Improving Oil Spill Preparedness and Response in Santa Barbara, CA

A Workshop Report from the National Academies of Science, Engineering and Medicine & Sea Grant Oil Spill Workshop Series

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Introduction

Marine oil spills are detrimental to the marine and coastal environment, natural resources, and the health and economies of coastal communities. In order to address improvements in oil spill response, the Gulf Research Program (GRP) and the Health and Medical Division of the National Academies of Sciences, Engineering, and Medicine hosted a workshop in 2017 in Washington, D.C. entitled, "Preparing for a Rapid Response to Major Marine Oil Spills: Protecting and Assessing the Health and Well-Being of Communities" (Giammaria et al., 2018). The workshop focused on identifying research priorities for improvements in oil spill preparedness and response, with an emphasis on public health and community well-being. This seminal workshop was the catalyst for a series of regional workshops that would aim to collect similar information at the local level.

To carry out these regional workshops, GRP formed a collaboration with the Sea Grant Oil Spill Science Outreach Program and Sea Grant programs across the United States (Alaska Sea Grant, University of Southern California Sea Grant, Virginia Sea Grant, Texas Sea Grant, and Mississippi-Alabama Sea Grant Consortium) to host five regional workshops to identify research needs to improve oil spill preparedness and response with respect to public health, social disruption, and economic impacts. Regional workshops were organized for Alaska, the east and west Gulf of Mexico, Mid-Atlantic and West Coast.

This report documents the outcomes of the West Coast workshop, which focused on Santa Barbara, CA. The Santa Barbara region is characterized by vibrant recreation, fishing and tourism industries, tribal communities, diverse marine wildlife and ecosystems, a National Marine Sanctuary and Marine Protected Areas. Santa Barbara and Ventura counties contain a high density of offshore oil rigs and platforms, and chronic oil seeps and spills from offshore installations also characterize the region. Santa Barbara has experienced two major spills – the historic 1969 oil spill followed by the recent 2015 Refugio spill, which released 4.2 million (NOAA) and 140,000 gallons (*The People of the State of California v. Plains All American Pipeline, LP,* 2016) of oil to the marine environment, respectively. These spills had profound impacts on the local environment and community, and insights gathered from Santa Barbara provide a case study for oil spill response across the broader West Coast region.

In order to organize a workshop that would effectively address local oil spill preparedness and response, University of Southern California (USC) Sea Grant convened a workshop steering committee that included local governmental and non-governmental partners, including Santa Barbara Channel Keeper, NOAA Channel Islands Marine Sanctuary, Environmental Defense Center, California Sea Grant, and Santa Barbara Zoo. The steering committee provided valuable insight and guidance on the workshop structure, agenda, and suggested speakers and invitees.

Participants at the Santa Barbara oil spill workshop

Workshop summary

On April 5, 2019, a workshop entitled "Improving Oil Spill Preparedness and Response in Santa Barbara" was held at the Santa Barbara Zoo Discovery Pavilion. The workshop was attended by sixty-seven participants representing a variety of stakeholders and emergency responders including county representatives and agencies, state and federal agencies, non-governmental organizations, academic researchers, indigenous community representatives, legislative representatives from Santa Barbara county and congressional offices, consultants, and private industry.

The workshop goals were to:
1. Share lessons learned from the 2015 Refugio oil spill
2. Consider impacts of oil spills on public health and socioeconomic sectors
3. Examine opportunities for community involvement in oil spill response
4. Review best practices
5. Improve future preparation

The workshop was structured in two parts to achieve these goals: a morning session was designed to review challenges and lessons learned in the 2015 Refugio oil spill, followed by an afternoon session focused on future improvements in oil spills, with panel discussions and breakout sessions on public communication, oil spill response, monitoring of human health and social dimensions, and a closing panel on oil spill prevention.

The morning session opened with a keynote and land acknowledgment address by Das Williams, First District Supervisor of the County of Santa Barbara, a former member of the California State Assembly and former Santa Barbara City Councilman. Williams emphasized the importance of updating aging infrastructure and adopting the latest technologies to reduce the scale of spills. His talk was followed by speakers who were heavily engaged in 2015 Refugio oil spill response operations from U.S. Coast Guard (USCG), National Oceanic and Atmospheric Administration (NOAA), CA Department of Fish and Wildlife, Office of Spill Prevention and Response (CDFW-OSPR), United States Environmental Protection Agency (EPA), Santa Barbara County Fire, as well as local non-governmental organizations that reviewed lessons learned from the spill, including Environmental Defense Center (EDC), and the Coastal Band of the Chumash Nation.

The afternoon session began with a panel discussion on public communication of risks and volunteer opportunities, with speakers from USCG, CDFW-OSPR, and EDC. The second panel addressed oil spill response with regard to improvements in response operations such as technology, timeliness, personnel, monitoring, sampling, and oil fingerprinting analysis, and these topics were addressed by speakers from USCG, NOAA, Santa Barbara Channel Keeper, and CDFW-OSPR. The third panel addressed monitoring of human health, natural resources, social and economic dimensions, with speakers from the Santa Barbara Air Pollution Control District, UC Santa Barbara Marine Science Institute, CDFW-OSPR, the Coastal Band of the Chumash Nation, and the Wishtoyo Chumash Foundation. Following these panels were breakout sessions on the same topics. The last panel of the day concerned oil spill prevention, with speakers from CA State Lands Commission, USCG, Accufacts Inc., and Santa Barbara County.

Oil spill response needs and gaps identified at workshop

Several recurring themes emerged during panels and accompanying talks throughout the workshop program about needs and gaps related to public communication, sampling and monitoring, data and technology, hazard mitigation and safety, and volunteer training. The following are summaries of the main themes about key topics presented by speakers and panelists at the workshop.

Public communication

The primary needs identified for public communication were more timely communication, better coordination and transparency among emergency responders and media, clearer media guidelines, more centralized information, and multilingual resources. A need for more timely and frequent public communication was a central concern, as lags in communication during the 2015 Refugio spill created informational gaps that caused public frustration and resulted in speculation and circulation of misinformation over the internet and social media. In order to avoid such speculation, it is critical that emergency responders engage immediately and frequently with the media throughout the oil spill response, allowing the media to inform the public in a timely manner. Additionally, concerns were raised that local agencies were constrained in their interactions with the media, and thus media guidelines for oil spills should be established (including rules about topics that can and cannot be publicly discussed, i.e., response vs. investigation) and press conferences held so that media can interface directly with first responders. There should be better coordination and organization among all entities that communicate and engage with communities; for example via an information network that keeps stakeholders, NGOs and the public informed. Additionally, liaison officers should be assigned to coordinate communication among agencies (eg. between Shoreline Cleanup and Assessment Technique (SCAT) teams), and assistant liaisons should be assigned to NGOs so that they report more directly to the public. Such liaisons should also engage with local staff of marinas and harbors to ensure that they are briefed on emergency response phone numbers and procedures for oil spills. In addition, information should be consolidated online through a central website on electronic resources regarding public communication. Daily public communications should be carried out with careful messaging via channels of communication that have been shown to be effective, such as Twitter and Nextdoor. There is also a need for public access to environmental sampling data, which is traditionally kept confidential for Natural Resource Damage Assessment (NRDA) investigations. Finally, communications must be tailored to reach specific demographic groups in the community, via means such as multilingual communications (especially in Spanish) and audience-relevant messaging.

