United States Department of the Interior
BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT

Finding of No Significant Impact

Government Initiated Deployment Exercises of Oil Spill Response Equipment in the Southern California Planning Area

The Bureau of Safety and Environmental Enforcement (BSEE), as a cooperating agency, adopts the Bureau of Ocean Energy Management's (BOEM) Programmatic Environmental Assessment (PEA) for government initiated deployment exercises of oil spill response equipment in the Southern California Planning Area. BSEE has independently reviewed the PEA and confirmed that all comments and concerns raised as a cooperating agency during the process of preparing the PEA have been adequately addressed and resolved by BOEM. The PEA provides sufficient evidence and analysis for determining that there are no significant impacts reasonably foreseeable as a result of the proposed action or alternatives and therefore an EIS is not required prior to deciding whether or not to proceed with the oil spill response equipment exercises. BSEE takes full responsibility for the accuracy, scope, and content of the attached PEA.

The Proposed Action

BSEE's proposed action is to conduct deployments of industry-owned oil spill response equipment listed in the oil spill response plans for regulated offshore facilities in the BSEE Southern California Planning Area. BSEE may need to conduct future NEPA in the form of a Determination of NEPA Adequacy (DNA) for any particular deployment exercise or a supplemental EA or an EIS if a future deployment exercise exceeds or substantially differs from what is analyzed here or significant new circumstances or information becomes available that are relevant to environmental concerns and bearing on the proposed action or its impacts.

Summary of Impact Analyses and Conclusions

Environmental resources that could be potentially impacted and were therefore examined in the PEA are: Air Quality, Water Quality, Benthic Resources, Marine Mammals and Sea Turtles, Environmental Justice and Archaeological and Cultural Resources. The impact producing factors identified as part of the proposed action and alternatives are: air emissions, sedimentation, turbidity, ship strike and entanglement and effects to cultural resources. Projects and activities considered in the cumulative analysis include: on-going oil and gas industry activities on federal leases, offshore lightering and other shipping and point source and nonpoint source discharges. BSEE concluded that potential impacts on all resources that could be affected during the project would be insignificant and that the incremental increase of the proposed action to cumulative impacts is negligible for all resources. Specific resource-based discussion and mitigations are given below.

Determination of Significance

Air Quality: Based on the short duration for each of the offshore and nearshore scenarios evaluated in this analysis (6 or less hours), the impacts to air quality are expected to be temporary and insignificant. No air quality mitigations are necessary.

Water Quality: The potential impacts to water quality from the proposed project are considered to be minimal due to the short time-frame of the project (6-8hrs, 3 times per year), the small volume of discharges from the response vessel and that any associated turbidity would be short term and localized. Water quality would return to natural conditions after project completion. Additionally, the incremental increase of the proposed action to cumulative impacts is negligible. Overall, the potential impacts to water quality resulting from the proposed project are considered to be minimal. No water quality mitigations are necessary.

Benthic Resources: The proposed action would result in negligible benthic disturbance caused by placement of two to four temporary moorings once a year at both Los Angeles/ Long Beach and Santa Barbara locations. No biologically significant benthic areas or species are expected to be affected. Further, the proposed action is not expected to result in any measurable increase in cumulative effects. No benthic resource mitigations are necessary.

Marine Mammals and Sea Turtles: Continued equipment deployment exercises at the levels indicated poses little risk to marine mammals and sea turtles in the project area. However, as noted below minor improvements may reduce risk of impacts to marine mammals and sea turtles. Of most importance is a continued awareness of site-specific marine mammal and sea turtle concerns.

Conducting offshore equipment deployment exercises may result in temporary displacement, collisions and entanglements of marine mammals and sea turtles. There is also the potential for destruction of forage resources for leatherback sea turtles. Although the possibility of these impacts cannot be eliminated, collisions and entanglements are unlikely and the effects of displacement and destruction of forage are negligible. Specific mitigations include:

- To further reduce entanglement risk, BSEE will immediately recover booms, marker buoys and anchors if a large whale enters the equipment deployment area.
- BSEE will also ensure that any equipment that may be lost during a drill is recovered as soon as possible.
- If dense concentrations of jellyfish are encountered, BSEE will discontinue boom and skimming operations to avoid destruction of leatherback sea turtle prey.

Environmental Justice: Impacts on environmental justice in minority and low-income populations were considered for this analysis in accordance with Executive Order 12898. The proposed action is expected to have negligible direct and indirect effects on minority and/or low-income populations, due to the low frequency of equipment deployments and short duration of exercises, and will not result in disproportionately high adverse human health or environmental effects to minority and/or low-income populations. No environmental justice mitigations are necessary.

Archaeological and Cultural Resources: As described above, the proposed project activities would result in a negligible cumulative impact on any historic period archaeological sites and would have no cumulative impact on sediments associated with pre-contact period archaeological sites. No archaeological or cultural resource mitigations are necessary.

Findings Statement

I have considered the evaluation of the potential effects of the Proposed Action and the review of the 40 CFR 1508.27 significance factors. It is my determination that the Proposed Action would not cause any significant impacts. Further, it is determined that implementing the Proposed Action does not constitute a major federal action significantly affecting the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969 and therefore an EIS is not required prior to decisions on whether or not to proceed with the deployment exercises.

DAVID FISH Digitally signed by DAVID FISH Date: 2018.04.09 10:02:38 -04'00'

David Fish
Chief, Environmental Compliance Division

Date

Programmatic Environmental Assessment
Government-Initiated Deployment Exercises
of
Oil Spill Response Equipment

Bureau of Safety and Environmental Enforcement
Pacific Region

Prepared by
Bureau of Ocean Energy Management
Pacific OCS Region
Office of Environment

Environmental Assessment (Final)
April 2018

Responsible Agency: Bureau of Safety and Environmental Enforcement
Pacific OCS Region
Office of Oil Spill Preparedness Division

Abstract: The Bureau of Safety and Environmental Enforcement's (BSEE's) proposed action is to conduct deployments of industry-owned oil spill response equipment listed in the oil spill response plans for regulated offshore facilities in the BSEE Pacific Region. BSEE may need to conduct future NEPA in the form of a Determination of NEPA Adequacy (DNA) for any particular deployment exercise or a supplemental EA if a future deployment exercise exceeds what is analyzed here. Environmental resources examined in this PEA are: Air Quality, Water Quality, Benthic Resources, Marine Mammals, Environmental Justice and Archaeological and Cultural Resources. The primary potential impacting agents are: air emissions, sedimentation, turbidity, ship strike and entanglement and effects to cultural resources. Projects and activities considered in the cumulative analysis include: on-going federal oil and gas projects, offshore lightering and other shipping and point source and nonpoint source discharges. All impacts are expected to be insignificant.

The PEA is available via the following ways:

On the Web: www.bsee.gov

By Mail: Bureau of Safety and Environmental Enforcement
Attn: BSEE Pacific Region Programmatic Environmental Assessment for Government-Initiated Deployment Exercises (2018)
Oil Spill Preparedness Division
45600 Woodland Road
Sterling, VA 20166

For further information contact: Eric Miller, Chief, Office of Oil Spill Preparedness Division, BSEE, 45600 Woodland Road, Sterling, VA 20166; Phone: 703-787-1569; email: eric.miller@bsee.gov

TABLE OF CONTENTS

List of Figures

List of Tables

1.0 Introduction

The Federal Water Pollution Prevention and Control Act, 33 U.S.C. 1321, as amended by the Oil Pollution Act of 1990 provides the legislative authority within the Department of Interior to regulate oil spill preparedness activities for offshore facilities. These responsibilities have been codified in *30 CFR §254: Oil Spill Response Requirement for Facilities Located Seaward of the Coast Line* and delegated to the Bureau of Safety and Environmental Enforcement (BSEE). Under these regulations, the BSEE Oil Spill Preparedness Division (OSPD) reviews industry Oil Spill Response Plans (OSRPs) to verify that owners and operators of offshore facilities in both federal and state offshore waters are prepared to respond to a worst case oil discharge.

To validate the reliability of a given OSRP, OSPD conducts regulatory activities including exercise oversight, industry training audits, and oil spill response equipment inspections. Firstly, OSPD conducts unannounced complex table-top and/or equipment deployment exercises to test an offshore facility owner/operator's ability to respond effectively and efficiently to a hypothetical spill scenario. Unannounced exercises, which involve interagency coordination, require an operator to respond as if it were an actual event. Secondly, OSPD audits the applicable training offshore facility owners and operators provide to their employees and contractors in order to ensure that industry personnel are proficient in supporting a command and control organization and have the ability to operate their spill response equipment. Finally, OSPD verifies the state of readiness for equipment listed in an OSRP by assessing the quality and performance of devices such as skimmers, pumps, booms, and integrated fast response vessels.

1.1 Project Background and Description

In meeting the various regulatory requirements under 30 CFR 254, offshore facility owners and operators may physically deploy all or portions of the response equipment inventories listed in their OSRPs. These equipment deployments can occur under three scenarios: (1) BSEE requires the equipment deployment to determine if the equipment is working properly or conducts an equipment verification audit; (2) BSEE requires the equipment deployment during a deployment exercise; or (3) an owner/operator deploys the equipment on their own to satisfy their mandated training and exercise requirements. If the operator fails to properly deploy and exercise the equipment under any of the above three scenarios, BSEE may direct the operator to redeploy a portion, or the entirety, of the response equipment initially exercised. The activities that would occur during these redeployments are the same as what is analyzed in this PEA, these redeployments are covered under the scope of this PEA. Each of these equipment deployment types provides potential sources of environmental effects.

In the Pacific Region, BSEE conducts periodic inspections of oil spill response equipment located at offshore platforms and at shore-side storage facilities. These inspections sometimes involve the temporary operation of equipment at the storage location to verify the working

condition of the equipment especially if it has been recently repaired. This document will address equipment deployments related to BSEE response equipment inspections.

BSEE typically conducts three deployment exercises annually within the Pacific Region. A deployment exercise could be a table-top exercise, an equipment deployment exercise, or a combination of both. Exercises that involve equipment deployments can occur anywhere within the region where offshore platforms are located, ranging from north of Point Conception to offshore areas of the Los Angeles/Long Beach harbors seaward of the coastline. The exercises may be conducted at any time of year to accommodate government and industry operational schedules, and to support training and testing under non-ideal (but not unsafe) conditions. This flexibility affords opportunities to exercise equipment and personnel under a full spectrum of weather and sea-state conditions and to validate the response capabilities listed in an offshore facility's OSRP. This document will address equipment deployments associated with BSEE deployment exercises.

As per BSEE's regulations, every owner/operator must deploy each type of oil spill response equipment listed in their OSRP sometime during a three-year period. This deployment requirement could be satisfied when it is part of a deployment exercise or when the owner/operator conducts drills on their own initiative to test various aspects of their OSRP. BSEE has no control over when operators self-exercise (although OSPD is notified at least 30 days prior to the conduct of an industry-initiated exercise). Consequently, this document does not cover industry-initiated exercises.

1.2 Purpose and Need

The purpose and need for the proposed action is to allow the BSEE OSPD to properly administer 30 CFR §254 to ensure that owners and operators of offshore facilities in both federal and state offshore waters are prepared to respond to a worst case oil discharge. Specifically, the BSEE OSPD must initiate and/or oversee the periodic deployment of oil spill response equipment listed in an offshore facility's OSRP. These deployments are necessary for ensuring that an offshore facility owner/operator's response equipment is in an optimal state of readiness, and has access to industry personnel who can competently support a command and control organization and operate the listed response equipment.

2.0 Proposed Action and Alternatives

2.1 Introduction

This chapter describes the BSEE's proposed action and alternatives for meeting the oil spill preparedness verification needs for offshore facilities. This chapter also includes the No Action Alternative and a discussion of the alternatives considered but eliminated from detailed consideration.

2.2 Proposed Action

The proposed action is to conduct deployments of industry-owned oil spill response equipment listed in the OSRPs for regulated offshore facilities in the BSEE Pacific Region. These deployments could occur in, under and/or over the waters seaward of the coastline of central and southern California. The equipment deployments would be associated with announced and unannounced equipment verification visits and deployment exercises.

2.3 Preferred Alternative

The Preferred Alternative consists of two types of government-directed equipment deployments: (1) equipment verification visits, and (2) deployment exercises. These deployments would occur on any frequency and scale needed by BSEE to validate the soundness of the OSRPs and the spill response competencies of their owners/operators located in the Pacific Region. BSEE personnel or a designated alternative from another qualified government agency would be present in both types of equipment deployment scenarios. The two types of equipment deployments are described in sections 2.3.2 and 2.3.3.

2.3.1 Types of Oil Spill Response Equipment Involved in Government-Initiated Equipment Deployments

Government-directed deployment and operation of oil spill response equipment in the marine environment can involve a variety of devices, but the most commonly deployed are:

- Oil spill boom of different sizes and shapes.
- Oil spill skimming equipment.
- Maneuvers of large oil spill response vessels and smaller work boats to exercise coordinated cleanup tactics for an oil response.
- Temporary oil storage devices such as small barges and bladders.
- Aerial and subsea surveillance equipment such as aerostats or underwater autonomous vehicles.

These general equipment types and others are described below.

2.3.1.1 Oil Spill Boom

Vessels and boom are the most commonly deployed equipment during exercises. Booms are floating, physical barriers to oil, made of plastic, metal, or other materials, which slow the spread of oil and keep it contained. While booms can be seen above the waterline, they may have between 18 and 48 inches of material known as a "skirt" that hangs beneath the surface. The largest sizes of boom are used for offshore responses. Containment boom comes in lengths of 500 feet or more and can be connected together into lengths reaching 1,500 feet. Depending on the cleanup tactic being exercised, boom can be deployed directly from a facility by its assigned small boats[1] or by an oil spill removal organization (OSRO) deployed to the scene (Figure 1).

Figure 1. Small boat deploying curtain boom offshore (Source: BSEE).

For offshore operations boom may be deployed in various configurations (i.e., U-shape, V-shape, J-shape) by one to three vessels coordinating their operations to simulate tactics for corralling spilled oil (Figure 2). When boom is deployed in the U-shaped, V-shaped, or J-shaped configurations, it is often done in conjunction with a deployment of mechanical skimming device(s) (Figure 3).

[1] Presently, 3 of the OCS platforms and 3 facilities in state waters have boom stored onboard. The remaining facilities rely on boom supplied by an OSRO.

Figure 2. Small boats deploying containment boom near a facility using the U-shaped boom configuration (Source: BSEE).

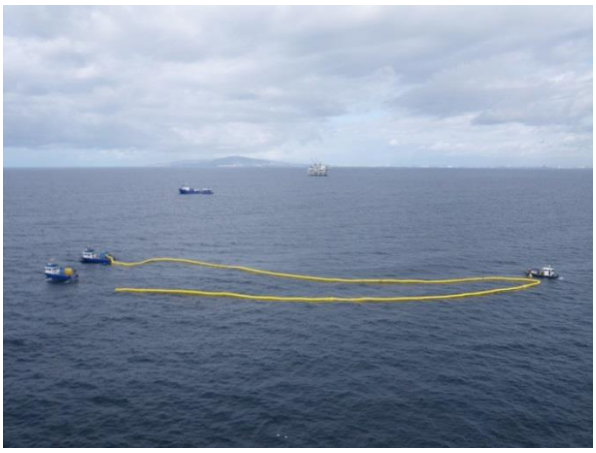


Figure 3. Two vessels deploying containment boom in V-shape while third vessel deploys a free-floating brush skimmer in apex of configuration (Source: BSEE).

For nearshore[2], boom designed for oil diversion or exclusion from sensitive areas can be of various shapes and lengths. Depending on the environmental conditions (i.e., sheltered harbor, fast currents) different boom sizes, means of floatation, and their means of inter-connection will need to be evaluated and selected. Boom deployed in nearshore environments can be moored in place with the use of anchor and weight systems (see Section 2.3.3.4).

