Regional Response Team (RRT) 6

Guidance for Oil Spill Response Activities within and near the Flower Garden Banks National Marine Sanctuary

Appendix 43

March 2019

Key Decision Processes Guidance

Recognizing that each oil spill incident is a unique event and that the Flower Garden Banks National Marine Sanctuary (FGBNMS) is a unique, highly sensitive, and federally protected underwater area in the Gulf of Mexico (GOM), the guidance from Regional Response Team 6 (RRT-6) is that all response actions be conducted in such a manner as to provide the greatest protection to the habitat and marine species that compose the FGBNMS. Aspects of the specific incident, including volume and location of oil discharged, distance from the FGBNMS, oil trajectory forecast, and consultation with the NOAA Scientific Support Coordinator and senior sanctuary staff as well as natural resource representatives to RRT-6, should assist and help guide oil spill response activities that might negatively impact the FGBNMS. The ultimate goal is prevention of injury to the FGBNMS – at a minimum, minimization of any and all impacts, direct and collateral, to the FGBNMS. Additionally, similar outer continental shelf habitats should also be identified as a high priority incident command objective with respect to protection of sensitive habitats.

Consensus of the stakeholders involved in a workshop conducted in May 2016 at the FGBNMS headquarters office in Galveston, TX was, to the maximum extent possible, avoid response activities that would introduce more oil components into the water column creating an oil pollution threat to FGBNMS. This is consistent with existing RRT-6 guidance on aerially applied dispersant use near FGBNMS, and the in-situ burn exclusion areas to prevent any heavier than water *in-situ* burn residues from directly impacting coral reef habitat and associated organisms known to utilize waters at or close to the surface of the water. The workshop participants also stated that potential threats from the use of dispersants in deep water by subsea dispersant injection include potential exposure risks to the FGBNMS. Current RRT-6 guidance requires a case-by-case approval process for subsea dispersant injection consistent with the workshop recommendations to include any potential response action threats to the FGBNMS.

This guidance and the May 2016 workshop consensus does not specifically preclude the use of aerially applied dispersants, subsea dispersants, or *in-situ* burns in situations that would result in preventing or reducing impacts to the FGBNMS. The guidance does state that such actions must be implemented with consideration of all environmental factors to include the distance from the coral reefs and potential transport mechanisms. The principle focus is to protect the FGBNMS through the use of the best information available and with consultation with the FGBNMS senior management as well as other technical and scientific experts. Operational decisions should avoid or minimize the potential for environmental impacts to these highly sensitive communities. Taking an inclusive approach will better assure that operational decisions would minimize the potential for concentrations of dissolved or dispersed oil components in the water

column that pass through these sensitive coral reefs and associated habitats would have adverse impacts to the community and the animals that occupy the FGBNMS.

The Federal On-Scene Coordinator (FOSC) has approval authority for decisions regarding the response to oil spills and hazardous substance releases. Currently, FGBNMS is within the Sector Houston-Galveston Captain of the Port Zone (COTPZ). A proposed expansion of the FGBNMS could put portions of the expanded sanctuary boundary within the Marine Safety Unit (MSU) Port Arthur and MSU Houma COPTZs. Events with a potential threat to the FGBNMS may also originate from a COPTZ other than Sector Houston-Galveston. In all cases where an oil discharge ***may*** affect FGBNMS resources, the Sanctuary Superintendent or a senior staff alternate ***must*** be notified and engaged in the decision process as to potential threats to the federally protected resources under the authorities of the Sanctuary Superintendent and NOAA Office of National Marine Sanctuaries.

Background Information

The FGBNMS is located approximately 70 to 100 nautical miles offshore of Galveston, Texas, and currently comprises three coral reef community systems and adjacent waters. The three dominant areas are the East Flower Garden Bank, West Flower Garden Bank, and Stetson Bank. Expansion of the Sanctuary has been proposed and is in the planning process. A Draft Environmental Impact Statement (EIS) regarding this expansion was published in the Federal Register in 2016. (https://www.federalregister.gov/documents/2016/06/10/2016-13661/rin-0648-ba21). Information in this RRT-6 guidance is applicable to areas considered as part of the expansion as they represent similar sensitive habitats and many of the species present are protected under other federal authorities.

