3	0.920	-1	250	-	**3**
Santa Cruz	Argentina	28.5	0.884	30	-	3	**4**
Santa Rosa Condensate	Venezuela	50.0	0.780	-40	-	3	**1**

Examples of Fresh Crude Oil Properties

Common Name	Country of Origin	°API Grav	Specific Gravity	Pour Point °C	Viscosity		Dispersibility
					cP @ 21°C	cS t@ 37.8°C	
Sarir	Libya	38.4	0.832	-21	9	7	**2**
Sea Breeze	USA	37.9	0.835	-3	5	4	**2**
Sepinggan	Indonesia	31.7	0.867	-7	-	3	**3**
Sergipano Platforma	Brazil	38.4	0.832	18	16	10	**2W**
Sergipano Terra	Brazil	24.1	0.909	6	438	149	**3W**
Seria Light	Brunei	36.5	0.842	2	3	2	**2**
Sharjah	Sharjah	22.0	0.922	-23	-	33	**3**
Sharjah Condensate	Sharjah	50.9	0.776	-46	-	3	**1**
Shengli	China	24.2	0.909	21	324	220	**3W**
Ship Shoal Block 239	USA	26.1	0.897	-15	27	-	**3**
Ship Shoal Block 269	USA	38.8	0.831	-42	5	-	**2**
Sirtica	Libya	41.3	0.818	-4	4	4	**2**
Sleipner Condensate	North Sea	58.4	0.745	-30	1	-	**1**
Snorre Blend	North Sea	38.2	0.834	3	7	-	**2**
Sockeye	USA	26.2	0.897	n/a	37	-	**3?**
Soroosh (Cyrus)	Iran	18.1	0.945	-12	1380	-	**3**
Souedie	Syria	24.9	0.904	-30	148	28	**3**
South Louisana	USA	32.8	0.861	-21	11	7	**3**
South Pass Block 60	USA	36.0	0.845	-9	8	-	**2**
South Pass Block 67	USA	16.5	0.956	13	-	-	**4**
South Pass Block 93	USA	33.4	0.857	-15	15	-	**3**
South Timbalier Block 130	USA	35.2	0.849	-27	6	-	**2**
Soviet Export Blend	Former Soviet Union	31.8	0.866	-12	11	10	**3**
Soyo Blend	Angola	33.7	0.857	18	-	12	**3W**
Statfjord	Norway	38.4	0.833	-2	6	4	**2**
Statford	UK	38.4	0.833	4	-	4	**2**
Sture Blend	North Sea	35.6	0.847	-3	8	-	**2**
Suez Mix	Egypt	32.0	0.865	4	-	12	**3**
Sumatran Light	Indonesia	32.8	0.861	38	30000	-	**4**
Sumatran Heavy	Indonesia	20.5	0.931	18	10000	-	**3W**

Examples of Fresh Crude Oil Properties

Common Name	Country of Origin	°API Grav	Specific Gravity	Pour Point °C	Viscosity cP @ 21°C	Viscosity cS t@ 37.8°C	Dispersibility
Taching	China	33.0	0.860	35	52	23-160	**4**
Takula	Angola	32.9	0.861	4	80	23	**3**
Tapis Blend	Malaysia	44.3	0.805	4	3	2	**2**
Tartan	North Sea	41.7	0.816	-9	-	14	**2**
Temblador	Venezuela	21.0	0.927	-51	149	63	**3**
Tembungo	Venezuela	37.4	0.837	-4	-	2	**2**
Thistle	North Sea	37.0	0.839	12	6	5	**2W**
Tia Juana 102	Venezuela	25.8	0.899	-48	54	37	**3**
Tia Juana Heavy	Venezuela	18.2	0.945	-40	435	199	**3**
Tia Juana Light	Venezuela	32.1	0.864	-43	14	12	**3**
Tia Juana Medium	Venezuela	26.9	0.893	-46	44	31	**3**
Tia Juana Pesada	Venezuela	13.2	0.978	-1	17000	3780	**4**
Trinidad	Trinidad	30.0	0.876	7	-	6	**3W**
Udang Light	Indonesia	38.0	0.834	38	17	15	**4**
Udang Heavy	Indonesia	14.4	0.970	38	9000	-	**4**
Ula	North Sea	38.6	0.832	6	8	-	**2W**
Umm Shaif	Abu Dhabi	37.4	0.838	-30	5	6	**2**
Venezuela Mix	Venezuela	22.5	0.919	-32	-	54	**3**
Veslefrink	North Sea	37.2	0.839	6	11	-	**2W**
Wafra Eocene	Neutral Zone	18.6	0.943	-29	-	286	**3**
Wainwright-Kinsella	Canada	23.1	0.915	-39	121	108	**3**
Walio Export Mix	Indonesia	35.4	0.847	-7	7	6	**2**
West Delta Block 30	USA	11.4	0.989	-23	1000	-	**4**
West Delta Block 97	USA	50.4	0.778	-27	1	-	**1**
West Texas Intermediate	USA	36.6	0.842	n/a	6	-	**2?**
West Texas Sour	USA	34.1	0.834	-46	7	6	**3**
Willmington	USA	18.6	0.942	-34	243	82	**2**
Zaire	Zaire	31.7	0.867	27	-	23	**4**
Zakum	Abu Dhabi	40.6	0.822	-21	4	4	**2**
Zarzaitine	Algeria	43.0	0.811	-12	5	4	**2**

Attachment B. Dispersant use Operational Planning and Implementation Guidance

Dispersant Use Operational Planning and Implementation Guidance

1. Purpose

This guidance was developed to assist the Federal On Scene Coordinator (FOSC) and the Unified Command in their effort to assess the potential use of dispersants, and if warranted, their use on applicable oil spills occurring within Region IV. This plan supports the decision making, logistical, and mobilization concerns associated with the proper use, deployment, and monitoring of dispersant technology. Essentially this document provides a guide to develop and execute a dispersant use operations plan.

2. Background

The priority in using dispersants is gaining the approval to do so and mobilizing the equipment and people to accomplish the task. It is critical that OSCs, Area Committees, and Unified Commands plan for the use of dispersants and other complex countermeasures. Time is critical for the use of this type of technology and deployment windows are narrow. The characteristics and weathering of most oils and other operational priorities lead to dispersant operations being more effective within the first 24 hours of the response. Also specialized equipment and trained personnel are not abundantly available, especially in some remote areas. These resources must be pre-identified and all necessary agreements needed to access them should be in place as much as practicable. This guidance, developed in checklist form, should assist OSCs and Unified Commanders in implementing proper dispersant use as an effective countermeasure for an oil spill. This guidance is arranged to assist in:

- Decision making on proper dispersant use and strategy;
- Development of an Operations Plan;
- Notifying the RRT and gaining RRT approval;
- Developing functional positions within the Unified Command to support dispersant operations;
- Site safety preparation; and,
- Enhancing planning efforts.

3. Format

The format of this guidance is a bit different in that it is not intended to stand by itself. It is a collection of flowcharts, matrices, checklists, templates, and job aids that planners can incorporate into existing planning efforts, be used in training, and be implemented during a response.

This guidance will assist in addressing the operational aspects, planning, and logistics of dispersant deployment but does not address approval or concurrence with these programs. The appropriate place for this information is planning and preparedness discussions with Area Committees and development of the ACP.

4. Implementation

4.1. Safety

Safety of personnel is paramount to the success of the operation. Reference information has been provided in this guidance to assist in the safety planning for a response where dispersants are used. Planners are encouraged to develop safety plan templates, including ICS-208 forms, before the need to deploy dispersants occurs.

4.2. Flexibility and Span of Control

Like other functions within a particular response management system, the Incident Commander is free to decrease or expand his/her functional structure based on the response need. Dispersant operations are no different. For instance, in a less complex response, the monitor role can be combined with the spotter role, thus alleviating the need for additional aircraft. For more complex operations, additional spray platforms under one spotter or multiple spotters may be added depending on the need and acceptable span-of-control. Observers may be assigned to any platform if acceptable to save resource expenses. Any combination is possible.

4.3. Organization

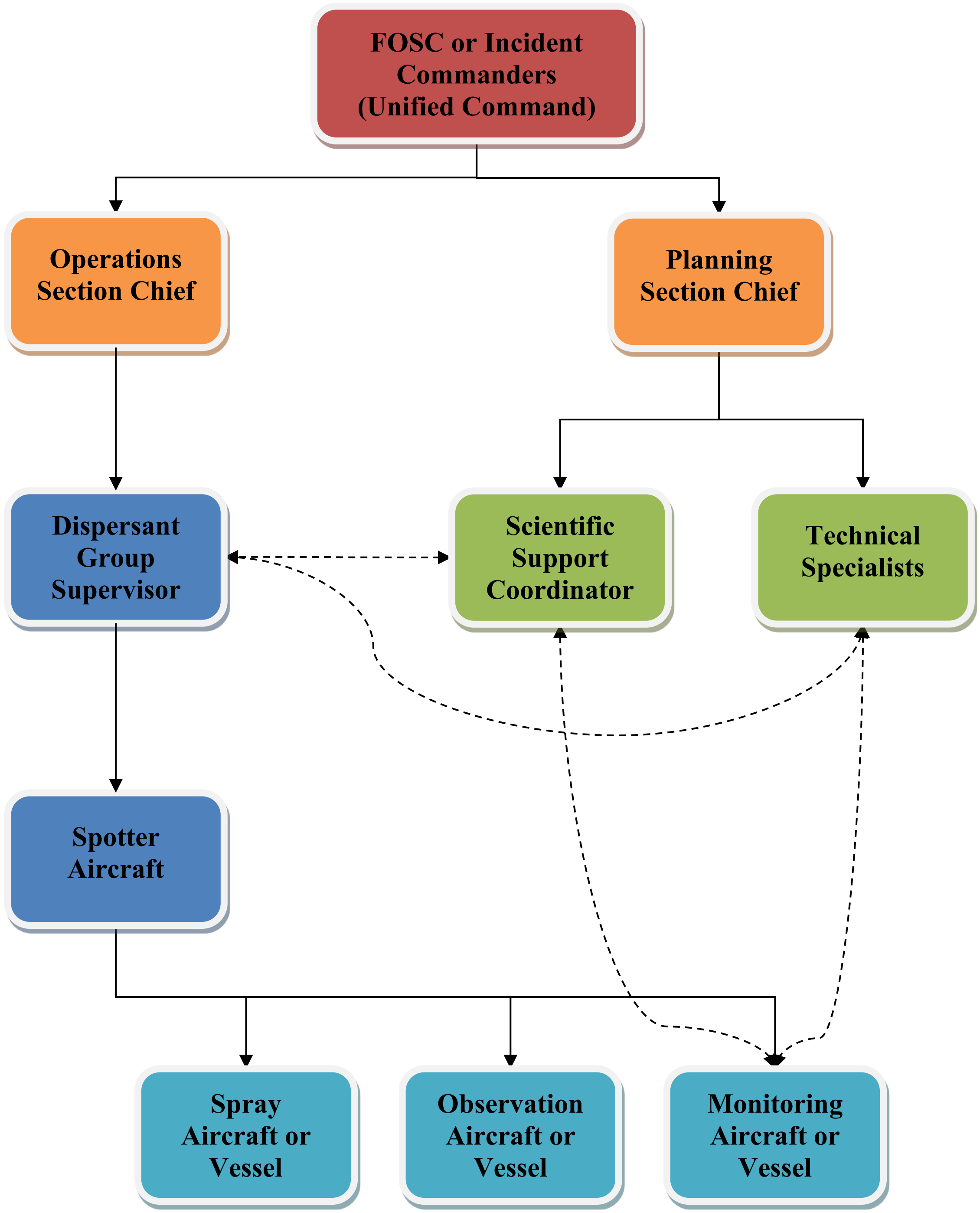
An ICS organization chart is included to show the potential relationships within the Unified Command between the Dispersant Operation Group, the Technical Specialists, and Logistics.

4.4. Procedure

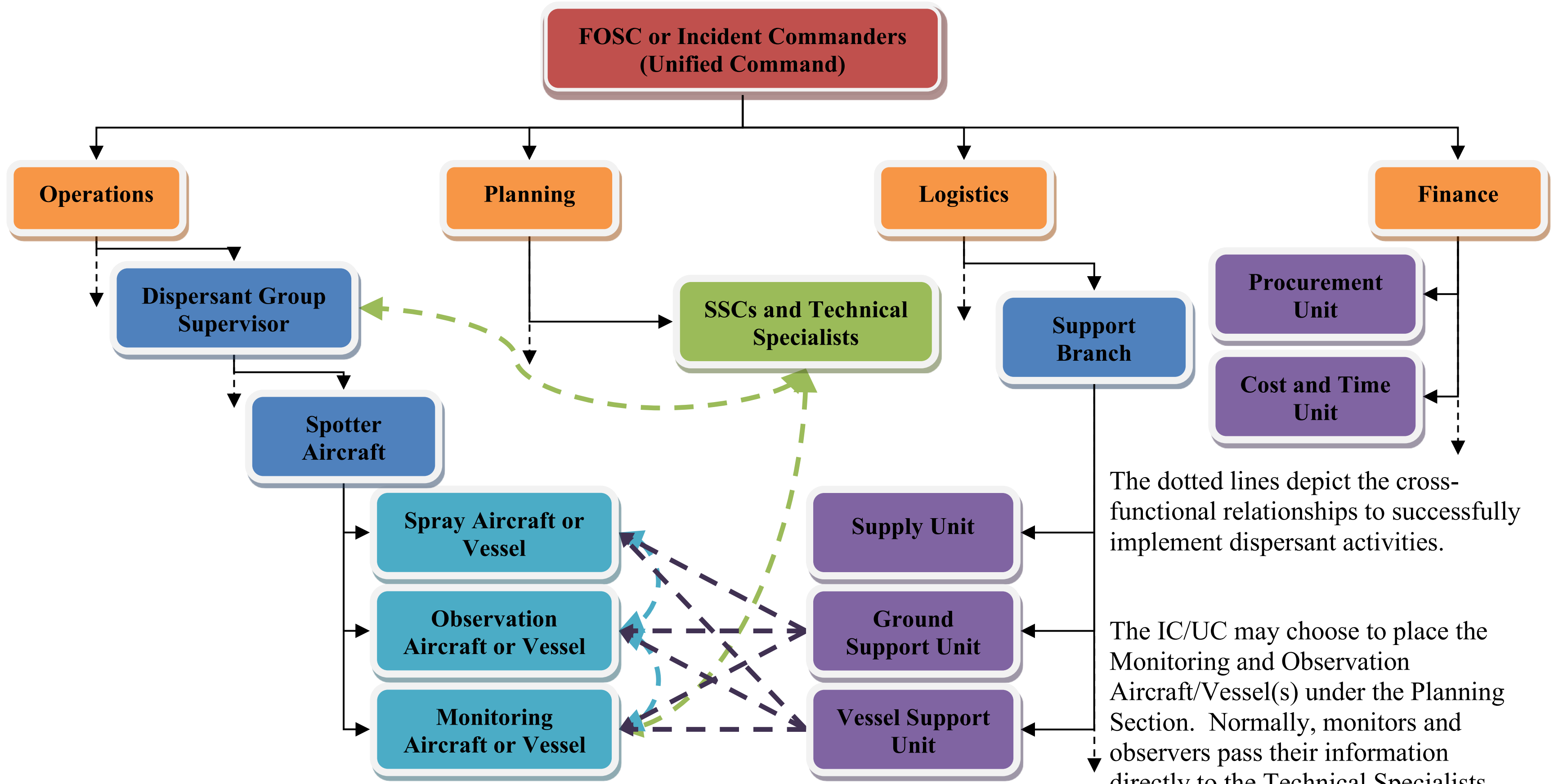
On Scene Coordinators (OSCs) are encouraged to use this guidance to standardize the planning and implementation of dispersant use.

5. Contents

Appendix I. **ICS Organization Chart for Dispersant Use**



Appendix II. **ICS Dispersant Use Organizational Relationships**



The dotted lines depict the cross-functional relationships to successfully implement dispersant activities.

The IC/UC may choose to place the Monitoring and Observation Aircraft/Vessel(s) under the Planning Section. Normally, monitors and observers pass their information directly to the Technical Specialists located under Planning (e.g. similar to SCAT Teams, field observers, etc.). Either scheme will work as long as a strong working/reporting relationship between Operations and Planning is established. Monitor and Observer placement within functional schematic

Appendix III. **Dispersant Use Decision and Implementation Element Checklist**

This is a recommended checklist but is not necessary for implementation of the DUPP. All answers should be **YES** or **N/A** before dispersant should be used

☐ Y ☐ N ☐ N/A	**Is the spill/oil dispersible?** Oil is generally dispersible if: - API Gravity is more than 17 - Pour Point is less than 10 F (5.5 C) below ambient temperature - Viscosity is less than 10,000 centistokes Note: Some modern dispersants may be formulated to be effective on a wider range of oil properties. The choices of dispersants listed on the NCP's National Product Schedule are limited. To answer this question, look at which dispersant would the most effective given the type of oil.
☐ Y ☐ N ☐ N/A	**Have environmental tradeoffs of dispersant use indicated that use should be considered?** Note: Dispersant toxicity assessment information found in biological assessments and consultations with DOI and DOC will provide direction for this decision. The Scientific Support Coordinator(s) will be able to interpret this information for operational recommendations.
☐ Y ☐ N ☐ N/A	**Is the chosen dispersant likely to be effective?** Consider: - effectiveness of dispersant application to the oil; - dispersant-to-oil application ratio; - oil slick thickness; - distribution of oil slick on the water; - droplet size distribution in aerial spray; - oil viscosity; - energy input; - suspended particles in water (sedimentation); - weathering of oil; - emulsification of oil; - oil composition; - dispersant composition; - water salinity; - temperature; and - dispersant type compatible with application means Note: A preliminary effectiveness test such as the standard flask swirling method is highly recommended.

☐ Y ☐ N ☐ N/A	**Can dispersant application be conducted safely and effectively given the physical environment?** Environmental parameters: - winds less than or equal to 25 knots - visibility greater than or equal to 3 miles - ceiling greater than or equal to 1000 feet - operations during daylight hours only
☐ Y ☐ N ☐ N/A	**Are sufficient equipment and personnel available to conduct aerial dispersant application operations within the window of opportunity?** Note: Refer to elements and position descriptions under the Dispersant Operations Group Supervisor in the Operations Section…Other tools are available to assess this such as the NOAA Dispersant Mission Planner
☐ Y ☐ N ☐ N/A	**Has a Site Safety Plan for dispersant operations been completed?**
☐ Y ☐ N ☐ N/A	**Is the spill/oil to be dispersed within a Pre-Approved Zone?** See sections 2.1 and 4.1 of the RRT IV Dispersant Use Plan
☐ Y ☐ N ☐ N/A	**If the spill/oil is NOT in a Pre-Approved Zone, has approval been granted?** See section 4.2 of the RRT IV Dispersant Use Plan. Submit "RRT Documentation/Application Form for Dispersant Use" to RRT IV with request for approval. Note: Dispersant use in non-approved areas must be requested by the FOSC and approved by EPA and the affected state(s) after consultation with DOC and DOI.
☐ Y ☐ N ☐ N/A	**Are the necessary equipment and trained personnel available to conduct the recommended monitoring operations?** The recommended monitoring protocol in the RRT IV is the Special Monitoring for Advanced Response Technologies or SMART. The Gulf Strike Team or Atlantic Strike Team is available to support and provide monitoring assistance. Note: It may not be appropriate to base Go/No Go or continue/discontinue decisions solely on results from SMART monitoring. The SSCs should be utilized to interpret monitoring results and provide operational recommendations.
☐ Y ☐ N ☐ N/A	**Has the overflight to assure that endangered species are not in the application area been conducted?** Note: Protocol 3.11 in the RRT IV Dispersant Use Plan requires the FOSC to determine if any threatened or endangered species are present in the projected application area or otherwise at risk from dispersant operations.
☐ Y ☐ N ☐ N/A	**Has a Dispersant Operations Plan been completed?** Note: Attached within this guidance a Dispersant Operations Plan template.

Appendix IV. **Dispersant Application Platform Capability Decision Matrix**

Platform	Payload (Gallons)	Approximate Min/Max Dosage (Gallons per Acre)	Coverage/ Sortie * 5 gal/acre Dosage (Acres)	Coverage/ Sortie * 10 gal/acre Dosage (Acres)	Coverage/ Sortie * Max gal/acre Dosage (Acres)	Maximum Operational Time (Hours)	Transit Speed (Knots)	Operational Speed (Knots)	Operational Niche/ Limitation Considerations
Bell 212 with Bucket	300	0.8/21.5	60	30	14	1.7	40-90	40-90	***(1)
C130 with ADDS	5000	1.4/16.4	1000	500	305	12	200-300	140-150	***(2)
C130 with MASS	2000	2.6/19.4	400	200	103	12	300	140-200	***(3)
DC-4	2170	0.8/10.3	434	217	211	4.5	175	156-175	***(4)
DC-6B	3000	4.3/19.8	600	300	152	5.5	130-225	130-225	***(5)
Thrush	510	-/-	102	51	-	4.5	125	90	***(6)
Air Tractor 801	800	-/-	160	80	-	2.5	200	150	***(7)
Large Vessel (>100ft)	3000	2.2/35.8	600	300	84	100	15	3-10	***(8)
Small Vessel (20-40 feet)	600	1.1/71.7	120	60	8	20	25	3-10	***(9)
Fire Monitor	Vessel Dependent	5/20	Vessel Dependent	Vessel Dependent	Vessel Dependent	Vessel Dependent	Vessel Dependent	2-15	***(10)

Notes:

* Assumes Full Payload

** Small platforms may be the best choice for larger spills to treat the leading edge and thicker portions of the slick until a larger and more effective platform can arrive on scene.

*** For notes (1) through (10) see next page.

(1) Bell 212 with Bucket

For relatively small spills and where transit distance is short. Platform has relatively short operational duration and spray capacity.

(2) C130 with ADDS

Most capable platform for large spills. Has high endurance and spray capacity. If a Coast Guard C-130 Hercules is used to support ADDS-Pack deployment, in accordance with existing MOAs, a modification (removal of rails in cargo bay) to the aircraft setup will be necessary which would take 6 to 8 hours to complete. This delay should be accounted for when considering aircraft availability.

(3) C130 with MASS

Good platform for endurance. Spray capacity is less than half of Adds-Pack. For medium to large spills.

(4) DC-4

Use for medium to large spills. Moderate endurance. Spray capacity is similar.

(5) DC-6B

Use for medium to large spills. Moderate endurance. Spray capacity is similar.

(6) Thrush

Crop-duster type aircraft good for small to medium spills. Can be turned around quickly for repeated treatments of larger slicks. Spray nozzels should be calibrated specifically for dispersant operations to obtain correct droplet size and spray pattern.

(7) Air Tractor 801

Crop-duster type aircraft good for small to medium spills. Can be turned around quickly for repeated treatments of larger slicks. Spray nozzels should be calibrated specifically for dispersant operations to obtain correct droplet size and spray pattern.

(8) Large Vessel (>100ft)

High endurance and spray capacity, but has slow operational speed.

(9) Small Vessel (20-40ft)

Small to medium slicks or surgical treatment of the slick's leading edge. Slow speed and low spray capacity.

(10) Fire Monitor

May be good for surgical treatment of the slick's leading edge and thickest portions of the slick. Calibration and delivery rate may be difficult to control.

Appendix V. **Dispersant Application Operational Feasibility Form**

This is a recommended worksheet but is not necessary for implementation of the DUPP.

KEY OPERATIONAL FACTORS

Weather:	**Wind:**	☐ OK ☐ Not OK	**Window of Opportunity:**	
	Visibility:	☐ OK ☐ Not OK	**Daylight Hrs Remaining:**	
	Clearance:	☐ OK ☐ Not OK	**Smallest Window:**	
Platform Data:	**Transit Speed:**	Knots	**Coverage Rate:**	Acres/s
	Application Speed:	Knots		SqFt/s
Swath:		Feet	**System Pump Rate:**	gpm
Dispersant Payload:		gals	**Dispersant Actual Load:**	gals
Ideal Oil/Dispersant Ratio:			**Oil Treatable/Ideal Ratio:**	bbls
% Oil Treatable w/ Ideal Ratio:		%	**# Dispersant Loads/Oil Volume:**	
Max Acres/Dispersant Load:		Acres	**bbls Treated Based on Speed:**	bbls
Actual Oil/Dispersant Ratio:			**Dispersant Gallons/Acre**	
Time to Deplete Stockpile:		hours		
Spotter Data:		**Type Platform:**		
		Transit Speed:		Knots

SPILL STATS

	bbls		%
Total Treatable Oil:	bbls	**Slick Area:**	Acres
Average Slick Thickness:	mm	**Distance of Staging to Treatment Area:**	Nautical Miles

RESOURCE LOCATIONS AND DISTANCES

Staging Area	**Location:**		**Distance to Staging Area:**	
	# Gallons Staged:	gals	**Transportation Unit:**	
	Dispersant in Product Schedule?	☐ Yes ☐ No	**Amount:**	gals
Platform Location:			**Application System Location:**	
Dispersant Location:			**Spotter Location:**	

TIME TO GET SYSTEMS READY

Use the first table for estimating the mobilization and arrival time for each component of the application system:

	Stockpile	**Platform**	**Application System**	**Spotter**
Personnel Recall:	Hrs	Hrs	Hrs	Hrs
Loading for Transport:	Hrs	Hrs	Hrs	Hrs
Transport to Staging Area:	Hrs	Hrs	Hrs	Hrs
(1) Total Mobilization Time:	Hrs	Hrs	Hrs	Hrs

Use the second table for estimating the time for readying the system, initial application, and turnaround for subsequent application:

Total time for latest component: (i.e. largest vale for the (1) Total row above)	Hrs
Loading of Application System:	Hrs
(2) Total Time for Ready System:	**Hrs**

Slowest Transport Speed:	Knots
Time to Arrive at Treatment Area:	Hrs
Time For Positioning:	Hrs
(3) Total Time Initial Application:	**Hrs**

Return Time:	Hrs
Reload Time:	Hrs
(3) Total Time Initial Application:	Hrs
(4) Total Time Next Application:	**Hrs**

Appendix VI. **Dispersant Operation Plan Checklist**

(To be Completed by Dispersant Operations Group Supervisor)

This is a recommended worksheet but is not necessary for implementation of the DUPP.