2.3.1.2 Mechanical Skimmers

Skimmers are mechanical devices that remove free floating or corralled oil from the surface of the water. Depending on the specific model these devices can remove anywhere from 100 gallons per minute (gpm) to 1000 gpm. Two general types are commonly used in the Pacific Region:

- Weir Skimmers: Weir skimmers come in several configurations and essentially work like a dam. The weir is adjusted to a height when deployed where oil floating on the water is drawn over the top of the dam at a collection inlet and store in a compartment connected to a pump inside the skimmer.
- Oleophilic surface skimmers: These skimmers are constructed with materials that attract oil and repel water. The material is incorporated into belts, disks, mop chains, or brushes which are squeezed or scraped in the skimmer to collect oil into various storage devices.

Both types of skimmers can be constructed as a permanent part of a vessel's physical design or to float free from a vessel (Figure 4). For offshore oil cleanup, weir and oleophilic skimmers are

[2] Nearshore, defined for the purposes of this document, is the ocean outside of the surf zone and within 1 mile of shore; the water depth will vary under this definition. See the discussion on nearshore exercises in Section 2.3.3.4.

generally deployed and maneuvered by vessels through an oil slick to actively collect the oil. For example, a vessel can extend a short length of boom on a fixed arm (side collector) to herd oil to an inlet leading to a skimmer (Figure 5). As the vessel moves forward, oil is forced to accumulate in the apex of the boom where the skimmer is located, thereby concentrating the oil by increasing the amount of oil relative to water at the skimmer. Skimmers can also be deployed at an opening at the apex of two booms being towed between two vessels to recover oil that is forced into the apex. In this configuration, the collected oil is typically pumped to a storage barge or other vessel with containment tanks stationed near the apex.

2.3.1.3 Vessels

Self-propelled vessels stationed specifically at offshore facilities or provided by an OSRO can engage in a variety of spill response activities. They serve as platforms to deploy and maneuver boom and mechanical skimmers, ferry equipment and personnel, conduct spill surveillance, apply dispersants, and to tow temporary oil storage devices and barges. Vessels used for these activities range in size from 12-ft skiffs to 207-ft oil spill response vessels (OSRV) (Figures 6 and 7). Some vessels used for spill response can achieve speeds up to 30 knots. They are usually dispatched within the first hour of a deployment exercise and achieve their highest speeds when transiting to the site of the simulated spill. Once on scene, vessels generally transit at very low speeds (0 to 5 kts) to conduct spill response operations.

2.3.1.4 Towable temporary oil storage devices and barges

Towable temporary oil storage devices (TSD) are designed to hold and transport recovered oil from a spill site. They are made of rubber or polymer-coated fabrics of various weights and designs and have capacities that range from a few gallons to more than 300,000 gallons. There are three types of towable TSDs in use today. The first is a towable, rectangular-shaped, pillow tank, similar to those used on land (i.e., emergency potable water storage), but equipped with special tow rigging. The second type is a towable flexible tank, or "bladder," which is long and cylindrical in shape. When full, it is largely submerged and is characterized by flexibility along the length of the device. The third type of device is a towable open tank, an inflatable barge-type vessel with an open-top storage bag suspended inside the main structure.

Figure 4. Free floating brush skimmer deployed from side of vessel (Source: BSEE).

Figure 5. Vessel deploying a side collecting boom and weir skimmer (Source: BSEE).

Figure 6. A 65-ft OSRV spraying water from dispersant application system to simulate surface dispersant operations (Source: BSEE).

Figure 7. The largest OSRV that could be used in Pacific Region exercises: 207-ft *Pacific Responder* (Source: NOAA).

In addition to the TSDs, metal or inflatable barges (sometimes called mini-barges) designed for temporary oil storage can be towed or pushed by a vessel during an exercise. These barges generally have a maximum storage capacity of 250 bbls and can be of various lengths.

2.3.1.5 Aircraft and aerostats

BSEE estimates that one deployment exercise in every five years will be designed to require an owner/operator to deploy their listed airborne asset(s) for oil spill response (helicopter or fix-winged aircraft). Spill activities associated with aircraft deployments in exercises include:

- Deployment of remote sensing equipment to detect and track oil spills;
- Aerial monitoring and application of dispersant operations; and
- Deployment of an ignition device to begin in-situ burning operations.

Helicopters are versatile platforms that can be used for a number of spill response activities. During an exercise, they may be launched from the local Santa Barbara area to demonstrate remote sensing capabilities or simulate dispersant application in a designated offshore area. For the latter activity, helicopters equipped with 32-ft sprayer arms or suspended 250-gal buckets would fly over the exercise area and discharge water to simulate dispersant application (Figure 8). Helicopters may also be deployed in an exercise to drop an incendiary device such as a Heli torch to practice in-situ burn operations. However, it is anticipated that the latter exercise activity would be seldom performed and if conducted, would not involve a device that was actually ignited.

Similar to rotary wing assets, fixed wing assets may be deployed in exercises to demonstrate remote sensing and dispersant application activities. For exercises in the Pacific Region, a King Air BE90 aircraft in Concord, CA and a C-130 aircraft in Mesa, AZ could be activated to conduct a coordinated simulated dispersant application operation (Figure 9). In such an exercise, BSEE would request the activation of both assets so that the King Air could provide spotter information to the pilots of the C-130 as the latter aircraft sprayed water in simulated dispersant application runs. This type of coordinated air operations would occur during an actual spill response and BSEE would use an exercise to evaluate the response times and effectiveness of the coordinated operations by the OSRP plan holder.

Figure 8. Helicopter exercising simulated dispersant application with bucket sprayer (Source: BSEE).

Figure 9. C-130 aircraft staged in Mesa, AZ that can be deployed for dispersant applications in the Pacific Region (Source: BSEE).

To ensure consistency with the Sector Los Angeles/Long Beach Area Contingency Plan, simulated dispersant exercises would adhere to the same requirements that would exist during a real response which include not spraying directly over marine mammals and sea turtles, and not within 1,000 feet of flocks of birds. All aircraft would spray fresh water, pre-loaded at the air field, in order to demonstrate the dispersant application operations.

Aerostats are balloon-like systems that are self-contained, compact platforms that can deploy multiple sensor payloads and other devices into the air. They can generally lift payloads less than 50 pounds and up to 500 ft into the air using a winch-controlled launch and recovery system from a vessel or platform. They are used to survey the extent of an oil spill and provide responders with real-time data to better guide operations.

2.3.1.6 Marker buoys

These buoys are used to demarcate the location of the simulated oil slick. They usually have a weighted, cone-shaped buoy body with a vertically extending narrow, fiber glass pole topped with a highly visible flag. Response vessels are to "capture the flag" to show success in a drill.

2.3.1.7 Oil spill response equipment not deployed into the marine environment

The following represent examples of equipment that may be involved in a deployment exercise but not deployed into the marine environment. These types of equipment are used to directly collect oil or support operations associated with collection activities.

- Vacuum trucks
- Waste bins
- All-terrain vehicles, trucks, and trailers
- Wildlife response trailers
- Personnel support equipment (e.g., cleaning, food, water, temporary accommodations, etc.)

If these items were to be deployed for a drill, they would be placed in a staging area to test the operator's ability to acquire the equipment in a short amount of time. The staging area would likely be a parking lot near the simulated drill site, but not on a beach or natural shoreline area. It is expected that the requirement to deploy oil spill response equipment to an onshore location would be limited to one time a year. The deployment could involve 10 to 30 people and up to 10 trucks and trailers for various purposes. Truck types could include a mix of light duty (Class 1 to 3), medium duty (Class 4 to 6), and heavy duty (Class 8).

2.3.2 Equipment Preparedness Verification Visits

The BSEE OSPD regularly inspects and will periodically request the operation of response equipment that is maintained by the OSROs and the operators. The goal is to verify that the equipment cited in Pacific Region OSRPs is operable and response-worthy. However, current 30 CFR 254 regulations only allow the OSPD to request equipment be operated if the piece of equipment has been damaged and repaired, modified, or the company is claiming a different recovery capacity than a prior BSEE approval. Hence, this limitation causes some fluctuation in how many pieces of equipment may be tested in a given year. There have been equipment preparedness verification visits where OSPD has not witnessed the starting and running of any

equipment and merely conducted a visual inspection, and others where the BSEE inspector requested several pieces of equipment to be started and run for a few minutes apiece.

Spill response equipment associated with the OSROs in the Pacific Region is often stored at an onshore location and requires a power pack/hydraulic unit for operation. Some equipment can be safely operated at the onshore storage facility but others may require deployment for testing in the waters adjacent to the storage location. BSEE typically requests the latter when inspectors want to test large weir skimming systems. Deployment of these skimming systems typically requires the activation of a vessel's main engines to operate a lifting crane on the vessel that will place the skimmer into the water next to the vessel. The test usually takes a short amount of time (e.g., 10 minutes) and concludes when BSEE personnel have observed the skimming system actively taking up water and discharging it back into the marine environment. On a few occasions OPSD has requested an OSRO only turn on the vessel's engines to verify that they're functional. BSEE will rarely, if ever, require an OSRO's vessels to depart their berths in order to observe the operation of any equipment during an equipment preparedness verification visit. BSEE may test from 15 to 100 pieces of equipment per year in both onshore storage facilities or in the marine environment.

Several offshore facilities in California have oil spill response equipment and small vessels stored directly on the platforms. BSEE may choose to test the equipment at these platforms during an equipment preparedness verification visit. These locations include:

- Beta Unit: Platforms Edith and Ellen
- Santa Clara Unit: Platforms Grace and Gail
- Santa Ynez Unit: Platform Hondo
- State waters platforms: Eva, Esther and Emmy

2.3.3 Government-Initiated Deployment Exercises

Unless otherwise specified by BSEE, the equipment deployed during a deployment exercise should include as much response equipment as reasonably needed for an initial response[3]. For example, BSEE may pose a spill scenario where the operator would have to respond to a 100-bbl spill from a cracked pipeline. The owner/operator would then need to deploy the equipment necessary to respond to recover this volume of spilled oil. Other scenarios could require different combinations of equipment and personnel depending on what capabilities BSEE was interested in evaluating. In any deployment exercise, the owner/operator must respond to the scenario as if it was a real spill to demonstrate that the equipment is operational and that the response personnel are competent in its use.

[3] This would occur for the first 6 hours of an actual response. Equipment used beyond the initial response would cascade from other sources such as other OSROs or contractors and are not analyzed in this EA.

2.3.3.1 Frequency and Duration

Based on the number of OSRPs currently overseen by BSEE in the Pacific Region, normally three deployment exercises involving table-top scenarios and/or equipment deployments are conducted annually. However, more than three deployment exercises may be initiated by BSEE if an owner/operator needs to be retested or if new OSRPs are approved in the Region. Equipment deployments during a deployment exercise generally occur for a few hours and rarely longer than a day. BSEE will rarely initiate nighttime equipment deployment exercises for safety reasons unless a low visibility response capability of an owner/operator needs to be evaluated. When mechanical skimmers are deployed and operated during a deployment exercise, they are typically done so for approximately ten minutes to ensure that they are working properly. BSEE personnel will observe the operation of these devices and generally will be satisfied with their performance when the skimmers are sufficiently drawing water from and discharging to the marine environment.

2.3.3.2 Offshore Exercises

Most equipment deployment exercises typically occur in the open water environments near one of the 26 offshore facilities located in the waters bounded in the south off Long Beach, through the Santa Barbara Channel, and north at Point Arguello (see the maps of the Pacific OCS Region in Figures 10, 11 and 12). In an exercise, the equipment may be deployed directly from the facility and/or from contracted OSRO assets located elsewhere in the area. Below are examples of the numbers and sizes of vessels, and possible scenarios that are typically employed in offshore scenario deployment exercises:

Typical Offshore Scenario. Offshore deployment exercises are usually designed with a scenario that simulates a large discharge of oil from a facility's subsea infrastructure or from its surface components. Consequently, the simulated oil surfaces in the immediate vicinity of the platform and the owner/operator is directed to initiate a response accordingly. These drills typically take 6 to 8 hours to complete, depending on exercise objectives, on-scene environmental conditions, and launch locations for the response equipment. Equipment anticipated for offshore response deployments include:

- Two to five boats ranging from 32 ft to 207 ft are deployed from their home bases. The larger vessels (65 ft and greater) will generally deploy mounted skimming systems.
- Cranes are typically needed to deploy the skimming systems over the sides of the vessels. The crane and skimmer are generally powered directly from the main engines of the vessels.
- The smaller boats (64 ft and under) are most often used to maneuver and tow lengths of boom to capture oil separately. They may also be used to tow temporary oil storage devices (TSDs) and storage barges.

- Depending on the platform and if the owner/operator maintains their own oil spill boom, the owner/operator may have a small vessel (under 30 ft in length) on the platform to deploy the boom or will request an assigned crew boat (approximately 100 ft long) to assist (Figures 13a and 13b). If the platform has a small boat, a crane may be used to put the boom boat in the water. Some cranes are diesel-powered while others are electric.

2.3.3.3 Nearshore Exercises

BSEE may need to evaluate the nearshore response capabilities for an owner/operator. These exercises would occur as BSEE determines the need and maybe conducted at any time during a year, pending weather and sea state. Deployment exercises for these scenarios would be designed to evaluate the equipment, training, and operations associated with deploying shallow-water response vessels and the placement of diversion and exclusion boom. The following scenarios have been targeted as potential exercise locations that BSEE could use to evaluate nearshore capabilities. None of the following scenarios will involve staging or deploying equipment from the beach. Any boats launched will be done so at preexisting boat ramps to transit to the exercise location. There will be no shore-based activities at the exercise sites. In general, equipment deployment and nearshore operations would be conducted at a distance that would least disturb sensitive nearshore species such as harbor seals, sea otters and roosting or nesting sea birds and none would be conducted near or within kelp beds.

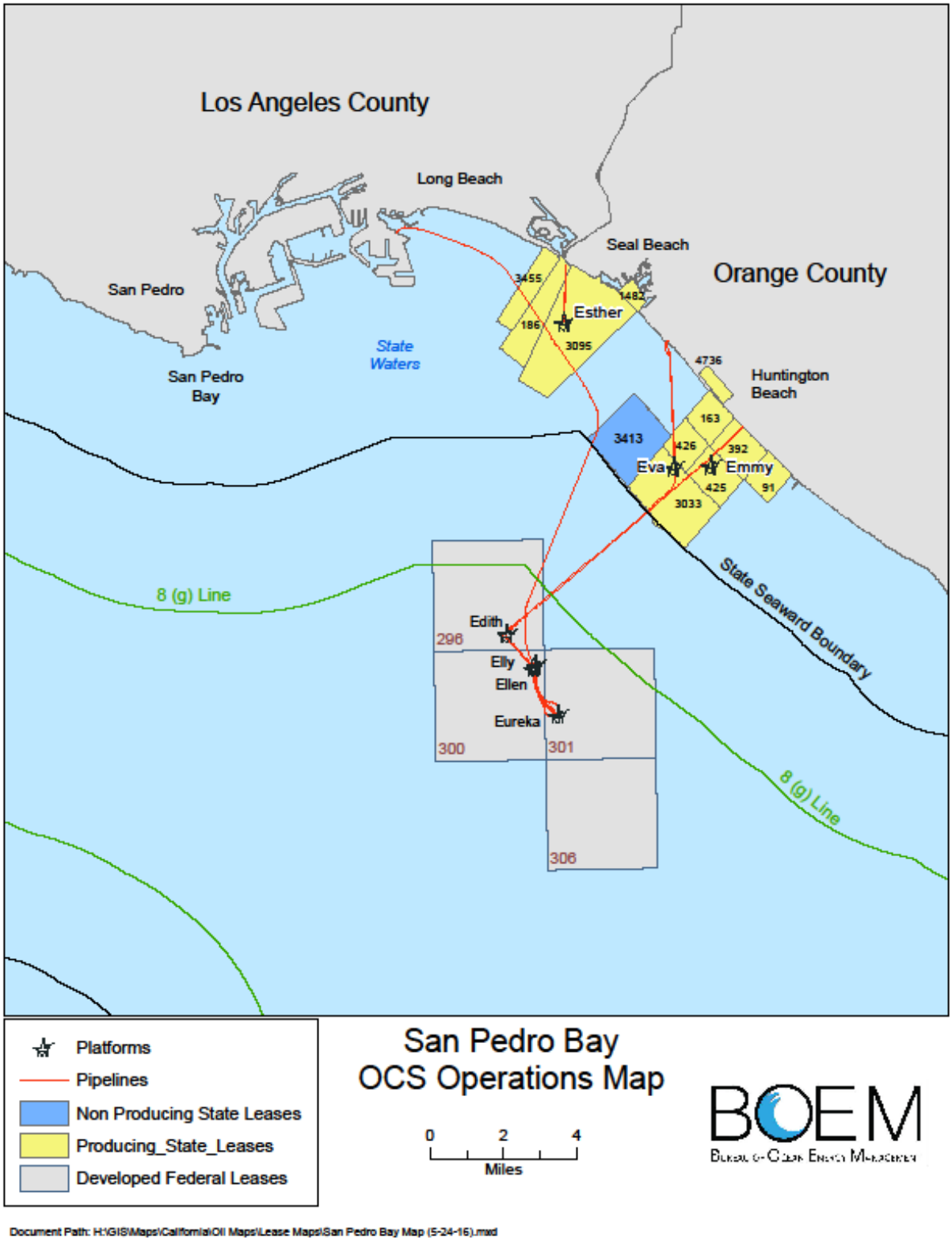


Figure 10. Map of the Long Beach-San Pedro area showing the state waters and OCS operations.