Sampling and Monitoring

Similar to communication, sampling and monitoring efforts require better coordination among entities carrying out these efforts, in addition to establishing baseline environmental conditions before a spill, and resolving issues related to site access restrictions that hinder monitoring efforts. Monitoring efforts by different organizations require better coordination so that resources are not wasted by duplicating efforts. In order to accomplish this goal, partnerships and collaborations for monitoring are critical. Additionally, NGO liaisons should be created so that NGOs can be granted similar monitoring permissions as academic researchers, and community science observations should be better integrated into monitoring efforts. There is also a need for more monitoring and data, as well as a data management system, that can help establish the long term environmental 'baseline' conditions before a spill. Establishing a baseline allows for a more accurate assessment of the environmental impacts of oil spills. Quantifying background oil levels from natural seeps is a critical component of this effort and requires development of better technology and protocols. Finally, strict restrictions on site access during spills hampered monitoring efforts during the 2015 Refugio Spill, as many monitoring entities were forbidden from accessing affected areas, which delayed and impeded monitoring efforts, increased competition for access, and created a 'gold rush' mentality to access these sites once restrictions were lifted. Such restrictions should be reconsidered for monitoring in future oil spills to ensure that important data collection and monitoring can occur after a spill, including updates on fisheries closures.

Data and Technology

Data and technology gaps were centered around the need for technology advancement, better data sharing and creation of databases. Oil spill technologies should be advanced in the following areas: unmanned vessels such as drones and unmanned aviation (differentiation should be made between unmanned aircraft systems (UAS) operations and hobbyists), aerial surveys, Pumas, sensors, night fighting capability, nighttime imaging, technologies that can reduce the scale of spills and access remote locations, and updates to aging infrastructure. In order to develop strategies to advance these technologies, working groups should be formed in addition to response technology evaluation units. In research and development of these technologies, U.S. Coast Guard techniques should be employed in deploying unmanned vehicles and drones. Federal and state agencies and their partners should work together for data management and sharing, and useful data products should be developed after each oil spill to share information, such as which technologies are available for use in spill response. Additionally, databases are needed to track problematic and abandoned vessels, oiled wildlife, and electronic methodologies that can be employed in the field. Finally, there is a need to utilize the best spill trajectory monitoring available, and to identify the best available science by bringing together scientists and experts from academia and government agencies.

Hazard Mitigation and Safety

In the area of hazard mitigation and safety, current needs and gaps relate to early preventative actions, industry pipeline safety, government regulations, and plan updates. Early preventative actions for spills include: fixing small vulnerabilities in pipelines that can cause great damage if overlooked, keeping spills small via better inspection of pipelines (including remote detection capability), addressing infrastructural vulnerabilities, increasing the number of practice scenarios and drills within a year (e.g., Government Initiated Unannounced Exercises (GIUE), Spills of National Significance (SONS)), and increasing general efforts for pre-spill preparation such as additional research and development of leak detection systems and shutoff systems. The oil industry must also take measures to reduce the likelihood of oil spills, such as by actively monitoring and detecting leaks and ruptures, adopting a systems model for safety and accident prevention, and allocating more funding to regulating infrastructure and implementing safety measures. Government regulations can also be improved, as there is a discrepancy in the stringency of inter- vs. intrastate pipeline regulation, resulting in less regulation of interstate pipelines which, as a result, are potentially more vulnerable. Additionally, the operation and safety of pipelines under federal government jurisdiction must be carefully overseen. Finally, plans must be reviewed and updated regularly to facilitate rapid response operations: new information must be incorporated into contingency plans in order to improve them, an area sub-command contingency group should be established to help identify shortfalls, an effective oil spill response plan must be developed (49CFR194 is not adequate), changes should be made to the Incident Command System regarding the Responsible Party in oil spills because the authorization process delays response, better resource mobilization capabilities must be developed since mobilization is limited by time and distance, and fisheries closure communication plans should be developed. There are also needs for facility oil spill contingency plans to identify pathways for potential spills. These include mechanisms to prevent or minimize onshore-to-offshore spills by identifying how to prevent oil from reaching the ocean and how to contain nearshore spills (because the marine Oil Spill Response Organizations (OSROs) cannot get close enough to shore), and effective training and mobilization of small vessel operators such as fishing vessels.

Volunteer and Essential Training

Volunteer training is an important aspect of spill response and there are currently gaps in pre-spill training, education and volunteer resources. One challenge with volunteer efforts emerges from safety concerns related to oil spills, as volunteers are needed but cannot always be engaged due to health and safety liabilities. In order to effectively deploy volunteers when a spill occurs, training and certifications must occur widely before the spill event, especially for non-wildlife volunteer training such as HAZMAT and HAZWOPER trainings. The 24- and 48-hour HAZMAT and HAZWOPER trainings online (and 8-hour refresher courses held once per year) can be utilized by volunteers and tribal communities, and the quantity of required safety outerwear such as HAZMAT suits should be increased to accommodate more volunteers. Finally, resources containing information for volunteers should be widely available and developed in a variety of electronic and non-electronic forms including handbooks, online volunteer databases, and disseminated via partnerships with key NGOs.

Tribal Monitors

Tribal monitors are required experts in spill response efforts, and they should also be included in the planning process for prevention and response. Their inclusion in this process is essential because of their deep knowledge of natural resources, sacred cultural sites and burial sites. However, there have historically been shortages of the required HAZMAT and HAZWOPER training and safety gear for tribal monitors, and a lack of authorization for tribal youth under 18 to participate despite their ability and willingness to do so. Role strain in tribal communities – especially the conflict between the cultural mandate to act as stewards and protectors of natural and cultural resources but the inability to help due to volunteer safety or training restrictions – can cause stress in these communities. Additionally, because indigenous groups are essential to the response process and their involvement is time-consuming, they require more funding from the government or oil industry to participate in the necessary trainings for spill response.

Das Williams presents the keynote address

Panelists discuss lessons learned from the Refugio spill

A panel with representatives from state and federal agencies

Breakout Session Summary

Breakout sessions to address oil spill response needs and gaps included all workshop participants and were held on three topics: 1) public communication of risks and volunteer opportunities, 2) oil spill response with regard to improvements in response operations such as technology, timeliness, personnel, monitoring, sampling, and oil fingerprinting analysis, and 3) monitoring of human health, natural resources, social and economic dimensions. There were two USC Sea Grant facilitators per topic, with roughly 10-12 participants per group that were divided based on their topic of interest. The public communication breakout topic had fewer participants and thus had only one breakout group rather than two.

In each breakout group, forty-five minutes in total were devoted to answering the following four questions about the breakout topic:

    1. What are suggested protocols to include in existing response and regulatory frameworks that would lead to improvements (in public communication/oil spill response/monitoring)?

    2. What pilot project ideas do you have that would lead to improvements (in public communication/oil spill response/monitoring)?

    3. What are research and outreach priorities for improvements (in public communication/ oil spill response/monitoring)?

    4. What resources are available that address improvements (in public communication/oil spill response/ monitoring)?

The following tables (1-4) contain answers to discussion questions by workshop participants in the breakout sessions for each topic: public communication, oil spill response, and monitoring.