DISPERSENT USE PRE-BRIEF – PLATFORM ASSIGNMENTS

Title	Platform/ Personnel Names	Tactical Call Sign	ETD to Site	ETA to Site
Spotter(s):				
Sprayer(s):				
Observer(s):				
Monitor(s):				

PLATFORM ASSIGNMENTS / IDENTIFICATION OF OPERATIONAL AREA BOUNDARIES

Title	Aircraft Designator	Latitude	Longitude	Altitude
Entry				
Exit				
Spill Site				
Location of Operational Area				

AIRCRAFT SEPARATION ALTITUDES

Title	Aircraft/Call Sign	Spray Altitude	Operations Altitude
Spotter		n/a	
Sprayer			
Observer		N/A	
Sprayer			

DISPERSANT INFORMATION

Dispersant Name:			
Source of Dispersant:			
Application Rate per Sortie:	Gal/acre	**Number of Sorties Planned:**	
Total Amount of Dispersant to be used per Sortie:			
Sprayer Platform:			
Sprayer Width:	feet	feet	feet

COMMUNICATIONS (complete as needed or attach ICS 205)

Air to Air:	VHF	UHF	Other
Air to Vessel:	VHF	UHF	Other
Air to Ground:	VHF	UHF	Other
Ground to Vessel:	VHF	UHF	Other
Vessel to Vessel:	VHF	UHF	Other

POST DISPERSANT USE INFORMATION (Fill out for each Sortie)

	SORTIE		
	1	**2**	**3**
Date:			
Total Amount of Dispersant Used:	gal		
Dispersant Initiation Time:	(24hhmm)	(24hhmm)	(24hhmm)
Dispersant Conclusion Time:	(24hhmm)	(24hhmm)	(24hhmm)
Number of Passes Per Sortie:			

OBSERVATIONS

Did the oil reappear after the application? (Refer to Observer's Log)

DEBRIEF (To be facilitated by the Dispersant Operations Group Supervisor with input from dispersant group elements)

What problems were encountered?
What recommendations would you make?

OTHER

Habitats Impacted and Resources at Risk[1]

		☐ Yes ☐ No
Habitat Type(s) Impacted:	☐ Southern cordgrass prairie ☐ Palmetto prairie ☐ Cypress savanna ☐ Agricultural lands ☐ Wetlands	☐ Estuarine[2] ☐ Riverine[3] ☐ Lacustrine[4] ☐ Palustrine[5] ☐ Other
Seasonal concerns:		☐ Yes ☐ No

[1] Summary of Protocol 4.11 from RRT IV *In-Situ* Burn Plan (also required for preauthorization): Burning will be conducted in accordance with consultations approved by USFWS and NMFS, under ESA Section & and EFH. Prior burning, an on-site survey will be conducted to determine if any threatened or endangered species are present or otherwise at risk, and natural resource specialists will be consulted.
[2] Estuarine wetlands - tidal wetlands in low-wave-energy environments where the salinity of the water is greater than 0.5 part per thousand and is variable owing to evaporation and the mixing of seawater and freshwater; tidal wetlands of coastal rivers and embayments, salty tidal marshes, mangrove swamps, and tidal flats.
[3] Riverine wetlands - wetlands within river and stream channels; ocean-derived salinity is less than 0.5 part per thousand.
[4] Lacustrine wetlands - wetlands within a lake or reservoir greater than 20 acres or within a lake or reservoir less than 20 acres if the water is greater than 2 meters deep in the deepest part of the basin; ocean-derived salinity is less than 0.5 part per thousand.
[5] Palustrine wetlands - freshwater wetlands including open water bodies of less than 20 acres in which water is less than 2 meters deep; includes marshes, wet meadows, fens, playas, potholes, pocosins, bogs, swamps, and shallow ponds; most wetlands are in the Palustrine system.

<table>
<tr><td>Comments:</td><td colspan="2"></td></tr>
<tr><td rowspan="12">Biological Resources
Describe Significant issues such as: Large Concentrations, Breeding Activities, Rookeries, Designated Critical Habitat</td><td>☐ Threatened / Endangered Species (including plants)</td><td></td></tr>
<tr><td>☐ Mammals</td><td></td></tr>
<tr><td>☐ Waterfowl</td><td></td></tr>
<tr><td>☐ Wading Birds</td><td></td></tr>
<tr><td>☐ Diving Birds</td><td></td></tr>
<tr><td>☐ Shore Birds</td><td></td></tr>
<tr><td>☐ Raptors</td><td></td></tr>
<tr><td>☐ Fish</td><td></td></tr>
<tr><td>☐ Reptiles</td><td></td></tr>
<tr><td>☐ Amphibians</td><td></td></tr>
<tr><td>☐ Other</td><td></td></tr>
<tr><td>☐ Comments/Attachments (i.e., ESI Maps)</td><td></td></tr>
</table>

Natural Areas	☐ National Park	
	☐ National Wildlife Refuge	
	☐ National Forest	
	☐ State Park	
	☐ State Wildlife Area	
	☐ Other Natural Areas	
	☐ Comments:	
Historic, Cultural, and Archeological Resources	☐ Yes ☐ No ☐ Unknown	
Commercial Harvest Areas	☐ Yes ☐ No ☐ Unknown	

DISPERSANT GROUP PERSONNEL SHOULD PROVIDE FEEDBACK TO THE DISPERSANT OPERATION GROUP SUPERVISOR

Appendix VII. **Dispersant Effectiveness Monitoring Aerial Checklist**

(To Be Completed by Dispersant Op Monitoring Team)

This is a recommended worksheet but is not necessary for implementation of the DUPP.

OBSERVATIONS

What immediately happened when the dispersant contacted the spill?				
After 2 Hours:				
After 6 Hours:				
After 24 Hours (if applicable):				
Submerged Cloud Observed?	☐ Y ☐ N	Did any oil resurface?:	☐ Y ☐ N ☐ Unknown	
Number of Passes/Sortie:	(1)	(2)	(3)	Total
Effects on Floating Oil, Biota, Sea Color, Wave Pattern, or Other Physical Features:				
Extent of Application/Acres of Oil Sprayed:				
Approximate Percent of Overspray:				
%				

PHOTOGRAPHY

	☐ Y ☐ N		☐ Y ☐ N
Storage location or POC for photos:			
If videotape of the operation is taken, obtain a copy.			
If AIREYE and/or HIRR/IR is used, obtain a copy of the film, tape, or digital imagery.			
Monitoring Team Leader reports data to the Scientific Support Coordinator after each sortie.			

THE ABOVE INFORMATION SHOULD BE FILLED OUT FOR EACH SORTIE

MONITORING TEAM LEADER ALSO COMPLETES THE DEBRIEF SECTION

DISPERSANT GROUP PERSONNEL SHOULD PROVIDE FEEDBACK TO DISPERSANT OPERATION GROUP SUPERVISOR

Appendix VIII. **Dispersant Effectiveness Monitoring Waterborne Checklist**

(To Be Completed by Dispersant Op Monitoring Team)

This is a recommended worksheet but is not necessary for implementation of the DUPP.

FLOUROMETRY/SAMPLING

<table>
<tr><td rowspan="3">Identify Monitoring Platform</td><td>Name</td><td>Location</td><td>ETD TO SITE</td><td>ETA TO SITE</td></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td></td><td></td></tr>
<tr><td colspan="2">Consider: draft, water depth, weather, freeboard, range, speed, transit time, and completion of each sortie.</td></tr>
<tr><td colspan="3">Background Fluorescence Readings Taken?</td><td colspan="2">☐ Y ☐ N</td></tr>
<tr><td colspan="3">Transect Readings After the Dispersants are Applied Recorded?</td><td colspan="2"></td></tr>
<tr><td colspan="3">Was an oil/dispersant/water sample collected?</td><td colspan="2"></td></tr>
<tr><td colspan="5">If an oil/dispersant/water sample was collected, label and record the following:</td></tr>
<tr><td colspan="2">Geographic Location:</td><td colspan="3"></td></tr>
<tr><td colspan="2">Depth:</td><td colspan="3"></td></tr>
<tr><td colspan="2">Location Relative to Spilled Oil:</td><td colspan="3"></td></tr>
<tr><td colspan="2">Time:</td><td colspan="3"></td></tr>
<tr><td colspan="2">Notes: (Why sample was taken? Was it typical or unusual?)</td><td colspan="3"></td></tr>
<tr><td colspan="3">Information Reported to Monitoring Team Leader?</td><td colspan="2">☐ Y ☐ N</td></tr>
</table>

DEBRIEF (To be facilitated by the Dispersant Operations Group Supervisor with input from dispersant group elements):

What problems were encountered?
What recommendations would you make?

OTHER:

DISPERSANT GROUP PERSONNEL SHOULD PROVIDE FEEDBACK TO THE DISPERSANT OPERATION GROUP SUPERVISOR

Appendix IX. **Dispersant Application Logistics and Support Checklist**

(Completed by Dispersant Operations Group Supervisor)

This is a recommended worksheet but is not necessary for implementation of the DUPP.

PERSONNEL

(Note: A person can hold more than one functional position especially within the Unified Command Post and depending on the platform resources deployed)

POSITION	NAME(s)
Incident Commander	
Operations Section Chief	
Dispersant Operations Group Supervisor	
Spotter	
Sprayer	
Effectiveness Monitor	
Operations Observer	
Planning Section Chief	
Technical Specialist	
Logistics Section Chief	
Support Branch Chief	
Supply Unit Leader	
Ground Support Unit Leader	
Vessel/Air Support Unit Leader	
Finance Section Chief	
Procurement Unit Leader	

EQUIPMENT

(Note: Number of aircraft and vessels needed are dependent on size/complexity of the operation…vessels or aircraft can serve more than one function)

Spotter Aircraft Type:	
Spray Platform Type:	☐ Aircraft[6] ☐ Vessel
Spray Platform:	
Camera Types:	☐ Handheld ☐ Aircraft-mounted ☐ Infrared ☐ Multi/Hyperspectral ☐ LWIR ☐ Video ☐ Geospatially-referenced ☐ Streaming over web/radio
GPS Logging:	☐ Georeferenced camera and/or video ☐ Flight path shapefile or other file format ☐ Remote real-time tracking software

[6] Helicopter (various)
C-130 Hercules
DC-4
DC-6B
DC-3, Fokker F-27, or Canadair CL-215
Agriculture Spray Planes: Piper Pawnee, Cessna Agtruck, Ayres Thrush, Turbo Thrush
Air Tractor 801

MATERIALS

	☐ Yes ☐ Initial on-site at minimum
Checklists and Job Aids for Functional Positions:	☐ Dispersant Operation Group Supervisor ☐ Spotter ☐ Sprayer ☐ Monitor ☐ Observer ☐ Common ICS Responsibilities
Forms:	**Sprayer** ☐ Checklist ☐ Log ☐ Report **Monitor** ☐ Checklist ☐ Log ☐ Report **Observer** ☐ Checklist ☐ Log ☐ Report
Dispersant Operations Plan Forms and Checklists:	☐ Dispersant Operation Plan Checklist ☐ Dispersant Effectiveness Monitoring Aerial Checklist ☐ Dispersant Effectiveness Monitoring Waterborne Checklist ☐ Additional Notification and ER Consultation Form *(if considering outside green zone)*
Basemaps / Charts of the Area	☐ Printed ☐ Digital
Site Safety Plan Items:	☐ Monitoring Equipment (e.g. O2/Combustible Gas Meter, WBGT/Heat Stress, H2S Monitor, etc.) ☐ Personal Flotation Device ☐ Emergency Locator Beacon ☐ Survival Equipment ☐ NOMEX Coveralls (if available) ☐ Cold Water Flotation Suit (if applicable) ☐ Level D and Level C PPE Equipment (where applicable) ☐ Communications Equipment

Appendix X. **Dispersant Operation Group Supervisor Job Aid**

Supervisor Responsibilities:

The Dispersant Operation Group Supervisor is in charge of a functional group under the Operations Section of the ICS organization. This position manages the planning and execution for the dispersant operation. This position relieves the burden on the Operations Section Chief and the Air Operations Branch, and in smaller cases may alleviate the need for the Air Operations Branch. In the event of a large spill, air operations could easily be overwhelmed with vessel skimming and overflight support, which might delay the actual dispersant application.

Supervisor Duties:

The **Dispersant Operation Group Supervisor** is ground-based and reports to the Operations Section Chief in the ICS organization. The Group Supervisor's duties include:

- Submits the dispersant application to the RRT
- Ensures the overall safety of the dispersant operation
- Develops dispersant operations portion of the Incident Action Plan or IAP (Dispersant Operation Plan)
- Requests restricted airspace if needed for the dispersant operation
- Determines what aircraft and vessels will be operating on scene to carry out the dispersant operation
- Requests resources needed to implement the Dispersant Operation Plan
- Arranges logistical support including such things as obtaining or storing adequate supplies of dispersants, aircraft maintenance and fuel, airport arrangements, and additional aircrews, if needed
- Supervises the execution of the Dispersant Operation Plan, monitors progress, and makes additional application requests as needed
- Coordinates any aircraft support through the Air Operations Branch Director
- Conducts a safety briefing and debriefing of dispersant operations group personnel
- Obtains video/still photography of the dispersant operation
- Coordinates the disposal of residual dispersant from drums and/or tanks
- Coordinate closely with Scientific Support Coordinator (SSC) and other technical specialists to ensure input/recommendations are shared with the Unified Command
- Obtain samples and oil information (e.g. MSDS, API, Viscosity, etc.) as soon as possible for both spills and potential spills. Can use NOAA's Oil Information Data Sheet from ADIOS to collect information. Determine dispersibility potential of the oil. May require lab analysis and testing. SSC can provide this service.

- Obtain dispersant capability as soon as potential need is identified. DRAT can assist.
- Obtain short- and long-term weather forecasts.
- Comply with the dispersant use planning protocols for the RRT region including completing of any checklist, consultations, and dissemination of required information to the RRT or others.
- Continue other countermeasures and operations as appropriate while waiting for dispersants or in conjunction with dispersant use.
- Treat thickest part of the slick as the priority.
- Consider using a tiered response plan (e.g. most available response means fist while waiting for more desirable response equipment). For example, start dispersant treatment with vessels and fire monitors or helicopters with a spray bucket until larger platforms, such as a C-130, arrive.
- Determine the relationship between the RP and the government's implementation of the Dispersant Operations Group Supervisor responsibility.
- Develop Safety Plan for Dispersant Operation.
- Establish applicable Safety Zones and Restricted Airspace to ensure safety of vessels, aircraft, and personnel during the operation.
- Use the NOAA dispersant mission planning software to develop a range of scenarios and a comparison table for planning purposes.
- Initiate recording and download capability for GPS or written documentation. GPS capability and maps should show application and no-application zones for open ocean.

Appendix XI. **Spotter Job Aid**

Spotter Responsibilities:

The Spotter Aircraft Position or "Spotter" is physically located in an aircraft. The Spotter is a person who "spots" or controls, guides, or lines up the sprayer aircraft or vessels over the spill target. Because a dispersant application can be made by both vessels and aircraft, the Spotter would maintain tactical control over both types of delivery systems.

The Spotter is in charge of the dispersant operation on scene. Because dispersant operations can be executed in multiple geographic areas due to the spreading and breakup of the slick, multiple spotter aircraft may be needed (one for each spray a/c).

Forward Air Controller:

The forward air controller (FAC) is a person within the operation who "controls" access into the "controlled" airspace of a dispersant operation. Controlled airspace would be airspace designated in a Notice to Airmen (NOTAM). The controller is normally the spotter aircraft when one spray aircraft or vessel is used but can be the observer or monitor aircraft if more than one spray platform is involved.

In addition, an aircraft's communications capabilities may play a role in the decision as to who should serve as the FAC if all aircraft are not equipped with compatible communications gear. This FAC duty is mainly used to "check" aircraft into the ongoing dispersant operation. The spotter aircraft, if not the FAC, will assign the responsibility and notify the command post.

Spotter Aircraft Recorder:

Spotter Aircraft Recorder is needed to record spray start/stop times, keep all pertinent log entries, photos, and video.

Spotter Duties:

The specific duties of the **Spotter Aircraft or "Spotter"** are as follows:

- Controls the operational area (ground to air) to ensure safety of entry, access, departure, and to prevent hazards resultant from spray exposure and collisions
- Establishes and maintains communications with dispersant sprayer, observation, monitor aircraft or vessels, and support bases
- Conducts early reconnaissance to determine dispersant target
- Supervises on scene airborne or waterborne dispersant activities
- Directs the line-up of the spray aircraft or vessel and when to turn the dispersant pumps on and off.
- Guides sprayer aircraft or vessels by giving course corrections, ensuring spray aircraft or vessels apply dispersants on the targeted areas

- Coordinates dispersant effectiveness monitoring. This includes aerial surveillance and possibly water monitoring. If a monitoring aircraft is available, the Spotter will use that resource for monitoring. If the monitoring aircraft is not available, the Spotter will assume the monitoring responsibility
- Coordinates the use of restricted airspace by serving as the Forward Aircraft Controller (FAC) (assumes only one spray aircraft). Aircraft assigned as the FAC should be the most capable communications platform. Manages outside air traffic entering or departing the operations area
- May coordinate the use of restricted airspace. Manages outside air traffic entering or departing operations area (assumes only one spray aircraft)
- Set communications protocol and limit communications traffic to avoid confusion between the Dispersant Operations Group resources and others
- Coordinates and is lead for any necessary emergency or rescue evolution
- Determine how the control of the "spray on" and "spray off" will be managed and coordinated for the operation.
- Spotter and Observation Aircrews should be knowledgeable with oil observation, dispersant observations, operations, directing spray aircraft, and monitoring protocols.
- Need to pre-identify training and knowledgeable personnel.
- Spotter Aircraft needs time in the air to observe prior to dispersant deployment.
- Speed of Spotter Aircraft must be compatible with Spray Aircraft.

Appendix XII. **Dispersant Sprayer Job Aid**

Sprayer Responsibilities:

The Spray Aircraft or Vessel or "Sprayer" is the delivery system of the dispersants to the oil slick. The dispersant application can be either waterborne or airborne depending on the size of the spill and/or dispersant operation complexity.

The "sprayer" reports to and receives tasking from the spotter aircraft. Because dispersant operations can be executed in multiple geographic areas due to the spreading and breakup of the slick, multiple "sprayer" aircraft or vessels may be needed.

Sprayer Duties:

The specific duties of the **"Sprayer"** are as follows:

- Verifies calibration of spray application
- Loads dispersant
- Establishes and maintains communications with the Spotter Aircraft
- Applies dispersants as directed by the Spotter Aircraft
- Documents the details of the dispersant application, including the exact location using a Global Positioning System (GPS) recorder and spray log if possible
- Properly disposes of residual dispersant

Appendix XIII. **Dispersant Sprayer Log Sheet**

(To Be Completed by Sprayer)

This is a recommended worksheet but is not necessary for implementation of the DUPP.

GENERAL INFORMATION

Incident Name:				
Application Platform Name:				
Date/Time of Sortie	**Date:**		**Time:**	
Location of Sortie:	**LAT:**		**LON:**	
Amount/Type of Oil Spilled:				
Dispersant Type:				

DISPERSANT USE INFORMATION

SORTIE NUMBER:	
Application Rate: (gal/acre)	
Total Amount of Dispersant to be Used:	
Sprayer Platform:	
Swath Width: (ft)	
Total Amount of Dispersant Used:	
Time Dispersant Application Began: ***(24hr clock and timezone)***	
Time Dispersant Application Ended: ***(24hr clock and timezone)***	
Number of Passes:	

Appendix XIV. **Dispersant Aircraft / Vessel Monitor Job Aid**

Monitor Responsibilities:

The monitor aircraft or vessel or the "monitor" is primarily responsible for monitoring the effectiveness of the dispersant operation through aerial observation in aircraft and through the use of fluorometers on board vessels to sample the dispersed oil.

Monitoring Goals:

Effectiveness monitoring is concerned primarily with determining whether the dispersant was properly applied and how the dispersant is affecting the oil. This information is of interest to the FOSC to ensure the process is being effective before pursuing the venture further. Monitors will:

- Help to optimize dispersant types and application rates that disperse the maximum amount of oil in the shortest time frame with the least amount of dispersant applied;
- Ensure that applications minimize overspray; and,
- Recommend whether continued or subsequent application is necessary.

While being fiscally responsible, the focus should be on the environmental benefits versus consequences of additional dispersant being added to the water. With lower toxicity of the dispersants available, it is almost always prudent to reapply dispersants if they are judged to be properly dispersing the oil.

Effectiveness monitoring results are passed (as prearranged) either through the Dispersant Operation Group Supervisor or directly to the Scientific Support Coordinator and the Federal On-Scene Coordinator.

Monitor Duties:

The specific duties of the **Monitoring Aircraft/Vessel and Monitor** are as follows:

- Monitors dispersant effectiveness through fluorometry;

  Personnel are normally deployed as a fluorometry monitoring team on a monitor vessel(s) or observation vessel(s) to measure dispersed oil in the water column;
- Ensures fluorometry data is made available to the Federal On Scene Coordinator (FOSC) through the **Scientific Support Coordinator (SSC);**
- Documents monitoring activities as required by the Dispersant Operation Plan;
- Obtains photos, digital imagery, video, and infrared imagery as appropriate to document operation;
- Identifies remote sensing and tracking requirements and the applicable support needed;
- Coordinates logistics for SMART monitoring teams (using USCG's District Response Advisory Team is recommended);
- Tracks oil slick through use of digital tools and other equipment such as tracking buoys;

- Identifies equipment and systems for remote sensing;
- Ensures that monitoring is properly integrated into overall operation by making recommendations for improved communication and reporting procedures; and,
- Maintains compatible communications with other operational elements.

Appendix XV. **Dispersant Observation Job Aid**

Observer Responsibilities:

The observation aircraft or vessels (the "observers") are platforms and persons specifically assigned to observe the dispersant operation. Their observer status should be authorized by the Unified command on the basis of their position as a stakeholder in the outcome of the operation. Observers might include corporate officials, agency representatives, political officials, scientists, trustees, interest group representatives, etc.

Field Reference Guide:

NOAA's Dispersant Application Observer Job Aid is a functional field tool for trained observers. This publication is available through NOAA's Office of Response and Restoration - Emergency Response Division. An electronic version of the job aid is available through the Office of Response and Restoration Division's website (http://response.restoration.noaa.gov) but hardcopy versions should be purchased and held in advance of a response.

Observer Reporting:

The Observer does not make operational decisions, i.e. how much dispersant to apply, when or where to apply it, etc. These decisions are made at the Command level. The Observer will make observations based on those decisions.

Different Observers at the same site may reach different conclusions about how much of the slick had been dispersed. This is why standard reporting criteria and adherence to a common set of guidelines is important.

Relationship to Spotters:

Spotter and Observation Aircrews should be knowledgeable with oil observation, dispersant observations, operations, directing spray aircraft, and monitoring protocols. Need to pre-identify training and knowledgeable personnel.

Oil On The Water:

Oil surface slicks and plumes can appear different for many reasons including: oil or product characteristics, time of day (different sun angles), weather, sea state, rate at which oil disperses, etc. Low contrast conditions (i.e. overcast, twilight, haze, etc.) make observations difficult.

For best viewing, the sun should be behind you and with the aircraft at an altitude of about 200-300 feet flying at a 30 degree angle to the slick.

Dispersant Applications:

During dispersants application, it may not be possible to determine the actual area of thickest oil concentrations, resulting in variable oil to dispersant application rates. This could lead to variations in the effectiveness of application. These conditions should be reported by the observer.

Initial application may have a herding effect on the oil. This would make the slick appear to be shrinking, however, it is the dispersant "pushing" the oil together. Due to this effect, in some cases, the oil slick may even "visibly disappear" from the sea surface for a short time.

After dispersant application, there may be color changes on the emulsified slick due to reduction in water content and viscosity, and shape of slick, due to the demulsification action of the dispersant, which enhances dispersion. Many trials have indicated that dispersants appear to modify the spreading rates of oils and within a few hours treated slicks cover much larger areas than control slicks.

Effective/Ineffective Applications:

Dispersed oil plume formation may not be instantaneous after dispersant application. In some cases, such as when the oil is emulsified, it can take several hours. A dispersed oil plume may not form at all.

The appearance of the dispersed plume can range from brown to white (cloudy) to no visible plume. Sometimes other things such as suspended solids may appear like dispersed oil.

The visibility of the dispersed plume will vary according to water clarity. In some case, remaining surface oil and sheen may mask oil dispersing under the slick and thus interfere with observations of the dispersed oil plume.

Dispersed oil plumes often are highly irregular in shape and non-uniform in concentration. This may lead to errors estimating dispersant efficiency.

If a visible cloud in the water column is observed, the dispersant is working. If a visible cloud in the water column is not observed, it will be difficult to determine if the dispersant is working or not.

If there are differences in the appearance of the treated slick versus an untreated slick, the dispersant may be working.

Boat wakes through oil may appear as a successful dispersion of oil, however, this may be just the vessel wake breaking a path through the oil (physically parting the oil) not dispersing it.