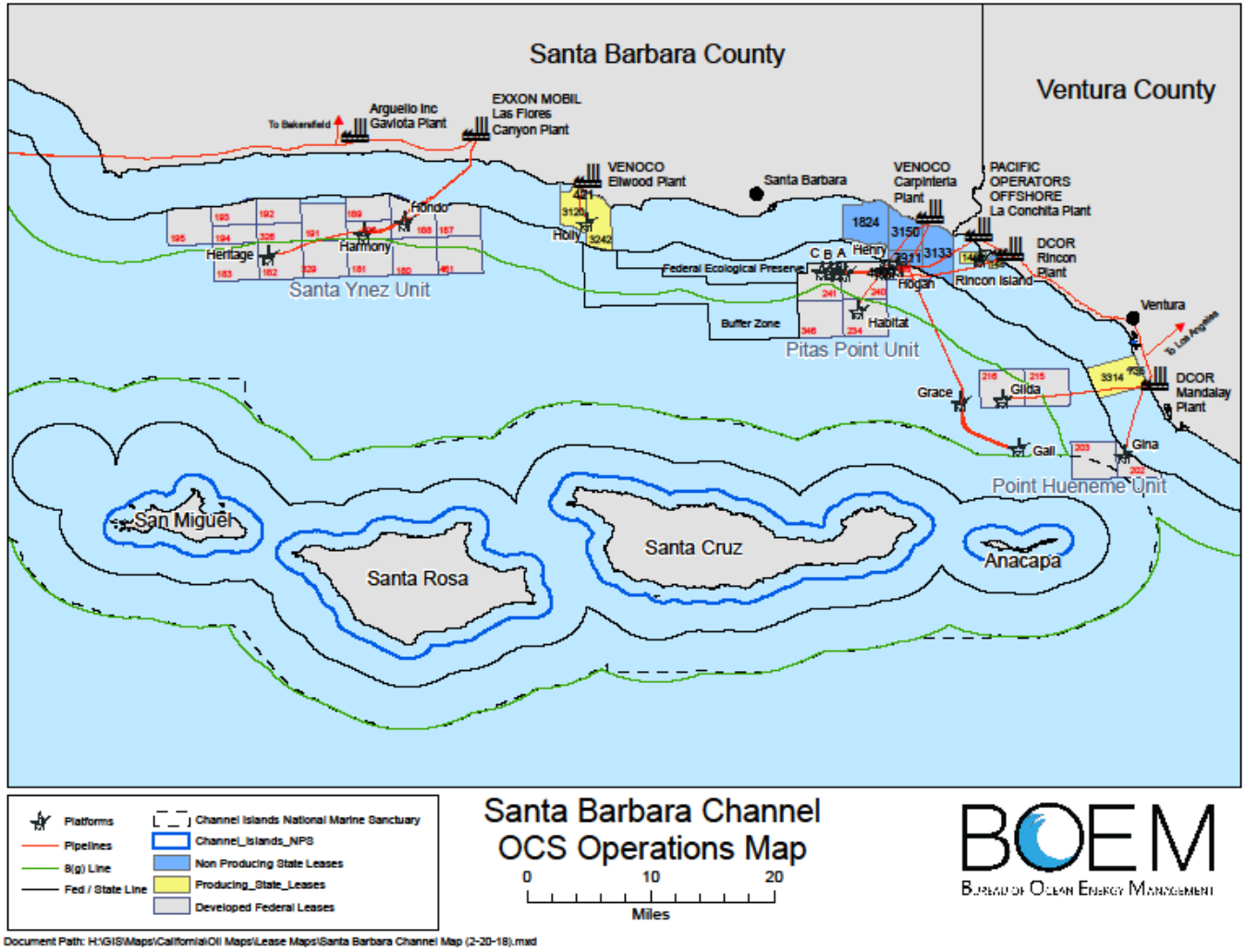


Figure 11. Map of the Santa Barbara Channel area showing the state waters and OCS operations.

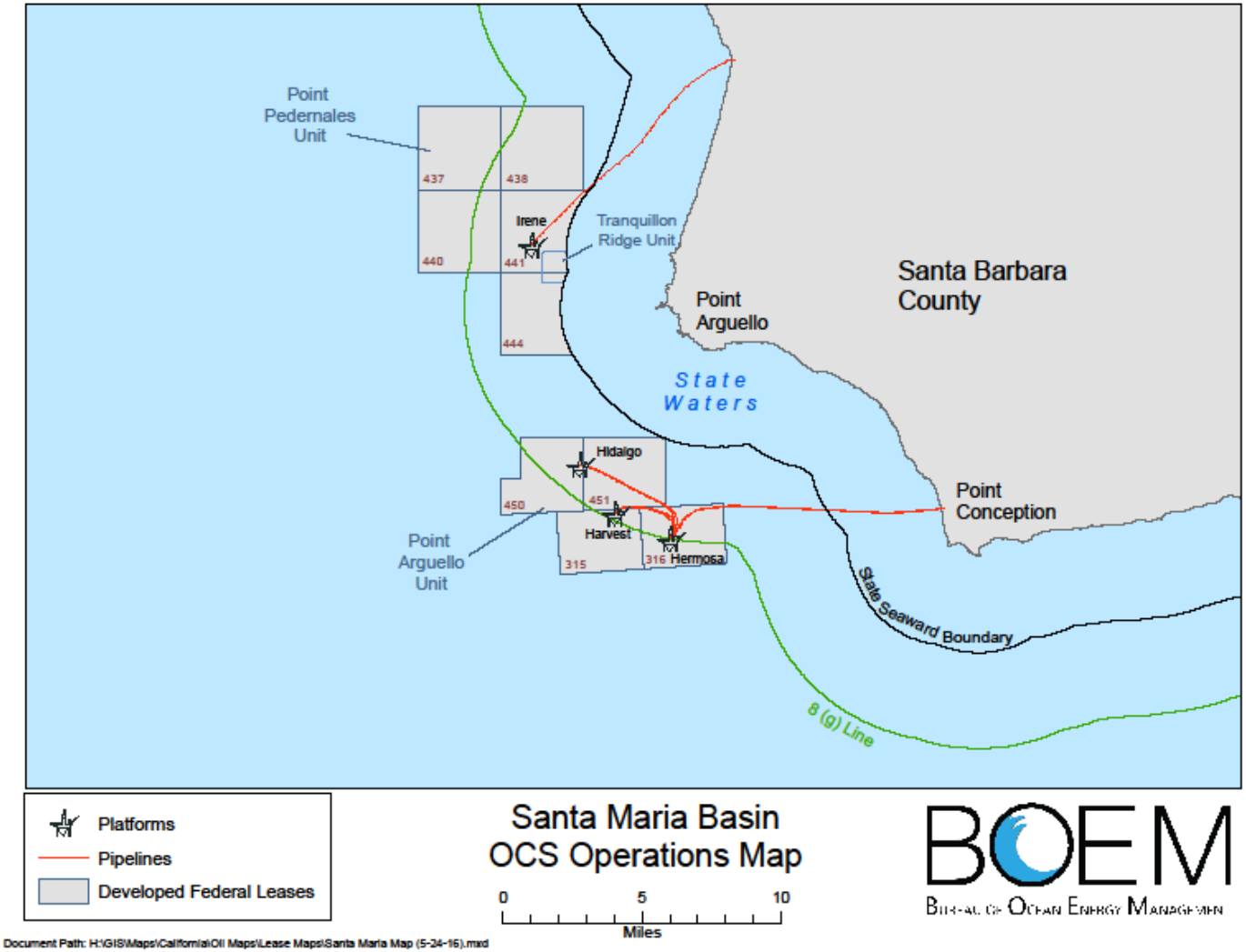


Figure 12. Map of the Santa Maria Basin area showing the OCS operations.

(a)

(b)

Figures 13a and 13b: Crew boat deploying containment boom from a storage reel on Platform Hondo during an exercise (Source: BSEE).

Nearshore Boom Deployment Anchoring Capabilities. In order to deploy a boom for diversion purposes, the operator would need anchors. Figure 14 shows a typical anchor system that could be used for this type of boom deployment and Figures 15 and 16 show a nearshore boom deployed and a boom being recovered, respectively. OSROs will generally use anchor systems that contain components of the dimensions depicted in Table 1. The most common anchor types used are Danforth and mushroom. When deploying the anchors and boom, the OSRO would make every effort to ensure the anchors are set and would minimize dragging the anchor along the sea floor by accurately gauging the water depth and assessing the existing weather conditions and by monitoring the boom. The OSRO would also keep a boom tender on station to ensure the boom is not moved during the exercise, although the scenarios are not planned to last longer than 6-8 hours.

Deploying of the anchors/boom system would be straightforward and involve the setting of an anchor and deploying the boom, which would put tension on the anchor and set it into the sea floor. Removal of the system would involve the opposite process. To limit potential impacts to the environment, BSEE has chosen to test the anchoring of diversion boom capabilities in two heavily used vessel anchorage areas described in the following boom deployment scenarios.

Nearshore Diversion Boom Anchoring Drill – Los Angeles/Long Beach, CA: BSEE has chosen to test the anchoring of diversion boom capabilities in the federally regulated Los Angeles – Long Beach anchorages described in 33 CFR 110.214. The federal anchorages can be viewed on NOAA chart number 18749 and have been extensively used by large commercial vessels for over 70 years. They are easily accessible in the major industrial corridor of the Los Angeles – Long Beach waterfront. In calendar year 2016, the anchorages were used by 2,128 large commercial vessels including tankships and bulk cargo carriers (private communication between BSEE and the Marine Exchange of Southern California, 2017). Each year thousands of

commercial ships drop anchors weighing up to 31 tons with long lengths of heavy iron chain to the bottom of San Pedro Bay within the anchorage areas. Figures 17(a) and 17(b) provide a size perspective comparing the large size of these commercial ship anchors versus the small anchors used to secure oil spill containment boom.

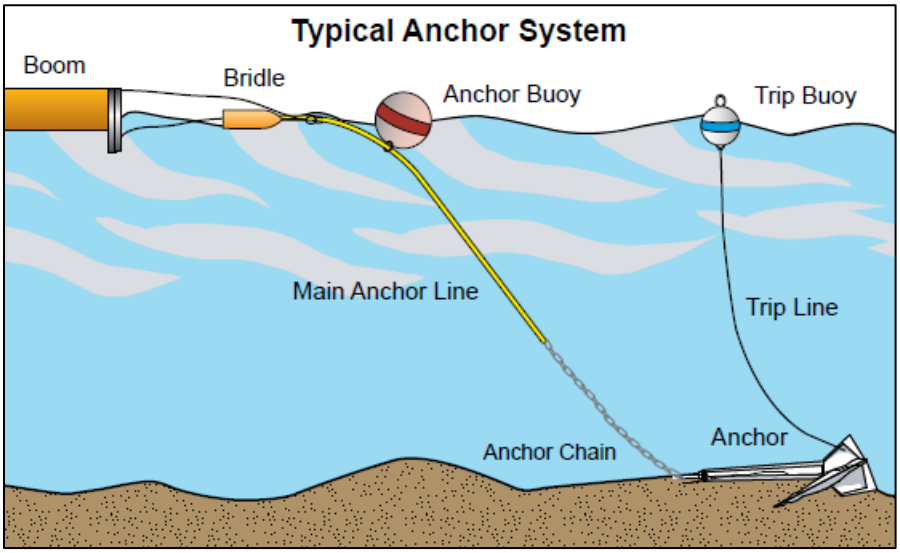


Figure 14. Typical boom anchor system (Source: *Spill Tactics for Alaska Responders*, 3/2014).

Figure 15. An example of a nearshore boom deployed (Source: USCG).

Figure 16. A nearshore deployed boom being recovered (Source: USCG).

Table 1. Typical Dimensions of Boom Anchoring Components

Anchor Weight	Anchor Chain	Anchor Rope	Anchor Buoy	Boom Painter Line	Anchor Shackle
22 lbs.	8’ of 3/8” Chain	60’ of 1/2” Nylon Rope	15” Inflatable Buoy	6’ of 1/2” Line	3/8” Galvanized Steel
40 lbs.	8’ of 3/8” Chain	60’ of 1/2” Nylon Rope	15” Inflatable Buoy	6’ of 1/2” Line	3/8” Galvanized Steel
65 lbs.	8’ of 3/8” Chain	60’ of 1/2” Nylon Rope	20” Inflatable Buoy	6’ of 1/2” Line	3/8” Galvanized Steel

(a)  (b) 

Figure 17. (a) Heavy stockless anchor being serviced for a commercial vessel. This type of anchor is regularly deployed by commercial vessels in the Los Angeles – Long Beach federally regulated anchorages (Source: Anchor and Chain Maintenance. Digital image. Commercial Diving Services Pty Ltd. Web. 30 March 2017). (b) Typical 40-lb Danforth anchor used to secure spill containment boom to the seafloor. (Source: Oil Containment Boom Water Anchor Systems. Digital Image. Enviro-USA. Web. 3 April 2017).

