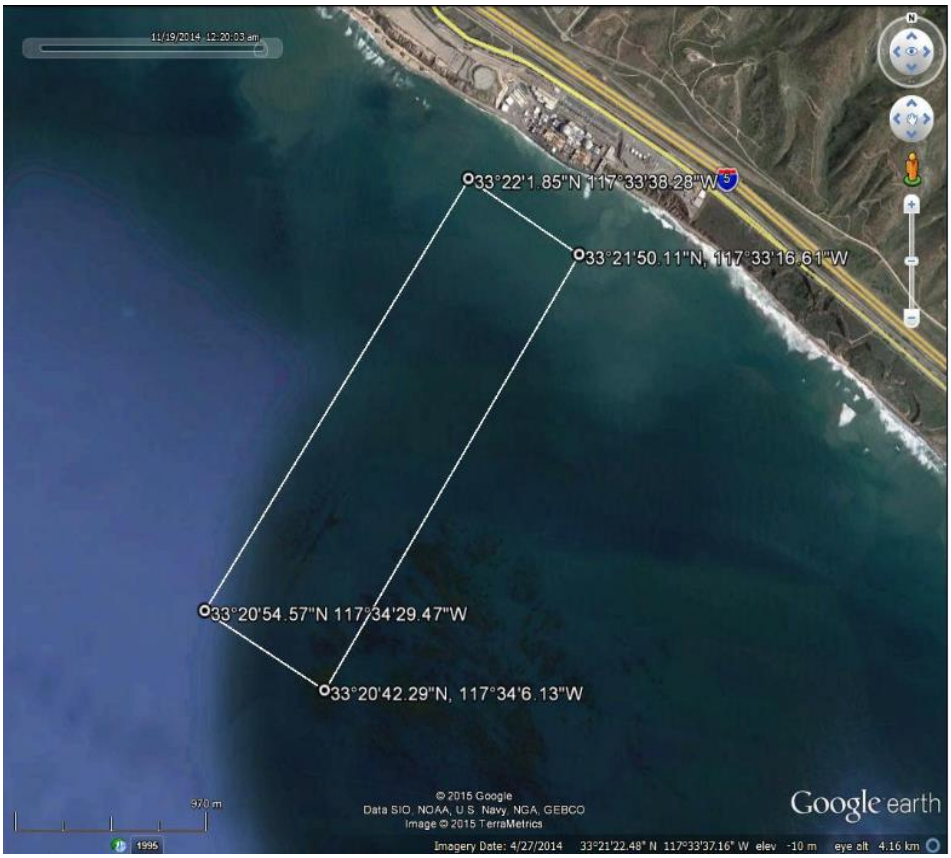
GEOPHYSICAL SURVEY OFFSHORE SAN CLEMENTE AT SAN ONOFRE SAN CLEMENTE, CALIFORNIA

Field Operations Report



Submitted to:

State Lands Commission
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GEOPHYSICAL SURVEY OFFSHORE SAN CLEMENTE AT SAN ONOFRE SAN CLEMENTE, CALIFORNIA

Field Operations Report

1.0 INTRODUCTION

Ecosystems Management Inc. (ECOM) conducted a geophysical survey on the 16th and 17th of January 2016 to determine areas of hard substrate nearby the intake and discharge systems at San Onofre Nuclear Generating Station (SONGS). This survey included a multibeam sonar survey and a side scan survey. The equipment used for this survey included a Kongsberg EM3002 dual multibeam sonar, side scan sonar, a sound velocity profiler, and a DGNSS positioning and attitude system. The geophysical survey was conducted offshore of the City of San Clemente, between 10 to 50 feet water depths.

Including the full width of swath coverage of the multibeam the survey data encompasses an area approximately 1.68km². The purpose of the survey was to determine the hard substrate areas nearby the water intake and discharge pipes in order to determine safe vessel anchorage positions adjacent to these features.

1.1 PERMITTING: CA STATE LANDS COMMISSION

Prior to the geophysical survey work, CE acquired the necessary permit from the California State Lands Commission (Permit # PRC 8536.9). As per permit requirements, a Marine Wildlife Contingency Plan was prepared and a marine wildlife monitor was present during the surveys to assure that marine mammals were not harmed by the acoustically generated pulses produced by the bathymetric survey equipment. Mammal observations that were carried out during the surveys determined when survey activities should be altered or stopped to avoid interaction with marine mammals. A copy of the Marine Wildlife Monitoring Report recorded during the survey and test patch is in Appendix A. Additionally, all parties identified in Exhibit C of the permit were sent notification of the geophysical survey activity. Figure 1-1 shows the survey area.

