CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
OFFICE OF SPILL PREVENTION AND RESPONSE

REFUGIO OIL SPILL
RESPONSE EVALUATION REPORT:
Summary and Recommendations from the Office of Spill Prevention and Response

May 2016

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I. EXECUTIVE SUMMARY

Introduction

The purpose of this report is to summarize the California Department of Fish and Wildlife (CDFW) Office of Spill Prevention and Response's (OSPR) response efforts to date regarding the Refugio Oil Spill, as well as lessons learned and recommendations for improvement. The information and recommendations provided in this report are based on OSPR's internal evaluation of performance in those response functions for which OSPR had responsibility. Although winding down, the Refugio Oil Spill response is ongoing, specifically focusing on implementing the Phase III Maintenance and Monitoring Plan. Because OSPR has a primary role in carrying out this plan, Shoreline Cleanup and Assessment activities will not be covered in this version of this report, but will be added as an addendum at a later date following full demobilization and closing of the response. Additionally, this report does not cover any civil or criminal investigations which are outside the scope of managing an incident.

The CDFW has public trustee responsibility for protecting, managing, and restoring the State's fish, wildlife, plants, and their habitats. During response to oil spills in state waters OSPR fulfills the trustee mandate as the designated State On-Scene Coordinator (SOSC) and represents the State in coordinated oil spill response efforts with the Federal government. As such, OSPR is one of the few State agencies in the nation that has both major pollution response authority and public trustee authority for wildlife and habitat.

The facts, information, and recommendations contained in this report are based upon information which is presently available through the response effort. Additional facts may be discovered or known which could otherwise be considered to modify content or recommendations contained in this report. Thus, CDFW/OSPR reserves the right to not be bound to the content of this report if additional information becomes known after the publication of this report.

The Refugio Oil Spill and Response

The Refugio Oil Spill occurred on May 19, 2015, due to the failure of an underground 24-inch pipeline (Line 901) near Highway 101 in Santa Barbara County. The responsible party (RP) was Plains Pipeline, L.P. (a subsidiary of Plains All-American Pipeline). The pipeline failure caused crude oil to be released onto land and then it flowed into the Pacific Ocean. As initial information on the potential spill was gathered, it quickly became apparent that the spill was a significant event and was continuing to grow. The RP initially estimated the amount of crude oil released at about 104,000 gallons, with 21,000 gallons reaching the ocean.

Within hours, based on recommendations from the California Office of Environmental Health Hazard Assessment, the CDFW issued a closure of fisheries. The following day, Governor Edmund G. Brown, Jr., declared a state of emergency for Santa Barbara County.

The pathway of the crude oil caused significant oiling to terrestrial areas before reaching the ocean at Refugio State Beach. A cliff face above the beach and the shoreline at Refugio State Beach was most heavily impacted. Other areas of the Santa Barbara and Ventura coast were also significantly affected. The crude oil that entered the ocean posed a significant risk to and injured marine wildlife, including invertebrates, fish, birds, and mammals. In addition to direct natural resource impacts, the closure of beaches and fisheries occurred days before the Memorial Day weekend resulting in losses for local businesses and lost opportunities for the public to visit and enjoy the shore and offshore areas. Some tar balls attributable to the Line 901 release were carried by southerly ocean currents and eventually reached some beaches in Los Angeles County.

This significant spill brought together a large number of federal, state, and local agencies operating under a Unified Command. For the Refugio response, the Incident Commanders consisted of the USCG, OSPR, Santa Barbara County, and Plains Pipeline. [The National Contingency Plan calls for the Responsible Party to be a member of the Unified Command; ref. 40 CFR 300.135(d)]

There was significant additional command participation by the U.S. Environmental Protection Agency (US EPA). Throughout the response, interest from media, legislators, Non-Governmental Organizations, members of the public, and other stakeholders remained high.

The scale of the response and level of effort expended is illustrated by the following numbers from June 4, 2015:

Equipment Assigned
Vessels, skimmers: 21
Helicopters: 2
Heavy equipment: 6
Vacuum/tank trucks: 3

Boom deployed
Boom on water: 6,000 feet
Boom nearshore: 1,080 feet

Personnel
Personnel in Unified Command: 127
Personnel assigned in the field: 1,126
Shoreline Cleanup and Assessment Techniques Teams (3-4 people per team): 4

Wildlife Recovered
Total Birds: 181
Total Mammals: 107

The oil cleanup has been complex, covering inland terrestrial areas, a range of shoreline types, and on-water recovery. Cleanup was further complicated by the constant and unpredictable natural seepage of oil from numerous seabed fissures in the offshore area of Santa Barbara. The Unified Command has conducted a phased approach to oil spill cleanup in accordance with the National Oceanic and Atmospheric Administration's (NOAA) *Shoreline Assessment Manual* that provides for defined cleanup processes and goals for each cleanup phase. The Refugio Oil Spill cleanup effort completed its first phase (active cleanup and gross oil removal) on or around August 31, 2015 and the second phase (refined oil cleanup endpoints for shorelines targeting maximum net environmental benefit) on January 22, 2016. As indicated above, the third phase (monitoring and sampling for residual and buried oil) will continue until May of 2016. If samples analyzed through May 2016 show no match to the spilled oil, the response operations will conclude. If this is not the case, the Unified Command will assess appropriate next steps for the response.

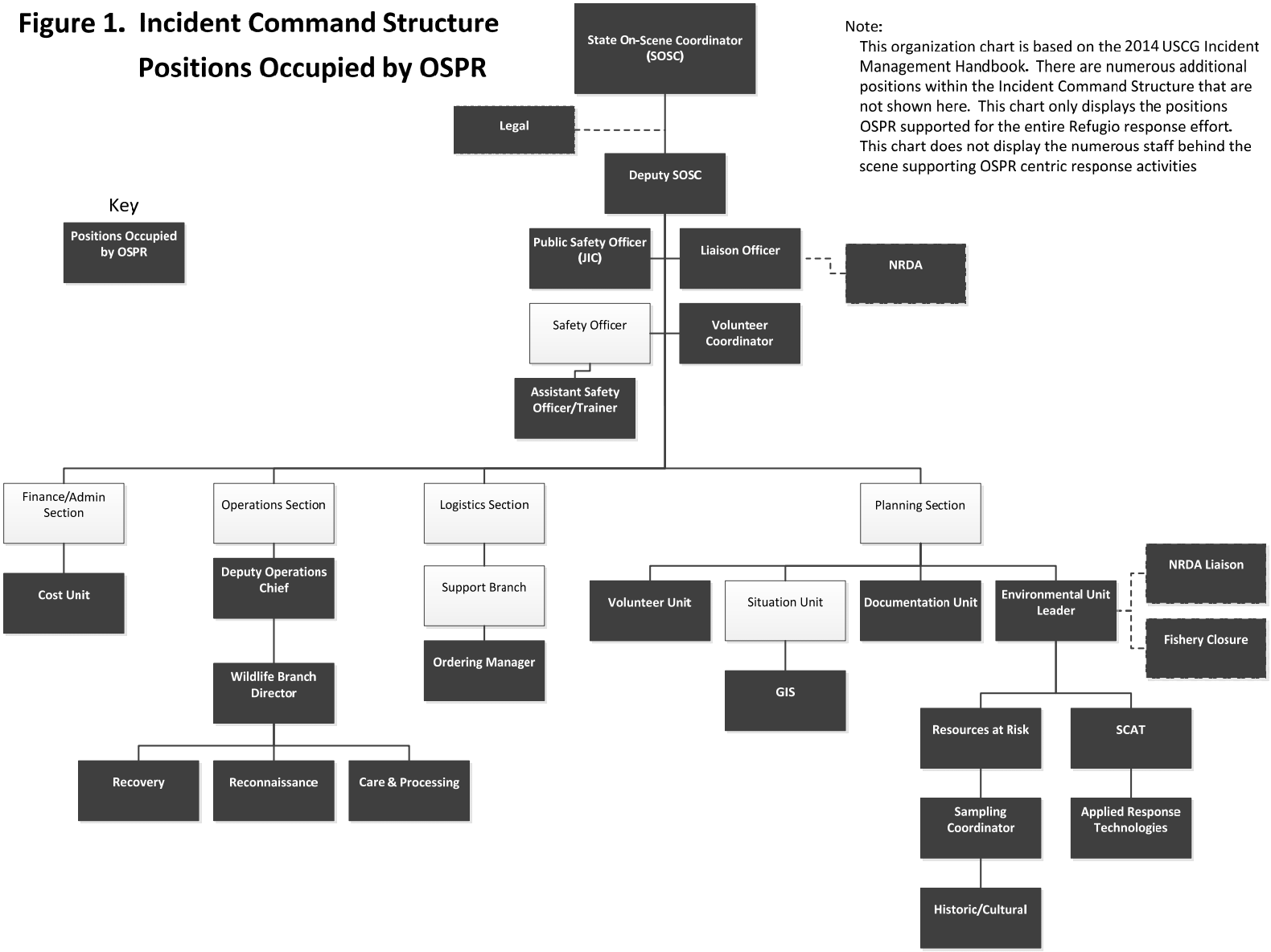
As the State On-Scene Coordinator for surface water oil spills and as a natural resources trustee, OSPR fulfills a variety of command and general staff functions within the Incident Command System. (See Figure 1) Besides being the state's Incident Commander in the Unified Command, OSPR also filled these roles:

- Command Staff: Liaison, with other governmental offices; Volunteer coordination, management, and deployment; Public Information; and Safety.
- Planning Section: Environmental Unit (lead and staff, including Resources at Risk and the Shoreline Cleanup and Assessment Technique teams); Documentation Unit; and Situation Unit.
- Operations Section: Wildlife Branch (lead and staff, together with the Oiled Wildlife Care Network); and Deputy Operation Chief.
- Finance and Logistics Sections

Additionally, OSPR managed the fisheries closure and re-opening, led the effort to coordinate with local tribal concerns for the protection of cultural resources, coordinated communications with Non-Governmental Organizations, and provided key GIS technical support to multiple functional areas of the response.

OSPR also is a primary participant in the ongoing Natural Resource Damage Assessment (NRDA) for the Refugio Oil Spill. NRDA is an independent process that parallels the response efforts; NRDA identifies wildlife and habitat resource losses, determines injuries, and pursues appropriate restoration. OSPR is participating in a cooperative NRDA in partnership with other state and federal trustee agencies and the RP. After the NRDA claim is resolved (whether in or out of court), the trustees will form a Trustee Council to oversee the use of restoration funds.

Figure 1. Incident Command Structure
Positions Occupied by OSPR



Note:
This organization chart is based on the 2014 USCG Incident Management Handbook. There are numerous additional positions within the Incident Command Structure that are not shown here. This chart only displays the positions OSPR supported for the entire Refugio response effort. This chart does not display the numerous staff behind the scene supporting OSPR centric response activities

Successes and Recommendations

Successful operations were highlighted in a number of areas, including:

- Interagency cooperation among the federal and state agencies participating in the UC
- Effective and strategic on-location support from CDFW and OSPR executives
- Training and incorporating spontaneous volunteers into response support activities
- A Community Open House event during the response attended by more than 200 people
- Ensuring tribal training and participation in monitoring of cleanup activities in areas of tribal or cultural concern
- Prompt fisheries closure and successful sampling effort allowing the quickest lifting of the closure
- Regular meetings to keep Non-Governmental Organizations informed and most effectively distribute updated information related to cleanup and emergency response efforts

OSPR recommendations for improvement include the following:

- Increase education efforts and information sharing with Non-Governmental Organizations and local governments regarding spill response planning and roles
- Train additional OSPR staff for Volunteer Unit positions and refine planning for managing spill volunteers
- Develop materials for more effective and efficient tribal entity involvement during response
- Plan for earlier community engagement and improve public information protocols
- Train additional OSPR staff for lead roles in wildlife operations
- Develop an electronic shoreline assessment data management system

II. Introduction & Background

OSPR and California Preparation
In 1990 Congress enacted the *Oil Pollution Act* in response to the 1989 *Exxon Valdez* disaster in Alaska. Also in 1990 California enacted the *Lempert-Keene-Seastrand Oil Spill Prevention & Response Act* (the *Act*) in response to the *American Trader* oil spill off Huntington Beach. The *Act* creates an Administrator who has the primary authority to direct prevention, removal, abatement, response, containment, and cleanup efforts with regard to all aspects of any oil spill affecting waters of the state. [Ref. Stats 1990, c. 1248; S.B. 2040; Gov. C. §8670.1 *et. seq.*] The Administrator is a Chief Deputy Director of the California Department of Fish & Wildlife (CDFW), and implements CDFW's public trustee responsibilities for wildlife and habitat in the context of water pollution. During an oil spill the Administrator is the designated Incident Commander/State-On-Scene Coordinator (SOSC). Additionally, the Administrator represents the State in any coordinated oil spill response efforts with the Federal government. [Ref. Gov. C. §§8670.7, 8670.5; Fish & Game C. §5655(d)]

The Administrator must ensure that all necessary readiness and preparedness measures are taken, and that sufficient response capability is available, in case of a spill. The guiding principle is "best achievable protection" of coastal and aquatic natural resources. Among the *Act's* many provisions, it requires certain facility and vessel operators that handle or transport oil and petroleum products to develop oil spill contingency plans. These plans are based, in part, upon preparedness standards established by the Administrator. The operators must contract with at least one cleanup company that has been "rated" by the Administrator. And the operators and the rated cleanup contractors must periodically participate in exercises to test their readiness. Additionally, the *Act* requires the operators to demonstrate minimum financial responsibility to pay for cleanup and damages resulting from a spill.

Facility and vessel oil spill contingency plans must also address protection of fish and wildlife. To further this goal, the Administrator is required to establish and fund an Oiled Wildlife Care Network. (OWCN; Gov. C. § 8670.37.5) The OWCN is administered by the U.C. Davis Wildlife Health Center (WHC) on behalf of the Administrator. The WHC ensures the maintenance and equipping of wildlife rescue and rehabilitation stations, to provide the best achievable treatment for mammals and birds affected by an oil spill in state waters. Currently, more than 35 academic, private non-profit, and rehabilitation organizations participate in the network.

An important aspect of preparing for coastal oil spills is the federal process of establishing an Area Contingency Plan (ACP). In California, the USCG and OSPR agree to joint preparation of area plans through co-chairing the Area Committees in the three USCG Port Areas of the state: San Francisco, Los Angeles /Long Beach, and San Diego. [Ref. 33 USC 1321(j)(4); 40 CFR 300.205(c)] The six Area Committees established in the California Coastal Zone are comprised of federal, state and local agencies, tribal governments, resource trustees, industry, and other entities. The primary role of an Area Committee is to act as preparedness and planning body to

develop, maintain and exercise Area Contingency Plans (ACPs) and provide a forum for planning and preparing for responses to major incidents that affect multiple jurisdictions. Major response actions require extraordinary cooperation and coordination among all levels of government. The ACPs are designed to facilitate and expedite formation of an incident command and implementation of environmental protection strategies to mitigate impacts to natural resources from oil spills. These plans are exercised through drills, exercises, and spill responses, and are updated on a regular schedule based on learning outcomes from these experiences.

The Incident

California had not experienced a spill the scale of the Refugio Oil Spill since the 2007 *Cosco Busan* Oil Spill in San Francisco Bay. See Appendix A for a summary of changes made to the OSPR programs since the *Cosco Busan* oil spill.

At the time of the Refugio oil spill, Plains Pipeline had a contingency plan approved by the Administrator, had demonstrated self-insurance for $109,250,000, and was current with its OSPR oil spill exercise requirements.

On May 19, 2015, OSPR field staff were dispatched to Refugio State Beach to investigate a reported oil spill. Based on the scope of the incident, additional OSPR and CDFW staff began assuming a variety of roles. Staff began coordinating cleanup activities with allied agencies, and investigating the incident separate from the incident management. As the first day progressed, OSPR personnel throughout California were deployed and began integrating into a fully staffed Unified Command (UC) and Incident Command Post (ICP), activating the OWCN, initiating a Fishery Closure process, and preparing both CDFW and OSPR personnel for a sustained oil spill response effort.

By the morning of May 20, 2015, the Emergency Operations Center (EOC) of the Santa Barbara Office of Emergency Management was established as the ICP. The ability of the Unified Command to use and staff the ICP at Santa Barbara County's EOC was crucial to the early success of this response. However, within a week of working in this facility, the number of responders working within the ICP grew close to 350 personnel and the facility became over-crowded while still needing to serve as the County's EOC for any other emergency within the County's jurisdiction. Incident management was moved to an empty office space near the Santa Barbara Municipal Airport and setup as the new ICP. This new facility served as the ICP for the remainder of the response until operations transitioned into the Phase II aspects of beach cleanups and Unified Command functions were handled remotely.

Current Status

Now, nearly a year after the incident, the Shoreline Clean-up Assessment Technique (SCAT) Teams continue to conduct surveys along affected beaches from Arroyo Hondo to Rincon Point, monitoring for buried oiled per the approved Phase III Maintenance and Monitoring Plan. In December 2015 and January 2016 oil samples were collected (after the first significant storm event) and determined not to be Refugio Line 901 oil. Also in January 2016 the final segment of coast line that was impacted by the spill was signed-

off as meeting the Phase II cleanup endpoints. The next oil sampling event is scheduled for May 2016 and if no Refugio 901 oil is detected that will be the final sampling event for the shoreline.

Additionally, per the approved Cliff Face Area Monitoring Plan ("Section 5"), the cliff face where the oil entered the ocean is now inspected monthly (and after significant events including rainfall over 0.5 inches over a 24-hour period, extreme tides, or earthquake); these monitoring observations may warrant a remobilization of personnel or equipment for cleanup for observed oiling, maintenance of Best Management Practices, or geological instability assessment. If re-oiling is noted, additional specialists with appropriate technical expertise will be deployed for further evaluation of the Section 5 cliff face. This monitoring of the Section 5 cliff face is scheduled to be completed by December 31, 2016.

The investigation into the cause and impacts associated with the Refugio Incident is ongoing. CDFW-OSPR investigators are coordinating closely with allied local, state and federal agencies to conduct a thorough investigation of the incident.

Also, the Natural Resource Damage Assessment (NRDA) is underway as a "cooperative assessment" with consultants representing the RP and the appropriate state and federal wildlife trustee agencies. Planning for and implementation of the Refugio Beach Incident NRDA began shortly after the spill. To better understand potential pre-spill (baseline conditions), resource injuries, and recovery rates of injured resources, trustees are currently planning a series of one year anniversary surveys and sample collections along shoreline areas affected by the spill.

The following sections of this report describe various aspects of response to the spill, highlighting the positives and identifying areas for improvement, and ultimately recommendations.

III. Response Activities

A. Unified Command

Objectives & Responsibilities

As previously mentioned, the OSPR Administrator is statutorily designated as the SOSC (i.e., Incident Commander) for oil spills. Spills are managed using the Incident Command System (ICS). A Unified Command (UC) is established as the decision-making body for the incident; the UC sets priorities, establishes objectives, and gives direction to the participants in the incident. For oil spills, generally the UC consists of OSPR, the USCG or U.S. EPA, and a representative of the responsible party (RP). Ultimately, the USCG or U.S EPA has the authority to make final decisions if there is not consensus within the UC.

The ICS structure for oil spills, and similar types of incidents, is detailed in the USCG *Incident Management Handbook* (Ref. May 2014). https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwi89eqqjIDMAhVKuoMKHRqID3kQFggdMAA&url=http%3A%2F%2Fwww.uscg.mil%2Fd9%2FD9Response%2Fdocs%2FUSCG%2520IMH%25202014%2520COMDTPUB%2520P3120.17B.pdf&usg=AFQjCNELw4hyeFybcMKAY00WU3t1ojabjw

Refugio Activities & Effort

On the day of the incident, OSPR quickly assumed incident command roles, including SOSC. Other OSPR and CDFW employees were deployed from various parts of the state to participate in the response.