Exercises conducted in the federal anchorages will likely involve a combination of shallow water vessels that would deploy boom in various containment, exclusion, and containment configurations. These vessels may also deploy skimmers to simulate nearshore skimming operations. For shallow-water boom deployments, the spill response teams may need to secure segments of the boom to the seafloor using 40-lb Danforth or mushroom anchors. These boom anchors are significantly smaller in size and up to 1,600 times lighter than the anchors used by commercial ships operating in the proposed exercise area. The impact to the seafloor caused by these small boom anchors deployed once or twice per year in BSEE-initiated exercises is marginal compared to the impact caused by the thousands of commercial vessels that annually drop large, multi-ton anchors and scopes of chain into these same areas. The drill would take

approximately six hours to complete and all equipment would be collected once the goals of the drill were met. Equipment anticipated for this capability testing includes

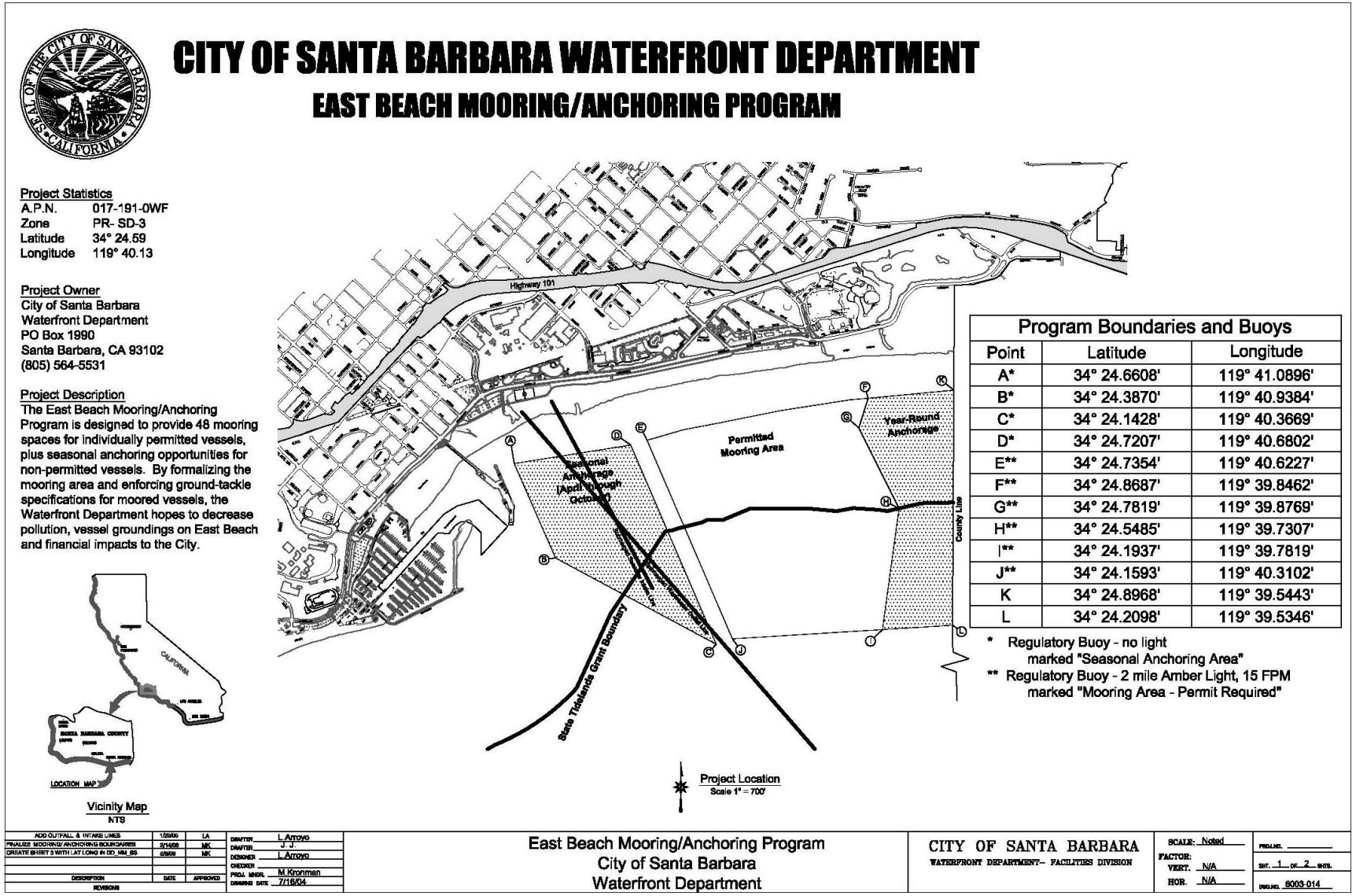
- Up to 5 boats no greater than 43’ in length with shallow drafts for handling skimming or booming operations in shallow water environments;
- 1, 98’-208’-ft OSRV;
- 2 48’ shallow draft 100-bbl barges for storage and skimming;
- 1500-ft to 3000-ft lengths of boom >18 in to be used for diversion or containment;
- 2-4, 28-in Danforth or mushroom anchors weighing up to 40 lbs. deployed to the ocean floor to hold boom in place outside surf zone. Figure 14 shows an example of a typical anchor system;
- 3-5 brush skimmers from OSRVs and barge; and
- 1 weir skimmer or 1 disc skimmer at the collection point.

Nearshore Diversion Boom Anchoring Drill – Santa Barbara, CA: BSEE desires to have northern location in the Pacific Region to provide logistical flexibility for conducting diversion boom anchoring drills. Consequently, BSEE has chosen to test this capability in the Santa Barbara Harbor year-round anchorage located east of the Stearns Wharf as described in the Title 17 Harbor section of the Santa Barbara Municipal Code (Figures 18 and 19). This area is not a federal anchorage but has been designated by the county to allow anchoring year-round without prior approval for most pleasure craft. The bottom area in this anchorage has been primarily affected by the anchoring activities of recreational vessels vice large commercial freighters. Boom anchoring drills in this area would take approximately six hours to complete and all equipment would be collected once the goals of the drill were met. Drills would not be conducted during holiday periods or special celebrations so as to not impact potential increased use of the anchorage by the public during these times. Equipment anticipated for this capability testing includes:

- Up to 5 boats no greater than 32 ft in length with shallow drafts for handling skimming or booming operations in shallow water environments;
- 1, 65-ft OSRV;
- 2 shallow draft 100-bbl barges for storage and skimming that require no anchoring;
- 1500-ft to 3000-ft lengths of boom >18 in to be used for diversion or containment;
- 2-4, 28-in Danforth or mushroom anchors weighing up to 40 lbs. deployed to the ocean floor to hold boom in place outside surf zone. Figure 14 shows an example of a typical anchor system;
- 3-5 brush skimmers from OSRVs and barge; and
- 1 weir skimmer or 1 disc skimmer at collection point.

Nearshore Scenario 1: Offshore El Capitan State Beach, Goleta, CA. Scenario 1 would simulate oil being released from a nearby offshore platform and being carried NNW to impact the coastline. El Capitan State Beach offers a sacrificial beach on which to direct the simulated oil

that would otherwise pass the beach to impact cobblestone-lined beaches farther west. Operations would likely be a combination of shallow water skimming vessels operating in the nearshore environment that would be pulling boom, holding diversion boom, or conducting skimming operations. No boom anchoring would occur in this exercise area (Figure 20).



Program Boundaries and Buoys		
Point	Latitude	Longitude
A*	34° 24.6608'	119° 41.0896'
B*	34° 24.3870'	119° 40.9384'
C*	34° 24.1428'	119° 40.3669'
D*	34° 24.7207'	119° 40.6802'
E**	34° 24.7354'	119° 40.6227'
F**	34° 24.8687'	119° 39.8462'
G**	34° 24.7819'	119° 39.8769'
H**	34° 24.5485'	119° 39.7307'
I**	34° 24.1937'	119° 39.7819'
J**	34° 24.1593'	119° 40.3102'
K	34° 24.8968'	119° 39.5443'
L	34° 24.2098'	119° 39.5346'

* Regulatory Buoy - no light marked "Seasonal Anchoring Area"
** Regulatory Buoy - 2 mile Amber Light, 15 FPM marked "Mooring Area - Permit Required"

Figure 18. Map of the year-round anchoring area proposed to be used for the Nearshore Diversion Boom Anchoring Drill at Santa Barbara. (Source: Santa Barbara Municipal Code Title 17)

Figure 19. Photo of the year-round anchoring area proposed to be used for the *Nearshore Diversion Boom Anchoring Drill* at Santa Barbara. (Source: http://www.thelog.com/local/from-harbor-to-shining-harbor-the-freedom-of-anchorages/. Photo credit: Parimal M. Rohit)

The drill would take approximately six hours to complete and all equipment would be collected once the goals of the drill were met. Equipment anticipated for this scenario includes:

- Up to 5 boats no greater than 32 ft in length with shallow drafts for handling skimming or booming operations in shallow water environments;
- 1, 65-ft OSRV;
- 2 shallow draft 100-bbl barges for storage and skimming;
- 1500-ft to 3000-ft lengths of boom >18 in to be used for diversion or containment (Figure 16);
- 3-5 brush skimmers from OSRVs and barge; and
- 1 weir skimmer or 1 disc skimmer at collection point.

Nearshore Scenario 2: Point Conception to Government Point Sensitive Site Protection Strategy. Scenario 2 would entail simulated oil released from an offshore platform and being carried towards the area between Point Conception and Government Point (Figure 22). This site is listed in the Sector Los Angeles/Long Beach Area Contingency Plan as having no feasible onshore strategies to protect sensitive habitat. The goal is to deflect or capture oil before it hits the inaccessible shoreline. No boom anchoring would occur in this exercise area. The challenge presented by this scenario is deploying assets over a long distance from the nearest full service harbor (Santa Barbara). The exercise would take approximately 8 hours to complete. Equipment anticipated for this scenario includes:

- Up to 3, 65-ft OSRVs;
- Up to 5, 32-ft long boats;

- 4500 ft of 60-in boom used for containment and diversion;
- No anchoring of boom is expected; and
- 4 to 8 brush skimmers.

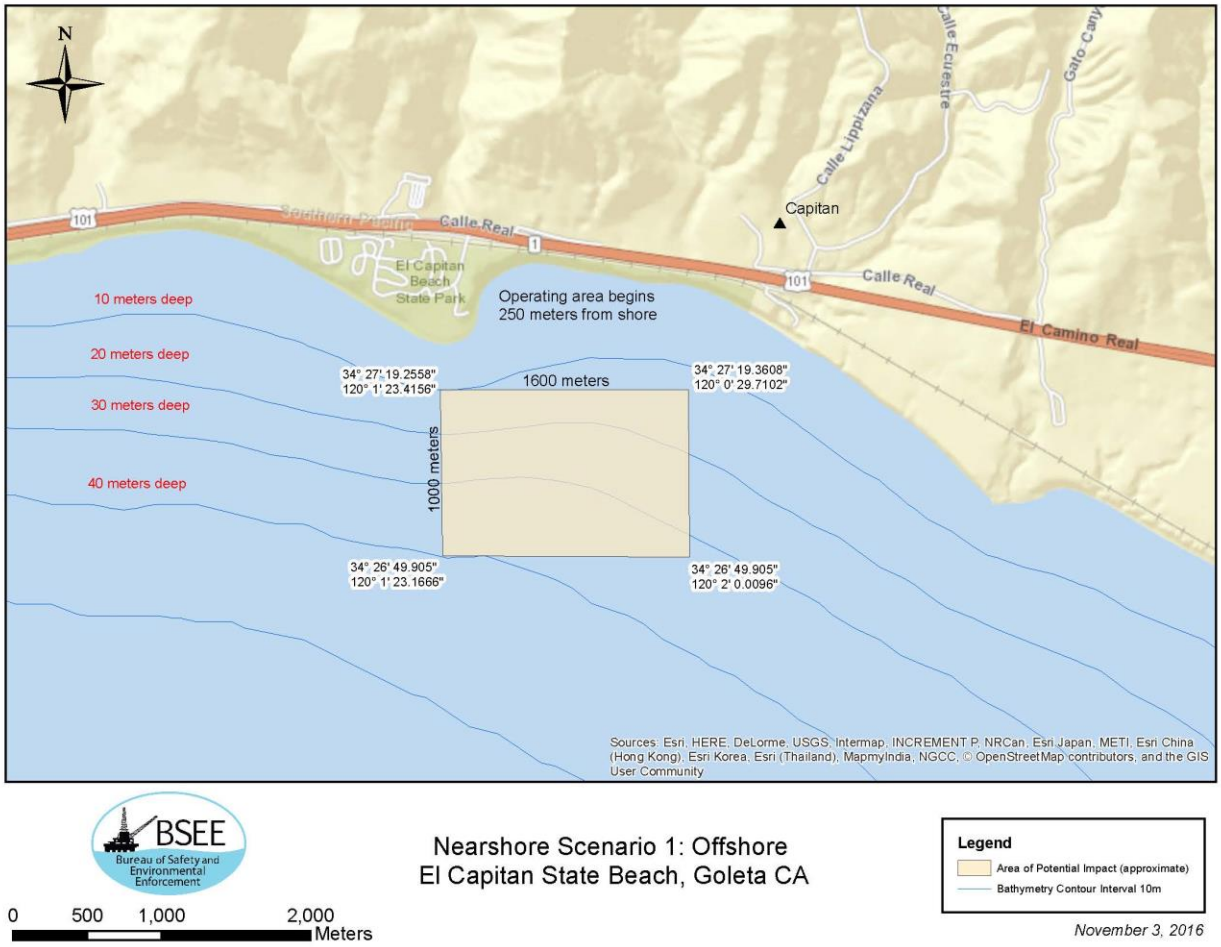


Figure 20. Approximate area where exercise would be held to demonstrate diversion of oil offshore of El Capitan State Beach.

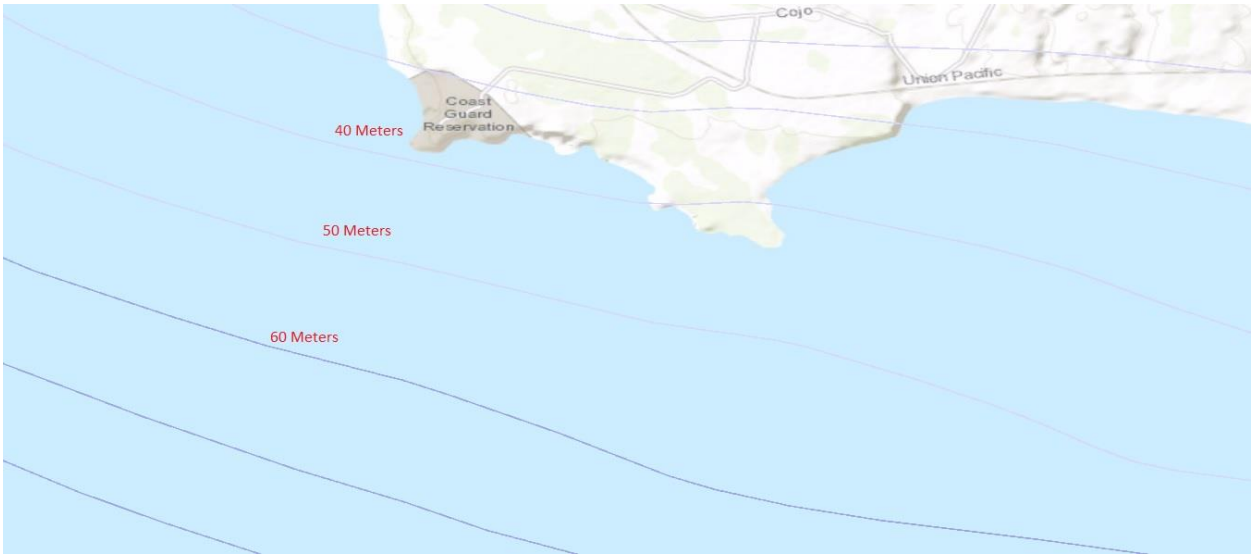


Figure 21. General area where the Point Conception to Government Point Sensitive Site Protection Strategy exercise would be carried out.

Nearshore Scenario 3: King Harbor Protection Strategy near Redondo Beach. Scenario 3 would focus on a simulated oil spill from an offshore platform being carried NNW past the Point Vincente State Marine Conservation area and caught in the eddy located off the Santa Monica shore. This eddy would catch the oil and threaten Redondo Beach from the north. The King Harbor Protection strategy calls for offshore mechanical cleanup and protection of the water intake towers for the Redondo Beach Power Plant and AES Redondo Beach Generating Station (Figure 23). The OSRO exercised would deploy for no more than 6 hours and potentially use the following equipment:

- 1, 207-ft OSRV;
- Up to 3, 28-ft boats to maneuver boom;
- 3000 ft of 43-in curtain boom;
- No anchoring of boom is expected;
- 2 brush skimmers; and
- 1 weir skimmer.

Figure 22. General area where the King Harbor Protection Strategy near Redondo Beach exercise would be carried out.

2.4 No Action Alternative

Under this alternative the potential effects that could occur under the proposed action would not occur. Instead, the BSEE OSPD would attempt to accomplish its regulatory responsibilities under 30 CFR 254 in other ways. However, if OSPD did not conduct deployment exercises or test equipment, there would be a potential for an increase in the effects from oil spills due to a decrease in the effectiveness in the response from the operators and the OSROs. This would arise from the lack of regulatory oversight that is applied when OSPD conducts deployment exercises and tests equipment which could allow the operators and OSROs to be less vigilant and competent in maintaining and operating their oil spill response equipment.

2.5 Alternatives Eliminated from Consideration

The following alternatives were eliminated from consideration because it would limit BSEE's regulatory responsibility to ensure the offshore oil and gas operators were properly prepared and trained to respond to any oil spill due to the number of times operators could be tested (2.5.1), could prevent some operators' onsite equipment from being tested (2.5.2), or because it essentially duplicates the analysis done in this PEA.

