

**FIELD OPERATIONS AND COMPLIANCE REPORT**  
**for**  
**CALIFORNIA STATE LANDS COMMISSION**

**GEOPHYSICAL CABLE ROUTE SURVEY**

**SAN LUIS OBISPO, GROVER BEACH & ESTERO BAY, CALIFORNIA**

Revision	Date	Description	Prepared by	Revised by	Approved by
0	11/28/2018	Initial	EBR		EBR



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## 1 SURVEY INFORMATION

### Project Description and Scope of Work

A geophysical inshore subsea cable corridor route survey was completed in Sept/Oct 2018 for a proposed subsea telecommunications cable landing at Grover Beach, CA. An optional landing was selected and surveyed at Estero Bay, CA as well. The survey was conducted from the closest, safest working distance to shore out to the 3nm State boundary.

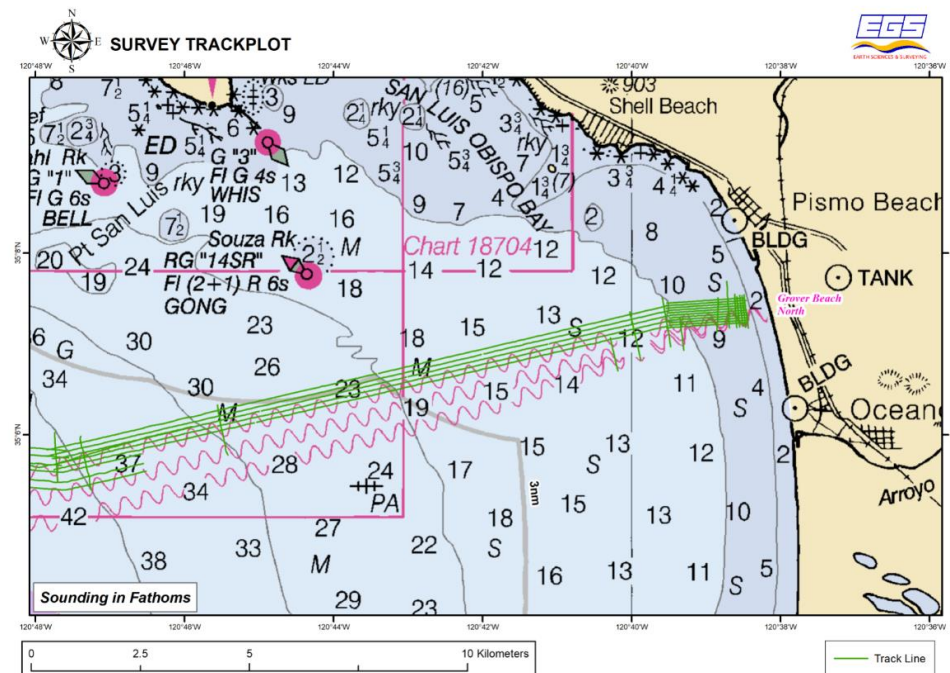
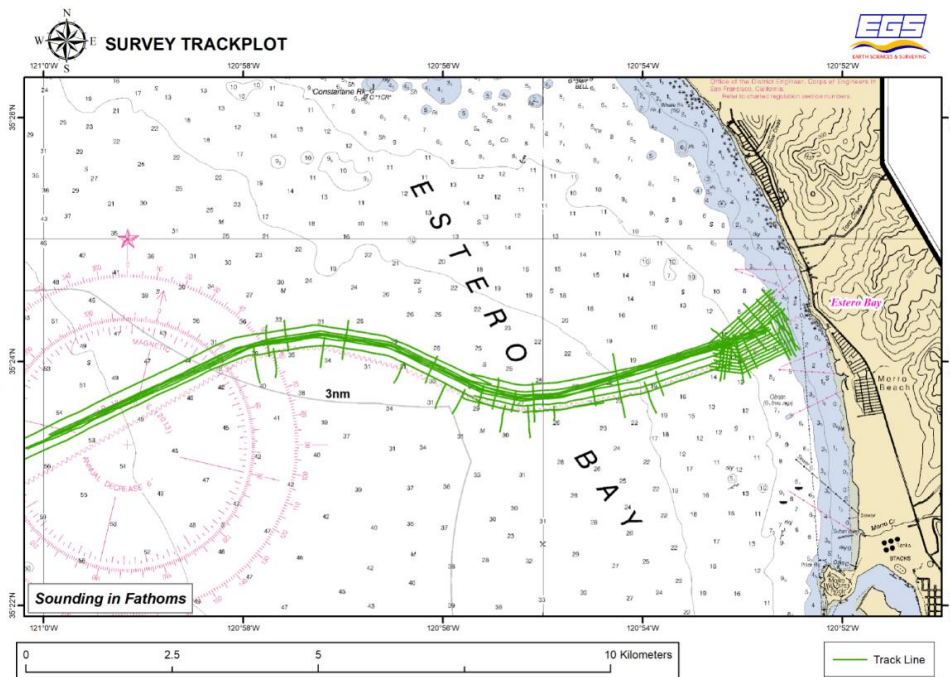
The route survey is required to provide information for engineering, installation, and subsequent maintenance of the cable. The survey objective was to complete the acquisition of inshore geophysical survey data including; bathymetric, sidescan sonar, sub-bottom, and magnetometer data to safely position the cable within a surveyed corridor.

### Weather and Sea State

Weather and sea state during survey events are provided in table below:

Date	Weather	Sea State (Beaufort)
9/21/18	Sunny – 3-5 knts NW	(3) 1 – 1.5m
9/22/18	Sunny – 7-10 knts NW	(3) 1 - 1.5m
9/23/18	Sunny – 7-10 knts NW	(2-3) – 1.0 m
9/24/18	Sunny – 7-10 knts NW	(2-3) – 1 - 2m
9/25/18	Overcast – 5-7 knts NW	(2) – 1 - 2m
9/26/18	Cloudy – 3-5 knts NW	(2) < 1m
9/27/18	Overcast – 5-9 knts NW	(2) < 1m
9/28/18	Part Sunny – 5-9 knts NW	(2) 1 – 1.5m
9/29/18	Sunny – 5-9 knts NW	(2) < 1m
9/30/18	Sunny – 8-12 knts NW	(3) – 1 - 2m
10/1/18	Sunny – 8-12 knts NW	(3) – 1 - 2m
10/2/18	Sunny – 8-10 knts NW	(3) – 1 - 2m
10/3/18	Sunny – 8-10 knts NW	(3) – 1 - 2m

## Chart of Area and Survey Tracklines



### GIS Trackline File

An ESRI compatible survey trackline file accompanies this report. WGS84 Geodetic.

### Date and Times of Data Collection

The data collection summary was taken from the final survey Daily Progress Reports (DPRs). The following table gives the breakdown of dates and data collection times:

Date	Start Data Collection (Local)	End Data Collection
9/21/18	08:15	16:58
9/22/18	08:30	17:30
9/23/18	09:08	17:31
9/24/18	11:15	11:55
9/25/18	10:55	17:12
9/26/18	7:58	17:25
9/27/18	8:00	15:38
9/28/18	9:18	16:45
9/29/18	7:59	15:50
9/30/18	8:02	15:56
10/1/18	7:59	15:46
10/2/18	7:55	17:50
10/3/18	7:15	9:55

#### **Environmental Hazards Encountered**

No environmental hazards were encountered.

