

Improving Biological Assessments and Consultations for Regional Response Team Preauthorization Plans: An Example with Federal Region 4 Gulf of Mexico and South Atlantic

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ABSTRACT

Immediately following the unprecedented use of dispersants in response to the Deepwater Horizon (a.k.a. MC252) incident, the National Response Team (NRT) issued a memorandum to NRT members and Regional Response Team (RRT) co-chairs recommending review and revision of all dispersant preauthorization plans. During this review process, the Regional Response Team 4 (RRT4) (North Carolina to Mississippi) determined that the Endangered Species Act (ESA) Section 7 consultations would likely require further revisions and that the assessment should also be prepared to request consultation in accordance with Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (i.e. Essential Fish Habitat (EFH)).

The RRT4 Science & Technology Committee Biological Assessment Workgroup developed a functional outline that included narrowing the focus of the assessment to evaluate only oil spill scenarios where dispersant is applied under preauthorized protocols and locations. An analysis of oil spill incidents using U.S. Coast Guard Marine Information for Safety and Law Enforcement (MISLE) data was performed to develop spill scenarios, each with dispersant response scenarios using the NOAA Dispersant Mission Planner (DMP2). The General NOAA Oil Modeling Environment (GNOME) model was used to quantitatively describe the average concentration of oil within the water column at different time steps. In close coordination with the Services, species and habitats were selected for evaluation based on their likelihood to occur in the proposed preauthorized geographic area, with effects of the action assessed for species groups. The same framework was used in preauthorization planning for in-situ burning. The summation of these steps resulted in a swift and cost-effective biological assessment process that incorporated both response tactics.

Initiating or revising biological assessments and consultations to oil spill contingency plans will continue to expand beyond preauthorization for alternative countermeasures under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Subpart J). The RRT4 efforts contribute to the body of practical practices as national recommendations continue to be developed.

INTRODUCTION

INITIATION OF CONSULTATION

On December 16, 2010, following the unprecedented use of dispersants in response to the Deepwater Horizon (DWH) incident (a.k.a. MC252), the National Response Team (NRT) issued a memorandum (Tulis & Caplis, 2010) to NRT members and Regional Response Team (RRT) co-chairs requesting review and revision of all dispersant preauthorization plans. Federal Region 4 RRT (RRT4), which covers federal waters from North Carolina to Mississippi, immediately responded by reviewing its dispersant use plan and determined that revisions were necessary to: 1) clarify that preauthorization would be limited to surface application methods; 2) revise the consultations for Endangered Species Act (ESA) Section 7 (16 U.S.C. § 1536) to include new species; 3) prepare for request consultation under Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. §1855) for the protection of Essential Fish Habitats (EFH); and 4) include new effects information related to the species and habitats of interest. Representatives from both RRT4 and Federal Region 6 RRT (RRT6) in collaboration with National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) agreed that updates to the consultations would be necessary, and that both of the existing RRT4 and RRT6 dispersant preauthorization plans and their corresponding consultations could be considered valid and operable until revisions could be finalized.

ESA Section 7, as amended, requires that Federal agencies confer with the Department of Interior and/or Department of Commerce for actions which may jeopardize listed or proposed species or critical habitats. It is the responsibility of the agency to prepare a Biological Assessment (BA) if listed or proposed species may be present in the action area. The applicability of and procedures for meeting ESA Section 7 consultation requirements (set forth in 50 CFR Part 402) in RRT and Area Committee Plans were best described in a 2001 Memorandum of Agreement (MOA) between the U.S. Coast Guard (USCG), the U.S. Environmental Protection Agency (USEPA), DOI, USFW), and NOAA (USCG et al., 2001). Responsibilities and timeframes for meeting consultation objectives were described within the 2001 MOA and shared between both the action agency and the Services (USFWS and NMFS).

HISTORY OF CONSULTATION IN RRT4

The initial RRT4 preauthorization plans for *in-situ* burning and dispersant use became effective in 1995 and 1996, respectively. The BAs for these plans were prepared in a joint effort both by the RRT4 Response and Technology Committee Dispersant Workgroup and assisting participants from NMFS and USFWS. The assessments addressed the status of species and effects of physically dispersed oil regarding relevant species for the jurisdiction of each Service agency. Most federally listed species within Federal Region 4 were determined to rarely occur within the proposed Action Area (where *in-situ* burning or dispersant would be pre-authorized) while sea turtles and cetaceans were identified as present seasonally within the *action area*. Any potential impacts due to burning were determined to be minor and temporary and generally beneficial due to reduced overall operational activities relating to the response. Potential impacts due to dispersants were evaluated according to direct contact with chemically dispersed oil as well as ingestion, prey contamination, and prey abundance. Impacts of chemically dispersed oil

to specific listed species were addressed based on information regarding a general exposure pathways and similar biota.