2.5.1 Frequency Limitation

BSEE would limit its equipment deployment exercises to no more than one per year. Equipment deployments associated with equipment preparedness verification visits would continue as per their current frequency and scope.

2.5.2 Geographical Limitation

BSEE would pre-identify two specific locations that deployment exercise equipment deployments would occur no matter what OSRP was being evaluated. The locations would be chosen based on the lowest proximity to environmentally sensitive areas. One would be located in the Santa Barbara Harbor and the second would be located in the Los Angeles Harbor. The current frequency and scope of equipment deployments associated with equipment preparedness verification visits would continue.

3.0 Affected Environment and Environmental Consequences

3.1 Environmental Resources Included in the EA

The BOEM followed a multi-step process in conducting the environmental analysis presented in this EA. The first step involved conducting an initial screening analysis to determine the resources that are in the project area and potentially could be impacted by the proposed activities. This was accomplished by examining the types of equipment, described above that are deployed during exercises, and the associated activities. Based on this examination and review of the proposed project, BOEM determined that the following environmental resources could be potentially impacted:

- Air Quality: Potential impacts to due to emissions from the vessels and deployed during an exercise as well as emissions from equipment that is tested during equipment verification tests.
- Water Quality: Potential impacts from small refined petroleum spills from vessel and equipment operations and the small amount of freshwater from a dispersant exercise as well as short-term turbidity from anchoring.
- Benthic Resources: Potential impacts to sensitive species such as sea grass beds during anchoring of boom during nearshore exercises.
- Marine Mammals and Sea Turtles: Potential for disturbance, collision, entanglement and prey impacts during equipment deployment exercises in nearshore and offshore waters.
- Historic Properties and Cultural Resources: Potential impacts to historic properties and cultural resources during anchoring of boom during nearshore exercises.
- Environmental Justice: Required by Presidential Executive Order.

3.2 Environmental Resources Not Included in the EA

The BOEM also determined which environmental resources would not be potentially impacted from the proposed activities. The following resources were not included for analysis in this PEA because they are not in the project area, would not be affected by the activities due to the low frequency of activities, the temporary and short-term nature of the deployment exercises, or are easily avoided during the course of an exercise: Special Areas, Plankton, Fish and Essential Fish Habitat, Marine Birds, Recreational Fishing, Commercial Fishing, Marine Transportation, and Socioeconomic resources.

3.3 Cumulative Projects

Possible sources of cumulative impacts to water quality in the project area include:

- On-going oil and gas activities in Federal waters and point;
- Nonpoint pollution sources;
- Anchoring associated with recreational boating;

- Maintenance activities associated with cable and pipeline infrastructure;
- The recent onshore pipeline leak of 2,381 barrels of oil;
- Commercial and recreational vessel traffic;
- Commercial and recreational vessel traffic;
- Commercial and sport fishing;
- Vessel traffic (propeller strikes, cooling water intakes); and
- Sea water-cooled power plants.

3.4 Oil Spills

The operation of three to five oil spill response vessels carrying out the deployment of oil spill response equipment during equipment deployment activity would involve the use of petroleum hydrocarbons, including small volumes of lubricating oils, hydraulic fluids, and waste oils. Spillage of these materials on any vessel could result in their release to the marine environment. The vessels will have spill containment and cleanup equipment on board in the event of local deck spills. If an oil spill to the ocean occurs from one of the vessels, operators will respond and assist the vessel(s) in accordance with its agency-approved OSRP for Pacific OCS Operations.

The incidental spillage of lubricating oil, hydraulic fluids, and waste oil would result in an insignificant impact to the marine environment due to the small volume of such spills, the onsite oil spill response capability, and other spill response resources in the immediate area. A large oil spill is not expected from these exercises because anchors will not be used near any large sources of oil such as the pipelines between platforms nor between platforms and the mainland.

Further, due to the short duration of any exercise (6-8 hours, 3 times per year), no vessels will need to refuel during the time of the exercises.

3.4.1 Overall Conclusion

Due to the short project time-frame, the lack of a source for a large oil spill, and the capability of a response to a spill of any size by the OSROs, no impacts from oil spills are expected and oil spills are not further analyzed in this document.

3.5 Meteorology and Air Quality

3.5.1 Affected Environment

The federal government has established ambient air quality standards to protect public health (primary standards) and, in addition, has established secondary standards to protect public welfare. The State of California has established separate, more stringent ambient air quality standards to protect human health and welfare. California and National standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulate

matter 10 microns (PM_{10}), suspended particulate matter 2.5 microns ($PM_{2.5}$) and lead. In addition, California has standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles.

Section 328 of the 1990 Clean Air Act Amendments (CAAA) transferred authority for air quality on the OCS to the EPA. On September 4, 1992, the EPA Administrator promulgated requirements (40 CFR Part 55) to control air pollution from OCS sources to attain and maintain federal and state air quality standards and to comply with CAAA provisions for the Prevention of Significant Deterioration. The promulgated regulations require OCS sources to comply with applicable onshore air quality rules in the corresponding onshore area. EPA delegated authority to the Santa Barbara and Ventura County Air Pollution Control Districts (APCD) and the South Coast Air Quality Management District (SCAQMD)to implement and enforce the requirements of 40 CFR Part 55. The full transfer of authority to regulate OCS air emissions pursuant to 40 CFR Part 55 transpired on September 4, 1994. The proposed oil spill exercises will be conducted in the Southern California Planning Area and could occur in the OCS and state waters adjacent to any of the three coastal counties. All OCS platforms are currently permitted and in full compliance with air quality regulations within jurisdictions of the Ventura and Santa Barbara APCDs and the SCAQMD.

Ventura and Santa Barbara (South Central Coast Air Basin). The climate, meteorology, air quality, and air quality trends of Ventura and Santa Barbara Counties located in the a South Central Coast Air Basin (SCCAB) have been described in detail in several planning and environmental documents and are best summarized in the most recent 2012 Santa Barbara County Clean Air Plan (SBCAPCD, 2012) and the 2007 Ventura County Air Quality Management Plan (VCAPCD, 2007). Both Ventura and Santa Barbara County can be described as having a Mediterranean climate characterized by warm, dry summers and cooler, mildly damp winters. The unique combination of prevailing wind conditions that are generated by a persistent offshore high pressure system, and the topography of coastal mountains result in variations of airflow which are conducive to the formation and retention of air pollutants.

Los Angeles (South Coast Air Basin). The climate, meteorology, air quality, and air quality trends of the South Coast Air Basin (SCAB) have been described in detail in several planning and environmental documents and are best summarized in the South Coast Air Quality Management District (SCAQMD) 2007 Air Quality Management Plan (SCAQMD, 2007). The SCAB can be described as having a Mediterranean climate characterized by warm, dry summers and mild winters. The Pacific Ocean influence results in mild, year round temperatures along coastal areas, with inland areas experiencing a wider range of temperatures. The unique combination of prevailing wind conditions, generated by a persistent offshore high pressure system (Pacific High), and the surrounding mountain ranges, results in variations of airflow which are conducive to the formation and retention of air pollutants.

The federal government has established ambient air quality standards to protect public health (primary standards) and, in addition, has established secondary standards to protect public welfare. The State of California has established separate, more stringent ambient air quality standards to protect human health and welfare. California and National standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, PM_{10} (suspended particulate matter 10 microns), $PM_{2.5}$ (suspended particulate matter 2.5 microns) and lead. In addition, California has standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles.

The federal and state attainment status of Ventura, Santa Barbara and SCAB is found in 40 CFR 81.305. A summary of the attainment status for Ventura, Santa Barbara and Los Angeles Counties is provided in Table 2.

Greenhouse Gases. Greenhouse gases (GHGs) are defined as any gas that absorbs infrared radiation in the atmosphere. Greenhouse gasses include, but are not limited to, water vapor, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). These greenhouse gases lead to the trapping and buildup of heat in the atmosphere near the earth's surface, commonly known as the Greenhouse Effect. The primary source of GHG in the United States is energy-use related activities, which include fuel combustion, as well as energy production, transmission, storage, and distribution. Fossil fuel combustion represents the vast majority of the energy related GHG emissions, with CO_2 being the primary GHG (EPA, 2005).

Table 2. Attainment Status of Santa Barbara, Ventura and Los Angeles, South Coast Air Basin

Air Basin/ County	1-hour O_3		CO		NO_2		SO_2		$PM_{10}/PM_{2.5}$	
	State	Federal	State	Federal	State	Federal	State	Federal	State	Fed
Santa Barbara County	N	A	A	A	A	UA	A	UA	N/U	U/UA
Ventura County	N	N	A	UA	A	A	A	A	N/N	U/UA
Los Angeles, South Coast Air Basin	N	N/E	A	A	A	A	A	A	N/N	N/S

Notes: A = Attainment of Standards; N = Nonattainment; U = Unclassified; UA = Unclassified/Attainment, N/E = Extreme, N/S = Serious. Source: CARB 2012; SCAQMD, 2016

3.5.2 Impact Analysis

The primary regulated pollutants of concern in the tri-county area (L.A., Ventura, and Santa Barbara) are oxides of nitrogen (NO_x) and reactive organic compounds (ROC). Both NO_x and ROC are considered precursors to ozone formation. The major pollutant of concern associated with projects of this type and duration are NO_x emissions, due to the primary impact agents of propulsion and stationary combustion equipment.

Several environmental documents associated with the offshore activities in the tri-county area have been prepared by BOEM, BOEMRE, Minerals Management Service and other agencies and provide background discussions of air quality impacts. Oil spill response vessels are considered to be specialty vessels that are used on an infrequent and temporary basis at the platforms. The emergency oil spill response vessels are not owned by the platform oeprators and that emission source is not directly permitted by the local air agencies.

Evaluation of Government-Initiated Unannounced Exercises Scenarios

Offshore Scenarios

Deployment exercises would be conducted about three times per year at three different locations, generally near offshore platforms. The equipment deployed during an exercise could include nearly the entire inventory of response equipment available to the drilled operator that could be reasonably used for an initial response[4]. For this analysis, each exercise is assumed to occur during daylight hours and expected to last a maximum of 6 hours. Mechanical oil spill response and other equipment is typically powered by the vessel's primary engines and do not cause emissions.

The three locations of the offshore deployment exercise scenarios will be:

1. Offshore Long Beach (Los Angeles County)
2. Southern Santa Barbara Channel (Ventura County)
3. Northern Santa Barbara Channel (Santa Barbara County).

On very rare occasions BSEE may call an exercise that required the companies to deploy their airborne dispersant system (i.e. their helicopter or fix-winged aircrafts). The extreme cost of such an activity borne by the companies for these purposes limits our desire to require this and due to its infrequent activity (<1 drill per 5 years), are not considered in this analysis.

There are two potential testing situations to be evaluated:

1. Equipment is deployed during a deployment exercise; and
2. Equipment is tested by an operator.

Equipment Deployed during a Deployment Exercise

Typical Offshore Scenario. Offshore deployment exercises are usually designed with a scenario that involves a large discharge of oil from a facility's subsea infrastructure or from its surface components. Consequently, the oil surfaces in the immediate vicinity of the platform and the owner/operator is directed to initiate a response accordingly. Equipment anticipated for offshore response deployments include:

[4] This would occur for the first 6 hours of an actual response. Equipment used beyond the initial response would cascade from other sources such as other OSROs or contractors and are not analyzed in this EA.

- Two to five vessels ranging from 32 ft. to 207 ft. from one or more OSROs are deployed from their home bases. The larger vessels (65 ft. and greater) will generally deploy mounted skimming systems.
- Cranes are typically needed to deploy the skimming systems over the sides of the vessels. The crane and skimmer are generally powered directly from the main engines of the vessels.
- The smaller boats (64 ft. and under) are most often used to maneuver and tow lengths of boom to capture oil separately. They may also be used to tow temporary oil storage devices (TSDs) and storage barges.

Depending on the platform and if the owner/operator maintains their own oil spill boom, the owner/operator may have a small vessel (under 30 ft. in length) on the platform to deploy the boom or will request an assigned crew boat (approximately 100 ft. long) to assist. If the platform has a small boat, a crane may be used to put the boom boat in the water. Some cranes are diesel-powered while others are electric. This happens infrequently as most companies use their crew boat or rely solely on the Marine Spill Response Corporation (MSRC) to deploy boom.

Operator Equipment Testing

BSEE requires the inventory of response equipment to be tested to verify that the equipment cited in Pacific Region operators' OSRPs is operable and response-worthy to maintain equipment preparedness verifications (EPV). This involves the testing of 15 to 100 pieces of equipment per year to see that it is functioning properly.

However, as most often these pieces of equipment are stored on land, for this evaluation we will only be considering those pieces of equipment where we would ask companies to put equipment in the water. This would generally entail the larger skimming systems that require their boat crane to place it next to the vessel in the water. For this they start up the main engines of the boat. The test usually takes 10 minutes so that skimmer is observed to take up water and discharge it back into the harbor. For normal testing protocol, boats deploy equipment in harbors to maintain their EPVs and are not asked to perform ocean testing. Due to the short, 10-minute duration of these tests, these in-harbor vessel emissions are considered nominal and are not considered in this analysis.

Nearshore Scenarios

Because BSEE has jurisdiction in all offshore waters, including both federal and state, on occasion BSEE may need to evaluate the nearshore response capabilities for an owner/operator. Deployment exercises for these scenarios would be designed to evaluate the equipment, training, and operations associated with deploying shallow-water response vessels and the placement of diversion and exclusion boom. The following scenarios have been targeted as potential exercise locations that E could be used to evaluate nearshore capabilities. None of the following scenarios

will involve staging or deploying equipment from the beach. Any boats launched would be done so at preexisting boat ramps to transit to the exercise location. There would be no shore-based activities at the exercise sites.

Nearshore Scenario 1: Offshore El Capitan State Beach, Goleta, CA

Scenario 1 would entail oil being released from a nearby offshore platform and being carried NNW to impact the coastline. El Capitan State Beach offers the potential sacrificial beach to direct oil to that would otherwise pass the beach to impact cobblestone-lined beaches farther west. Operations would likely be a combination of shallow water skimming vessels operating in the nearshore environment that would be pulling boom, holding diversion boom or skimming operated by MSRC. The drill would take about six hours and all equipment would be collected once the goals of the drill were met. Anticipated equipment could include:

- Up to 5 boats up to 32' in length with shallow enough draft to get close to shore for skimming or boom handling
- 1 65' OSRV
- 2 shallow draft 100 bbl. barges for storage and skimming
- 1500-3000' boom >18" used for diversion or containment
- 3-5 brush skimmers from OSRVs and barge
- No anchoring of boom expected
- 1 weir skimmer or 1 disc skimmer at collection point

Nearshore Scenario 2: Point Conception to Government Point Sensitive Site Protection Strategy

Scenario 2 would entail oil released from an offshore platform and being carried towards the area between Point Conception and Government Point. The OSRO (MSRC) would bring the small, nearshore vessels to the site and deploy them, conducting skimming operations and then demobilize all the equipment. Anticipated equipment used in this scenario could include:

- 2-3 65' OSRVs
- 1-5 boats up to 32' in length
- 4500' 60" boom used for containment and diversion
- No anchoring of boom expected
- 4 to 8 brush skimmers

Nearshore Scenario 3: King Harbor Protection Strategy near Redondo Beach

Scenario 3 would entail an oil release from an offshore platform and being carried NNW towards Redondo Beach. This scenario would involve MSRC oil spill response vessels and equipment. The King Harbor Protection strategy calls for offshore mechanical cleanup and protection of the water intake towers for the Redondo Beach Power Plant and AES Redondo Beach Generating Station. The MSRC would deploy for no more than 6 hours the following equipment:

- 1 207' OSRV

- Up to 3 28’ boom boats
- 3000’ of 43” curtain boom
- No anchoring of boom expected
- 2 brush skimmers
- 1 weir skimmer

3.5.3 Conclusion

The data presented in the Table 3 indicate the estimated emissions for the deployment exercise scenarios. Nearshore Scenario 2 is estimated to result in the greatest emissions due to an increased number of spill response and support vessels with that scenario as compared to the other scenarios. The OCS scenario is estimated to have more emissions than Nearshore Scenarios 1 and 3 and less emissions than those expected with Nearshore Scenario 2. All scenarios evaluated resulted in emissions of less than 0.5 tons of NOx.