Several areas have been identified where the collaborative work among agencies and RP went extremely well:

- Establishment of the UC. The UC was quickly established, consisting of the USCG, OSPR, County of Santa Barbara Office of Emergency Management, and RP representatives. Effective communication and jurisdictional priorities were quickly established and understood by all parties early on. The ability to know each agency's jurisdiction, roles, and responsibilities allowed the streamlined creation of the initial ICS Form 201 briefing document and, thus, the distribution of resources to begin the containment and cleanup of oil on the coastline.

- Open House Stakeholder Meeting. The Unified Command decided to hold a "Community Open House" for the local community and concerned stakeholders. This event is further detailed below under the "Public Information / Joint Information Center" section.

- Response Innovations. The Refugio Response provided opportunities to the UC to consider use of innovative clean-up strategies. One of those innovations was the use of dry-ice blasting. Due to the weathered nature and tar-like consistency of Line 901 oil in the environment, the UC decided to test, and subsequently use, ice-blasting power washers. Oil on rocks was essentially frozen by liquid nitrogen and, once hardened, removed from the habitat, rocks, and cobbles in the impacted zones. Another example was the use of a Spider Excavator, an all-terrain excavator, for removing debris, soil, and rocks from the Section V cliff-face. Due to the steep-angle vertical face of this area, responders could not safely access the site, and thus cleanup was slow and labor intensive.

- Use of Subject Matter Experts. The UC utilized local subject matter experts in a variety of disciplines. Due to the complexity of responding to, and cleaning up, oil from shorelines that routinely experience natural seep events, the UC reached out to the University of California at Santa Barbara and received presentations from researchers and professors who were considered local experts in oil chemistry and natural oil seep formations. Additionally, the Unified Command used experts in the fields of Geology to assist in the formation of response

committees to help assess and recommend cleanup strategies and safety measures in bluff-side areas prone to erosion and rock slides. With the help of State Parks, the UC also utilized certified State Park Archeologists to assist the Tribal Nations' Liaison and oil spill cleanup crews in assessing culturally sensitive sites prior to cleanup activities.

- UC Field Tours. Commanders regularly attended tours/site visits of the response areas where active cleanup or assessments were taking place. The in-field perspective of this decision allowed the UC to understand the varied constraints of this response (i.e., tides, wave action, eroding bluffs, weather, humidity, oil coverage, and terrain). This perspective allowed the modification of previously agreed upon cleanup decisions based on actual in-field assessments of the cleanup crews and the effectiveness of their techniques.

Recommendations

In addition to the successes noted above and an overall effective response to the Refugio Oil Spill, suggestions for improvement of UC tactics and decision making are listed below:

- Training and Authority of Local Spill Incident Commanders. An existing Memorandum of Understanding (MOU) between OSPR and the County of Santa Barbara allows the County to participate in the UC with decision-making responsibilities. For the Refugio Oil Spill the County rotated several representatives as Local On-Scene Coordinators (LOSC). This transformed the UC from a traditional three-member body (State and Federal OSC's, and RP) per the National Contingency Plan, into a four-member body. This precedent, although beneficial to relationships with local governments, created challenges in other areas. The UC representatives from the County were not given decision-making authority by their superiors/chain-of-command. When a command decision was required, often the County representatives in the UC would need to defer their decision or vote to their immediate supervisors, or brief the Board of Supervisors for approval. This is contrary to ICS, counter-productive for the response, and created delays in tactical operations. It is recommended that only staff with direct decision-making authority should be considered as a potential LOSC.

- Community Engagement. The UC should begin the process of communicating with the public at the very onset of a response. Concerned Legislators, Non-Governmental Organizations (NGOs), and the local public were heavily engaged in the Refugio Oil Spill. While the Incident Commanders deemed stakeholder communication to be of high importance, the amount of time required to do so for the Incident Commanders was extensive and threatened decision-making on operational priorities. Earlier proactive communications by the JIC/PIO or Liaison staff in the response, such as the Open House informational forum, would have helped with our outreach to the local community and concerned stakeholders and alleviate the demands on the Incident Commanders.

- Tribal Nations / Unified Command Involvement. The UC should ensure proper inclusion of Tribal Nation representatives through establishment of a tribal liaison(s) in coordination with the Operations Section (for cultural monitors) and the Cultural/Historic Group (CHG) within the Planning Section. The coordination with Tribal Nations is further described below in the "Tribal/Cultural Coordination" section.

a. Public Information / Joint Information Center

Objectives & Responsibilities

OSPR Public Information Officers (PIO) are part of the Joint Information Center (JIC), together with information officers from the other UC representatives. JIC objectives are generally to inform media, external stakeholders and the local community of actions being taken during an oil spill response. The JIC provides timely information to help create an external understanding of the level and nature of the response through daily fact sheets, updates, and statistical information. The JIC ensures consistency of all communications from the various entities within the JIC. The JIC coordinates with the various ICS sections to support outreach activities as needed. The JIC may rotate Lead PIO and JIC Manager duties across the agencies in the JIC.

Specific PIO responsibilities in a JIC include: conducting live and taped interviews; constructing talking points for the UC; recognizing social media trends; and posting press release, media advisories, photos, graphics and videos with UC approval. They receive and respond to inquiries via phone and electronic means and translate and disseminate Spanish language information.

For medium-to-larger incidents the JIC utilizes the Public Information Emergency Response (PIER) system for communicating to the media and the public. The Pier system is contracted by the U.S. Coast Guard (USCG) and other agencies during crises communication events. PIER is one of several options available during incidents. It supports web-based communication and is designed for information management, crisis communications, business continuity, disaster recovery, public relations, mass notification, news monitoring, press release distribution and the management of documents, contacts, inquiries and media.

OSPR uses its CalSpillWatch site (https://calspillwatch.dfg.ca.gov) either in cooperation with PIER or in the absence of a crises communication platform. CalSpillWatch is a repository for all media coverage generated during an oil spill event.

Refugio Activities & Effort

For the Refugio Oil Spill the Lead PIO was generally the USCG but for about the first week it was US EPA and OSPR. OSPR also periodically served as the JIC Manager, alternating with USCG. At the beginning, the JIC consisted of approximately 15 people, but after a few weeks staffing levels reduced to approximately six people. The JIC followed guidelines established by the USCG.

The JIC was responsible for providing important information and delivering key messages, such as public safety concerns, oiled wildlife and other environmental impacts. The JIC provided the media with contact information for claims, volunteering, oiled wildlife, and reporting oil spills. The JIC worked diligently to communicate the UC's efforts to minimize the impacts of the spill on the community and the environment.

A media strategy was established at the beginning of the response and followed the 96-Hour Plan created by the USCG. The JIC distributed a press release twice daily, and press conferences were held twice a day for the first three weeks. The outreach provided each agency an opportunity to communicate UC-approved key messages and progress on the oil spill response.

More than 50 media organizations representing outlets locally, nationally, and internationally attended the press conferences in the first week. A consistent local media presence of 10 to 15 people remained after the initial media event. An American Sign Language signer was provided after the first day and attended each press conference throughout the response. A Spanish-speaking CDFW Wildlife Officer conducted interviews for the Spanish media.

One of the functions of the JIC was to anticipate high interest news coverage and recommend a communication plan to the UC. One example was the potential impact of cleanup operations on California grunion. Grunion spawning at night on sandy beach habitat was expected to begin in early June. The UC decided cleanup operations would not occur at night when grunion spawning was taking place and cleanup crews were instructed to minimize disturbance to the sand as much as possible during the run. The JIC was proactive by informing the UC of the issue and then informing the public via media about steps the UC took to insure the safety of the grunion.

The JIC promoted updates on the fisheries closure, air flight restrictions, and road closures connected to the response operations. The JIC also facilitated media availability, showcasing the specialized expertise of OSPR, the Oiled Wildlife Care Network (OWCN), and other field scientists.
An important outreach event organized by the JIC involved an open house-style forum for the community to meet with the UC and spill response professionals. This event was held within two weeks of the incident and provided an opportunity for the public to learn about the ongoing response and potential environmental impacts, pose questions to responders, and voice their concerns. More than 200 people attended the event. The JIC set up numerous booths with technical experts and provided the public with information including cleanup and monitoring, public health and safety, volunteer opportunities, and wildlife rescue and rehabilitation.

There were many "firsts" for the JIC during the Refugio Oil Spill. This was the first major oil spill that a JIC incorporated social media channels to communicate key messages and interact with the public. PIOs initiated the concept of a "photo and video news release" that was easier for a general audience to understand. The JIC developed Spanish language materials which mirrored demographics of the region. As the ICP

demobilized, PIOs utilized a “virtual JIC,” allowing information officers in different locations to access the latest response facts electronically and respond to media requests quickly.

In conclusion, the Refugio Oil Spill JIC proved effective in its mission of providing accurate and timely information to the media and public. Stakeholders remained engaged and technology facilitated a uniform message. Although there’s always room for improvement, interagency preparedness drills and ongoing contingency planning will continue to keep PIOs ready for the next big incident.

Recommendations

Challenges for the JIC included addressing spontaneous volunteers, establishing a location for press conferences, nomenclature, and training for PIER. Recommendations for improving the function and utility of the JIC in future responses are as follows:

- OSPR should work with the USCG to establish best practices for distribution of video and pictures during responses.

- Well-meaning members of the public self-deployed to oiled beaches, attempting cleanup and wildlife rescue, and didn’t understand how to appropriately and safely engage in the response efforts. This was in part due to a perception that the shoreline cleanup was delayed and uncertainty on the part of some public members as to whether or how government agencies were going to respond. Recommend a stronger messaging strategy to address the understandable desire for the public to participate, to include: pre-vetted messaging that conveys health dangers and potential harm to wildlife that can occur as result of self-deployment, as well as information about established plans and protocols used for response; and social media platforms to push the information early in the response.

- Some JIC members had irregular schedules which led to some confusion as to whether tasks were completed. Participants need to be dedicated for a set period with designated and committed replacements.

b. Liaison

Objectives & Responsibilities

The Liaison Officer (LOFR) is a Command Staff position within the ICS. The position is filled for large incidents involving multiple jurisdictions or when several agencies are involved. Only one LOFR will be assigned for each incident. The LOFR may have as many Assistant Liaison Officers as necessary, and the Assistants may represent numerous agencies or jurisdictions. The LOFR is the point of contact for individuals assigned to the incident from other assisting or cooperating agencies, known as Agency Representatives (AREPs). The LOFR helps facilitate response efforts as a conduit of information and assistance between organizations within and outside the ICS structure.

Typical responsibilities of a LOFR include but are not limited to the following:

- Briefing AREPs on status of the spill; assigning AREPs into the ICS structure as appropriate
- Developing a Stakeholder Involvement Plan
- Providing information for the Cal-Spill Watch website
- Coordinating and leading VIP tours and briefings
- Updating the UC about AREP concerns and emerging issues

There may also be a Liaison in OSPR's Sacramento Operations Support Center (Support Center). The role of the Support Center Liaison is to support the LOFR at the Command Post, such as compiling a comprehensive e-mail notification list, developing written updates, and keeping the Support Center Duty Officer apprised of issues and concerns.

Refugio Activities & Effort

For the Refugio Oil Spill an OSPR representative and a Plains representative initially were co-leads; after a few weeks OSPR and the USCG served as co-leads. The following were the most common types of issues:

- *Keeping AREPs Informed.* It was the daily responsibility of the LOFR to provide updated information to AREPs, and OSPR LOFR staff provide the Support Center Liaison to be incorporated in the AREP email. The Support Center Liaison incorporated this information into updates, as a "'passive" means of keeping the on-scene and remote AREPs and others on an e-mail list apprised and updated on the response efforts. These updates are distinguished from press releases in that these updates are summaries of response actions and resources, with more detail than typically found in press releases, and focused on areas of particular interest to the AREPs.

- *Inquiry/Question Reponses.* The LOFR responded to numerous inquiries daily from AREPs as well as the Support Center Liaison. Typical questions/answers would include oiled wildlife information, potential oil impacts, questions about pipeline security and removal, fishery and beach closures, volunteer opportunities, and road closures.

- *Coordination of VIP and Field Tours.* The LOFR coordinated a number of VIP and field tours during the Refugio Oil Spill, including state and federal legislators, and the California Attorney General. This involved outreach to tour participants, preparing a briefing packet, providing logistical oversight for the ICP and field visits, arranging technical experts as appropriate, and coordinating the ICP briefing.

- *Initial Point of Contact for Scientific Study Requests.* Due to the high volume of requests to perform scientific studies during the Refugio Oil Spill, the LOFR was tasked with being the initial point of contact for these requests. The LOFR worked with NOAA's Scientific Support Coordinator to develop a checklist and protocols to

collect all relevant information on the studies, and also worked with the USCG to make this checklist a fillable form on the web linked to the Refugio Response website. The LOFR was responsible for routing and monitoring these requests as appropriate through the UC for potential approval.

- *Coordination and Participation in the Community Open House.* During the incident a community open house event was held to provide information the public. For the LOFR this included initial and follow-up planning meetings, contacting various subject matter experts to staff the informational tables, providing documentation and other logistical support for participants, and attending and overseeing the Community Open House to answer questions and provide support as needed.

- *Workgroup Participation to Accommodate the "AIDS/Life Cycle" Event.* An ad-hoc workgroup coordinated the accommodation of the "AIDS/Life Cycle" event. This seven-day, 545-mile fundraising cycling event took place from San Francisco to Los Angeles and was scheduled to pass close by the response cleanup efforts at Refugio State Beach. The workgroup was tasked with researching options and alternate scenarios, and making a recommendation to the UC. The UC supported the workgroup's recommendation and directed Operations to modify their cleanup activities so this planned event could take place uninterrupted.

- *Responding To Requests for Donations of Services, Equipment and Supplies, and Forwarding As Appropriate.* Donations to a spill response effort are typical but there was an exceptionally large volume of these offers at the Refugio Incident, presumably due to the high social media aspect of the spill and a very interested and engaged public. Donations ranged from buckets to air boats. These offers were forwarded to the Resources Unit Leader for consideration.

- *Provided Updates for the Local Office of Emergency Services (OES) Daily Teleconference with Other OES Regions.* Early in the response the LOFR was asked to participate and provide input for the Local OES daily teleconference with other OES Regions.

- *Routing offers of Oil Spill Clean-up Agents.* There were unsolicited offers of oil spill cleanup materials. These were initially directed through the LOFR, who provided guidance on OSPR's website for the proper process to submit these offers for potential review for testing and use. (See the Applied Response Technology section of this report)

Recommendations

Scientific Study Requests: Early in the response there were requests for access to spill sites to gather data for research studies. Most of these requests were from scientists associated with U.C. Santa Barbara or other educational institutions. The spill afforded them the unique opportunity to gather samples and data during a real oil spill, as opposed to data gathering during simulations under lab conditions. Some of these requests were handled by the NOAA Scientific Support Coordinator to determine and

rate usefulness and nexus of these studies to oil spill response. These types of requests were prevalent during the Deepwater Horizon oil spill in the Gulf of Mexico, and it is anticipated they will continue to be pursued in future oil spills.

- It is recommended that OSPR and NOAA collaborate on development of a protocol for evaluating and vetting of Scientific Study Request concepts. When completed, this protocol should be exercised during drills.

Expanded OSPR LOFR Capacity: As the states' lead agency for oil spill response, OSPR has several staff trained to perform a Liaison role. In the wake of the Refugio Oil Spill and as OSPR now has expanded statewide authority, recommendations are as follows:

- The lead LOFR should be assigned from a government agency, and not the RP. This should be incorporated in drills so it becomes the norm for an actual spill.
- OSPR should identify agencies that potentially would provide Assistant LOFR personnel, and plan to incorporate them into drills and exercises.
- OSPR should evaluate the need for liaison staff for a spill the size of the Refugio Oil Spill, and increase the numbers of in-house LOFRs currently trained and qualified to meet this need.

c. Health & Safety

Objectives & Responsibilities

The Safety Officer (SOFR) is a member of the Command Staff, responsible for monitoring incident operations and advising the Incident Commander(s) on all matters relating to operational safety, including the health and safety of emergency responder personnel. There is only one SOFR for each incident, but the SOFR may have Assistant Safety Officers (ASOFs) as needed.

Major responsibilities of the SOFR include:

- Ensure an incident-specific safety plan is developed
- Identify hazardous situations associated with the incident
- Review the IAP for safety and health implications
- Implement intervention measures to prevent unsafe acts
- Investigate accidents
- Identify, communicate, and document safety and health hazards
- Track and report accidents, injuries, and occupational illnesses
- Brief the UC on safety and occupational health concerns

Refugio Activities & Effort

The initial role of the OSPR Industrial Hygienists (IH) was to serve as ASOFs to the SOFR designated for the incident. At the time, the Safety Unit consisted of representatives from the RP and employees from the Center for Toxicology and Environmental Health (CTEH). The RP provided the SOFR for the Unified Command.

CTEH was functioning as a vendor for the RP, and provided air monitoring and consultation services.

The initial objective of the OSPR IHs was to establish and assess situational awareness pertinent to the incident, including conducting a survey of the spill response sites, and reviewing the existing safety documents. Contact was also made with the Oil Spill Response Organizations (OSROs) that were conducting the oil clean-up. These OSROs were Patriot Environmental Services, who was responsible for on-shore clean-up, and Clean Seas LLC, who was conducting the on-water containment and recovery operations.

Upon review of the Site Safety and Health Plan, it was determined that it did not meet the Cal/OSHA requirements (HAZWOPER; 8 CCR §5192). Therefore the OSPR IH produced a new plan to conform to Cal/OSHA requirements and incorporated a separate safety plan that only addressed two OSROs (Patriot Environmental Services, and Clean Seas LLC). This resulted in one Site Safety and Health Plan that covered all response activities, and which included a Safety Data Sheet (SDS) which was more specific for the crude oil and additives released than the initial SDS' provided by the RP.

Oil Spill Clean-Up Training
Early in the response, the OSPR IHs were informed there were volunteers that needed the Cal/OSHA required training in order to assist with the beach clean-up activities. The OSPR IHs updated their existing 4-hour Oil Spill Clean-Up Worker training to make it specific to the Refugio oil spill response and several training sessions were conducted for the following groups:

- Chumash tribal cultural monitors
- Archeologists from Applied EarthWorks
- California Department of Parks and Recreation staff
- Oiled Wildlife Care Network (OWCN) member organizations
- Over 290 Volunteers from the public

Volunteer Safety Monitoring
OSPR IHs and Oil Spill Prevention Specialists (OSPS) monitored volunteer activities on Goleta Beach, Haskells Beach, Gaviota State Park Beach, and Elwood Beach, which included procuring appropriate personal protective equipment (PPE) from Patriot Environmental Services and assisting volunteers in the PPE donning/doffing process, providing the pre-work safety briefing, and remaining on location to continue with on-going safety monitoring.

Recommendation

- CDFW should consider HAZWOPER certification for all dive team members that may potentially participate in spill activities.

d. Legal

Objectives & Responsibilities

During water pollution incidents the Legal staff for OSPR will provide legal support to the SOSC and OSPR/CDFW responding staff, Executive staff, investigative staff, and natural resource damage assessment (NRDA) staff.