Breakout groups are shown discussing different topic areas

Table 1: Suggested protocols to include in existing response and regulatory frameworks

Topic	Suggested protocols	Description
Public communication	Assign (Assistant) Liaison Officer	This officer would communicate directly with the community. Protocols should be established to assign this liaison from the outset of a spill to mitigate "white space" in communication. In addition to assigning an officer, protocols should be established to identify communication tools and resources that can be provided to this officer and key stakeholders that should be included as primary contacts for the liaison officer.
	Establish a communication network that connects all involved parties in spill response	Identify local, trusted contacts for communication with state and federal responders as well as the responsible party, with specific need for tribal contacts. These contacts should be included in the ACP
	Create a Multi-Agency Committee (MAC)	Establish the MAC for firsthand communication and information sharing among city, county, and NGO representatives
	Ensure media access to restricted sites via CA Penal Code Section 409.5(d)	CA Penal Code Section 409.5(d) allows media access to disaster scenes but this is not widely known. Reporters play a key role in keeping the community informed. While safety issues must be taken into consideration, protocols should ensure journalist access to spill sites via CA Penal Code Section 409.5(d)
	Increase speed and accuracy of communications	Ensure that communications between trustees, responders and public are prompt and accurate to avoid misinformation and confusion
	Create an "official" message and social media policy for public outreach and communications	Outreach in the Refugio spill failed, as social media conversations took on a life of their own without an official message about the spill. There is a need to establish a social media policy because the lack of an "official" message creates misinformation and a lack of trust

Table 1 (continued): Suggested protocols to include in existing response and regulatory frameworks

Topic	Suggested protocols	Description
Oil spill response	Identify a place in the Incident Command System for NGOs and other non-agency participants	The current National Incident Management System (NIMS) and Incident Command System (ICS) do not have a logical place within which to include relevant NGOs and other non-agency civilian groups that have a stake in the management of a disaster such as an oil spill. Including them would facilitate communication in the ICS or NIMS
	Convey pipeline locations more clearly	The location of pipelines needs to be more clearly conveyed to public safety agencies and the public
	Incorporate protocols for night operations in oil spills	Often the impact of an oil spill could be significantly reduced if provisions were made in advance for night cleanup and remediation operations. Currently, operations stop during hours of darkness
	Improve positioning of response gear	Pre-positioning needs to be improved but it also depends upon knowing where a spill is likely to occur, especially with respect to the location of pipelines
	Improve rapid response capability	Advance planning is needed to anticipate where the risk of a spill is likely so that responders can quickly reach the scene
	Provide better training for volunteer responders	The public is often interested in helping but if they are to be used, the ICS system needs to include a training component to avoid sending untrained personnel into the field. This is a safety and liability concern for the oil companies as well as the professional response teams
	Build capacity in remote locations	Build capacity in remote areas by ensuring emergency response gaps are filled, and enabling and equipping communities to be part of the response

Topic	Suggested protocols	Description
Oil spill response	Improve technology and clean-up equipment to reduce response time	Response time is important – tidal zones, wave action, and other physical processes impact the ability to respond in a timely manner. Technology and cleanup equipment must be improved to overcome factors that slow response
	Update the Area Contingency Plans (ACPs) to address biosecurity and invasive species	Response equipment and methods could carry invasive species and other biological threats to natural habitats. The cost of treating oil-contaminated areas increases when natural habitats are also threatened by biological agents. The National Park Service has a plan for invasive species but it should align with local ACPs – there is a need to plan ahead of incident for these threats via discussions and partnerships, and to determine whether plans are implementable
	Assign third party observers to monitor response protocols during and after response	Third party should be neutral and not associated with government or responsible party. The community should also be given access to the response via these third parties
	Make pre-spill determination of which groups can access restricted sites	Vetted groups that can access the spill site for diverse functions must be identified pre-spill
	Conduct spill drills using new technologies and partnerships	For example, use drones that incorporate Federal Aviation Administration (FAA) and air space access
	Develop wildlife protocols for volunteer efforts	Develop wildlife protocols, updated regularly, that include trained volunteers that can carry out functions such as collecting evidence and treating animals
	Develop oil fingerprinting and data sharing protocols	Oil fingerprinting methods need to be streamlined to one standardized method and data must be more accessible to agencies that need fingerprinting data. The expertise in this area needs to be expanded

Table 1 (continued): Suggested protocols to include in existing response and regulatory frameworks

Topic	Suggested protocols	Description
Oil spill response	Reduce pollution associated with technology and cleanup equipment	While technology for spill cleanup is important, some of these technologies can introduce additional pollution to spill sites. It is important to create cleaner technologies
	Ensure that private property and jurisdictional issues do not hamper response	During Refugio, access restrictions related to property ownership and jurisdiction slowed and hampered response efforts. Provisions should be made in protocols to address these issues for future spills
Monitoring	Determine access rights to affected sites for monitoring, observation and research during a spill	Given that monitoring and data collection is necessary during a spill, protocols must be developed to allow access to restricted spill sites for monitoring and research efforts
	Include local tribal governments in protocols and regulatory frameworks	Tribal notification and consultation are required for protocols and regulatory frameworks
	Ensure that communities dependent on coastal resources are provided for if these resources become depleted or unsafe for consumption due to spill	For tribes and local subsistence communities that are dependent on marine resources for food and livelihood, there must be a plan to provide for these communities if resources such as fisheries close. These closures can have long-term cultural and spiritual impacts on these communities
	Increase funding, capacity, and inclusion of tribal governments	Tribal communities must be included in response plans and efforts
	Create geographic response strategies in area response plans	Due to demographic differences by geographic region, specific plans should be developed to address regional needs
	Include psychological first aid in response protocols	Psychological aid services are necessary for affected communities at the onset of a spill. For example, role strain in tribal communities causes psychological stress

Table 1 (continued): Suggested protocols to include in existing response and regulatory frameworks

Topic	Suggested protocols	Description
Monitoring	Create an Area Committee Task Force on tribal inclusion	An Area Committee Task Force is needed to engage tribal governments or representatives; the state of Washington provides an example
	Codify access rights to spill sites for tribal governments in ACPs	Given that many spill sites may overlap with tribal cultural landscapes, traditional villages, and sacred sites, tribal representatives should be given access to sites affected by spills that are otherwise closed to members of the public
	Ensure that tribes are in charge of sensitive data on tribal heritage sites	Tribal communities do not want unauthorized parties to trespass on their village sites and therefore would like this information to be private and to be in charge of information on these sites and distribution of this information. However, they would like to raise awareness of traditional village names and locations to response workers so that responders have an increased awareness of the extent to which tribal sites are affected by the spills and where tribal communities consider home
	Standardize data acquisition and processing methods	Standardizing methods will ensure that people in different places are carrying out consistent methods and producing comparable data
	Develop protocols for training and certifying citizen/community based science volunteers for monitoring and data collection	A verification process is needed to trust the quality of citizen/community based science datasets
	Beach cleaning and monitoring should be carried out consistently before oil spills	Beach cleaning and monitoring should occur before active sheen hits shorelines

Table 2: Pilot project ideas

Topic	Pilot project	Description
Public communication	Provide information to public-facing organizations and agencies to make sure that information reaches the public	State/county/local representatives that interface with the public (eg. lifeguards, fire staff, parks staff) should be given information to act as messengers between emergency responders and public
	Create a volunteer handbook that is readily available on the relevant website	Provide access to a volunteer handbook on a regularly updated central website so that information is consolidated and easily accessible to interested volunteers
	Create an online volunteer database	An online volunteer database can provide information to trained volunteers in the event of a spill and also allow emergency responders to contact them for volunteer efforts
	Provide pre-spill training for volunteers	Facilitating volunteer training before the next spill would encourage rapid deployment of volunteers at the time of the spill. While there is concern about the cost and accessibility of training, 24- or 48-hour trainings are usually feasible
	Share information with public in advance of spills and release up-to-date information about ongoing response efforts	While television still appears to be the most popular source of information and the media may not find all information newsworthy, important information can still be shared by interested organizations or through platforms such as Nextdoor
	Provide video information on oil spill response	Video information could assist the public in understanding how to volunteer in oil spill response (in the past this was referred to as "Oil Spill 101"). Advance knowledge would greatly speed training for volunteers working on a spill