NMFS concurred with the findings of the BA that the proposed policy for preauthorization of *in-situ* burning and dispersant use was unlikely to adversely affect endangered or threatened species. USFWS found the BA sufficiently supported that the action would not likely adversely affect listed species and concurred with this determination.

DEVELOPING THE BIOLOGICAL ASSESSMENT

APPROACH TO BIOLOGICAL ASSESSMENT

RRT4 was not the first RRT to complete updates to its Dispersant Use Plan (DUP) and *In-Situ* Burn Plan (ISBP). RRT9 completed a comprehensive BA for their DUP-, RRT10 completed a BA for a unified oil and hazardous substances response plan for Alaska, and the Caribbean RRT completed a unified BA for their DUP and ISBP, similar to the approach intended by the 2001 MOA(USCG et al., 2001).

RRT4 approach to consulting on its plan(s) is similar to other regions in three areas:

- A Biological Assessment is utilized as opposed to the “Planning Template” (USCG et al., 2001). Key features and components of BAs from other regions were incorporated into the RRT4 BA although the content was uniquely developed due to geographic differences;
- Assistance and guidance was provided by the Services but primary authorship of the BA was left to a team composed of USCG, USEPA, and USCG’s contractor: Research Planning, Inc. (RPI); and,
- RRT4 opted to incorporate both consultation on the DUP and ISBP in a single BA, which streamlined the overall workload.

However, the RRT4 approach to consulting differs from other regions in three key areas:

- Spill scenarios are utilized to provide context for geographic footprint of the impacted area, capability to deploy countermeasures
- Detailed discussions on the toxicity of the dispersed or burned oil are included to support effects determinations and to recommend protective measures; and,
- Assessment of the action is evaluated against EFHs and consultation is requested under Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. §1855)

The team also evaluated whether the BA would provide a comparative analysis of dispersant or *in-situ* burning use on an oil spill versus physical removal or even versus no action. Since the established role of a BA is to measure the effect of an action that will occur, the team determined that evaluation of whether to utilize dispersants or *in-situ* burning on an oil spill should be consigned to their respective plans. RRT4’s BA is therefore designed to assume that application of dispersants or *in-situ* burning has already been implemented within preauthorized parameters.

RRT4 DISPERSANT AND IN-SITU BURN PLANS

The RRT4 preauthorization plans for both dispersants and *in-situ* burning contain restrictions that define both circumstances and controls under which preauthorized use is permitted. The most obvious restriction is a geographical boundary that defines the preauthorized versus non-preauthorized areas; these are referred to as the *Green Zone* and the *Yellow Zone* respectively. Both the RRT4 DUP and ISBP contain identical language defining the boundaries of these zones:

The *Green Zone* consists of all offshore waters within Federal Region 4 for which all of the following conditions apply:

- The waters are not classified as a *Yellow Zone* in the plan;
- The waters are at least 3 nautical miles (nm) seaward of any shoreline (and is 9 nm from Florida's Gulf Coastline) and are within the United States' Exclusive Economic Zone (EEZ); and,
- The waters are beyond the 30-foot (ft) isobath (approximately 10 meters [m] or 5 fathoms [ftm]).

The *Yellow Zone* consists of all areas within Federal Region 4 for which any of the following conditions apply:

- 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;
- The area is under state jurisdiction;
- The area is within 3 nm of a shoreline (or is within 9 nm from the Florida Gulf Coastline);
- The waters are within the 30-foot isobaths (approximately 10 m or 5 ftm); and,
- 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.