Observer Duties:

The specific duties of the **Observation Aircraft / Vessel / "Observers"** are as follows:

- Establishes and maintains communications with the Spotter Aircraft
- Coordinates observation of the dispersant application with the Spotter Aircraft
- May serve as the Forward Aircraft Controller (FAC) if directed by the Spotter. Aircraft assigned must be the most capable communications platform.
- If assigned as FAC, coordinates the use of restricted airspace. Manages outside air traffic entering or departing the operations area
- Use attached checklists and logs
- Before operation begins, Observation Aircraft should mark slick boundary using GPS.

Appendix XVI. **Dispersant Monitor/Observer Final Reporting Form**

(To Be Completed by Monitor/Observer)

This is a recommended worksheet but is not necessary for implementation of the DUPP.

OBSERVER INFORMATION

Incident Name:				
Application Platform Name:				
Date/Time of Sortie	**Date:**		**Time:**	
Location of Sortie:	**LAT:**		**LON:**	
Name of Observers (Agency):				
Distance from shore (miles):				

ENVIRONMENTAL CONDITIONS

Current Weather:	☐ Clear ☐ Partly Cloudy ☐ Overcast ☐ Rain ☐ Snow ☐ Fog ☐ Inversion		
Surface Current (Direction toward):	Degrees	**Speed:**	Knots
Visibility:	Nautical Miles	**Ceiling:**	Feet
Sea State (Wave Height):	Feet	**Precipitation:**	Inches
Sea Temperature:	°F	**Air Temperature:**	°F
Tidal Condition:		**Water Depth:**	Feet
Misc. Condition Notes			

OIL AND DISPERSANT INFORMATION

Spilled oil/substance name (if known):				
API Gravity:		**Pour Point:**		☐ ºF ☐ ºC
Viscosity:		**Percent Evaporation:**	(24 hrs)	(48 hrs)
Name of Dispersant:		**Type of Application Method:**	☐ Aircraft ☐ Vessel	
Observation Altitude:		**Application Altitude:**		
Surface Area of Slick:		**Percent of Slick Treated:**	%	
Estimated Efficiency:		**Visual Appearance of Application:**		
Submerged Cloud Observed?	☐ Yes ☐ No	**Re-coalescence Observed?**	☐ Yes ☐ No	

Effectiveness of Application in Achieving Goal (reduce shoreline impact, etc):
Operational Constraints Imposed by Agencies:
Presence of Wildlife (any impacts, i.e. fish kills, etc):
Photographic Documentation:
Lessons Learned:

Appendix XVII. **Common ICS Responsibilities for Each Position**

ICS Duties for Each Position:

The Common ICS Responsibilities for **each position** are as follows:

- Obtain briefings from supervisors
- Participate in planning meetings as required
- Review assignments with subordinates.
- Maintain communications with subordinates
- Ensure safe operations
- Make or approve expedient changes to the Incident Action Plan (IAP) during the operational period if necessary
- Determine the need and request additional resources
- Maintain Activity Log and submit to the Documentation Unit Leader, Situation Unit Leader, or the Planning Section.

Appendix XVIII. **Information for Development of Site Safety Plan**

Composition:

Crude oils are composed of indefinite number of hydrocarbon compounds. Most crude oils contain benzene, up to 1 percent by volume. Crude oils also contain toluene, xylene, naphthalenes, & PolyAromatic Hydrocarbons (PAHs) in concentrations that vary widely depending on the source of the oil, weathering, and aging.

Hazard Description:

Crude oil may cause dermatitis by skin contact; nausea by inhalation; and eye irritation. Benzene is a hematological toxin (it affects the blood and blood forming organs), and is a carcinogen. The most significant hazard from benzene, toluene, and xylene is in poorly ventilated areas (such as pits or under docks), or around freshly spilled oil. Benzo(a)pyrene is a skin contact hazard and potentially may cause skin cancer with chronic skin contact. As oil weathers and ages, benzo(a)pyrene becomes more concentrated because it evaporates much slower than other chemicals in the mixture.

Basic Precaution:

Stay away from, or upwind of, fresh oil spills; wear chemical resistant clothing as necessary to protect against skin or eye contact; periodically change protective clothing that has oil on it; immediately change clothing that is showing evidence of oil penetrating to your skin; and wash skin with soap and water if contact with oil occurs. Flush eyes with water if oil gets in them. If ingested do not induce vomiting, contact a physician. Use respiratory protection when volatile organic compounds and specifically benzene concentrations exceed OSHA PEL.

Exposure limits of interest:

Chemical Name (CAS #)	Occupational Action Levels	
	IDLH (ppm)	TWA (ppm)
Benzene (71-43-2)	500	OSHA PEL = 1 NIOSH REL = 0.1 ACGIH TLV = 10
Toluene (108-88-3)	500	OSHA PEL = 200 NIOSH REL = 100 ACGIH TLV = 20
Xylenes	900	OSHA PEL = 100 NIOSH REL = 100 ACGIH TLV = 100
Naphthalene (91-20-3)	250	OSHA PEL = 10 NIOSH REL = 10 ACGIH TLV = 10
Hexane (110-54-3)	1100	OSHA PEL = 500 NIOSH REL = 50 ACGIH TLV = 50
Coal Tar / Coal Tar Pitch Volatiles (65996-93-2)	80 mg/m3 Benzene soluble fraction	OSHA PEL = 0.2 mg/m3 benzene soluble fraction NIOSH REL = 0.1 mg/m3 cyclohexane extractable fraction ACGIH TLV = 0.2 mg/m3 benzene soluble fraction

Appendix XIX. **Hazard Evaluation of Dispersant Application**

Behavior and Composition:

Dispersants act like detergents. They reduce the surface tension of the oil and break it into tiny droplets. The oil droplets are then mixed in the water column and disperse . To be effective, dispersants keep the droplets apart, and prevent coagulation. Early dispersants contained fairly strong and toxic solvents that were used for clean up of oil tanks or mechanical equipment. They were quite toxic, both to marine organisms and to human. The dispersants currently in use are much less toxic. They contain a surfactant mixed with a solvent, and possibly other chemicals that serve as stabilizers. The solvents currently in use are water, alcohol, glycol, or ethylene glycol.

Application:

When applied, dispersants are sprayed on the oil slick, most likely by aircraft. Flying altitude during application is expected to be 50 to 100 feet above the water. The droplets should be large enough to settle rapidly on the slick. Smaller droplets may remain suspended for a longer period of time, and be carried downwind over some distance.

Health Hazards:

Inhalation of droplets is the most likely route of exposure to dispersant. The toxicity of the solvents now in use is relatively low, and the concentration , if safe operating procedures are used, is not expected to be above the level of concern. Overexposure to the solvent in dispersants, which are the compound of most concern, may cause nausea, dizziness, headache and skin and eye irritation. These are the symptoms to watch out for. See attachment 3 for MSDS for Corexit 9527

All persons coming in contact with the dispersants should read and understand the material safety data sheet (MSDS) of the dispersant to be used. The hazards of contact, symptoms, and preventive measures should be understood and followed.

Protection:

Adequate protection may be achieved by minimizing exposure. Vessels monitoring dispersant operations should be upwind and shall keep a safe distance away (300 yards) during aerial application. In general, using respirators should not be a routine practice for personnel involved in dispersant application and monitoring. However, under some conditions, when monitoring indicate that overexposure to oil or dispersant may occur, respirators may be used per recommendation of the site safety officer.

Personnel loading the dispersants on planes and vessels and otherwise handling large quantities of the product should exercise greater caution and protection. They should wear non-permeable clothing, boots, and gloves, use eye protection, and exercise safe loading transfer of the material. procedures. Since loading of dispersant-applying aircraft may be done many miles away, prudent safety management requires that this operations will be monitored by a safety supervisor at the loading site.

Monitoring:

Monitoring may be conducted to evaluate the concentration of hazardous chemicals, and to justify the level of PPE. Monitoring equipment should be calibrated and maintained in accordance with the manufacturer’s instructions; electronic equipment should also be calibrated before each day’s use. Monitoring equipment can include:

- Combustible Gas Indicators.
- Oxygen Sensors
- Photo Ionization Detector and/or Flame Ionization Detector
- Wet Bulb Globe Temperature Meter
- Noise Meter
- H_2S Chemical Specific Monitor
- Other Chemical Specific Monitors

Appendix XX. **Chemical Compounds Associated with Oil Spills and Dispersants**

The following table contains a list of chemical compounds associated with both oil spills and dispersants listed on the NCP Product Schedule. This information is suitable for initial planning efforts and development of an air monitoring program during an emergency response. It is necessary to remember that the Action Levels (IDLH, PEL, REL, TLV, and AEGL) in this table are designed for occupational and/or emergency response use; thresholds for public protection will be incident-specific and must be established in coordination with the Scientific Support Coordinator.

Chemical Name (CAS #)	Explosive Limit	Odor Threshold (ppm)	Occupational Action Levels IDLH (ppm)	TWA (ppm)	AEGL-1 4-hr (ppm)	8-hr (ppm)	Flash / Ignition Pt	Vapor Pressure @ 68°F (mmHg)	Vapor Density	Specific Gravity	Boiling Point	Ionization Potential (eV)
Benzene (71-43-2)	UEL= 7.8% LEL= 1.2%	1.5	500	PEL = 1 REL = 0.1 TLV = 10	18	9	12°F	75	2.7	0.88	176°F	9.24
Toluene (108-88-3)	UEL= 7.1% LEL= 1.1%	2.9	500	PEL = 200 REL = 100 TLV = 20	800	200	40°F	21	3.2	0.87	232°F	8.82
Xylenes	UEL= 6.7-7.0% LEL= 0.9-1.1%	1	900	PEL = 100 REL = 100 TLV = 100	130	130	81-90°F	7-9	3.7	0.86-0.88	281-292°F	8.44-8.56
Naphthalene (91-20-3)	UEL= 5.9% LEL=0.9%	0.084	250	PEL = 10 REL = 10 TLV = 10	n/a	n/a	174°F	0.08	4.42	1.15	424°F	8.12
Hexane (110-54-3)	UEL= n/a LEL= n/a	130	1100	PEL = 500 REL = 50 TLV = 50	AEGL-2 3300	AEGL-2 3300	-7°F	124	2.97	0.66	156°F	10.18
Coal Tar / Coal Tar Pitch Volatiles (65996-93-2)	n/a	n/a	80 mg/m3 Benzene soluble fraction	PEL = 0.2 mg/m3 benzene soluble fraction REL = 0.1 mg/m3 cyclohexane extractable fraction TLV = 0.2 mg/m3 benzene soluble fraction	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Carbon Monoxide (630-08-0)	UEL= 74% LEL= 12.5%	n/a	1200	PEL = 50 REL = 35 TLV = 25	AEGL-2 33	AEGL-2 27	n/a	>26,600	0.97	n/a	-313	14.01
Hydrogen Sulfide (7783-06-4)	UEL= 44.0 LEL= 4.0	0.01	100	PEL = 20 REL = 10 TLV = 10	0.36	0.33	n/a	13,380	1.19	n/a	-77°F	10.46

Chemical Name (CAS #)	Explosive Limit	Odor Threshold (ppm)	Occupational Action Levels		AEGL-1		Flash / Ignition Pt	Vapor Pressure @ 68°F (mmHg)	Vapor Density	Specific Gravity	Boiling Point	Ionization Potential (eV)
			IDLH (ppm)	TWA (ppm)	4-hr (ppm)	8-hr (ppm)						
Sulfur Dioxide (7446-09-5)	n/a	0.67	100	PEL = 5 REL = 2 TLV = 2	0.2	0.2	n/a	2432	1.89	n/a	14°F	12.30
PAHs (as particulate)	n/a	n/a	750 mg/m3	PEL = 0.2 mg/m3 REL = 0.1 mg/m3 TLV = 0.2 mg/m3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
*Propylene Glycol (57-55-6)	UEL= 12.6% LEL=2.6%	n/a	n/a	PEL = n/a REL = n/a TLV = n/a	n/a	n/a	210.3°F	0.07	2.62	1.04	370°F	<10.2
*Dipropylene glycol n-butyl Ether (29911-28-2)	UEL= n/a LEL= n/a	n/a	n/a	PEL = n/a REL = n/a TLV = n/a	n/a	n/a	212.7°F	0.04	n/a	n/a	442°F	n/a
*2-Ethylhexanol (104-76-7)	UEL= 9.7% LEL= 0.88%	0.07	n/a	PEL = n/a REL = n/a TLV = n/a	n/a	n/a	178°F	0.05	4.49	0.834	364°F	≤10.6
*Dioctylsulfosuccinate (577-11-7)	UEL= n/a LEL= n/a	n/a	n/a	PEL = n/a REL = n/a TLV = n/a	n/a	n/a	n/a	2.17E-11	n/a	1.1	n/a	n/a
*Sorbitan Monooleate (1338-43-8)	UEL= n/a LEL= n/a	n/a	n/a	PEL = n/a REL = n/a TLV = n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
*Polyoxyethylene Sorbitan Monooleate (9005-65-6)	UEL= n/a LEL= n/a	n/a	n/a	PEL = n/a REL = n/a TLV = n/a	n/a	n/a	>230°F	n/a	n/a	1.1	n/a	n/a
*Polyethylene Glycol Sorbitan Trioleate (9005-70-3)	UEL= n/a LEL= n/a	n/a	n/a	PEL = n/a REL = n/a TLV = n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
*Deodorized Kerosene (64742-47-8)	UEL= n/a LEL= n/a	n/a	n/a	PEL = n/a REL = n/a TLV = n/a	n/a	n/a	136°F	0.45	n/a	n/a	>300°F	≤10.6
*Diethanolamine (111-42-2)	UEL= 9.8% LEL=1.6%	0.27	n/a	PEL = None REL = 3 TLV =1 mg/m3	n/a	n/a	279°F	<0.01	3.65	1.095	516.4°F	n/a
*Ethanolamine (141-43-5)	UEL= 17% LEL=5.5%	3	30	PEL = 3 REL = 3 TLV = 3	n/a	n/a	200°F	0.4	2.1	1.016	338°F	8.96
*2-Buthoxyethanol	UEL= 10.6%	0.35	700	PEL = 50	n/a	n/a	143°F	0.8	4.07	0.9	339°F	<10

Chemical Name (CAS #)	Explosive Limit	Odor Threshold (ppm)	Occupational Action Levels IDLH (ppm)	Occupational Action Levels TWA (ppm)	AEGL-1 4-hr (ppm)	AEGL-1 8-hr (ppm)	Flash / Ignition Pt	Vapor Pressure @ 68°F (mmHg)	Vapor Density	Specific Gravity	Boiling Point	Ionization Potential (eV)
(111-76-2)	LEL= 1.1%			REL = 5 TLV = 20								
*Potassium Hydroxide (1310-58-3)	UEL= n/a LEL= n/a	n/a	n/a	PEL = n/a REL = 2 mg/m3 (ceiling) TLV = 2 mg/m3 (STEL only)	n/a	n/a	n/a	1	n/a	2.04	2415°F	n/a
*Dipropylene Glycol Methyl Ether (34590-94-8)	UEL= n/a LEL= n/a	34.6	600	PEL = 100 REL = 100 TLV =100	n/a	n/a	180°F	0.5	5.11	0.95	408°F	n/a
*Sodium Hydroxide (1310-73-2)	UEL= n/a LEL= n/a	n/a	10 mg/m3	PEL = 2 mg/m3 REL = 2 mg/m3 (ceiling) TLV = 2 mg/m3 (STEL only)	n/a	n/a	n/a	≈0	n/a	2.13	2534°F	n/a

*Published constituents of dispersants

DISCLAIMER: This list, and the information contained within it, is a sufficient summary for the purposes of this guidance but it is not intended to be comprehensive and it should not be assumed to describe all potential chemicals of concern at a spill response. Chemical properties for some compounds may differ slightly across data sources. Action levels (IDLH, PEL, REL, TLV, AEGL) are subject to change and should be verified during a response and/or plan development.

Sources that can be used to reference and verify chemical information:

• NIOSH Pocket Guide to Chemical Hazards	http://www.cdc.gov/niosh/npg/
• ATSDR Toxicological Profiles	http://www.atsdr.cdc.gov/toxprofiles
• EPA Technology Transfer Network Air Toxics Web	http://www.epa.gov/ttnatw01/
• EPA Final Acute Exposure Guideline Levels	http://www.epa.gov/oppt/aegl/
• OSHA Health Guidelines	http://www.osha.gov/SLTC/healthguidelines/
• CAMEO Chemicals Library	http://cameochemicals.noaa.gov/
•	http://toxnet.nlm.nih.gov/
• RAE Systems Technical Notes	http://www.raesystems.com/downloads/tech-notes

Definition of terms:

AEGL - Acute Exposure Guideline Levels – concentration that describes the risk to humans resulting from once-in-a-lifetime, or rare, exposure to airborne chemicals. Led by the U.S. EPA, published by the AEGL Committee of federal and private members.

IDLH - Immediately Dangerous to Life and Health - concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere. Published by U.S. National Institute for Occupational Safety and Health (NIOSH).

LEL - Lower Explosive Limit - the lower limit of flammability of a gas or vapor at ordinary ambient temperatures expressed in percent of the gas or vapor in air by volume. This limit is assumed constant for temperatures up to 120°C (250°F).

PEL - Permissible Exposure Limit - an exposure limit that is published and enforced by Occupational Safety and Health Administration (OSHA) as a legal standard.

REL - Recommended Exposure Limit - an occupational exposure limit recommended by NIOSH to OSHA for adoption as a permissible exposure limit.

TLV - Threshold Limit Value - a time-weighted average concentration under which most people can work consistently for 8 hours a day, day after day, with no harmful effects. Published by the American Conference of Governmental Industrial Hygienists.

TWA - Time-weighted average concentration - Refers to concentrations of airborne toxic materials which have been weighted for a certain time duration, usually 8 hours.

UEL - Upper Explosive Limit - the highest concentration (expressed in percent vapor or gas in the air by volume) of a substance that will burn or explode when an ignition source is present.

Appendix XXI. **Hazard Evaluation of Aircraft**

Use in Response:

The acute hazard of aircraft related accident seems to be the major health and safety concern in dispersant observation. Care must be taken that the observation aircraft will not fly close to the aircraft applying the dispersant. All flight must be well coordinated, and safety distance must be kept at all times.

Choice of Platforms:

Helicopters are often the aircraft of choice during spill response. Fixed wing aircraft may be used, however, as observation or application platforms. An important consideration for flying aboard any aircraft type is whether or not you are adequately prepared for emergency landings in the event of equipment problems. Multi-engined aircraft are always preferred and offer a much higher degree of safety, especially when operating over water. Floats on a helicopter may be comforting and provide some degree of safety but are often inadequate in rough or rolling seas. If single engine aircraft are used, operations should be adjusted to account for the possibility of a forced landing. One option is to operate only within a reasonable distance to shore and at an altitude that would allow for an emergency no power landing. Another option is to operate only in conjunction with vessels equipped with monitoring communications and able to effect a quick rescue response. In all cases appropriate safety and flotation equipment should be worn. Keep in mind that in time of emergency you will not have time to put on your flotation vest or grab the emergency locator. You better have it on you at all times while in flight.

Aviation safety tips:[7]

- Never walk across airfield aprons without an escort.
- When approaching or leaving aircraft, care must be taken to avoid the intakes, exhausts, propellers and rotor blades.
- A rotating helicopter blade may pass near to the ground particularly when idling: personnel should always crouch when approaching or departing from a helicopter with turning rotors and in the direction advised by the aircraft crew.
- Approach to an aircraft should only be made when directed by the pilot or crew, and the route should remain in the pilot's field of view.
- Briefings must be provided to passengers by the aircrew on the safety aspects of the aircraft and the location and use of the exits and life saving equipment provided.
- Particular attention should be paid to hearing protection and the wearing of high visibility garments when working on airfields.
- Loose objects pose a threat to aircraft safety and should be controlled. This includes litter, nuts and bolts, packing cases and hats.

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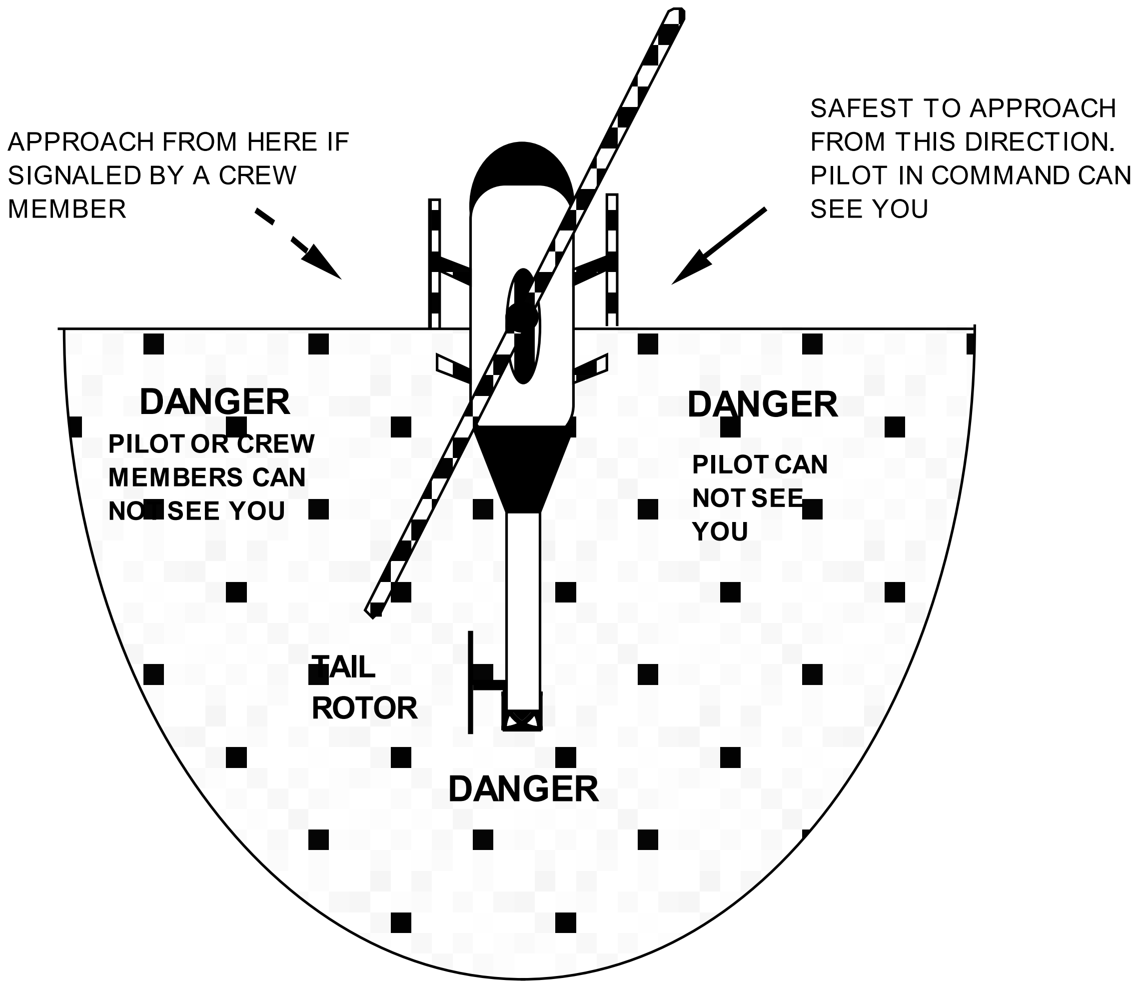
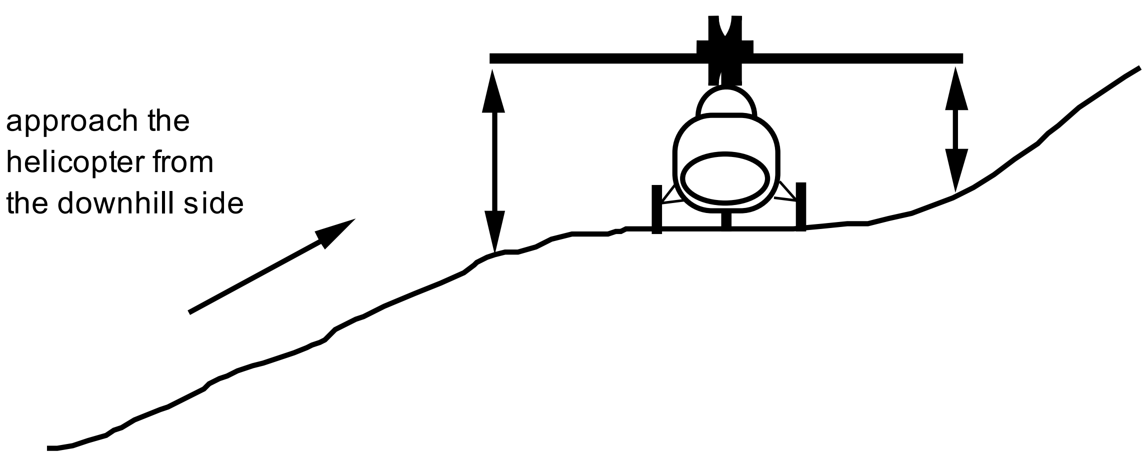
[7] *Oil Spill Responder Safety Guide*. IPECA Oil Spill Report Series Volume 11. International Petroleum Industry Environmental Conservation Association, Aug. 2002

SAFE APPROACH TO A HELICOPTER





Appendix XXII. **MSDSs for Common Dispersants**

Attachment C. RRT4 Dispersant Use Expedited Concurrence and Consultation Guide

Region IV Regional Response Team Dispersant Use Expedited Concurrence and Consultation Guide (DUECCG)

January 2021

1. Introduction

Following an oil spill, response actions should be designed to minimize environmental impact. While physical control and recovery techniques are the traditional response measures, other countermeasures may also need to be considered. Dispersant use is not intended to exclude or replace the use of mechanical, in-situ burn, or other open water cleanup methods, but to enable and encourage the use of appropriate techniques to minimize the impacts of an oil spill.