FGBNMS contains coral reefs, and deeper coral areas, referred to as mesophotic coral ecosystems, as well as a vibrant and diverse assemblage of organisms associated with these unique habitats. In addition to the coral reefs and associated ecosystems themselves, there are numerous species of fishes, including whale sharks, and federally listed manta rays; several species of federally listed sea turtles, and a range of protected marine mammals. These aquatic resources are present mostly in the water column and on the reefs themselves, which rise to within approximately 55 feet of the water surface. The sensitive coral reef habitat and the endangered and threatened species present are key biological considerations that must be included in all response decisions and actions. It should be noted that pelagic species, such as manta rays and marine mammals, may travel between multiple locations in the region, and even when outside of the sanctuary boundaries, are still protected by other federal laws such as the Endangered Species Act and Marine Mammal Protection Act.

FGBNMS is at risk to oil spills from a number of sources in the Gulf of Mexico (US and Mexico), including offshore oil exploration and production activities and discharges from vessels. Because of this vulnerability, and the unique habitat of the FGBNMS and similar under-sea reef communities, concerns about selection of spill response options prompted a workshop on the topic in May 2016. The workshop brought together a range of different stakeholders' interest, response managers, and sanctuary staff to evaluate response options (the workshop report and additional details are available at http://crrc.unh.edu/NRPT_Texas).

The guidelines in this RRT-6 document are based on existing RRT-6 policies on the use of dispersants (Appendix C to FOSC Dispersant Pre-Approval Guidelines) and exclusion of *in-situ* burns over hard-bottom areas such as the FGBNMS (Appendix E to ISB Plan, Part 1, Operations), and incorporate the shared knowledge and best professional judgment of the stakeholders present at the workshop identified above. The FGBNMS is within the RRT-6 aerial dispersant pre-approval zone, but there has always been a recognition that a dispersant use decision that ***might*** impact the FGBNMS would include notification and coordination with the Sanctuary Superintendent. The FGBNMS is within the *in-situ* burn exclusion areas - *in-situ* burning of oil above these sensitive habitats is not permitted by RRT-6 guidance. The use of subsea dispersants ***must*** be discussed and approved on a case-by-case basis – this is particularly true for the potential use of subsea dispersant injection adjacent to or in areas that may have an impact to the FGBNMS.

Applicable Response Methodologies

In a practical sense, there are five possible methods of responding to offshore oil spills: allowing natural weathering processes to occur (the no response option), mechanical recovery, dispersing oil slicks at the ocean surface, dispersing released oil subsea at the point of release, and burning in-situ at the ocean surface. In a typical managed response, multiple methods are considered and often utilized with the goal of environmental protection. How those options might affect resources at FGBNMS are briefly discussed below.

Natural Weathering Processes: In an offshore system, wind and wave energy will spread oil across the ocean surface, transport it down-current and downwind, and physically mix oil into the water column if there is adequate surface wave energy. Left to weather naturally, a portion of the oil will evaporate and oil may physically disperse into the upper water column during sea-state conditions that result in significant surface mixing. Except in very high wind or weather conditions, the generally accepted mixing depth of naturally dispersed oil is approximately 30 feet into the water column (slightly above the upper reef depths of the FGBNMS). Any oil on the surface or remaining at

the surface to include oil sheens may expose and impact organisms that reside at the surface or interact with the sea surface atmosphere boundary such as sea turtles and marine mammals that rise to breathe, and birds that either rest or dive through the ocean surface to feed. Direct contact with oil can have smothering and coating effects that often lead to mortality. Individual oil components may dissolve into the water column below the surface slick causing aquatic toxicity and injury. Despite the negative impacts of oil in the marine ecosystem, there are situations where no action or the "no response action" is the only or best response if reached by consensus of the unified command with stakeholder input.

Mechanical Recovery: The objective of mechanical recovery is to physically remove oil pollution from the ocean surface and transport the recovered oil to shore for proper treatment or disposal. Offshore vessels and boom are used to recover oil at the ocean surface using a wide variety of skimming devices. While skimming does not affect natural dispersion into the water column, the efficiency of mechanical recovery is often poor in offshore response situations and may be limited by availability of assets, transit times, and sea conditions that would allow safe operations. While effective under many response situations, efficient recovery of oil at the sea surface is limited by weather and wave conditions, oil thickness, and oil weathering. When in operation, even moving at very slow speeds, there is the potential for vessel and surface oil recovery operations to encounter fauna surfacing to breathe, and/or impact resources that are part of the ocean surface habitat, such as *Sargassum*.