The constructs of the *Green Zone* and *Yellow Zone* have existed within RRT4 plans since their inception and the basic boundary of remaining outside state jurisdictional waters and special management areas is largely unchanged. However, the inclusion of all proposed and designated Critical Habitats as part of the *Yellow Zone* was reconsidered following the 2014 designation of Loggerhead Sea Turtle Critical Habitat (79 FR 39856) for *Sargassum* habitat in the Atlantic Ocean (LOGG-S-1) and Gulf of Mexico (LOGG-S-2). These two critical habitat units include the majority of the *Green Zone* described by the RRT4 DUP and ISBP. Because (1) inclusion of these units with all relevant critical habitats would render the effectiveness of each plan obsolete; and (2) exclusion of these particular units from protection would leave the loggerhead sea turtle vulnerable in the event of a preauthorized action, an alternative solution was proposed by the RRT4 Science & Technology Committee. Each plan calls for a special Emergency Consultation with the NMFS prior to preauthorized use of dispersants or *in-situ* burning within areas of the *Green Zone* that are also one of eight critical habitats (six for the loggerhead sea turtle, one for the North Atlantic right whale, and one for elkhorn and staghorn

corals). The special consultation will focus on the risk of the activity to that particular habitat and the presence of the species it is intended to protect.

SPILL RESPONSE SCENARIOS

An inherent limitation in response planning is the difficulty in accounting for all possible variables which contribute to each unique event. Even worst-case discharge (WCD) estimates are limited in foretelling the circumstances and consequences with any precision. The 2011 Incident Specific Preparedness Review team report on the BP Deepwater Horizon Spill (Rufe et al., 2011) noted that

“Even though the release rate was less than planned for [WCD of 250,000 barrels of oil per day in the submitted Oil Spill Response Plan (OSRP) versus approximately 53,000 to 62,000 barrels per day during the event (USCG, 2011)] the duration of the event strained resources to a degree not contemplated by any of the plans designed to address an event of this type.”

This inherent limitation may sufficiently justify avoiding utilization of scenarios in building a response plan with the intention that the plan will be able to accommodate events not yet considered. Since one objective of a BA is to assess the potential effects on protected resources resulting from an action, spill scenarios were used within the BA to illustrate quantifiable chemical toxicity from dispersed oil under preauthorized circumstances. The potential effects on species and habitats can then be more clearly assessed, while acknowledging the limitation of estimated values.

Analysis was done on the types of oil found in bulk quantities within Federal Region 4, the containment, transportation, or production units related to that oil, and the history of spill events throughout the region. Two initial boundaries were placed on the scope of this analysis. First, spill sources from land-based units were excluded since these discharges would be unlikely to reach the designated *Green Zone* for preauthorized use of dispersants or *in-situ* burning. Second, spills originating outside of Federal Region 4 were not considered since the plan governing preauthorized use of dispersants or *in-situ* burning on such a response would lie with the adjacent Federal Region or Area Committee.

Data on individual discharge incidents within USCG District 5, 7, and 8 were obtained from the USCG Marine Information for Safety and Law Enforcement (MISLE) (USCG, 2015), and analyzed for counts and cumulative volumes by spill size, counts and cumulative volumes by oil type, locations in the *Yellow Zone* versus *Green Zone*, and time of year for spill events (Figure 1).