2. Expedited Concurrence and Consultation Guide

This document describes Federal Region 4 Regional Response Team (RRT4) procedures developed under 40 CFR 300.910(b) authority for dispersant use that do not qualify for preauthorized use under the RRT Dispersant Use Preauthorization Plan (DUPP). Where preauthorization does not apply, concurrence from RRT4 representatives of EPA and affected states, and well as consultations from DOI and DOC, must be provided on an incident-specific basis for dispersant application.

2.1. Authority for Dispersant Use

Subpart J of the NCP provides that the RRT4 representatives from the U.S. Environmental Protection Agency (EPA), U.S. Department of Commerce (DOC), U.S. Department of Interior (DOI) and the affected state(s) may preauthorize the use of chemical agents for oil spill response [40 CFR 300.910(a)]. Where the preauthorization plan does not apply to a specific incident, concurrence will be required from the EPA and the affected state, and consultation will be required from the DOC and DOI natural resource trustees [40 CFR 300.910(b)].

Commandant, U.S. Coast Guard, has pre-designated the USCG Captains of the Port as OSCs for coastal spills; and has delegated authority and responsibility for compliance with Section 311 of the Federal Water Pollution Control Act, as amended, to them. The EPA, DOI, and DOC have delegated their authority for approval of preauthorization of dispersants to their RRT4 representatives.

RRT4 representatives from the states of North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi have been delegated authority by their respective agencies or state governments to represent natural resource concerns and to serve as consultants to the OSC on these matters.

2.2. Scope of Authority

Offshore dispersant application to remediate oil spills should be conducted in accordance with the procedures set forth in this guide. Approval for preauthorization of dispersants is granted solely to the USCG Federal OSC (FOSC) and may not be further delegated.

This guidance is applicable for all dispersant use within geographical boundaries described in the Yellow Zone of section 3.2 of the RRT4 DUPP. This guidance is also applicable for dispersant application activities that are outside the Scope of Preauthorization listed in section 2.3 of the RRT4 DUPP, which includes use of subsurface, injection, or alternative dispersant application methods (i.e. methods outside of application to surface water with aircraft or vessel spraying systems).

2.3. Authority to Discontinue Use

The use of dispersants will be discontinued immediately when directed by the FOSC.

Concurrence for incident-specific dispersant use from the USCG, EPA, or an affected state may be suspended at any time. Such notification may be verbal but should be followed by written and signed documentation to the RRT4 co-chairs.

The DOI or DOC may advise the OSC that the incident specific consultation provided to the response is no longer adequate or applicable. In this event, the consultation must be revised for dispersant operations to continue.

2.4. Multi-Jurisdictional Responses

Concerns over dispersant operations which may impact adjacent State, special Federal management jurisdictions, or Federal regions are addressed through the responding Incident Management Team (IMT) and mediated by the RRT(s) if necessary.

3. Zones

Dispersant operations will be conducted within the jurisdiction of RRT4 in accordance with the policies and protocols set forth in the DUPP and, as applicable, in accordance with Letters of Agreement (LOA) from the USCG, EPA, DOI, DOC, or the affected state(s).

This guidance is applicable for all dispersant use within geographical boundaries described in the Yellow Zone of section 3.2 of the DUPP. Dispersant use within the Green Zone should follow policies and protocols as described in the DUPP.

This guidance may be used, but is not necessary, if the FOSC determines that a consultation with the resource trustee is necessary under the conditions of protocol 4.12 in the DUP.

4. Protocols and Procedures

All protocols in section 4 of the DUPP are applicable for dispersant use under this guidance. Additional procedures are listed below which will serve to meet both the needs of the responding agency and the service agencies in expedited consultation. It will be the Federal OSC's responsibility to ensure that these procedures are accomplished as part of the incident-specific response operation:

4.1. Justifiable Use

The requirements for Justifiable Use are equivalent to protocol 4.1 of the DUPP

4.2. RRT Notification

The requirements for RRT Notification include the language of protocol 4.2 in the DUPP.

Additionally, RRT4 should respond to the FOSC's request for concurrence within 4 hours from the initial request. This response should define changes or objections, if any, that RRT4 determines are applicable for the proposed dispersant activity.

4.3. Evaluation of Continued Use

The FOSC agrees to make every effort to continuously evaluate the decision to use dispersants by considering the advice of the EPA, DOI, DOC, and the affected state(s), other members of the RRT, and any other agencies, groups or information sources which may be available.

The FOSC will provide a schedule to RRT to establish when the decision(s) for continued use will be formally rendered and documented.

4.4. Health and Safety

The requirements for Health and Safety are equivalent to protocol 4.4 of the DUPP

4.5. Daylight Operations

The requirements for Daylight Operations are equivalent to protocol 4.5 of the DUPP

4.6. RRT Observers

Barring any unforeseen circumstances (such as time constraints, safety considerations, or logistical concerns) the FOSC will make a reasonable effort to provide designated representatives from the USCG, EPA, DOI, DOC and the affected state(s) with an opportunity to observe dispersant application operations.

4.7. Monitoring

The requirements for Monitoring include the language of protocol 4.8 in the DUPP.

Additionally, SMART Tier 2 and Tier 3 protocols should be implemented where applicable and feasible.

4.8. Final Report

The requirements for Final Report are equivalent to protocol 4.9 of the DUPP

4.9. Product Schedule

The requirements for Product Schedule are equivalent to protocol 4.11 of the DUPP

4.10. Endangered Species Act (ESA) and Essential Fish Habitat (EFH) Consultation

Prior to commencing application operations, an emergency consultation with natural resource specialists from DOI and DOC will be conducted to determine if any threatened to endangered species or habitats are present in the projected application area or are otherwise at risk from dispersant operations. The consultations will provide a list of recommended measures that must be taken to prevent risk of any injury to wildlife, especially endangered or threatened species. Additional and ongoing consultation, including survey flights in the area of application, will be conducted as appropriate.

Completion of the emergency consultation may use the Dispersant Use Form – Supplemental in Appendix VIII of the DUPP to ensure that all contributing factors and issues are addressed.

4.11. National Historic Preservation Act (NHPA) Consultation

The NHPA consultation in Appendix C of the DUPP should be reviewed prior to dispersant application. The consultations will provide a list of recommended measures that must be taken to prevent risk of any damage to historic sites. These measures must be employed where the conditions identified by the service agency apply.

5. Signature

I hereby attest and declare that by my signature I approve this guidance for dispersant use as presented herein for the agency or government I represent on the Federal Region 4 Regional Response Team (RRT4).

United States Coast Guard — Date
Region 4 Response Team Co-chair

United States Environmental Protection Agency — Date
Region 4 Response Team Co-chair

U.S. Department of the Interior — Date
Region 4 Response Team representative

U.S. Department of Commerce Date
Region 4 Response Team representative

State of North Carolina Date
Region 4 Response Team representative

State of South Carolina Date
Region 4 Response Team representative

State of Georgia Date
Region 4 Response Team representative

State of Florida Date
Region 4 Response Team representative

State of Alabama Date
Region 4 Response Team representative

State of Mississippi Date
Region 4 Response Team representative

Attachment D. Biological Assessment for the Preauthorized Use of Dispersant & In-Situ Burn Operations

15.4 Appendix D: In-situ Burn Plan

The most current version of this plan, which may be updated annually, will be posted at https://r4.ercloud.org/r4rrt/.

Region IV Regional Response Team
In-Situ Burn Plan (ISBP)

January 27, 2021

Region IV Regional Response Team Science & Technology Committee

NOAA

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EPA

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USCG

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State

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Record of Changes

Change Number	Effective Date	Date Entered	Entered By	Page Check

Letter of Promulgation

From: Region IV Regional Response Team

To: Distribution

Subject: LETTER OF PROMULGATION

1. The Region IV Regional Response Team (RRT IV) has approved the attached plan for vessel decontamination on ocean and coastal waters throughout the RRT IV area of responsibility effective as of this date. This plan describes RRT IV policy and hereby replaces any other policies, guidelines or plans now in force throughout RRT IV. This plan will be used in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).
2. <u>Preauthorization as defined in this plan is contingent on the evaluation of natural resources</u> with formal assessments conducted under Section 7(a)(2) of the Endangered Species Act (ESA), Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and Section 106 of the National Historic Preservation Act (NHPA) with consultations from U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS) and the Advisory Council on Historic Preservation (ACHP).
3. This plan may become part of the local Area Contingency Plans (ACP) maintained by the U.S. Coast Guard units throughout RRT IV.
4. This plan shall be followed as closely as possible, but has not provided for every possible contingency that might occur. Deviations from this plan are authorized when necessary in the best interest of safety or protection of resources. The RRT IV must be made aware of any deviation as soon as possible.
5. This plan cannot be changed or altered without notice and opportunity for comment provided to each signatory official or designated representative to the RRT IV.
6. Any signatory official or designated representative to the RRT IV can petition the RRT IV to amend or revise the plan and/or withdraw approval at any time.
7. All comments and requests for revision shall be directed to the RRT IV Science and Technology Committee for consideration by the RRT IV.
8. The RRT IV Science and Technology Committee will remain abreast of developments and changes for *in-situ* burning which may provide cause for recommending revision to this plan. Additionally, the Science and Technology Committee may be tasked at any time by members of the RRT IV to provide additional information or guidelines pertaining to *in-situ* burning if available.
9. This Letter of Promulgation remains in effect until canceled by a competent authority.

DATE of EFFECT:________________________

U.S. Environmental Protection Agency RRT IV Co-Chair: //s//

U.S. Coast Guard RRT IV Co-Chair: //s//

Encl: (1) RRT IV Vessel Decontamination Plan

Distribution List

Copies of this plan and subsequent changes will be distributed as follows:

COAST GUARD

Commandant (CG-533)
LANTAREA OPCEN
National Strike Force Coordination Center
Atlantic Strike Team
Gulf Strike Team
CGD Seven (Drm)
CGD Seven (cc)
CGD Eight (Drm)
CGD Five (Drm)
Sector North Carolina Sector Charleston
MSU Savannah
Sector Jacksonville
Sector St. Petersburg
Sector Miami
Sector Mobile
Sector Key West

STATE AND LOCAL AGENCIES

State of North Carolina, RRT IV representative
State of South Carolina, RRT IV representative
State of Georgia, RRT IV representative
State of Florida, RRT IV representative
State of Alabama, RRT IV representative
State of Mississippi, RRT IV representative

NON-GOVERNMENT AGENCIES

Marine Spill Response Corporation, SE region
Clean Caribbean Corporation
Chevron Oil
Shell Oil

FEDERAL AGENCIES

U.S. EPA Region IV
U.S. Department of the Interior Region IV
U.S. Department of Commerce Region IV
U.S. Fish and Wildlife Service Region IV
National Marine Fisheries Service Region IV
NOAA National Marine Sanctuaries,
Florida Keys National Marine Sanctuary
U. S. National Park Service Region IV
Bureau of Indian Affairs (BIA)
Eastern Region – Nashville
Bureau of Ocean Energy Management (BOEM)
BOEM New Orleans
NOAA National Marine Sanctuaries,
Grays Reef National Marine Sanctuary
NOAA HAZMAT Reference Library
Seattle, Washington
NOAA Biological Assessment Team,
Seattle, Washington
NOAA HAZMAT USCG
Commandant (G-MEP)
NOAA Scientific Support Coordinator,
CGD Seven

If you would like to be added to this distribution list please contact the Region IV Regional Response Team *Science* and Technology Chairperson or your agency representative to the regional response team.

Table of Contents

Table of Appendices

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1. Purpose

Following an oil spill, response actions should be designed to minimize environmental impact. While physical control and recovery techniques are the traditional response measures, other countermeasures may also need to be considered. In-situ burning is not intended to exclude or replace the use of mechanical or other open water cleanup methods, but to enable and encourage the use of appropriate techniques to minimize the impacts of an oil spill.

The underlying precept is that in-situ burning of oil in offshore waters can prevent the potentially more devastating impacts of oil on sensitive environments inshore. Effective implementation of in-situ ¬burning requires accessible quantities of oil on water which can be herded to a thickness sufficient to sustain combustion; due to the action of natural dispersion and currents, there may be a limited window of opportunity for in-situ¬ burning to be feasible. Therefore, the effective use of burning agents often requires that preauthorization be given prior to an incident.

2. Region IV In-Situ Burn Policy

The Region IV In-Situ Burn Policy (ISBP) is comprised of the RRT IV In-Situ Burn Plan, including in-situ burning in ocean waters and recommended guidance for burning in the inland zone.

2.1. Preauthorization Policy for In-Situ Burning in Federal Region IV

This RRT IV *In-Situ* Burning Policy includes preauthorization agreements for the use of appropriate burning agents, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Preauthorization is contingent on the evaluation of natural resources with formal assessments conducted under Section 7(a)(2) of the Endangered Species Act (ESA), Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and Section 106 of the National Historic Preservation Act (NHPA) with consultations from U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS) and the Advisory Council on Historic Preservation (ACHP).Within areas designated for preauthorization of the use of appropriate burning agents, further consultation by the U.S. Coast Guard Federal On-Scene Coordinator (FOSC) is not required for initial use, as long as the appropriate RRT agencies are immediately notified and the relevant protocols outlined in Section 4 of this plan are followed.

RRT IV believes that this *In-Situ* Burn Plan represents a conservative approach to burning agent preauthorization, and that institution of this policy will help to ensure a more rapid and effective response to oil spills in Region IV. It is hoped that this careful and measured endorsement of *in-situ* burning in selected Region IV waters will lead to an increased availability of *in-situ* burning capable equipment in the region. Questions, concerns, and recommendations relating to this policy may be addressed to the Chair of the Science and Technology Committee or either Co-Chair of the Region IV Regional Response Team.

2.1.A. Purpose for Preauthorization

The purpose of this Agreement is to provide concurrence of the USCG, EPA, DOC, DOI, and State representatives to the Region IV Regional Response Team for the preauthorized use of appropriate burning agents in response to oil discharges occurring in ocean and coastal waters within the jurisdiction of the RRT IV.

RRT IV recognizes that in some instances the physical collection and removal of oil is infeasible or inadequate, and the effective use of *in-situ* burning as an oil spill response technique must be considered. Preauthorization within the set guidelines of this agreement allows the FOSC to utilize burning agents to: (1) prevent or substantially reduce a hazard to human life, (2) minimize the environmental impact of the spilled oil or, (3) reduce and/or eliminate economic or aesthetic losses which would otherwise presumably occur without the use of this technique.

2.1.B. Authority for Preauthorization

Subpart J of the NCP provides that the FOSC; with the concurrence of the EPA representative to the RRT IV and the State(s) with jurisdiction over affected waters, and in consultation with the DOC and DOI trustee representatives to the RRT IV; may authorize the use of burning agents on oil spills [40 CFR 300.910(c)]. Preauthorization of burning agents may be adopted with concurrence from all of the above mentioned RRT IV representatives [40 CFR 300.910(a)].

Commandant, U.S. Coast Guard has predesignated the USCG Captains of the Port as On-Scene Coordinators for coastal oil spills; and has delegated authority and responsibility for compliance with Section 1321 of the Clean Water Act, as amended, to them. The EPA has delegated its authority for authorization of appropriate burning agents the EPA representative to the Regional Response Team. RRT IV representatives from the DOC, DOI, and the states of North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi have been delegated authority by their respective agencies or state governments to represent natural resource trustee concerns and to serve as consultants to the FOSC on these matters.

2.1.B(1) Clarification of Burning Agents

Subpart J of the NCP specifically addresses authorization procedures for the use of "appropriate burning agents". A burning agent, a.k.a. "accelerant", is defined as an additive that, through physical or chemical means, improves the combustibility of the materials to which it is applied [40 CFR 300.5]. The process of *in-situ* burning, through deliberate action as an applied response technology, uses burning agents to assist with ignition and sometimes with sustained combustion. The NCP does not require technical product data submissions for burning agents and does not include burning agents on the NCP Product Schedule [40 CFR 300.915(e)].Scope of Preauthorization

The USCG, EPA, DOI, DOC, and the coastal states of RRT IV have adopted *in-situ* burning as an approved tool to remove discharged oil from ocean and coastal waters within the jurisdiction of RRT IV. This agreement covers protocols under which appropriate burning agents are preauthorized for use by the USCG FOSC on state and federal coastal and ocean waters.

Offshore *in-situ* burning to remediate oil spills occurring in Federal Region IV will be conducted in accordance with this plan and, in addition, where applicable, in accordance with Letters of Agreement established between the USCG, EPA, DOI, DOC and the affected state(s) [1]. The preauthorization for burning agents in this plan is in effect for the predesignated USCG FOSC only. Limitations on continued use of *in-situ* burning may be adopted by RRT IV on a case-by-case basis.

Preauthorization is not limited to only those organizations with pre-established contracts with *in-situ* burning operators. Due to the time-critical elements involved in an *in-situ* burn decision, RRT IV strongly recommends that contractual arrangements for provision of the necessary equipment and personnel for burning operations be established prior to an incident to avoid unnecessary delays in implementation of this policy.

2.1.B(2) Authority to Discontinue Use

In-situ burning will be discontinued immediately when directed by the FOSC.

Preauthorization for FOSC authority for use of burning agents may be temporarily withdrawn if an RRT4 representative who's agency is a signatory to this plan (USCG, EPA, DOI, DOC, or an affected state) notifies RRT4 that their agency's approval for the plan has been suspended. Such notification may be verbal but must be followed by written and signed documentation to the RRT4 co-chairs. These agencies and all other RRT4 member agencies retain the authority to convene RRT4 to discuss concerns about the response. Inability to provide opportunity for observation of *in-situ* burning described in Protocol 4.6 should not be cited as a cause for suspension of burning agents.

Concurrently, the DOI or DOC may advise the FOSC that the consultation provided to this preauthorization plan is inadequate or inapplicable to the response. In this event, an emergency consultation must be completed for use of burning agents to continue.

2.1.B(3) Multi-Jurisdictional Responses

Concerns over *in-situ* burning operations which may impact adjacent State, special Federal management jurisdictions, or Federal regions will be addressed with the Liaison Officer (LOFR) of the responding Incident Management Team (IMT) and mediated by the RRT(s) if necessary.

2.2. General Policy for In-Situ Burning in Federal Region IV

The NCP does not require RRT approval for the use of *in-situ* burning as a response technology when burning agents are not utilized. However, the USCG, EPA, DOI, DOC, and member states of RRT IV have agreed that the protocols, preauthorization restrictions, and implementation guidance within this plan are appropriate for all oil spill responses in Federal Region IV where *in-situ* burning is utilized through deliberate action as an applied response technology.

In-situ burning to remediate oil spills occurring in Federal Region IV will be conducted in accordance with this plan and, in addition, where applicable, in accordance with Letters of Agreement established between the USCG, EPA, DOI, DOC and the affected state(s). This policy includes:

[1] "affected state(s)" means state(s) with jurisdiction over environmental resources that might be impacted or threatened by the release or discharge.

- *In-situ* burning at offshore, near-shore, and/or inland oil spills;
- *In-situ* burning where burning agents (aka “accelerants”) are not utilized; and/or,
- Federal and State responses where a Federal FOSC is not present for *in-situ* burning activities.

This policy and this plan are not intended to cover debris burning of stockpiled materials.

3. Preauthorization and Application Zones for *In-Situ* Burning

In-Situ Burning operations will be conducted within the jurisdiction of the RRT IV region in accordance with this agreement and, as applicable, in accordance with protocols established in Letters of Agreement (LOA) between the USCG, EPA, DOI, DOC, and the affected state(s). The authority to authorize the use of *in-situ* burning provided under this Agreement to the USCG FOSC may not be delegated.

Two Zones: Green and Yellow, have been established to delineate locations and conditions under which burning operations may take place in waters of Federal Region IV. Preauthorization for *In-Situ* Burning is limited to the geographical boundaries outlined in the Green Zone only. Requests for burning operations in the Yellow Zone must follow the procedures in Appendix V.

3.1. Green Zone – Preauthorization Zone for Open Water Burning

The Green Zone is defined as any offshore waters within Federal Region IV in which ALL of the following conditions apply:

3.1.A. Jurisdiction

The waters fall exclusively under federal jurisdiction;

3.1.B. Other Zones

The waters are not classified within a "Yellow" zone as defined under Section 3.2;

3.1.C. Distance

The waters are at least three nautical miles seaward of any shoreline (and is nine nautical miles from the West coast of Florida [2]) and are within the United States' Exclusive Economic Zone (EEZ); and,

3.1.D. Depth

The waters are beyond the 30-foot isobath (approximately 10 meters or 5 fathoms).

Within Green Zones, the USCG, EPA, DOC, DOI, and the state(s) agree that the decision to use *in-situ* burning rests solely with the predesignated USCG FOSC, and that no further approval, concurrence or consultation on the part of the USCG or the USCG FOSC with EPA, DOC, DOI, or the state(s) is required. Preauthorization is otherwise invalid for areas or circumstances where ESA, EFH, or NHPA consultations are missing, inapplicable, and/or determined by the service agency (USFWS, NMFS, or ACHP) to be inadequate.

[2] Special Case for West Coast of Florida: Florida state waters extend seaward into the Gulf of Mexico to a distance of nine nautical miles whereas all other state coastal waters in RRT IV, including Florida's east coast, extend seaward to a distance of three nautical miles.

All burning operations within the Green Zone will be conducted in accordance with the Protocols outlined in Section 4 of this plan. It is imperative that the USCG FOSC make every reasonable effort to continuously evaluate *in-situ* burning within the Green Zone, and will allow RRT IV agencies and the affected state(s) the opportunity to comment as outlined in the protocol 4.2.

3.2. Yellow Zone – Case-by-Case Approval for Open Water Burning

The Yellow Zone is defined as any area within Federal Region IV for which ANY of the following conditions apply:

3.2.A. Special Jurisdiction

The area is under special management jurisdiction. This includes any waters designated as marine reserves, state parks, National Marine Sanctuaries, National or State Wildlife Refuges, or units of the National Park Service;

3.2.A(1) Critical Habitat – Seasonal

Proposed or designated critical habitat components which reflect seasonal use are not inherently part of the *Yellow Zone*; however, special Emergency Consultation is required under ISBP Protocol 4.7 for application in a geographic area which meets all the criteria of a *Green Zone* in 3.1 and is also within a proposed or designated Critical Habitat which reflects seasonal use.

Known critical habitats that meet these criteria are:

- Loggerhead Sea Turtle Northwest Atlantic Distinct Population Segment (DPS)
    - Four segments of critical habitat management units (N-01, N-02, N-17, N-18 and N-19; 79 FR 39856) extend through the *Green Zone* due to migratory habitat features.
    - Two management units (S-01 and S-02; 79 FR 39856) are within the *Green Zone* for *Sargassum* habitat features.
- North Atlantic Right Whale
    - One critical habitat delineated in regard to winter calving (81 FR 4837).

3.2.A(2) Critical Habitat – Non-Seasonal

Proposed or designated critical habitat components which are not limited to seasonal use are part of the *Yellow Zone*

Known critical habitats that meet these criteria and would otherwise be within the geographic boundaries of the Green Zone [Sections 3.1.C through 3.1.D] are:

- Elkhorn and Staghorn Corals
    - One critical habitat delineated in regard to marine habitat (73 FR 72210)
- Gulf of Mexico subspecies of the Bryde's Whale
    - Although the Gulf of Mexico subspecies of the Bryde's Whale does not have a designated Critical Habitat. The RRT4, in consultation with NOAA NMFS,

will consider the core distribution area published by NOAA in June of 2019 [3] as part of the *Yellow Zone* for the ISBP

3.2.B. Distance

The area in three nautical miles of a shoreline (or within nine nautical miles of the west coast of Florida) and/or falling under State jurisdiction;

3.2.C. Depth and Living Reefs

The waters are within the 30 foot isobaths (approximately 10 meters or 5 fathoms) AND contain living reefs; and,

3.2.D. Habitats

The waters are in mangrove or coastal wetland ecosystems, or directly over living coral communities. Coastal wetlands include submerged algal beds and submerged sea grass beds.

4. Protocols for *In-Situ* Burning

The following requirements apply to the use of all in-situ burning operations under the provisions of this policy:

4.1. RRT Notification

The Application\Checklist form in Appendix E shall be completed for all burns and provided to RRT IV members in a timely manner for documentation and informational purposes. [4]

4.2. Evaluation of Continued Use

The FOSC agrees to make every effort to continuously evaluate the decision to burn by considering the advice of the EPA, DOI, DOC, and affected state(s), other members of the RRT IV, and any other agencies, groups or information sources which may be available.

The FOSC must be able to address the decision elements in Appendix F when evaluating the applicability of *in-situ* burning as a response option.

4.3. Health and Safety Concerns

Assuring workers' health and safety is the responsibility of employers and the USCG FOSC who must comply with all Occupational Safety and Health Administration (OSHA) regulations. Prior to any *in-situ* burn operations, a site safety plan must be submitted and approved by the FOSC. The burning should be stopped if it is determined that it becomes an unacceptable health hazard due to operational or smoke exposure concerns to responders or the general public. If at any time exposure limits are expected to exceed OSHA Permissible Exposure Limits (PELs) at workstations then *in-situ*

[3] Gulf of Mexico Bryde's Whale Core Distribution Area Map & GIS Data - https://www.fisheries.noaa.gov/resource/map/gulf-mexico-brydes-whale-core-distribution-area-map-gis-data

[4] A copy of the notification form should also be provided to nmfs.ser.emergency.consult@noaa.gov

burning operations will immediately cease. More stringent exposure limits such as NIOSH RELs, STELs, AEGLs, TEELs, and ERPGs may be used in site safety planning. National Ambient Air Quality Standards (NAAQS) should be used as a benchmark for air quality monitoring in nearby populated areas; exposure limits should be established prior to ignition and State and/or County Health Departments should be notified of the burn activity as soon as practicable. Exposure concerns should include particulate pollution fractions of both PM10 and PM2.5as well as applicable chemical-specific air contaminants.