#### **Accident, Injury, Damage, or Loss to Property**

No accidents, injuries, damage, or loss to property was sustained.

## **2 BIOLOGICAL INFORMATION**

This section includes Marine Wildlife Monitoring Report with field operations summary including sonar equipment shut downs and start-ups, haul out behaviour, and number of collisions.

### **EXHIBIT H – California State Lands Commission**

Below see initialled and dated Exhibit H:

#### **Marine Wildlife Monitoring Report**

See Marine Wildlife Monitoring Post-Survey Report below prepared by Marine Mammal Consulting Group.

# MARINE WILDLIFE MITIGATION REPORT

## Shallow Water Fiber-optic Cable Survey Grover Beach and Estero Bay, California

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## 1.0 Executive Summary

This report involves the shallow water parts of two surveys of submarine cable routes off California. One was off Grover Beach and the other was off Estero Bay, south and north of Morro Bay, respectively. The cables will likely be installed in 2019. The cable routes cross submerged coastal lands from mean high water to three nautical miles offshore, then stretch into federal waters and beyond. The purpose of the shallow water surveys was to determine the route option that would provide maximum burial depths for the cables. The surveys identified the makeup of the ocean floor, including hard bottom areas, so they could be avoided when the cables are laid. In general, the surveys served to route the cables to soft bottom areas, where maximum burial could be achieved. Low-energy sonar was used for the surveys.

EGS, an international group of survey firms, was selected to perform the survey. The Marine Mammal Consulting Group, Inc. (MMCG), of Santa Barbara, California, was selected by EGS to prepare a marine wildlife contingency plan in accordance with California State Lands Commission (CSLC) requirements (CSLC 2015; MMCG 2018a) and to perform marine mammal mitigation monitoring for this project. Mitigation measures are presented in the plan.

Regulatory agencies at federal and state levels were concerned that survey operations might harm marine wildlife. In particular, a potential for collision between the survey vessel and marine mammals and turtles existed. Potential impacts on marine wildlife from sonar noise were of concern as well. The agencies were also concerned about entanglement of marine wildlife in the sonar tow cable, and to a much lesser extent, in cables used to deploy various devices. Finally, the agencies wanted to be assured that proper procedures were followed in the unlikely event of an oil or fuel release.

This report provides background on the cable routes and survey schedules. It describes the mitigation monitoring methods, including briefings, watch schedules, equipment used by the monitor, communications, data recording, and reporting procedures. In the results section, the marine wildlife sightings are listed by species and include numbers of animals observed, location, behavior, and other relevant information. Anecdotal sightings of other wildlife are also discussed. The conclusions and recommendations section summarizes the effectiveness of the monitoring and makes recommendations for similar future projects. This report includes literature citations.

The survey vessel *JAB* was used for the survey. After a preliminary briefing, the marine mammal observer from MMCG boarded the boat each day in Morro Bay, California. *JAB* began testing and calibration offshore on 21 September, then began surveying Grover Beach the same day. In all, the project required a total of 13 survey days to complete. A total of seven species of marine mammals was observed. The total number of animals seen offshore was 901, plus 466 in Morro Bay, a large majority of which were likely resights. No impacts were observed on any wildlife. The monitoring effort was effective.

## 2.0 Survey Equipment and Route

### 2.1 Survey Vessel

The 44-foot (13.4-meter) catamaran *JAB* (Figure 1) was used for the shallow water survey. *JAB* was powered by twin Cummins diesels. It had a draft of 2.5 feet (0.75 meters). It was propelled by twin jet drives and had no propellers or other exposed moving parts beneath the waterline.



**Figure 1: Survey Vessel *JAB* in Morro Bay**

### 2.2 Sonar

Multiple low- and mid-frequency sonar arrays used by the Navy, as well as high-energy seismic surveys involving the use of airguns, have raised significant concerns about anthropogenic sounds and their impacts on marine wildlife (Carretta *et al.* 2017). The sonar that was used for this survey was low energy and generally much higher in frequency (see Table 1, below).

**Table 1: Survey Equipment Specifications**

Hull-mounted System	Rms Source Level (dB re. 1µPa – m)	Frequency (kHz)	Max. Ping Rate (Hz)	Pulse Length	Distances to Isoleths in Meters (dB re. 1µPa – rms)
R2Sonics 2024 (160°swath)	221	200-400	60	15-1000 us	190 dB: 26 and 19 180 dB: 57 and 35 160 dB: 164 and 80
<b>Sub-bottom Profiler Towed System</b>					
Edgetech DSS2000 Chirp (24°cone)	202	2-16	10	20ms	190 dB: 6 180 dB: 10 160 dB: 130
<b>Sidescan Sonar Towed System</b>					
Edgetech DSS2000 LF (100°swath)	213	120	25	N/A	190 dB: 13 180 dB: 51 160 dB: 210
Edgetech DSS2000HF (100°swath)	219	410	50	N/A	190 dB: 9 180 dB: 39 160 dB: 160
Sonardyne 8071 Ultra Short Baseline (USBL; cone)	188	19-36	14	N/A	

Source: EGS



**Figure 2: Sonar towfish**

In a revision to NOAA's technical guidance for assessing effects on anthropogenic sound on marine mammals (National Marine Fisheries Service [NMFS] 2018), marine mammals were divided into five groups based on their generalized hearing ranges. These included:

- Low-frequency (LF) cetaceans
- Mid-frequency (MF) cetaceans
- High-frequency (HF) cetaceans
- Phocid pinnipeds (PW)
- Otariid pinnipeds (OW)

In an appendix to the report, a sixth group was added, comprising manatees and dugongs, or sirenians (SI). These are not included in this plan because they do not occur on the West Coast.

**Table 2: Summary of Weighting Function Parameters and TTS/PTS Thresholds**

						Non-impulsive	Non-impulsive	Impulsive	Impulsive	Impulsive	Impulsive
						TTS	PTS	TTS	TTS	PTS	PTS
Group	<i>a</i>	<i>b</i>	<i>f</i> <sub>1</sub> (kHz)	<i>f</i> <sub>2</sub> (kHz)	<i>C</i> (dB)	SEL (weighted)	SEL (weighted)	SEL (weighted)	peak SPL (unweighted)	SEL (weighted)	peak SPL (unweighted)
LF	1	2	0.20	19	0.13	179	199	168	213	183	219
MF	1.6	2	8.8	110	1.20	178	198	170	224	185	230
HF	1.8	2	12	140	1.36	153	173	140	196	155	202
OW	2	2	0.94	25	0.64	199	219	188	226	203	232
PW	1	2	1.9	30	0.75	181	201	170	212	185	218

Source: Adapted from NMFS 2018

In the table above, TTS refers to Temporary Threshold Shift, in which a temporary shift over part or all of an animal's hearing occurs. PTS refers to a Permanent Threshold Shift, in which part or all of an animal's hearing is lost permanently. Sound Exposure Levels (SEL) thresholds are expressed in dB re 1  $\mu\text{Pa}^2\text{s}$  and peak Sound Pressure Levels (SPL) thresholds in dB re 1  $\mu\text{Pa}$ . The two columns titled "Non-impulsive" refer to sonar sounds, whereas the columns labeled "Impulsive" refer to explosives, pile-driving, and geophysical airguns.