Based on the short duration for each of the offshore and nearshore scenarios evaluated in this analysis (6 or less hours), the impacts to air quality are expected to be temporary and insignificant.

3.5.4 Cumulative Analysis

Potential sources of cumulative air quality impacts in the project area which may overlap both spatially *and* temporally include emissions from on-going and proposed oil and gas activities in State and Federal waters and offshore shipping and lightering operations. All of the cumulative projects and activities considered in this document occur in the South Coast and South Central Coast Air Basin.

Oil and Gas Activities. State and federal OCS oil and gas activities considered in this analysis include the drilling of new wells within existing platforms, exploration well abandonment, and future decommissioning. However, no proposals are anticipated for either exploration well abandonment or decommissioning of platforms during the short duration of the deployment exercise oil spill response exercises. All oil and gas platforms and activities are within the jurisdiction of the three air quality districts and have been permitted, controlled and are in full compliance with applicable air quality rules and regulations. To date, no exceedances of the NO_2 standard have occurred at applicable monitoring sites during deployment exercises. Thus, the additional incremental emissions levels expected with the proposed deployment exercise scenarios are not expected to have a cumulative air quality impact with existing controlled and fully offset State and Federal oil and gas activities.

Non-Oil and Gas Projects and Activities. *Marine Shipping and Lightering.* The other emission sources considered in this cumulative analysis are shipping and lightering operations. Emissions from marine vessels traversing the Santa Barbara Channel are not regulated by Federal, State, or

local air authorities and may combine with emissions from the proposed project to affect onshore air quality. Due to the short duration of the exercises and the approximate distance of the shipping lanes from the scenario locations, cumulative air quality impacts of marine shipping and lightering would not change with the proposed nominal incremental increase of emissions from the proposed action.

Table 3. Estimated Deployment Exercise Emissions

Response Scenarios	**NO_X**	**ROC**	**CO**	**SO_X**	**PM**	**PM_{10}**	**GHG**
OCS Scenario							
Oil Response Vessels	442.07	26.12	80.38	5.91	26.50	25.34	17,579.96
Support Vessels	62.27	3.68	11.32	0.83	3.72	3.58	2,476.37
Total Pounds	**504.34**	**29.80**	**91.70**	**6.74**	**30.12**	**28.92**	**20,056.33**
Total Tons	**0.25**	**0.015**	**0.046**	**0.003**	**0.015**	**0.014**	**10.03**
Nearshore Scenario 1 – El Capitan							
Oil Response Vessels	221.03	13.06	40.19	2.95	13.20	12.67	8,789.98
Support Vessels	103.79	6.13	18.88	1.39	6.20	5.95	4,127.28
Total Pounds	**324.82**	**19.19**	**59.07**	**4.34**	**19.40**	**18.62**	**12,917.26**
Total Tons	**0.16**	**0.01**	**0.03**	**0.01**	**0.01**	**0.01**	**6.46**
Nearshore Scenario 2 – Point Conception to Government Point							
Oil Response Vessels	663.10	39.18	120.56	8.88	39.60	38.01	26,369.95
Support Vessels	103.79	6.13	18.87	1.39	6.20	5.95	4,127.28
Total Pounds	**766.89**	**45.32**	**139.43**	**10.26**	**45.80**	**43.96**	**30,497.22**
Total Tons	**0.38**	**0.02**	**0.07**	**0.01**	**0.02**	**0.02**	**15.25**
Nearshore Scenario 3 – King Harbor							
Oil Response Vessels	221.03	13.06	40.19	2.96	13.20	12.67	8,789.98
Support Vessels	62.27	3.68	11.32	0.83	3.72	3.57	2,476.36
Total Pounds	**283.30**	**16.74**	**51.51**	**3.79**	**16.92**	**16.24**	**11,266.35**
Total Tons	**0.14**	**0.01**	**0.02**	**0.01**	**0.01**	**0.01**	**5.63**

Greenhouse Gas Emissions. Deployment exercise -related GHG emissions associated with the proposed oil response training; when combined with emissions throughout the area and the world may incrementally have a potential to contribute to climate change. Locally, there are industrial, commercial and residential projects in the tri-county area that contribute to cumulative impacts due to the release of GHG emissions. The Draft GHG Emissions Inventory (CARB, 2016), estimates that the annual CO_2E for all GHGs produced in California in 2014 was 441.5 million metric tons. Therefore, the GHG associated with deployment exercise-related emissions (15.25 metric tons of CO_2E) would represent a negligible percentage of the annual GHG emissions produced statewide.

Cumulative Impacts Conclusion. The potential for the incremental emissions increase associated with the deployment exercise oil spill training exercises to cumulatively impact

regional air quality is considered to be insignificant. The emissions associated with the deployment exercise are not expected to contribute significantly to the potential impact to regional air quality that may be expected from existing offshore oil and gas activities and marine shipping and lightering emissions.

3.5.5 Overall Conclusion

The potential impacts to onshore air quality resulting from emissions from vessels and equipment used in the deployment exercise oil response training in both OCS and nearshore scenarios is considered to be insignificant. Thus, the potential for violations of the ambient air standards from the proposed action are considered to be negligible. Overall, the potential impacts to air quality resulting from the offshore and nearshore deployment exercise scenarios evaluated are considered to be insignificant.

3.6 Water Quality

3.6.1 Affected Environment

The California Current flows southeastward off the central California Coast bringing subarctic water into the Southern California Bight (SCB). The Southern California Countercurrent brings water north within the SCB and the northern flow is blocked by the northern Channel Islands where the water then travels west and merges with the California current, thus creating a counterclockwise-rotating gyre within the SCB. The California Undercurrent brings warmer water from the south into the SCB and flows underneath both the California Current and the Southern California Countercurrent (Daily et. al. 1993). The seasonal patterns in the California Current system drive the oceanography within the SCB (Hickey 2003).

Cold, upwelled waters dominate the south Central California coast, Point Arguello and Point Conception (Harms and Winant 1998). The circulation in the Santa Barbara Channel can be described as Upwelling, Cyclonic and Relaxation (Harms and Winant 1998). Upwelling consists of alongshore currents moving south, while the Cyclonic pattern is a single-cell cyclonic gyre in the western and central Santa Barbara Channel. The Relaxation state is a northern alongshore current that comes from the eastern entrance of the Santa Barbara Channel, travels to Point Conception and is common when upwelling-favorable winds have subsided. Upwelling dominates in the spring, while all 3 oceanographic regimes are found in the summer and fall (Harms and Winant 1998).

Offshore water quality is determined by a number of factors, including natural seawater properties such as transparency and turbidity, oxygen, nutrients, and trace metals. The addition of anthropogenic pollutants can change these properties to the extent that the resulting water quality could affect the plankton, fish, and other biological entities living in marine waters. Table 4 describes the water quality characteristics of the SCB.

Table 4. Key Water Quality Parameters for the Southern California Bight

Parameter	**Characteristics**
Temperature	At surface ranges from 14.5 °C in December-April to 19 °C in July-September (Daily et. al. 1993)
Salinity	33.4-33.6 parts per thousand (Daily et. al. 1993)
Dissolved oxygen	5.5-6 ml/L at the surface, decreasing with depth to 2 ml/L at 200 m; below 350 m, as low as 1 ml/L; upwelling can bring this oxygen-poor water to the surface waters, especially from April to July (Lynn et. al. 1982; Daily et. al. 1993; Hickey 1993)
pH	Range from about 7.869 to 8.266 at Point Conception (Hofmann et. al. 2011).
Nutrients	Important for primary production; include nitrogen, phosphorus, and silicon; Depleted near the surface but increasing with depth (SCCWRP 1973; Eganhouse and Venkatesan 1993).
Surface light transmittance	Visual transparency along the coast for all seasons varies from less than 6m to more than 15m (SCCWRP 1973).
Trace Metals	The levels of metals in the waters of the southern California bight are within ranges reported for seawater in various areas around the world (SCCWRP 1973).
Organics	May enter the marine environment from municipal and industrial wastewater discharges, runoff, natural oil seeps, and offshore oil and gas operations.

Sources of Pollution. Sources of marine pollution in the Southern California Planning Area include river runoff, nonpoint source pollution, and publicly owned treatment works (municipal sewage). Rivers draining into the project area are: Santa Ynez, Santa Maria, Santa Clara, Dominguez Channel, Los Angeles, San Gabriel, and Santa Ana. All of these rivers are typical for southern California in that they flow intermittently during the dry summer and fall months and more strongly during the winter months when rain falls into the watershed and courses down to the sea, carrying sediment and pollutants into the ocean.

During the dry months, a variety of pollutants enter the mostly dry stream beds. The first strong storm of the winter season flushes those pollutants into the ocean. Known as “first flush” the highest levels for pollution would occur during this time. The large pollutant loadings and pathogens from these river systems surpass the loadings for most constituents from municipal wastewater discharges (Warwick et al. 2007). Pollutants that could be associated with these river plumes include metals (e.g., zinc, copper, lead, nickel, and cadmium), polyaromatic hydrocarbons, and enterococcal bacteria (e.g., *E. coli*).

The rainy season accounts for more than 95% of the total annual runoff to the southern California Bight (Schiff et al. 2000). Stormwater plumes are correlated with the size of storm events. Even small amounts of precipitation can cause a plume to develop and plumes can vary greatly in size depending on the amount of precipitation (Nezlin and Digiacomo 2005; Warwick et al. 2007). Immediately during and after storms, plumes tend to emerge from the river mouth and turn to the left, contrary to the Coriolis influence (Warwick et al. 2007). Strong northerly or northwesterly winds push the plumes south, usually remaining within 10km (6 mi) of the coast (Warwick et al. 2007). When these strong, post-storm winds relax, the river plumes move further from the coast and can travel as much as 24 km (15 mi) from shore and thus into the project area (Nezlin and DiGiacomo 2005).

Publicly Owned Treatment Works (municipal sewage) range from Goleta wastewater treatment plant that collects and treats waste water from Goleta and Santa Barbara to larger plants in Los Angeles area that treat wastewater from a much larger population (e.g., Hyperion and Orange County Sanitation District). There are thousands of potential sources of nonpoint source pollution that discharge along the Southern California Planning Area.

Overall, water quality in the project area may be characterized as good to mildly polluted. This is due to the range of pollution sources throughout the project area.

3.6.2 Impact Analysis

Water quality may be temporarily affected by:

- Sediment raised from the seafloor during anchoring in the nearshore environment;
- Freshwater from a dispersant exercise; and
- Discharge of treated sewage from oil spill response vessels

Sediments. Small volumes of sediments will be displaced during anchoring. The disturbed sediments will rise into the water column and gradually dissipate downcurrent, becoming increasingly dilute due to resettlement and dispersion. These activities would cause only a small increase in turbidity and impacts to water quality would be short-term, localized, and insignificant.

Freshwater. Small amounts of freshwater will be released during dispersant exercises. The activities will only contribute a minimal amount of freshwater into the ocean, thus producing a negligible effect.

Vessel Discharges. The proposed activities would utilize three to five oil spill response vessels that will discharge ballast, bilge, cooling water, and sanitary wastes. These types of routine discharges, regulated by the U.S. Coast Guard (USCG) via the Federal Water Pollution Control Act, ensure that vessel effluents such as sewage and cooling water do not leave a sheen or other

foreign material on navigable waters. Ballast and bilge waters will be treated by the vessel's onboard oil separation system which is designed and operated to meet the USCG-required limit of 15 ppm oil in the effluent. Similarly, the sewage treatment plant onboard the vessel is USCG-approved and is designed and operated to meet the USCG-required limits. Surface currents, wind and waves will combine to dissipate these effluents.

3.6.3 Conclusion

The impacting agents that could affect water quality are increases in turbidity, addition of freshwater from dispersant simulation, and the discharge of treated effluents from the oil spill response vessels. No unreasonable degradation to these impacting agents will occur.

3.6.4 Cumulative Analysis

Section 3.3 describes the projects considered in the cumulative analysis for the proposed project. Possible sources of cumulative impacts to water quality in the project area include on-going oil and gas activities in Federal waters and point and nonpoint pollution sources.

Federal Offshore Oil and Gas Projects. *Activities Occurring on Existing Platforms*. Routine production operations (discharges of permitted effluents) and accidental oil spills from platforms in the southern California Planning Area could overlap temporally and spatially with the proposed project. These are not expected to have a cumulative impact on water quality because of the short-term nature of the project (6-8hrs) and the small amount of sediment that would be raised from the seafloor during the nearshore anchoring.

Non-Energy Projects and Activities. *Point Source and Nonpoint Source Discharges.* Sewage and other discharges from the vessels used for the proposed project will contribute a negligible quantity to the pollution from the wastewater treatment plants, the intermittently flowing rivers, and the thousands of nonpoint source pollution in the project area. The temporary increase in turbidity from anchoring in the nearshore will provide a minimal quantity that will quickly dissipate.

Cumulative Impacts Conclusion

Significant cumulative impacts to water quality are not expected from the proposed project when added to other activities in the area. Impacts from the proposed project represent an insignificant incremental increase of cumulative impacts to water quality resources.

3.6.5 Overall Conclusion

The potential impacts to water quality from the proposed project are considered to be minimal due to the short time-frame of the project (6-8hrs, 3 times per year), the small volume of discharges from the repair vessel and turbidity will be short term and localized and water quality will return to natural conditions after project completion. Additionally, the incremental increase of the proposed

action to cumulative impacts is negligible. Overall, the potential impacts to water quality resulting from the proposed project are considered to be minimal.

3.7 Benthic Resources

3.7.1 Affected Environment

The affected environment is seafloor habitat and species in these habitats that could be affected by activities offshore.

Kelp Beds. Vessels and equipment deployment activities in the three nearshore scenarios of Point Conception, El Capitan, and King Harbor may be in or adjacent to kelp (*Macrocystis pyrifera*) canopies. Kelp beds are known to grow throughout that area. Kelp beds and associated flora and fauna in this region can extend out to 40 feet depth or, conservatively, almost 2,000 feet (0.38 miles) from the shoreline. Kelp grows to the water surface and the upper portion is called a canopy that supports a diverse and productive habitat for many fish and invertebrate species. Kelp mapping surveys from 1989 through 2014 show kelp beds present in all three areas (West Coast Ocean Data Network, 2016). In King Harbor area, kelp is more constricted to a narrow bank along the break wall. Kelp beds were designated a Habitat Area of Particular Concern by the NOAA Fisheries and the Pacific Fishery Management Council in 2006.

Anchoring Areas. The nearshore diversion boom drill anchoring area of the Los Angeles/Long Beach harbor will occur in an established anchorage area for commercial and recreational vessels. Over 32 biological surveys have been done in this harbor describing the habitats and species. The most recent biological surveys in 2013-2014 (MBC, 2016) determined the quality of many biological resources in the outer harbor, where the anchorages are located. Outer harbor seafloor habitat and species sampling showed that while most sites are considered "disturbed," the habitat quality is improving over time as indicated by the increasing number of pollution-sensitive species. In the MBC (2016) survey, the crustacean amphipod, *Amphideutopus oculatus*, was the most abundant species for the first time. Five other pollution sensitive species were also among the top ten most abundant species in the 2013-2014 survey.

The nearshore diversion boom anchoring area in Santa Barbara is east of Stern's Wharf and is smaller and less studied than the Los Angeles/Long Beach Harbor Complex. A U.S. Army Corp of Engineers review (2016) found that seafloor invertebrates within the harbor were last surveyed in 1972 and fishes (Love, 1991) were only described more generally in the area. Benthic resources, listed under the ESA, occur nearshore of the anchorage and include tidewater goby (*Eucyclogobius newberryi*) critical habitat and southern California distinct population segment of steelhead (*Oncorhynchus mykiss*).