4.4. Favorable Conditions

In-situ burning is advised only when the meteorological and sea conditions are operationally favorable for a successful burn. The FOSC will utilize readily available resources to gather information on the speed and direction of the wind, atmospheric conditions, plume modeling, and the proximity to population centers or sensitive resources onshore, and will make efforts to avoid particulate impacts in these areas. A safety margin of 45 degrees of arc on either side of predicted wind vectors should be used and documented for shifts in wind direction.

4.5. On-Site Survey

Prior to beginning an *in-situ* burn, an on-site survey will be conducted to determine if any threatened or endangered species are present in the burn area or otherwise at risk from any burn operations, fire, or smoke. Appropriate natural resource specialists, knowledgeable with any special resource concern in the area and representing the resource trustee, will be consulted prior to conducting any *in-situ* burn. Measures will be taken and documented to prevent risk of injury to any wildlife, especially endangered or threatened species. Examples of potential protection measures may include: moving the location of the burn to an area where listed species are not present; temporary employment of hazing techniques, if effective; and physical removal of individuals of listed species only under the authority of the trustee agency.

4.6. Observers

Barring any unforeseen circumstances (such as time constraints, safety considerations, or logistical concerns) the FOSC will make a reasonable effort to provide designated representatives from the USCG, EPA, federal trustee agencies, the affected state(s), OSHA, and the responsible party with the opportunity to observe *in-situ* burning operations. An inability to provide this opportunity will not, however, be cause for immediate cessation of burn operations.

4.7. Monitors

Monitoring to establish "Continue/Discontinue" data for input to the FOSC will be conducted in accordance with protocols established by the Region IV Regional Response Team and as outlined in the monitoring program contained in appendix VI. Unless smoke plumes are predicted to cross overpopulated or environmentally sensitive areas, an inability to conduct monitoring operations will not be automatic grounds for discontinuing or prohibiting *in-situ* burn operations. All burns must incorporate monitoring procedures currently being supported by the USCG National Strike Force [5] that will include visual monitoring at the burn site to record the disposition of burn residues and to monitor the burn site for potential impact to any natural resource in the area. Samples of the residue will be collected if feasible.

4.8. Emergency Consultation for Critical Habitats

In the event that *in-situ* burning is planned or considered within, or adjacent to, a proposed or designated Critical Habitat which meets the criteria of Section 1.1.A, an Emergency Consultation shall be initiated with the DOC through the NOAA Scientific Support Coordinator (SSC) to narrowly address the species, habitat, and type of habitat (e.g. *Sargassum*, calving, etc.) which may be at risk.

4.9. Burn Control

Burning will be conducted in a way that allows for effective control of the burn, to the maximum extent feasible, including the ability to rapidly stop the burn if necessary. Contained and controlled burning is recognized as the preferred method of burning using fire-resistant boom.

4.10. Ignition Control

All practical efforts will be made to control and contain the burn and prevent accidental ignition of the source. Generally, it is not recommended that the source or adjacent uncontained slicks be allowed to ignite during *in-situ* burning operations. Certain circumstances, however, may warrant consideration of carefully planned source ignition.

4.11. Mechanical Recovery

Mechanical recovery equipment shall be mobilized on-scene, when feasible, for backup and complimentary response capability. Provisions must be made for collection of burn residue following the burn(s).

4.12. ESA and EFH Consultation

In-situ burning will be conducted in accordance with consultations from USFWS, NMFS and the ACHP on formal assessments conducted under Section 7(a)(2) of the ESA, Section 305(b) of the MSA, and Section 106 of the NHPA. Where consultations are missing, inapplicable, and/or determined by the service agency (USFWS, NMFS, or ACHP) to be inadequate, an informal emergency consultation [6] shall be initiated prior to beginning *in-situ* burning.

4.13. Final Report

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[5] Usecurrent version of the Special Monitoring of Applied Response Technologies (SMART) Protocols unless the a separate monitoring protocol for *in-situ* burning is adopted by the USCG National Strike Force.

[6] "*Emergency Consultation"* is an informal process wherein the action agency contacts the Service(s) as soon as possible about the situation for advice on measures that would minimize effects of the response. This contact need not be in writing. The Service(s) will follow the initial contact with a written summary of the conversation. If the initial review indicates that the action may result in jeopardy or adverse modification, and no means of reducing or avoiding this effect are apparent, the agency should be so advised, and the Service(s) conclusions documented.

Any use of in-situ burning requires that a post-incident report be provided by the FOSC or a designated member of the FOSC's staff, within 45 days of completing in-situ burning operations. Recommendations for changes or modification to this policy should be presented in the report, if appropriate. This report will be presented at a Region IV RRT meeting, if requested by the RRT. Required criteria for the final report are outlined in Appendix K.

5. Signature Page

We hereby attest and declare that by our signature we do approve this policy for *in-situ* burning as presented herein for the agency or government we represent on the Region IV Regional Response Team (RRT IV).

United States Coast Guard | Date

RRT IV Co-chair

United States Environmental Protection Agency | Date

RRT IV Co-chair

U.S. Department of the Interior | Date

Region IV Response Team representative

U.S. Department of Commerce | Date

Region IV Response Team representative

State of North Carolina | Date

Region IV Response Team representative

State of South Carolina | Date

Region IV Response Team representative

State of Georgia Date

Region IV Response Team representative

State of Florida Date

Region IV Response Team representative

State of Alabama Date

Region IV Response Team representative

State of Mississippi Date

Region IV Response Team representative

State of Tennessee Date

Region IV Response Team representative

State of Kentucky Date

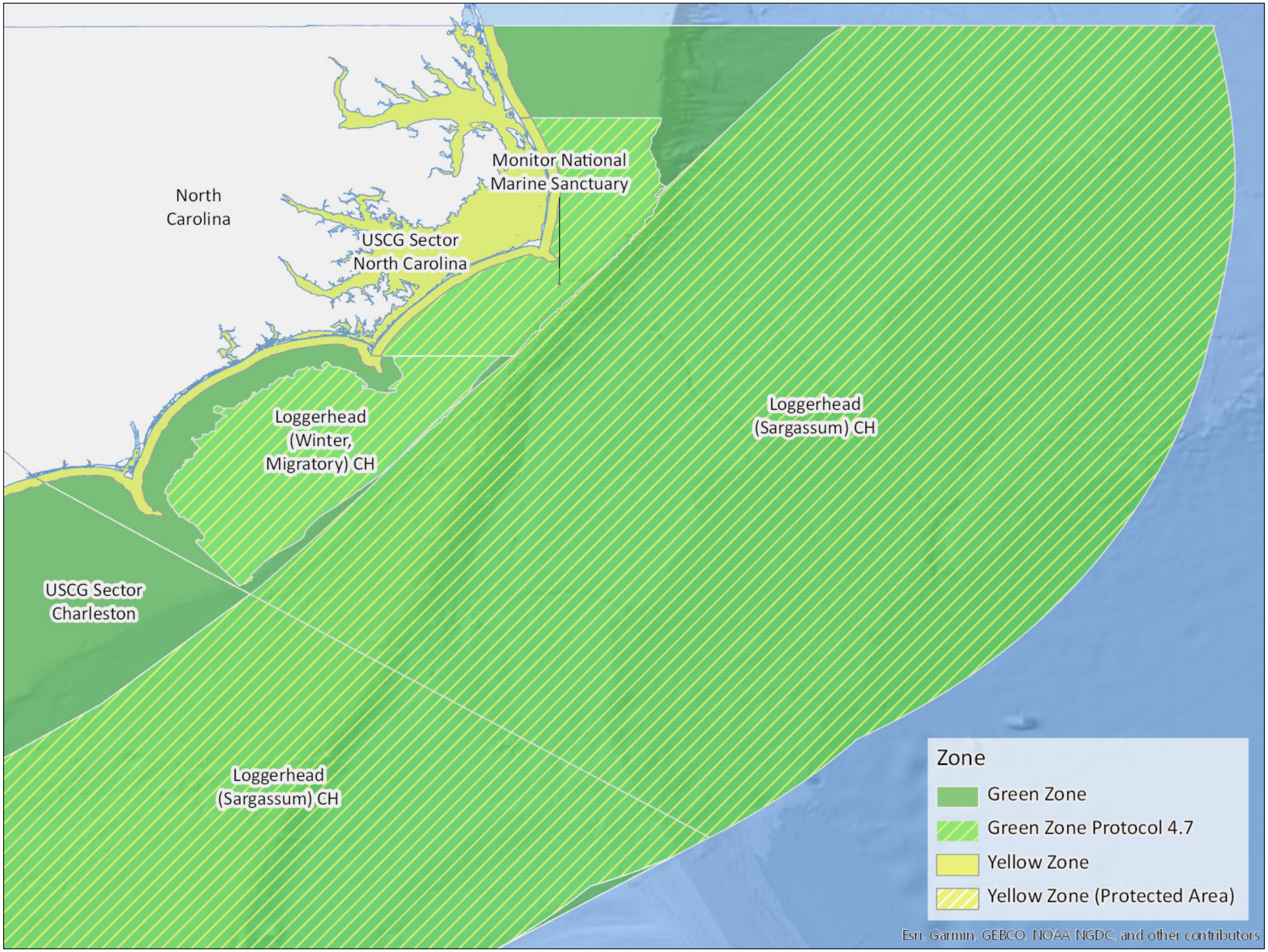
Region IV Response Team representative

Appendix I. *In-Situ* Burning Zone Maps

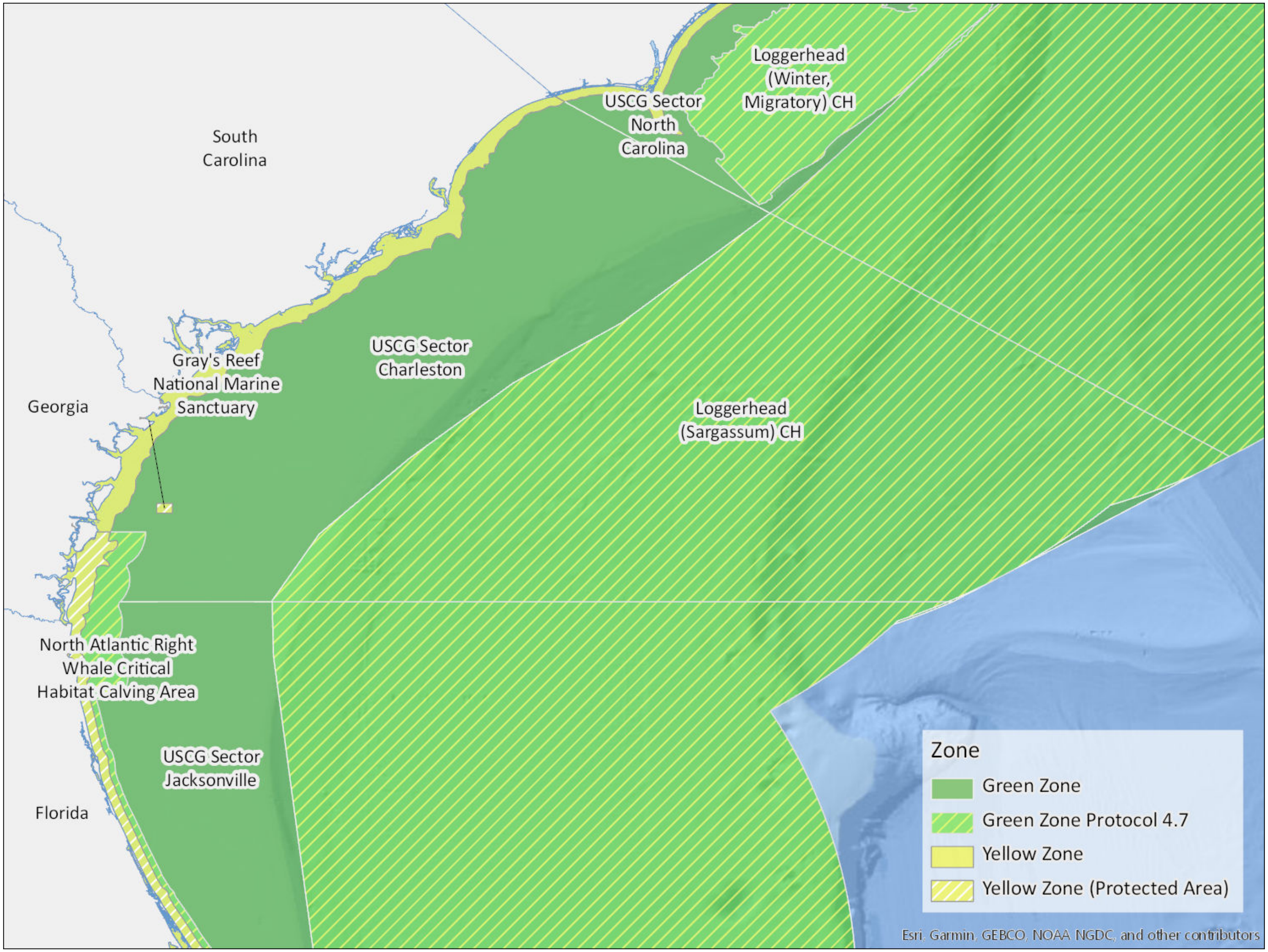
In general, preauthorization exists 3 nautical miles seaward of any land providing that the water depth is at least 30 feet deep. Within the State of Florida, preauthorization exists 9-nautical miles seaward of land on the Florida Gulf Coast and 3-nautical miles seaward on the eastern coast and Florida Keys. Some special management areas are however, excluded from preauthorization. Any preauthorization granted within state's waters will be addressed in a separate Letter of Agreement between the state, The USCG, the EPA, DOI, and DOC. The maps contained in this section serve as a general reference to indicate locations, distance from shore, and distance from the 30 foot contour for the preauthorized zones throughout Federal Region IV.

- **Sector North Carolina**
- **Sector Charleston**
- **Sector Jacksonville**
- **Sector Miami**
- **Sector Key West**
- **Sector St. Petersburg**
- **Sector Mobile**

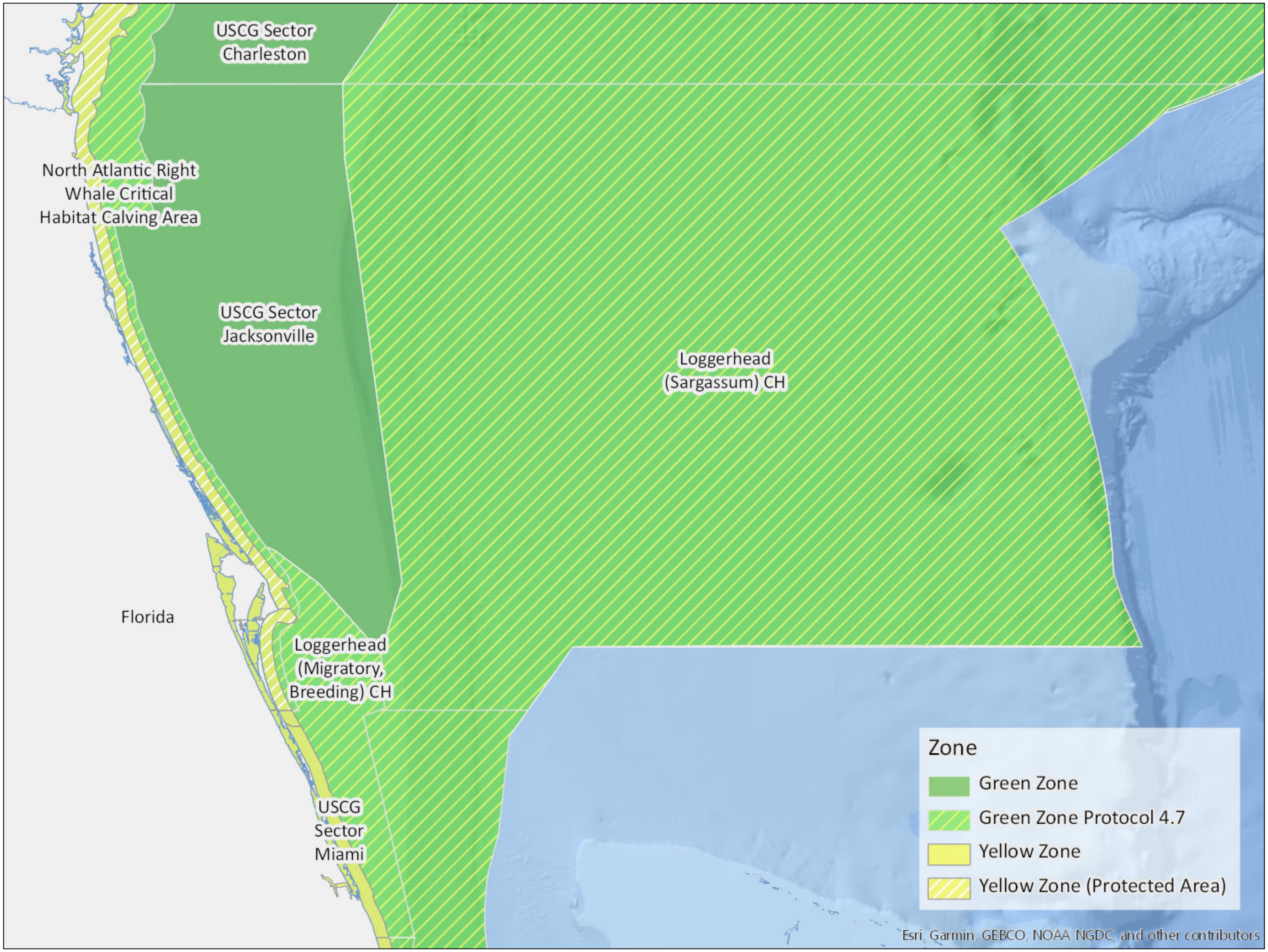
In-Situ Burn Plan Green and Yellow Zone for Sector North Carolina



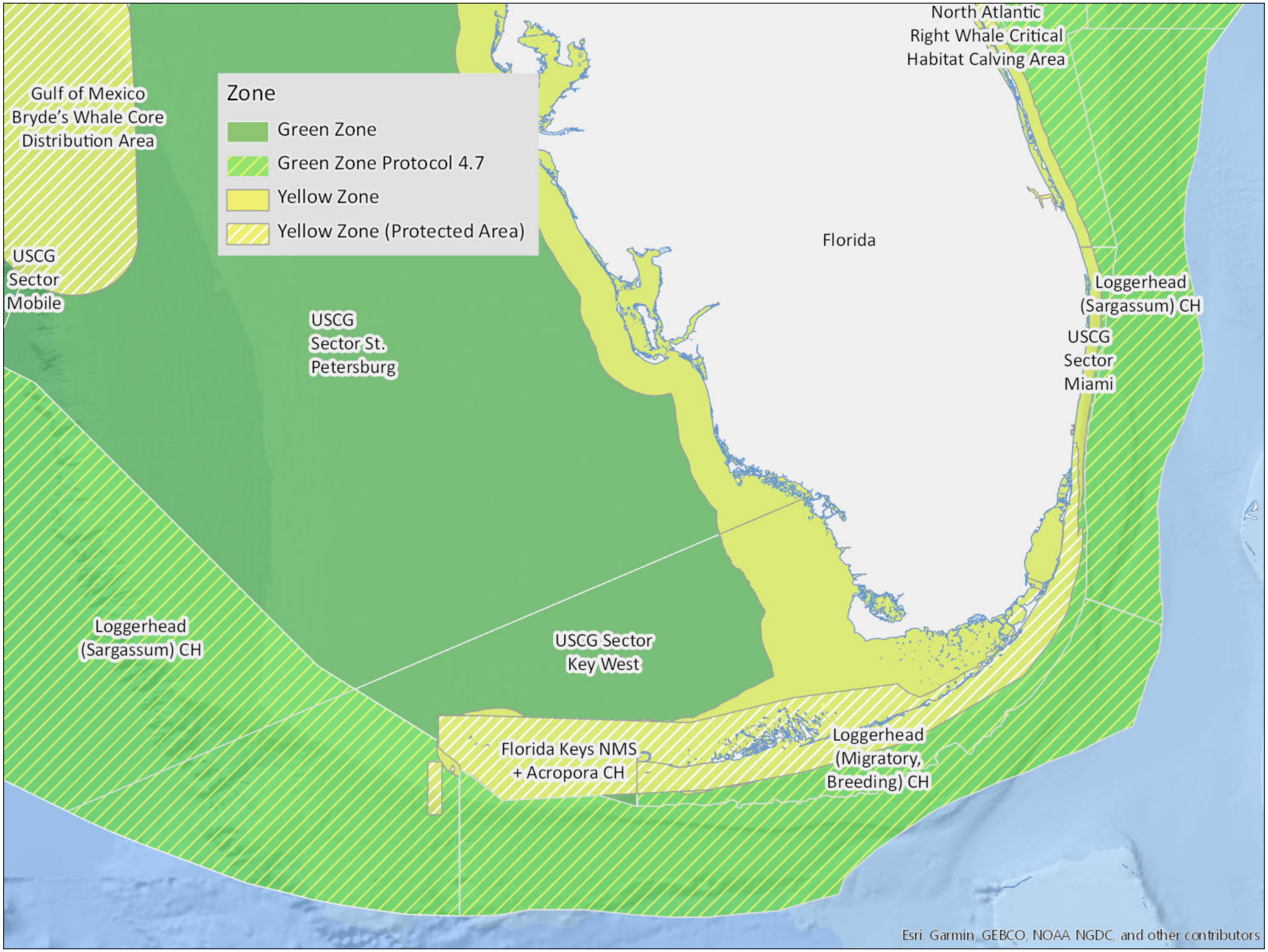
In-Situ Burn Plan Green and Yellow Zone for Sector Charleston