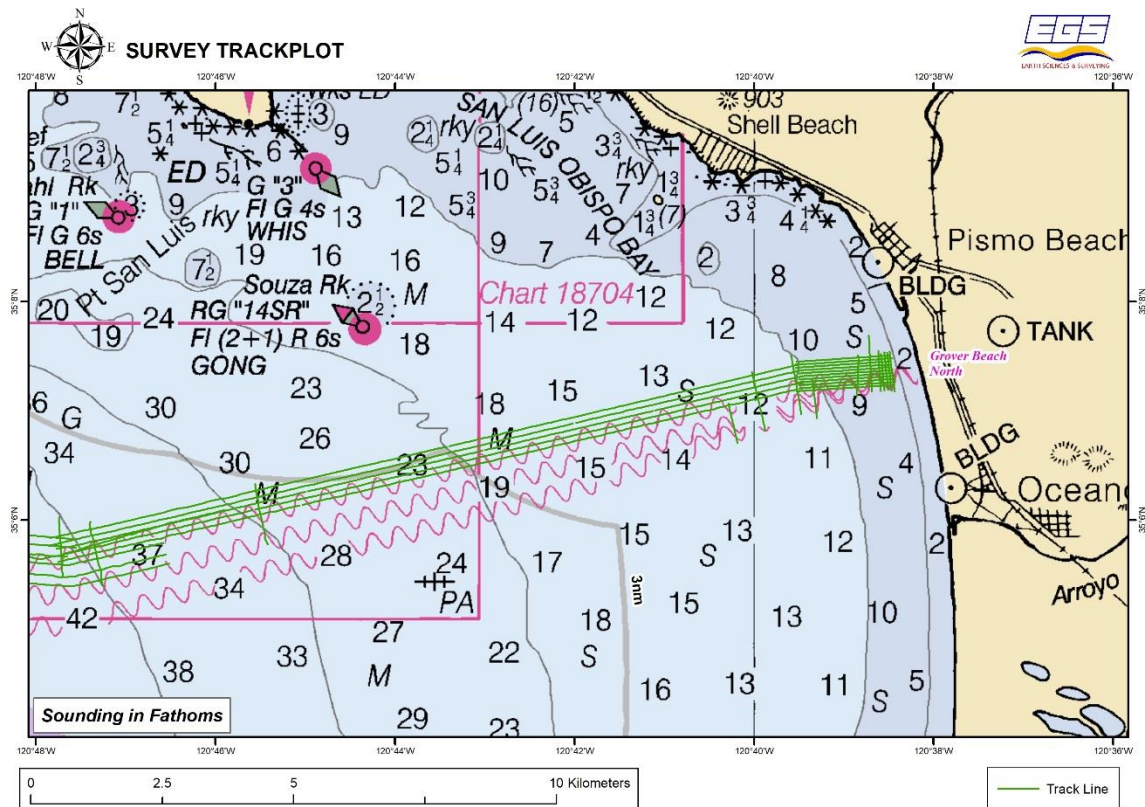
The Morro Bay stock of harbor porpoises (*Phocoena phocoena*) ranges from Point Conception to Point Sur, south of Monterey Bay. It is considered a high-frequency cetacean (above). Considering this, we expanded the original hazard zone approved in earlier documents by CSLC (MMCG 2018a), to 1000 meters for the harbor porpoise (MMCG 2018b). The hazard zone for other marine mammals we recommend maintaining at the original 600 meters, along with the 1000-meter warning zone for all marine mammals that we recommended in earlier documents (MMCG 2018a).

## 2.3 Survey Routes

The Grover Beach survey headed from shore to the west-southwest. The start of this survey was at 35 07.533 North, 120 38.597 West. The end of this survey was at 35 07.261 North, 120

55.492 West. The Estero Bay survey started at 35 24.232 West, 120 52.551 North and ended at 35 22.848 North and 121 03.958 West.

Rather than a box, the survey area was more like a very long corridor about 500 meters wide. If obstructions such as areas of high relief had been encountered, the survey was widened slightly to get around such spots. Based on the results, the in-field routing engineer decided during the survey if the Route Position List (RPL), which represented the center of the cable route, needed to be adjusted within the survey corridor. Once the engineer was satisfied no cable hazards existed, a new RPL, called the In-Field Engineered Route, was created.



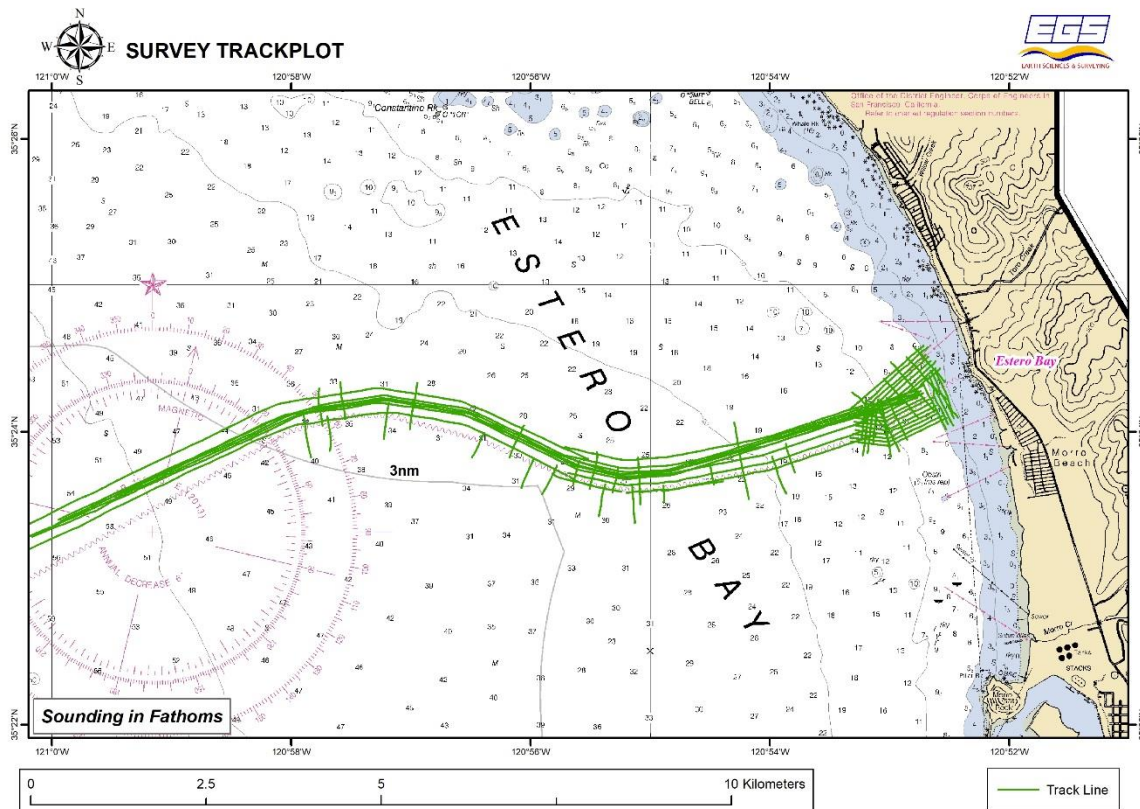
Source: EGS

**Figure 3: Shallow Water Cable Survey Route, Grover Beach, California**

### 3.0 Mitigation Monitoring Methods

#### 3.1 Briefings

The Marine Wildlife Contingency Plan (MMCG 2018a) and data sheets were provided to the MMCG monitor for review and familiarization before the project began. A briefing was held between MMCG’s principal scientist and the monitor to discuss mitigation monitoring methods.