Refugio Activities & Effort

During the Refugio incident, at least one OSPR attorney was present at the ICP for the first several weeks of the spill, and Legal staff provided advice and guidance from the OSPR Support Center in Sacramento. Legal staff continues to work on issues at this time, particularly regarding the on-going criminal investigation and the NRDA case development.

Some of the issues the Legal staff assisted with during the first few weeks included:

- Ensure statutory mandates for OSPR and the RP were being initiated and fulfilled
- Supported the SOSC and Deputy SOSC, and other OSPR/CDFW incident staff
- Coordinated with the OSPR criminal investigation team
- Coordinated with the NRDA team
- Provided advice regarding the Governor's Emergency Declaration, including research and drafting
- Briefed or coordinated with the CDFW Office of General Counsel, the Natural Resources Agency, and the Governor's Office
- Researched and advised on issues to minimize potential legal exposure to OSPR/CDFW
- Reviewed UC agreements
- Coordinated with allied local, state and federal agencies
- Reviewed press releases
- Interpreted and advised on various MOU's with agencies for applicability during response (e.g., hazardous waste storage, and decanting of oily water)
- Issued a litigation hold, and coordinated document and data management

Recommendation

- Develop a draft data-sharing agreement for use among the Incident Commanders in the UC. The value of this document is to ensure that no party claims ownership of data or information generated during a spill, provide for where data is stored, and ensure sharing of all response data among all parties.

B. Oil Recovery Operations

Objectives & Responsibilities

The Operations Section coordinated the response activities specific to mitigating and recovering the spilled oil in the environment. The Operations Section established an

on-water recovery group, an on-land recovery group, and staging areas to achieve the UC's objectives during the response. The Operations Section worked with the Planning Section to determine the best courses of action and assignments for each operational period for the oil recovery work crews.

OSPR often has a senior Oil Spill Prevention Specialist or Supervisor fill the Deputy Operations Chief position to be a liaison between the work crews and what the Environmental Section is relaying. This allows for state input to the waste, decontamination, demobilization, and other plans developed by the cleanup contractors.

Refugio Activities & Effort

At Refugio, OSPR filled the role of Deputy Operations Chief; and initially OSPR filled both the On-Water Recovery Group Supervisor and the Shoreline Recovery Group Supervisor roles until the Responsible Party's spill management team filled these two roles.

On-Water Recovery

Clean Seas, LLC conducted the on-water recovery operations as the Responsible Party's (RP) contracted oil spill response organization (OSRO). On-water skimming operations utilized brush type skimmers that are permanently mounted on several of the Clean Seas vessels that are staged in the Santa Barbara area. These skimming vessels are also equipped with on-board storage for recovered oil to offload at a later time. Clean Seas vessels, as well as vessels from the Fisherman's Oil Spill Response Team (FORT), took measures to contain free floating oil on the water, deployed boom from the Clean Seas vessels to concentrate and corral the oil. Vessels also utilized absorbent boom and oil snare boom to collect lighter oil closer to shore. Clean Seas deployed several deflection booms close to shore to guide and divert oil to the beachline for recovery, thereby reducing the migration of oil to the east. A deck barge outfitted with a crane and anchored outside the affected area offshore of Refugio State Beach, supported the fleet of offshore vessels participating in the recovery operations. The RP contracted for a landing craft to assist in the loading and offloading of 20 cubic-yard bins to the deck barge and to transfer collected debris and oiled waste from the offshore vessels.

On Shore Recovery

Beach crews, organized into several divisions to work on specific tasks and areas, conducted the on-shore recovery operations. The RP and Clean Seas contracted with several environmental companies to remove oil from the shore -- these companies provided the work crews with the necessary training and personal protective equipment to work in the environment to contain, collect, and recover spilled material. Each beach crew was accompanied by a site supervisor, safety officer, and a cultural monitor. Each team's division supervisor provided direction and oversight to complete specific tasks to clean the affected areas as identified by the Environmental Unit.

Air operations
To aid the on-water and on-shore recovery efforts, the operations section utilized fixed-wing aircraft and helicopters to identify and guide skimming operations.

Pipeline recovery
The section of pipe that released the oil was at an elevation above a man-made drainage culvert, allowing gravity and berm structure to guide the oil into the culvert where it collected in a large pool. The RP used a local contractor who utilized vacuum trucks to remove this pooled oil from the contaminated area. The contractor then transported several liquid loads to a staging area for further transfer of the oil to waste storage tanks. The contractor also used a warm water deluge to flush the culvert and collect the residual oil and water mix. The contractor excavated contaminated soil and loaded it into large 20 cubic-yard bins for further transport to a staging area for final quantification.

Sampling protocol
Clean up contractors separated recovered pollutant by waste stream type and location where the waste was initially removed from the environment. Liquid waste was held in secure tanks for gauging to determine oil content and quantity prior to disposal. Liquids recovered during flushing, steam cleaning, and decontamination operations were kept separate from the recovered free-floating recovered oil. Recovered pollutants held in solids were placed in roll-off bins or over-pak drums with tare weights. Solids were segregated, weighed, and categorized as sorbents, debris, soil, or contaminated personal protective equipment. Solids recovered from the waters of the state or adjacent shorelines were stored separately from those recovered elsewhere.

Staging areas
Clean up contractor set up several staging areas to accommodate work crews, collection of oiled debris, and decontaminate equipment used in the response. For work crews, staging areas were set up at Refugio and El Capitan State Beaches; these areas provided space for work crew safety briefings and for a secure depository for the 20 cubic-yard bins containing oiled debris. Port Hueneme proved to be a good location for the decontamination of large vessels and gross decontamination of equipment before being transported to T&T Truck and Crane Services in Ventura County for final decontamination and repair of response equipment. Decontamination of smaller vessels occurred at the dry-dock facility located in the Channel Islands harbor facility. All vessels were inspected prior to being released from the response.

Recommendation

- Develop a position in Operations Section to liaise with SCAT, and include task book and job aid. Early in the response, much of the information passed at the SCAT meeting never reached the appropriate field operations personnel in time to make the next day's work assignments.

C. Wildlife Branch

Objectives & Responsibilities

Wildlife is put at risk when oil is spilled into aquatic or terrestrial environments. Both federal and state statutes mandate protection, rescue, and rehabilitation of oiled wildlife. In California, OSPR and the Oiled Wildlife Care Network (OWCN; administered by the UC Davis Wildlife Health Center), work to provide the best achievable capture and care for impacted wildlife during oil spill response. This mission is met through providing reconnaissance for oil-impacted wildlife; assessing the need for and providing hazing of at-risk wildlife; recovering potentially oil-impacted live and dead wildlife; stabilizing, washing and rehabilitating impacted live wildlife; and documenting and managing disposition of dead potentially impacted wildlife.

Refugio Activities & Effort

In response to the Refugio incident, the Wildlife Branch Director (WBD; an OSPR staff scientist) activated the OWCN on May 19, 2015. This initial activation set in motion the activation of OWCN member organization staff, pre-trained volunteers, and facilities. On May 20, OSPR established the Wildlife Branch in the Operations Section at the Incident Command Post (ICP) and, with other Agency and OWCN Member Organization staff and volunteers, began recovering impacted wildlife. Wildlife Branch field operations were demobilized on June 24, based on oil fingerprinting results from samples taken from recovered animals.

Wildlife Reconnaissance

Baseline information on the status and distribution of wildlife was important in assessing at risk wildlife and developing appropriate response actions. While this information was available during spill response from the Environmental Unit of the Planning Section (Resources-at-Risk Specialist), variations from historic baseline conditions due to daily and seasonal movements of many animal species necessitated rapid, real-time reconnaissance of wildlife concentrations in the spill area. Real-time data were collected using aircraft and initial on-water/boat and onshore surveys. An OSPR-contracted team of U.C. Santa Cruz experts flew with a CDFW-piloted plane on May 21, 2015, to provide marine bird and mammal locations at-sea in relation to the spill. This data aided in planning where to send recovery teams, and determining whether and where specialized equipment was needed, e.g., specific kennel sizes or capture gear for specific species.

Reconnaissance also included managing over 1,000 phone calls from the public reporting over 300 sightings of oiled wildlife. The OWCN Oiled Wildlife Hotline (hotline) began receiving calls reporting oiled wildlife on day two of the spill. At this time, the hotline was transferred to OSPR phone operators who received information from concerned citizens on the location of oiled wildlife. Operators then transferred this information to Wildlife Branch staff at the ICP via email who then texted it to the Wildlife Recovery Group in the field.

The extent of coastline over which oiled wildlife was found was extensive. In past spills, shoreline reconnaissance has typically been covered by wildlife recovery teams from the shoreline. Post spill evaluation indicated that shoreline and/or boat reconnaissance teams could have been useful throughout the duration of this spill.

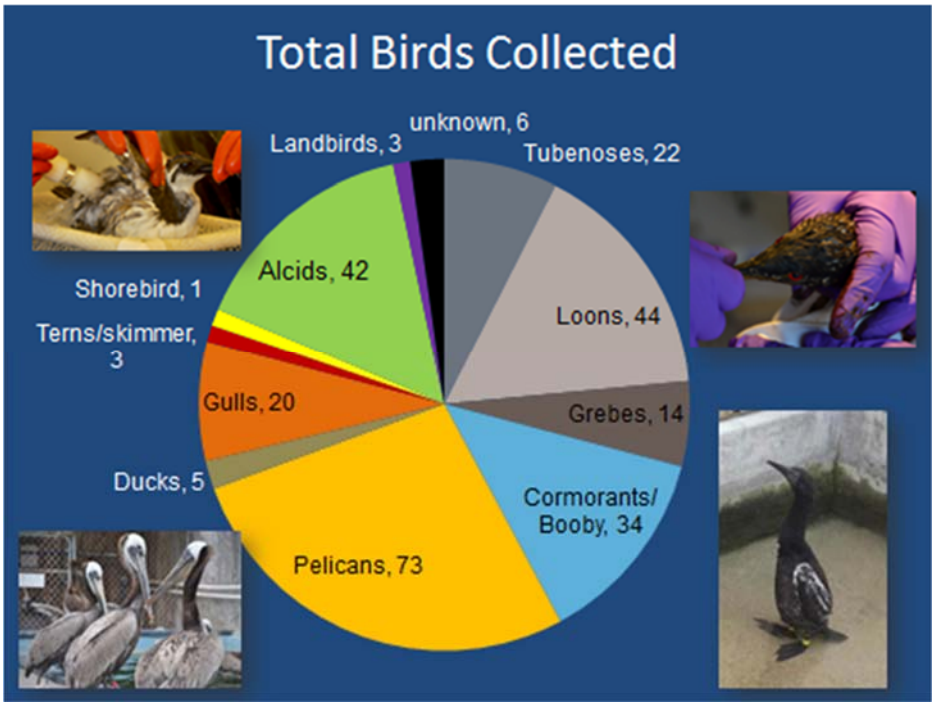
Wildlife Hazing

Wildlife hazing is intended to minimize injuries to wildlife by attempting to keep animals away from oil and/or cleanup operations. The need for hazing was assessed initially and throughout the Refugio incident and deemed not advantageous for onshore and nearshore birds and pinnipeds, and not practical far offshore for whales. The Hazing Group Supervisor made the recommendation to not haze via the WBD to the Unified Command. The recommendation was guided by site-specific and species-specific factors present at the time of the spill, and availability of proven hazing techniques.

Wildlife Recovery

Once animals became oiled, habitat-specific and species-specific strategies to recover and remove oiled live animals and all dead wildlife were required. Wildlife recovery teams – under separate bird and mammal operational groups – attempted to complete systematic surveys to collect affected wildlife, including at least one survey as early as safely possible after dawn. Successful captures not only depended on the condition of the target animals, but also on the training and experience of the Recovery teams, and techniques and equipment used. Concerned citizens began recovering oiled wildlife in the afternoon of day one of the spill in part due to lack of knowledge regarding wildlife response protocols (*i.e.*, capture should only be done by qualified response personnel) and oil health and safety practices.

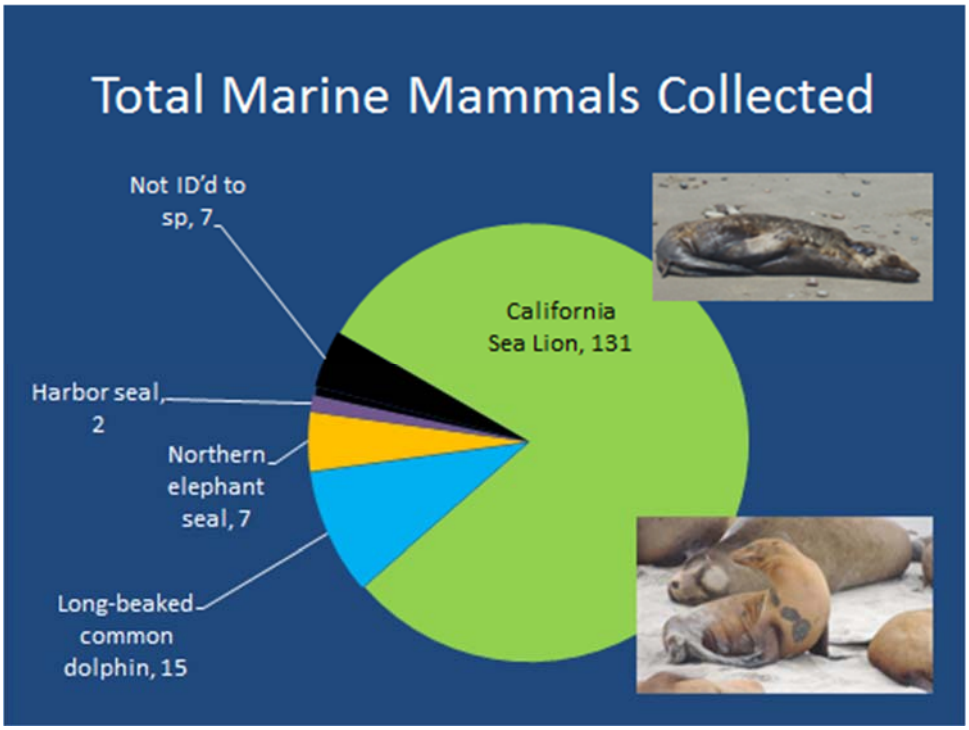
Bird recovery teams recovered 267 live and dead birds. Of the 65 live birds captured, 46 were released and 19 died in care. An additional 202 birds were collected dead. The primary species collected were Brown Pelicans, Common Murres, and Pacific Loons. Several oiled Snowy Plovers were observed at Coal Oil Point, but teams did not attempt capture due to a determination made by the U.S. Fish and Wildlife Service (USFWS) in consultation with the Wildlife Branch, that the risks of injury from capture outweighed the negative consequences of light oiling.



Marine mammal recovery teams (composed primarily of members of the California Marine Mammal Stranding Network acting within the OWCN and in coordination with the NOAA National Marine Fisheries Service (NMFS) Marine Mammal Stranding Network Coordinator) responded to reports of live and dead oiled marine mammals. Teams followed national oiled pinniped guidelines, recently updated by NMFS following the Deepwater Horizon, to capture and recover marine mammals. For dead animals, recovery teams deployed to collect the animal, or (if the animal was too large to collect) field processing teams deployed to collect information/evidence from the carcass.

Due to a concurrent and on-going California Sea Lion Unusual Mortality Event (UME) and the use of the new national guidelines, additional staff and resources were needed to recover and process both live and dead marine mammals. Most facilities and local staff were already operating at capacity due to the UME. While the recovery teams that were initially deployed had limited supplies to support early bird operations, the unusual finding of large numbers of affected marine mammals presented a greater challenge for acquiring necessary equipment.

Teams recovered a total of 162 live and dead marine mammals. Of the 63 live mammals captured, 24 were released and 39 died in care. Ninety-nine mammals were recovered dead. The primary species collected was the California Sea Lion.



Transportation
Transport of oiled wildlife from the field to the recovery/field stabilization area(s), and/or to the primary care facility was done as quickly and efficiently as possible. However, because most marine mammal facilities were above operational capacities due to the UME, the closest large-scale facility that could accept oiled pinnipeds was SeaWorld San Diego. Similarly, the closest large-scale primary care center for birds was the Los Angeles Oiled Bird Care & Education Center, located in San Pedro. The extensive shoreline area over which impacted wildlife were recovered, coupled with the long distance to primary care facilities and significant traffic congestion, presented transportation challenges throughout the response. When possible, animals were checked on periodically during transport, and if needed, provided hydration and nutrition.

Field Stabilization
The Field Stabilization Group provided initial care prior to transportation to the primary care facilities to increase survival. The OWCN mobile veterinary laboratory/animal care trailer (aka, MASH unit) was dispatched to the field for this purpose. In addition, smaller wildlife rehabilitation centers (Channel Islands Marine and Wildlife Institute and the Marine Mammal Care Center in Fort MacArthur for pinnipeds, and Santa Barbara Wildlife Care Network for birds) provided additional stabilization support.

Wildlife Care & Processing
The Wildlife Care & Processing Group utilized two Strike Teams – Wildlife Care and Wildlife Processing. The Wildlife Care Strike Team ensured that wildlife exposed to petroleum products received the best achievable care through veterinary services at

rehabilitation centers. The Wildlife Processing Strike Team ensured oiled animals were fully evaluated and that data were captured, so the UC could obtain oiled wildlife statistics used for a variety of purposes, such as response strategy development and media updates. Separate care and processing groups were formed for birds and mammals within the two separate primary care centers.

Recommendations

Both OSPR and OWCN hosted multiple "Refugio Incident Wildlife Hotwash" discussions to identify lessons learned among lead and key staff. The following describes significant lessons learned and recommended changes to improve spill response for oiled wildlife.

Wildlife Reconnaissance

- While the hotline was effective in receiving and transferring information for hundreds of calls, tracking the status of each animal was time consuming for responders in the field. In the future, data should be input to a "live spreadsheet" document that can be shared among key wildlife staff (e.g., operators, WBD, responders in the field). This system will provide data more efficiently to responders, and will aid operators in providing status updates to concerned citizens on animals they report.

- To address increased calls to the hotline as a result of public concern during spills and ready access via cell phones, as well as a request from OWCN for shoreline and/or on-water reconnaissance teams throughout the duration a large oil spill, OSPR should prepare to fill the role of Reconnaissance Group Supervisor in future wildlife responses and as appropriate in drills.

Wildlife Recovery

- The OWCN will develop more comprehensive plans to ensure an on scene core staff Wildlife Recovery Group Supervisor and complete supply caches (either within the OWCN's Sprinter van or pre-staged caches) are available on day one of a spill. Additionally, the OWCN will establish standards to cascade resources to a spill over defined time periods.

- The Refugio Incident was the first spill in recent California history to involve significant numbers of oiled and possibly impacted marine mammals. For example, during the *Cosco Busan* oil spill, one live oiled marine mammal was encountered, and five dead. As such, activated Recovery personnel had greater-than-normal operational taskings for the incident size. In the future, additional staff should be activated to ensure coverage is attained both for responding to public/responder sightings as well as systematic regional searches.

Wildlife Field Stabilization and Field Processing

- OWCN leads should ensure all OWCN personnel receive additional training on the National Oiled Marine Mammal Guidelines, and develop California-specific guidelines that help enact these Guidelines.
- For spills with anticipated wildlife impacts, a core staff Group Supervisor and the MASH unit (with equipment and supplies needed to support field stabilization and (if necessary) field processing) should be on scene within 24 hrs.