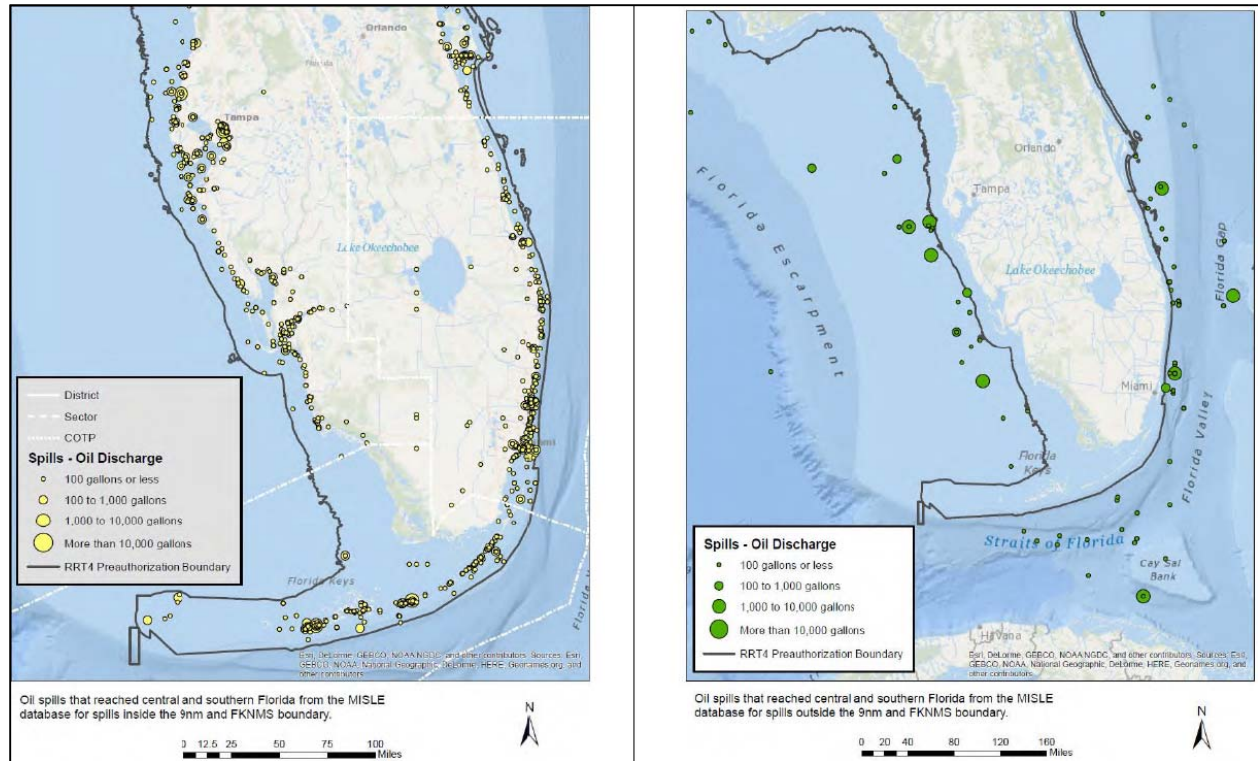


Figure 1. Example for geospatial plot of location and spill volume between incidents originating in the Yellow Zone and the Green Zone using data obtained from U.S. Coast Guard's MISLE database

Additional sources of information included oil discharge incidents from the USCG 2012 Spill/Release Compendium (USCG, 2012), import and production information on crude oil and petroleum products from the U.S. Energy Information Administration (U.S. EIA, 2015), and transportation information related to oil and petroleum products from the U.S. Army Corps of Engineers Waterborne Commerce Statistics Center (U.S. Army Corps of Engineers, 2013). Because preauthorization for dispersant and *in-situ* burning is limited to areas outside state jurisdictional waters, spill events and commodity movements in deepwater routes were evaluated for high concentrations of activity.

Offshore production facilities were evaluated with Bureau of Safety and Environmental Health (BSEE) data which in 2015 (BSEE, 2015) reported nine active OSRPs for offshore production facilities in Federal Region 4, three of which are primarily designed for natural gas production. The six crude production facilities are located on average 92 mi offshore, with the closest facility at 75 mi, and (according to the OSRPs on file) are more likely to impact Plaquemines, Louisiana than Federal Region 4.

DISPERSANT MISSION PLANNER

Four locations and two oil types were selected for scenarios within the *Green Zone* of Federal Region 4. The scenarios are intentionally distributed across the geographical breadth of the region:

- 1) A scenario involving heavy crude oil offshore from Mississippi was used to represent commerce relating to refineries in Mississippi and Alabama and production within the Gulf of Mexico;
- 2) A scenario involving heavy crude further offshore from North Carolina was used to encompass the mid-Atlantic states and represents oil commerce from foreign imports to refineries in the northeast United States;
- 3) A scenario involving No. 6 fuel oil near Tampa Bay and Savannah and Charleston was used to represent fuel oil commerce activity near the busiest locations for this material;
- 4) A scenario involving No. 6 fuel oil near Key West was used to encompass the southern extent of the region and represented the high density of fuel oil being transported around the Florida peninsula enroute to east coast harbors.

In determining the potential spill volume for scenarios in Federal Region 4, consideration was given to the Oil or Hazardous Material Pollution Prevention Regulation for Vessels Tank Vessel Response Plans (TVRP) for Oil (33 CFR §155.1010-1070), which provides a definition for Maximum Most Probable Discharge (MMPD) and WCD (33 CFR §155.1020). Scenarios for crude oil were assumed to occur in self-propelled tanker ships and assigned a discharge volume of 1 million gallons, which is more than the MMPD but is less than the WCD. One million gallons reflects the severity of the incident and the potential spill volume. Scenarios for No. 6 fuel oil were assumed to occur in deep draft tank barges and assigned a discharge volume of 100,000 gallons which is concurrent with the MMPD value.