Aerially Applied Dispersants: Aerially applied dispersants increase the rate of oil mixing into the water column enhancing the rate of natural dispersion. The intended purpose of ocean surface applied dispersants (such as by aircraft spray systems or vessel application) is to move whole oil slicks from the ocean surface into the water column as very small droplets of oil to reduce the impacts to marine life at the sea surface and interface with the atmosphere and to prevent impacts to sensitive coastal habitats that might be many miles away. The mixed depth of the dispersed oil into the water column is similar to natural dispersion and, under many situations, would not result in high levels of exposure to sensitive coastal habitats (this statement makes the assumption that surface currents move the dispersed oil plume away from sensitive habitats). Dispersed oil is not recoverable. Oil is toxic to water column organisms, including coral, and effective chemical dispersion will increase the concentration of oil in the water column more than natural dispersion under normal conditions. Thus, while toxicity of the oil itself does not change with chemical dispersion, exposure does – surface exposure is decreased and oil exposure within the upper water column is increased.

Corexit®9500 has been shown to cause mortality in corals (Fromerta et al, 2017; Goodbody-Gringley et al 2013) at concentrations greater than 25 mg/L. These concentrations are significantly higher than would be expected at typical surface application rates of 5 gallons of dispersant per acre of sea surface and oil that typically produce concentrations at less than 5 mg/L dispersant in the upper 1 meter of the water column and dilutes to much lower concentrations as it mixes into the upper 5 to 10 meters of the upper ocean mixing layer. The rate of mixing (rate of both dispersion and dilution) and the depth of the "plume" is directly driven by physical ocean properties and varies with sea-state and other oceanography processes.

Dispersing a large amount of oil ***may*** contribute to marine flocculants (sometimes called marine snow) below and down-current from the dispersant location. *Marine snow is a naturally occurring phenomenon* that occurs in the absence of spilled or dispersed oil, and is often associated with planktonic marine organisms and can create a transport mechanism to move trapped and adsorbed dispersed oil particles into deeper ocean waters and the ocean floor. While marine snow occurs in the absence of the use of dispersants, some researchers have suggested that there can be greater amounts of "marine snow" as a result of dispersant application. Evidence of this transport process was documented during the Deepwater Horizon Oil Spill in 2010 and the Ixtoc-I oil spill in 1979 (both were very large oil spills and large amounts of dispersants were applied during both events).

There is limited data for current prediction and subsurface oil trajectory analysis around the unique topographic features present along the outer continental shelf including the reef sites of the FGBNMS salt-domes (or sea mounts). Dispersed oil droplets can travel great distances before being converted or degraded through natural biodegradation and weathering. Given the lack of accurate or validated plume forecasting in and near such habitats and the rate of natural oil biodegradation, a safe and conservative, minimum regret approach should be used for dispersant response planning near the FGBNMS.

Subsea Dispersants: Dispersants can be applied at the point of oil discharge in the case of a subsea release to enhance effectiveness and provide continuous treatment (surface application is limited to daylight hours only). As with aerially applied dispersants, this increases exposure for water column organisms and potentially to benthic flora and fauna in FGBNMS, depending on ocean depth at the point of application, transport and current flow in the area, and proximity of sensitive habitats to the dispersant application. Oil dispersed at depth will generally surface more slowly than undispersed oil, and the subsurface plume will frequently be larger in area but less concentrated than undispersed oil. There are also mechanisms that can transport dispersed oil to the sea floor. Small droplets of dispersed oil in the deep ocean may

remain in deep sea layers without ever rising to the photic zone or upper ocean layer where there is sunlight penetration and the greatest productivity and abundance of marine life. Specific transport mechanisms in the deep ocean are more difficult to predict (especially over large distances) as there is generally little, limited, or no measured or actual deep oceanographic current data available.

In-Situ Burns (Open Water): An *in-situ* burn combusts (burns) a significant portion of the oil at the surface, reducing volume, producing smoke and air pollution, and producing a residue which often sinks. The transport of smoke downwind from the burn site from a public health perspective should be assessed when considering *in-situ* burning (typically, this is not an issue far offshore). The sinking residue is a distilled fraction of the original oil that is often like a heavy asphalt or tar containing far less of the more acutely toxic oil components. The heavy tar residue does contain heavier oil components which can be of chronic concern, but they are far less bioavailable than they would be as liquid oil or dispersed oil. The residue can potentially smother, coat, or otherwise cause physical damage to organisms in the water column below or down-current of the burn location as it sinks to the ocean floor. Not all burn residues sink, but during highly effective burns, the intense heat from burning oil not only vaporizes the oil during combustion but fractionally distills what crude oil doesn't burn. When a successful burn reaches a point where the volume of oil is significantly reduced to the point that heat loss to the ocean prevents continued combustion, the residual remaining cools and will sink if the density is heavier than seawater (this has been observed in both test burns and offshore operational burns). *In-situ* burns are typically 95 to 98% effective in removing oil from the surface. Potential direct impacts to organisms from the *in-situ* burn itself include entrapment in the collected oil. Best management practices for *in-situ* burns include monitoring for animals such as turtles during oil collection and burning operations, and removal of those animals, if feasible, given responder safety and other operational considerations. *Sargassum* serves as a source of shelter and habitat to many marine organisms and should be avoided. Water has a high heat capacity and cooler waters are constantly moving below the burning slick, so elevated temperatures or thermal threats do not extend any considerable depth below the water surface at the site of an *in-situ* burn.