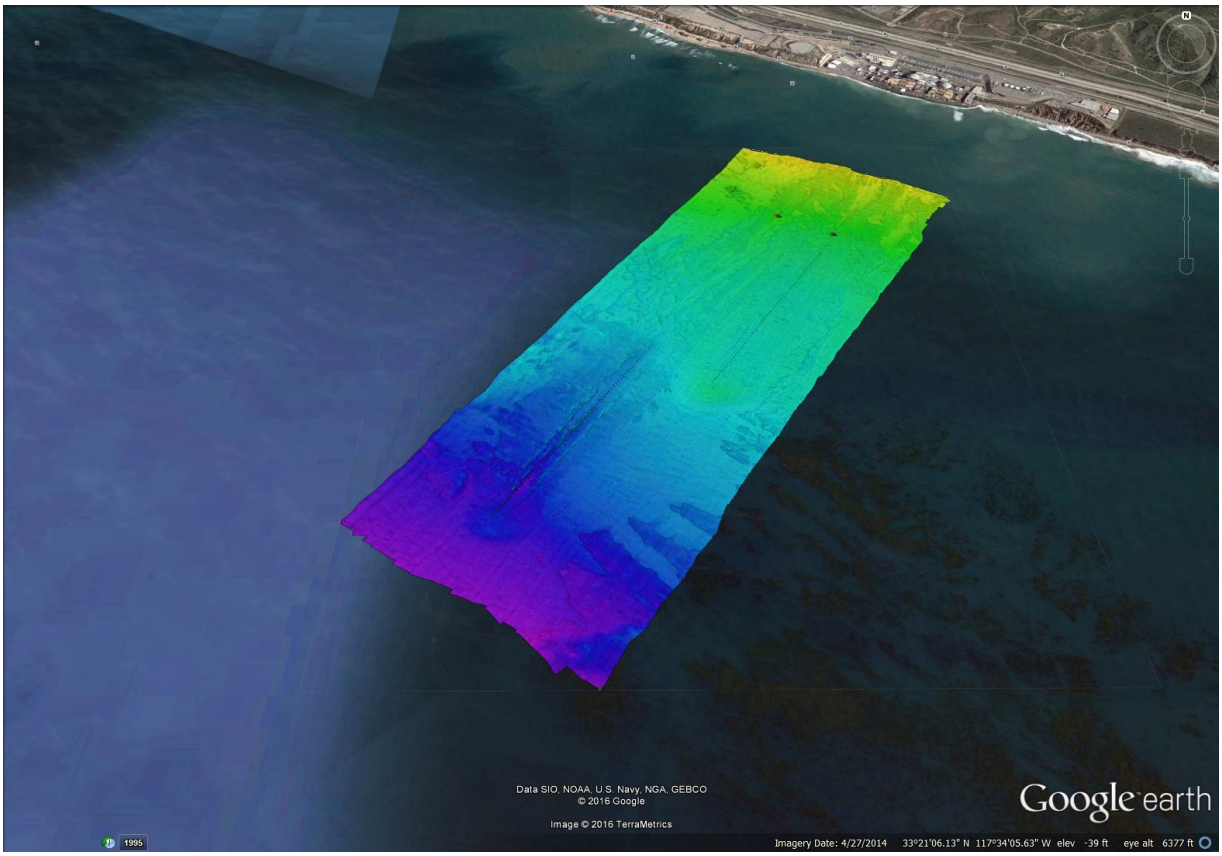

Figure 1-1. Prospective image of the survey area at San Onofre offshore San Clemente, California.

2.0 SURVEY METHODS AND INSTRUMENTATION

2.1 GEOPHYSICAL SURVEY DATE

The survey was conducted on January 16th and 17th 2016 to determine areas of hard substrate nearby the intake and discharge systems offshore of San Clemente at SONGS.

2.2 SURVEY VESSEL

The *Farallon*, a 25-foot-long vessel, was used as the survey vessel for the project (Figure 2-1). The vessel was equipped with the following primary equipment for execution of the survey:

1. Kongsberg EM3002 dual multibeam and side scan sonar.
2. Sound Velocity Profiler
3. DGNSS Positioning and attitude system.