Dispersant Use Scenarios were evaluated using the NOAA Dispersant Mission Planner (DMP2) (NOAA, 2009) and recently updated dispersant capability and stockpile status information updated based on direct phone calls to Oil Spill Removal Organizations. During the evaluation period, COREXIT EC9500A was the only dispersant readily available in sufficient quantities near Federal Region 4 and Marine Spill Response Corporation was identified as having the closest resources staged near the proposed scenario locations. Standard dispersant to oil ratios (1:20) and dispersant application rates (5 gal/acre) were used but a higher application rate (10 gal/acre) was added to consider difficult dispersant scenarios under high viscosity conditions. The maximum treated oil capability exceeded the discharge volume in two of the five scenarios, meaning that the entire discharge from those scenarios could be dispersed inside the 12-hour operational period, if deemed necessary.

With the consideration of two application rates, two versions of each scenario were effectively generated and evaluated. Geographical distances for the discharge and response locations based on deepwater transportation routes and “cascade” dispersant staging areas. Calculated operating hours ranged from 12 hours in the Mississippi scenario to 8 hours in the North Carolina scenario (due to mobilization distance and cascade distances). Maximum dispersant delivered ranged from 22,750 gallons in the Mississippi high application rate scenario to 2,550 gallons in the Atlantic fuel oil low application rate scenario.

GENERAL NOAA OIL MODELING ENVIRONMENT (GNOME)

Maximum most probable non-continuous discharge volumes from spill scenarios were used to estimate environmental concentrations of oil (as total petroleum hydrocarbons; TPH). Model outputs were generated using the General NOAA Oil Modeling Environment (GNOME) (NOAA/ERD, 2013), a model that estimates the trajectory and spreading of oil and generates trajectory outputs based on horizontal and vertical mixing (i.e., local hydrodynamics, water column turbulence) (Beegle-Krause, 2001; Simecek-Beatty, C., & Lehr, 2002). Because GNOME incorporates oil-specific fate and behavior information (e.g., evaporation, dispersion) from an oil weathering model (Automated Data Inquiry for Oil Spills, ADIOS2) (Lehr, Jones, Evans, Simecek-Beatty, & Overstreet, 2002), oil trajectories can be used to quantitatively describe the average concentration of oil within the water column. Estimated oil concentrations from GNOME were compared to time-varying hazard concentrations (reported as TPH) derived from species sensitivity distributions (SSDs¹) (Bejarano & Mearns, 2015). SSDs were derived for several exposure durations and used to estimate the 5th percentile hazard concentrations (HC5²) (Bejarano & Mearns, 2015). HC5s were then used to estimate time-varying HC5 values via regression analysis, producing a function that allows for the estimation of time-varying HC5 values (Bejarano & Mearns, 2015). Six-hour HC5 values averages were then compared to the environmental concentrations of oil for each of the maximum most probable non-continuous spill scenarios in the Gulf and Atlantic regions to generate quantitative metrics of potential impacts to aquatic organisms.

Model parameters were set when appropriate, to worst-case conditions generating conservative estimates of oil concentrations in the water column. GNOME outputs were interpreted relative to aquatic organisms entrained within the moving water mass containing the chemically dispersed oil (e.g., fish embryos, plankton), and relative to slow moving and sessile benthic organisms exposed to a passing water mass containing the chemically dispersed oil (e.g., corals, benthic fauna). While comparisons are made relative HC5 values derived from empirical toxicity data, these HC5 values may not be necessarily protective of all aquatic organisms, and particularly of those known to be sensitive to stressors (e.g., coral eggs and larvae, early life stages of fish). In all cases, estimated oil concentrations in the water column peak immediately after dispersant use (12 hours post-spill) with concentrations rapidly declining during the simulation period (120 hours). Although under all maximum most probable scenarios oil concentrations are elevated during the first 24-48 hours, exceedances of the time-varying HC5 values for organisms entrained within the water column and traveling with the plume generally occur later during the simulations (≥ 60 hours) (Table 1).

¹ SSDs are cumulative distributions of toxicity data allowing for comparisons of the sensitivities of aquatic species to the same chemical.

² The HC5, or 5th percentile hazard concentration refers to the concentration that is assumed to be protective of 95% of all the species in the SSD.

Table 1. Summary of the maximum most probable non-continuous oil spill scenarios in the Gulf and Atlantic regions. Oil concentrations are reported as TPH.