Wildlife Transportation

- Use of staff from OSRO's as drivers for transportation of oiled wildlife was effective for providing dedicated personnel for this important task as well as trucks of sufficient size. In the future the WBD should consider the use of OSRO or other contract personnel/vehicles for transport, in particular when marine mammals are impacted. All transporters should be accompanied by a trained OWCN volunteer or staff who can ensure animals remain stable and can also direct communications with the facility and transportation coordinators to provide updates on estimated arrival times.

D. Environmental Unit

Environmental Unit (EU) Introduction

This section summarizes 1) objectives and responsibilities; 2) response activities and efforts; and 3) recommendations from the Refugio Incident Environmental Unit (EU). General EU objectives, responsibilities, activities, and recommendations are described first followed by more specifics for each of the main functions under the EU that OSPR led in this response, including:

- Identifying resources at risk – Resources at Risk (RAR) Technical Specialist
- Conducting Shoreline Cleanup Assessment Technique (SCAT) surveys – SCAT Coordinator (see Appendix B for SCAT evaluation and recommendations)
- Sampling – Sampling Technical Specialist/Coordinator
- Fisheries closures – Fisheries Closure Technical Specialists
- Tribal/Cultural Coordination – Historical/ Cultural Resources Technical Specialist
- Applied Response Technology (ART) evaluation – ART Technical Specialist
- Geographic Information System (GIS) support – GIS Technical Specialist which is officially under the Situation Unit but in this case GIS Technical Specialists were also integrated into the EU.

Not detailed in this report are the following functions that were part of the EU but not led by OSPR staff:

- NOAA Scientific Support Coordinator (SSC) – Responsible for oil spill trajectory, oil fate and effects, weather forecasts and assistance with response technology evaluations)
- Endangered Species Act Consultation, Section 7 Permits – filled by U.S. Fish and Wildlife Service (USFWS)

- Waste Coordinator Technical Specialist – led by the RP
- NRDA Liaison – filled by USFWS
- Trajectory Technical Specialist – filled by NOAA
- Public Health Group – led by an RP contractor

This section also references a number of plans that were generated within the EU, but not every plan that was generated is detailed here.

General EU Objectives & Responsibilities

It is the policy of OSPR that the Environmental Unit Leader (EUL) position be filled with a representative from a state or federal natural resource trustee, and may be assisted by a Deputy EUL provided by the RP. For the Refugio response the EUL was staffed by OSPR and the Deputy EUL was staffed by an RP representative.

The EU was primarily comprised of staff from OSPR, NOAA, NOAA's contractor (Research Planning, Inc.), RP employees and contractors, State Department of Parks and Recreation, USFWS, EPA contractors, Santa Barbara County, Central Coast Regional Water Quality Control Board, and the University of California, Santa Barbara.

In general, the EU is responsible for environmental matters associated with the response and for providing scientific support. Following the Incident Management Handbooks (USCG, 2014 and US EPA 2007), overarching objectives of the EU are to: 1) identify and develop strategies and direction for shoreline cleanup efforts to maximize protection of environmentally sensitive areas including wildlife, habitats (considering pre-impact shoreline debris removal), and historic properties; 2) investigate potential uses of alternative response technologies; and 3) determine fate and effect (through trajectories, modeling and other data evaluation) of the spilled oil.

General EU Refugio Activities & Effort

Throughout the response, the EU coordinated with all pertinent federal, state, and local agencies and incorporated representatives in appropriate EU positions based on individual skill sets. During the initial days of the spill, appropriate actions were taken to fully staff the EU, to initiate air monitoring for worker/public health and safety, identify resources at risk, determine initial extent and degree of oiling, coordinate regarding historical/cultural resources, address permitting, and develop mitigation and avoidance measures to minimize natural resource impacts by the oil and the cleanup operations. Additional activities included the collection of product and environmental samples (water and sediment), evaluation of applied response technologies, addressing the fisheries closure, and development of response plans (e.g., Phase I cleanup endpoints, waste treatment, treatment plan for archeological/cultural concerns, submerged/sunken oil assessment, beach reopening, and remedial alternatives analyses).

As the spill progressed, additional efforts were made to investigate reports of oil stranding on distant shorelines (e.g., South Bay/Manhattan Beach). In late May 2015, during a separate response to tar balls in Los Angeles County, OSPR's Petroleum Chemistry Laboratory identified one of the tar balls collected at Manhattan Beach as a

match to the Line 901 oil. At around this time, the RP's contract chemistry laboratories also reported matching tar balls from this area to Line 901 oil. From July 9-10, 2016, a "Sampling Blitz" was conducted for Santa Barbara, Ventura, Los Angeles, and Orange County beaches to provide simultaneous oil sampling data from the Refugio Oil Spill area as well as the second spill area further south, that could be released to the public. Of the samples collected in the "Sampling Blitz" effort, OSPR's Petroleum Chemistry Laboratory identified one tar ball from Santa Barbara County as a 'match' with the Line 901 oil.

Further refinements of existing plans (i.e., remedial alternatives analysis matrix) were made and new plans developed (e.g., Phase II Guidelines for Terrestrial, Marine Waters and Shoreline Habitat Cleanup Endpoints, Fingerprinting Sampling and Analysis Plan, Seep Oil/Sheen Sample Plan, Oiled Cobble Relocation Plan, Storm Water Management Plan/Erosion Control and Restoration, Subsurface Oil Detection and Delineation Plan, Pipeline Excavation Sample and Analysis Plan). A Constraint Assessment Team was formed to evaluate areas that could not be cleaned due to geological constraints (e.g., falling rocks along a cliff face). The EU also incorporated Non-Governmental Organizations (NGOs) into a sampling collection effort as part of the Overview Oiling Survey Assessment.

The Phase III Maintenance and Monitoring Plan included sampling in December 2015, and after the first significant storm event in January 2016. The plan also included, as conditions allowed, SCAT surveys every two weeks until recently when the remaining shoreline segments were signed off as meeting Phase II cleanup endpoints (January 2016). Additional sampling will occur in May of 2016 to determine cleanup needs if Line 901 oil is found. Regarding the ability to identify matches to Line 901 oil, many factors (e.g., biodegradation, mixing, and washing) in the environment can affect a spilled oil's chemical signature that is used for comparison to a source. Current laboratory methods can differentiate incident oil from background with certainty if these factors have not affected individual samples to the point at which their chemical signatures have changed too far. The degree to which these factors might or might not affect individual samples taken for comparison cannot be predicted over time or geographic area.

Additional attention focused on Section 5 (cliff face) and a technical advisory group evaluated remedial alternatives. The Section 5 cliff face continues to be monitored and, when seepage of oil above cleanup endpoints is observed, the monitoring team makes notifications so remedial options can be assessed/implemented. Currently there are monthly inspections/monitoring events for Section 5 in addition to monitoring events if specific triggers are met (e.g., earthquake), to continue through the end of 2016.

Regarding the bluff and the pipeline sections, the contamination was excavated, and the area was backfilled and re-seeded per the approved excavation and restoration plan and per State Parks specifications. Watering and maintenance/monitoring are ongoing.

In California the Wildlife Branch in the Operations Section is responsible for recovering and rehabilitating injured wildlife (e.g., removing oiled carcasses, pre-emptive capture,

hazing, and/or capture and treatment); and the EU coordinated with the Wildlife Branch throughout the response.

General EU Recommendations

- For large spills consider using multiple Deputy EULs to support EUL.
- When a spill occurs in an area of natural seep activity, the EU should form sampling teams with representatives from the state, federal government and RP, and create a pre-approved sampling plan to support distinguishing spill from natural seep oil. Consider developing pre-approved clean-up endpoints for areas with known significant natural seepage or use background as the endpoint.
- OSPR should work with NOAA to update shoreline cleanup methods and analyses for different habitat types; and consider using Shoreline Treatment Recommendations Form (or similar form) per habitat type versus per segment.

a. Resources at Risk (RAR)

Objectives & Responsibilities

The RAR Technical Specialist is responsible for the identification of resources at risk from exposure to the spilled oil and response activities. The RAR Technical Specialist evaluates the relative importance of the resources, weighs the risks to each and recommends priorities for their protection in conjunction with Trustee Agencies and the Historical/Cultural Technical Specialist. Use of pre-identified environmentally sensitive sites and recommended response strategies in the ACP is a primary strategy to identify and prioritize resources at risk until more accurate information from aerial reconnaissance and shoreline surveys were available. Oil spill trajectories, using real time wind and current data, are also used. The RAR Technical Specialist is responsible for completing the ICS 232 form that identifies/prioritizes the environmental, economic, historic, and cultural sensitive sites to protect. The RAR Technical Specialist also assists Operations in identifying the kind, type, and number of response resources required to implement the response strategies and objectives, and follows up with Operations to ensure strategies have been implemented.

Refugio Activities & Effort

Throughout the response the RAR Technical Specialist completed and updated the ICS 232 identifying and prioritizing sensitive sites to protect and incorporating this information into the IAPs. In addition, the RAR Technical Specialist followed up with Operations regarding implementing site strategies, coordinated with other Trustee Agencies to identify minimization and avoidance measures to prevent impacts to wildlife from operational activities, incorporated these measures into the IAP and provided special messages for the ICS 204 forms (Assignment Lists).

Recommendations

- The RP's contractors utilized their own ICS software to develop the IAPs. There were times when information from the RAR Technical Specialist didn't make it into the IAP and important resource protection information was potentially left out

of some IAPs. OSPR should develop procedures to ensure RAR information and other information from the Environmental Unit gets incorporated into the IAP when ICS software is used.

b. Sampling Coordinator

Objectives & Responsibilities

It is the responsibility of the Sampling Coordinator (SC) to coordinate the collection, documentation, secure storage, transportation and submittal of spill samples to appropriate laboratories for chemical analysis or storage. The SC coordinates the sampling process to prevent duplication of samples and wasted effort, assigns priorities for analysis, identifies gaps in sampling, identifies and coordinates additional analytical capability which may be needed. In the context of the Incident Command System, the SC position resides within the EU. From the EU, the SC may work within the framework of a Sampling Advisory Team made up of representatives of different functional areas, including NRDA, Wildlife, Fisheries Closure, EU, and Investigations. The Sampling Advisory Team is responsible for developing objective specific initial sampling plans, implementing plans and modifying plans as necessary during the spill response, investigation and damage assessment.

Other major responsibilities of the SC include:

- Participating in planning meetings
- Providing status reports
- Maintaining sample collection log and sampling map in coordination with GIS
- Developing and/or reviewing sample plans and procedures
- Determining logistical needs for sampling (e.g., sample equipment, sample storage, and sampling supplies distribution)
- Identifying and coordinating with laboratories, including contract labs, if needed
- Completing ICS forms as needed (e.g., ICS 204)
- Ensuring source sample and enforcement investigation samples are collected
- Maintaining chain of custody records

Refugio Activities & Effort

After the spill response was initiated, the OSPR SC began coordinating efforts with OSPR NRDA, investigations, fisheries closure, and EU staff; and assumed responsibility for distributing supplies, advising on appropriate analyses, taking custody of samples, securing appropriate sample storage and arranging for shipment to the OSPR Laboratories. The SC also participated in sample coordination meetings with US EPA, USCG and the RP to develop sample plans including the Forensic Sampling and Analysis Plan to provide accurate and reproducible petroleum hydrocarbon fingerprinting results between laboratories. As analytical data became available from the OSPR Laboratories, the SC helped review and report on the results. Other activities of the SC included:

- Reviewed/approved several sample plans including the Quality Assurance Plan
- Coordinated with the RP to receive splits of samples

- Compiled RP and USCG analytical results as they became available for transmittal to OSPR Laboratories
- Managed the sample and equipment storage facility and distributed sampling supplies, coolers, and ice as needed

Recommendation

- In large spill responses, separate SC's for NRDA, Response and Investigation sampling efforts should be considered
- Revise Sample Coordinator job aid to include evaluating/sampling natural seep sources during spills in known natural seep areas

c. Fisheries Closure

Objectives & Responsibilities

CDFW is required by Fish and Game Code Section 5654 to close affected waters to the take of all fish and shellfish within 24 hours of notification of an oil spill or discharge. This closure must take place in any affected location or potentially affected location where commercial, recreational, or subsistence fishing or aquaculture operations are known to take place. The Code states that closure is not required if the Office of Environmental Health Hazard Assessment (OEHHA) finds, within 24 hours of the notification that a public health threat does not, or is not, likely to exist. If a fishery closure is enacted, the CDFW director, in consultation with OEHHA, must determine within 48 hours if a public health issue is likely to persist, if the closed area should be expanded or contracted, and the estimated length of closure based upon all current information.

If the fishery remains closed after 48 hours, the director is required, within seven days from the spill notification, to order expedited tests of fish and shellfish that would have been open for commercial, recreational, or subsistence purposes in the closed area if not for the closure. Tests must be performed to determine the levels of contamination, if any, and whether the fish or shellfish are safe for human consumption.

If OEHHA determines that no threat to human health exists from the spill or discharge, the director must reopen the closed area within 24 hours. If a threat does exist, the director is authorized to maintain a closure of the entire affected area or change the geographic boundaries of the closure based upon OEHHA's findings. The director shall communicate, to the extent feasible, with commercial and recreational fishing associations and subsistence fishing communities regarding the extent and duration of a closure, testing protocols, and findings.

The process described above was directly followed on May 19, 2015 in response to the Refugio Oil Spill.

Refugio Activities & Effort

Closure Boundaries
In a conservative effort to protect public health, OEHHA recommended a closure of fish and shellfish harvesting be enacted for the coastal area near Refugio State Beach. The closure boundary, based on available information, extended from approximately one mile to the west and one mile to the east of Refugio State Beach and included the shoreline and offshore areas between these points to one-quarter mile offshore.

Later, the closure area expanded significantly based on aerial observations and review of the NOAA's oil spill trajectory models of where the oil was expected to spread. The amended closure area extended from Canada de Alegeria on the western edge to Coal Oil Point on the eastern edge and included the onshore and offshore areas between these points to six miles offshore, encompassing approximately 138 square miles. Since the closure was in effect for more than 48 hours, expedited testing of the seafood was required prior to allowing a lift of the closure.

Sampling Plan and Collection
CDFW and OEHHA jointly developed a sampling and analysis plan to determine the degree of the impact and geographic extent of potential seafood contamination. The sampling plan utilized CDFW commercial fishing blocks with the goal of making decisions regarding lifting the closure on a block by block basis. The fisheries closure area, fishing blocks, and sampling blocks are illustrated in Figure 1.

Nineteen species of finfish, invertebrates, and plants were collected using multiple methods from each of the three sampling blocks and analyzed for contamination related to the oil spill. Three primary factors determined which finfish and invertebrate species were selected for sampling 1) potential for exposure to oil, 2) recreational or commercial importance, and 3) representation of different feeding ecologies and habitat types within the closure area. Finfish species consisted of: barred surfperch, grass rockfish, kelp rockfish, pacific sanddab (collected at both deep and shallow depths), vermillion rockfish, black and yellow rockfish, bocaccio rockfish, and pacific mackerel. Invertebrate species collected included: California spiny lobster, warty sea cucumber, giant red cucumber, red sea urchin, ridgeback prawn, yellow rock crab, brown rock crab, sheep crab, mussels, and red abalone. Although not a traditional fishery, harvesting of kelp is regulated under Fish and Game Codes 6650-6657 and it is an important food item for many aquatic species in the area. Therefore, it was included in the sampling plan. All sampling was done in accordance with standard sample collection and safety protocols.

Many agencies and organizations were involved with the various components of the sampling effort, including CDFW and OEHHA staff, a private consulting company that supplemented the CDFW dive team, and commercial fishermen (for collection using trawls and traps). RP representatives assisted with mussel collection efforts.

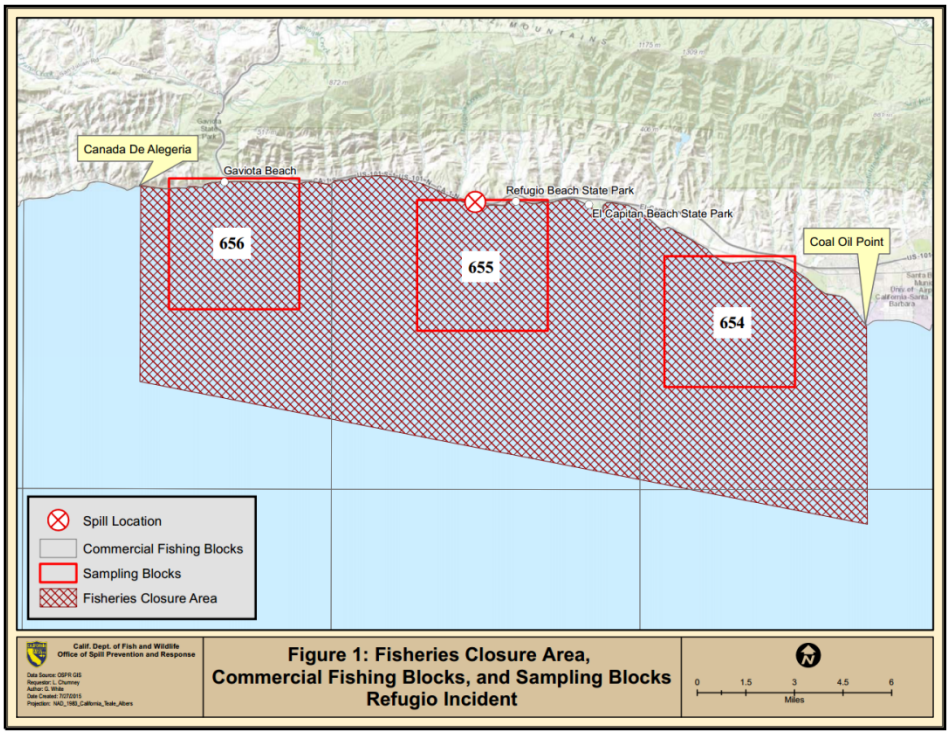
The cooperation between all participants in the plan design and sampling process was essential to expediting this process in a way that maintained the integrity of the data

collected. One of the primary successes that resulted from this response was the collaboration and cooperation between state and federal agencies, the RP, and the commercial fishermen who assisted with the sampling efforts. OSPR enlisted the assistance and expertise of these various parties to plan and conduct the sampling effort. For example, as further information became available from trajectory models and overflight data in the 24-48 hours post release, it became evident that the fisheries closure boundary needed to expand significantly into federal waters. CDFW consulted with the NOAA, who have jurisdiction in federal waters, prior to expanding the boundary. Further, CDFW identified active commercial fishermen who provided essential equipment and knowledge to capture targeted species.