2.3 DATA ACQUISITION AND INSTRUMENTATION

2.3.1 GPS Positioning

A C-Nav 3050 Differential Global Navigation Satellite System (DGNSS) Precise Point Positioning system provided high accuracy position data during the survey. The GPS health was monitored continuously via the C-NaviGatorII. Position data was output to all sensor acquisition systems and raw data logged directly from the receiver.

Hypack navigation software provided real-time vessel positioning using DGNSS and inertial navigation inputs. The navigation software provided paged output to the helmsman for survey vessel tracking (Table 2-1 and Figure 2-1). The system collected, displayed and logged various DGNSS quality information and additional online quality assessment information.

2.3.2 Multibeam Echo-sounder System (MBES)

A Kongsberg EM3002, 300 kHz high-resolution multibeam echosounder was used for acquisition of bathymetric and backscatter data. The system was hard mounted on the port side of the survey vessel using an Oceaneering portable mounting bracket.

Data acquired with the EM3002 were recorded and monitored in real time with the Simrad Seafloor Information System (SIS) for the duration of survey operations. SIS displayed a variety of real-time imagery so that sonar settings could be adjusted to improve data quality if needed.

The EM3002 was coupled with the Applanix POS MV system to account for vessel motion. All dynamic systems were tied into the C-Nav DGNSS precise point differential packet for improved motion and heading calculation.

Table 2-1. Geophysical survey GPS coordinates (NAD83) for the start and end points of each survey line.

Trackline Number	Date	Start Lat.	Start Long.	End Lat.	End Long.
1	1/16/2016	33.3486846	-117.5752732	33.3636073	-117.5634107
2	1/16/2016	33.3625641	-117.5635692	33.3490443	-117.5743563
3	1/16/2016	33.3491461	-117.5733292	33.362864	-117.5630621
4	1/16/2016	33.3621458	-117.5630342	33.3525114	-117.5709706
5	1/16/2016	33.3524169	-117.570645	33.3623847	-117.5625864
6	1/16/2016	33.3621446	-117.5624519	33.3524224	-117.5705372
7	1/16/2016	33.3519847	-117.5704563	33.3623199	-117.5619141
8	1/16/2016	33.3620546	-117.5617334	33.3519023	-117.5700083
9	1/16/2016	33.3515678	-117.569792	33.3619808	-117.5615122
10	1/16/2016	33.3618878	-117.5612129	33.3512718	-117.5695233
11	1/16/2016	33.3510123	-117.5692117	33.3616798	-117.5610812
12	1/16/2016	33.3616132	-117.560779	33.3508246	-117.5688013
13	1/16/2016	33.3506892	-117.5685117	33.3615385	-117.5606444
14	1/16/2016	33.3614516	-117.5603448	33.3506526	-117.5680647
15	1/16/2016	33.3504151	-117.5678559	33.3614213	-117.5601275
16	1/16/2016	33.3611105	-117.5600429	33.3502	-117.5674992
17	1/16/2016	33.35006	-117.5671993	33.3610301	-117.5597283
18	1/16/2016	33.3608731	-117.5594591	33.3499043	-117.5667994
19	1/16/2016	33.3498014	-117.5663796	33.3608447	-117.5592849
20	1/16/2016	33.3606982	-117.5590084	33.3496777	-117.5660147
21	1/16/2016	33.3494325	-117.5657253	33.3606078	-117.5588251
22	1/16/2016	33.3599481	-117.5572662	33.349502	-117.5655506
23	1/16/2016	33.3496159	-117.5658063	33.3598014	-117.5575381
24	1/16/2016	33.3599749	-117.5576765	33.3538446	-117.5629799
25	1/16/2016	33.3538386	-117.5631214	33.3602023	-117.5578496
26	1/16/2016	33.3604088	-117.5580082	33.3585738	-117.5599238
27	1/16/2016	33.3586716	-117.5600169	33.3603599	-117.5584046
28	1/16/2016	33.3605344	-117.5585193	33.360245	-117.5591423
29	1/16/2016	33.3615571	-117.560947	33.3624585	-117.5621797
30	1/16/2016	33.3621922	-117.562042	33.3585483	-117.565255
31	1/16/2016	33.3587299	-117.5662782	33.3626426	-117.5629626
32	1/16/2016	33.3625767	-117.5627317	33.3624506	-117.5632487
33	1/16/2016	33.3624759	-117.5639407	33.3616822	-117.5648533
34	1/16/2016	33.3586903	-117.5653123	33.3559446	-117.5684962
35	1/16/2016	33.3556976	-117.5681028	33.3556976	-117.5681028
36	1/16/2016	33.3545136	-117.5665717	33.3485152	-117.571728
37	1/16/2016	33.3483476	-117.5748675	33.3496159	-117.5732992
38	1/16/2016	33.3502904	-117.5723865	33.348204	-117.5745824