Oil Type	Region	Treated Oil Volume (gal)	Entrained organisms			Sessile organisms		
			Average (min-max) oil concentration in the water mass (mg/L) over entire the simulation period	Time to HC5 Exceedance (h)	Total area above HC5s (km ²) ³	Average (min-max) oil concentration in the passing water mass (mg/L) over the entire simulation period	Time to HC5 Exceedance (h)	Total area above HC5s (km ²)
API 12.3 (No. 6 Fuel Oil)	Gulf	203,000	0.87 (0.25-3.06)	84	28	1.12 (0.04-1.89)	None	0
		259,980	1.12 (0.32-3.92)	78	29	1.43 (0.05-2.43)	None	0
		260,000	1.12 (0.32-3.92)	78	29	1.43 (0.05-2.43)	None	0
		324,996	1.40 (0.40-4.90)	60	30	1.79 (0.06-3.03)	None	0
	Atlantic	51,000	0.22 (0.06-0.77)	>120	11	0.28 (0.01-0.48)	None	0
		59,514	0.26 (0.07-0.90)	>120	12	0.33 (0.01-0.56)	None	0
API 17 (Heavy Crude)	Gulf	390,000	1.56 (0.72-5.34)	54 ³	28	2.48 (0.19-4.89)	None ⁴	0
		454,986	1.83 (0.84-6.23)	60 ³	29	2.89 (0.22-5.71)	None	0
	Atlantic	195,000	0.78 (0.36-2.67)	84	24	1.24 (0.10-2.45)	None	0
		195,006	0.78 (0.36-2.67)	84	24	1.24 (0.10-2.45)	None	0

³ Areas are conservative given upward rounding of oil concentrations for ease of area calculations; ² Within the immediate vicinity of the point of dispersant application, which is the area expected to have the greatest concentrations of oil for the entire simulation period; ³ A first exceedance occurs immediately after dispersant application, with concentrations falling below the HC5 value within <1 h; ⁴ An exceedance occurs immediately after dispersant application, with concentrations falling below the HC5 value within <1 h.

In all cases, oil concentrations in the passing water mass at point locations followed a rapid increase and decline in concentrations to background levels, with exposures lasting approximately 14 hours. Exceedances of the time-varying HC5 values for slow moving or sessile organisms are only noted for the larger heavy crude oil spill scenario in the Gulf Region, with exceedances lasting approximately 1 hour (Table 1).

Conservative and likely overestimated areas exceeding HC5s changed as a function of spill duration, consistent with the dilution and expansion of the chemically dispersed oil water mass over time. The maximum area above thresholds across all scenarios do not exceed 5 km² at the beginning of the oil treatment with dispersants or 30 km² at the end of the entire simulation period.

KEY ELEMENTS OF THE BIOLOGICAL ASSESSMENT

STATUS OF SPECIES AND HABITATS

A critical component of the BA is the identification of listed and proposed threatened or endangered species under the ESA, including any designated critical habitats, and essential fish habitats within the preauthorized area for the potential aerial or surface application of dispersants. The *Green Zone* was considered the Action Area⁴ for the purposes of this BA; only species occurring or expected to occur within the *Green Zone* were considered and only those critical habitats within the *Green Zone* were included. Species are organized by jurisdiction under NMFS or USFWS. Essential Fish Habitats (EFH) are organized by South Atlantic Fisheries Management Council (SAFMC) and Gulf of Mexico Fisheries Management Council (GMFMC) jurisdictions.

For each species, critical habitat, and EFH found within the Green Zone, a standardized informational sheet is provided (Figure 2). The sheet includes (as applicable): names, listing status, federal register reference, photo, appearance description, diet, population information, distribution map, list of threats, description of habitat and migration, list of USCG Sectors in which the resource occurs, and essential information hyperlinks. These forms can be easily modified to update information and can be incorporated into incident specific plans as-needed.

⁴ Action Area - all areas to be affected directly or indirectly by the Proposed Federal Action and not merely the immediate area involved in the action. 50 CFR §402.02