In-Situ Burn Plan Green and Yellow Zone for Sector Jacksonville

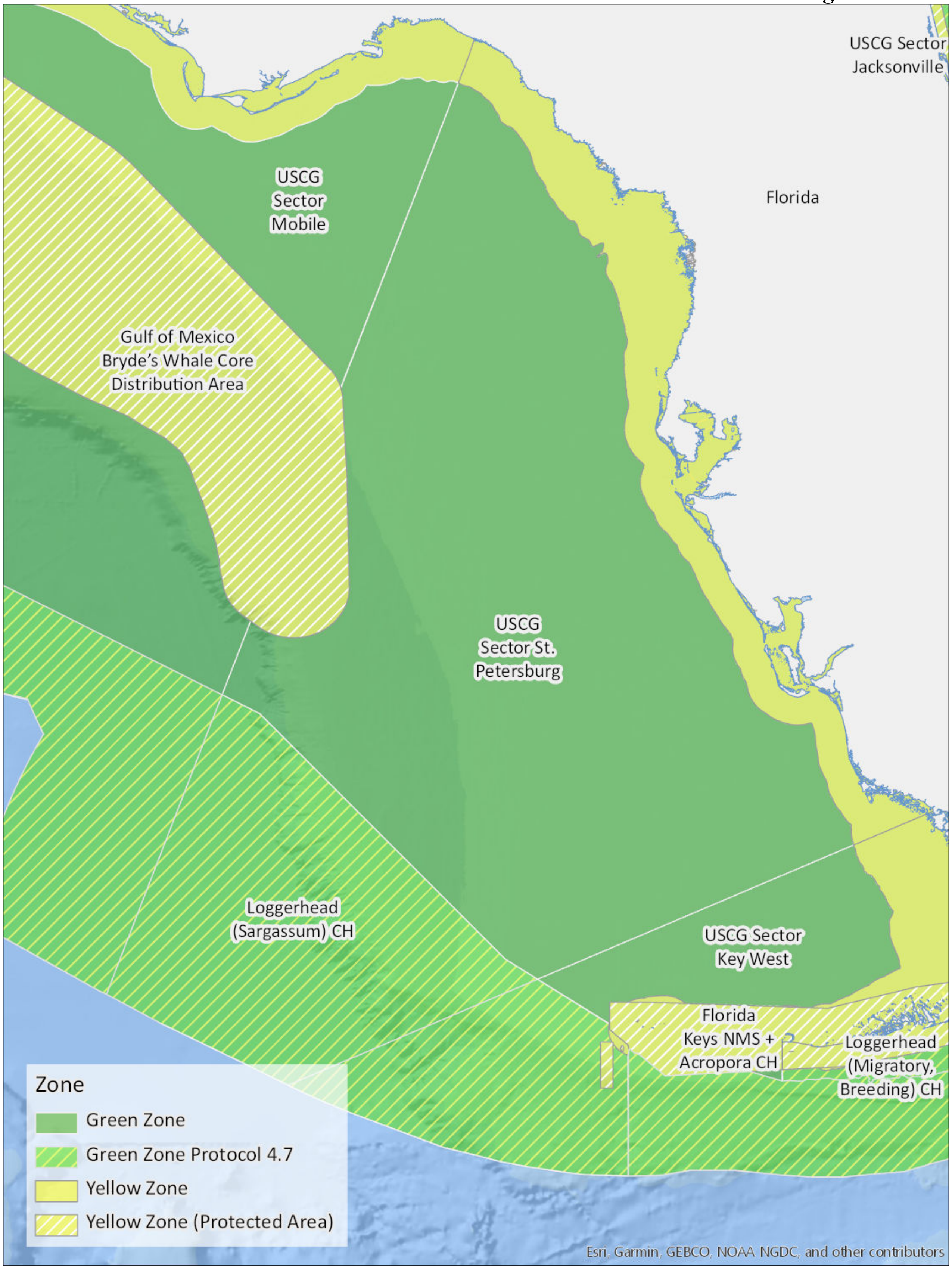


In-Situ Burn Plan Green and Yellow Zone for Sector Miami and Sector Key West

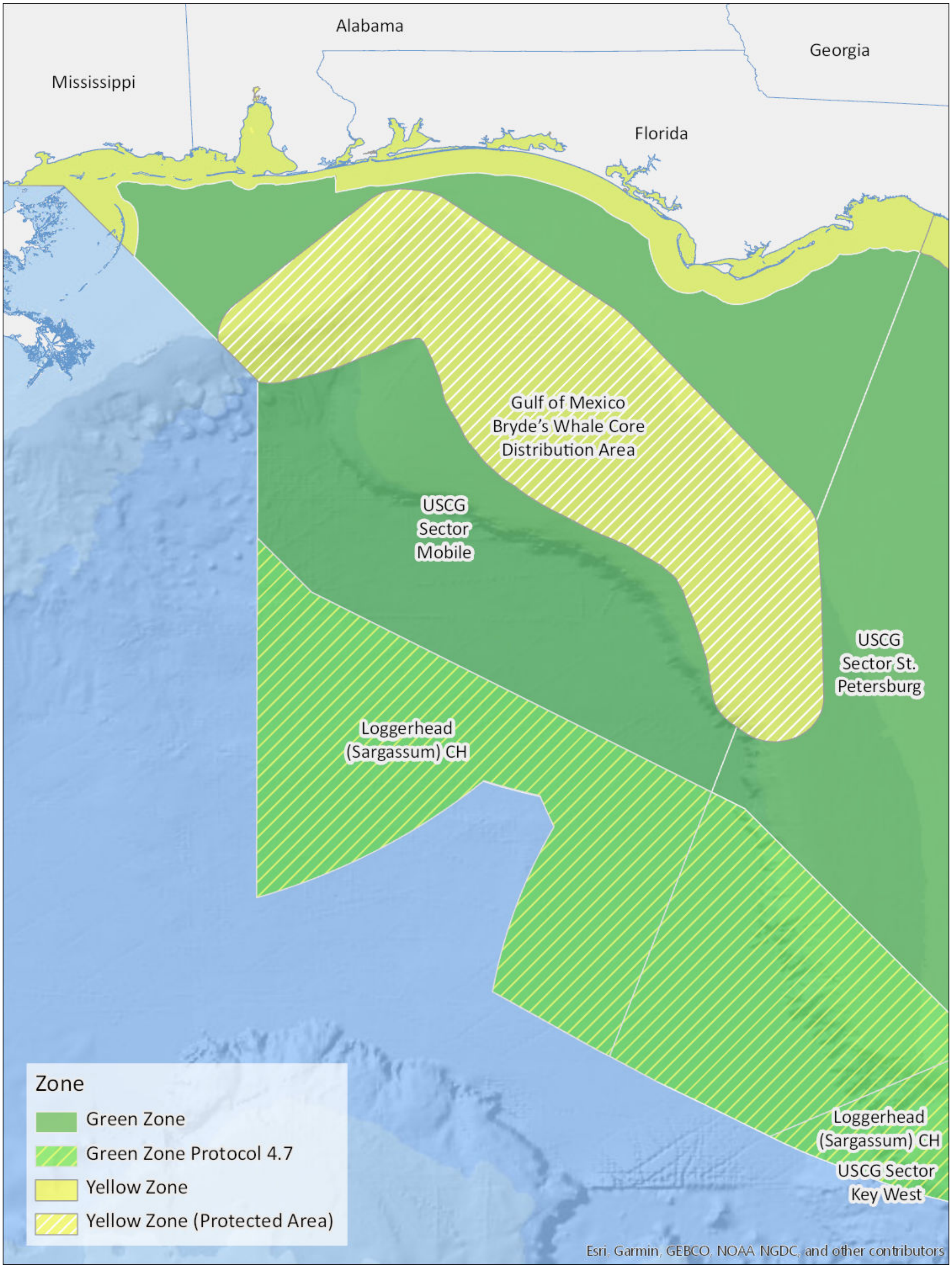


Zone
Green Zone
Green Zone Protocol 4.7
Yellow Zone
Yellow Zone (Protected Area)
Gulf of Mexico
Bryde's Whale Core
Distribution Area
USCG
Sector
Mobile
USCG
Sector St.
Petersburg
North Atlantic
Right Whale Critical
Habitat Calving Area
Florida
Loggerhead
(Sargassum) CH
USCG
Sector
Miami
Loggerhead
(Sargassum) CH
USCG Sector
Key West
Florida Keys NMS
+ Acropora CH
Loggerhead
(Migratory,
Breeding) CH
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

In-Situ Burn Plan Green and Yellow Zone for Sector Saint Petersburg



In-Situ Burn Plan Green and Yellow Zone for Sector Mobile



Alabama
Georgia
Mississippi
Florida
Gulf of Mexico
Bryde's Whale Core
Distribution Area
USCG
Sector
Mobile
USCG
Sector St.
Petersburg
Loggerhead
(Sargassum) CH
Loggerhead
(Sargassum) CH
USCG Sector
Key West
Zone
Green Zone
Green Zone Protocol 4.7
Yellow Zone
Yellow Zone (Protected Area)
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

Appendix II. Letters of Agreement

Where applicable, other State and Federal Trustee documents relevant to *in-situ* burning decisions have also been included. Until such time as an LOA or other policy document is completed for *in-situ* burning within a State's waters or specially managed Federal Resource, burning decisions will be made on a case-by-case basis, in accordance with this Region IV IN-Situ Burn Plan and the National Contingency Plan.

- **North Carolina**
- **South Carolina**
- **Georgia**
- **Florida**
- **Alabama**
- **Mississippi**
- **Federal Trustees**

Appendix III. *In-Situ* Burning Application and Evaluation Form

►- Denotes information that is necessary for preauthorization notification to RRT IV [7]. All other information must be provided at a later time upon request from RRT IV, or must be provided for case-by-case approval from RRT IV.

A copy of the notification form should also be provided to nmfs.ser.emergency.consult@noaa.gov

RESPONDING AGENCY

► Time of Report:	Date	mm / dd / yyyy	Time (24 hr)		☐ Eastern ☐ Central
► Acting FOSC:	Name:		Agency:		
	Phone:		Email:		
► Alternate Contact:	Name:		Agency:		
	Phone:		Email:		

(POTENTIALLY) RESPONSIBLE PARTY

► Company Name:			► Street Address:	
► Primary Phone:			► City, State, Zip:	
► PRP IC:	Name:		Affiliation:	
	Phone:		Email:	
► Alternate PRP Contact:	Name:		Affiliation:	
	Phone:		Email:	

[7] See Section 2.1 of the RRT IV *In-Situ* Burn Plan

SPILL INFORMATION

<table>
<tr><td>► Incident Name:</td><td colspan="5"></td></tr>
<tr><td>► Vessel or Facility Name:</td><td colspan="5"></td></tr>
<tr><td>► Date/Time Spill Occurred</td><td>Date</td><td>mm / dd / yyyy</td><td>Time (24 hr)</td><td></td><td>☐ Eastern
☐ Central</td></tr>
<tr><td>► Location of Spill:</td><td>LAT:</td><td></td><td>LON:</td><td colspan="2"></td></tr>
<tr><td>► Type of Release:</td><td colspan="5">☐ Instantaneous
☐ Continuous Flow</td></tr>
<tr><td rowspan="2">► Type of Incident:</td><td colspan="2">☐ Grounding
☐ Transfer Operations
☐ Explosion
☐ Vehicle Accident
☐ Blowout
☐ Pipeline
☐ Other:</td><td rowspan="2">► Product(s) Released:</td><td colspan="2">☐ Heavy Crude
☐ Bunker C / #6 Fuel Oil
☐ Medium Crude
☐ Diesel / #2 Fuel Oil
☐ Jet Fuels / Gasoline
☐ Other:</td></tr>
<tr><td colspan="2">Other:</td><td colspan="2">Other:</td></tr>
<tr><td>► Did source burn?</td><td colspan="2">☐ Yes
☐ No</td><td>► Is source still burning?</td><td colspan="2">☐ Yes
☐ No</td></tr>
</table>

OIL TYPE

► Spilled oil/substance name (if known):					
API Gravity:		Pour Point:			☐ ºF ☐ ºC
Viscosity:		Percent Evaporation:		(24 hrs)	(48 hrs)
► Amount Spilled:		☐ Gallons ☐ BBLs			
► Potential for spill size (if ongoing)		☐ Gallons ☐ BBLs			
► Flow Rate (if continuous):					
Did oil emulsify within the operational period?		☐ Yes ☐ No			
► Oil Condition:	Fresh oil,< 2-3 days exposure	☐ Yes ☐ No	>2-3 mm, (0.1 inch) thickness		☐ Yes ☐ No
**** Any information from visual over flights of the slick, including estimations of slick thickness, should be included here. All additional available information pertaining to physical characterization of spilled oil should be included here.**					

ENVIRONMENTAL CONDITIONS:

►Current Weather:	☐ Clear	☐ Partly Cloudy ☐ Overcast ☐ Rain	☐ Snow ☐ Fog ☐ Inversion
►Current Wind Speed	**►Surface** [8]	**►Forecasted** [9]	**Transport** [10]
Speed (mph):			
Direction (from):			
►Surface Current (Direction toward):	Degrees	►Speed:	Knots
►Visibility:	Nautical Miles	►Ceiling:	Feet
►Sea State (Wave Height):	Feet	►Precipitation:	Inches
►Sea Temperature:	°F	►Air Temperature:	°F
►Tidal Condition:		►Water Depth:	Feet
Misc. Condition Notes			
►Is visibility sufficient to see oil, containment systems, and aerial ops for burn observation?	☐ Yes ☐ No	►Conditions acceptable for burn operations?	☐ Yes ☐ No
Degree of Weathering:	☐ Mild ☐ Moderate ☐ Significant		

[8] Surface wind speeds are measured at the site at water level

[9] Forecasted wind speeds are usually measured at approximately 20 feet above water level

[10] Transport winds determine where and how fast the smoke plume will travel (provided by state forestry agency in daily prescribed fire or smoke management forecasts)

DESCRIPTION OF SPILL INCIDENT AND SPILL SITE:

Note all relevant details concerning the spill incident and spill site here. Be sure to note whether the spill was a one-time or continuous release, the amount of cargo remaining aboard the vessel, the stability of the vessel, and sensitive environmental conditions in the vicinity of the vessel. An estimated amount of oil on the water should be made, if possible, by using available information on the area of the slick and the estimated slick thickness (as indicated by the color of the slick). Also included should be a description of the location of the spill site, including the nearest major port.
►PROJECTED AREA OF IMPACT IF OIL IS NOT BURNED:
►Reasons Why Mechanical Removal of Oil is Not Feasible or Optimal (provide brief description):

WEATHER FORECAST (can be completed by NOAA SSC):

24 HOUR PROJECTED FORCAST			
24hr Weather:	☐ Clear	☐ Partly Cloudy ☐ Overcast ☐ Rain	☐ Snow ☐ Fog ☐ Inversion
24hr Wind Speed	**Surface** [11]	**Forecasted** [12]	**Transport** [13]
Speed (mph):			
Direction (from):			
24hr Surface Current (Direction toward):	Degrees	24hr Speed:	Knots
24hr Visibility:	Nautical Miles	24hr Ceiling:	Feet
24hr Sea State (Wave Height):	Feet	24hr Precipitation:	Inches
24hr Sea Temperature:	°F	24hr Air Temperature:	°F
24hr Tidal Condition:		24hr Water Depth:	Feet
Misc. Condition Notes			
Visibility expected to be sufficient in 24hrs?	☐ Yes ☐ No	Conditions expected to be acceptable for burn operations in 24hrs?	☐ Yes ☐ No
Projected Degree of Weathering in 24hrs:	☐ Mild ☐ Moderate ☐ Significant		

[11] Surface wind speeds are measured at the site at water level
[12] Forecasted wind speeds are usually measured at approximately 20 feet above water level
[13] Transport winds determine where and how fast the smoke plume will travel (provided by state forestry agency in daily prescribed fire or smoke management forecasts)

48 HOUR PROJECTED FORCAST			
48hr Weather:	☐ Clear	☐ Partly Cloudy ☐ Overcast ☐ Rain	☐ Snow ☐ Fog ☐ Inversion
48hr Wind Speed	**Surface** [14]	**Forecasted** [15]	**Transport** [16]
Speed (mph):			
Direction (from):			

48hr Surface Current (Direction toward):	Degrees	48hr Speed:	Knots
48hr Visibility:	Nautical Miles	48hr Ceiling:	Feet
48hr Sea State (Wave Height):	Feet	48hr Precipitation:	Inches
48hr Sea Temperature:	°F	48hr Air Temperature:	°F
48hr Tidal Condition:		48hr Water Depth:	Feet
Misc. Condition Notes			
Visibility expected to be sufficient in 48hrs?	☐ Yes ☐ No	Conditions expected to be acceptable for burn operations in 48hrs?	☐ Yes ☐ No
Projected Degree of Weathering in 48hrs:	☐ Mild ☐ Moderate ☐ Significant		

[14] Surface wind speeds are measured at the site at water level
[15] Forecasted wind speeds are usually measured at approximately 20 feet above water level
[16] Transport winds determine where and how fast the smoke plume will travel (provided by state forestry agency in daily prescribed fire or smoke management forecasts)

Evaluation of Response Operations, Equipment, and Personnel

►Considering spill size, forecasted weather and trajectories, amount of available equipment, is there time to deploy mechanical recovery equipment?	☐ Yes ☐ No
►Considering spill size, forecasted weather and trajectories, amount of available equipment, is there time to conduct burning operations?	☐ Yes ☐ No

►Why is *in-situ* burning necessary?(check all that apply)	☐ Remove oil to prevent spread to sensitive sites or over large areas ☐ Reduce the generation of oily waters, especially where transportation or disposal options are limited ☐ Access to the Site is limited by shallow water, soft substrates, thick vegetation, or the remoteness of the location ☐ Other removal methods have lost effectiveness or become too intrusive ☐ Other:
	Other:

►Has the burn area been isolated (e.g., by fire breaks)?	
►Is there an approved site safety plan in place?	
►Have local fire and police departments been notified?	
►Are the appropriate firefighting gear and personnel on-scene?	
►Is aircraft for ignition and aerial observation required?	
►If yes, are they available? [17]	
►Is the aerial ignition company FAA certified?	
►Is ignition system available?	
►Type/Method of ignition to be used?	
►Burn Agent [18] or Accelerant to be used?	
►Personnel trained, equipped with safety gear, & covered by site safety plan?	
►Communications System to communicate with aircraft and fire fighters available and working?	
►Is access to the site restricted to response personnel only?	

[17] Flight requirements: daylight hours; visibility >1 mile; ceiling >500 feet

[18] A burning agent, a.k.a. "accelerant", is defined as an additive that, through physical or chemical means, improves the combustibility of the materials to which it is applied [40 CFR 300.5]

Trustees

<table>
<tr><td colspan="2">Local public health official/agency notified and consulted?</td><td rowspan="4">☐ Yes
☐ No</td></tr>
<tr><td>Name</td><td></td></tr>
<tr><td>Address</td><td></td></tr>
<tr><td>Phone</td><td></td></tr>
<tr><td colspan="2">Land Owner/Manager (federal/tribal/state/ private) notified and consulted?</td><td rowspan="4">☐ Yes
☐ No</td></tr>
<tr><td>Name</td><td></td></tr>
<tr><td>Address</td><td></td></tr>
<tr><td>Phone</td><td></td></tr>
<tr><td colspan="2">Local Fire Management Officer/Fire Ecologist/State Forestry Commission consulted?</td><td rowspan="4">☐ Yes
☐ No</td></tr>
<tr><td>Name</td><td></td></tr>
<tr><td>Address</td><td></td></tr>
<tr><td>Phone</td><td></td></tr>
<tr><td colspan="2">Historic Property Specialist pursuant to the Programmatic Agreement on Protection of Historic Properties during emergency response contacted?</td><td rowspan="4">☐ Yes
☐ No</td></tr>
<tr><td>Name</td><td></td></tr>
<tr><td>Address</td><td></td></tr>
<tr><td>Phone</td><td></td></tr>
<tr><td colspan="2">State Natural Resource Agency notified and consulted?</td><td rowspan="4">☐ Yes
☐ No</td></tr>
<tr><td>Name</td><td></td></tr>
<tr><td>Address</td><td></td></tr>
<tr><td>Phone</td><td></td></tr>
<tr><td rowspan="2">►Federal Natural Resource Trustees notified and consulted? (check all that apply)</td><td colspan="2">☐ Department of the Interior
☐ U.S. Forest Service
☐ National Oceanic and Atmospheric Administration / DOC
☐ Department of Energy
☐ Department of Defense
☐ Tennessee Valley Authority
☐ National Aeronautic and Space Administration
☐ Tennessee Valley Authority
☐ Other</td></tr>
<tr><td colspan="2">Other:</td></tr>
</table>

<table>
<tr><td colspan="2">Native American interests present?</td><td rowspan="9">☐ Yes
☐ No
☐ Unknown</td></tr>
<tr><td colspan="2">Tribal Contact</td></tr>
<tr><td>Name</td><td></td></tr>
<tr><td>Address</td><td></td></tr>
<tr><td>Phone</td><td></td></tr>
<tr><td colspan="2">Bureau of Indian Affairs Contact</td></tr>
<tr><td>Name</td><td></td></tr>
<tr><td>Address</td><td></td></tr>
<tr><td>Phone</td><td></td></tr>
</table>

Habitats Impacted and Resources at Risk[19]

<table>
<tr><td colspan="2">Surface water intakes and/or wells (public and/or private):</td><td>☐ Yes
☐ No</td></tr>
<tr><td>Habitat Type(s) Impacted:</td><td>☐ Southern cordgrass prairie
☐ Palmetto prairie
☐ Cypress savanna
☐ Agricultural lands</td><td>☐ Wetlands
☐ Estuarine[20]
☐ Riverine[21]
☐ Lacustrine[22]
☐ Palustrine[23]
☐ Other</td></tr>
<tr><td colspan="2">Seasonal concerns:</td><td>☐ Yes
☐ No</td></tr>
<tr><td>Comments:</td><td colspan="2">h</td></tr>
</table>

<table>
<tr><td rowspan="6">►Biological Resources
Describe Significant issues such as: Large Concentrations, Breeding Activities, Rookeries, Designated Critical Habitat</td><td>☐ Threatened/Endangered Species (including plants)</td><td></td></tr>
<tr><td>☐ Mammals</td><td></td></tr>
<tr><td>☐ Waterfowl</td><td></td></tr>
<tr><td>☐ Wading Birds</td><td></td></tr>
<tr><td>☐ Diving Birds</td><td></td></tr>
<tr><td>☐ Shore Birds</td><td></td></tr>
</table>

[19] Summary of Protocol 4.11 from RRT IV *In-Situ* Burn Plan (also required for preauthorization): Burning will be conducted in accordance with consultations approved by USFWS and NMFS, under ESA Section & and EFH. Prior burning, an on-site survey will be conducted to determine if any threatened or endangered species are present or otherwise at risk, and natural resource specialists will be consulted.

[20] Estuarine wetlands - tidal wetlands in low-wave-energy environments where the salinity of the water is greater than 0.5 part per thousand and is variable owing to evaporation and the mixing of seawater and freshwater; tidal wetlands of coastal rivers and embayments, salty tidal marshes, mangrove swamps, and tidal flats.

[21] Riverine wetlands - wetlands within river and stream channels; ocean-derived salinity is less than 0.5 part per thousand.

[22] Lacustrine wetlands - wetlands within a lake or reservoir greater than 20 acres or within a lake or reservoir less than 20 acres if the water is greater than 2 meters deep in the deepest part of the basin; ocean-derived salinity is less than 0.5 part per thousand.

[23] Palustrine wetlands - freshwater wetlands including open water bodies of less than 20 acres in which water is less than 2 meters deep; includes marshes, wet meadows, fens, playas, potholes, pocosins, bogs, swamps, and shallow ponds; most wetlands are in the Palustrine system.

	☐ Raptors	
	☐ Fish	
	☐ Reptiles	
	☐ Amphibians	
	☐ Other	
	☐ Comments/Attachments (i.e., ESI Maps)	
Natural Areas	☐ National Park	
	☐ National Wildlife Refuge	
	☐ National Forest	
	☐ State Park	
	☐ State Wildlife Area	
	☐ Other Natural Areas	
	☐ Comments:	
Historic, Cultural, and Archeological Resources	☐ Yes ☐ No ☐ Unknown	
Commercial Harvest Areas	☐ Yes ☐ No ☐ Unknown	

Proposed Burn Plan

►Proposed burning strategy (Check all appropriate)		☐ Ignition away from source after containment ☐ Immediate ignition at or near source ☐ Ignition of uncontained slick(s) at a safe distance ☐ Controlled burn at natural collection site at or near shore ☐ Multiple ignitions needed per burn	
►Estimated amount of oil to be burned: (enter one or both)	Area		☐ Square Feet ☐ Acres
	Volume		☐ Gallons ☐ BBLs
►Estimated duration of burn:			☐ Minutes ☐ Hours
►Are simultaneous burns planned?			☐ Yes ☐ No
►If yes, how many?			
►Are sequential or repeat burns planned (not simultaneous)?			☐ Yes ☐ No
Method for terminating the burn:			
►Ability to collect burned oil residue?			☐ Yes ☐ No
Disposal method for oil residue:			
►Estimated smoke plume trajectory:		(Degrees)	
		(Miles)	
►SMART Monitoring Protocols in place?			☐ Yes ☐ No
Is additional monitoring required?			☐ Yes (attach to form) ☐ No

Evaluation of Anticipated Emissions

Using an appropriate chart, plot and calculate the following locations and distances:	Location of burn from source	Degrees Miles
	Location of burn from ignitable slick	Degrees Miles
	Location of burn from nearby populated areas	Degrees Miles
	Location of burn from commercial fishing	Degrees Miles
►Populations of special concern:	☐ Schools ☐ Hospitals ☐ Day Care Centers	☐ Nursing / Convalescence Homes ☐ Retirement Communities ☐ Other:
Using a distance of miles with the forecasted wind and transport wind direction, plot the estimated smoke plume with particulate concentration >150 ug/m3 and attach to this form		☐ Attached ☐ Other Source:
►Will impairment of visibility affect airports and/or highways?		☐ Yes ☐ No
►Can burning be conducted in a controlled fashion?		☐ Yes ☐ No
Explain measures to reduce and/or control secondary fires:		

►Are additional pollutants of concern present in the smoke plume? (Consultation with local air and health authorities may be necessary)	☐ Yes (list) ☐ No ☐ Unknown	
►Will the anticipated smoke plume disperse before reaching populated areas?		☐ Yes ☐ No ☐ Unknown
►Public notification (e.g. radio broadcast to public, safety zone broadcast to mariners, road closure, etc.) implemented?		☐ Yes ☐ No
►A trial burn may be necessary to observe and confirm anticipated smoke plume behavior. Unless preauthorization conditions are met, trial burns must have RRT approval.	Is a trial burn necessary?	☐ Yes ☐ No
A. ►Does the estimated smoke plume potentially impact a populated area with particulate concentrations averaged over one hour exceeding 150 ug/m3?	☐ Yes (Continue to part B below) ☐ No (Burning is acceptable)	
B. Can the impacted population be temporarily relocated prior to burning?	☐ Yes (initiate warning or evacuation) ☐ No (burning is not advised)	

FOSC's Decision Regarding *In-Situ* Burning

►FOSC Initials	
	Do not conduct *in-situ* burning
	In-situ burning may be conducted as requested (Burning may proceed if conditions for preauthorization are met [24]; otherwise, case-by-case approval [25] is needed from RRT IV)
►FOSC Signature:	
►FOSC Name (printed):	

►Date	mm / dd / yyyy	►Time (24 hr)		☐ Eastern ☐ Central

►Unified Command Concurrence

Signature	Name	Agency

[24] See RRT IV *In-Situ* Burn Plan Sections 2.1, 3, and 4.1
[25] See RRT IV *In-Situ* Burn Plan Section 3 and 4.2

RRT IV Decision Regarding *In-Situ* Burning

		Do not conduct *in-situ* burning (If burning was initiated under conditions for preauthorization, burning operations must be suspended until further notice from RRT IV [26])
		In-situ burning may be conducted as requested
		In-situ burning may be conducted as requested pursuant to the attached conditions

EPA Co-Chair Signature:
EPA Co-Chair Name (printed):
USCG Co-Chair Signature:
USCG Co-Chair Name (printed):

Date	mm / dd / yyyy	Time (24 hr)		☐ Eastern ☐ Central

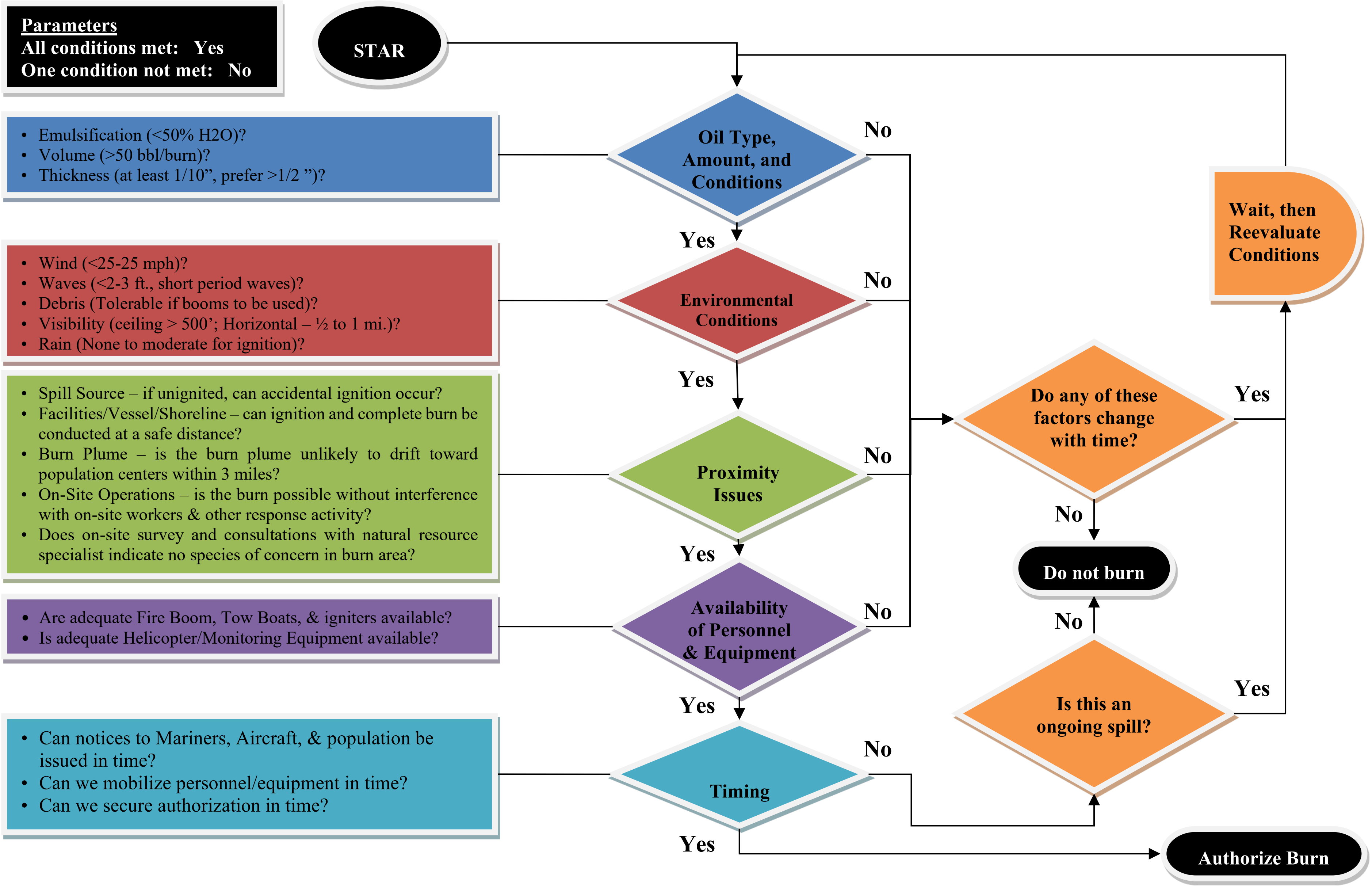
[26] See protocol 4.6 in the RRT IV *In-Situ* Burn Plan

RRT IV Member Concurrence (not required for use of *in-situ* burning under preauthorization authority) [27]		
Signature	Name	Agency
		(DOI)
		(DOC)
		(Affected State)
		(Affected State)
		(Affected Tribe)
		(Other Federal Trustee)
		(Other Federal Trustee)

Land Owner/Manager Concurrence		
Signature	Name	Representing

[27] As stated in Section 2.1: "Within areas designated for preauthorization of the use of appropriate burning agents, further consultation by the U.S. Coast Guard Federal On-Scene Coordinator (FOSC) is not required for initial use, as long as the appropriate RRT agencies are immediately notified and the relevant protocols outlined in Section 4 of this plan are followed."