Trackline Number	Date	Start Lat.	Start Long.	End Lat.	End Long.
39	1/16/2016	33.3480373	-117.5743335	33.3525121	-117.5700847
40	1/16/2016	33.3526658	-117.5696971	33.3477932	-117.5739077
41	1/16/2016	33.3475772	-117.57372	33.3521923	-117.569369
42	1/16/2016	33.3521266	-117.569217	33.3473104	-117.5732362
43	1/16/2016	33.3473605	-117.5729728	33.3515736	-117.5692311
44	1/16/2016	33.3517666	-117.5684813	33.3470522	-117.5724413
45	1/16/2016	33.3468085	-117.572168	33.3507129	-117.5683981
46	1/16/2016	33.3506549	-117.5680161	33.3466076	-117.5716445
47	1/16/2016	33.3464648	-117.571277	33.3505103	-117.5676206
48	1/16/2016	33.3503423	-117.5672729	33.3461255	-117.5708204
49	1/17/2016	33.3459055	-117.5705058	33.3500678	-117.5668996
50	1/17/2016	33.3500962	-117.5665401	33.3455268	-117.5700702
51	1/17/2016	33.3453791	-117.5698331	33.3498846	-117.5662509
52	1/17/2016	33.3496714	-117.5658711	33.3451243	-117.5692879
53	1/17/2016	33.3448873	-117.5689905	33.3495819	-117.5655053
54	1/17/2016	33.3495041	-117.5651058	33.3461264	-117.567992
55	1/17/2016	33.3484763	-117.5655036	33.3523054	-117.5726631
56	1/17/2016	33.3534574	-117.5716531	33.3541657	-117.5710901
57	1/17/2016	33.3552636	-117.5702145	33.356057	-117.560031
58	1/17/2016	33.3597061	-117.5574244	33.3630378	-117.5638229
59	1/17/2016	33.3631146	-117.5636564	33.3599002	-117.5573084
60	1/17/2016	33.3601039	-117.557297	33.3633964	-117.5637125
61	1/17/2016	33.3635355	-117.5635338	33.3603051	-117.5571861
62	1/17/2016	33.3604292	-117.5569761	33.3637063	-117.5634281
63	1/17/2016	33.3638385	-117.5631913	33.3606128	-117.5569189
64	1/17/2016	33.3607613	-117.5567308	33.3638488	-117.5634726
65	1/17/2016	33.3639398	-117.5635333	33.3609755	-117.5565806
66	1/17/2016	33.3610413	-117.5563319	33.3641499	-117.5631722
67	1/17/2016	33.364324	-117.5630643	33.3612827	-117.5562361
68	1/17/2016	33.3613287	-117.556084	33.3644959	-117.5629877