Laboratory Analysis and Results

Tissue samples were prepared and analyzed by the OSPR Laboratories. Tissue samples were received, processed, analyzed, and stored in accordance with OSPR standard operating procedures and/or US EPA protocols. Concentrations of oil contamination in seafood were compared to a previously established level of concern (LOC). The LOC is a concentration that is considered to pose an unacceptable health risk if consumed at a specified rate and for the predicted duration. No samples of offshore finfish, invertebrates, or kelp exceeded the LOC. Mussels collected on May 24th at Refugio State Beach, El Capitan State Beach, and Haskell's Beach initially had levels above the LOC. That number had decreased substantially for the mussels collected during the second sampling event on June 4-5. By the final mussel sampling period on June 17-18, all mussels collected were below the LOC. Final results were made available to OEHHA on June 29, 2015, at which time OEHHA recommended to CDFW that the consumption of seafood from the area posed no significant ongoing spill-related human health risk and that the closure be lifted. CDFW lifted the closure immediately and notification was provided to the public. More detailed information regarding the analysis process and results are provided in OEHHA's risk assessment report, found online at:
http://www.oehha.ca.gov/public_info/emergency/pdf/RefugioBeachSeafoodRisk12202015.pdf

FIGURE 1: FISHERIES CLOSURE AREA, COMMERCIAL FISHING BLOCKS, AND SAMPLING BLOCKS



Recommendations

OSPR received feedback from members of the active fishing community in the affected area. The majority of comments from the fishing community were positive, but some allowed for areas of improvement:

- Improve notification to local businesses that have water intakes within an affected area such as aquaculture facilities and seafood restaurants. Although communication regarding the closure was widely disseminated, it may have proved challenging for these types of businesses to assess potential risk to their individual facilities.
- Improve communication and outreach from OSPR and OEHHA to the public to reassure consumers when fishery closures are lifted.

d. Tribal/Cultural Coordination

Objectives & Responsibilities

A number of Federal and State laws, regulations, and policies govern the protection of cultural and historic resources during an emergency response in the State of California. For purposes of oil spill response, the two most critical laws that the UC must address are: *The National Historic Preservation Act of 1966* (Section 106), and *The Native American Graves and Repatriation Act of 1990*. In addition, in 2011, Governor Brown issued Executive Order B-10-11 in 2011 which established a Tribal Advisor as a part of

the Office of the Governor and further encouraged all government agencies to communicate and consult with California Indian Tribes. For purposes of the Order, the terms "Tribe," "California Indian Tribe", and "tribal" include all Federally Recognized Tribes and other California Native Americans. In 2014, CDFW adopted a policy that stipulated that such consultation would include both federally and non-federally recognized Tribes.

Within the UC structure, responsibilities for archeological, historical, and cultural resource protection fall within the Environmental Unit (EU). Per the programmatic agreement between the State of California and the Federal Government,[1] OSPR assumes responsibility for the coordination of the Cultural/Historical Group (CHG) within the EU and serves as the Cultural/Historical Technical Specialist (CHT).

Many cultural resources important to the Tribal people are located in Santa Barbara and Ventura Counties, including all artifacts, human remains, hunting and fishing grounds, sacred religious and ceremonial sites, cemeteries, midden, lithic scatters, botanical collection areas, and rock art. To protect these resources, the UC agreed that the CHG, led by OSPR (CHT), and that all California Tribes listed by the Native American Heritage Commission (NAHC), regardless of federal recognition status, would be invited to be a part of the response. After establishing the CHG, the CHT's primary responsibility was to coordinate with the UC, the EUL, the Tribes, and the archeological staff to insure that cultural and historic properties were appropriately protected during response activities. Cultural concerns of the Tribes and the scientific and legal concerns of the archeologists were very different, and at times divergent. It was the CHT's responsibility to unify and align these two "disciplines" into one cohesive group with a common mission. Early objectives included:

- Develop an inclusive process for all tribal representatives to participate
- Meet all state and federal requirements regarding resource protection
- Avoid irreparable harm to historic, cultural, or archeological resources
- Establish functional group to address all resource needs

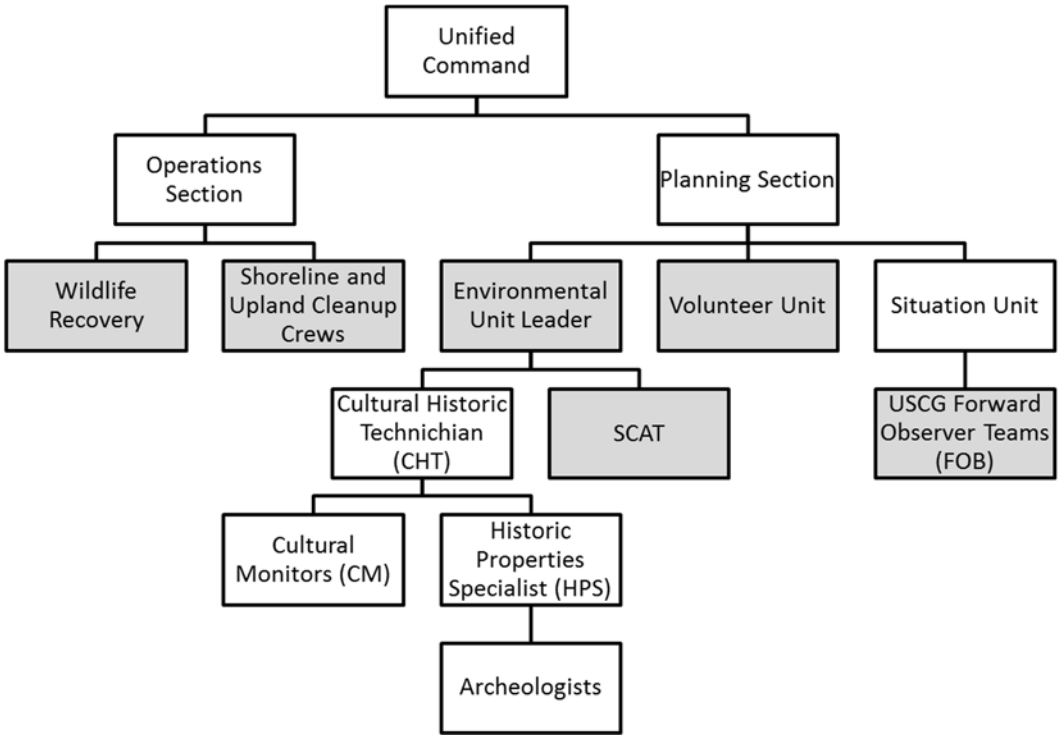
Refugio Activities & Effort

For the duration of the response, the CHT coordinated with the Tribes to identify and document their concerns into the Incident Action Plan (IAP). Tribal entities included the Santa Ynez Band of Chumash Indians (SYBCI), the only federally recognized Tribe in the area as well as non-federally recognized Tribes: the Coastal Band of Chumash Indians (CBCI) (including the Owl Clan) and the Barbareno Band of Chumash Indians (BBCI). On June 6, when the response expanded into Ventura County, another non-

1 To ensure consistency throughout the State for the protection and preservation of cultural and historic resources, the State of California and the Federal Government, through leadership of the Region IX Regional Response Team, adopted the *California Implementation Guidelines (CIG) for Federal On-scene Coordinators for the Programmatic Agreement on Protection of Historic Properties during Emergency Response under the National Contingency Plan* as an appendix to the Regional Contingency Plan. This agreement is further cited in the California Oil Spill Contingency Plan as state policy.

federally recognized Tribe, the Barbareno Ventureno Band of Mission Indians (BVBMI), was also brought into the response.

A primary focus of the CHG was coordinating Cultural Monitors (CMs), who would accompany multi-agency Forward Observer Teams (FOBs) to observe cleanup crews and identify areas of concern. These teams effectively allowed very basic cultural resource monitoring to occur early in the response. Archeologists were not included in the FOBs, but were rather deployed to various locations based on excavations and site sensitivity. To meet the needs of the expanding response and adequately protect sites of concern, the CHG helped develop a long term plan for additional CMs; the UC approved fifty CMs and fifteen archeologists. OSPR industrial hygienists conducted several 4-hour response specific HAZCOM classes to provide required HAZWOPER training to the CMs and archeologists. Through the course of the response, the CHT coordinated training for close to 100 Tribal CMs.



NOTE: Shaded boxes indicate Units, Teams, and Crews to which CMs were attached as needed.

As part of CM coordination, the CHT, EUL, Historic Properties Specialist (HPS), and Tribal supervisors reviewed shoreline treatment recommendations (STR) prior to inclusion in the following day's IAP. This was initially a long and negotiated process, which threatened to delay cleanup activities. However, with time and adjustments to address Tribal concerns, the STR review process became very efficient and did not hamper cleanup schedules. Daily scheduling of CMs was a similarly long process initially, which was streamlined by an excellent computer scheduling program (CSP)

developed by the Tribal supervisors. Finally the use of paper maps and the legally protected status of cultural/historic GIS data delayed STR and other reviews.

It was the CHT's responsibility to minimize any slowing or stoppage of operations as a result of cultural monitoring activities, which was an issue early in the response. When an artifact was found, the CM would document it and decide to leave in place, bury it on-site, or remove it to the cultural trailer for cataloging and safekeeping. The CHT worked with the archeological staff on many of the same issues as the CMs (logistics, contracts, scheduling, STR reviews, etc.). In addition to cultural resources, archeologists were responsible for the cataloging of numerous historic properties impacted by the spill and the response, such as early culverts and transportation infrastructure, trash dumps, and structure sites. The HPS was required to prepare time-consuming treatment plans addressing how identified cultural/historical resources would be protected.

At the height of response, the CHG had 66 personnel responsible for evaluating and monitoring all on-shore/on-land field operations and staging area locations that could potentially impact resources. The CHG provided archeological and cultural monitors every day through Phase I and Phase II of clean-up operations. Currently, the EUL continues to consult with tribal and archeological monitors, as part of Phase III monitoring.

The CHT coordinated two dignitary visits, working closely with the OSPR Deputy Administrator as the UC's representative. The first was a visit from the Santa Ynez Elders and the second included the Governor's Tribal Advisor and staff and several members of the NAHC. Both went very well and the Governor's Tribal Advisor commented not only on the success of the operations, but of her desire to work with OSPR to develop protocols based on this event as a model for future government-tribal interactions.

The last major CHT responsibility related to cultural resources was to address a number of ceremony requests from several different tribes. This was a very sensitive issue, however the UC decided that requests for ceremonies in the "hot zone" would not be granted (for safety considerations) and asked the CHT to work with the Tribes to find alternatives. Two notable exceptions to this policy were made, as the CMs were already working in the hot zone and had the necessary safety training. The first was a morning Summer Solstice ceremony at Refugio State Beach and the second was a repatriation of artifacts to the ocean on board a CDFW patrol boat. A few CDFW personnel were invited by the Tribes to participate in the repatriation ceremony and were honored to be included.

Other duties performed by the CHT, not previously mentioned, include: developing protocols for when bones were found; helping the JIC with questions regarding cultural sensitivity and the media; serving as facilitator to help resolve on-going inter-tribal disputes; and providing support to the volunteer unit, wildlife operations, pipeline activities, and cleanup methodologies testing.

Recommendations

The following findings and recommendations were developed with input from Tribal representatives for continued improvement and development of the Cultural/Historic Group:

1. Expanded CHG Focus for OSPR
    - OSPR should identify and train staff sufficient to serve the role of CHT and deputy CHT for a Type 1 oil spill response in each of the three Field Response Teams.
    - OSPR should develop a Tribal Outreach Plan, in consultation with the NAHC, to support coordination and communications during a response.
    - OSPR should expand a cultural/historic properties (C/HP) manual for engaging the Tribes during the first few days of a response, to include:
        - o A policy stating adherence to the ICS span of control, including a single supervisor and streamlined scheduling structure (e.g., the CSP used during the Refugio response) for all CM staff.
        - o Contracting guidelines to facilitate Tribes contracting directly with the RP during a response
        - o A template and timeline for a "ceremonial policy" that can be used at the time of an incident.
        - o An STR review policy to be explained to the Tribes early in a response.
        - o A process by which the JIC will, early in a response, establish an incident-specific policy for Tribal media concerns.

2. Tribal Integration into a Response:
    - OSPR, with the NAHC, should encourage federally recognized and non-recognized Tribes to HAZWOPER train their CMs before spills happen, to avoid delays in deployment.

3. Timeliness for Cultural/Historical Review for Shoreline Operations
    - OSPR consult with the Governor's Office of Tribal affairs, the NAHC, the SHPO, and OSPR GIS staff to explore options for accessing location information on cultural resources for planning and response while maintaining confidentiality and any legal restrictions that may apply.

4. Cultural-ICS Sensitivity Training
    - OSPR PIOs should receive Native American-specific cultural training.

e. Applied Response Technology (ART)

Objectives & Responsibilities

Applied Response Technologies (ART) includes the use of an oil spill cleanup agent (OSCA) or the use of in-situ burning (ISB) of oil. Chemical dispersants are one type of OSCA. Other types of OSCAs include surface washing agents, gelling agents or solidifiers, bioremediants, and sorbents. Federal and state policies apply to the use of

most ARTs, and are designed to provide special review of any potential ART effects on living resources and their supporting habitats.

In California marine oil spill responses, the NOAA SSC and the California ART Lead Technical Specialist (ART Specialist) work together within the EU under the Planning Section. The ART Specialist will in most cases be a trained response and ART policy specialist from OSPR. The ART Specialist identifies other trained agency personnel (e.g., from USCG) that can assist with ART research and decision-making support, and assists the FOSC, Regional Response Team (RRT) IX and the OSPR Administrator with decisions on the use of any ART that are consistent with federal and state law, regulations and policies. Only the ART options that the trustee agencies agree may provide additional environmental benefit (compared to mechanical recovery or no recovery) are advanced by the NOAA SSC and/or ART Specialist to the FOSC for his/her further consideration for use.

There currently is no identified process for the structured review of non-ART technologies during a California marine oil spill response, as most responses are addressed by Oil Spill Response Organizations (OSROs) that are regulated at both federal and state levels to have the requisite types and amounts of response equipment available within designated time frames. The only previous oil spill response that demanded a more fully developed approach to Response Technology Evaluation (RTE) was the Deepwater Horizon Oil Spill response. The Deepwater Horizon response led to the development of RTE approaches for both ICP intake and processing of technology ideas and products, and field testing of the technologies identified by the Operation Section as having merit or need. The RTE recommendations from Deepwater Horizon have been reviewed by the National Response Team (NRT) but are not yet part of the Incident Management Handbook.

The OSPR ART Specialist was involved in RTE during the Deepwater Horizon response, and employed some of those approaches during the Refugio response. Technologies or products identified through the Logistics Unit or public information officers were routed to the ART Specialist. This allowed the ART Specialist to identify which OSCA products offered were already EPA-listed and/or California-licensed for use and which mechanical products might receive additional consideration through Operations and/or field testing, and to respond by email to each offer of product or equipment.

Refugio Activities & Effort

The OSPR ART Lead Technical Specialist (ART Specialist) worked on both ART issues as well as aspects of Response Technology Evaluation (RTE) during the Refugio response. Some response technologies (e.g., dry-ice blasting) were evaluated and implemented outside of the active deployment of the ART Specialist, and the summary below does not cover those efforts.

The Refugio Oil Spill was a spill setting and oil type for which the ART Specialist, who is a lead ART specialist for the state and a member of Regional Response Team (RRT)

IX, could rapidly and informally determine that dispersant use was not going to be an appropriate or allowable response option. The ART Specialist made this informal assessment on the day the spill was reported (May 19, 2015), primarily based on these factors: 1) California regulations prohibit dispersant use on shorelines; 2) it is California policy (and presumed RRT IX policy) that dispersants will not be applied over marine waters shallower than 60 feet; and 3) the type of oil spilled (Monterey Formation oil produced from the offshore platforms) is generally not amenable to break down by chemical dispersants, such that dispersants would likely not be effective on this oil even if the spill occurred offshore and over suitably deep water.

Although the Federal On-Scene Coordinator (FOSC) had not officially requested that dispersant use be evaluated, the ART Specialist was proactive in providing her informal assessment regarding the use of dispersants. Early media reports indicated alarm on the part of some environmental groups that dispersants might be used. The UC provided information to the public to clarify that the use of dispersants would not be allowed given the factors above.

The FOSC did not request that the ART Specialist evaluate *in-situ* burning of the oil at either the land-side spill site or on any shoreline-affected areas, so no evaluation was conducted.

Evaluation of Non-Dispersant Oil Spill Cleanup Agents (OSCA)
Use of surface washing agents, a type of OSCA, was investigated by the ART Specialist as a potential method for cleaning of the mid-size cobble forming the protective berm at Refugio State Beach, and potentially for larger immovable boulders at other affected beaches. The primary question of interest was whether these agents would be effective at loosening the spilled oil from hard surfaces. However, after initial testing of one product, Accell Clean, the FOSC and RRT IX indicated to the ART Team that other rock cleaning options (e.g., physical/mechanical methods) were preferable to cleaning agents. Removal and replacement of the surface layer of oiled cobble was also considered as an alternative to the various cleaning options being explored. The ART Team subsequently reviewed several other physical approaches to oil removal, and these are discussed in the sections below.

The ART Specialist also evaluated several other OSCA's:

- SaveSorb, a peat product, was the only other oil spill cleanup agent that was subjected to field use observations. Field testing indicated potential utility of this product; however SaveSorb was not licensed by the state. A one-time incident-specific use of SaveSorb was approved by the OSPR Administrator. The SaveSorb license application is still pending.
- Oil Spill Eater II (OSEII), a bioremediation product licensed by the state, was considered by the ART Specialist, however, based on the chemical components of the product, no appropriate or approvable use for the OSEII product could be identified for the Refugio Oil Spill. Bioremediants are typically used as a long-term "polishing" tool for resistant or hard-to-access oil stranded on shorelines.

- Thirteen other types of loose or self-contained sorbent products were offered by manufacturers for review during the Refugio Oil Spill, as well as an additional bioremediants, and four additional surface washing agents (in addition to Accell-Clean). The ART Specialist responded to all offers and suggested that some pursue an OSPR license or exemption for their product following the Refugio Oil Spill.

At one point during the Refugio Oil Spill, the ART Specialist was apprised of the unauthorized use of a sorbent product and surface washing agent on a private beach. The unauthorized user agreed to stop using both products in the response.

Response Technology Evaluation (RTE)
In addition to the various oil spill cleanup agents offered for review, the ART Team (the ART Specialist and a USCG representative) also considered offers of various mechanical response technologies. These included a parachute skimmer, a detection array, Tiger Boom and Cherrington sand sifters. Individual email responses were offered by the ART Specialist to all product vendors.

As mentioned above, the ART Team was tasked by the RRT IX and the FOSC to explore various rock cleaning options that did not employ the use of oil spill cleanup agents. Four of these additional options received some field testing by the ART Team:

- Cold water, high pressure washing: Tests indicated effectiveness at cleaning rocks, however there were concerns about how much water would be needed for large-scale cleaning. It was determined that using salt water, with appropriate equipment, would relieve concerns about using limited potable water. Also, setting up a system where wash water could be filtered and reused would further reduce the water use concerns, and allow quantification of oil in the rinse water.
- Hot water, high pressure washing: Tests did not offer a desirable result as the hot water pressure washing appeared to liquefy the oil, spreading it over the rock and possibly embedding the oil into the rock pores.
- Power brush scrubbing: The powered wire brush scrubber was not more efficient than wire brushing by hand. In addition, while oil and oil stain were removed, a pitted and gouged rock surface was a result. Combined with possible inhalation concerns for workers, the ART Team advised against its use.
- Rock tumbling: A small portable cement mixer, along with a mix of playground sand, small gravel and 6-7 oiled cobbles from Refugio State Beach, were tumbled for various amounts of time to determine if this could result in at least removal of gross oil from the cobble surface. Tumbling was effective at removing some gross oil, but it would take extended periods of tumbling. Given that a suitable source for replacement cobble was available, it was determined that it was no longer reasonable to expend more time, money or effort on other rock cleaning technology tests.

Recommendations

- The OSPR ART Specialist and other staff should deliver training and outreach for RRT IX members regarding the uses, benefits, and consequences of use for the various ARTs in order to ensure timely and environmentally protective decisions.
- The OSPR ART Specialist, working with NOAA, should develop spill-of-opportunity test protocols for surface washing agents and bioremediants to allow side-by-side tests of, at minimum, all CA-licensed products. This process could also include non-licensed products that are listed on the NCP Product Schedule. Also develop updated template protocols for spill-of-opportunity sorbent testing. Tests should not be allowed by the RRT IX, FOSC/UC or OSPR Administrator if they impair the response, or would otherwise not benefit the response.
- Response Technology Evaluation: In future spills, responding agencies should consider adopting the RTE model developed following the Deepwater Horizon spill response, which describes a tiered approach. In smaller spills, RTE could continue to be handled under the EU, but for larger responses, a separate RTE Unit under the Planning Section would be stood up, with its own Unit Leader. The RTE model better assures the proper coordination between Planning and Operations Sections.

f. Geographic Information System (GIS) support

Objectives & Responsibilities

The Geographic Information System (GIS) Unit was included as part of the Situation Unit (SITU). The primary responsibilities of the GIS Unit were to provide daily situational awareness maps for the Situation Unit Leader (SITL), daily field maps and data management for the Shoreline Cleanup Assessment Technique (SCAT) Coordinator, and other maps and displays as requested. Beyond the primary responsibilities just stated, the GIS Unit supported the mapping needs and data management for the entire response effort including but not limited to Operations, the Joint Information Center (JIC), Santa Barbara County Fire Department, Cultural Monitors and the Unified Command (UC).

Refugio Activities & Effort

The GIS Unit was comprised of GIS professional staff from OSPR, NOAA's Environmental Response Management Application (ERMA) team, and NOAA's contractor, RPI. The RP provided one GIS professional initially, but he was released by the RP after just a few days. OSPR GIS staff generated the majority of all map requests submitted by responders, and administered OSPR's on-site GIS data server that was used for digital data management and storage. NOAA personnel were responsible for managing the manned aerial overflight data (transcribing original field notes and digitizing into GIS layers), and also the initial management of the ERMA Common Operational Picture (COP). RPI personnel transcribed SCAT field data sheets and entered information into the SCAT database, then generated the resulting GIS files.

GIS Physical Space: The initial Incident Command Post (ICP) at the Santa Barbara County Office of Emergency Management (SBOEM) was space limited. GIS had to function in extremely tight quarters. The ICP move to the Santa Barbara Airport location provided more appropriate space for the GIS Unit including extra table space for map viewing.

Internet: Initial internet access was via a local Wi-Fi router provided by the SBOEM facility. Due to the number of people in the facility the Wi-Fi was barely adequate for GIS data transfer, even with the use of personal mi-fi "hot spots". At the airport location GIS experienced total failure due the poor internet connectivity. This was resolved after the RP contracted with the local cable TV company to install a business class internet service.

Relationship with SITL: The GIS Unit was part of SITU on the organization chart. Once a routine and schedule for situational awareness maps was established there was limited contact with SITL. SITL sent runners to collect the required maps for the situation board and to liaise with the GIS Unit Lead for special requests.

Relationship with EUL: GIS had frequent contact with the EUL in order to provide custom field maps and GIS displays as needed by EU personnel, daily.

Relationship with SCAT Coordinator: The GIS Unit worked very closely with the SCAT Coordinator to provide daily critical mapping support and management of the data collected from all SCAT teams. This relationship still continues as part of the Phase III monitoring.

Relationship with NOAA: NOAA staff was integral to the successful flow and integration of data from the field into the on-site GIS server. After several weeks NOAA de-mobilized their staff from the response, which created a challenging transition for OSPR GIS staff, resulting in a minor disruption in the management of the COP. RPI, NOAA's contractor, remained on-scene to transcribe the daily SCAT field forms and enter the data into the SCAT database.

Relationship with Documentation Unit (DU): The DU was important for meeting the needs for daily map production. The DU had a large format plotter and scanner that were used extensively by GIS staff. The DU staff was able to assist in the printing/plotting of maps for the GIS Unit when provided with PDF files.

Data Management Plan: NOAA in consultation with the GIS Unit Lead drafted a data sharing/management plan that was signed by the members of the Unified Command. This document formalized where response data were stored and managed. OSPR is currently working on an updated version of this document that can be used as a template in future emergency oil spill responses.

Remote Sensing Activities: The OSPR GIS Unit coordinated with the Unified Command and Air Operations to conduct three limited remote sensing missions. These were

academic experiments and field training missions, the results of which were for further learning purposes and not used for any operational decision making.

Marine Spill Response Corporation Activities: Ocean Imaging's (OI's) Tactical Response Airborne Classification System (TRACS) flown and operated by the Marine Spill Response Corporation (MSRC) was on scene as part of a previously scheduled training exercise over the natural seep fields in the Santa Barbara Channel. They flew over a limited area immediately offshore around the spill point at Refugio State Beach. The collected imagery was processed by OI in their Denver, Colorado headquarters. The resulting interpretation was then transmitted to the ICP as a GIS file and posted to the ERMA COP.

NOAA: The Aerostat-IC owned and operated by Inland-Gulf Maritime, LLC (IGM), Fairhope, Alabama, was on scene under contract to NOAA as part of a previously scheduled exercise over the natural seep fields in the Santa Barbara Channel. NOAA granted permission to move the Aerostat-IC over the spill site to collect imagery for experimental purposes.

NASA/JPL: NASA's Airborne Visible Infrared Imaging Spectrometer, Next Generation (AVIRIS-NG) Hyperspectral sensor system was invited by OSPR for an experimental imaging mission along the shoreline at Refugio and El Capitan state beaches. The purpose of this mission was to see if tar balls could be imaged and discriminated along the shoreline and in the offshore environment. Prior to the flights, a team of scientists led by Bubbleology Research International, Solvang, California, collected tar balls on an affected beach and analyzed them in a laboratory operated for the Department of Energy. The infrared spectral analysis confirmed the presence of unique petroleum hydrocarbon spectral features that would allow diagnostic mapping of beach tar from the air or space.

GIS Server: The OSPR GIS server was successfully deployed and used to securely store and manage digital data for the response. Access to the server was controlled by the GIS Unit. All those who had a need for the data were granted access permissions and then able to log into the server environment. This worked well and there were no problems distributing the data to those who needed it. The physical setup for the server requires a 220 volt outlet. This need turned out to be somewhat problematic and in the SBOEM ICP the uninterruptable power supply for the server had to be disabled (it required the 220 volt connection). At the second command post location at the Santa Barbara Airport, a 220 volt receptacle was installed to solve this problem.

Recommendations

- Electrical and Internet needs: OSPR should develop GIS specifications for electrical and internet needs at an ICP
- Data Management Plan: A data management plan should be presented to the Unified Command, agreed upon, and implemented within the first few days of the response. A standard template for such a plan is currently being drafted by OSPR. Key elements of this plan may include 1) on-site data management by

the OSPR GIS Unit, 2) a determination of the COP to be used for the response (OSPR SOSC should recommend ERMA, because this is the COP tool developed by NOAA/US EPA and has allowed OSPR access rights to post, edit and manage data layers), and 3) all parties (RP and agencies) will have access to the response data.

- SCAT Data Collection and Data Management: Transcribing paper forms for manual entry into a database is very time consuming, labor intensive and cumbersome. The OSPR GIS Unit in coordination with OSPR's Field Response Teams (FRTs) is currently developing a California-centric SCAT data collection App for the iPad. This App will have the ability to export the field data into a matching SQL database to store, manage, and query the data, then output the results into GIS format for map making and inclusion in the COP.
- Remote Sensing Plan: Response operations would benefit from a template plan for oil slick detection using remote sensing technologies. OSPR will produce a draft remote sensing document for external agency review.

E. Volunteer Coordinator/Unit

Objective & Responsibilities

The Volunteer Coordinator (VC) is a technical specialist to the UC. The VC responsibilities include: assess volunteer interest, conduct stand-by notifications to local volunteer organizations, coordinate with the JIC to establish timely messaging to the public regarding volunteer information that includes social media, volunteer hotlines and websites; work with appropriate Section Chiefs and Command Staff to determine if volunteers are needed and can be safely utilized, recommend suitable volunteer tasks and required training; and identify a volunteer management system that has the authority to screen, register, train, and assist in the management of volunteers.

If volunteer interests become significant then a Volunteer Unit (VU) will be established within the Planning Section, and the VC becomes the Volunteer Unit Leader (VUL). The VU includes an Emergency Volunteer Center Coordinator and Non-Governmental Organization Coordinator. The VU responsibilities include:

- VUL coordinates with the JIC regarding outgoing volunteer messaging such as approved press releases, volunteer hotlines/websites, appropriate and timely public messaging and participates in Town Hall and Community Open House events.
- Collaborates with local government emergency volunteer center(s) to ensure all volunteers are registered and have completed any incident-specific training.
- Coordinates with the Environmental Unit, Operations Section, and Safety Officer to determine if and how to utilize volunteers, recommend suitable volunteer tasking and deployment location(s), and any training requirements.
- Develop a Volunteer Use Plan (VUP) which includes volunteer Site-Specific Health/Safety Plan, volunteer assignment(s), training center location(s), field deployment location(s), and identify resources needed.

- Provide volunteer status updates and raise related issues to the UC.
- Communicate with the Liaison Officer (LOFR), Local Government On-Scene Coordinator (if identified), and stakeholders to ensure appropriate sharing of volunteer information is in a timely manner.

It is recommended that the VC and VUL positions be filled by a state or local government representative that has the authority to manage volunteers.

Types of Volunteers Utilized in Oil Spills: To better understand how oil spill volunteers may be utilized in response activities, it is important to recognize the differences between the volunteer organizations and why certain volunteer groups may be deployed first. The types of volunteers include: OWCN pre-trained, Affiliated, and Spontaneous Volunteers (also known as Community Volunteers).

- OWCN Pre-trained Volunteers: These are the first volunteers to be utilized during an oil spill. The OWCN maintains a cadre of pre-trained volunteers that are affiliated with one of the network organizations. OWCN pre-trained volunteers receive oiled animal training, attend drills and exercises, most are 24-hour HAZWOPER Cal OSHA certified and have completed ICS training. During an oil spill, OWCN pre-trained volunteers register with CDFW and complete a Volunteer Service Agreement (VSA). OWCN pre-trained volunteers are considered unpaid employees of CDFW and are eligible for coverage under the state's workers' compensation insurance program.

- Affiliated Volunteers: These are volunteer organizations that have a pre-existing arrangement with a governmental agency and are covered by their organization's workers compensation insurance program. In most cases, affiliated volunteers are trained for a specific role or function prior to a disaster. Affiliated volunteer organizations must have an established role in the oil response structure. During an oil spill, affiliated organizations that have been pre-identified are placed on standby until needed. These organizations include CDFW-Natural Resource Volunteers (NRV), California Conversation Corp (CCC), and Community Emergency Response Team (CERT) members.

- Spontaneous Volunteers: These are members from the public that express interest in supporting response efforts during an oil spill. Typically these volunteers are not associated with any part of the existing emergency response system. If the UC approves the use of spontaneous volunteers, a volunteer management system must be established which may include volunteer screening and registration, Site-Specific Health/Safety training, identifying appropriate volunteer opportunities, deployment locations and liability considerations.

Refugio Activities & Effort

Initial Volunteer Response
Volunteer operations for the Refugio Oil Spill began on the first day of the incident. During the initial phase of the response, OSPR's Operations Support Center discussed

the type of volunteers that could be utilized safely. OSPR's VC in the Support Center conducted outreach to OWCN, CCC, and CDFW-NRVs to determine their availability to assist during the Refugio Oil Spill. Early in the response state agencies proposed that OSPR use spontaneous volunteers for oiled beach cleanup activities. Due to safety concerns, oiled beach cleanup is not typically a preferred activity for volunteers. This is especially true when potential exposure to toxic components of oil is at their highest level. For the safety of all responders, site characterization of oiled areas must be completed prior to starting cleanup operations. It is for public health and safety that OSPR does not initially use spontaneous volunteers for oiled beach cleanup efforts until gross oil has been removed.

The afternoon of the first day, a small number of individuals from the local community began to self-deploy using buckets, rakes, and shovels to scoop up oil along Santa Barbara's shoreline. In order to provide the public with information about volunteer efforts, OSPR launched a CalSpillWatch-Volunteer page and activated the Volunteer Hotline. This was in an effort to address the immediate concerns from the public and provide general volunteer information. OSPR staffed one full-time staff person at the Support Center to manage the Volunteer Hotline.

OSPR deployed two VCs from Sacramento to the ICP. Upon their arrival, OSPR's VCs briefed the Planning Section Chief and the UC regarding the deployment of OWCN pre-trained volunteers and established a VU as outlined in the Los Angeles-Long Beach ACP Non-Wildlife Volunteer Plan (NWVP). The VU included the following organizations: CaliforniaVolunteers, Governor's Office of Emergency Services, University of Santa Barbara, and County/City of Santa Barbara CERT members.

Use of OWCN Pre-trained Volunteers
OWCN pre-trained volunteers were integrated into Wildlife Operations on day one. The OWCN VC notified nearby OWCN Member Organizations and began requesting assistance for Care & Processing, oiled wildlife Recovery and Transport, and Field Stabilization activities. Management of OWCN pre-trained volunteers was done through the cooperation of the OWCN VC and a VC representative from one of OWCN's Member Organization. OWCN pre-trained volunteers worked under the CDFW Volunteer Service Agreement (VSA), effectively making them unpaid workers for the state. A total of 77 OWCN pre-trained volunteers and 21 OWCN Member Organizations assisted with wildlife operations during the Refugio Oil Spill.

It is also noted that members of the public are often utilized to support oiled animal efforts at the wildlife centers. However, during the Refugio Oil Spill, and due to relatively low numbers of oiled birds, members of the public were not incorporated into wildlife response operations.

Use of Affiliated Volunteers
On day two, the VC position expanded to a full Volunteer Unit in the Planning Section. This was due to the public's interest in volunteering. The VU proposed the use of affiliated volunteers for crowd control, post-fishery closure signs, passing out

fishery/beach closure flyers, provide ICP support, staff the wildlife hotline and distribute volunteer brochures. The VU explored other tasks such as pre-impact beach cleanup, but due to beaches being groomed, this task was not needed. The VU developed the Volunteer Use Plan (VUP) for UC approval. The UC approved and incorporated the VUP into the Incident Action Plan (IAP). The use of affiliated volunteers included the following organizations: County/City Santa Barbara CERT, UCSB CERT, California Conservation Corps (CCC), and CDFW Natural Resource Volunteers (NRVs).

Activities included the following:

- County/City Santa Barbara County CERT members were successfully integrated into the ICP to provide support to the VU and other ICS sections
- UCSB's CERT members posted fishery closure signs, provided crowd control at Refugio State Beach, assisted with spontaneous volunteer registration and trainings, filled strike team leader roles during tar ball deployments
- CCC team (24-hour HAZWOPER Cal OSHA certified) deployed to Refugio State Beach staging areas for field support operations
- CDFW-NRVs conducted oiled animal transport

Approximately 356 affiliated volunteers were utilized from May 19 – June 7, 2015.

Use of Spontaneous Volunteers
UC considerations on the use of spontaneous volunteers included the following:

- Safety
- Site contained only weathered oil (completion of gross oil removal)
- Liability for spontaneous volunteers
- Identify government authority willing to be responsible for managing spontaneous volunteers
- Ensure tribal/cultural concerns followed protocol
- Ensure volunteer operations did not interfere with response contractors and oiled wildlife recovery and transport teams

Due to increasing public interest to assist in cleanup operations the CDFW Director authorized OSPR to manage spontaneous volunteers for tar ball cleanup activities. Therefore, the State of California assumed the liability for the use of spontaneous volunteers and the initial cost for operations.

By day four the VU established an on-line registration process in order to enroll interested members of the community; the registration form was uploaded to OSPR's Cal Spill Watch volunteer page; the JIC sent out a press release with instructions for volunteer registration; and OSPR Executive briefed the UC regarding the state's commitment to manage volunteers. The Refugio Oil Spill is the first incident in which OSPR lead all efforts regarding spontaneous volunteers for activities outside of oiled wildlife care and processing.

The VU managed all volunteer registration and screening, health and safety training, ordered all necessary resources and equipment, coordinated with EUL to select

appropriate tar ball cleanup sites for volunteer deployment. This coordination ensured that spontaneous volunteer deployments did not interfere with field operations, cultural and historical sites, or snowy plover nesting sites.

The VU executed four tar ball beach cleanup deployments during the month of May that utilized 159 volunteers. The VU and CERT members provided for volunteer set-up, volunteer sign-in/out and CERT members filled ICS Strike Team Leader positions. Additionally, Tribal and Cultural Monitors were in place and provided oversight for cultural concerns. The volunteers were provided Personnel Protective Equipment (PPE) and all other necessary equipment to complete their tasks. OSPR ensured volunteer decontamination was conducted as per Cal OSHA requirements and oiled PPE and equipment were disposed of properly. OSPR Wildlife Officers provided for staff and volunteer safety. Volunteer debriefs were provided and thank you notes distributed.

Ongoing Volunteer Activities

The VU discussed future volunteer activities, safety concerns and the decision to stand-down the spontaneous volunteer group in the VU. The VU updated CalSpillWatch-Volunteer Page thanking the community for their support during the Refugio Oil Spill. OSPR continued to utilize CERT members as needed/requested.

Volunteer Appreciation Day

On August 30, 2015 OSPR hosted a Volunteer Appreciation Day, during which spill volunteers were provided with presentations from the VU members and OWCN. Information about volunteering for oil spills and getting involved before a spill occurs was shared with all who attended. The OSPR Volunteer Appreciation Day was well received by all. OSPR will continue to build relationships with local government agencies and NGOs.

Recommendations

Two separate “lessons learned” sessions were conducted for the Volunteer Unit (VU), as well as the public’s input that was obtained in a survey application. The Volunteer Unit Leader (VUL) also participated in the Non-Governmental Organization (NGO) “lessons learned” session which was helpful in understanding the public’s perception during the initial stages of the response. From these sessions, the following findings and recommendations were developed for continued improvement of the NWVP.

- It is recommended that the San Francisco and LA/LB Area Committee’s Volunteer Subcommittees develop volunteer messaging and an outreach plan to be incorporated into the Non-Wildlife Volunteer Plan (NWVP). Volunteer messaging needs to be provided to the public early so that the public has a better understanding of how oil spill response is conducted, the phases of response, types of volunteers utilized during oil spills and how and when volunteers are incorporated into oil spill operations.

- It is recommended that the VU be expanded to include a Volunteer Messaging Coordinator to work directly with the JIC on volunteer messaging, providing for volunteer press releases and fact sheets, monitoring social media outlets, i.e., Facebook and Twitter for potential conflicts with the public.

- It is recommended that OSPR expand its capacity for managing volunteers during response. Additional staff should be trained to fill critical roles such as VUL, VC and as well as positions in support of these roles.

- It is recommended that County OEM's develop and maintain closer working relationships with NGOs and Voluntary Organizations Active in Disaster (VOAD) within their area of operation.

F. Stakeholder and Non-Governmental Organization Engagement

Objectives & Requirements

The UC is responsible, through the Joint Information Center (JIC), to develop and implement a communications and outreach plan. Broadly, this plan is designed to gather timely and accurate cleanup and response information and disseminate this information in the most effective manner to all target audiences including but not limited to the general public and non-governmental organizations (NGOs), potentially affected local businesses and commercial fishermen, and trade groups. It is critical for the UC and JIC to understand the local historical context and concerns around an oil spill in order to efficiently and effectively engage with the general public and interested stakeholder groups. In addition, it is the responsibility of the Liaison Officer (LOFR) to coordinate with governmental agencies on both information dissemination and identifying agency resources that can be incorporated into the response. Typically, NGOs are not formally "incorporated" as a part of the UC structure or given roles and responsibilities within an ICP, as they have no formal authority or jurisdiction for oil spill response. That being said, some NGOs may have a well-organized network of members that are potentially helpful for informing spill response operations.

Refugio Activities & Effort

Communications

The Refugio Oil Spill occurred within the historical context of the 1969 Union Oil Platform blow-out in the Santa Barbara Channel, which was the largest oil spill in waters off of California and the third largest in U.S. waters after the 2010 Deepwater Horizon and the 1989 *Exxon Valdez* spills. The national public outrage generated by the 1969 spill resulted in numerous pieces of environmental legislation within the next several years. In addition, many of the NGOs and stakeholder groups affected by the Refugio Oil Spill were involved in the public debate over permitting of pipeline construction for on-shore oil movement from the platforms in the 1980s. A court ruling issued in the late 1980s allowed the pipeline to be used without an automatic shut-off valve after a county decision to require one. The pipeline was put into crude oil service in 1991 and subsequently purchased by Plains All American Pipeline in 1998.

The UC hosted a meeting to provide a forum early in the response for NGOs and other stakeholders, however NGOs felt that there was insufficient time in this meeting for communicating their concerns. In addition, while the Executive Order issued by Governor Brown on May 20, 2015 (later modified on June 8, 2015) was intended to facilitate the emergency phase of the response, some NGOs interpreted some of the provisions as compromising environmental protection requirements. As the response operations continued, many NGOs were frustrated by what they perceived as a lack of transparency, an inability to get timely information from the JIC, as well as insufficient opportunity to inform response operations priorities, cleanup endpoint criteria, volunteer operations or public safety concerns regarding beach closures.

In order to improve communications and working relations between the UC and NGOs, the CDFW Director hosted regular conference calls to update NGOs on spill activities and respond to questions. The goal of the calls was to provide a forum where all thoughts and concerns could be heard and discussed in a respectful manner. OSPR participated in these calls and briefed the UC on issues that were discussed and of ongoing concern, such as beach closures and safety signage, the release of sampling data, and process for ongoing shoreline monitoring. These calls were instrumental in improving the dialogue between the UC and NGOs and fostering trust between the participants. As well, the Community Open-House (previously described in this report under JIC Refugio Activities & Effort) was helpful in further engaging the NGOs. By the end of the formal cleanup phase and into the monitoring phase, OSPR had established good working relationships with many NGOs.

Sampling Data

The presence of natural seeps in the response area created challenges in identifying and meeting cleanup endpoints. NGOs expressed concerns that without on-going sampling data that could be made public; there would be no mechanism for them to verify that the shorelines were indeed clean. The UC implemented two protocols that helped assure the NGOs that such information would be available:

- A “Sampling Blitz” was conducted July 9-10, 2015, for Santa Barbara, Ventura, Los Angeles, and Orange County beaches. This protocol was designed to provide a “snapshot” of oil sampling data from the Refugio Oil Spill area as well as the second spill area further south that could be released to the public. The data provided a dual purpose: it was releasable to the public and it provided additional information regarding on-going response cleanup operational needs. NGOs were invited to participate as a part of this sampling process.
- Phase III Monitoring: Once most of the shorelines were cleaned to “Phase II” cleanup endpoints (beyond which no further cleanup can be done without doing more harm to the environment or without compromising worker safety), the UC developed a “Phase III” monitoring plan. This plan provides for ongoing assessment for residual and buried oil until May 2016, and includes several sampling events, one of which occurred following the first significant storm event in January. All sample data to date have been released to the public and have come back negative for matching to oil from the Refugio Oil Spill (i.e., Line 901).

Public Health and Safety on Beaches
Because volunteers were required to wear appropriate personal protective equipment while on beaches, some NGOs expressed concern that beaches would be perceived as "unsafe" by the general public. They suggested that the UC close the beaches or post safety signage, however such authority resides with local government and not the UC. Further, the local health jurisdiction did not feel the beaches posed a public health threat nor did it view closure or signage as appropriate actions.

Recommendations

A "lessons learned" session with OSPR and NGO representatives was held on December 18, 2015. The day was very productive and OSPR and the NGOs agreed to establish a workgroup to further the dialogue and begin developing a plan for implementation of identified needs. The key recommendations from this meeting are as follows:

- OSPR should assist NGOs in becoming more integrated into oil spill preparedness including the area contingency planning process, participation in drills and exercises, and training opportunities for greater familiarization with the USCG Incident Management Handbook.
- OSPR should reach out to NGOs and other stakeholders regarding opportunities to be pre-trained as an Affiliated Volunteer for oil spill response; and development of a simple, one-page brochure that NGOs can provide to members.
- OSPR should work with NGOs and USCG to evaluate the use of local knowledge or scientific expertise of members of the public during response ("Citizen Scientist").
- OSPR should review its website with an eye for online resource capabilities, such as spill status, fisheries closures maps, volunteer information, beach status including closed/sampled/reopened, that would be useful to the public and provide easy to access during an oil spill.
- OSPR and the NGOs should identify key "best practices" for improving communications both prior to and during oil spill response. They should seek further opportunities for greater collaboration in areas of mutual interest.

G. Logistics

Objectives & Responsibilities

The goal of OSPR staff working on logistics issues was to provide the necessary services and support to the responding personnel to aid in the success of response. Although their primary focus was on the CDFW/OSPR responders, their scope of work expanded to assist the broader UC Logistics Section, as their time and workloads permitted. This was especially true during the first week of the response. They achieved this goal through the execution of the following responsibilities:

- Ensuring that all incident facilities (ICP, operations and staging areas, and OSPR mobile command trailer) adequately met the work demands of the responding personnel
- Ensuring that the incident resource ordering process was in place, explained to all appropriate CDFW-OSPR responders, and adhered to.
- Obtaining lodging for responders; administering and monitoring contracts for lodging; managing responder lodging assignments; and continuously surveying lodging to track availability, particularly during the initial response phase that occurred simultaneously with the Memorial Day weekend
- Preparing, managing, and maintaining an incident transportation plan, the purpose of which was to assist the responders with travel to, from, and locally during their time at the response. The plan included scheduling flights (commercial & CDFW), individual and group rental car reservations and/or contracts, obtaining vehicles from DGS Fleet Services, and commercial cargo transport vehicles.
- Ensuring all CDFW-OSPR responder communication needs were met. (i.e., internet, phone, fax, and copier services).

Refugio Activities & Efforts

The OSPR Logistics staff was activated the day of the spill. In the initial days of the response, Logistics staff were heavily focused on securing longer term lodging contracts for the growing number of deployed staff, initiating emergency purchases, and preparing an information sheet for deployed staff containing important information like ICP address, lodging assignment, and key points of contact. As it became increasingly difficult to manage the OSPR logistics activities remotely from Sacramento, two additional staff deployed to the ICP. The number of deployed Logistics staff would peak at five, the ideal number for a spill of this size and complexity.

Facilities

By Friday, May 22, 2015 it was evident the physical needs of the ICP had outgrown the current facility. At the request of the RP's Logistics Section Chief, OSPR Logistics staff performed a survey of potential ICP sites further inland in the Buellton/Solvang area. After receiving replies to multiple inquiries, it became clear that there were no available facilities that would accommodate the size of the response. Ultimately, the RP identified and selected a suitable location at the Santa Barbara Airport in Goleta. OSPR Logistics staff coordinated the deployment and use of the OSPR mobile command trailer (a valuable meeting space and internet hub), and obtained a secured storage facility for the OSPR Sample Coordinator, crucial in maintaining the preservation of evidence and integrity of the chain of custody for oil samples.

Requisition Process:

Due to the magnitude of the initial response efforts and the impending Memorial Day holiday weekend, the RP agreed that OSPR would handle completion of as many of the requisitions as possible. At that time OSPR Logistics staff solely completed all Wildlife Operations and Volunteer Unit requests, as well as assisted the USCG with group transportation requests. The range of requisitions varied greatly: clean-up site supply

deliveries (i.e., daily morning ice run for wildlife transport); printed materials (volunteer spill flyers; MSD sheets and other training materials); purchase of numerous kennels, canopy tents, beach cleanup tools, office and lab supplies; rental of portable toilet units, cargo and passenger vans, etc.

By June 1 the RP instituted a formal requisition process that was better able to accommodate the needs of the unified response. However, OSPR Logistics staff continued to process the majority of the Wildlife Operations and Environmental Unit related requests because state vendors were more cost-effective and timely than RP vendors.

Lodging

From the initial notification and activation of the OSPR Logistics staff, lodging was a major task as most of the Santa Barbara hotels were near or fully booked for the upcoming Memorial Day weekend. For the majority of the response, OSPR Logistics staff established three primary lodging contracts for approximately 40 responders (two in the Santa Barbara/Goleta area and one 20 miles to the south in Carpinteria). That number would fluctuate, with a peak night of approximately 65 responders. During the life of the spill, lodging was provided for 140 responders, occupying 16 hotels within 8 cities and 2 states. The lodging situation had to be constantly managed. Two key methods were utilized by OSPR Logistics staff: 1) developing a unique working relationship with the lodging vendors in the area to stay abreast of room availability, rate changes, and upcoming events, all factors that impacted lodging; and 2) continually touching base with the other OSPR section leaders to stay informed of staff deployment schedules. Logistics staff obtained emergency approvals for several out-of-state travel requests for CDFW enforcement officers to track evidence to Ohio.

All lodging rooms were procured with the American Express Meeting Planner Account (MPA). The average cost of a hotel room in the spill area was $150-$175 per night, well above the State of California maximum allowable rate of $90. For this reason the use of the MPA proved to be invaluable; it alleviated a tremendous financial burden from the individual responder completing multiple deployments.

Transportation

OSPR Logistics staff created a transportation plan to manage the travel needs of the responders such as air travel and rental car reservations. A big part of the plan was the coordination of flights to and from the response area. While the majority of the flights to the response area were commercial, there were a significant number of flights provided by CDFW Law Enforcement Division Air Unit. There were no direct flights from Sacramento to Santa Barbara. A responder would have to fly into Burbank airport, rent a car, and drive an hour and half (or more depending on traffic) to reach the ICP. Often times the demands of the response required incoming staff to be in Santa Barbara at specific times for key meetings or assignment swap-outs during peak hours. If a commercial flight would have been the only option, there were many times staff would not have been able to meet these timeframes. The CDFW flights proved to be a valuable resource.

Logistics staff was tasked with renting an RV for evidence transport out of state one-way and renting cargo vans to be used for wildlife transportation; both requests proved to be challenging given the immediate need of the acquisition.

Communications
OSPR Logistics communications and IT staff were on-site to ensure that all communication needs were addressed. This included loaning out Wi-Fi hotspots and cell phones provided to OSPR by Verizon as part of the emergency services portion of the existing contract. The staff also established printing networks and fax capabilities.

Recommendations

Staff Deployment
The OSPR Logistics staff was not deployed to the ICP until day four. As a result, it was challenging to meet and stay abreast of increasing requests. Also, due to the high level of demand for logistics support, filling Logistics positions with qualified staff during the response became challenging.

Recommend development of a protocol to provide for deployment of adequate staff numbers to assess and meet logistics needs.

OSPR Mobile Command Trailer Deployment (Facility)
The OSPR trailer arrived on day five of the incident. There was limited availability of certified drivers (Class A) within OSPR. The trailer housed valuable communication equipment and supplies, and provided additional private meeting space for OSPR.

Recommend revising the OSPR Mobile Command Trailer deployment standards and procedures. (Additional drivers may need to be certified.)

Emergency Procurement Restrictions
Standard state procurement policies were applied to some of the emergency requisitions. Valuable time was lost in the process of obtaining standard required approvals for those requisitions.

Recommend that OSPR provide training to CDFW administrative staff on OSPR emergency purchasing procedures.

Communication upgrade
The loaner phones available to OSPR were not Smart phones but older flip-phones. This made it very difficult to communicate with others in the unified response who used text messaging and emails as an efficient form of communicating quickly. Also, a Smart phone serves as a navigation system, which was important when driving in an unknown area.

Recommend amending the OSPR phone contract to provide Smart phones as loaners.

H. Finance

Objectives & Responsibilities
The Finance Section has the responsibility of:

- Analyzing and managing the incident situation from a financial perspective
- Establishing and maintaining finance requirements (funding sources, documentation requirements, budgets, cost ceilings, cost estimates, and local agency assistance)
- Serves as State Contracting Officer
- Preparing and maintaining cumulative incident cost records to ensure cost recovery mandates are met

Refugio Activities & Efforts
The OSPR Support Center was opened in response to the Refugio Oil Spill. On the afternoon of May 19, 2015, OSPR Finance staff was activated. During the first 24 hours of the response the Finance staff's initial concerns were as follows:

- Assess current situation regarding Finance staffing needs
- Determine Responsible Party identification and contact information
- Determine a funding source for OSPR/CDFW expenditures
- Identify a valid Certificate of Financial Responsibility (COFR) for the Responsible Party
- Assign unique accounting codes to the incident (Index/PCA) for expenditure tracking purposes

Over the next several days OSPR Finance staff focused on identifying and tracking the status of deployed and Support Center staff. Contact was made with Plains All-American who accepted financial responsibility. Finance deployed one staff to the incident on day two and continued with one staff at the Support Center. One staff rotated weekly to the ICP through the first week of June, and then continued the Finance role at OSPR in Sacramento.

Cost and Time Unit
Finance staff tracked estimated costs which included personnel hours, per diem, air travel, rental cars, lodging, vessels, aircraft, and other OSPR/CDFW assets used to respond. This estimate was submitted daily to Plains Pipeline's Finance staff. OSPR Finance reached out through the Liaison Officer to assist other Local and State Agencies in documenting their costs for reimbursement from Plains. Those that requested and received assistance were UC Santa Barbara and the California Conservation Corp.

Procurement Unit-Contracts
Three Urgency Contracts were prepared for San Jose State Research Foundation to perform laboratory analyses on various types of samples: Response, Investigation, and NRDA. One Urgency Contract was prepared for the hiring of a technical specialist

related to SCAT operations. Several other Urgency Contracts were initiated to hire local fisherman, but Plains offered to contract with them instead.

Recommendations
There are no recommendations for OSPR Finance operations at this time.

I. NRDA

Objectives & Responsibilities
The Natural Resource Damage Assessment (NRDA) is a separate, parallel effort to the spill response and cleanup. The goal of the NRDA is to examine the natural resource injuries from oil spills or other pollution events, to quantify the injuries, and ultimately to both restore the injured resources and compensate the public for the lost interim ecological benefits and uses of those resources. Typically the assessment and quantification of natural resource injuries, as well as restoration planning, occurs immediately after a spill event and continues long after the spill response effort has ended. While NRDA activities generally do not occur within the structure, processes, and control of the spill Unified Command, for purposes of health and safety, as well as coordinating the deployment of NRDA field teams with spill response personnel, communication and coordination between the two efforts is critical.

All NRDA activities during spill response are communicated and coordinated with the spill Unified Command through an NRDA Representative ("NRDAR"; Ref. USCG *Incident Management Handbook*, 2014). The NRDA Representative is typically assigned within the Environmental Unit and is tasked with the following key duties:

- Ensures that all NRDA agency staff or their contractors responding to a spill have appropriate health and safety training, and coordinates all NRDA field activities through the Unified Command.
- Ensures that the response effort provides a minimum of basic spill-related information, logistical needs, and source-sampling support to NRDA during a spill incident.
- Provides information to the Unified Command regarding any pertinent NRDA field observations, as well as species and habitats at risk from the spill.

Refugio Activities & Effort
The natural resource trustees initially responding to the Refugio Oil Spill included representatives from a number of state and federal regulatory agencies, including OSPR (State Lead Administrative Trustee for the spill), California State Lands Commission, Department of Parks and Recreation, University of California, NOAA, U.S. Fish and Wildlife Service (USFWS, Federal Lead Administrative Trustee for the spill), National Park Service, and the Bureau of Land Management. The natural resource trustees also involved various contractors in the injury assessment, including private organizations and university staff.

The trustee agencies involved in the NRDA started working within hours of the spill, deploying scientists in the field to collect data that would characterize the extent of the injury and to document human recreational use impacts. Time-sensitive data are critical to determine the natural resources that have been exposed to oil or have been impacted by clean-up activities. NRDA teams conducted dozens of field surveys and collected hundreds of environmental samples throughout the affected area. Injuries to the following types of natural resources or their uses are being investigated:

- Birds (including pelicans, western snowy plovers)
- Marine mammals (including sea lions, dolphins)
- Fish (including grunion)
- Rocky intertidal habitat
- Sandy beach habitat
- Subtidal habitats (including kelp beds, seagrasses)
- Recreation (including Refugio and El Capitan campgrounds).

The initial Refugio Oil Spill NRDA data collection effort benefited significantly from the following:

1. Prior to the spill, the OSPR NRDA Unit had established relationships with federal trustee agencies, university experts, and private contractors to plan for and implement NRDA-targeted chemical/biological sampling and surveys. Those relationships were built by outreach from the OSPR NRDA Unit and included several NRDA drills and sampling exercises with the Ventura USFWS Office, Channel Islands National Park Service, Tenera Environmental, and members of the Multi Agency Rocky Intertidal Network (MARINe). MARINe members have played a significant role in NRDA data collection efforts following the Torch (1997), Cosco Busan (2007), and Dubai Star (2009) oil spills.

2. The OSPR NRDA Unit pre-staged NRDA sampling supplies and equipment at the nearby CDFW Monterey Field Office and Ventura USFWS Office. NRDA field sampling requires specialized sampling equipment, containers, documentation, and chain-of-custody. Without pre-staging equipment and supplies across the state, there may be delays in collecting time critical environmental samples, including water, sediment, and biological tissues. During the Refugio Incident, samples were collected within hours of the spill and were not constrained by the availability of sampling supplies or equipment.

3. Trustee interagency NRDA planning among USFWS, NOAA, and OSPR NRDA technical experts have focused on assessment strategies for various marine resources and habitats, including tidal mudflats and sandy beaches. Experts from the three aforementioned agencies had been meeting quarterly, prior to the spill in 2014/15, to discuss and develop a draft sandy beach habitats NRDA assessment plan. This plan was developed in coordination and consultation with Dr. Jennifer Dugan of the University of California, Santa Barbara. Parts of the plan were implemented during the Refugio Incident and lead to the rapid collection of sandy beach exposure and injury data.

4. Internal CDFW support from both OSPR and Regional staff was invaluable to the NRDA effort. Support was provided by:

    - Environmental Unit/OSPR Environmental Scientists (e.g., resources at risk, SCAT, and other time critical information)
    - Wildlife Branch (e.g., wildlife search and recovery logs, data)
    - Operations/OSPR Oil Spill Prevention Specialists (e.g., helped coordinate collection of dead wildlife not typically recovered or rehabilitated by the Wildlife Branch)
    - Marine Region (e.g., Marine Protected Areas, invertebrate and vertebrate fisheries experts)

    External support from the Ocean Protection Council (OPC) and various NGOs provided pre-spill survey information that will be useful to the NRDA effort and assist in the assessment of Marine Protected Areas within the spill zone.

5. An NRDA Command Post was first established at the Pacific Suites Hotel in Goleta and then at the ICP. Each Command Post provided breakout meeting rooms for Trustees/RPs, areas to stage field equipment and supplies, as well as space to download photographs, GPS data, and field notes.