Appendix IV. In Situ Burning Application Decision Tree



Prior to ISB:

1) An on-site survey will be conducted to determine if threatened or endangered species are present in the burn area or otherwise at risk from *in-situ* burn operations. Appropriate specialists knowledgeable of threatened and endangered species and habitats in the area, will be consulted prior to conducting any *in-situ* burn. Measures will be taken to prevent risk of injury to any wildlife, especially endangered or threatened species.
2) Compliance with the programmatic agreement on the protection of Historic Properties during emergency response under the NCP will occur.
3) Any use of *in-situ* burning requires that a post-incident report be provided by the FOSC, or a designated member of the FOSC's staff, within 45 days of completing *in-situ* burning operations.

Health and Safety Issues

The FOSC will notify adjacent land managers/owners prior to any *in-situ* burn operation.

Operators: Assuring workers' health and safety is the responsibility of employers and the FOSC who must comply with all Occupational Safety and Health Administration (OSHA) regulations. Prior to any *in-situ* burn operations, a site safety plan must be prepared and approved by the FOSC.

The burning should be stopped if it is determined that it becomes an unacceptable health hazard due to operational or smoke exposure concerns to responders or the general public. If at any time, exposure limits are expected to exceed national federal air quality standards in nearby populated areas, as a result of *in-situ* burning operations, then *in-situ* burning operations will immediately cease. The Level of Concern (LOC) for particulates for the general public is 150ug/m3 (PM-10) averaged over 1 hour. For information purposes, Attachment 2 compares emission rates from the NOBE test burns with other known sources.

Burning will occur at a minimum of three miles from sensitive human population centers (i.e., hospitals, schools, day care, retirement, nursing homes). The FOSC will give due consideration to the direction of the wind, and the possibility of the wind blowing precipitate over population centers or sensitive resources. A safety margin of 45 degrees of arc on either side of predicted wind vectors should be considered for shifts in wind direction.

When to Use

Consider in situ burning under these conditions:

- To remove oil to prevent it's spread to sensitive sites or over large areas.
- To reduce the generation of oily wastes, especially where transportation or disposal options are limited.
- Where access to the site is limited by shallow water, soft substrates, thick vegetation, or the remoteness of the location.
- As a removal technique, when other methods begin to lose effectiveness or become too intrusive.

Favorable conditions include:

- Remote or sparsely populated sites (at least 3 miles from populated areas).
- Fresh crudes or light/inter-mediate refined products which burn more readily and efficiently.
- Mostly herbaceous vegetation, though some shrubs and trees are fire tolerant.
- Areas void of vegetation, such as dirt roads, ditches, dry streambeds, idle cropland.
- In wetlands, with an adequate water layer (at least 1") covering the substrate (prevents thermal damage to soil and roots, and keeps oil from penetrating substrate). However, a water layer is not mandatory, at a minimum, the soils should be water saturated (at least 70%).

Limiting Factors/Environmental Constraints

- Heavy, weathered, or emulsified oils may not ignite.
- A crust or residue is often left behind after burning and may need to be broken up or removed to speed restoration.
- Prolonged flooding of a burned wetland may kill surviving plants if they are completely submerged.
- Erosion may be a problem in burned areas if plant cover is reduced; short-term erosion control measures may be needed.
- The site may need protection from overgrazing, especially since herbivores may be attracted to new growth at burned sites.
- Thickness of the oil to be burned must be 2 to 3 mm.

Monitoring

Monitoring *in-situ* burning for effectiveness is the responsibility of the FOSC; monitoring for effects on biota is the responsibility of the trustees.

All burns must incorporate visual monitoring at the burn site for safety and fire control and to record the disposition of burn residue. The burn site will be monitored for potential impact to natural resources in the area. Samples of the residue will be collected if feasible.

Monitoring to establish "Continue/Discontinue" data for input to the FOSC will be conducted utilizing SMART protocols. An inability to conduct monitoring operations, except for visual monitoring, will not be grounds for discontinuing or prohibiting *in-situ* burn operations.

Describe and photograph the burn site before and after the burn, record detailed information on the burn, including duration, residue type and volume, water depth before/after the burn, visible impacts, post-burn activities (e.g., residue removal methods), restoration efforts and results, etc.

Waste Generation and Disposal Issues

In-situ burning should significantly reduce the amount of oily wastes generated. Burn residue that is collected must be properly disposed of after the burn is completed.

Appendix V. Request for *In-Situ* Burning in the Yellow Zone

Where a Letter of Agreement (LOA) is in effect between the USCG, EPA, DOI, DOC, and the affected state(s), the policy for authorization established by the LOA will become the primary guidance for application in the Yellow Zone. Established LOAs are provided in Appendix I of this plan. In the event that a LOA not in effect for areas falling within the Yellow Zone, the following protocols shall apply:

a) If the FOSC determines that *in-situ* burning should be used in areas falling within the Yellow Zone, a request for authorization must be submitted to the RRT IV representatives of the EPA, DOI, DOC, and the affected state(s), along with the required information listed in the *In-Situ* Burning Documentation and Application Form, found in Appendix VI;

b) The FOSC's decision to use *in-situ* burning shall be made after consulting with RRT IV representatives of state and federal trustee agencies to ensure that the best available information pertaining to the presence or absence of natural resources at the burn site is obtained;

c) The FOSC is only granted authority to conduct *in-situ* burning in the Yellow Zone when concurrence has been given by EPA and the affected state(s), and after consultation with DOI and DOC;

d) RRT IV will respond to the FOSC's request for authorization to burn in the Yellow Zone within four hours from the time of notification. If a decision by RRT IV members cannot be reached within four hours, the FOSC should be notified and informed of the delay, and the issues causing it. States may elect to grant assumed approval, and DOI and/or DOC may elect to grant assume concurrence, for use of *in-situ* burning in the event that their respective representative to RRT IV cannot respond to the FOSC’s request within four hours. Assumed approval procedures and limitations should be documented in the member agency’s LOA to this plan.

All burning operations within the Yellow Zone will be conducted in accordance with the Protocols outlined in this plan. It is imperative that the USCG FOSC make every reasonable effort to continuously evaluate *in-situ* burning within the Yellow Zone, and will allow RRT IV agencies and the affected state(s) the opportunity to comment as outlined in the protocol 4.2.

Appendix VI. Residues from *In-Situ* Burning of Oil

Results from larger-scale laboratory and meso-scale field tests suggest that the most important factors determining whether an *in-situ* burn residue will float or sink are:

Water Density

Burn residues that are denser than the receiving waters are likely to sink. The density of fresh water is 0.997 g/cm3 at 25 degrees Celsius, and the density of seawater is 1.025 g/cm3.

Properties of the Starting Oil

Studies predict that burn residues will sink in sea water when the burned oils have a) an initial greater density than about 0.0865 g/cm3 (or API gravity less than about 32) or b) a weight percent distillation residue (at >1000 F) greater than 18.6%. When these correlations are applied to 137 crude oils, 38% are predicted to sink in seawater, 20% may sink, and 42% will float.

Thickness of the Oil Slick

Residues from burns of thick crude oil slicks are more likely to sink than residues from burns of thin slicks of the same crude oils, because higher-molecular weight compounds concentrate in the residue as the burn progresses.

Efficiency of the Burn

Factors affecting burn efficiency include original slick thickness, degree of emulsification and weathering, areal coverage of the flame, wind speed, and wave choppiness. For efficient burns, removal efficiencies are expected the exceed 90% of the collected and ignited oil. Rules of thumb for predicting residue thickness are:

- Unemulsified crude oil up to 10-20mm thick, residue will be about 1mm thick.
- Thicker slicks result in thicker residues (up to 3-6mm thick).
- Emulsified oils can produce much thicker residues.
- Light/medium refined products, the residue will be about 1mm thick, regardless of slick thickness.

Burn residues sink only after cooling. Models of cooling rates predict that ambient water temperature will be reached in less than five minutes for 3mm-thick residues, and in 20-30 minutes for 7mm-thick residues.

Appendix VII. Emission Rates from the NOBE Test Burns and Other Known Sources.

Substance	Average Emission Factor for NOBE (g/kg, fuel burned)	Emission Rate (kg/hr)	Comparable Emissions from Other Known Sources
C02	2,800	75,600	approx. 2-acre slash burn
CO	17.5	470	approx. 0.la slash burn or ~1,400 wood stoves
S02	-15	405	7400 kg/hr. (avg. coal-fired power plant)
Total smoke particle	150	4,050	approx. 9-acre slash burn or ~58,000 wood stoves
Sub-3.5 micro-meter smoke particle	3	3,050	approx. 9-acre slash burn
Sub-3.5 micro-meter soot	55	1,480	approx. 38-acre slash burn
PAHs	0.04	1.1	Approx. 7-acre slash burn or ~1,800 wood stoves

Fingas, M., Halley, G., Ackerman, F., Nelson, R., Bissonnette, M., Laroche, N., et al. (1995). The Newfoundland Offshore Burn Experiment. *Proceedings of the 1995 International Oil Spill Conference* (pp. 123-132). Washington, D.C.: American Petroleum Institute.

Appendix VIII. *In-Situ* Burn Final Report Requirements

Any implementation of *in-situ* burning requires that an *In-Situ* Burn Final Report be provided by the FOSC, or a designated member of the FOSC's staff, within 45 days of completing burning operations. Recommendations for changes or modification to this *In-Situ* Burn Plan may be presented in the report, if appropriate. *This report will be presented at a Region IV Regional Response Team meeting, if so requested by the RRT IV*.

The report must include, at minimum, the following criteria:

i. Incident Overview
ii. Oil Slick Trajectory and Behavior
iii. Justification for *In-Situ* Burning
iv. Chronology (Date and Time) of Burning-Related Events
v. Overview of Burning Operations
vi. Overview of Burn Monitoring
vii. Completed *In-Situ* Burn Preauthorization Initial Call Checklist and FOSC *In-Situ* Burn Checklist

There no standardized format for report submission and the contents of the report will be incident-specific according to the circumstances and special issues surrounding the response. The following subsections are suggested criteria to consider when developing the *In-Situ* Burn Final Report:

i. Incident Overview

- Description of initial report (date, time, source, etc.)
- Spill source
- Spill location
- Estimated quantity & potential quantity
- Environmental conditions

ii. Oil Slick Trajectory and Behavior

- Expected movement of slick
- Expected weathering and behavior of product
- Observations of same

viii. Justification for *In-Situ* Burning

- Potential impact areas and their respective sensitivities to impact
- Within preauthorization zone for RRT IV
- Potential for use of other response methods (e.g., mechanical recovery, dispersants)
- Weather and sea state

iii. Chronology (Date and Time) of Burning-Related Events

- FOSC notification of spill
- Reconnaissance aircraft requested
- Reconnaissance aircraft "wheels up"
- Gulf Strike Team alerted for SMART
- SMART en-route
- Reconnaissance aircraft on-scene and reports
- RP requested implementation of burning
- Source and field sample requested by USCG
- Burning approved under preauthorization guidelines
- Burning contractor notified
- Burning equipment requested
- Burning equipment en-route
- Burning equipment arrival at airport/dock
- Burning vessels left dock
- SMART equipment deployment
- Burning vessels on-scene
- SMART equipment operational
- Source and "in-water" sample collected
- Ignition
- SMART monitoring results and recommendations
- Additional ignition and SMART monitoring (as required)
- Termination of burning operation

iv. Overview of Burning Operations

- Time and duration of each burn
- Record of specific locations where each burn occurred
- Any extenuating circumstances affecting the deployment of any element (vessels, equipment, SMART, etc.)
- Estimates of oil quantity (area and thickness) and observations
- Estimates and observations of plume size, height, direction, speed, and opacity
- Any discrepancies between estimates
- Any discrepancies between observations

v. Overview of Burn Monitoring

- Documentation of monitoring activities, wildlife hazing, observation of specific buffer zones, etc.
- Any sightings of pelagic/migratory birds, sea turtles, or marine mammals
- Documentation of any wildlife incidents
- Records from SMART protocol implementation, findings, and subsequent recommendations; as well as records from any additional monitoring activities that may have been implemented
- Account of any procedures or activities that were affected, examined, or otherwise discussed as part of consultation efforts with DOI, DOC, EPA, or affected states

vi. Completed *In-Situ* Burn Preauthorization Initial Call Checklist and FOSC *In-Situ* Burn Checklist

vii. Points of Contact to Request for Additional Information

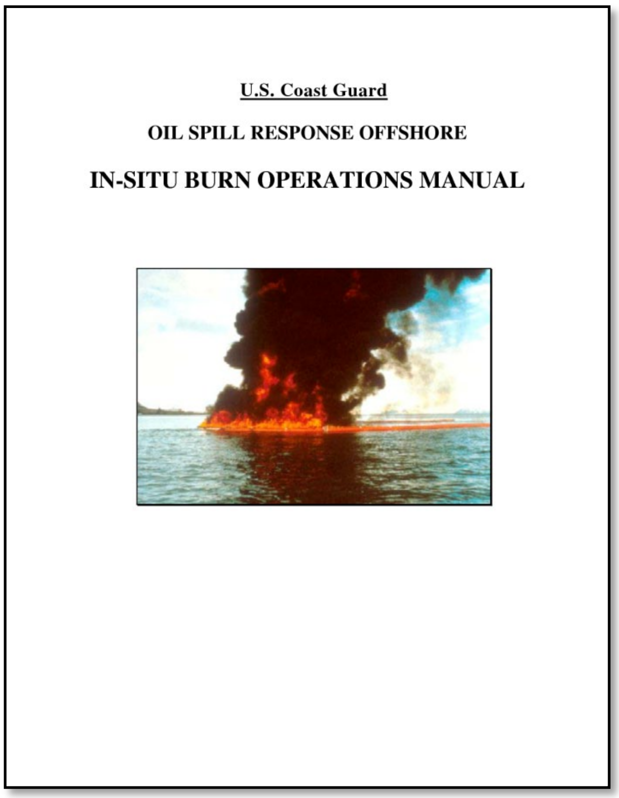
- Parties may request additional information (e.g., pilot's logs, SMART logs, and SMART data) by contacting the FOSC for the particular spill/release response activity
- Information requested will be provided within 30 to 60 days following the request

Appendix IX. USCG *In-Situ* Burn Operations Manual

The purpose of the U.S. Coast Guard Oil Spill Response Offshore In-Situ Burn Operations manual is to assist field personnel in managing, conducting, and monitoring successful In-Situ Burn (ISB) activities and to communicate the risks and benefits of the response method.

Development of the manual was based on proven technologies, approaches, and lessons learned from several recent field exercises conducted by the USCG, and years of field experience and testing. The manual makes extensive use of graphics, nomographs, photos, decision trees, checklists, matrices, and clear advice.

The manual includes a summary Decision Guide for quick reference of key steps in making a "go/no-go" decision, and in assessing the information, equipment, and personnel requirements. Detailed descriptions of the feasibility of ISB for a given situation, the equipment in a successful burn, safety and risk factors, including measures and operational procedures, are provided to support decision-making by the On-Scene Coordinator.


U.S. Coast Guard

OIL SPILL RESPONSE OFFSHORE

IN-SITU BURN OPERATIONS MANUAL

Appendix X. Additional Reference Material

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Coastal Response Research Center. (2012, March 22). *The Future of Dispersant Use in Oil Spill Response Initiative.* Retrieved December 2012, from Workshop on the Future of Dispersant Use in Spill Response. September 20-22, 2011. Mobile, Alabama.: http://www.crrc.unh.edu/workshops/dispersant_future_11/Dispersant_Initiative_FINALREPORT.pdf

Coolbaugh, T., & McElroy, A. (2011). Dispersant Efficacy and Effectiveness. *Final Report for the Future of Dispersant Use on Oil Spill Response Initial Workshop* (pp. 50-62). Mobile, Alabama: Coastal Response Research Center.

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Attachment A. Biological Assessment and Consultations for Federal Agency Action

Attachment B. In-Situ Burning in the Inland Zone Guidance

In-Situ Burning in the Inland Zone Guidance

The USCG, EPA, DOI, DOC, and the states may use *in-situ* burning (ISB) as a tool to remove spilled oil from inland waters and lands within the jurisdiction of RRT IV. This guidance covers the case-by-case use of ISB and includes protocols under which the FOSC in the inland zone may be granted authorization for using ISB.

When is In-Situ Burning in the Inland Zone Effective?

In-situ burning in the inland zone can be used in areas where access to the site is limited by shallow water, soft substrates, thick vegetation, or the remoteness of the location. It is also an alternative removal technique that can be used when other methods begin to lose effectiveness or become too intrusive such as when oil is spread to sensitive sites or over large areas. An advantage of *in-situ* burning is the reduction of oily wastes that are generated during the response; this is beneficial in situations where transportation or disposal options are limited.

Favorable conditions for *in-situ* burning in the inland zone include:

1) Remote or sparsely populated sites (at least three nautical miles from populated areas);
2) Spilled oil of fresh crudes or light/intermediate refined products which burn more readily and efficiently;
3) Sites that meet one or more of the following three descriptions:
    - Mostly herbaceous vegetation, though some shrubs and trees are fire tolerant;
    - Areas void of vegetation, such as dirt roads, ditches, dry streambeds, idle cropland; or,
    - Wetlands with an adequate water layer (at least 1-inch) covering the substrate (prevents thermal damage to soil and roots, and keeps oil from penetrating substrate). A water layer is not mandatory if the soils are water saturated (at least 70% at a minimum).

Limiting factors and environmental constraints for *in-situ* burning in the inland zone include:

a) Heavy, weathered, or emulsified oils may not ignite;
b) A crust or residue that is left behind after burning must be broken up or removed to improve restoration;
c) Prolonged flooding of a burned wetland may kill surviving plants if they are completely submerged;
d) Erosion may occur in burned areas if plant cover is reduced so short-term erosion control measures may be needed;
e) The site may need protection from overgrazing, especially since herbivores may be attracted to new growth at burned sites; and,
f) Oil thickness of must be 2-3 millimeters for sustained burning to take place.

Authority for In-Situ Burning in the Inland Zone

The NCP, 40 CFR 300.910(c), provides that the FOSC; with the concurrence of the EPA representative to the RRT IV, and with the concurrence of the State(s) with jurisdiction over the navigable waters threatened by the release or discharge, and in consultation with the DOC and DOI trustee representatives to the RRT IV; may authorize the use of burning agents on a case-by-case basis.

Preauthorized use of burning agents for ISB is limited to the Green Zone outlined in Section 3.1 of the RRT4 ISB Plan (ISBP). For burning in the inland zone FOSC must complete the ISB Application and Evaluation Form in Appendix III of the RRT4 ISBP and submit it to RRT4 for approval.

Protocols for In-Situ Burning in the Inland Zone

This section contains additional protocols as they apply to *in-situ* burning in the inland zone. Protocols in Section 4 of the ISBP should be considered applicable for *in-situ* burning in the inland zone as well.

a) The FOSC must complete the ISB Application and Evaluation Form in Appendix III of the RRT4 ISBP, and receive approval from RRT IV prior to ignition.

b) The FOSC will initiate an emergency consultation with the Department of Interior, U.S. Fish and Wildlife Service and then implement recommended conservation measures.

c) ISB will be allowed only after mechanical recovery is shown to be inadequate, infeasible, or may cause unacceptable additional impact to sensitive resources and habitats; or when ISB may enhance overall cleanup or protection efforts.

d) ISB will be allowed only under the direction of a fire ecologist/practitioner. Burning will be conducted utilizing safe fire management techniques. All practical efforts will be made to control and contain the burn and prevent accidental or unplanned ignition of adjacent areas.

e) ISB will occur primarily in wetland areas, inland waters, agricultural lands, lands void of vegetation, and grasslands. Burning will not occur in bottom land hardwood swamps or in forested areas unless otherwise recommended by the fire ecologist, the land manager/owner, and approved by the RRT.

f) Compliance with the Programmatic Agreement on the Protection of Historic Properties during Emergency Response under the NCP will occur.

g) The FOSC will notify adjacent land managers/owners prior to any *in-situ* burn operation.

h) Burning will occur at a minimum of three nautical miles from sensitive human population centers (i.e., hospitals, schools, day care, retirement, nursing homes).

i) Descriptions and photographs of the burn site must be collected before and after the burn. Detailed information about the burn must be recorded, including duration, residue type and volume, water depth before/after the burn, visible impacts, post-burn activities (e.g., residue removal methods), restoration efforts and results, etc.

15.5 Appendix E: Vessel Strike Avoidance Measures and Reporting for Mariners

Vessel Strike Avoidance Measures and Reporting for Mariners NOAA Fisheries Service, Southeast Region

Background

The National Marine Fisheries Service (NMFS) has determined that collisions with vessels can injure or kill protected species (e.g., endangered and threatened species, and marine mammals). The following standard measures should be implemented to reduce the risk associated with vessel strikes or disturbance of these protected species to discountable levels. NMFS should be contacted to identify any additional conservation and recovery issues of concern, and to assist in the development of measures that may be necessary.

Protected Species Identification Training

Vessel crews should use an Atlantic and Gulf of Mexico reference guide that helps identify protected species that might be encountered in U.S. waters of the Atlantic Ocean, including the Caribbean Sea, and Gulf of Mexico. Additional training should be provided regarding information and resources available regarding federal laws and regulations for protected species, ship strike information, critical habitat, migratory routes and seasonal abundance, and recent sightings of protected species.

Vessel Strike Avoidance

In order to avoid causing injury or death to marine mammals and sea turtles the following measures should be taken when consistent with safe navigation:

1. Vessel operators and crews shall maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species.
2. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel.
3. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.
4. When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.
5. Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures should always be exercised. The vessel shall attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible.
6. Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel and when safety

permits, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.

Additional Requirements for the North Atlantic Right Whale

1. If a sighted whale is believed to be a North Atlantic right whale, federal regulation requires a minimum distance of 500 yards be maintained from the animal (50 CFR 224.103 (c)).
2. Vessels entering North Atlantic right whale critical habitat are required to report into the Mandatory Ship Reporting System.
3. Mariners shall check with various communication media for general information regarding avoiding ship strikes and specific information regarding North Atlantic right whale sighting locations. These include NOAA weather radio, U.S. Coast Guard NAVTEX broadcasts, and Notices to Mariners. Commercial mariners calling on United States ports should view the most recent version of the NOAA/USCG produced training CD entitled "A Prudent Mariner's Guide to Right Whale Protection" (contact the NMFS Southeast Region, Protected Resources Division for more information regarding the CD).
4. Injured, dead, or entangled right whales should be immediately reported to the U.S. Coast Guard via VHF Channel 16.