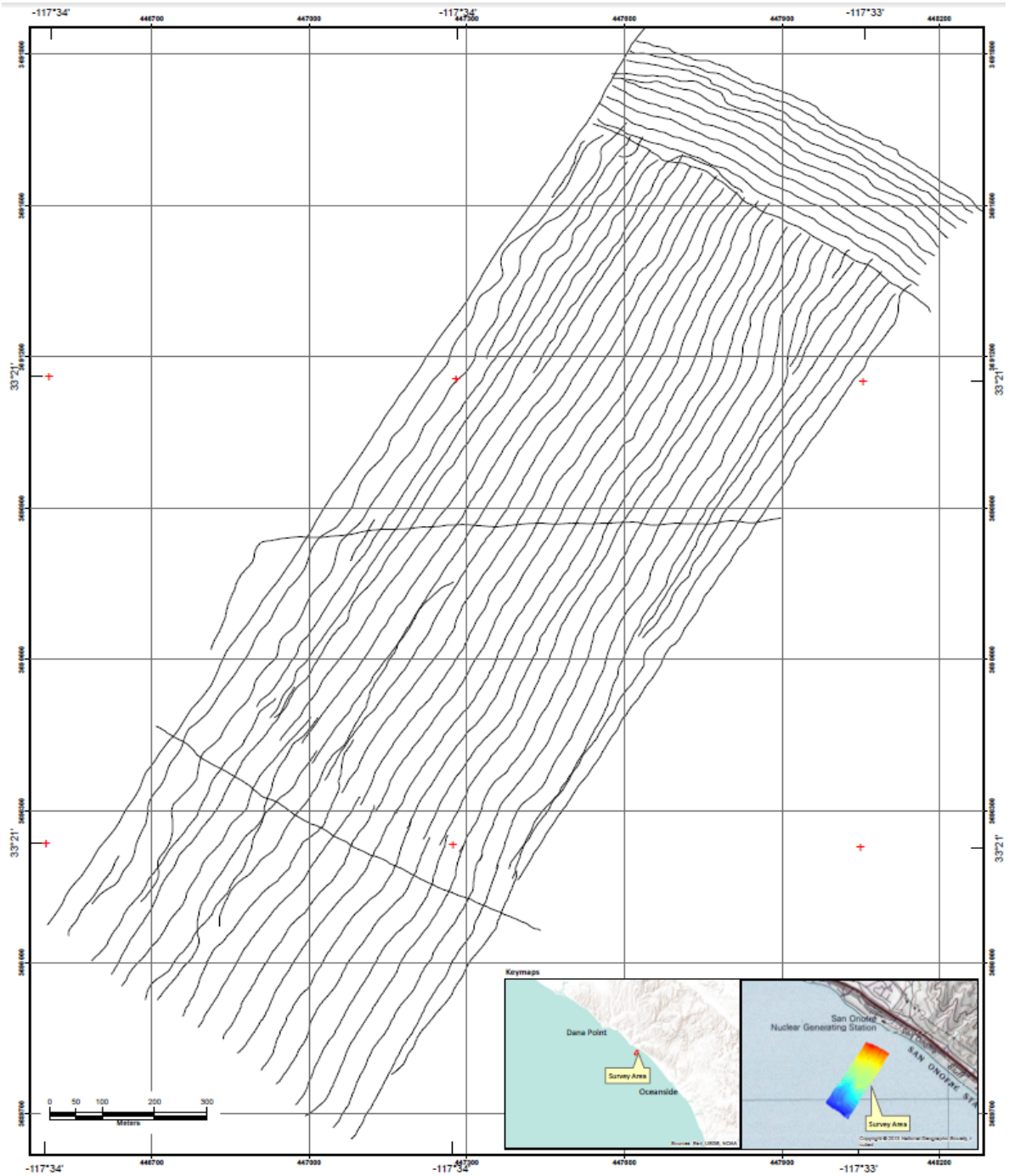

Figure 2-1. Survey vessel track lines for the multibeam survey performed January 2016.

2.4 DATA PROCESSING

2.4.1 Bathymetry

Multibeam bathymetry was processed using CARIS Hydrographic Information Processing System (HIPS) version 9.0.21. Verified tide data from the NOAA Los Angeles tide gauge were applied to the data set to reduce to the MLLW datum.

Bathymetry data was corrected for dynamic vessel heave, pitch and roll. The data was also examined for any gaps or outliers in attitude and heading. After all individual lines had been examined the data was merged and gridded.

Swath and area-based editing techniques were employed to remove acoustic noise and data outliers. Gridded data was examined for vertical discrepancies needing localized editing. After the data were corrected and cleaned, a 50 cm resolution gridded dataset, or DTM, was exported as both a GeoTIF and an ASCII xyz file to ArcGIS 10.1 for digitization.

3.0 MULTIBEAM SONAR SURVEY RESULTS

The objective of the survey was to acquire multibeam data to determine areas of hard substrate nearby the intake and discharge systems at the SONGS. 68 transect lines provided continuous bathymetric coverage within area of the intake and discharge systems. In several locations the exact boundary between hard substrate and sand was difficult to determine. Consequently a conservative approach was taken; any region of high reflectivity (dark) that did not show clear sand-wave features was classified as hard substrate. In order to minimize the potential for a false-positive hard substrate classification, a multi-directional oblique illumination hillshade was created to distinguish fine details in topographic profile that would otherwise be lost in a single-illumination hillshade.