Recommendations

The Refugio Oil Spill provided an opportunity to learn how an initial NRDA data collection effort can be improved. Corrective actions, and planning tasks to be undertaken to improve the NRDA process immediately following large oil spills include:

- Since data collected by universities may be important for NRDA purposes and to ensure the safety of university personnel when they participate in NRDA, continue NRDA outreach and communication with university researchers that potentially study oil spill impacts on the environment. Include NRDA as a separate, but coordinated effort, in spill response drills and exercises. Perform environmental sampling and health & safety training and exercises with resource trustees and interested university colleagues.
- Continue outreach and pre-identification of a contractor(s) that can provide trained staff for NRDA-related water, sediment, and tissue sampling support, as well as provide administrative, sample intake, sample transport, and sample storage support during spills.
- To ensure NRDA captures as much information as possible regarding resource injuries, develop protocols and coordination procedures for improving documentation of spill-related wildlife mortality.

Table: Summary Recommendations – Organized by ICS Section or Role

Topic	Corrective Action / Improvement Plan	Target Date for Completion
Command: Incident Command		
Local On-Scene Coordinator Authority	Work with local agencies, through outreach and training, to support the practice of assigning local staff with decision-making authority to LOSC positions	Continuous
Community Engagement	Develop community open house event protocols and procedures for community outreach to facilitate earlier community engagement	December 2016
Tribal Coordination	Establish OSPR Tribal Liaison to work with Operations (Cultural Monitors) and Planning (Cultural/Historic Group) to address tribal concerns in ICS process	December 2016
Command: Joint Information Center		
Early messaging to the public	Review/update existing strategy to address public participation. Develop pre-vetted messages that describe health dangers, oil cross-contamination issues, and potential harm to wildlife that can occur as result of self-deployment. Develop message that informs public that the UC follows an established plans such as the Area Contingency Plan (ACP) for oil spill response	August 2016
Joint Information Center (JIC) and Staffing	Encourage and ensure that JIC participants need to be dedicated for a set period with designated and committed replacements	Ongoing drills and exercises
Distribution of media files	Coordinate with USCG to establish best practices and tools for capture and distribution of video and images	August 2016

Topic	Corrective Action / Improvement Plan	Target Date for Completion
Command: Liaison		
Scientific Study Requests	Develop protocol for evaluating and vetting of Scientific Study Requests	December 2016
Liaison Officer (LOFR) Roles and Capacity	Develop policy that identifies LOFR as a public agency representative	December 2016
	Identify outside agencies that may support LOFR and incorporate representatives in drills	December 2017
	Have a deeper pool of trained LOFR in OSPR	December 2017
Command: Health & Safety		
Responder Safety	Evaluate the use of CDFW dive team members for spill response, including the need for health and safety training (e.g. HAZWOPER)	June 2017
Command: Legal		
Unified Command Data Sharing	Develop a template agreement for data management and sharing for UC signatures, ensuring sharing of response data and recommendation of a Common Operational Picture (COP) for oil spill response in California	June 2017

Topic	Corrective Action / Improvement Plan	Target Date for Completion
Operations: Oil Recovery		
Communications	Develop a position in Operations Section to liaise with SCAT, including a task book and job aid	June 2017
Operations: Wildlife Branch		
Wildlife Branch staffing	Update OWCN Wildlife Recovery Group Supervisor protocols for staff response times	June 2016
	Review recovery and transport protocols	June 2017
	Identify and train an OSPR Reconnaissance Group Supervisor and develop a PQS Task book and job aid	June 2016
	Update training curriculum of OWCN staff to address National Oiled Marine Mammals Guidelines, including development of California specific guidelines	December 2016
Data Tracking of Oiled Wildlife	Develop a system/application that will allow data to be actively accessible to key wildlife staff	December 2016
Animal Care	Establish locations of readily available caches of supplies, and mobile caches	December 2017
	Consider the use of contract personnel or vehicles for wildlife transport, in particular when marine mammals are impacted.	December 2016
	Amend existing protocols to ensure staff Group Supervisor and the MASH unit to be on scene within 24 hrs	June 2016

Topic	Corrective Action / Improvement Plan	Target Date for Completion
Planning: Environmental Unit (General)		
Efficiency in the Environmental Unit (EU)	Update/revise EUL job aids to plan for multiple Deputy EULs for large responses	December 2016
Improve Clean Up Efficiencies	Work with NOAA to update shoreline cleanup methods and analyses for different habitat types; and consider using Shoreline Treatment Recommendations (STR) Form per habitat type	December 2018
	Revise OSPR clean-up endpoint document to address areas with known significant natural seepage.	December 2018
Planning: Environmental Unit – Resources at Risk (RAR)		
Incident Action Plan (IAP) Software	Develop procedures to ensure RAR information and special environmental considerations get incorporated into IAP.	June 2017

Topic	Corrective Action / Improvement Plan	Target Date for Completion
Planning: Environmental Unit – Sampling		
Sampling Coordinators	Develop Sampling Coordinator job aid that identifies the sampling needs of a complex spill event	December 2016
Response Sampling	Include in Sample Coordinator job aid a section for evaluating/sampling natural seep sources during spills in known natural seep areas	December 2016
Planning: Environmental Unit – Fisheries Closure		
Communication Plan	Update protocols to improve notification to local businesses, including aquaculturists and restaurants	December 2016
	Develop message template (to go with lifting of fishery closure) that will provide situation-specific information regarding the safety of local seafood	December 2016

Topic	Corrective Action / Improvement Plan	Target Date for Completion
Planning: Environmental Unit – Cultural/Historic Group (CHG)		
Training & Outreach for Staffing	Develop training plan to increase the number of available Cultural/Historic Technical Specialists (CHTs)	December 2016
	Develop CHG/CHT Training Manual	December 2016
	Develop a tribal outreach plan, in consultation with the Native American Heritage Commission (NAHC)	Continuous
	Coordinate with NAHC to encourage 24-Hour HAZWOPER training for Cultural Monitors.	Continuous
Tribal Integration into the UC Structure	Prepare contracting recommendations sheets, to be included in the CHT Response Manual, for tribes to directly contract with the Responsible Party	December 2016
	Develop policy for use of Cultural Monitors adhering to the ICS span of control requirements and streamlining the structure for scheduling and supervision	December 2016
	Develop a template for a “ceremonial policy” that can be used at the time of an incident	December 2016
Timeliness for Cultural/Historical Review for Shoreline Operations	Determine if there is a mechanism by which the GIS shape data can be more efficiently accessed for both preplanning and response needs	December 2016

	Prepare a STR review policy to streamline approval of STRs	December 2016
	Develop a training curriculum for OSPR Public Information Officers regarding Native American cultural messaging	December 2016
	Develop a protocol for establishing incident- specific policies for Tribal media concerns	December 2016
Planning: Environmental Unit – Applied Response Technologies (ARTs)		
ART Training and Outreach	Develop Training and Outreach Plan to RRT IX members describing various ART uses, benefits, and consequences of use for the various ARTs to support decision-making	June 2017
Spill-of-Opportunity Testing	Develop spill-of-opportunity test protocols for various ARTs and sorbents to allow side-by-side tests of, all CA-licensed products and non-licensed products (optional) that are listed on the National Contingency Plan Product Schedule	June 2017
Response Technology Evaluation (RTE) of mechanical and non-OSCA rock-cleaning technologies	Evaluate possible adoption of the RTE model developed following the Deepwater Horizon spill response	December 2017

Topic	Corrective Action / Improvement Plan	Target Date for Completion
Planning: Environmental Unit – Geographic Information System		
Technical Fact Sheet	Develop GIS specification that identifies electrical and internet needs at an Incident Command Post	June 2016
Shoreline Assessment and Cleanup (SCAT) Data Collection and Data Management	Develop a California SCAT data collection system that electronically collects, stores and manages field data and outputs results in GIS format for map making and inclusion in the COP	June 2016 (Beta Test)
Remote Sensing Plan	Develop a remote sensing template plan for oil slick detection	December 2016
Planning: Volunteer Coordinator/Unit (VU)		
Messaging & Outreach	Develop messaging and outreach plan and incorporate into the Non-Wildlife Volunteer Plan	December 2016
	Develop a Volunteer Messaging Coordinator position within the Volunteer Unit to work directly with the JIC	December 2016
	Train additional OSPR staff to fill VU positions.	June 2017
	Encourage counties to develop and maintain close working relationships with NGOs and Voluntary Organizations Active in Disaster (VOAD) within their area of operation.	Continuous

Topic	Corrective Action / Improvement Plan	Target Date for Completion
Stakeholder & Non-Governmental Organization (NGO) Engagement		
NGO Integration & Engagement	Encourage NGOs to attend and participate in spill preparedness and response activities including Area Committee meetings, drills & exercises, and other trainings	June 2017
	OSPR should encourage NGOs and other stakeholders to be pre-trained as an Affiliated Volunteer for oil spill response	June 2017
	Coordinate with NGOs to evaluate the use of local knowledge or scientific expertise of members of the public during response	December 2017
Communication and Status	Review and revise templates for OSPR web page postings during an incident to improve public access to spill information	August 2016
	Develop communication “Best Practices” between OSPR and NGOs	December 2016
Logistics		
Staff Deployment	Develop OSPR Logistics deployment protocols and develop internal position qualification standards	June 2017
Mobile Command Trailer Deployment (Facility)	Update Mobile Command Trailer deployment procedures and trailer use guide	December 2016

Topic	Corrective Action / Improvement Plan	Target Date for Completion
Emergency Procurement Restrictions	Review and train internally regarding emergency purchasing authority and procedures	Continuous
Communication Upgrade	Explore communication options during incident to improve handheld cellular capability of deployed staff	July 2016
Natural Resource Damage Assessment (NRDA)		
Communication & Outreach	Develop outreach to universities regarding study of oil spill impacts on the environment	Continuous
	Develop outreach and pre-identification of contractors that can provide trained staff for NRDA-related water, sediment, and tissue sampling support, sample intake, sample transport, and sample storage support during spills	Continuous
	Include NRDA staff in spill response drills and exercises, including university representatives	Continuous
Documentation	Develop protocols for improving documentation of spill-related wildlife mortality not currently captured by the Wildlife Branch	December 2016

Appendix A.

Improvements by OSPR Preparedness Since the MV Cosco Busan Oil Spill

On November, 7th, 2007 the *MV Cosco Busan* struck a tower of the San Francisco – Oakland Bay Bridge and spilled 53,569 gallons of heavy fuel oil (also known as 'bunker fuel') into the San Francisco Bay. Through that response OSPR identified several issues for improving preparedness and response for future spills. The identified areas of improvement included: the need for OSPR to do more with local governments in a variety of capacities; managing convergent volunteers during a spill; policies and protocols dealing with the Environmental Unit Leader; development of a protocol for closing fishery areas affected by the spill; implementation of non-wildlife volunteer plans within the Area Contingency Plans (ACP); and media outreach.

Local Government Coordination: Through the *Cosco Busan* incident, OSPR recognized that it needed to do more to ensure that local governments were kept informed of response activities and that they had the resources necessary to protect their economically sensitive sites from the impacts of an oil spill in or near their jurisdiction. To ensure that local governments were fully informed of spill response activities, OSPR has developed a series of training qualifications for the Command Staff function of Liaison Officer and now has significantly more staff qualified to serve in this role in the event of a spill, both at the Incident Command Post and in Sacramento at the OSPR Support Center. By having a greater number of trained Liaison Officers, OSPR can ensure that local government agency representatives have the information they need, on a near real-time basis to influence their own response to an oil spill incident. While environmentally sensitive sites are protected through strategies in the applicable ACPs, economic sites such as marina's, docks, and other economic / recreational assets are addressed during each incident. As many of these types of sites were impacted during *Cosco Busan*, OSPR developed and implemented the Local Government Oil Spill Response Equipment Grant program which delivers boom, absorbent materials, a trailer, and training to counties, cities, special districts and tribal nations in order to enable them to protect these economic resources. Through this program OSPR has delivered forty-one Local Government Oil Spill Response Equipment trailers throughout California, including three in Santa Barbara County, several in the Los Angeles/Long Beach area, and several in the San Francisco Bay area. OSPR also has developed and delivered oil spill response overview training to local coastal and inland counties.

Wildlife Trustee Role in Incident Management: After *Cosco Busan* language was integrated into the ACPs for the San Francisco Bay Area and Los Angeles/Long Beach identifying that the Environmental Unit leader and other positions within the Environmental Unit should be a representative of a federal or state trustee agency. The reason is to ensure that early critical response decisions are made quickly, efficiently and effectively consistent with the statutory mandates for wildlife and habitat protection. This was done in response to issues identified during the spill about environmental

response, management of environmentally sensitive sites, and integration of the environmental issues into the planning process by Unified Command during the spill.

Fisheries Closure: Following the *Cosco Busan* incident, California legislation was enacted to provide for the closure of fisheries by the California Department of Fish & Wildlife after an oil spill into marine waters. (Assembly Bill 2935) This legislation established a partnership between CDFW (consulting with OSPR), and the Office of Environmental Health Hazard Assessment (OEHHA). OEHHA is responsible for determining whether fish caught in California waters can be safely consumed. The protocols articulate the actions to be taken by both CDFW and OEHHA: during the first 24 hours after notification of an oil spill, during the first seven days after notice, the process for sampling and analysis of fish and invertebrates potentially impacted by the spill, notice to the affected public of closed fisheries and the boundaries of closed areas, and when fisheries can be re-opened. [Ref. Fish & Game C. §5654]

Convergent Volunteers: In response to the involvement of members of the public who are not affiliated with recognized volunteer organizations, a Non-Wildlife Volunteer Plan (NWVP) was developed and adopted by the San Francisco Area Committee and later by the Los Angeles/Long Beach Area Committee. The NWVP outlines a policy for specific roles appropriate to be filled by members of the public and identifies the mechanisms for activating these people as volunteers in oil spill response.

California law expressly provides that the OSPR Administrator may utilize volunteers to assist with oil spills in waters of the state. [Gov. C. §8670.8.5] These volunteers are deemed employees of the state for the purpose of workers' compensation. The responsible party (RP) is liable for all costs associated with an oil spill, including costs associated with the use of volunteers. The costs associated with the use of registered volunteers may be funded by the state's Oil Spill Response Trust Fund. Any payments for registered volunteer workers' compensation claims shall be made from the Oil Spill Response Trust Fund. The RP is liable for payment of these costs either directly or by reimbursement to the Trust Fund.

Media Outreach: The *Cosco Busan* oil spill took place in the heart of San Francisco Bay, a highly visible environment with significant media interest. During the spill it was identified that OSPR did not have a mechanism to provide regular updates to the public and media regarding the spill response activities. To rectify this, OSPR developed https://calspillwatch.dfg.ca.gov/ which serves as an easily searchable, readily identifiable source for spill related news. During an active oil spill response this website is regularly updated with information that may include: media releases, fact sheets, photographs of the spill, maps, statistical information, volunteer opportunities, how to report oiled wildlife, and other relevant topics. The website also provides critical information in Spanish language translation. The Cal Spill Watch website is a supplement to the Joint Information Center (JIC) that is established by the Unified Command; the website does not supplant the efforts of the JIC.

Appendix B.

Response Evaluation Report Addendum for Environmental Unit Shoreline Cleanup Assessment Technique (SCAT)

In May 2016, California Department of Fish and Wildlife (CDFW), Office of Spill Prevention and Response (OSPR) prepared a Refugio Oil Spill Response Evaluation Report. The purpose of this report was to summarize the CDFW-OSPR response efforts to date regarding the Refugio Oil Spill, as well as lessons learned and recommendations for improvement. Because part of the Refugio Oil Spill response was still on-going, specifically monitoring of the cliff face (Section 5) where the oil flowed down and impacted the beach, the report did not at the time include a Shoreline Cleanup Assessment Technique (SCAT) section. The Unified Command remained established until March 2, 2017 following the completion of monitoring of spill-affected areas. The purpose of this addendum is to summarize information related to SCAT for the Refugio Oil Spill Response.

Objectives & Responsibilities

SCAT is a systematic method using standardized terminology for surveying an affected shoreline after an oil spill. SCAT falls under the Environmental Unit (EU) of the response and is designed to support decision-making for shoreline cleanup. SCAT surveys are initiated early in the response to assess initial shoreline conditions, and ideally are continued in advance of operational cleanup. A SCAT Coordinator is assigned by a federal or state agency to oversee SCAT field teams from the command post. Teams are comprised of individuals trained in the techniques, procedures, and terminology of shoreline assessment.

Activities & Effort

Reconnaissance level surveys were conducted day one of the incident to obtain initial information on extent of oiling on the shoreline. Starting on day 2 of the incident and throughout the response a SCAT Coordinator led and deployed multiple SCAT teams to conduct surveys following existing SCAT protocols. The SCAT Coordinator position was filled by OSPR staff and the SCAT data manager position was filled by National Oceanic and Atmospheric Administration (NOAA) and OSPR staff. SCAT team members included staff from OSPR, U.S. Coast Guard, the Responsible Party, and County of Santa Barbara.

Sediment levels were relatively low at the beginning of the response, accreted through the summer, and eroded during the winter months. In order to track sediment erosion and accretion, SCAT teams took photographs at pre-established locations at low tide

along the affected shoreline from May to September 2015, and compared sediment levels from photos to determine when operations would be able to continue cleaning to meet cleanup endpoints. SCAT used monitoring maps to show clean-up progress and to help relocate buried oil. SCAT used a combination of maps and segment inspection reports (SIRs) to direct Operations Section on cleanup. During the first few months of the response a SCAT liaison followed through with Operations to ensure SIRs were being followed correctly and to collect feedback from Operations. During the final months of the response there was no liaison. SCAT Teams worked in tandem with Operations to sign-off a segment (as having met cleanup endpoints) immediately after clean-up endpoints were achieved, and before re-oiling by natural seep oil occurred.

The Phase III Maintenance and Monitoring Plan prepared by the EU included sampling in December 2015, and after the first significant storm event in January 2016. The plan also included, as conditions allowed, SCAT surveys every two weeks along shoreline segments that had been previously signed off as meeting Phase II cleanup endpoints. A final round of sampling occurred in May 2016.

Excluding monitoring of the cliff face/Section 5, formal SCAT surveys were completed on January 22, 2016. Per the cliff face/Section 5 Monitoring Plan, monthly inspections/monitoring events were conducted and continued through February 24, 2017, in addition to monitoring events when specific triggers were met (e.g., following a significant rain event defined as 3.5 inches or more of rain in a 24-hour period). A February 17 rain event triggered a storm monitoring event but, due to weather, the monitoring could not be conducted safely until February 24, 2017. This monitoring event, done in conjunction with a USCG overflight of the area, did not detect any oil or geological instability. This was considered the final monitoring event of the cliff face/Section 5.

Recommendations

- OSPR personnel should continue to work with the Santa Barbara County staff to provide more opportunity for SCAT training and collaboration in the future.

- In the beginning of the response, consider providing Operations with clean-up recommendations per each habitat type instead of per each segment/division. To support this, OSPR should work with the Area Committees to develop pre-approved clean-up methodologies (including dry ice blasting) by habitat type and consider incorporating into the Area Contingency Plan.

- SCAT Team Leaders should hold calibration meetings with the Operations contractor and crew leads and confirm that both SCAT and Operations have a

common understanding of cleanup recommendations and expectations.

- Clean-up endpoints should include “no more oil than background oil” when in area of known natural oil seepage. Alternatively, consider developing pre-approved clean-up endpoints for areas with known significant natural seepage (e.g., Santa Barbara County). Work with local researchers, stakeholders, and citizen scientists to determine background levels.

- SCAT teams should use a systematic approach, such as beach profile transects, early in the spill, to accurately measure and document sand deposition/erosion, so that these sites can be identified and monitored for buried oil.

- Response staff from outside SCAT should not be embedded into SCAT teams unless there is a need to have a technical expert on the SCAT team; the SCAT Team Leader or SCAT Coordinator should make this request.