Injured or Dead Protected Species Reporting

Vessel crews shall report sightings of any injured or dead protected species immediately, regardless of whether the injury or death is caused by your vessel.

Report marine mammals to the Southeast U.S. Stranding Hotline: 877-433-8299

Report sea turtles to the NMFS Southeast Regional Office: 727-824-5312

If the injury or death of a marine mammal was caused by a collision with your vessel, responsible parties shall remain available to assist the respective salvage and stranding network as needed. NMFS' Southeast Regional Office shall be immediately notified of the strike by email (takereport.nmfsser@noaa.gov) using the attached vessel strike reporting form.

For additional information, please contact the Protected Resources Division at:

NOAA Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701
Tel: (727) 824-5312
Visit us on the web at http://sero.nmfs.noaa.gov

NMFS Southeast Region Vessel Strike Avoidance Measures and Reporting for Mariners; revised February 2008.
http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/copy_of_vessel_strike_avoidance_february_2008.pdf

15.6 Appendix F: Wildlife Observer Definition and Qualifications

15.6.1 **Description of Wildlife Observers**

Wildlife Observers may be deployed during an oil spill respon
sightings of, marine protected species or critical habitats during offshore response activities (i.e.,
servers are individuals with a background in biology and conservation that have demonstrated experience and expertise with the taxa to be observed, familiarity with pertinent protected species regulations, understanding of wildlife observation and response protocols, and training for the intended observation platform (i.e., aircraft or vessel).

15.6.2 **Wildlife Observer Criteria**

In order to qualify as a Wildlife Observer for Protocols approved by Unified Command (UC) for the ________________ event, each individual must:

A. Be authorized to work under the UC as a resource agency staff member, contractor, or volunteer.

B. Be approved by the SSC in consultation with NMFS/FWS staff responsible for the taxa to be observed (e.g., marine mammals, sea turtles, birds) based on:

- Demonstrated applicable field experience (e.g., previously conducted aerial or vessel surveys sighting taxa or habitat to be observed in the planned operation);
- Completion of any training requirements specific to the incident;
- Fulfillment of any specific considerations related to observation platform, species, life stage, or habitat type.

C. Abide by pertinent UC protocols, including safety protocols, data collection and reporting requirements.

- Use the standard marine life observation form

15.7 Appendix G: Marine Species Observation Form

The information contained herein is confidential and should be submitted to NOAA Resources at Risk Specialist at the Environmental Unit

MARINE SPECIES OBSERVATION FORM	**ANIMALS SIGHTED: Y OR N**
	ANIMALS RETRIEVED: Y OR N
OBSERVER#:	**PAGE: OF:**
TRIP#:	**DATE (MM/DD/YY):**
SURVEY#:	**SKIMMER TYPE:**
OBSERVATION PLATFORM:	

LOCATION		
	START LAT/LONG (DD.MM.mmm)	**START TIME(24hr)**
	END LAT/LONG (DD.MM.mmm)	**END TIME(24hr)**

SOURCE □ **NON-SOURCE** □ **NEARSHORE** □ **BEACH** □

TARGET OIL	**HABITAT TYPES**	
HEAVY(dork block/brown) □	**SARGASSUM WEEDLINE: OIL:** □ **NO OIL:** □	**OIL LINE NO SARGASSUM:** □
MEDIUM (brown to peanut color) □	**DISPERSED SARGASSUM: OIL:** □ **NO OIL:** □	**OTHER:** □
LIGHT (sliver/rainbow sheen, metallic bm)□	**HEAVY CONINUOUS OIL NO SARGASSUM** □	
Emulsified (orange) □	**DISPERSED PATCHES OF OIL NO SARGASSUM** □	

LENGTH OF BOOM (FT):		**SKIRT HIEGHT (INCHES):**
START BURN TIME (24hr):	**WEATHER DESCRIPTION:**	**VISIBILITY (FT):**
		SEA STATE:

ANIMAL OBSERVATION SUMMARY

ANIMAL TYPE	NUMBER OF ANIMALS	
	ALIVE	DECEASED
Sea turtles		
Dolphins		
Whales		
Manatees		
Sea birds		
Other (Specify):		

The information contained herein is confidential and should be submitted to NOAA Resources at Risk Specialist at the Environmental Unit

SIGHTING AND RETRIEVALS – ADDITIONAL INFORMATION							
SPEC. #	SPECIES	CONDITION	PHOTOS (Y OR N)	LATITUDE	LONGITUDE	SURVEY PHASE	COMMENT (Y OR N)

COMMENTS (Describe any interactions with equipment, species identification, characteristics, behavioral characteristics, etc.)

SPECIMEN DELIVERY INFORMATION		
Date Specimen Delivered	Vessel/Organization Name	Name of Individual Receiving

15.8 Appendix H: In-Situ Burn Sea Turtle Observer Protocol

CRRT Best Management Practices for Oil Spill Response Operations, October, 2015
Caribbean Regional Response Team
http://www.crrt.nrt.org/production/nrt/RRTHomeResources.nsf/resources/CRRTPolicies2015/$File/CRRT_BMPs_Final_Oct_2015.pdf

Preferably the observer will be stationed on the ignition boat and conduct the survey from a position that optimizes visibility. A general header data collection sheet will be filled out by the observer that includes information on the time survey begins, location, sea state, a general description of the oil and habitat, and unique information to track the survey data.

A sea turtle survey includes monitoring of 3 areas prior to the burn including: 1) the area in front of the boom boats; 2) oil concentrated in the boom; and, 3) any oil trailing behind the boom. As part of the survey, observers will note the type of oil encountered during the survey, the type of habitat (e.g. sea weed or other aquatic vegetation) encountered during the survey.

Sea turtles encountered during the survey that can be removed from the oil will be captured with a dip net. The sea turtle will be boarded and the observer will provide a cursory assessment of its status. Data relative to condition, location, and survey phase will be recorded. Sea turtles will be placed in a confined urea/container and covered with a wet towel to minimize stress if the animal is alive. The sea turtle will be transported to the support vessel and the observer will notify the support vessel to arrange transport the sea turtle back to land.

15.9 Appendix I: Sea Turtle Handling and Resuscitation Requirements

CODE OF FEDERAL REGULATIONS

Title 50: Wildlife and Fisheries

PART 223—THREATENED MARINE AND ANADROMOUS SPECIES

Subpart B—Restrictions Applicable to Threatened Marine and Anadromous Species

§223.206 Exceptions to prohibitions relating to sea turtles.
(d) Exception for incidental taking.

(1) Handling and resuscitation requirements. (i) Any specimen taken incidentally during the course of fishing or scientific research activities must be handled with due care to prevent injury to live specimens, observed for activity, and returned to the water according to the following procedures:

(A) Sea turtles that are actively moving or determined to be dead as described in paragraph (d)(1)(i)(C) of this section must be released over the stern of the boat. In addition, they must be released only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels.

(B) Resuscitation must be attempted on sea turtles that are comatose, or inactive, as determined in paragraph (d)(1) of this section, by:

(1) Placing the turtle on its bottom shell (plastron) so that the turtle is right side up and elevating its hindquarters at least 6 in (15.2 cm) for a period of 4 up to 24 hours. The amount of the elevation depends on the size of the turtle; greater elevations are needed for larger turtles. Periodically, rock the turtle gently left to right and right to left by holding the outer edge of the shell (carapace) and lifting one side about 3 in (7.6 cm) then alternate to the other side. Gently touch the eye and pinch the tail (reflex test) periodically to see if there is a response.

(2) Sea turtles being resuscitated must be shaded and kept damp or moist but under no circumstance be placed into a container holding water. A water-soaked towel placed over the head, carapace, and flippers is the most effective method in keeping a turtle moist.

(3) Sea turtles that revive and become active must be released over the stern of the boat only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels. Sea turtles that fail to respond to the reflex test or fail to move within 4 hours (up to 24, if possible) must be returned to the water in the same manner as that for actively moving turtles.

(C) A turtle is determined to be dead if the muscles are stiff (rigor mortis) and/or the flesh has begun to rot; otherwise the turtle is determined to be comatose or inactive and resuscitation attempts are necessary.

(ii) In addition to the provisions of paragraph (d)(1)(i) of this section, a person aboard a vessel in the Atlantic, including the Caribbean Sea and the Gulf of Mexico, that has pelagic or bottom longline gear on board and that has been issued, or is required to have, a limited access permit for highly migratory species under §635.4 of this title, must comply with the handling and release requirements specified in §635.21 of this title.

15.10 Appendix J: Sea Turtle Retrieval Protocol

All live and dead sea turtles (includes oiled turtles) should be recorded and retrieved (if possible) and taken to an onshore facility for cleaning and rehabilitation or salvage/necropsy. Animals can be netted at the surface using dip nets or other hoists. Once on board, sea turtles need to be carefully handled and transported to shore as soon as possible, in accordance with NMFS guidance.

BE SURE TO USE APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT
(Gloves, Tyvek suits, boots, and goggles if necessary)

Sea Turtle Retrieval Kit (1 per boat) Includes:

- Large Diameter dip net
- Large Plastic Crate
- PPE (Gloves, Tyvek, goggles)
- Several beach towels

1. Bring turtle on board (dip nets are useful for small turtles less than - 3 ft length). Do not pick up turtles by their flippers, but rather, lift them by grasping both sides of the carapace. If the turtle attempts to evade capture, do not pursue. When handling turtles, be aware of the head and flippers - they will bite and have powerful flippers with claws.

2. Determine position at sea (latitude/longitude coordinates as DD.dddd).

3. Contact the RAR Sec 7 or your supervisor to report the turtle as quickly as possible.

4. Place a wet towel in the bottom of the transport crate. Place the turtle on top of the towel. Put the crate with the turtle inside in the shade. Do not add more water to the crate.

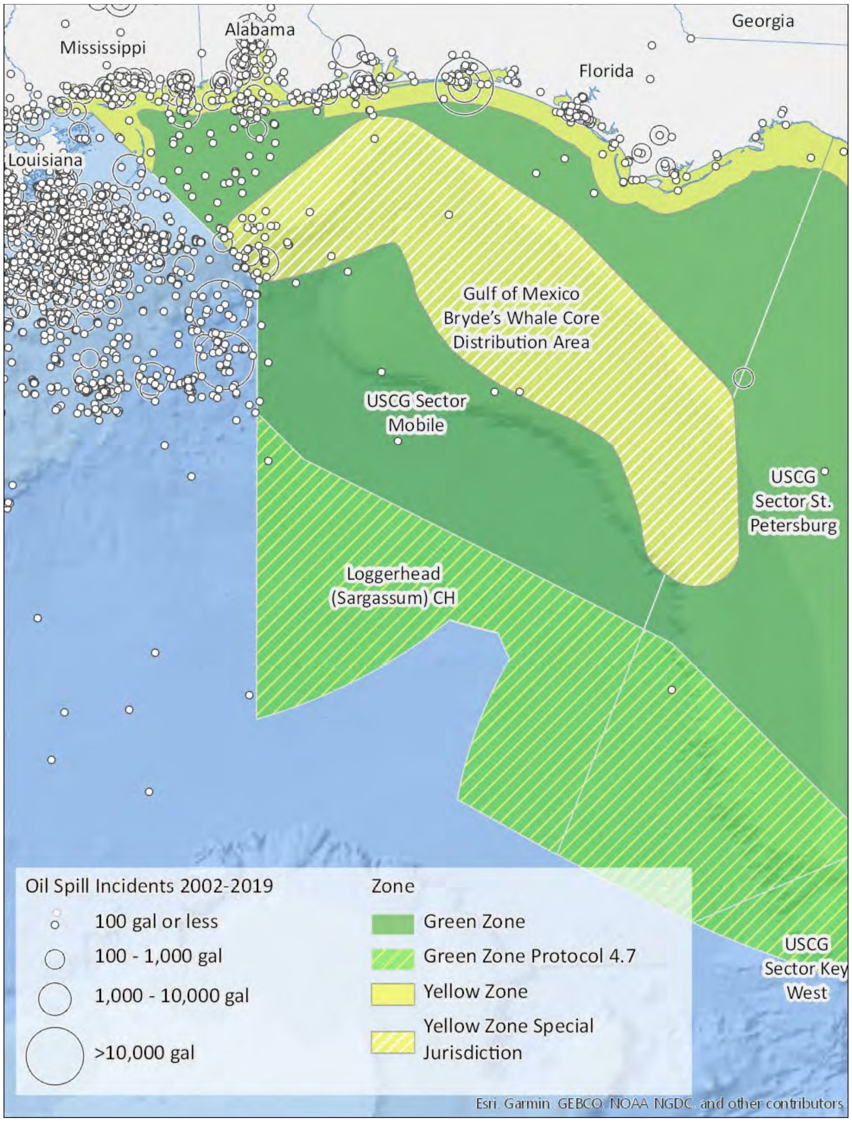
5. If the turtle appears to be dead, follow the same process but roll the towel up to raise the hind end a few inches higher than the head. Keep the crate in the shade. (Note: live turtles may appear comatose for up to 24 hours!)

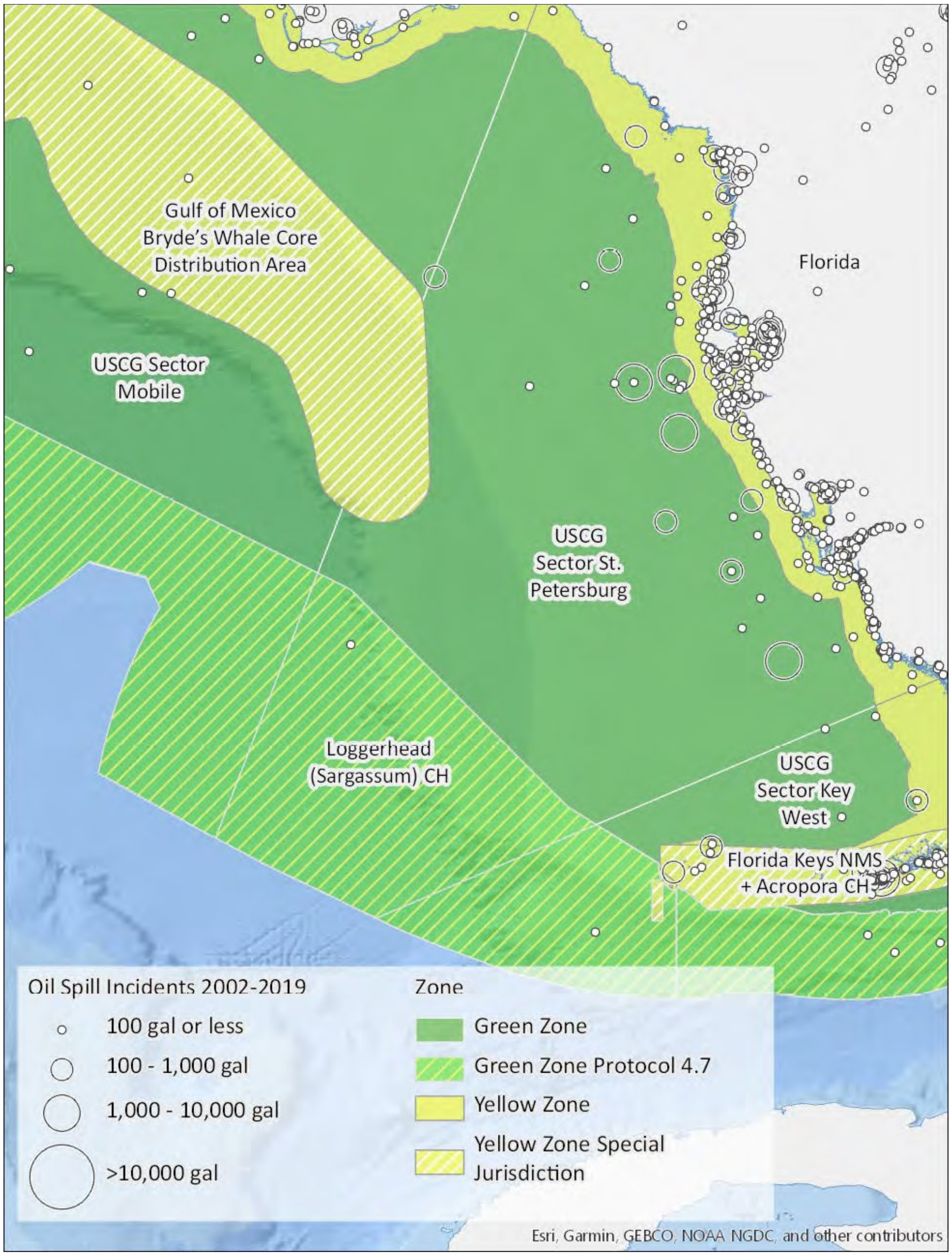
6. Deliver the sea turtle (live or dead) to the designated Response Center. Transport turtles in individual containers when possible. Be sure to provide location, date and time data, and a chain of custody form with each turtle.

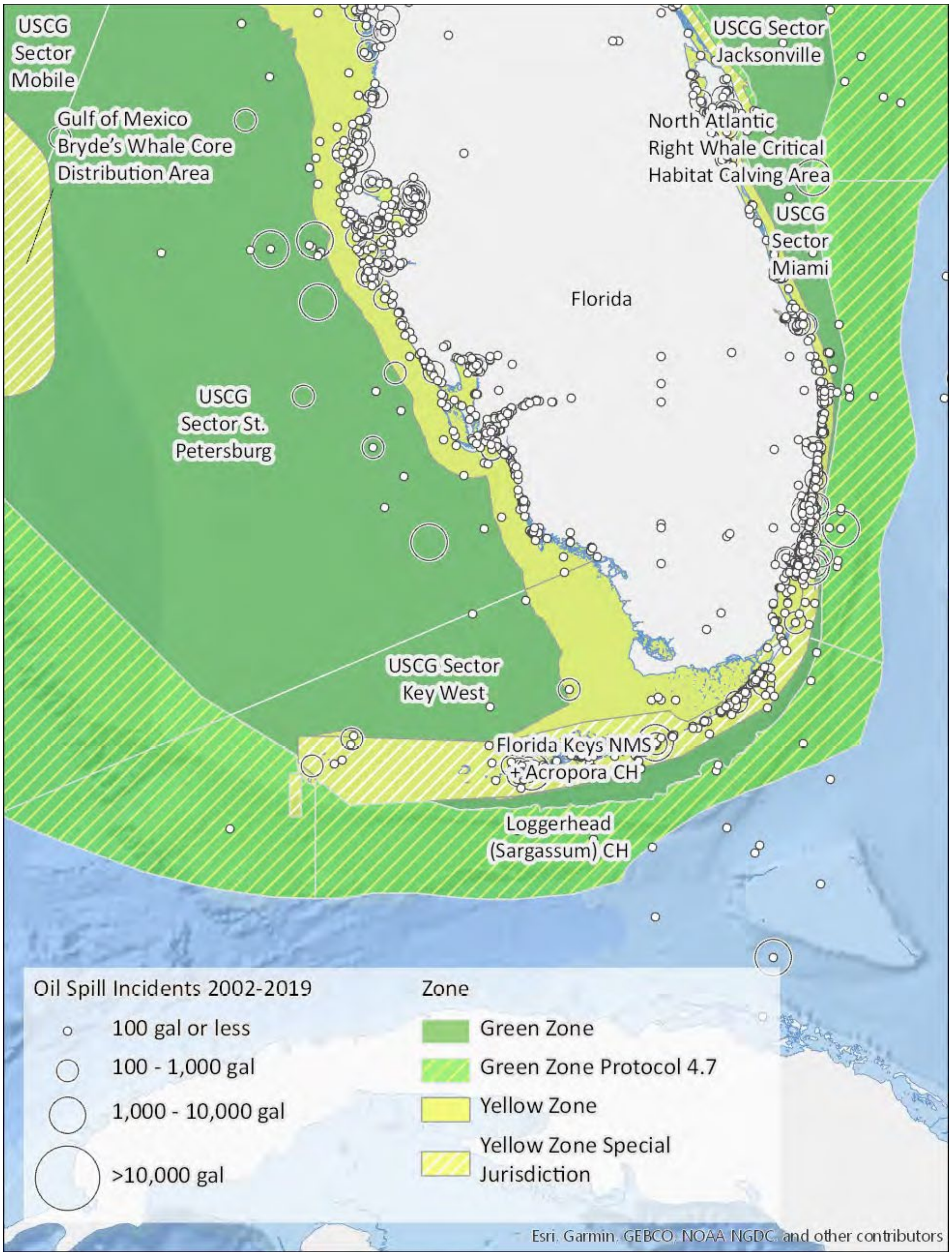
Source: Caribbean Regional Response Team Best Management Practices for Oil Spill Response Operations, October, 2015

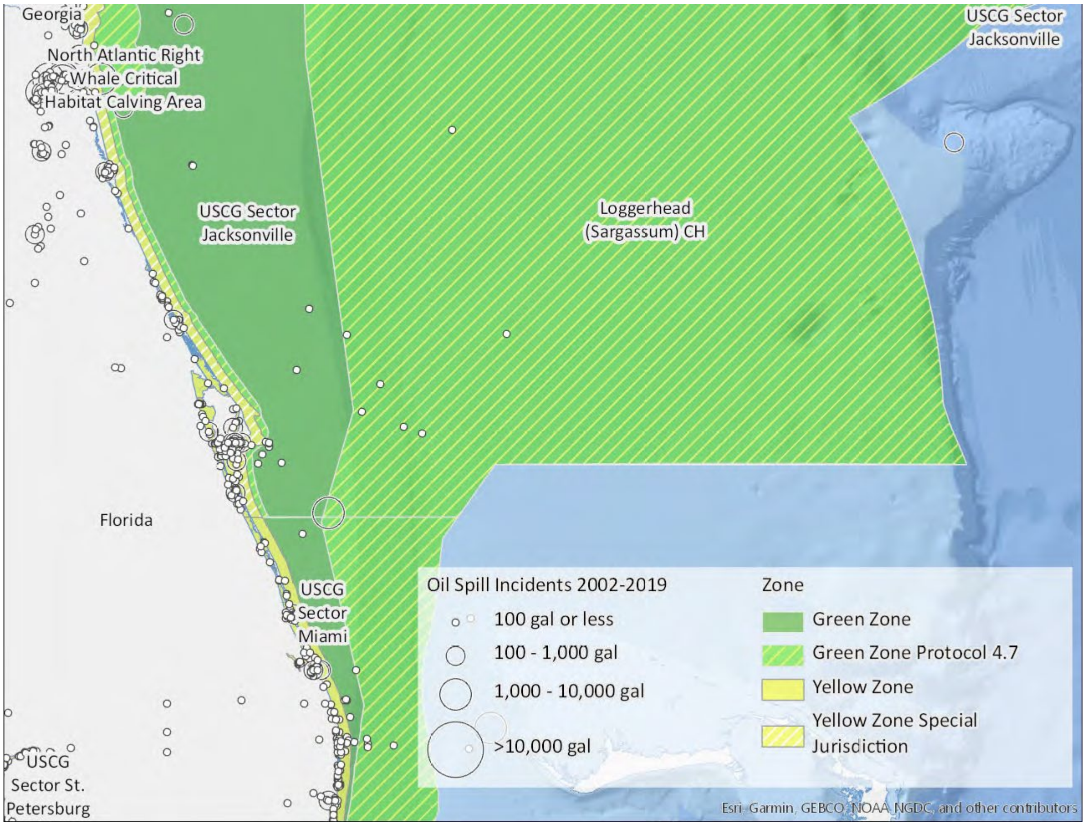
15.11 Appendix K. RRT4 Maps Displaying Historical Oil Spill Discharges in the US Southeast

Source: RRT4 Biological Assessment




Gulf of Mexico
Bryde's Whale Core
Distribution Area
USCG Sector
Mobile
Florida
USCG
Sector St.
Petersburg
Loggerhead
(Sargassum) CH
USCG
Sector Key
West
Florida Keys NMS
+ Acropora CH
Oil Spill Incidents 2002-2019
100 gal or less
100 - 1,000 gal
1,000 - 10,000 gal
>10,000 gal
Zone
Green Zone
Green Zone Protocol 4.7
Yellow Zone
Yellow Zone Special
Jurisdiction
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors


USCG Sector Mobile
Gulf of Mexico Bryde's Whale Core Distribution Area
USCG Sector St. Petersburg
USCG Sector Jacksonville
North Atlantic Right Whale Critical Habitat Calving Area
USCG Sector Miami
Florida
USCG Sector Key West
Florida Keys NMS + Acropora CH
Loggerhead (Sargassum) CH
Oil Spill Incidents 2002-2019
100 gal or less
100 - 1,000 gal
1,000 - 10,000 gal
>10,000 gal
Zone
Green Zone
Green Zone Protocol 4.7
Yellow Zone
Yellow Zone Special Jurisdiction
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors


Georgia
North Atlantic Right
Whale Critical
Habitat Calving Area
USCG Sector
Jacksonville
Loggerhead
(Sargassum) CH
Florida
USCG
Sector
Miami
USCG
Sector St.
Petersburg
Oil Spill Incidents 2002-2019
100 gal or less
100 - 1,000 gal
1,000 - 10,000 gal
>10,000 gal
Zone
Green Zone
Green Zone Protocol 4.7
Yellow Zone
Yellow Zone Special
Jurisdiction
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors


North
Carolina
USCG Sector
North Carolina
South
Carolina
USCG Sector
Charleston
Georgia
Loggerhead
(Sargassum) CH
Gray's Reef
National Marine
Sanctuary
North Atlantic Right
Whale Critical
Habitat Calving Area
USCG Sector
Jacksonville
Florida
Oil Spill Incidents 2002-2019
100 gal or less
100 - 1,000 gal
1,000 - 10,000 gal
>10,000 gal
Zone
Green Zone
Green Zone Protocol 4.7
Yellow Zone
Yellow Zone Special
Jurisdiction
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors