

Strengthening Preparedness and Response Decision-Making within a Region: Adaptations to Manage Better and Suffer Less

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ABSTRACT

Decisions about response strategies to mitigate threats to people and the environment from an oil spill must be made rapidly because an oil spill on water is dynamic. Science to inform the decision making process is applied when possible; but ultimately decision makers rely on their judgement, available technical knowledge, advisors and experience, and contingency plans to inform their time-critical choices. Given real-time needs, it's important to organize approval and support for decisions pre-spill, including stakeholder inputs about potential risks and benefits of response actions. Oil spill stakeholders include those with the legal authority to make decisions, those who could be affected by decisions, and those who have knowledge to contribute to the decision making process, such as practitioners, researchers, scientists and engineers, in addition to the public at large. The Deepwater Horizon National Incident Commander observed in late 2010 cautioned that our options going forward are to adapt, manage or suffer. The paper discusses oil spill stakeholders and their roles in preparedness and response decisions. Adaptations are proposed to increase and strengthen support for oil spill decisions at the regional and local levels, e.g., Regional and Area Contingency Plans in the US, response actions and technologies, particularly dispersants, as well as to speed recovery and promote community and environmental resilience. Examples of proposed practices also are provided.

INTRODUCTION

Significant oil spills provide unique learning opportunities both during the response and later through hindsight about the experience. After retiring in 2010, USCG Adm. Thad Allen, the Deepwater Horizon (DWH) National Incident Commander, observed that social media and the 24-hour news cycle are part of a fundamental change in our sociological structure, and that public participation in major events will happen whether it's managed or not. He cautioned that our options going forward are to *adapt, manage or suffer* (Allen 2010). This paper discusses needs and opportunities to adapt and strengthen contingency planning and incident management, in order to reduce the suffering caused by a large waterborne oil spill on affected communities, the public at large, and the incident management team, as well as the environment.

The Oil Pollution Act of 1990 (OPA 90) was passed by Congress following the Exxon Valdez oil spill (EVOS). OPA 90 modified the US oil spill regulatory framework to improve preparedness and response. U.S. oil spill contingency planning is required at the national, regional, and area levels. Area level refers to the geographic jurisdiction of US Coast Guard (USCG) and Environmental Protection Agency (EPA) Federal On-scene Coordinators (FOSCs). For USCG FOSCs, who are Sector Commanding Officers, an Area encompasses coastal waters, inland rivers or lakes under their command, which typically includes multiple counties in one or more states. For EPA FOSCs, Areas represent the inland areas within a Federal region.

Preparedness Needs

Contrary to intention, pollution-driven regulatory contingency plans developed at the national, regional and area levels have some noteworthy gaps in oil spill preparedness and response, especially at the county and community levels.

Following the Deepwater Horizon (DWH) oil spill in 2010, USCG Headquarters developed an Area Contingency Planning Process Job Aid (Landry 2012) to address

preparedness gaps. The Job Aid notes that Area Committees represent the core element of oil spill response planning and preparedness for a local Sector Commander who is also the Captain-of-the-Port (COTP). Discussions and strong partnerships with all stakeholders during the Area Committee process are necessary to inform a plan that, when implemented, will be adequate to effectively respond to a worst case discharge within that specific COTP zone. Further, it states that the ACP development is a collaborative process; one that requires consensus decision-making among all Area Committee members. Oil spill stakeholders encompass the entities and roles in oil spill decision making as shown in Table 1 (Walker 2016). Few oil spill preparedness practices, if any, routinely engage the stakeholders nationwide in italics; this is a gap.

Table 1. Oil spill stakeholders

Stakeholder Group	Examples
Decision makers	Formal authorities in Unified Command, i.e., Federal On-scene Coordinator (FOSC), State On-scene Coordinator (SOSC), and Responsible Party (RP; private or public), National Incident Commander (NIC) Also, when appropriate, <i>Tribal and Local On-scene Coordinators</i> Resource Trustees Compensation providers
Knowledge sources and advisors	Oil spill practitioners and technical specialists (government and industry) Resource managers Energy and marine operators <i>Academia</i> <i>Public health agencies</i> <i>Tribal representatives</i> <i>Others with traditional knowledge (i.e., fishers and marine pilots)</i>
Stakeholders affected by decisions	<i>Local communities</i> <i>Fishers and seafood industry</i> American Indians, other Indigenous peoples <i>Tourist industry</i> Other businesses in the spill area Oiled property owners

	Designated resource managers
	Energy/oil, marine, and shipping industries
Communicators, influencers, and opinion leaders	Media (print, broadcast, and electronic)
	<i>Elected officials and community leaders</i>
	<i>Academia</i>
	<i>Trade associations, e.g., Louisiana Shrimpers Association</i>
	Non-governmental Organizations (NGOs)
	<i>Community health workers</i>
	Social media bloggers/communicators

The italicized stakeholder groups have priorities other than oil spills and lack oil spill preparedness and response as part of their mission. Typically, they don't participate in the regional and area oil spill contingency planning activities. Nevertheless, if affected by an oil spill, their interests and inputs will influence the degree to which a response to a worst case discharge of oil in the coastal zone will be viewed as effective. For example, some number of academic scientists possess detailed field knowledge about coastal habitats and resources, which could be at risk during a specific spill. Having the capability to engage with all oil spill stakeholder groups would cultivate a broad capability to understand, monitor, characterize, and model hazards to more completely inform all levels of preparedness and response decisions. Stakeholder engagement, that is, the process used by an organization to engage relevant stakeholders for a clear purpose to achieve accepted outcomes, should be adapted to include the full range of oil spill stakeholders.

Established regulatory frameworks for preparedness and response omit proactively managing oil spill human impacts, particularly those that are related to personal injury, i.e., stress and behavioral health. The preparedness and response framework in the US National Oil and Hazardous Substances Pollution Contingency Plan (NCP) is top-down, that is, headed by Federal

officials, whereas disaster response in the US under the Stafford Act, or in the UK under the Civil Contingencies Act, is managed at the local level, i.e., bottom-up.

Those affected in a spill area have incident-specific questions and concerns that, when left unanswered, will undermine public support for decisions made during response and contribute to behavioral health impacts (Osofsky, Hansel et al. 2015). Connecting with them could add value to, and support for, the decision process. Therefore, those responsible for spill preparedness and response would be wise to explore novel ways to include the full range of stakeholders in the oil spill preparedness and response process.

Response Needs

During response, the Unified Command (UC) structure of the incident command system (ICS) enables joint decision making in the US by those who have designated authority and jurisdiction as indicated in Table 1. ICS has been the dominant emergency management system for US spill response since the EVOS, particularly after its use was formalized in the 1994 revision of the NCP. ICS is based on military command-and-control (top-down management), and originally was developed in the 1970s following a series of catastrophic fires in California's urban interface. Studies found that response problems were far more likely to result from inadequate management (tactics and resources) than from any other single reason. ICS offers the advantages of common terminology, and effective and efficient domestic incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure. In 2005, Presidential Directive 5 (PD-5) identified ICS as the organization system for all government emergency response throughout the US. Globally for oil spills, industry is promoting an Incident Management System (IMS) which has features similar to ICS (IPIECA 2014).

ICS as taught and practiced does deal well with previously unidentified issues and stakeholder groups, which are typical during disasters and catastrophic events. Since ICS is a hierarchical (vertical) command and control system, derived from managing wildfires, critics say that it has limited ability to mesh well with the horizontal, collaborative way in which many crisis-relevant, issue-driven organizations emerge and operate during disasters—that is, it has weakness in the area of “cultural interoperability”(Waugh, Tierney et al. 2007).

Disaster research literature also tells us that, following major public emergencies, disasters and catastrophes, new issues emerge and new organizations and organizational structures evolve, especially in reaction to impacts on the community and social consequences. Therefore, to be effective, an emergency response organization should be flexible enough to manage by feedback and address emerging problems and ad hoc organizational elements (Quarantelli 1996). Many emergency response management systems like ICS are vertically-structured and oriented toward operational objectives and tactical functions. This means that obtaining input from scientists and other sources of knowledge outside the response organization requires expanding objectives beyond an operational focus. However adaptable and flexible, ICS does not promote horizontal collaboration outside the incident management organization.

The flexibility of ICS allows it to be adapted to accommodate emergence and external stakeholder inputs (Walker, Ducey et al. 1994), but this will likely need the explicit leadership by spill decision makers, i.e., Unified Command, to make such horizontal collaboration a response priority. To be practical, this proactive leadership should occur during preparedness at the area level to identify a procedural space in the ICS organization to collaborate externally during response. The USCG Incident Management Handbook (IMH) serves as the Coast Guard’s operational concept for implementing ICS. The IMH is default guidance for government, as well

as state and industry responders who interface with the USCG in Unified Command. When an incident occurs, people refer to what is familiar and immediately available; important concepts which are absent in those references may not be implemented. The 2014 USCG IMH (US Coast Guard 2014) revision includes some mechanisms for greater external collaboration, specifically in the responsibilities for the Command Staff and the Environmental Unit. However, these elements are omitted from routine ICS training and exercises. Instead, the emphasis in current ICS training remains on operational tactics rather than enabling greater horizontal collaboration with those outside the incident command organization.

METHODS

This article has been developed from a synthesis of the author's practitioner experience with oil spill decision making, response management and stakeholder engagement since 1980; research in oil spill risk communication using the mental models approach; surveys of oil spill practitioners about what constitutes effective response management and community engagement; and a multidisciplinary literature review. To carry out projects, research, and response assignments, journal articles and reports have been reviewed on a wide range of topics. Two recent project practices provide examples of these engagement concepts.

DISCUSSION

Oil spill decision makers, both government and spiller representatives, and their staff have the discretionary authorities to explore possible ways to incorporate new local stakeholders into preparedness and response. Engaging new local stakeholders could reveal innovative scenarios (Leschine, Pavia et al. 2015) and revitalize oil spill exercises which have become rather predictable over the last 20 years. A practical way to leverage relationships with external

stakeholders, both developing and sustaining ones, is to work through organizations that have established networks and are trusted by organizations and communities at the local level.

Preparedness Opportunities

External linkages between communities and government officials and experts are important for obtaining assistance for an affected community. The provision of external resources and knowledge is necessary for communities to adapt and be resilient to environmental changes caused by oil spills (Cheong 2012). Adaptive resilience refers to the capacity of social units, e.g., communities, to overcome crisis-related problems through effort and ingenuity to adapt to the situation. In working with spill authorities and specialists, communities can learn more about aspects that are somewhat certain, dealing with oil spill uncertainties, and what they can do to help themselves and the responders. Furthermore, belief in the validity and trustworthiness of expert knowledge and government-disseminated information hinges upon exchanging knowledge, which best occurs over time. Developing and sustaining these external linkages with oil spill formal authorities and responders should begin during preparedness and be actively used during response. These linkages are especially valuable when they involve trusted relationships.

Current oil spill contingency planning in the US fails to recognize or operate through the local networks that could more effectively enhance inherent resilience (Colten, Hay et al. 2012) and does little to reveal potential impacts on local communities and individuals that are unrelated to direct oil exposure. The only exception in the US is Alaska where OPA 90 required the establishment of two Regional Citizens Advisory Councils (RCAC), funded by industry. However, no other areas in the US have RCACs and Congress is unlikely to establish any others. While the UK has a similar top-down NCP, a notable difference is that the UK addresses

connecting the NCP with local authorities and response plans; plus shoreline cleanup is managed at the local level (MCA 2015, MCA 2016).

During preparedness, local communities could participate in exercises that use storm scenarios as the cause of oil spills. This would enable the integration of emergency response under both oil spill and disaster frameworks, and improve preparedness under both systems (Leschine, Pavia et al. 2015). When sorted out in these exercises, arrangements should be formally agreed upon and included in contingency plans.

The influence of legal teams, claims and compensation regimes, and politics on incident management teams should be addressed proactively, i.e., pre-spill. Concerns about liability tend to discourage and/or prevent addressing community concerns and impacts through engagement during response. Legal teams think ahead to possible negative consequences of sharing information externally and may advise against any information sharing that is not otherwise required. Compensation regimes represent boundaries that define and limit the scope of (1) activities that can be carried out during response, (2) funds to pay for activities during response, and (3) compensation for spill costs and damages not otherwise covered. Under OPA 90, personal injury damages, e.g., stress and behavioral health, can only be addressed through litigation, which has been documented to exacerbate individual and community impacts (Dyer, Gill et al. 1992, Picou and Gill 1996, Picou and Gill 1997, Picou, Formichella et al. 2009, Gill, Picou et al. 2014). Political priorities may also overshadow and even pre-empt the discretionary authority of incident leaders.

Response Opportunities

When is an oil spill response successful? Measures of performance for oil spills have been previously identified through critical success factors (Walker, Ducey et al. 1994, Harrauld

2006) and “best response” (Kuchin and Hereth, 1999). Critical success factors (CSFs) are the set of things that must go right if an operation is to succeed; they are key areas of activity in which favorable results are absolutely necessary. After the *Exxon Valdez* oil spill, the following CSFs were identified by academic researchers based on the collective knowledge of over 100 experienced responders:

1. Minimize spillage and do not interfere with response operations while controlling the source.
2. The immediate response by industry and government must mobilize enough appropriate response resources (people and equipment) to contain most of the oil at /near the source to protect resources at risk.
3. The response organization must be capable of sustaining effective operations until the emergency and the threat(s) to human health and the environment have been resolved.
4. The response organization must be able to communicate and manage information internally and externally (the media and public).
5. Coordination between government and industry must be pre-planned, account for stakeholder interests and ensure a response organization that will be cohesive and effective.
6. The response organization must meet the public’s realistic and achievable expectations for response to the hazard.

CSFs 3-6 encompass linkages with the public, including affected communities. However, these elements have been considered primarily through the lens of responders, and not informed by social and decision science researchers who could expand responder understanding of how to fully achieve these CSFs. Further development of oil spill success metrics were based on the

CSFs which could guide responders toward conducting a “best response” for all oil spills. Key Business Drivers (KBDs) underlie the best response model (Kuchin and Hereth 1999). The best response model has been institutionalized as a part of the USCG doctrine for oil spill response.

Our ability to manage a successful response could further mature if incident management systems are adapted to be more collaborative, per the indicators for organizational resilience (Tierney 2009). Such adaptations add value by setting more realistic expectations about oil spill response, could help close the anxiety gap consistent with meta-leadership principles (NPLI 2010), and lead to improved public stakeholder satisfaction with response.

Stakeholder collaboration, learning about risk perceptions, community networks, and creating new ways to use volunteers are potential socially-responsible strategies to promote community resilience and recovery from an oil spill disaster (Walker, Boyd et al. 2013), and strengthen support for response decisions. Decision makers possess some discretionary authority to consider engaging a broader set of stakeholders, if they can see that the extra effort to engage an expanded set of advisors, communicators, influencers, and opinion leaders, adds value. However, it’s not readily apparent about how to go about adapting preparedness and response systems and define a space for such engagement. Preparedness leaders would need to clearly recognize the value in developing new trusted relationships, and leveraging existing networks within communities or state chapters of professional organizations. Trusted intermediaries, i.e., third parties who have established relationships with a stakeholder or stakeholder group, represent an important bridge between responders and communities. With regard to concerns about human health risks and dispersants, a trusted intermediary is trusted and/or viewed as credible sources of information might be a local pharmacist.

The more the oil spill response community reaches out to build relationships with local communities to enable mutual learning, the easier it will be to effectively transfer knowledge. It's important to develop and sustain relationships to familiarize the community with oil spill practitioners, and for oil spill practitioners to actively learn about community concerns, questions and risk perceptions. In addition to response strategies, incident management teams should collaborate with local networks developed during preparedness to build confidence that the best that can be done is being done for environmental and socioeconomic resources at risk.

Collaboration between response organizations and affected communities can lead to shared objectives, effective information exchange, and the ability capability to manage incident-specific issues. Because incident management systems are inherently flexible, doctrine can be adapted to promote greater horizontal collaboration. However, this will not occur unless Unified Command identifies collaborative objectives as priorities in addition to the tactical/operational objectives.

An Integrated Oil Spill Stakeholder Engagement Process

A proposed new integrated engagement process for oil spill stakeholders is presented in Figure 1. This process facilitates engagement during preparedness with the full range of oil spill stakeholders, i.e., decision makers; knowledge sources and advisors; those affected by decisions; and communicators, influencers and opinion leaders, to support achieving CSFs. The use of this process is envisioned to be initiated pre-spill, and then refreshed during response to address incident-specific issues and emerging stakeholder groups. Existing oil spill preparedness and response frameworks would have to be adapted. Oil spill preparedness and response is driven by environmental compliance, is a collateral duty, and has limited funding to do what is required, let alone do more. Consequently, the author recognizes that such adaptations are dependent on

preparedness and response leaders using their discretionary authority to implement recommended improvements in stakeholder engagement.

The top half of the diagram represents the two-way process of engagement; the bottom half displays the culmination of the process in the form of outputs and value-added capacity for all stakeholders. This is proposed as an iterative process. Its capacity to improve stakeholder understanding of and support for oil spill decisions is achieved when the sequence of activities repeated over time, to gradually expand knowledge and relationships. During response, the process will need to be refreshed, leveraged and adapted for incident-specific conditions.

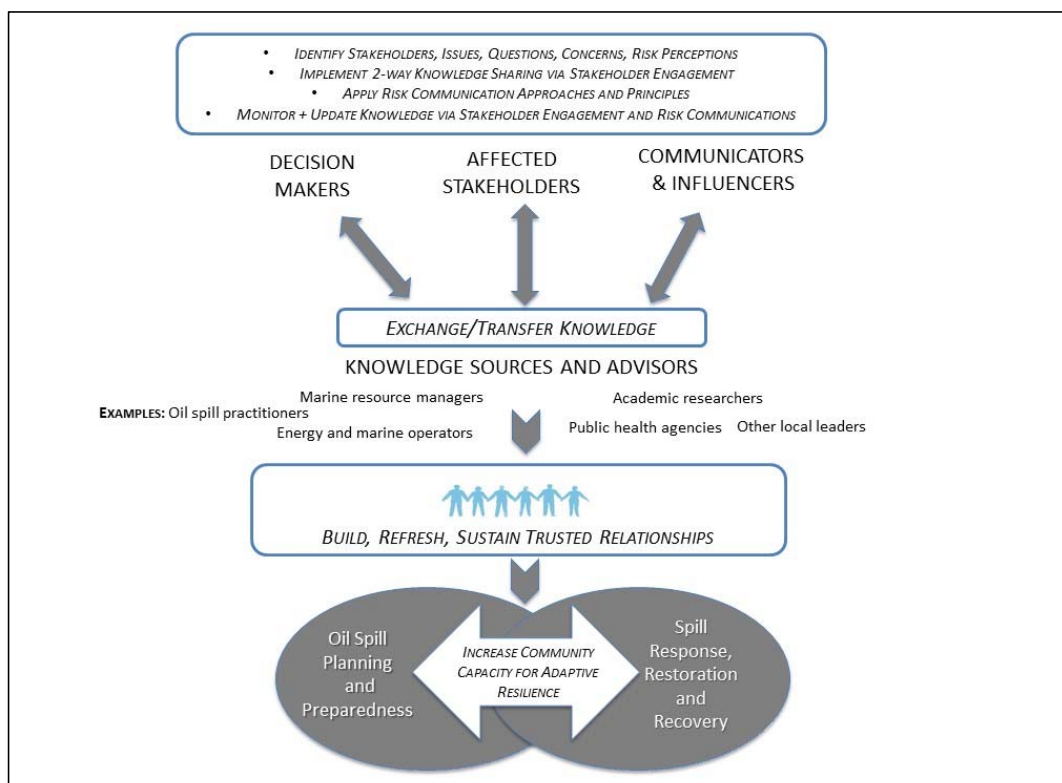


Figure 1. Stakeholder engagement process for oil spills

The process begins by identifying organizations within each stakeholder group for a geographic area. This activity is generally referred to as stakeholder mapping. Deciding who to

include in stakeholder mapping should involve thoughtful discussion, especially with those who could be impacted, and then to identify organizations impacted stakeholders would trust as information sources. Key stakeholder concerns and their performance expectations should be viewed as valid inputs. It also refers to a willingness to provide coherent responses to questions and concerns by communities and stakeholders. After identifying relevant stakeholders, consider general categories of important, controversial spill response issues and identify stakeholder organizations whose missions or interests align with those issues. For example, sharing information with the Centers for Disease Control, state Departments of Health or American College of Emergency Physicians could help address public health questions and concerns about dispersants. Next, screen identified specific organizational or individual candidates according to their willingness to collaborate in mutually-agreed ways. Obvious stakeholders to connect with are local emergency management officials who already have responsibility for emergency preparedness and response, and have established relationships in the community. Other groups whose focus is different from oil spills but could be affected might be local tourism and fishing organizations, community health workers (a network exists worldwide), and scientific associations. Some organizations may be disinterested in mutually-beneficial collaboration if their mission is strictly issue-based advocacy.

With the realities of potential liability and politics, clearly defined boundaries for information sharing should be agreed pre-spill. Boundaries for disclosure is an important condition of engagement and should be established. Transparency and the sensitivities of data and information sharing during response must be recognized. Openness and transparency can strengthen people's trust in government and encourages greater public confidence in decision-making. However, some information generated during a response may be too sensitive to share

for security or legal reasons and therefore must be restricted in its distribution. Information, and its use or misuse, can have significant legal and reputation implications for all those involved in the response. This includes an evolving spill situation as more information and data is gathered. Even though affected stakeholders and the public have questions and concerns, facts about a response situation are fluid. What is thought to be a fact on the first day may change as more is learned about the situation. These are legitimate reasons for not sharing all incident information at all times with community stakeholders.

The next step in the process is to work with stakeholders to define issues of interest, concern and perceptions about oil spill risks; identify appropriate knowledge sources and advisors to address issues; create opportunities to engage directly through two-way dialogue; and finally to share available knowledge about oil spills. Oil spills response is a specialty in emergency response and science, involving specialized knowledge. Through respectful dialogue that allows people to ask questions and express concerns, and by enabling oil spill practitioners to share what they know and/or are doing, a more complete understanding can evolve. When knowledge is transferred both ways through trusted relationships, uncertainty may be easier to manage because stakeholders may be more inclined to give the response organization and leaders some benefit of the doubt. Building those trusted relationships before a spill occurs should be a priority.

The opportunities for preparedness and response engagement can consist of a mix of activities ranging from integrating engagement into meetings as an discussion item, organizing open houses based on the world café method (Fullarton and Palermo 2008), collaborating to develop sets of information materials (both paper and web-based), exchanging information online through social media, and working through networks of trusted intermediaries.

One shortfall of direct one-on-one engagement is limited scale; it's inefficient for reaching large numbers of people. Working through networks of trusted intermediaries, however, makes possible an exponential expansion in the scope of engagement.

Engagement and communication experts recommend monitoring the effects of engagement and evaluating the extent to which the work is successful in achieving objectives, e.g., improving broad stakeholder understanding about oil spills. It's also helpful to articulate and describe the value of relationships developed during engagement, to identify those willing to engage during spill response, define during preparedness triggers for activating preferred ways to connect with those stakeholder representatives in the event of an actual spill, and then to document this information in contingency plans.

Although this process can be applied at a national level, in the author's view, its best value is when implemented at the local level because engagement can help build an adaptive capacity for community resilience during oil spills. Through conversations, especially with community leaders, opportunities can be identified to remedy disconnects between the oil spill (top-down) and disaster (bottom-up) regulatory frameworks, to strengthen preparedness, and enhance both environmental and community recovery.

During response, Unified Command should activate established relationships and, through their networks, learn about the incident-specific stakeholder risk perceptions, questions and concerns. The response organization should establish specific functions to collaborate internally and connect with external networks and assess the situation in relation to risk perceptions of the affected communities and then share information to address incident-specific risk perceptions, questions and concerns.

Example Practices

Elements of this process for oil spill stakeholder engagement have been carried out successfully. Two examples involving the author are offered to illustrate potential opportunities.

The first example is stakeholder collaboration on a recent API-funded Comparative Risk Assessment (CRA) project to examine the complex aspects of response strategies to a well blowout offshore in the Gulf of Mexico, with a specific focus on subsea injection of dispersants at the wellhead. Several aspects were novel about this project: (1) industry funding of a project to evaluating the potential tradeoffs of involving dispersants; previous US consensus ecological risk assessment (CERA) efforts involving dispersants have been government-funded; (2) an approach which integrated three-dimensional modeling, potential exposure to and recovery from oil with and without response strategies on valued ecosystem components in different environmental compartments, with results displayed in an interactive CRA Results Tool; and (3) the establishment of a Technical Advisory Committee (TAC) involving approximately 35 members from a broad range Gulf of Mexico oil spill stakeholder groups representing decision makers, knowledge sources/advisors and communicators/influencers from government, academia, and industry. The role of the TAC was to (1) review the approach and assumptions for the modeling and CRA analyses and (2) contribute to project-related decisions and resolution of potential uncertainties when practical. Presentations were made to the TAC at each step in the CRA process to review and refine inputs, methodologies, and results. Following the completion of the technical work, a workshop was held with the TAC and other invited participants to review collectively the CRA approach and CRA Results Tool, reflect on its value and potential use in oil spill response planning and preparedness. Additional enhancements were also discussed, e.g., more scenarios, sensitivity analysis, further elaboration of potential ecological consequences and

publication of the work in a peer-reviewed journal. This project illustrates the opportunity for significant and meaningful engagement among oil spill stakeholders on a complex issue during preparedness.

The second example involves developing new strategies to engage academia (knowledge source/advisors and influencers/opinion leaders) and the seafood industry (affected by oil spill decisions). Funded by Gulf of Mexico Research Initiative, the Coastal Waters Consortium II (CWC-II), has supported an outreach effort to connect academic researchers to the response community. This project has developed new strategies for institutionalizing engagement with both of these stakeholder networks. Strategies are being prepared for consideration by the New Orleans Area Committee, the Region 6 Regional Response Team, and the National Response Team. If adopted, they will represent new opportunities to implement going forward on an as needed, incident-specific basis.

CONCLUSIONS

New opportunities to collaborate with the full range of oil spills stakeholders through the proposed oil spill stakeholder engagement process could strengthen incident management going forward, by leveraging networks of trusted relationships developed in emergency preparedness among local government, elected officials, and communities. Value added by the oil spill engagement process include:

- Improving the completeness of the decision process when identifying and evaluating the range of potential response strategy risks and benefits to ecological and human systems;
- Facilitating broader stakeholder input to and support for oil spill decisions, especially at the community or local level;

- Improving the ability of the response organization to deal effectively with incident-specific emerging issues and organizations during a response;
- Improving crisis and risk communications about oil spills; and
- Developing the capacity of communities to recover from oil spills through knowledge transfer and stronger working relationships with oil spill practitioners (decision makers, subject matter experts) and other stakeholders.

Relationships and dialogue established during preparedness enable rapid, more effective communications with stakeholders affected by a spill, as well as crisis communications with the public at large, through traditional media, websites, and social media distributed networks that can be identified pre-spill. Collaboration with trusted intermediaries is one way to “get ahead” of incident-specific issues. Trusted working relationships developed pre-spill through mutual respect may reveal novel ways to more effectively address new questions, concerns, and risk perceptions which invariably emerge during response. An ongoing challenge is engaging those whose interest in oil spills is primarily stimulated by an actual spill and not part of their normal mission. For full stakeholder engagement to yield better positive outcomes during oil spills, government and industry leaders with oil pollution responsibilities will need to exercise their discretion to adapt their respective management of oil spill contingency planning.

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