Table 2 (continued): Pilot project ideas

Topic	Pilot project	Description
Public communication	Establish a dedicated recruiter or figurehead to educate people during a spill event	Employ multiple strategies to inform public, such as talking to people on the street and through organizations. Identify a person capable of organizing events to invite a trained communicator to share trusted information
	Connect aspects of the HAZWOPER training with public communication	In the HAZWOPER training, the health and safety of the individual is emphasized; some of this information should be communicated in public promotional materials
	Utilize advertising and marketing sectors to help frame communications about the affected community in a positive light	There is a need to cast the affected community in a positive light after disasters so that people are not deterred from visiting. The narrative should be shifted from negative ('this whole area was impacted and it was bad') to positive ('this area was impacted, is now in recovery mode, and still a great place to visit')
	Leverage social media and associated web or mobile platforms to create a communications consortium and a unified public service announcement about the affected community	A unified public communications effort that consolidates governmental and non-governmental organizations (all groups involved in spill recovery efforts) should be developed. This sort of unified message provides a strong communications tool, deflects misinformation, and can create better exposure for tourism
	Use tourism activities (i.e., cruise ships) to help change perceptions about a community post spill	Exposing visitors to a recovered area via cruise ships or other tours would help elevate public perception of the location and combat negative perceptions associated with a spill

Table 2 (continued): Pilot project ideas

Topic	Pilot project	Description
Oil spill response	Expand participation in ICS drills to include NGOs, tribal representatives, coastal volunteer organizations	By including these groups, especially coastal tribal monitors, response can avoid damage to tribal traditional territories and sacred sites
	Advance information on existing oil production and transmission facilities	Maps that locate transmission lines should be readily available to help reveal whether a spill is from a seep or a pipeline leak and so that indigenous peoples can be aware of risks to sacred sites
	Expand the use of remotely operated technology to collect information about the extent of an oil spill	Sending out remote vehicles to assess the impact of an oil spill may be cheaper, easier and safer than sending personnel, especially in assessing the impact of the spill in an ocean environment
	Develop safer nighttime operations by reducing manpower with technology	To avoid danger and reduce safety risks at night, create and use technology that can replace or reduce manpower
	Create audience-specific training programs	Cater trainings to different networks, organizations, and groups such as tribal partners, contractors, and volunteers. Leverage existing organizations such as Coastkeepers to carry out this effort
	Use Santa Barbara oil seeps as a testing ground for emerging oil spill remediation technologies	Natural seeps in Santa Barbara provide a system in which to test emerging remediation technologies without introducing additional oil to the marine environment
	Use decommissioned rigs to deploy oil spill response equipment	Given that many rigs are becoming decommissioned, it would be beneficial to take advantage of the physical structure of these rigs to stage oil spill response equipment during oil spills
	Use spills of opportunity to test out new approaches	Would need an advocate in Unified Command to enable this

Table 2 (continued): Pilot project ideas

Topic	Pilot project	Description
Monitoring	Find ways to build relationships within the community to increase cohesiveness and bring down institutional walls	Explore ways to bring people together in non-crisis mode and share stories in order to build relationships and increase trust within the community. Agencies are often restricted in what they can say during emergencies, so it is helpful to come together as people first and put institutional affiliations in context – i.e., to contextualize personal interests in the type of work carried out by their agency or organization
	Create more public facing roles for agencies	Find ways for agencies to more proactively engage with public
	Convene community educational workshops	Have organizations and agencies educate people about their organization's missions, roles and work. There is a need for agencies to proactively bring down their walls and reach different populations by telling them what they do in their community
	Prioritize interdisciplinary projects that cut across health, social, and cultural arenas	As many oil spill impacts are intertwined and affect multiple sectors simultaneously, there is a need to think about these issues in an interdisciplinary manner
	Hold discussion-based exercises for agencies and communities	Bring groups and agencies together to identify gaps and commonalities in their work. Additionally, listen to communities to hear their needs and perspectives. This can serve as a way to build relationships and collaborations. An example of this type of process is the Community Air Protection Program

Table 2 (continued): Pilot project ideas

Topic	Pilot project	Description
Monitoring	Ensure inclusion of each tribal government in decision making in a sovereign and independent manner	Consult tribes and address tribal needs and interests regarding cultural sites, assets, and resources. Multiple local tribes have overlapping tribal territories. Each tribe is an independent, sovereign government with its own representatives. There is no single representative that speaks on behalf of all of the tribal entities collectively. Engagement with each tribe is independent of engagement with the others
	Leverage and expand existing efforts of current citizen/ community based science projects to establish 'baseline' environmental conditions	There is a need for baseline data before the spill event to detect change and measure the magnitude of the impact. Using citizen/ community based science helps includes people as part of the process from the beginning and can fill in gaps from other long-term monitoring efforts (e.g. Santa Barbara Channel Keeper, MARINE, PISCO, ReefCheck, LiMPETS). Having robust community science programs can increase documentation and understanding of pre-spill conditions. For instance, taking and cataloging photographs over time can contribute baseline data. High quality coastal baseline monitoring programs and citizen science operations offer great benefit to the community and to the environment (e.g. BeachCOMBERS). These efforts require long-term and sustainable funding sources
	Link long-term monitoring projects to Natural Resource Damage Assessment (NRDA)	Find ways to make long-term monitoring data usable for NRDA assessment and for the eventual determination of mitigation requirements

Table 2 (continued): Pilot project ideas

Topic	Pilot project	Description
Monitoring	Coordinate across groups that carry out air and water quality monitoring	Air and water quality monitoring are interconnected and need coordination among groups carrying out monitoring efforts (e.g. RWQCB, CARB, local health departments/agencies, etc.)
	Create programs to help train volunteers with each agency	Leverage current relationships, communication channels and outlets for pre-spill volunteer involvement and training
	Design community science programs that incorporate local and indigenous knowledge	Indigenous people and locals working in the environment have a deep knowledge of the natural environment and their contributions and input are incredibly important for enhancing community science and monitoring efforts. Thus, local and tribal knowledge and community science efforts are complementary and efforts to collaborate should be pursued
	Expand a program like Fisherman's Oil Spill Response Team (FORT) to all ocean users, not just fishermen	It would be helpful to expand the pool of knowledge from just fishermen to all ocean users (surfers, boaters, tribes) to better understand the incident and environment, and coordinate response efforts. For example, Washington has a Vessels of Opportunity program which is a volunteer vessel program for oil spill cleanup
	Expand the use of "smart" technology for field data collection at oil spill sites	Smart technologies that are traditionally used for other purposes should be adapted to collect data

Table 3: Research and outreach priorities

Topic	Research/Outreach priority	Description
Public communication	Create a network of similar contacts	Connect organizations that are doing similar work
	Develop "official" preapproved messaging and talking points for public communication	In the past, waiting for talking point approval creates a delay in communication and creates a "white space" in communication. This communication delay and the absence of an official message can lead to circulation of misinformation. Public information gaps need to be addressed within Unified Command (e.g. USCG can activate a Public Communication team) and from outside; these measures are necessary to combat misinformation and to demonstrate to the public that action is being taken to address the spill. A multi-lingual template that includes topics to be addressed in media communications should be developed in advance of a spill
	Host an "open house" event for public communication about oil spill	An open house should be developed for the general public where questions about the spill can be answered. A tabling setup has been shown to be an effective communication tool in past disaster events (e.g. Hawaii volcanic eruptions). Events like this can be organized by local government officials who are not working on spill response to reduce the operational burden on first responders. A guidance document to outline measures and steps to incorporate for town halls and open houses should be developed. The USCG public communications team should also be involved
	Create mechanisms to hear the needs and perspectives of communities	Sit down with communities to listen to their concerns, needs and perspectives. The Community Air Protection Program provides a model for this kind of discourse