APPENDIX A

MARINE MAMMAL OBSERVATION REPORT

MARINE MAMMAL OBSERVATION REPORT

Marine Wildlife Monitoring Report

Vessel: Farallon
Marine Wildlife Monitor Observer: Ryan Switzer
Dates of survey: January 16-17, 2016

The results of the Marine Wildlife Monitoring report are described below. Daily field log reports are found in Tables A-1 and A-2. Tables A-3 and A-4 detail the survey sightings and activity log.

Survey Date: 16 January 2016

Departure from Dana Point Marina at 6:45.

In transit to the test patch site. Multiple California sea lions (*Zalophus californianus*) were observed in the Dana Point Marina however no survey equipment was being operated, therefore, no mitigation required or taken.

Sighting 1: 11:26/ 11:28
2 Short-beaked common dolphin (*Delphinus delphis*) – Observed 2 short-beaked common swimming approximately 150 m on the port side of the vessel at 11:26. Both dolphins were observed while operating a 400kHz multibeam echosounder (MBE). They appeared to be exhibiting normal behavior at a distance of 100-200 m away from the vessel. The dolphins were only observed for 2 minutes while surfacing. Both dolphins were travelling southeast. No mitigation required or taken.

Direction of travel: Southeast
Total animals: 2
Distance when first observed: 200m
Closest distance to the vessel: 100m
Mitigation action: None taken, animal too far away.

Sighting 2: 14:24/14:30
1 California sea lion (*Zalophus californianus*) – A California sea lion was observed 25 m off the stern. The sea lion was swimming in the wake of the boat and pursued the vessel for 6 minutes. It was observed while operating 400kHz MBE. The sea lion appeared to be looking for handouts as there were multiple fishing vessels in the area. The sea lion was demonstrating normal behavior and gave up on pursuit of the vessel after 6 minutes. No action taken as MBE was operating at 400 kHz. No change in mammal behavior.

Direction of travel: North
Total animals: 1
Distance when first observed: 50m
Closest distance to the vessel: 25m
Mitigation action: None taken.

Sighting 3: 15:32/15:39
1 California sea lion (*Zalophus californianus*) – A California sea lion was observed 10-100 m off the stern. The sea lion was swimming in the wake of the boat and pursued the vessel for 7 minutes. The sea lion was observed while operating at 400kHz MBE. Based on the size and behavior of the sea lion, it

appeared to be the same individual that had pursued the boat an hour earlier. The sea lion was demonstrating normal behavior and gave up on pursuit of the vessel after 7 minutes. No action taken as MBE was operating at 400 kHz. No change in mammal behavior.

Direction of travel: West
Total animals: 1
Distance when first observed: 100m
Closest distance to the vessel: 10m
Mitigation action: None taken.

End of survey was around 17:33 and our boat docked in the harbor at 17:55.

Survey Date: 17 January 2016

Departure from Dana Point Marina at 9:50.

In transit to the survey area. Multiple California sea lions (*Zalophus californianus*) were observed in the Dana Point Marina however no survey equipment was being operated therefore no mitigation required or taken. There were no marine mammals observed outside of the harbor while MBE was being operated.

End of survey was around 11:30 and our boat docked in the harbor at 12:00.

SUMMARY

Over the course of 2 days, 3 marine mammal sightings were recorded, none of which required shut-downs as mitigation action for compliance with the marine wildlife protection plan.

Table A-1. Marine mammal sightings for 16 January 2016.

Sighting No.	Time (PDT)	Lat (N)	Long (W)	Species	Dist. From Vessel (m)	Closest Dist. To Vessel (m)	Direction of Travel	Number	Behavior	Sound Source
1	11:26/11:28	33° 21.41′	117° 33.93′	Common Dolphin	200	100	Southeast	2	Swimming/Surfacing	Sonar On, 400kHz, 220dB
2	14:24/14:30	33° 21.64′	117° 33.56′	California Sea Lion	50	25	North	1	Swimming in wake of boat looking for handouts	Sonar On, 400kHz, 220dB
3	15:32/15:39	33° 20.91′	117° 34.31′	California Sea Lion	100	10	West	1	Swimming in wake of boat looking for handouts	Sonar On, 400kHz, 220dB

Table A-2. Marine mammal sightings for 17 January 2016.

