OIL SPILL SCIENCE

SEA GRANT PROGRAMS OF THE GULF OF MEXICO

WHAT TO EXPECT IN RESPONSE TO AN OIL SPILL: A TIP SHEET FOR ACADEMIC RESEARCHERS

This tip sheet identifies ways academic researchers can become more familiar with oil spill research needs and response activities. It is based on input from academic, industry, and response representatives.

RESPONSE LEADERSHIP AND PRIORITIES

The Oil Pollution Act of 1990 (OPA 90) defines who responds in the event of oil spills. The National Incident Management System (NIMS) outlines the makeup, roles, and responsibilities during a spill and uses the Incident Command System (ICS). ICS consists of four sections under the Unified Command (UC): operations, planning, logistics, and finance (Figure 1). The U.S. Coast Guard serves as the Federal On-Scene Coordinator (FOSC) for spills in coastal and Great Lakes waters and leads the UC, which typically also includes the State On-Scene Coordinator (SOSC) and the Responsible Party's Incident Commander (RP-IC). The ICS structure under the UC could include trustee representatives from federal, state, tribes, and local agencies and the responsible party. NOAA and some states employ Scientific Support Coordinators (SSCs) to serve as lead science advisors and share the best available science to inform the decision-making process. Operations personnel report details about the spill and responders must contain and clean up the spill, which are some of the priorities during response.

Employees of oil industries and government agencies come together at a "spill drill" in Texas to work through a response plan for a fictional oil spill scenario. (Photo provided by Anadarko)

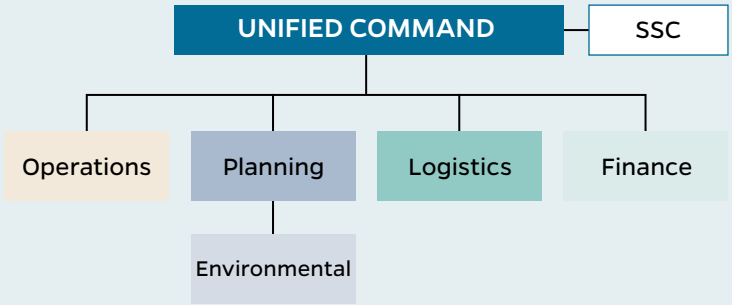

FIGURE 1. *Typical ICS structure used for spill response. Various experts, including academic researchers, may be invited to assist in response and would typically work with the SSCs and personnel in the Environmental Unit, which consists of environmental experts from multiple disciplines.*

RESPONSE SCIENCE VERSUS DAMAGE ASSESSMENT STUDIES

Science is incorporated into many aspects of an oil spill. Three distinct areas science is used:

1. Response with a very short timeframe of hours to days (Figure 2).
2. Damage assessment, which is a prolonged, comprehensive process that can take years.
3. Independent research, which requires coordination with UC prior to accessing an active spill area.

Response-related science includes topics such as fate and transport of oil, cleanup methods and effects, and safety. Damage assessment-related science topics include evaluating and quantifying injuries and losses to habitats, wildlife, and recreational uses. Different groups lead these efforts. A large-scale damage assessment was performed for the Deepwater Horizon oil spill and is linked in the resources section. Research opportunities related to response or damage assessment is relatively infrequent and typically occurs on large-scale or complex incidents.

RESPONSE-DRIVEN SCIENCE QUESTIONS

NOAA's SSCs role may be summarized by a simple set of questions, but SSC roles can be broader than these questions:

1. What was spilled?
2. Where could it go?
3. What could it affect?
4. What harm could it cause?
5. What can be done to help?

HOW TO GET INVOLVED

Keep in mind

- Responders' priorities focus on public and worker health and safety as well as limiting environmental and economic impacts, while containing and recovering the spilled oil.
- During the response phase, only research that directly supports these activities is of immediate concern for the UC.
- It takes time to collect data, draw conclusions, and publish research. During a spill response, time is of the essence. The two timelines do not coincide (Figure 2). Research that is of relevance to spill responders has to be completed prior to a response. Research performed during a specific incident will most likely be of value for a future incident. The Deepwater Horizon spill was a unique incident and most spill responses are not at that magnitude. Research should consider large, probable incidents as well as the worst-case scenario.

Before the Spill

- Participate in appropriate training and obtain proper certificates. Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) and Incident Command System (ICS) trainings are examples. Everyone on the research team must have proper training before they request permission to access the spill site(s). For more details on requirements visit the Occupational Safety and Health Administration (OSHA) website (link provided in resources).
- Participate in "Science of Spills" classes that are organized by NOAA and presented in different locations throughout the U.S.
- Build relationships and develop trust with members

LEGAL CONSIDERATIONS

Resource agencies and others traditionally contract with academic researchers to provide scientific input during oil spill response or natural resource damage assessments (NRDA) based on information needs. During the Deep Water Horizon response, for example, researchers were under contract by federal and state agencies, as well as the responsible party – BP. Contract terms often dictate how data must be collected, documented, and published, especially if the research is intended to contribute to a formal, legal process. Common practices include following "chain of custody" requirements and submitting electronic files, including the physical drives they are stored on, to agencies or the responsible party. Prior to working on a spill, you should engage with your university's sponsored programs office to understand what you are and are not permitted to do under the terms and conditions of your contract or grant. Note that it is possible that you and your data and records may be subject to being called into court regardless of funding source.

of the response community by attending local and regional response planning meetings and seeking opportunities to participate in oil spill exercises.

- Be available 24 hours per day and seven days per week in case a spill occurs.
- Have a well-defined research and analytical plan and equipment ready in the event of a spill. Provide flexibility within the plan so it can be adapted based on the unique aspects of a spill.
- Identify if your institution would be willing to develop contract language for pre-spill agreements (e.g. MOUs) to provide research assistance during response and damage assessment phases of a spill.
- Be prepared to explain why the research is important, time sensitive, and how it will be beneficial.

During the Spill

Permission and permits to access an active spill must be granted by the UC. Even if the training is completed, there is no guarantee that access will be granted. The priorities of the response community supersede any other interests. Safety and operational considerations are paramount and there can be no interference with response activities. There can be logistical challenges that must be overcome.

- Follow guidelines and instructions provided by UC, which may include that communications about your work be stewarded through the Joint Information Center.
- Use appropriate personal protective equipment and follow decontamination procedures.
- Provide a briefing for the SSC and/or Environmental Unit of UC on activities and initial findings.
- Be prepared to leave an area at any time, if required.

THREE LEVELS OF PLANNING AND WAYS TO BUILD TRUST

OPA 1990 defines three levels of oil spill planning and response. Planning occurs at the national, regional, and local levels. The easiest way for researchers to get involved in oil spill activities is to engage with regional response teams (RRTs) and participate in quarterly local area committee (LAC) meetings, which allows researchers