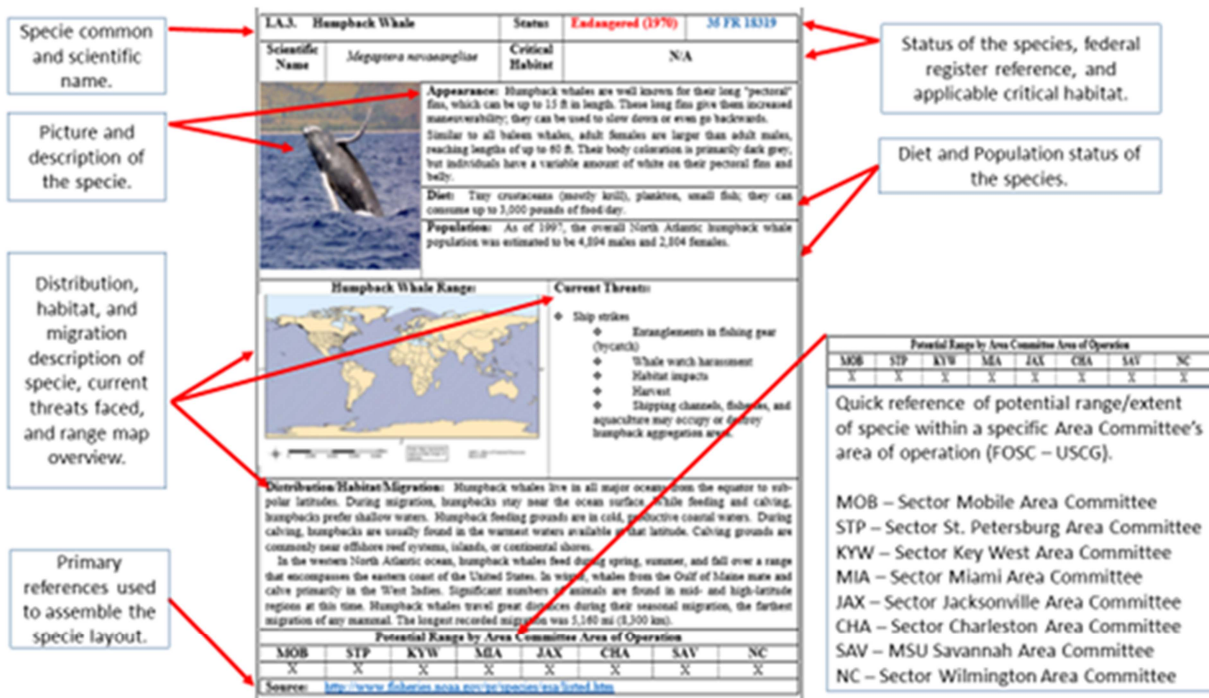


Figure 2. Representative example of the standardized information sheets used as part of the RRT4 BA.

Based on NMFS recommendations, EFH types or features were defined within the geographic ranges of each Fishery Management Council. Although their features are often similar, the SAFMC and GMFMC utilize differing titles and descriptions for habitats. The biological assessment therefore separates the analysis of the management councils - resulting in language that appears repetitive but is more functional during a response or when updating the document.

ENVIRONMENTAL BASELINE

The environmental baseline is a description of existing conditions that are related to the Federal Action, the Action Area (*Green Zone*), and the species and habitats therein, that may add or alleviate certain stressors on listed species, critical habitats or EFH. For this assessment, the following conditions were identified and described:

- Oil Production & Transportation
- Maritime Transportation & Port Expansion
- Pollution & Environmental Toxicants
- Invasive Species
- Habitat Degradation
- Climate Change & Ocean Acidification
- Fishery Impacts
- Military Training
- Environmental Restoration Projects

EFFECTS OF THE ACTION

Effects of a preauthorized dispersant and *in-situ* action are individually addressed for each species, critical habitat, and EFH. *Direct effects* are explicitly defined as those caused by the Proposed Federal Action and occur at the same time and place as the Action; and *Indirect effects* are explicitly defined as those caused by the Proposed Federal Action and are later in time, but are reasonably certain to occur (50 CFR § 402.02). Effects are assumed to occur when there is a clear pathway of exposure, when a Proposed Federal Action has been undertaken, and when the receptors or critical habitats are physically present. A complete exposure pathway to dispersants or chemically dispersed oil can only occur when all of the following elements are present (modified from (ATSDR, 2005; Suter II, Vermeire, Munns, & Sekizawa, 2003)):

- 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 with the body (i.e., ingestion, inhalation, and dermal contact and absorption)

Due to similarities in life history, behavior and physiology, species are grouped by taxa in the discussion of effects, but determinations are made on individual species and critical habitats. Similar analyses are included for EFH. Only species, critical habitat, or EFH known to be present within the *Green Zone*, or are located within the immediate vicinity of the *Green Zone*, are included. Effects determinations for each resource type, jurisdiction, and response method are summarized in a series of tables (Table 2). The effects determinations for species and critical habitats were all characterized as “*may affect, not likely to adversely affect*” and no determinations of “*no affect*” or “*may affect, likely to adversely affect*” were applied to any species or critical habitat. Similarly, the effects determinations for EFH were all characterized as “*may adversely affect*” and no determinations of “*no affect*” or “*will adversely affect*” were applied to any EFH.