Sighting No.	Time (PDT)	Lat (N)	Long (W)	Species	Dist. From Vessel (m)	Closest Dist. To Vessel (m)	Direction of Travel	Number	Behavior	Sound Source
-	-	-	-	-	-	-	-	-	-	-

**No sightings were reported on the second day of surveying.

Table A-3. Survey Sightings and Activity Log for 16 January 2016.

Time	Survey Activity Sightings
06:45	Departure from Dana Point Marina. Heading towards Patch test site. Multiple California sea lions were observed within the marina however no sound source was being operated. Weather was about 52° F, slight offshore wind, 2-3 ft swell, and minimal cloud cover.
07:30	Mounted multibeam echosounder (MBE) off port side of the vessel at the patch test site.
07:35	Sound velocity profiler deployed to bottom (40 ft depth).
08:15	MBE was turned on to 400 kHz to begin patch test roughly ¼ mile north of San Clemente Pier. No marine mammals were observed prior to startup of equipment.
08:30	Patch test completed. And MBE was turned off.
09:01	MBE was brought back onboard the vessel in order to begin transit to SONGS site.
09:27	Arrived at SONGS site and casted another sound velocity profiler.
09:35	MBE was mounted on port side of vessel and turned on to 400 kHz.
09:38	Began surveying offshore of SONGS.
11:26	Two common dolphins were observed 100-200m off port side of vessel while running MBE. The two dolphins were observed for two minutes while surfacing. The wind began to switch onshore to 8 Kts.
14:24	California sea lion observed 25-50 m off stern of vessel while running MBE. Sea lion was observed for 6 minutes while following in boat wake.
15:32	California sea lion observed 10-100m off stern of vessel while running MBE. Sea lion was observed for 7 minutes while following in boat wake.
17:06	As sun was setting we completed nearshore survey lines following bathymetric contours.
17:33	MBE transducer was turned off and brought back onboard the vessel.
17:39	En route to Dana Point Marina.
17:55	Arrived at dock in Dana Point Marina.

Table A-4. Survey Sightings and Activity Log for 17 January 2016.

Time	Survey Activity Sightings
09:38	Re-fueled the research vessel at Dana Point Marina fuel dock Weather was about 61° F, 5 kt onshore wind, 6 ft swell at ~ 20 sec period, and minimal cloud cover.
09:50	Began transit to SONGS site.
10:50	Attached MBE to port side of vessel and turned it on to 400 kHz. No marine mammals were observed prior to startup of equipment.
11:05	Began first inshore survey line approximately 10 m water depth along bathymetric contours.
11:30	Turned off MBE as large 6+ ft swell precluded our ability to any closer to shore. Surveyed to approximately 7-8m water depth.
11:35	Brought MBE back on board the vessel and began heading back to Dana Point Marina.
12:00	Arrived back at Dana Point Marina.

APPENDIX B

EXHIBIT H

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
Air Quality and Greenhouse Gas (GHG) Emissions (MND Section 3.3.3)						
MM AIR-1: Engine Tuning, Engine Certification, and Fuels. 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).	Daily emissions of criteria pollutants during survey activities are minimized.	Determine engine certification of vessel engines. Review engine emissions data to assess compliance, determine if changes in tuning or fuel are required.	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.	N/A- exempt-gasoline vessel
	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 NOx 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		Verify that Tier 2 or cleaner engines are being used. Calculate daily NOx emissions to verify compliance with limitations.			N/A- exempt-gasoline vessel
	San Luis Obispo County: Use vessel engines meeting CARB's Tier 2-certified engines or cleaner, accomplished with Tier 2 engines if daily fuel use is 585 gallons or less; all diesel equipment shall not idle for more than 5 minutes; engine use needed to maintain position in the water is not considered idling; diesel idling within 300 meters (1,000 feet) of sensitive receptors is not permitted; use alternatively fueled construction equipment on site where feasible, such as compressed natural gas, liquefied natural gas, propane or biodiesel.		Verify that Tier 2 or cleaner engines are being used. Inform vessel operator(s) of idling limitation. Investigate availability of alternative fuels			N/A- exempt-gasoline vessel
	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.		Verify that Tier 2 or cleaner engines are being used. Investigate availability of alternative fuels			N/A- exempt-gasoline vessel
	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.			N/A- exempt-gasoline vessel