Evaluating Environmental Tradeoffs

The entire ecosystem that makes up the FGBNMS is sensitive to oil pollution. Because of the concern for marine species that interact with the ocean surface such as sea turtles and marine mammals, a wide variety of water column organisms (many that are listed as threatened or endangered species), and the highly sensitive coral reef communities themselves, minimizing any oil exposure to the FGBNMS should be a

primary response objective. Coral reefs are unique and important areas of biodiversity in the Gulf of Mexico. Coral reefs are long lived and form and grow over hundreds, if not thousands, of years. Recovery rates of coral communities are very slow (some may never recover if damaged or killed). Counterbalancing trade-off concerns when developing response tactics that minimize the impact to unique offshore resources like the FGBNMS, mesophotic communities and other important offshore habitat such as *Sargassum* habitat (where aggregations of marine life and seabirds are often present), and the potential for impacts to ecologically important near-shore and shoreline habitats is a delicate balance and a challenge when planning for and responding to oil spill events in the Gulf of Mexico.

In Summary

This RRT-6 guidance document stresses the unique habitat and sensitivity of the FGBNMS as it relates to the threat from oil spills and oil spill response activities. This document stresses the importance of engaging the FGBNMS Sanctuary Superintendent (or other Senior Sanctuary Staff if the Superintendent is unavailable) as well as the NOAA Scientific Support Coordinator and other resource protection specialist during an actual event and during contingency planning activities and exercises that could potentially impact the FGBNMS.

All current RRT-6 guidance for the use of dispersants and *in-situ* burning is in effect as it relates to the FGBNMS. *In-situ* burning is currently excluded over sensitive reef and hard-bottom habitats including the FGBNMS. Surface dispersant application using existing RRT-6 guidelines require that the FOSC's use of dispersants to be "environmentally safe." Appendix C of the current RRT-6 guidelines require the FOSC to notify senior staff at the FGBNMS. In addition, Appendix C states that the FGBNMS staff may be able to provide the RRT and the FOSC information "that could affect the decision to apply dispersants." The approval process for the use of sub-sea dispersant injection at the release point is considered and approved by RRT subject to an incident-specific decision process. The goal of all oil spill response actions is to prevent or reduce environmental impact. Our collective goal is to do no more harm than good in response to oil spills. These guidelines assist that goal with respect to the FGBNMS.

Key NOAA and FGBNMS Contacts:

- The NOAA Scientific Support Coordinator (SSC) for the incident should be engaged in the evaluation process. The 24-hour Hotline for NOAA's Emergency Response Division and Scientific Support is (206) 526-4911.

- Primary POC: Senior FGBNMS Staff ***must*** be notified and should be included in the consultation process. FGBNMS Sanctuary Superintendent, George P ("G.P.") Schmahl, (409) 356-0383, (979) 229-6542 (cell)

- Alternate POC: FGBNMS Research Coordinator (Designated Alternate), Emma Hickerson, (409) 356-0390, (979) 777-3895 (cell)

- Third-Level POC: FGBNMS Marine Operations Coordinator (2nd Alternate), (979) 777-7183 (cell)

- If the contacts above do not respond, contact the FGBNMS Office Administration, Irene Arthur, (409) 356-0393 (working hours)

- The NOAA Office of National Marine Sanctuaries National Resource Protection Coordinator (NRPC), may be able to assist in providing direct contact with FGBNMS staff during an emergency if the Superintendent or alternate is unavailable. Rotational position, (240) 688-1368 (cell)

- The DOC/NOAA Representative to RRT-6, working with the regional NOAA Scientific Support Coordinator, can also assist to ensure that proper scientific support and natural resource consultation is provided to both RRT and FOSCs by NOAA.

DOC/NOAA RRT-6 Rep., Charlie Henry, (206) 849-9928 (cell)
DOC/NOAA RRT-6 Alternate, Paige Doelling, (206) 549-7819 (cell)