Source: EGS

**Figure 4: Shallow Water Cable Survey Route, Estero Bay, California**

The monitor provided the survey crew in advance with the Marine Wildlife Contingency Plan (MMCG 2018a), along with lists of methods to be employed by them to avoid adverse impacts on marine wildlife. Consultations were held in advance between MMCG and EGS to review sonar ramp-up procedures. Before the vessel left port, the monitor met in person with the crew. The meeting included the following topics:

- Legal aspects pertaining to marine wildlife protection;
- Responsibilities of crew and monitor to protect wildlife;
- Procedures for crew to follow to avoid potential impacts;
- Marine wildlife most likely to be encountered during the survey;
- Copies of the Marine Wildlife Protection Plan were always available to all crew members.

### 3.2 Watches

A continuous watch was kept from port en route to each survey area, within each survey area, and from each survey area back to port. Watches were held on the bridge, which allowed ready access for observations in every direction.

### 3.3 Equipment

The monitor was equipped with 7X50 waterproof, low-light binoculars with a compass and range-finding reticule for establishing relative bearings and distances of animals from the vessel. These binoculars were calibrated for range prior to departure from port. The monitor also had a high-resolution laser rangefinder as well. He was equipped with a handheld GPS unit as well as with a portable weather measuring device. This device recorded wind speed and direction as well as temperature. The monitor also had a digital camera.

### 3.4 Communications

The monitor was equipped with a standard digital cellular telephone with voice mail and text capabilities. The monitor also carried a handheld marine VHF radio for communications with other vessels if necessary. This radio also had ship-to-shore capabilities (telephone links). As a backup, *JAB* also had a cellular telephone and a VHF radio with ship-to-shore capabilities. With these extensive communications capabilities, reliable means of communications were maintained throughout the project. Reliable communications with many backups are essential for such operations in case of emergencies.

### 3.5 Data Recording

All marine wildlife observations were recorded. Data sheets designed for this project included the date and time of each sighting, the monitor's name, and the vessel name. The location of each sighting was noted, using the monitor's handheld GPS. The genus and species of each animal was mentioned, along with the number of animals. Their behavior was noted, along with their heading if they were moving. Age categories and sex were noted when possible. Additional information, such as the direction, range, and bearing of the animal(s) from the observer, along with its heading, was included. The remarks section included notes as to when each operation began and ended, and the nature of each operation (e.g., in transit, on station, ramping up, survey start and end, etc.). Anecdotal information was recorded on other wildlife, particularly sea birds, along with any association such wildlife had with marine mammals or with project operations.

If an alert were made or action had to be taken to prevent a potentially adverse impact, a detailed report could be filled out. This both ensured that the effectiveness of such actions could be analyzed later, but also served as a record of essential information that would be needed in case an impact actually did occur. These incident reports included:

- Date;
- Monitor's name;
- Vessel name and contact information;
- Vessel's position at time of incident;
- Onsite weather and sea conditions;
- Time animal sighted;
- Species;
- Number of animals;
- Animal's behavior;
- Closest distance of animal to vessel;
- Type of hazard (e.g., collision, sonar noise, etc.);
- Time crew notified;
- Time avoidance action implemented;
- Time animal definitely clear of hazard;
- Time normal operations resumed;
- Effectiveness of avoidance action;
- Crew's names and titles;
- Time CSLC and NOAA Fisheries Service notified (if impact occurred);
- Description of action taken:
- Names and titles of responding parties;
- Photographs taken? Photographer's name(s);
- Descriptive narrative of action taken.

Weather data were also recorded and updated hourly throughout each day. These included date, time, monitor's name, vessel's name, and location. Percentage and type of cloud cover were noted, along with visibility in meters and nautical miles. Percentage and direction of glare were also noted. Swell direction and height in meters were recorded, along with wind direction and velocity in knots.

## 4.0 Results

### 4.1 Marine Mammal Sightings

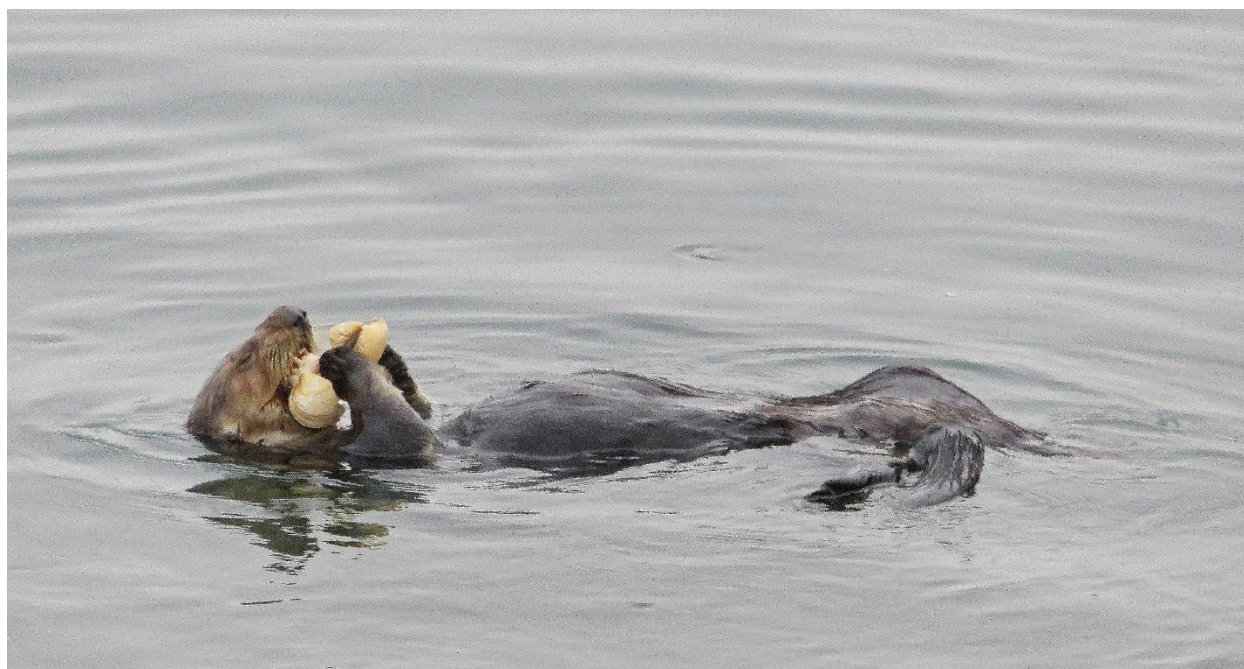
Marine mammal sightings were fairly abundant, with seven different species represented. No species of marine mammals were unidentified. Behaviors included resting, slow travel, diving, and feeding. Considering the number of birds near the animals on occasion, it's likely that other feeding activities happened but were not observed because the animals were underwater. The tables below reflect the maximum number of animals of each species seen each day.

A number of sea otters, sea lions, and one harbor seal were seen in Morro Bay: in the water, on harbor docks, and on the harbor entrance buoy. The total number of animals seen in Morro Bay was 368 sea otters, 94 sea lions, and 1 harbor seal.