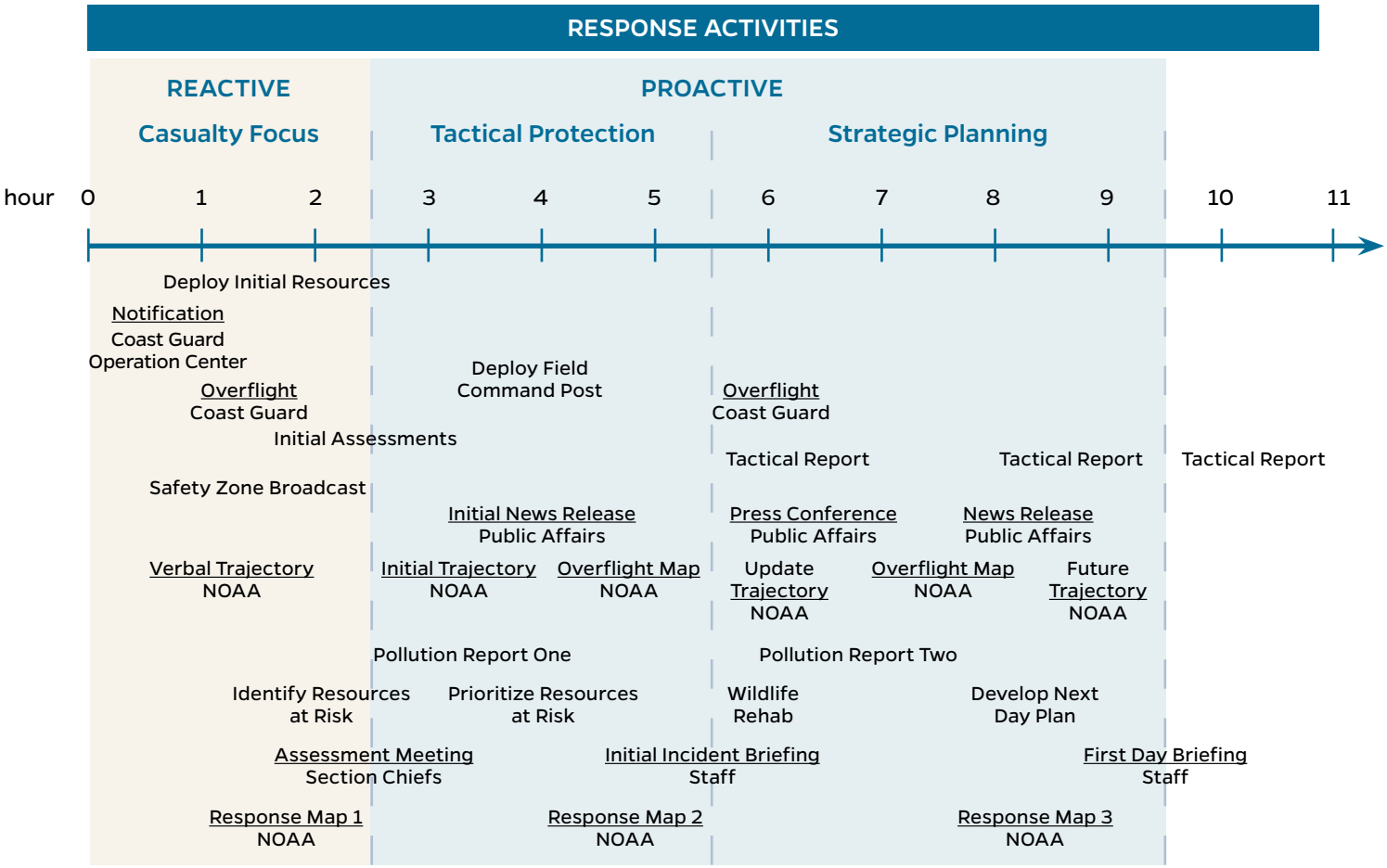

FIGURE 2. *Typical timeline of response activities. Timeline may expand or contract depending on scale and complexity of the spill. (Figure originally created by Ed Levine, NOAA.)*

to meet the people located in the area who respond to spills. LAC meetings allow response leaders to discuss recent spills, engage in planning and preparedness activities, and participate in related activities. Researchers can also engage with the NOAA SSC and state and local representatives in your region. Because SSCs share the best available science to minimize impacts from oil spills and response activities, they could identify ways research can be framed to inform future spills.

OTHER WAYS TO GET INVOLVED

Before developing a research plan related to spills, engage with the response community to identify research needs. Framing research objectives and methods to directly address those needs will increase the likelihood that work could transition from research to application.