Table 3 (continued): Research and outreach priorities

Topic	Research/Outreach priority	Description
Public communication	Create a guidance document for convergent volunteers	For convergent volunteers that show up unannounced to assist with disaster response, a guidance document can provide them with critical information so that their help can be utilized without distracting responders. The county and state are familiar with experts on this topic and can work with them on developing this guidance
	Expand public information about the non-wildlife volunteer plan	The non-wildlife volunteer plan contains procedures and protocols necessary for the potential use of volunteers to assist in a capacity other than the aiding of wildlife during a marine oil spill. This program, managed by the US Coast Guard, could be of more utility if the public knew more about it
	Research the most effective local communication and outreach strategies during response	Different challenges exist based on local geographies. (e.g. sometimes cell phones don't work). Set up ad-hoc communications to evaluate approaches and determine what is needed in each region
	Develop site and demographic-specific messaging	Identify groups that need to be informed and how. Include multi-lingual resources
	Conduct a network analysis to understand the most economical way to engage people	This analysis can help identify what is the best "bang for buck" in engaging people
	Create cell phone and text-messaging lists regarding spill communications	Because of constant turnover of personnel during spills, these contact lists will need to be updated daily
	Create emergency banners on websites to provide emergency warnings	In addition to other means of communication (i.e. text message alerts), warning banners should be provided on websites, major browsers and search engines
	Create a mobile app for emergency warnings	A mobile app for oil spill emergency warnings should be created, similar to an earthquake warning app

Table 3 (continued): Research and outreach priorities

Topic	Research/Outreach priority	Description
Public communication	Conduct research to better understand the public perception of safety concerns following a spill and how to best communicate what are real vs. perceived threats	Following a disaster, there is a need to understand and address the public perception of safety. This is a public relations problem that needs to be addressed both within the community and beyond, because it affects the overall perception of a community and can impact tourism. Entities such as local chambers of commerce should develop public relations strategies to combat misperceptions of danger because these can detrimentally impact tourism and the local economy
	Increase outreach to communicate when the areas affected by the spill are considered safe for use	When the affected coastline is safe for access and use, this information needs to be communicated clearly and widely. This can dispel fear and uncertainty in public perceptions of safety, and encourage public recreation and tourism in these places
	Expand the use of social media and range of topics discussed over social media	Better use of social media can assist in keeping the public informed about topics such as the status of an oil spill remediation incident
	Expand pre-spill communication with stakeholders	Pre-spill communication with stakeholders should be increased by sharing information that would allow an ICS command center to be more rapidly established
	Improve the existing hotline for oil spill information	The hotline can be improved via coordination with local partners and agencies
	Communicate opportunities for volunteer training widely	Volunteer training costs money and while some training is available online, many people are not aware of available training until an incident happens, at which point it is too late

Table 3 (continued): Research and outreach priorities

Topic	Research/Outreach priority	Description
Public communication	Provide resources for multi-lingual and visual/auditory impaired audiences	Information and materials should be provided in forms accessible by visual/auditory impaired individuals and in relevant predominant languages, especially Spanish. Translate existing online resources into multiple languages
Oil spill response	Develop technology to facilitate retention of oil spilled within the surf zone	Oil in the surf zone is a particularly difficult remediation problem because of the dynamic environment. There is a need to advance our skill at recovering oil in that location
	Create an oil fingerprinting kit that can be deployed in the field to discriminate between oil from a natural seep and oil leaked from a pipeline	Oil fingerprinting is routinely done but most often in laboratories far removed from the spill, imposing delays that impede response plans. Fingerprinting often can have a distinct impact on the strategy for containing a spill, and a field kit that could diagnose the source of oil would reduce delays
	Identify suitable locations for an ICS command center in advance of need	In areas where oil is found, identifying locations for a command center in advance of need will facilitate rapid response to a spill
	Determine what training, assets, and equipment should be provided to first responders before a spill happens	In past spills, some emergency responders did not have the appropriate certification, equipment, assets, or ability to acquire them at the time of the spill. Thus, these provisions should be carefully planned for and acquired before a spill
	Expand funding for tribal monitors Hazardous Waste Operations and Emergency Response (HAZWOPER) training	HAZWOPER training for tribal monitors, which is managed by the Occupational Safety and Health Administration (OSHA), would ensure the availability of a sufficient number of tribal monitors required in oil spill response and cleanup

Table 3 (continued): Research and outreach priorities

Topic	Research/Outreach priority	Description
Oil spill response	Expand funding for volunteer Hazardous Waste Operations and Emergency Response (HAZWOPER) training	HAZWOPER training for volunteers, which is managed by the Occupational Safety and Health Administration (OSHA), could greatly advance the ability of the public to assist in an oil spill
	Expand financial support for Fishers Oil Spill Response Team (FORT)	Fishers can assist in deploying oil retention booms as well as using their knowledge about the coastline to assist others in collecting oil that has escaped into the marine environment. However, the fishers who assist in a spill in this way are often not compensated for their time and fuel. Thus, increased funding for FORT could help strengthen the capacity of this effort
	Enhance oceanographic technology	Smart buoys and current profilers that can be quickly deployed when oil reaches the water should be a part of the pre-positioned gear for responding to such a situation. New technology makes this gear cheaper and easier to deploy and use. The information provided by this equipment can greatly assist in predicting the migration of a marine oil spill
	Improve the state of the art for mechanical recovery of oil	There is a need to improve oil recovery technology and reduce the environmental impacts of clean up and removal technologies
	Investigate the impacts of non-floating oils	It is important to investigate the ecological impacts of oil in sub-surface marine environments
	Create training programs for using remotely operated technologies in spills	More training is needed in the use of remotely operated vehicles and technologies for managing marine oil spills

Table 3 (continued): Research and outreach priorities

Topic	Research/Outreach priority	Description
Oil spill response	Identify tasks for volunteers that do not require HAZMAT/ HAZWOPER training	Safety is often an issue that prohibits use of volunteers in cleanup operations, but there are other response-related tasks that could use volunteers (for example, laundry for first responders, food preparation, etc). People should be appointed to these tasks ahead of the incident. However, communications should not be one of these "general tasks" because messaging needs to be controlled to avoid misinformation
Monitoring	Create a smartphone app for geotagged evidence collection	A mobile app with geotagging capability will facilitate collection of location-specific data and observations through a centralized medium by a wide range of users across geographic locations. This will increase capacity for data collection and enable documentation of spill extent
	Develop a community drill for oil spills	Similar to earth quake drills (e.g. "Great ShakeOut"), a community drill to practice oil spill response should be developed and implemented
	Need research and outreach on and for remote communities	Human health and safety need to be accounted for in remote communities hours away from emergency response. First responders must be able to reach these communities and bring them to safety
	Need an ongoing funding mechanism in place for safety training for oil industry	To prevent the likelihood of large-scale disasters, it would be beneficial to have an ongoing, funded program to train oil industry employees on pipeline and operations safety so that employees are aware of risks and trained to help in emergencies when spills occur

Table 3 (continued): Research and outreach priorities

Topic	Research/Outreach priority	Description
Monitoring	Need ongoing funding for volunteer training	It would be helpful to have an ongoing funding source for post-spill volunteer training, for people to help out in whatever capacity possible given safety limitations
	Conduct outreach early and often with tribal partners	Fostering relationships with tribal communities builds trust, which is important in spill response efforts
	Conduct more research to advance oil fingerprinting technologies	There is a need for better oil fingerprinting techniques that can more accurately identify different sources of oil. This is necessary not only to identify the source of oil in a spill but also to distinguish oil from the background natural seep versus the spill
	Need an ongoing annual monitoring effort and dataset on baseline oiling from natural seepage	There is a need to better understand how much background oil seepage is occurring naturally to be able to determine the magnitude and impacts of spills
	Implement in-kind mitigation to clean up all oil detected at a spill site, even when it includes natural seepage	Even if fingerprinting techniques can detect that some oil at a spill site is from natural sources, it is beneficial to clean up all oil found at the site
	Conduct an oil weathering study to determine degradation rates associated with different sources of oil	An oil weathering study is necessary to understand degradation rates of different sources of oil. This information can better determine the source of oil (i.e. natural seep vs. spill) and inform the environmental persistence of different oil sources
	Conduct a regional audit of culverts to determine where they are located in relation to pipelines	An audit of culverts will help determine where are they in relation to pipelines and where oil would flow in the event of a spill
	Conduct a vulnerability assessment of pipelines	A vulnerability assessment of pipelines will help identify drainage areas, vulnerable tipping points and triggers, and where sensors could be placed to most effectively detect spills and alert responders