3.7.2 Impact Analysis

A potential impact to benthic resources is the nearshore deployment of equipment adjacent to kelp canopies. Kelp entanglement and damage from vessels and equipment could occur. The intent of drill deployments is to avoid all contact with kelp because of the additional potential damage to small engines and equipment.

The potential impact to benthic resources is the annual deployment of oil spill equipment in the Port of Los Angeles/Long Beach federal anchorage area and the Santa Barbara municipal anchorage area. At these locations two to four, 28-in Danforth or mushroom anchors (see Figures 14, 16, and 17b) deployed to the ocean floor to hold boom in place. These anchors can range from 14 to 100 lbs depending on the model of anchor. This size anchor is typical for recreational boating activities. Anchoring will occur in soft sediment habitats between approximately 0.4 miles and three miles offshore.

3.7.3 Conclusion

Kelp entanglement and in equipment and engines can occur accidentally over the natural course of the exercise. Damage to kelp will be minimal because operations will stop to be moved offshore further away from the kelp. The size and frequency of anchoring is negligible and will not impact the sediment or the benthic resources in measureable or detectable ways.

3.7.4 Cumulative Analysis

The kelp offshore of El Capitan State Beach was impacted in May, 2015 from an onshore pipeline leak of over 100,000 gallons (2,381 barrels) of oil (Natural Resources Damage Assessment and Restoration, 2016). Kelp abundance within all nearshore scenario areas is most affected by temperature. In years with colder ocean temperatures, these canopies are larger and more visible on the ocean surface while in warmer water years; kelp beds can be much smaller or not visible from the surface.

The anchoring activities for the annual deployment of oil spill equipment in the Port of Los Angeles/Long Beach federal anchorage area and the Santa Barbara municipal anchorage will occur in areas that are continually used by commercial and recreations vessels for anchoring. In addition to anchoring, these harbors have multiple ongoing construction and dredging and depositing activities that occur adjacent to or in the anchoring areas. The Port of Los Angeles/Long Beach is continually under construction and the most recent projects were an effort to improve terminals and a channel deepening (U.S. Army Corp of Engineers and Los Angeles Harbor Department, 2009; 2017). A federal review of the Santa Barbara Harbor was completed in 2016 for dredging the area as needed through 2022 and depositing materials nearshore of the anchorage area (U.S. Army Corp of Engineers, 2016).

Cumulative Impacts Conclusion

Significant cumulative impacts to benthic resources are not expected from the proposed project when added to other activities in the area. Impacts from the proposed project represent an undetectable and insignificant incremental increase of cumulative impacts to the benthic habitat and the associated species.

3.7.5 Overall Conclusion

The proposed action would result in negligible benthic disturbance caused by placement of two to four temporary moorings once a year at both Los Angeles/ Long Beach and Santa Barbara locations. No biologically significant benthic areas or species are expected to be affected. Further, the proposed action is not expected to result in any measurable cumulative effects.

3.8. Marine Mammals and Sea Turtles

3.8.1 Affected Environment

The project area includes open water environments near California offshore facilities bounded by Long Beach in the south, through the Santa Barbara Channel, and northwest to Point Arguello. Equipment deployment scenarios include offshore areas (greater than 3 miles offshore) and nearshore areas (within 3 miles of shore). Marine mammals are abundant in both offshore and nearshore areas and sea turtles may be occasionally encountered in these same areas. Table 5, provides a list of species that are likely to be present in the project area and some specific information related to their habitat use within the project area.

The most ubiquitous of these species are California sea lions and common dolphins. Sea lions will likely be observed during any equipment deployment exercise near an offshore facility. This species often hauls out on offshore facilities and forages in both nearshore and offshore environments. Similarly, common dolphins are common and frequently approach and ride the bow wake of transiting vessels within the project area.

Large baleen whales including blue, humpback, and gray whales are seasonally abundant in the project area and minke whales may be found year round throughout the project area. Of these species, the gray whale travels almost exclusively in shallow nearshore waters.
Point Conception is an important area for many marine mammals and borders on designated critical habitat for the leatherback sea turtle. Sea otters live and forage in shallow waters nearshore and are commonly associated with kelp beads (*Macrocystis*) in the vicinity of Point Conception. Important haul-out area for harbor seals is located between Point Conception and Point Arguello. The southernmost coastal haul-out for northern elephant seals is also found below the lighthouse at Point Conception. Oil spill response vessels are often moored in the Cojo anchorage which is in the lee of Point Conception.

Sea turtles are rarely seen in the project area. Nevertheless, a well-documented green sea turtle aggregation area is located in the San Gabriel River near offshore oil and gas facilities in the southern end of the project area. On the northern end of the project area, critical habitat for leatherback sea turtles has been designated to protect important forage resources (jellyfish).

Table 5. Marine Mammals and Sea Turtles Likely to be Found in the Project Area

Common Name	**Scientific Name**	**Habitat Usage in Project Area**	**Status**
Southern Sea Otter	*Enhydra lutris nereis*	Nearshore, Point Conception/Cojo, often associated with kelp beds	T
California Sea Lion	*Zalophus californianus*	Nearshore and Offshore, entire project area, often haul-out on platforms	
Pacific Harbor Seal	*Phoca vitulina richardii*	Nearshore, large haul-outs at Point Conception, Carpinteria.	
Northern Elephant Seal	*Mirounga anugustirostros*	Offshore, haul-out at Point Conception	
Blue Whale	*Balaenoptera musculus*	Offshore, seasonal patchy abundance summer and fall	E
Humpback Whale	*Megaptera novaengliae*	Offshore, seasonally abundant summer and fall	E
Minke Whale	*Balaenoptera bonaerensis*	Offshore, local resident animals	
Gray Whale	*Eschrichtius robustis*	Nearshore, migration route through entire project area, winter and spring	
Common Dolphin	*Delphinus sp.*	Offshore, may be found throughout project area	
Risso's Dolphin	*Grampus griseus*	Offshore, may be found throughout project area	
Bottlenose Dolphin	*Tursiops truncatus*	Nearshore and Offshore groups may be found throughout the project area	
Killer Whale	*Orcinus orca*	Offshore, transient groups	
Green Sea Turtle	*Chelonia mydas*	Local population in the Seal Beach/ Long Beach area	T
Leatherback Sea Turtle	*Dermochelys coriacea*	Offshore and Nearshore, Point Conception, Transient	E, CH

Endangered (E), Threatened (T), Critical Habitat (CH)

3.8.2 Impact Analysis

In this analysis the potential effects of equipment deployment exercises including displacement/disturbance, collision risk, potential for entanglement and potential destruction of forage prey for sea turtles (jellyfish) are considered.

Displacement/Disturbance. Equipment deployment exercises would likely result in some alteration in behavior of marine mammals and sea turtles that are encountered. Sea lions are often curious and may approach deployed equipment. Similarly common dolphins may approach vessels transiting to and from equipment deployment sites. This behavior is common and no deleterious effects on either species are expected.

Large whales and other marine mammals may actively avoid an area where equipment deployment exercises are being conducted. The resulting displacement is not expected to greatly exceed the relatively small area in which equipment is being deployed and given the short duration and small number of these exercises, we do not expect marine mammals to lose significant foraging opportunities. Migrating species, like gray whales, encounter many obstacles along migration routes and equipment deployment exercises are not likely to cause these species to abandon or significantly alter their travel along these routes.

Disturbance of seals and sea lions resting on shore will be avoided by limiting equipment deployment activities near seal/sea lion haulout sites. Limitations may vary significantly depending on the species and location. Harbor seals hauling out next to the Carpinteria pier are accustomed to a significant amount of vessel activity whereas harbor seals hauling out in the Point Conception area are extraordinarily sensitive to disturbance. Elephant seals at their haul-out site at Point Conception are relatively tolerant of many human activities and should not be disturbed by offshore equipment deployment exercises. In California, sea otters rarely haul out on shore; instead they sleep on the ocean surface, often in kelp beds. Avoiding equipment deployment activities in kelp beds will greatly reduce the potential for disturbance of sea otters.

Encounters with sea turtles are expected to be rare and there is little indication that they will actively avoid an equipment deployment area.

Collision Risk. Collisions between vessels and marine mammals and sea turtles are a possibility. Collision risk is a function of a vessel's speed, size, location, operator vigilance and individual species vulnerability. In general, vessels transiting to and from an equipment deployment area will travel faster that those that are actively deploying and managing equipment, creating a relatively higher risk of collision. Large whales and sea turtles are considered more susceptible to collisions risk because of either their inability to recognize the threat or their inability to maneuver quickly to avoid a collision. Vigilance of vessel operators working at offshore facilities in California is considered good and collisions with marine mammals and sea turtles is exceedingly rare. This, coupled with the low frequency and localized nature of equipment deployment exercises, will likely reduce the threat of collision with marine mammals and sea turtles to near zero.

Entanglement. Entanglement of marine mammals and sea turtles is a problem world-wide. Most instances involve active or derelict fishing gear. Several pieces of oil spill response equipment may pose an entanglement risk including boom and associated handling lines, marker buoy lines and anchoring systems. Although many species may be susceptible to entanglement, entanglements of large whales are especially problematic. Large whales may not easily detect lines in the water and they are exceptionally difficult to disentangle should they wrap lines around their body.

Equipment deployment exercises are infrequent in number and short in duration (up three exercises per year and a few hours to a day per exercise). All equipment deployed is expected to be recovered. This effectively reduces exposure to entanglement risk and entanglement of marine mammals and sea turtles is expected to be rare.

Destruction of Forage (Leatherback Sea Turtles). Leatherback sea turtle populations in the Pacific are in rapid decline. Critical habitat was designated for waters north of Point Conception to protect food resources, specifically jellyfish, which these turtles depend upon when they travel to California. Booms, pumps and skimmers associated with equipment deployment exercises may damage and/or kill jellyfish. The extent of this damage may be directly correlated with jellyfish densities. It is estimated that high densities of jellyfish may reduce or preclude some equipment deployment exercises because of potential damage to the equipment and subsequent equipment cleaning requirements. In any case, the probability of encountering dense jellyfish congregations is low. This combined with the limited duration of equipment testing, low frequency of equipment deployment exercises and low leatherback sea turtle predation pressure lead us to believe that any consequences resulting from jellyfish damage will be insignificant.

3.8.3 Conclusion

Conducting offshore equipment deployment exercises may result in temporary displacement, collisions and entanglements of marine mammals and sea turtles. There is also the potential for destruction of forage resources for leatherback sea turtles. Although the possibility of these impacts cannot be eliminated, collisions and entanglements are unlikely and the effects of displacement and destruction of forage are negligible. To further reduce entanglement risk, BSEE will immediately recovery of booms, marker buoys and anchors if a large whale enters the equipment deployment area. BSEE will also ensure that any equipment that may be lost during a drill is recovered as soon as possible. If dense concentrations of jellyfish are encountered, BSEE will discontinue boom and skimming operations to avoid destruction of leatherback sea turtle prey.

3.8.4 Cumulative Analysis

Commercial and recreational vessel traffic continues to be a significant driver of displacement concerns and collision risk within the project area. Commercial and sport fishing are the primary

sources for materials related to marine mammal and sea turtle entanglements in the project area. Jellyfish are routinely lost to vessel traffic (propeller strikes, cooling water intakes) and sea water-cooled power plants.

Cumulative Impacts Conclusion

In the context of these activities, continuing equipment deployment exercises will not measurably increase impacts to marine mammals and sea turtles.

3.8.5 Overall Conclusion

Minor improvements may reduce risk of impacts to marine mammals and sea turtles. Of most importance is a continued awareness of site-specific marine mammal and sea turtle concerns. Overall, continued equipment deployment exercises at the levels indicated poses little risk to marine mammals and sea turtles in the project area.

3.9 Environmental Justice

Impacts on environmental justice in minority and low-income populations were considered for this analysis in accordance with Executive Order 12898. The proposed action is expected to have negligible direct and indirect effects on minority and/or low-income populations. The expected frequency of offshore deployment exercises is three per year, generally lasting a few hours and rarely longer than one day. Deployment exercises will be timed to not interfere with public occasions. Nearshore deployment exercises will not involve staging or deploying equipment from the beach. Any onshore staging activities are expected to be limited to one or two times per year. Due to the low frequency of equipment staging and the short duration of exercises, the proposed action will have negligible onshore effects and will not result in disproportionately high adverse human health or environmental effects to minority and/or low-income populations.

3.10 Archaeological and Historic Properties

3.10.1 Affected Environment

The proposed activities may affect historic and pre-contact period archaeological resources (or relict paleocultural landforms that have the potential to contain these sites) located within the proposed project area. A general overview of archaeological resources in the Pacific OCS, incorporated by reference, can be found in *Inventory and Analysis of Coastal and Submerged Archaeological Site Occurrence on the Pacific Outer Continental Shelf* (ICF 2013, available on BOEM's website at: http://www.boem.gov/Study-2013-0115/). Additional sources of existing and available information regarding historic properties that may be affected included correspondence and shipwreck listings from the Office of Historic Preservation's Central Coast Information Center at the University of Santa Barbara.

Historic Shipwrecks and Obstructions Pacific Shipwreck Database. Offshore archaeological resources that may exist within the proposed project area include historic period shipwrecks dating certainly from the 1500s with documented Spanish exploration and settlement of the immediate area, but possibly as early at AD499 with early Asian exploration of the wider Pacific coast (ICF 2013). Based on the historical data compiled from the above sources, thirteen historic shipwrecks are identified as lost somewhere near the Santa Barbra anchorage and sixty-two lost somewhere near the Long Beach/Los Angeles harbor area. While these losses are reported in the general geographic area, there is no information that suggests that they were lost in the specific location of the proposed activities, and an examination of the nautical charts and maps do not list any losses in the project areas.

Submerged Pre-contact Archaeological Resources within Pacific OCS. Offshore archaeological resources that may exist within the proposed project area may also include submerged pre-contact period archaeological sites or relict paleocultural landforms that have a potential to contain these sites. No sites have been previously identified within the proposed offshore project areas; however, the area is located within a region of the OCS that was formerly aerially exposed and available for human habitation. Given late Pleistocene environmental conditions and the reconstructions of late Wisconsinan glacial ice sheets, early migration via coastal routes into the area could have occurred as early as 16,000 years ago; interior routes of entry could have occurred as late as 13,350 years ago (ICF 2013). Because of this, the proposed project areas are within zones that are considered to have the potential for the presence of submerged pre-contact period archaeological sites (ICF 2013).

3.10.2 Impact Analysis

Seafloor/bottom disturbing activities will include the temporary deployment and anchoring of diversion boom using between 2 to 4, 28-inch Danforth or mushroom anchors weighing up to 40lbs. to hold boom in place. The geographic boundaries of the proposed project area consist of the year round anchorage in Santa Barbara harbor and the federal anchorage area in Long Beach Harbor. No detailed site-specific archaeological identification surveys have been conducted in the portions of the proposed project areas where the anchoring activities will take place. The use of these anchors would result in a negligible impact on any historic period shipwreck in the proposed project area. Moreover, BSEE will place conditions on the deployment operations such that in the event a historic shipwreck or pre-contact period archaeological site is located during operations, the operator must immediately halt and contact BSEE for further guidance. BSEE will avoid these properties and notify the California SHPO of these unanticipated finds.
Based on available information regarding the paleo-shoreline positions, relative sea level rise, and the regional geology, the proposed project area is also considered to have the potential to contain relict landforms that have the potential to contain pre-contact period archaeological sites.

If, having survived the coastal processes associated with sea level rise, these sites, in an undisturbed form may exist in particular geological facies dating to the Holocene and the Pleistocene epochs. Recent studies that reviewed the modern bathymetry of the project areas as a means of modeling emergent coastal paleolandscapes, and as a means of determining the depth of sedimentation in the project areas, suggest that the depth of offshore pre-contact sites would be quite substantial. Anderson et al. (1990: II-18) report that the inner shelf (that area of the POCS that lies in water depths of 40 to 70 meters) sediment thicknesses of 5 to 10 meters with even greater thicknesses seen near the mouth of rivers. The sedimentation rates closer inshore and within the proposed project areas are likely similar, if not greater than, those found offshore and any pre-contact sites in the project areas are buried under a substantial sedimentation layer and not exposed at the surface. The use of between 2 to 4, 28-inch Danforth or mushroom anchors would not impact sediments of this depth below surface and thus would have no impact on pre-contact period archaeological resource in the proposed project area.