Table 2. Representative example of the final determinations on the impacts of the federal actions used as part of the RRT4 BA.

Species	All	MOB	STP	KYW	MIA	JAX	CHA	SAV	NC
Marine Mammals									
Sperm Whale	X	X	X	X	X	X	X	X	X
North Atlantic Right Whale				X	X	X	X	X	X
Humpback Whale	X	X	X	X	X	X	X	X	X
Fin Whale	X	X	X	X	X	X	X	X	X
Sei Whale	X	X	X	X	X	X	X	X	X
Brydes Whale	X	X	X	X	X	X	X	X	X
Sea Turtles									
Kemp's ridley Sea Turtle	X	X	X	X	X	X	X	X	X
Green Sea Turtle	X	X	X	X	X	X	X	X	X
Loggerhead Sea Turtle	X	X	X	X	X	X	X	X	X
Leatherback Sea Turtle	X	X	X	X	X	X	X	X	X
Hawksbill Sea Turtle	X	X	X	X	X	X	X	X	X
Anadromous and Marine Fish									
Smalltooth sawfish	X	X	X	X	X	X	X	X	X
Gulf Sturgeon		X	X						
Scalloped Hammerhead	X	X	X	X	X	X	X	X	X
Atlantic Sturgeon Carolina DPS							X	X	X
Atlantic Sturgeon South Atlantic DPS					X	X	X	X	X
Shortnose Sturgeon					X	X	X	X	X
Nassau Grouper				X	X	X	X	X	X
Corals									
Elkhorn Coral				X	X				
Staghorn Coral,				X	X				
Rough Cactus Coral			X	X	X	X			
Mountainous Star Coral			X	X	X	X			
Lobed Star Coral			X	X	X	X			
Pillar Coral			X	X	X	X			
Boulder Star Coral			X	X	X	X			
Seagrass									
Johnson's Seagrass					X				
Determination	No affect		May affect, not likely to adversely affect			May affect, likely to adversely affect			

CONSERVATION MEASURES

Both the ISBP and DUP contain protocols that must be followed as part of the conditions for preauthorization. These requirements can be regarded as initial control measures developed in consideration of a burn or dispersant operation. These control measures are then augmented by the conservation measures developed in consideration of the potential biological impacts. Additional recommended measures are identified through the formal consultation process to prevent risk of injury to wildlife, especially endangered or threatened species; critical habitat; and essential fish habitat. The conservation measures provided in the BA have been identified in

consultation with NOAA, NMFS, USFWS, SAFMC, GMFMC, EPA, and USCG. Thirty-six measures were adopted for burn operations and twenty-six measures were identified for dispersant use. Furthermore, additional conservation and protection measures for Habitat Areas of Particular Concern (HAPC) were added for both FMCs (11 HAPCs under the SAFMC and 5 HAPCs under the GOMFMC). These measures must be employed where the conditions identified by the service agency apply and can be added to contingency plans, operational plans, incident action plans, ICS-204s, Safe Work Practices, etc., as appropriate for the management of the incident.

PLAN MAINTENANCE

Annually, the RRT4 will review this biological assessment in order to validate that the information contained therein reflects the latest science, technology, plans, and listed species and critical habitats. As such, specific to ESA and EFH consultation, the RRT4 will request of the Services any updated listing of species, critical habitats, and EFH to ensure the latest information is contained in the BA.

CONCLUSIONS

The development of the RRT4 BA for ESA Section 7 and EFH consultation was necessitated both by the updates to their ISBP and DUP and modifications to listed species and critical habitats. One goal of the RRT4 Science and Technology Committee Biological Assessment Team was to utilize the best parts of similar documents developed by other RRTs and a combined BA for multiple response strategies. Key factors to the RRT4 BA which are unique include the incorporation of EFH consultation and the use of modeling for toxicological impacts within representative spill scenarios. For utility, species status information is separated and formatted for inclusion in incident specific planning documents and effects determinations are summarized in tables for reference efficiency. Conservation measures are also tabulated in a separate appendix for inclusion in planning documents when needed. The structure of this BA is stable and its content is flexible in response to future modifications to proposed and listed species and habitats under ESA and changes in EFHs or HAPCs.

The BA was signed and submitted to NMFS and USFWS for consultation in August of 2016. RRT4's developments in this project compliment and contribute to the body of work being conducted by the Regional Response Teams and the Area Committees throughout the country in producing functional assessments and consultations for response plans.

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