Table 3 (continued): Research and outreach priorities

Topic	Research/Outreach priority	Description
Monitoring	Conduct studies to understand drainage areas that are most vulnerable to oil spills and create mechanisms to immediately stem the flow of oil	Need to understand which drainage areas would be impacted in the event of an onshore to offshore spill, and create infrastructure that allows one person to stop the flow of oil by closing a pipe or culvert. Immediately stopping the flow of oil from land can drastically reduce the scale of a spill by preventing the flow of oil to the ocean
	Conduct spatial mapping of human health data to determine pre-spill public health baseline patterns	Using data and monitoring resources of the CA Department of Public Health, it would be useful to carry out spatial mapping of public health data to better understand pre- and post-spill public health patterns. Pre-spill data can be used as a 'baseline' for the state of public health prior to a spill, and can be compared to post-spill data to better assess public health impacts of spills. Additionally, CA State Lands Commission has spatial information of oil facilities and infrastructure, which can be overlaid with health data to help inform the relationship between oil industry impacts and public health
	Conduct more research on whether environmental and human health are impacted by oil facilities	There is currently a lack of information about the impact of oil facilities on environmental and human health
	Utilize traditional and local knowledge of ocean and coastal ecosystems via ocean user communities such as surfers, fishers and tribes for ecosystem baseline data	These user groups all have a deep knowledge of the local waters and natural resources, as well as data, and can serve as good sources of information on the baseline state of the system before the incident (See *Traditional and Local Knowledge: A Vision for the Sea Grant Network*, 2018)

Table 3 (continued): Research and outreach priorities

Topic	Research/Outreach priority	Description
Monitoring	Monitor and establish pre-spill baseline environmental conditions, and develop metrics to measure impacts of spill	There is a need to establish baseline conditions for many types of environmental monitoring (water quality, air impacts, pollution monitoring, biology/ecology) so that the environmental impacts of the spill can be understood. Additionally, quantifiable metrics should be developed to assess the impacts of spill in comparison to the baseline conditions
	Analyze pre-and post-spill data from mobile apps that document species to assess the effectiveness of these apps as monitoring tools	Citizen/community based science data collected by mobile apps such as iNaturalist that collect geotagged species data need to be vetted for their accuracy and compared to other monitoring datasets. If the data is consistent with other monitoring efforts, these apps can be used as trusted and effective tools in citizen science monitoring both pre- and post-spill
	Gather data from traditional tourism and user group surveys to understand most popular tourist activities and destinations	Tourism and user group surveys can be used to better understand information such as why people visit, what they are most willing to spend money on, and what activities they enjoyed most. This information can help inform post-spill recovery and communication efforts for tourism
	Train and educate younger age cohort for cultural monitoring	Cultural monitors from tribal communities often age out of this role, thus younger people need to be educated and trained
	Coordinate on-the-ground monitoring efforts	There has been a lack of coordination in monitoring efforts, often with a lack of awareness of which groups are involved in monitoring. This results in redundant efforts by multiple groups that could be better coordinated for more efficient, effective and collaborative monitoring

Table 3 (continued): Research and outreach priorities

Topic	Research/Outreach priority	Description
Monitoring	Conduct more monitoring of pipeline technology as a preventative measure for spills	Involve a nonbiased, nongovernment third party entity to regularly monitor and audit pipelines for safety. Find ways for the community to also be involved in this effort
	Develop less prohibitive strategies for closing access to spill sites for groups that need access to the site	Closing public access to spill sites for extended periods of time had negative impacts on fishers, researchers, tribal communities and NGOs during the Refugio spill. These closures impeded monitoring efforts, fisheries operations, and important activities. Special exceptions should be made for these groups to access spill areas
	Find the most effective ways to share data among governmental agencies, NGOs, academia, jurisdictions	Data exists but needs to be shared in a more meaningful way. Coordinate among organizations to standardize formats, programs, and databases to best enable data sharing
	Incentivize involvement by oil industry in monitoring efforts	The oil industry needs to be involved in conversations and efforts regarding baseline monitoring. These monitoring efforts are in their interest too, as better data of spill impacts can potentially reduce their clean-up costs
	Establish standards and metrics for acceptable air quality and pollutant levels before spills	Standards for acceptable pollutant levels must be established pre-spill in order to have preapproved public health messaging in the wake of a disaster
	Determine metrics for economic impacts of spills	In trying to understand economic impacts to fisheries, business, shipping, recreational and commercial sectors, there needs to be a pre-established methodology for assessing impacts and a designated party that would assess these impacts

Table 4: List of available resources

Topic	Resource	Description
Public communication	Bucket Brigade Network	An organization that responds to natural disasters and community crises through volunteer training, coordination and deployment
	List of contacts from prior spills in the region	Email contacts of those involved in oil spill preparedness and response are often maintained by agencies, and these lists should be updated and utilized for future spill events
Oil spill response	Sea Grant Programs	Use Sea Grant resources, especially extension and outreach professionals, to train stakeholders in the use of the Incident Command System. Since Sea Grant Extension has strong ties to the stakeholder population, it could and should be used as a training resource to help their clients learn how to participate in the ICS system. Sea Grant programs are also closely connected with academic researchers and community/citizen science efforts.
	Fishermen's Oil Response Team (FORT)	Commercial fishing vessels and crews that are trained and deployed in cleanup efforts
	Vessels of Opportunity (VOO)	Boat owners that have oil recovery training can aid in response
	Community Emergency Response Team (CERT)	Local volunteers can help with community efforts based on need, such as traffic control, search and rescue, etc.
	Hazardous Waste Operations and Emergency Response (HAZWOPER)	OSHA's HAZWOPER standards establish health and safety requirements for employers engaged in hazardous waste operations, as well as responses to emergencies involving releases of hazardous substances

Table 4 (continued): List of available resources

Topic	Resource	Description
Oil spill response	CA State Lands Commission	CA State Lands Commission manages four million acres of tide and submerged lands and the beds of navigable rivers, streams, lakes, bays, estuaries, inlets, and straits. CA State Lands Commission protects state waters from oil spills by providing protection of the marine environment at all marine oil terminals in California and offshore oil platforms and production facilities
Monitoring	American Indian Health and Services (AIH&S)	Addresses cultural, health and environmental issues. Culturally connected to Santa Barbara
	Wishtoyo Chumash Foundation	Wishtoyo preserves the Chumash culture and links traditional knowledge of its maritime peoples with present-day environmental issues
	Beach Coastal Ocean Mammal and Bird Education and Research Survey (BeachCOMBERS) Project	Beach survey program using trained volunteers to survey and collect data and samples of beached marine birds, mammals and oil
	Multi-Agency Rocky Intertidal Network (MARINe)	MARINe focuses on intertidal habitat monitoring
	The Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO)	Long-term scientific research program led by four core campuses: Oregon State University, Stanford University's Hopkins Marine Station, UC Santa Cruz, UC Santa Barbara
	Long-term Monitoring Program and Experiential Training for Students (LiMPETS)	LiMPETS is a community/citizen science program for students, educators and volunteer groups, focused on monitoring the coastal ecosystems of California's national marine sanctuaries, including sandy beach and rocky shore habitats

Table 4 (continued): List of available resources

Topic	Resource	Description
Monitoring	ReefCheck	ReefCheck trains thousands of citizen scientist divers who volunteer to survey the health rocky reef ecosystems and kelp forests along the entire coast of California. The results are used to improve the management of these natural resources
	Santa Barbara Channel Keeper	A grassroots non-profit organization whose mission is to protect and restore the Santa Barbara Channel and its watersheds through science-based advocacy, education, field work and enforcement. Channel Keeper runs a number of citizen science monitoring programs such as stream and creek monitoring
	CA Coast Keeper Alliance	Unites local Waterkeeper programs to maintain swimmable, fishable and drinkable waters in California communities and ecosystems
	California Air Resource Board (CARB)	CARB is responsible for monitoring the regulatory activity of California's 35 local air districts
	Community Air Protection Program	California Air Resources Board (CARB) established the Community Air Protection Program to reduce exposure in communities most affected by air pollution. The aim of the program is to prioritize air quality improvements in California's most polluted communities through enhanced monitoring, deployment of cleaner technologies and expanded community participation
	Santa Barbara County Air Pollution Control District	Air quality monitoring for Santa Barbara County
	Regional Water Quality Control Board (RWQCB)	The nine regional water quality control boards in California regulate water quality and exercise rulemaking and regulatory activities by basin

Table 4 (continued): List of available resources

Topic	Resource	Description
Monitoring	Snapshot Cal Coast	An annual citizen science initiative by the California Academy of Sciences to document coastal biodiversity. Photographs of coastal organisms are taken by community members and uploaded to the iNaturalist app
	iNaturalist app	A citizen science mobile app developed by the California Academy of Sciences with geotagging capabilities that is used to document and identify species. Other citizen science naturalist apps include eBird and Whale mAPP
	Geographic Information Systems (GIS)	Use GIS to make maps and mapping products related to information such as natural resources, pipeline locations and infrastructure, and spill extent
	Sanctuary Aerial Monitoring and Spatial Analysis Program (SAMSAP)	SAMSAP is an ongoing long-term aerial monitoring program that collects data on vessel and visitor use patterns and cetacean populations within the Channel Islands National Marine Sanctuary. SAMSAP provides data for management, research, and emergency response needs
	Universities	Researchers and experts from local universities are engaged in research and monitoring efforts (Eg. UC Santa Barbara Marine Science Institute and Bren School, CSU Channel Islands) and likely have valuable baseline data

General summary & conclusions

In addition to the specific research needs and recommendations that emerged from the breakout sessions, a repeated, overarching theme that emerged from the workshop was the need for building better relationships and trust across different agencies and stakeholders within the community before a spill event, so that response and recovery efforts are better coordinated when emergencies occur. Relationship building can be achieved via working groups, partnerships, liaison officers, task forces with state and federal involvement, sharing of contact information, and other mechanisms that convene and connect agencies and stakeholders in the community. Through better community engagement and leveraging of expertise across agencies and stakeholders, a more coordinated response effort can be achieved. There is especially a need for more inclusion of and relationship building with tribal groups, in several key ways: by increasing presence of the indigenous community in response efforts; including their deep knowledge of the natural environment, cultural resources and sacred sites in response efforts (see *Traditional and Local Knowledge: A Vision for the Sea Grant Network,* 2018); and generally forming stronger working relationships among agencies and tribal governments. All coastal tribes should be included in these efforts whether or not they are recognized by the state or federal government. Finally, there is a need for stronger public accountability and involvement by the oil industry and Responsible Party in aiding and funding response efforts. By better integrating and building relationships between all parties involved in oil spill response, communications, and monitoring, communities can recover from these events with more resilience.

References

Giammaria, C., Nicholson, A., & Snair, J. (2018). NASEM Workshop Summary: Preparing for a Rapid Response to Major Marine Oil Spills: Protecting and Assessing the Health and Well-Being of Communities. *TR News*, 313.

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Appendix 1: Workshop agenda

Improving Oil Spill Preparedness and Response in Santa Barbara
April 5, 2019 | 8:30am-4pm
Santa Barbara Zoo Discovery Pavilion
Santa Barbara, CA

Objectives:
1. Share lessons learned
2. Consider impacts on public health and socioeconomic sectors
3. Examine opportunities for community involvement
4. Review best practices
5. Improve future preparation

8:30 – Registration and check in, light breakfast/coffee

9:00-9:10 – Welcome: Sea Grant oil spill program & NAS-GRP collaboration overview, workshop goals and outcomes
- Phyllis Grifman, USC Sea Grant
- Christine Hale, Texas Sea Grant

9:10-9:30 – Keynote and land acknowledgment: Das Williams, First District Supervisor, County of Santa Barbara

Morning Session
Goal: Provide context for the symposium by reviewing challenges and lessons learned from the 2015 Refugio oil spill

9:30-10:30 – Refugio spill response: what happened, challenges
- CDR Rom Matthews, U.S. Coast Guard (USCG)
- Jordan Stout, National Oceanic and Atmospheric Administration (NOAA)
- Lieutenant Christian Corbo, CA Fish and Wildlife – Office of Spill Prevention and Response (CDFW-OSPR)
- CAPT Craig Vanderzwaag, Santa Barbara County Fire

10:30-10:45 – Coffee break
10:45-12:00 – Lessons learned: how do we better prepare for another spill, recommendations for oil spill contingency plan
- Butch Willoughby, USCG
- Linda Krop, Environmental Defense Center (EDC)
- Melissa Boggs, CDFW-OSPR
- Jason Musante, U.S. Environmental Protection Agency (EPA)
- Mia Lopez, Former Tribal Chair, Coastal Band of the Chumash Nation & Wishtoyo Foundation

12:00-12:45 – Lunch
12:45 – Overview of afternoon session
- Dr. Marika Schulhof, USC Sea Grant

Appendix 1 (continued): Workshop agenda

Outcomes for breakout sessions:
1. Protocols to include in response and regulatory frameworks
2. Project ideas to address local, state or regional issues
3. Research and outreach priorities
4. Resources to address topical issues

Topics:
1. Public communication
2. Oil spill response
3. Monitoring human health and social dimensions

12:45-2:15 – Panel discussions about breakout session topics
12:45-1:15 – Public communication
- LT Travis Thornell, USCG
- Steve Gonzalez, CDFW-OSPR
- Linda Krop, EDC

1:15-1:45 – Oil spill response
- MST1 Duskin Deichl, USCG
- Todd Jacobs, NOAA
- Ben Pitterle, Santa Barbara Channel Keeper
- Jon Victoria, CDFW-OSPR

1:45-2:15 – Monitoring human health and social dimensions
- Aeron Arlin Genet, Air Pollution Control District
- Merit McCrea, UCSB Marine Science Institute
- Jennifer Gold, CDFW-OSPR
- Mia Lopez, Former Tribal Chair, Coastal Band of the Chumash Nation & Wishtoyo Foundation

2:15-3:00 – Breakout sessions

3:00-3:15 – Coffee break

3:15-4:00 – Panel discussion: Oil spill prevention
- Ravi Varma, CA State Lands Commission
- CWO Paul Ricketson, USCG
- Richard Kuprewicz, Accufacts Inc.
- Errin Briggs, Santa Barbara County

4:00 – Closing remarks / end of workshop
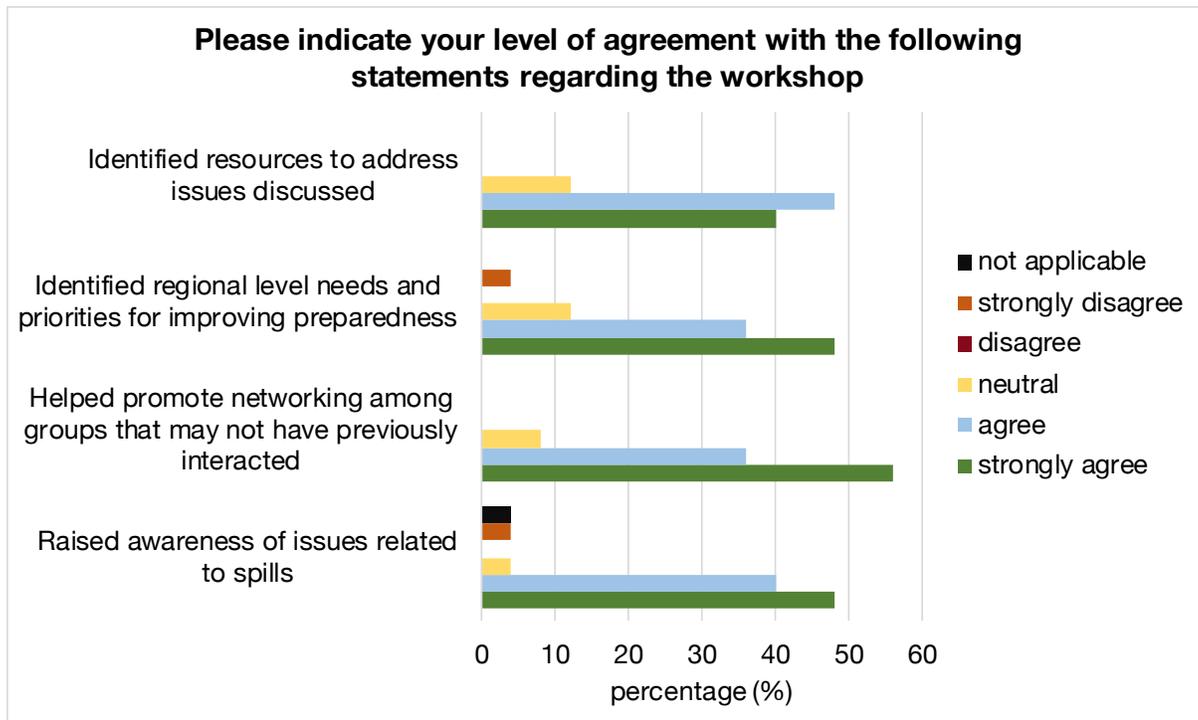- Evaluation forms

Figure 1: The evaluation respondents' level of agreement with each statement about the effectiveness of the workshop is shown as percentages (n=25).
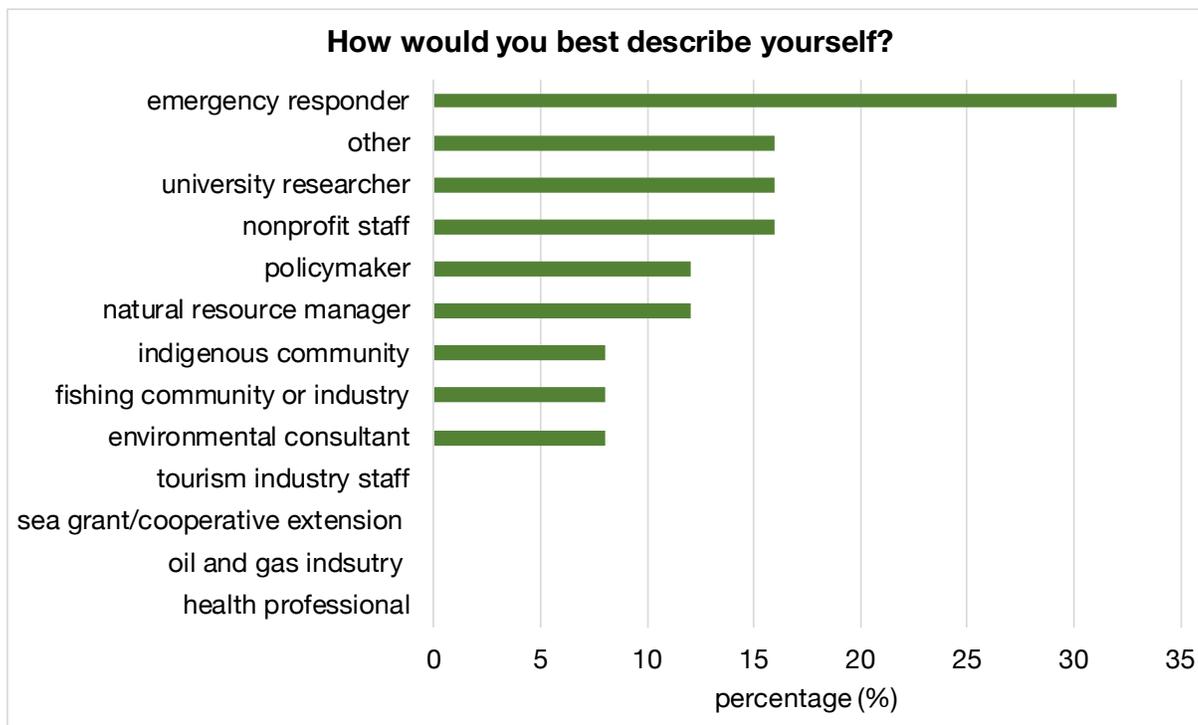

Figure 2: The professional sectors of evaluation respondents are shown as percentages (n=25).

Appendix 2 (continued): Summary of selected workshop evaluation responses (n=25; 37% of total workshop participants)
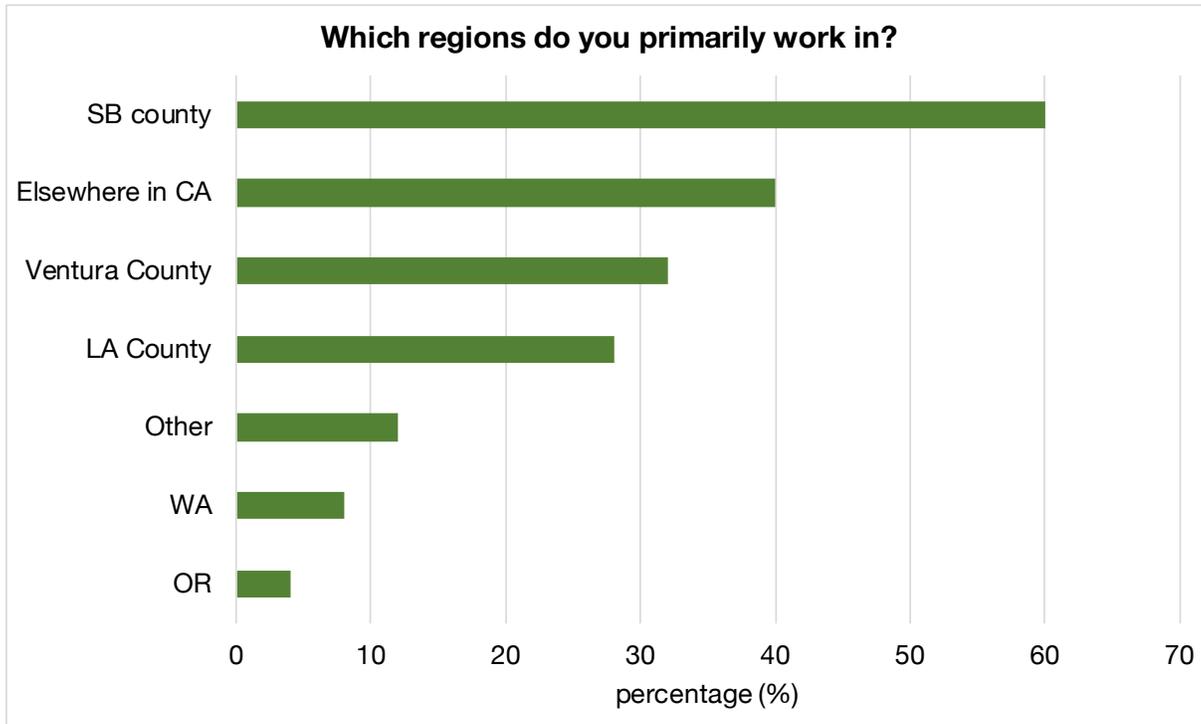

Figure 3: The regions in which evaluation respondents work are shown as percentages (n=25)

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