GET INVOLVED	LEVEL OF DIFFICULTY AND TIME COMMITTMENT	HOW TO PROCEED
Design and implement research projects based on response community input.	Minimal; less than 8 hours of face-to-face discussions and follow-up. If project awarded, then additional hours with end-users.	Engage with the response community to identify needs and frame real-world conditions **before** oil spill incidents and **before** writing proposals for funding that could be sent to your traditional funding sources or in response to special research competitions.
Inform response planning.	Minimal; 4 hours per quarter plus time on subcommittees.	Participate in local area committee meetings; volunteer to serve on science committees that support Area Contingency Plans.
Conduct research on-site during active spill.	High; dozens to hundreds of hours (trainings, certifications, pre-established research plan; data collection).	Complete required trainings prior to spill; obtain permission and permits from UC and appropriate agencies; follow strict guidelines; limit communication about results until peer reviewed.

RESOURCES FOR ADDITIONAL INFORMATION

Training

- United States Department of Labor's Training Marine Oil Spill Response Workers under OSHA's Hazardous Waste Operations and Emergency Response Standard: *osha.gov/Publications/3172/3172.html*
- FEMA ICS: *training.fema.gov/emiweb/is/icsresource/trainingmaterials/*

Engaging with Response Community

- Find your local Area Committee Meeting contacts via the Sea Grant oil spill science outreach team: *gulfseagrant.org/oilspilloutreach/*
- Find your Regional Response Team contacts: *nrt.org/Site/Regionmap.aspx*
- Find your NOAA Scientific Support Coordinator: *response.restoration.noaa.gov/about/orr-field-staff.html*

Others

- Oil Pollution Act of 1990: *epa.gov/laws-regulations/summary-oil-pollution-act*
- National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Overview: *epa.gov/emergency-response/national-oil-and-hazardous-substances-pollution-contingency-plan-ncp-overview*
- Area Contingency Planning Handbook: *epa.gov/sites/production/files/2014-04/documents/epa_acp_handbook_3-25-14_low-res.pdf*
- NOAA's Science Role in Response: *response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/resources/fosc-guide.html*
- Programmatic Damage Assessment and Restoration Plan from Deepwater Horizon: *gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan*
- NOAA's Damage Assessment, Remediation and Restoration Program: *darrp.noaa.gov/*
- Leveraging Science and Academic Engagement During Incidents: *scholars.unh.edu/crrc/25/*
- Fostering emergency responder and university researcher collaboration: Workshop summary report: *masgc.org/oil-science/Researcher-Responder-Workshop-Report.pdf*

Response Research Funding Sources and Organizations

- Gulf of Mexico Research Initiative: *gulfresearchinitiative.org/*
- National Academy of Science Gulf Research Program: *nationalacademies.org/gulf/index.html*
- EPA Oil Spill Research: *epa.gov/land-research/oil-spill-research*
- Bureau of Safety and Environmental Enforcement Oil Spill Response Research: *bsee.gov/what-we-do/research/oil-spill-preparedness/oil-spill-response-research*
- Interagency Coordinating Committee on Oil Pollution Research: *dco.uscg.mil/ICCOPR/*
- National Pollution Fund Center (NPFC) Spill Response Funding (restricted from funding research during spill response incidents): *uscg.mil/Mariners/National-Pollution-Funds-Center/Response/*

ACKNOWLEDGEMENT

Thank you to the following people that informed and shared input about this publication: Kristina Alexander, Tom Brosnan, Doug Helton, Ed Levine, Scott Lundgren, Amy MacFadyen, Dave Palandro, Jordan Stout, LaDon Swann, and three leaders within the Gulf of Mexico Research Initiative.

Sea Grant
Texas • Louisiana • Florida
Mississippi-Alabama

GULF OF MEXICO RESEARCH INITIATIVE

NOAA

gulfseagrant.org/oilspilloutreach

This work was made possible in part by a grant from The Gulf of Mexico Research Initiative, and in part by the Sea Grant programs of Texas, Louisiana, Florida and Mississippi-Alabama. The statements, findings, conclusions and recommendations do not necessarily reflect the views of these organizations.

GOMSG-G-20-002 MASGP-20-037