3.10.3 Conclusion

As described above, the size and frequency of anchoring would result in a negligible impact on any historic period archaeological sites and would have no impact on sediments associated with possible pre-contact period archaeological sites.

3.10.4 Cumulative Analysis

The location of the anchorages proposed for anchoring booms during the deployment exercies has been heavily impacted by anchoring activities by both pleasure craft and ocean-going commercial ships and freighters. These commercial vessels use anchors weighing up to 31 tons with long lengths of heavy chain to the bottom, the sweep of which could easily demolish historic period shipwrecks. Should a historic period archaeological site exist in the surface or shallowly buried in the immediate area of the anchor sweep, it is likely that it would already be highly disturbed. For historic period shipwrecks that may be located on or shallowly buried in the seafloor, because of previous anchoring in the project area, it is likely that any of these resources would already be highly disturbed and the proposed project anchors weighing up to 40lbs. would add a negligible cumulative impact to previous disturbance.

Cumulative Impacts Conclusion

Given the depth of burial of the sensitive sediments potentially containing pre-contact period archaeological sites, the proposed project activities would add no cumulative impact.

3.10.5 Overall Conclusion

As described above, the proposed project activities would result in a negligible impact on any historic period archaeological sites and would have no cumulative impact on sediments associated with pre-contact period archaeological sites.

4.0 Consultation, Coordination and Communication

4.1 Essential Fish Habitat Consultation

BOEM sent a letter to the NOAA's National Marine Fisheries Service on July 28, 2017 recommending concurrence with BOEM's determination that no additional conservation measures are necessary to avoid, minimize or otherwise offset impact to EFH from the proposed activities. On August 15, 2017, the NFMS representative sent the following email:
From: Bryant Chesney – NOAA Federal <bryant.chesney@noaa.gov> Tue, Aug 15, 2017 at 11:58 AM
To: "Schroeder, Donna M" <Donna.Schroeder@boem.gov>
Hi Donna, NOAA's National Marine Fisheries Service (NMFS) received your letter on July 28, 2017, regarding proposed oil spill response drills conducted offshore Santa Barbara, Ventura, and Los Angeles Counties. NMFS has reviewed the information provided in your letter regarding impacts to essential fish habitat (EFH), and concurs that the proposed activities would have minimal adverse impacts on EFH. Given that benthic disturbance activities will avoid habitat areas of particular concern, NMFS also concurs that no additional conservation measures are necessary to avoid, minimize, or otherwise offset the impacts to EFH. Thank you for consulting with NMFS. Regards, Bryant

4.2 Endangered Species Consultation with the US Fish and Wildlife Service

The Bureau of Ocean Energy Management, Regulation and Enforcement (now BOEM) reinitiated endangered species consultation with the U.S. Fish and Wildlife Service (FWS) via letter dated September 1, 2011, also meeting in person a few days later to discuss BOEMRE's proposal to engage in programmatic consultation. FWS's response stated, in part, that during the ESA reinitiation process, BOEMRE could continue oil and gas drilling and production activities (including oil spill response drills) under existing and previously approved development and production plans in the Southern California Planning Area. In addition, BOEMRE stated that they would continue to comply with all existing terms and conditions identified in all previous Biological Opinions.

On March 17, 2017 BOEM submitted a request for formal consultation on Outer Continental Shelf (OCS) oil and gas development and production activities in the Southern California Planning Area. BOEM proposed consultation for regulatory actions related to existing and future oil and gas development and production such as reviewing development and production plans, applications for permits to drill or modify wells, and oil spill response exercises; implementing their inspection program; and approving infrastructure repairs, structural improvements, and geological surveys.

In a response letter dated July 28, 2017, FWS requested additional information before they would initiate formal consultation. BOEM's response to this letter is underway at this writing. We anticipate that FWS will conduct a consultation once BOEM satisfies their information requests.

4.3 Endangered Species Consultation with NOAA's National Marine Fisheries Service

The Bureau of Ocean Energy Management, Regulation and Enforcement (now BOEM) reinitiated endangered species consultation with NMFS via letter dated September 1, 2011, also meeting in person a few days later to discuss BOEMRE's proposal to engage in programmatic consultation. NMFS's October 14, 2011, response stated, in part, that during the ESA reinitiation process, BOEMRE could continue oil and gas drilling and production activities (including oil spill response drills) under existing and previously approved development and production plans in the Southern California Planning Area. In addition, BOEMRE stated that they would continue to comply with all existing terms and conditions identified in all previous Biological Opinions.

On August 14, 2017, BSEE requested that, because they had been deferring oil spill response equipment exercises pending the completion of this consultation with NMFS, NMFS accelerate the review of this component of their proposed action. Following a discussion with BOEM's Greg Sanders on August 28, 2017, NMFS explained to BOEM and BSEE via email on August 30, 2017 that, under the ESA, they could not "piecemeal" out portions of the proposed activities for concurrence. Furthermore, ESA regulations require NMFS to assess the effects of the entire action, including any interrelated and interdependent actions. NMFS also reiterated that, as expressed in the October 14, 2011, letter to BOEMRE, activities/operations could proceed while the consultation was in process because BOEMRE had made their required ESA section 7(d) finding.

On December 4, 2017, NMFS completed their consultation action and issued a letter entitled: Endangered Species Act Section 7(a)(2) Concurrence Letter for the Proposed Continuation of Offshore Oil and Gas Development and Production Activities in the Southern California Planning Area. Overall, NMFS concluded that they concurred with BOEM's (and BSEE's) determination that the proposed oil and gas development and production activities in the Southern California Planning Area may affect, but are not likely to adversely affect any of the species consulted on. In the unlikely event that a listed species is injured or killed as a result of any oil and gas development and production activities, BOEM and/or BSEE should immediately cease operations and contact our regional stranding coordinator, Justin Viezbicke, at (562) 980-3230. This event would also trigger initiation of a formal consultation under section 7(a)(2) of the ESA for the project activity that has resulted in the injury or death of a listed species.

Specifically regarding deployment exercises, NMFS noted that they did not expect vessels involved in oil spill response exercises to be a factor in striking large whales during the conduct of those exercises, and would not change the annual vessel use estimates given that there are not expected to be more than 3 equipment deployment exercise days in any given year.
Further, NMFS stated, "During the monitoring associated with oil spill response exercises, BSEE should be watching for marine mammal presence and behaviors indicative of potential harassment. Any such incidental harassment would require authorization through an Incidental Harassment Authorization (IHA) issued by NMFS Office of Protected Resources. The mitigation procedures for large whales described earlier[5] should help minimize the potential for marine mammal harassment or injury under the MMPA resulting from the proposed oil spill response activities. If marine mammal disturbance appears to be occurring during any exercise, BSEE should cease activity and contact NMFS before proceeding further. In the unlikely event of an injury or mortality of a marine mammal due to these activities, please immediately contact our regional stranding coordinator, Justin Viezbicke, at (562) 980-3230."

4.4 Section 106 Consultation

BSEE consulted with the California State Historic Preservation Office (SHPO), California State Lands Commission, the Native American Heritage Commission and federally and state recognized tribes. Consultation with the SHPO and California State Lands Commission consisted of electronic correspondence regarding information contained in their files related to potential historic properties within the APE. No historic properties were identified during records searches at the Central Coast Information Center.

BSEE contacted seventeen federal and state tribal contacts and representatives provided by the California Native American Heritage Commission, in order to provide information on the proposed activities and offer consultation as desired (Table 5). BSEE received responses from the Santa Ynez Band of Chumash Indians on July 26, 2017 and additional information including maps were supplied to the Elders Council. On December 06, 2017 BSEE received an email from the Santa Ynez Band of Chumash Indians indicating no objection to the project.

Table 5. Tribes with traditional lands or cultural places located within the boundaries of Santa Barbara and Los Angeles Counties

Barbareno/Ventureno Band of Mission Indians (at four separate addresses)
Coastal Band of the Chumash Nation
Fernandeno Tataviam Band of Mission Indians
Gabrielino Tongva Indians of California Tribal Council
Gabrielino/Tongva Nation

[5] The mitigation is as follows (also contained in the August 14, 2017, letter): if any large whales enter the oil spill response drill area, any deployed booms and anchors will be immediately recovered.

Gabrieleno/Tongva San Gabriel Band of Mission Indians
Gabrielino/Tongva Tribe
Gabrieleno Band of Mission Indians – Kizh Nation
Kern Valley Indian Council
Kitanemuk & Yowlumne Tejon Indians
San Fernando Band of Mission Indians
San Manuel Band of Mission Indians
Santa Ynez Band of Chumash Indians
Soboba Band of Luiseno Indians

BSEE also received a response from Pat Tumanmait from the Barbareno/Ventureno Band of Mission Indians on August 22, 2017. Mr. Tumanmait initially wished to meet to discuss the undertaking and the APE, but on December 1, 2017 Mr. Tumanmait notified BSEE that he saw no adverse effects regarding the undertaking and a meeting regarding the project was no longer necessary. Following consultation, no further concerns were expressed regarding the undertaking.

4.5 Historic Properties

After review of historic properties identification efforts and public consultation and in consideration of the minimally invasive nature of the project activities, BSEE determined that no historic properties will be affected by this undertaking. On February 5, 2018, the California SHPO indicated that they did not object to BSEE's determination that no historic properties will be affected by the undertaking.

5.0 List of Preparers

Dave Panzer – Coordinator
Mark Eckenrode – Air Quality
Susan Zaleski – Water Quality
Lisa Gilbane – Benthic Resources
Greg Sanders – Marine Mammals and Sea Turtles and NMFS ESA Consultation
David Pereksta – FWS ESA Consultation
Sara Guiltinan – Environmental Justice
Brandi Carrier – Section 106 Consultation and Historic Properties

6.0 References

Anderson, J., K. Marcus, and J. Wilson 1990. California, Oregon, and Washington archaeological resource study. Volume II: Geology. Prepared under: MMS Contract 14-35-0001-30439 by Espey, Huston and Associates, Inc., Austin, Texas.

California Air Resources Board (CARB). 2016. California Air Resources Board Green House Gas Emissions Inventory.

Daily, M.D., D.J. Reish, and J.W. Anderson (eds.). 1993. Ecology of the Southern California Bight. Berkeley: University of California Press. p. 926.

Harms, S. and C. Winant (1998). "Characteristic patterns of the circulation in the Santa Barbara Channel." Journal of Geophysical Research 103(C2): 3041-3065.

Hickey, B.M. 1993. Physical oceanography. In: M.D. Dailey, D.J. Reish, and J.W. Anderson [Eds.]. *Ecology of the Southern California Bight: A Synthesis and Interpretation*. Berkeley: University of California Press. pp. 19-70.

Hickey, B. M., E. L. Dobbins, and S. E. Allen. 2003. Local and remote forcing of currents and temperature in the central southern California bight. Journal of Geophysical Research 108 (C3), 3081.

Hofmann GE, Smith JE, Johnson KS, Send U, Levin LA, et al. (2011) High-Frequency Dynamics of Ocean pH: A Multi-Ecosystem Comparison. PLoS ONE 6(12): e28983. doi:10.1371/journal.pone.0028983.

ICF International, Davis Geoarchaeological Research, and Southeastern Archaeological Research. 2013. Inventory and Analysis of Coastal and Submerged Archaeological Site

Johnson, Samuel Y., Peter Dartnell, Guy R. Cochrane, Nadine E. Golden, Eleyne L. Phillips, Andrew C. Ritchie, Lisa M. Krigsman, Bryan E. Dieter, James E. Conrad, H. Gary Greene, Gordon G. Seitz, Charles A. Endris, Ray W. Sliter, Florence L. Wong, Mercedes D. Erdey, Carlos I. Gutierrez, Mary M. Yoklavich, Amy E. East, and Patrick E. Hart (Samuel Y. Johnson and Susan A. Cochran, editors), 2015. Scientific Investigations Map 3319. California State Waters Map Series—Offshore of Refugio Beach, California. Online only by US Geological Survey, http://pubs.usgs.gov/sim/3319/. Video of transect in deltaic sediments (https://www.youtube.com/watch?v=V4iVqWFeHuc).

Love, R.M. 1991. Probably More Than You Want to Know About the Fishes of the Pacific Coast. Really Big Press: Santa Barbara, CA. 214 p.

Lynn, K.J., K.A. Bliss, and L.E. Eber. 1982. Vertical and horizontal distributions of seasonal mean temperature, salinity, sigma-t, stability, dynamic height, oxygen and oxygen saturation in

the California Current, 1950-1978, Calif. Coop. Oceanic Fish. Invest. Atlas 30. La Jolla, Calif.: Scripps Institution of Oceanography, 513 pp.

MBC Applied Environmental Sciences. 2016. 2013-2014 Biological Surveys of Long Beach and Los Angeles Harbors. Prepared for the Ports of Long Beach and Los Angeles. In association with Merkel & Associates and Thomas Johnson Consultant LLC. June 2016.

Occurrence on the Pacific Outer Continental Shelf. U.S. Department of the Interior, Bureau of Ocean Energy Management, Pacific OCS Region, Camarillo, CA. OCS Study BOEM 2013-0115. 280 pages, plus appendices.

Natural Resource Damage Assessment and Restoration, 2016. Personal communication with M. Anderson and details from https://www.wildlife.ca.gov/OSPR/NRDA/Refugio.

Nezlin, N. P. and P. M. DiGiacomo. 2005. Satellite ocean color observations of stormwater runoff plumes along the San Pedro Shelf (southern California) during 1997–2003. Continental Shelf Research 25:1692–1711.

Santa Barbara County Air Pollution Control District (SBCAPCD). 2012. Santa Barbara County Air Pollution Control District 2012 Clean Air Plan. Santa Barbara County Air Pollution Control District.

South Coast Air Quality Management District (SCAQMD). 2007. South Coast Air Quality Management District 2007 Air Quality Management Plan.

Schiff, K. C., M. J. Allen, E. Y. Zeng and S. M. Bay. 2000. Southern California. Marine Pollution Bulletin 41:76-93.

Southern California Coastal Water Research Project (SCCWRP). 1973. The ecology of the Southern California Bight: Implications for water quality management. Technical Report 010. Southern California Coastal Water Research Project. El Segundo, CA.

Southern California Coastal Water Research Project. 2003. Annual Report, 2001-2002.

U.S. Army Corp of Engineers. 2016. Draft environmental assessment for the Santa Barbara Harbor Six-Year Federal Maintenance Dredging Program. Santa Barbara County, California. Prepared by the Los Angeles District. August, 2016 (http://www.spl.usace.army.mil/Portals/17/docs/publicnotices/santa_barbara_dredging_ea.pdf)

U.S. Army Corps of Engineers and Los Angeles Harbor Department. 2017. Final EIS/EIR – Berths 226-236 [Everport] Container Terminal Improvements Project. October 2017. https://www.portoflosangeles.org/environment/public_notices.asp

U.S. Army Corp of Engineers and Los Angeles Harbor Department. 2009. Final Supplemental Environmental Assessment for Port of Los Angeles Channel Deepening Project, San Pedro Bay, California, Sand Mining Operations, April 2009. https://www.portoflosangeles.org/EIR/ChanDeep/FEIR/feir_chandeep.asp

West Coast Ocean Data Network. 2016. West coast canopy forming kelp 1989-2014. On-line GIS layer created by Sound GIS. Accessible through marinecadastre.gov and portal.westcoastoceans.org (accessed on 10/25/2017).

Ventura County Air Pollution Control District (VCAPCD). 2007. Ventura County 2007 Air Quality Management Plan.

Warrick, J. A., P. M. DiGiacomo, S. B. Weisberg, N. P. Nezlin, M. Mengel, B. H. Jones, J. C. Ohlmann, L. Washburn, E. J. Terrill, and K. L. Farnsworth. 2007. River plume patterns and dynamics within the Southern California Bight. Continental Shelf Research 27:2427–2448.