**Table 3: Occurrence of Marine Mammals in Morro Bay**

Date	Southern sea otter <i>Enhydra lutris nereis</i>	California sea lion <i>Zalophus californianus</i>	Pacific harbor seal <i>Phoca vitulina richardii</i>
21 September	33	24	0
22 September	15	7	0
23 September	20	16	0
24 September	28	0	0
25 September	67	4	0
26 September	43	1	1
27 September	37	3	1
28 September	6	21	1
29 September	37	0	0
30 September	17	0	0
1 October	15	2	1
2 October	36	8	0
3 October	24	8	0
Totals	368	94	4



**Figure 5: A sea otter enjoys a clam dinner in Morro Bay**

These totals represent the numbers seen while leaving the harbor as well as returning to the harbor. The maximum number of sea otters seen during one day was 37; sea lions, 24; and harbor seals, 1. The total number of animals seen in Morro Bay, including on the harbor entrance buoy, was 466. The vast majority were most likely resights.

**Table 4: Occurrence of Marine Mammals at Grover Beach**

Date	Southern sea otter <i>Enhydra lutris nereis</i>	California sea lion <i>Zalophus californianus</i>	Pacific harbor seal <i>Phoca vitulina richardii</i>	Long-beaked common dolphin <i>Delphinus capensis</i>	Humpback whale <i>Megaptera novaeangliae</i>	Harbor porpoise <i>Phocoena phocoena</i>
21 Sept.	30	14	2	0	5	2
22 Sept.	10	10	0	0	5	0
23 Sept.	2	9	0	0	1	0
24 Sept.	7	9	0	0	1	0
25 Sept.	6	15	0	3	3	11
28 Sept.	9	28*	0	0	2	5
30 Sept.	7	17	0	600	19	0
1 Oct.	7	19	1	9	5	2
Totals	78	121	3	611	39	20

\*This includes one floating, long-dead sea lion.

On 21 September, three common bottlenose dolphins (*Tursiops truncatus t.*) were observed close to shore off Grover Beach. These were from the coastal stock. This was the only sighting of such animals during this project, so this species is not included in any tables herein. Thus, the total number of animals counted off Grover Beach, including the bottlenose dolphins, was 875.

**Table 5: Occurrence of Marine Mammals at Estero Bay**

Date	Southern sea otter <i>Enhydra lutris nereis</i>	California sea lion <i>Zalophus californianus</i>	Pacific harbor seal <i>Phoca vitulina richardii</i>	Long-beaked common dolphin <i>Delphinus capensis</i>	Humpback whale <i>Megaptera novaeangliae</i>	Harbor porpoise <i>Phocoena phocoena</i>
26 Sept.	2	1	0	0	4	0
27 Sept.	0	1	0	0	1	0
29 Sept.	1	7	0	5	0	0
2 Oct.	1	0	0	0	0	0
3 Oct.	0	1	0	0	2	0
Totals	4	19	0	5	7	0

The total number of marine mammals seen off Estero Bay was 26.

#### **4.1.1 Avoidance of Marine Mammal – Cable Survey Vessel Interactions**

The following circumstances resulted in the monitor taking action to avoid impacts. No adverse impacts occurred and the whales appeared to be acting normally each time. They did not seem to be reacting to the vessel in any way. The following circumstances resulted in the monitor taking action to avoid impacts. No adverse impacts occurred and the whales appeared to be acting normally each time. They did not seem to be reacting to the vessel in any way.

##### ***21 September 2018, Grover Beach:***

At 1422, a single humpback whale was spotted traveling quickly on a potential collision course. The crew was alerted. The vessel was moving at 4.4 knots at the time. The whale passed well ahead of the bow and continued on its way. The whale was last seen over 600 meters away, heading steadily away from the vessel. It did not react to the vessel in any way.

##### ***22 September 2018, Grover Beach:***

A single humpback was spotted at 1554 hours abeam of the survey vessel, which was traveling slowly at the time. The whale breached a few times and slapped its flippers, then continued slowly traveling on its way. Once it was well clear astern, operations resumed.

##### ***26 September 2018, Estero Bay:***

At 1408, four humpbacks were noted about 1000 meters from the boat. They were traveling slowly at the time. The survey vessel was moving slowly on a towfish run. At 1532, the whales were near the 600-meter zone. The sonar was stopped and the vessel's course altered to starboard. At 1557, the whales were 1000 meters distant and behaving normally, so sonar operations were resumed.

##### ***30 September 2018, Grover Beach:***

At 0917, the monitor noticed three humpbacks in the distance. They were traveling slowly, diving, and feeding. The vessel operator was notified at 1006 that the whales were getting close to the 600-meter zone. At 1017, the sonar was shut down. Once the whales were well clear, a sonar ramp-up began. The whales did not react to the vessel.

##### ***3 October 2018, Estero Bay:***

Shortly after 0700, two humpbacks were observed diving and feeding in the vicinity as the operator was preparing to ramp up the sonar. The ramp up was stopped until the whales were clear of the hazard zone. The whales continued to feed and dive once they were clear of the hazard zone and the ramp up began again.

#### **4.1.2 General Reactions of Marine Mammals to Operations**

California sea lions occasionally approached the survey vessel and even followed it on one occasion. Sport and commercial fishing are very popular off Morro Bay, however, so it is possible they were following the boat in the hopes of scavenging some fish. The sea lions did not display any reaction to any of the project operations. Sea otters occasionally approached

the boat, seemingly out of curiosity, but otherwise behaved normally. For the most part, humpback whales went about their business and did not react to the vessel.

#### 4.1.3 Pinniped Haul-outs and Rookeries

CSLC requires various mitigation measures to ensure that pinniped haul-out and rookery sites within or immediately adjacent to survey operations are protected from project activities. No haul-out sites exist near the landing at Grover Beach. The closest pinniped haul-out site to the area at the south end of Estero Bay lies beyond a rocky point. This is called Corallina Cove. It is out of sight from the project area. Harbor seals also haul out in Morro Bay itself, at the mudflats or at the mouth of Chorro Creek. These sites are also out of view from the project site. CSLC Mitigation Measure BIO-7, Avoidance of Pinniped Haul-out Sites, does not apply to this project (CSLC 2014).

#### 4.2 Bird Sightings

Birds were abundant in the survey areas. This suggests abundant prey, particularly small schooling fish, since many of the birds listed below feed on such fish. Also, the birds were sometimes seen near sea lions, long-beaked common dolphins, and humpback whales, which suggests the marine mammals were feeding on fish as well.

Sea and shore birds (including ospreys):

- California brown pelicans (*Pelecanus occidentalis californicus*)
- American white pelicans (*P. erythrorhynchos*)
- Western gulls (*Larus occidentalis*)
- Heermann's gulls (*L. heermanni*)
- Black-vented shearwaters (*Puffinus opisthomelas*)
- Forster's terns (*Sterna forsteri*)
- Caspian terns (*Hydroprogne caspia*)
- Common murrelets (*Uria aalge*)
- Rhinoceros auklets (*Cerorhinca monocerata*)
- Ancient murrelets (*Synthliboramphus antiquus*)
- Red Phalaropes (*Phalaropus fulicarius*)
- Brandt's cormorants (*Phalacrocorax pencillatus*)
- Double-crested cormorants (*P. auritus*)
- Pelagic cormorants (*P. pelagicus*)
- Western grebes (*Aechmophorus occidentalis*)
- Eared grebes (*Podiceps nigricollis*)
- Black-crowned night herons (*Nycticorax nycticorax*)
- Great blue herons (*Ardea herodias*)
- Great egrets (*A. alba*)
- Common loons (*Gavia immer*)

- Sooty shearwaters (*Puffinus griseus*)
- Pink-footed shearwaters (*P. creatopus*)
- Northern fulmars (*Fulmarus glacialis*)
- Black-footed albatrosses (*Phoebastria nigripes*)
- Pomarine jaegers (*Stercorarius pomarinus*)
- Leach's storm petrels (*Oceanodroma leucorhoa*)
- Brants (*Branta bernicla*)
- Long-billed dowitchers (*Limnodromus scolopaceus*)
- American bitterns (*Botaurus lentiginosus*)
- Ospreys (*Pandion haliaetus*)

Land birds:

- Peregrine falcons (*Falco peregrinus*)
- Barn owls (*Tyto alba*)



**Figure 6: Black-crowned night heron in Morro Bay**

### 4.3 Turtle Sightings

No turtles were seen.

### 4.4 Other Wildlife

An adult shortfin mako shark (*Isurus oxyrinchus*) was observed several miles off Grover Beach on 28 September. A juvenile common thresher shark (*Alopias vulpinus*) was observed leaping out of the water at Estero Bay on 30 September. This behavior is common for this species of shark.



**Figure 7: The dorsal fin of a short-finned mako shark pierces the surface**

### 4.4 Marine Protected Areas

No Marine Protected Areas (MPAs) exist at or near the survey area. CSLC Mitigation Measure BIO-9, Limitations on Survey Operations in Select Marine Protected Areas, does not apply to this project (CSLC 2014).

## 4.5 Environmental Conditions

Environmental conditions were very moderate during the 13 days of the surveys. Winds generally ranged from west to southwest and varied from calm to 14.1 knots. Swell generally came from the west at 0.25 to 1.0 meters. On two days, swells reached 1.5 meters. Air temperatures ranged from 15.2 to 25.7 degrees Celsius (59.3 to 77.9 degrees Fahrenheit). Visibility was usually 1 to 2 nautical miles each day. Glare was minimal because many of the surveys were overcast. Clouds consisted of marine layer, occasionally with low cumulus and thin morning fog some days.

## 5.0 Reporting

A post survey field operations and compliance report shall be submitted to CSLC as soon as possible, but no later than 30 days after the survey has been completed (EGS in prep). Among other subjects, this report shall include:

- A summary of marine mammal and turtle species seen during the project;
- A summary of environmental conditions;
- Descriptions of any incidents during which action had to be taken to avoid adverse impacts and the effectiveness of such actions.

## 6.0 Conclusions and Recommendations

The mitigation efforts were successful, with no incidents or impacts reported to marine wildlife, MMCG recommends continuing such mitigation efforts in future such projects.

## 7.0 Acknowledgements

MMCG gratefully acknowledges the support and cooperation of EGS and the survey members and crew of *JAB*.

## 8.0 Literature Cited

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EXHIBIT H

Mitigation Monitoring Program

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
<b>Air Quality and Greenhouse Gas (GHG) Emissions (MND Section 3.3.3)</b> <b>MM AIR-1: Engine Tuning, Engine Certification, and Fuels.</b> The following measures will be required to be implemented by all Permittees under the Offshore Geophysical Permit Program (OGPP), as applicable depending on the county offshore which a survey is being conducted. Pursuant to section 93118.5 of CARB's Airborne Toxic Control Measures, the Tier 2 engine requirement applies only to diesel-fueled vessels.	All Counties: Maintain all construction equipment in proper tune according to manufacturers' specifications; fuel all off-road and portable diesel-powered equipment with California Air Resources Board (CARB)-certified motor vehicle diesel fuel limiting sulfur content to 15 parts per million or less (CARB Diesel).  Los Angeles and Orange Counties: Use vessel engines meeting CARB's Tier 2-certified engines or cleaner; the survey shall be operated such that daily NO <sub>x</sub> emissions do not exceed 100 pounds based on engine certification emission factors. This can be accomplished with Tier 2 engines if daily fuel use is 585 gallons or less, and with Tier 3 engines if daily fuel use is 935 gallons or less.	Daily emissions of criteria pollutants during survey activities are minimized.	Determine engine certification of vessel engines.	OGPP permit holder and contract vessel operator; California State Lands Commission (CSLC) review of Final Monitoring Report.	Prior to, during, and after survey activities. Submit Final Monitoring Report after completion of survey activities.	EBR 3/22/18
			Verify that Tier 2 or cleaner engines are being used.			
	Santa Barbara County: Use vessel engines meeting CARB's Tier 2-certified engines or cleaner, accomplished with Tier 2 engines if daily fuel use is 790 gallons or less.		Investigate availability of alternative fuels.			—
	Ventura County: Use alternatively fueled construction equipment on site where feasible, such as compressed natural gas, liquefied natural gas, propane or biodiesel.		Investigate availability of alternative fuels.			—

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Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM BIO-1: Marine Mammal and Sea Turtle Presence – Current Information.	All State waters; prior to commencement of survey operations, the geophysical operator shall: (1) contact the National Oceanic and Atmospheric Administration Long Beach office staff and local whale-watching operations and shall acquire information on the current composition and relative abundance of marine wildlife offshore, and (2) convey sightings data to the vessel operator and crew, survey party chief, and onboard Marine Wildlife Monitors (MWMs) prior to departure. This information will aid the MWMs by providing data on the approximate number and types of organisms that may be in the area.	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Document contact with appropriate sources. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder; Inquiry to NOAA and local whale watching operators.	Prior to survey.	EBR 10/13/18
MM BIO-2: Marine Wildlife Monitors (MWMs).	Except as provided in section 7(h) of the General Permit, a minimum of two (2) qualified MWMs who are experienced in marine wildlife observations shall be onboard the survey vessel throughout both transit and data collection activities. The specific monitoring, observation, and data collection responsibilities shall be identified in the Marine Wildlife Contingency Plan required as part of all Offshore Geophysical Permit Program permits. Qualifications of proposed MWMs shall be submitted to the National Oceanic and Atmospheric Administration (NOAA) and CSLC at least twenty-one (21) days in advance of the survey for their approval by the agencies. Survey operations shall not commence until the CSLC approves the MWMs.	Competent and professional monitoring or marine mammals and sea turtles; compliance with established monitoring policies.	Document contact with and approval by appropriate agencies. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Prior to survey.	EBR 10/3/18
MM BIO-3: Safety Zone Monitoring.	Onboard Marine Wildlife Monitors (MWMs) responsible for observations during vessel transit shall be responsible for monitoring during the survey equipment operations. All visual monitoring shall occur from the highest practical vantage point aboard the survey vessel; binoculars shall be used to observe the surrounding area, as appropriate. The MWMs will survey an area (i.e., safety or exclusion zone) based on the equipment used, centered on the sound source (i.e., vessel, towfish), throughout time that the survey equipment is operating. Safety zone radial distances, by equipment type, include:	No adverse effects to marine mammals or sea turtles due to survey activities are observed; compliance with established safety zones.	Compliance with permit requirements (observers); compliance with established safety zones. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Prior to survey.	EBR 10/3/18

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Mitigation Measure (M/M)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials										
	<p style="text-align: center;"><b>Equipment Type</b>                      <b>Safety Zone (radius, m)</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Single Beam Echosounder</td> <td>50</td> </tr> <tr> <td>Multibeam Echosounder</td> <td>500</td> </tr> <tr> <td>Side-Scan Sonar</td> <td>600</td> </tr> <tr> <td>Subbottom Profiler</td> <td>100</td> </tr> <tr> <td>Boomer System</td> <td>100</td> </tr> </table> <p>If the geophysical survey equipment is operated at or above a frequency of 200 kilohertz (KHz), safety zone monitoring and enforcement is not required; however, if geophysical survey equipment operated at a frequency at or above 200 KHz is used simultaneously with geophysical survey equipment less than 200 KHz, then the safety zone for the equipment less than 200 KHz must be monitored. The onboard MWMS shall have authority to stop operations if a mammal or turtle is observed within the specified safety zone and may be negatively affected by survey activities. The MWMS shall also have authority to recommend continuation (or cessation) of operations during periods of limited visibility (i.e., fog, rain) based on the observed abundance of marine wildlife. Periodic reevaluation of weather conditions and reassessment of the continuation/cessation recommendation shall be completed by the onboard MWMS. During operations, if an animal's actions are observed to be irregular, the monitor shall have authority to recommend that equipment be shut down until the animal moves further away from the sound source. If irregular behavior is observed, the equipment shall be shut-off and will be restarted and ramped-up to full power, as applicable, or will not be started until the animal(s) is/are outside of the safety zone or have not been observed for 15 minutes.</p> <p>For nearshore survey operations utilizing vessels that lack the personnel capacity to hold two (2) MWMS aboard during survey operations, at least twenty-one (21) days prior to the commencement of survey activities, the Permittee may petition the CSLC to conduct survey operations with one (1) MWMS aboard. The CSLC will consider such authorization on a case-by-case basis and</p>	Single Beam Echosounder	50	Multibeam Echosounder	500	Side-Scan Sonar	600	Subbottom Profiler	100	Boomer System	100					<p style="text-align: center;">CWT. EBR 10/3/10</p>
Single Beam Echosounder	50															
Multibeam Echosounder	500															
Side-Scan Sonar	600															
Subbottom Profiler	100															
Boomer System	100															

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Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
	factors the CSLC will consider will include the timing, type, and location of the survey, the size of the vessel, and the availability of alternate vessels for conducting the proposed survey. CSLC authorizations under this subsection will be limited to individual surveys and under any such authorization; the Permittee shall update the MWCP to reflect how survey operations will occur under the authorization.					CONT EBR 10/3/12
<b>MM BIO-4:</b> Limits on Nighttime OGPP Surveys.	All State waters; nighttime survey operations are prohibited under the OGPP, except as provided below. The CSLC will consider the use of single beam echosounders and passive equipment types at night on a case-by-case basis, taking into consideration the equipment specifications, location, timing, and duration of survey activity.	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Presurvey request for nighttime operations, including equipment specifications and proposed use schedule.  Document equipment use.  Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Approval required before survey is initiated.  Monitoring Report following completion of survey.	EBR 3/22/18 DAYLEHT ONLY ops
<b>MM BIO-5:</b> Soft Start.	All State waters; the survey operator shall use a "soft start" technique at the beginning of survey activities each day (or following a shut down) to allow any marine mammal that may be in the immediate area to leave before the sound sources reach full energy. Surveys shall not commence at nighttime or when the safety zone cannot be effectively monitored. Operators shall initiate each piece of equipment at the lowest practical sound level, increasing output in such a manner as to increase in steps not exceeding approximately 6 decibels (dB) per 5-minute period. During ramp-up, the Marine Wildlife Monitors (MWMs) shall monitor the safety zone. If marine mammals are sighted within or about to enter the safety zone, a power-down or shut down shall be implemented as though the equipment was operating at full power. Initiation of ramp-up procedures from shut down requires that the MWMs be able to visually observe the full safety zone.	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Compliance with permit requirements (observers); start procedures.  Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Immediately prior to survey.	EBR 10/3/18

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Mitigation Monitoring Program

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
<p><b>MM BIO-6:</b>                      Practical Limitations on Equipment Use and Adherence to Equipment Manufacturer's Routine Maintenance Schedule.</p>	<p>All State waters: geophysical operators shall follow, to the maximum extent possible, the guidelines of Zykov (2013) as they pertain to the use of subbottom profilers and side-scan sonar, including:</p> <ul style="list-style-type: none"> <li>Using the highest frequency band possible for the subbottom profiler;</li> <li>Using the shortest possible pulse length; and</li> <li>Lowering the pulse rate (pings per second) as much as feasible.</li> </ul> <p>Geophysical operators shall consider the potential applicability of these measures to other equipment types (e.g., boomer). Permit holders will conduct routine inspection and maintenance of acoustic-generating equipment to ensure that low energy geophysical equipment used during permitted survey activities remains in proper working order and within manufacturer's equipment specifications. Verification of the date and occurrence of such equipment inspection and maintenance shall be provided in the required presurvey notification to CSLC.</p>	<p>No adverse effects to marine mammals or sea turtles due to survey activities are observed.</p>	<p>Document initial and equipment settings during survey.                       Submit Final Monitoring Report after completion of survey activities.</p>	<p>OGPP permit holder.</p>	<p>Immediately prior to and during survey.</p>	<p>ESR                      10/13/10</p>
<p><b>MM BIO-7:</b>                      Avoidance of Pinniped Haul-Out Sites.</p>	<p>The Marine Wildlife Contingency Plan (MWCP) developed and implemented for each survey shall include identification of haul-out sites within or immediately adjacent to the proposed survey area. For surveys within 300 meters (m) of a haul-out site, the MWCP shall further require that:</p> <ul style="list-style-type: none"> <li>The survey vessel shall not approach within 91 m of a haul-out site, consistent with National Marine Fisheries Service (NMFS) guidelines;</li> <li>Survey activity close to haul-out sites shall be conducted in an expedited manner to minimize the potential for disturbance of pinnipeds on land; and</li> <li>Marine Wildlife Monitors shall monitor pinniped activity onshore as the vessel approaches, observing and reporting on the number of pinnipeds potentially disturbed (e.g., via head lifting, flushing into the water). The purpose of such reporting is to provide CSLC and California Department of Fish and Wildlife (CDFW) with information regarding potential disturbance associated with OGPP surveys.</li> </ul>	<p>No adverse effects to pinnipeds at haul outs are observed.</p>	<p>Document pinniped reactions to vessel presence and equipment use.                       Submit Final Monitoring Report after completion of survey activities.</p>	<p>OGPP permit holder.</p>	<p>Monitoring Report following completion of survey.</p>	<p>ESR                      10/13/10</p>

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Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
<p><b>MM BIO-8:</b> Reporting Requirements – Collision.</p>	<p>All State waters; if a collision with marine mammal or reptile occurs, the vessel operator shall document the conditions under which the accident occurred, including the following:</p> <ul style="list-style-type: none"> <li>• Vessel location (latitude, longitude) when the collision occurred;</li> <li>• Date and time of collision;</li> <li>• Speed and heading of the vessel at the time of collision;</li> <li>• Observation conditions (e.g., wind speed and direction, swell height, visibility in miles or kilometers, and presence of rain or fog) at the time of collision;</li> <li>• Species of marine wildlife contacted (if known);</li> <li>• Whether an observer was monitoring marine wildlife at the time of collision; and,</li> <li>• Name of vessel, vessel owner/operator, and captain officer in charge of the vessel at time of collision.</li> </ul> <p>After a collision, the vessel shall stop, if safe to do so; however, the vessel is not obligated to stand by and may proceed after confirming that it will not further damage the animal by doing so. The vessel will then immediately communicate by radio or telephone all details to the vessel's base of operations, and shall immediately report the incident. Consistent with Marine Mammal Protection Act requirements, the vessel's base of operations or, if an onboard telephone is available, the vessel captain him/herself, will then immediately call the National Oceanic and Atmospheric Administration (NOAA) Stranding Coordinator to report the collision and follow any subsequent instructions. From the report, the Stranding Coordinator will coordinate subsequent action, including enlisting the aid of marine mammal rescue organizations, if appropriate. From the vessel's base of operations, a telephone call will be placed to the Stranding Coordinator, NOAA National Marine Fisheries Service (NMFS), Southwest Region, Long Beach, to obtain instructions. Although NOAA has primary responsibility for marine mammals in both State and Federal waters, the California Department of Fish and Wildlife (CDFW) will also be advised that an incident has occurred in State waters affecting a protected species.</p>	<p>No adverse effects to marine mammals or sea turtles due to survey activities are observed.</p>	<p>Submit Final Monitoring Report after completion of survey activities.</p>	<p>OGPP permit holder.</p>	<p>Monitoring Report following completion of survey.</p>	<p>ESR 11/20/10</p>

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Mitigation Monitoring Program

Mitigation Measure (M/M)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM BIO-9: Limitations on Survey Operations in Select Marine Protected Areas (MPAs).	All MPAs; prior to commencing survey activities, geophysical operators shall coordinate with the CLSC, California Department of Fish and Wildlife (CDFW), and any other appropriate permitting agency regarding proposed operations within MPAs. The scope and purpose of each survey proposed within a MPA shall be defined by the permit holder, and the applicability of the survey to the allowable MPA activities shall be delineated by the permit holder. If deemed necessary by CDFW, geophysical operators will pursue a scientific collecting permit, or other appropriate authorization, to secure approval to work within a MPA, and shall provide a copy of such authorization to the CSLC as part of the required presurvey notification to CSLC. CSLC, CDFW, and/or other permitting agencies may impose further restrictions on survey activities as conditions of approval.	No adverse effects to MPA resources due to survey activities are observed.	Monitor reactions of wildlife to survey operations; report on shutdown conditions and survey restart.  Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder; survey permitted by CDFW.	Prior to survey.	11/28/10 EGR
MM HAZ-1: Oil Spill Contingency Plan (OSCP) Required Information.	Permittees shall develop and submit to CSLC staff for review and approval an OSCP that addresses accidental releases of petroleum and/or non-petroleum products during survey operations. Permittees' OSCP's shall include the following information for each vessel to be involved with the survey: <ul style="list-style-type: none"> <li>• Specific steps to be taken in the event of a spill, including notification names, phone numbers, and locations of: (1) nearby emergency medical facilities, and (2) wildlife rescue/response organizations (e.g., Oiled Wildlife Care Network);</li> <li>• Description of crew training and equipment testing procedures; and</li> <li>• Description, quantities, and location of spill response equipment onboard the vessel.</li> </ul>	Reduction in the potential for an accidental spill. Proper response and notification of responsible parties in the event of a spill.	Documentation of proper spill training.  Notification of responsible parties in the event of a spill.	OGPP permit holder and contract vessel operator.	Prior to survey.	11/28/10 EGR no spills
MM HAZ-2: Vessel fueling restrictions.	Vessel fueling shall only occur at an approved docking facility. No cross vessel fueling shall be allowed.	Reduction in the potential for an accidental spill.	Documentation of fueling activities.	Contract vessel operator.	Following survey.	11/28/10 EGR
MM HAZ-3: OSCP equipment and supplies.	Onboard spill response equipment and supplies shall be sufficient to contain and recover the worst-case scenario spill of petroleum products as outlined in the OSCP.	Proper and timely response in the event of a spill.	Notification to CSLC of onboard spill response equipment/supplies inventory, verify	Contract vessel operator.	Prior to survey.	11/28/10 EGR No spills

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Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM HAZ-1: Oil Spill Contingency Plan (OSCP) Required Information.	Outlined under Hazards and Hazardous Materials (above)		ability to respond to worst-case spill.			-
MM HAZ-2: Vessel fueling restrictions.	Outlined under Hazards and Hazardous Materials (above)					-
MM HAZ-3: OSCP equipment and supplies.	Outlined under Hazards and Hazardous Materials (above)					-
MM BIO-9: Limitations on Survey Operations in Select MPAs.	Outlined under <b>Biological Resources</b> (above)					-
MM REC-1: U.S. Coast Guard (USCG), Harbormaster, and Dive Shop Operator Notification.	All California waters where recreational diving may occur; as a survey permit condition, the SLC shall require Permittees to provide the USCG with survey details, including information on vessel types, survey locations, times, contact information, and other details of activities that may pose a hazard to divers so that USCG can include the information in the Local Notice to Mariners, advising vessels to avoid potential hazards near survey areas. Furthermore, at least twenty-one (21) days in advance of in-water activities, Permittees shall: (1) post such notices in the harbormasters' offices of regional harbors; and (2) notify operators of dive shops in coastal locations adjacent to the proposed offshore survey operations.	No adverse effects to recreational divers from survey operations.	Notify the USCG, local harbormasters, and local dive shops of planned survey activity.  Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Prior to survey.	ERK 11/28/10 No DIVE ops



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Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM FISH-1: U.S. Coast Guard (USCG) and Harbormaster Notification.	All California waters: as a survey permit condition, the CSLC shall require Permittees to provide the USCG with survey details, including information on vessel types, survey locations, times, contact information, and other details of activities that may pose a hazard to mariners and fishers so that USCG can include the information in the Local Notice to Mariners, advising vessels to avoid potential hazards near survey areas. Furthermore, at least twenty-one (21) days in advance of in-water activities, Permittees shall post such notices in the harbormasters' offices of regional harbors.	No adverse effects to commercial fishing gear in place.	Notify the USCG and local harbormasters of planned survey activity.  Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Prior to survey.	EBR 3/22/18  NO GEMR CONFLICT
MM FISH-2: Minimize Interaction with Fishing Gear.	To minimize interaction with fishing gear that may be present within a survey area: (1) the geophysical vessel (or designated vessel) shall traverse the proposed survey corridor prior to commencing survey operations to note and record the presence, type, and location of deployed fishing gear (i.e., buoys); (2) no survey lines within 30 m (100 feet) of observed fishing gear shall be conducted. The survey crew shall not remove or relocate any fishing gear; removal or relocation shall only be accomplished by the owner of the gear upon notification by the survey operator of the potential conflict.	No adverse effects to commercial fishing gear in place.	Visually observe the survey area for commercial fishing gear. Notify the gear owner and request relocation of gear outside survey area.  Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Immediately prior to survey (prior to each survey day).	EBR 3/22/18  NO GEMR CONFLICT
MM FISH-1: USCG and Harbormaster Notification.	Outlined under <b>Commercial and Recreational Fisheries</b> (above)					

Acronyms/Abbreviations: CARB = California Air Resources Board; CDFW = California Department of Fish and Wildlife; CSLC = California State Lands Commission; dB = decibels; kHz = kilohertz; MPA = Marine Protected Area; MWCP = Marine Wildlife Contingency Plan; MWM = Marine Wildlife Monitor; m = meter(s); NOAA = National Oceanic and Atmospheric Administration; NO<sub>x</sub> = Nitrogen Oxide; OGPP = Offshore Geophysical Permit Program; OSCP = Oil Spill Contingency Plan; USCG = U.S. Coast Guard