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	EC 1/4/16
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.	EC 1/4/16
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.	EC 1/4/16

<table>
<tr><th>Mitigation Measure (MM)</th><th>Location and Scope of Mitigation</th><th>Effectiveness Criteria</th><th>Monitoring or Reporting Action</th><th>Responsible Party</th><th>Timing</th><th>Implementation Date(s) and Initials</th></tr>
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<tr><td>Multibeam Echosounder</td><td>500</td></tr>
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<tr><td>Boomer System</td><td>100</td></tr>
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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. For nearshore survey operations utilizing vessels that lack the personnel capacity to hold two (2)</td><td></td><td></td><td></td><td></td><td></td></tr>
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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
	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) MWM aboard. The CSLC will consider such authorization on a case-by-case basis and 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.					
MM BIO-4: 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.	EC 1/4/16

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM BIO-5: 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); compliance with safe start procedures. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Immediately prior to survey.	RS 1/16/16
MM BIO-6: Practical Limitations on Equipment Use and Adherence to Equipment Manufacturer's Routine Maintenance Schedule.	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 sidescan sonar, including: • Using the highest frequency band possible for the subbottom profiler; • Using the shortest possible pulse length; and • Lowering the pulse rate (pings per second) as much as feasible. 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	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Document initial and during survey equipment settings. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Immediately prior to and during survey.	RS 1/16/16

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
	equipment inspection and maintenance shall be provided in the required presurvey notification to CSLC.					
MM BIO-7: Avoidance of Pinniped Haul-Out Sites.	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: • The survey vessel shall not approach within 91 m of a haul-out site, consistent with National Marine Fisheries Service (NMFS) guidelines; • 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 • 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	No adverse effects to pinnipeds at haul outs are observed.	Document pinniped reactions to vessel presence and equipment use. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Monitoring Report following completion of survey	RS 1/18/16
MM BIO-8: Reporting Requirements – Collision.	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: • Vessel location (latitude, longitude) when the collision occurred; • Date and time of collision; • Speed and heading of the vessel at the time of collision; • 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	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Monitoring Report following completion of survey.	N/A No Collisions Reported 01-16-16 / 01-17-16

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
	collision; • Species of marine wildlife contacted (if known); • Whether an observer was monitoring marine wildlife at the time of collision; and, • Name of vessel, vessel owner/operator, and captain officer in charge of the vessel at time of collision. 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.					
MM BIO-9: Limitations on Survey Operations	All MPAs; prior to commencing survey activities, geophysical operators shall coordinate with the CLSC, California Department of Fish and Wildlife (CDFW), and	No adverse effects to MPA resources due to survey	Monitor reactions of wildlife to survey operations; report on	OGPP permit holder; survey permitted by	Prior to survey.	N/A No MPAs in project area

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
in Select Marine Protected Areas (MPAs).	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	activities are observed.	shutdown conditions and survey restart. Submit Final Monitoring Report after completion of survey activities.	CDFW.		
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' OSCPs shall include the following information for each vessel to be involved with the survey: • 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); • Description of crew training and equipment testing procedures; and • Description, quantities, and location of spill response equipment onboard the vessel.	Reduction in the potential for an accidental spill. Proper and timely 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.	HE 12/8/15
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.	N/A- boat is trailered and fuels on land
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 ability to	Contract vessel operator.	Prior to survey.	HE 1/3/16 - supplies confirmed

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
			respond to worst-case spill.			
MM HAZ-1: Oil Spill Contingency Plan (OSCP) Required Information.	Outlined under **Hazards and Hazardous Materials** (above)					HE 3/17/15
MM HAZ-2: Vessel fueling restrictions.	Outlined under **Hazards and Hazardous Materials** (above)					N/A- boat is trailered and fuels on land
MM HAZ-3: OSCP equipment and supplies.	Outlined under **Hazards and Hazardous Materials** (above)					HE 12/8/15
MM BIO-9: Limitations on Survey Operations in Select MPAs.	Outlined under **Biological Resources** (above)					N/A No MPAs
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 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 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.	EC 1/13/16