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**NEARSHORE SONAR SURVEYS AT WHEELER NORTH REEF, SAN CLEMENTE,
CALIFORNIA
FIELD OPERATIONS REPORT**

09 Oct 2014- 11 Oct 2014

1.0 INTRODUCTION

EcoSystems Management Associates, Inc. (ECO-M), a subsidiary of Coastal Environments (CE), conducted a nearshore geophysical survey offshore of Wheeler North Reef (WNR), San Clemente from 09 October to 11 October 2014. The purpose of this survey was to inspect the condition and position of reef modules, originally placed in 2005 for the Wheeler North Reef. Results from this survey will be compared to the previous 2009 bathymetric survey to quantify any changes which may have occurred over time, to assess whether or not well-placed reef substrate disappears into the sediment, and to provide the necessary information for use in determining the surface material present. For this project, multibeam and single beam echosounder surveys were carried out at frequencies ≥ 200 kHz. These surveys were carried out 0.6-1.2 miles offshore of the City of San Clemente, in 11-15 m water depths. Figure 1 shows the location of the survey area.

1.1 PROJECT BACKGROUND AND NEED

The purpose of this survey was to inspect the condition and position of reef modules used in the 2005 construction of the Wheeler North Reef (WNR). Data collected from this survey will also be used to assess whether or not well-placed reef substrate disappears into the sediment and provide the necessary information for use in determining the surface material present. Results from this survey may be able to be compared to the previous 2009 bathymetric survey (Figure 2) to quantify any changes which have occurred over time. These objectives will be achieved by determining water depth, seabed hazards, geomorphology and the presence of kelp using survey-grade hydrographic and geophysical survey instruments. The WNR artificial reef is intended to establish a persistent, natural, healthy, giant kelp forest ecosystem with associated biota (i.e. algae, invertebrates and fish) at a site near San Clemente, California as mitigation for resource losses at the nearby San Onofre Kelp Bed associated with operation of the San Onofre Nuclear Generating Station.

2.0 PERMITTING: CALIFORNIA STATE LANDS COMMISSION

Prior to the geophysical survey work, ECO-M acquired the necessary permit from the California State Lands Commission (Permit #PRC 8536.9). As per the permit requirements, a Pre-Notification Procedure was implemented, which included: 1) Exhibit F (Notification of Geophysical Survey Equipment Used), 2) the Marine Wildlife Contingency Plan (which covers the MM BIO 1-9 specifications listed in Exhibit H), 3) the Oil Spill Contingency Plan (which covers the MM HAZ-1 –3 specifications listed in Exhibit H), 4) Verification of equipment service and/or maintenance and sound output, 5) Copies of certified mail sent to recipients indicated in Exhibit E, and 6) the Exhibit G Checklist.



Figure 1. Location of the geophysical survey conducted at the Wheeler North Reef on 09-11 October 2014.

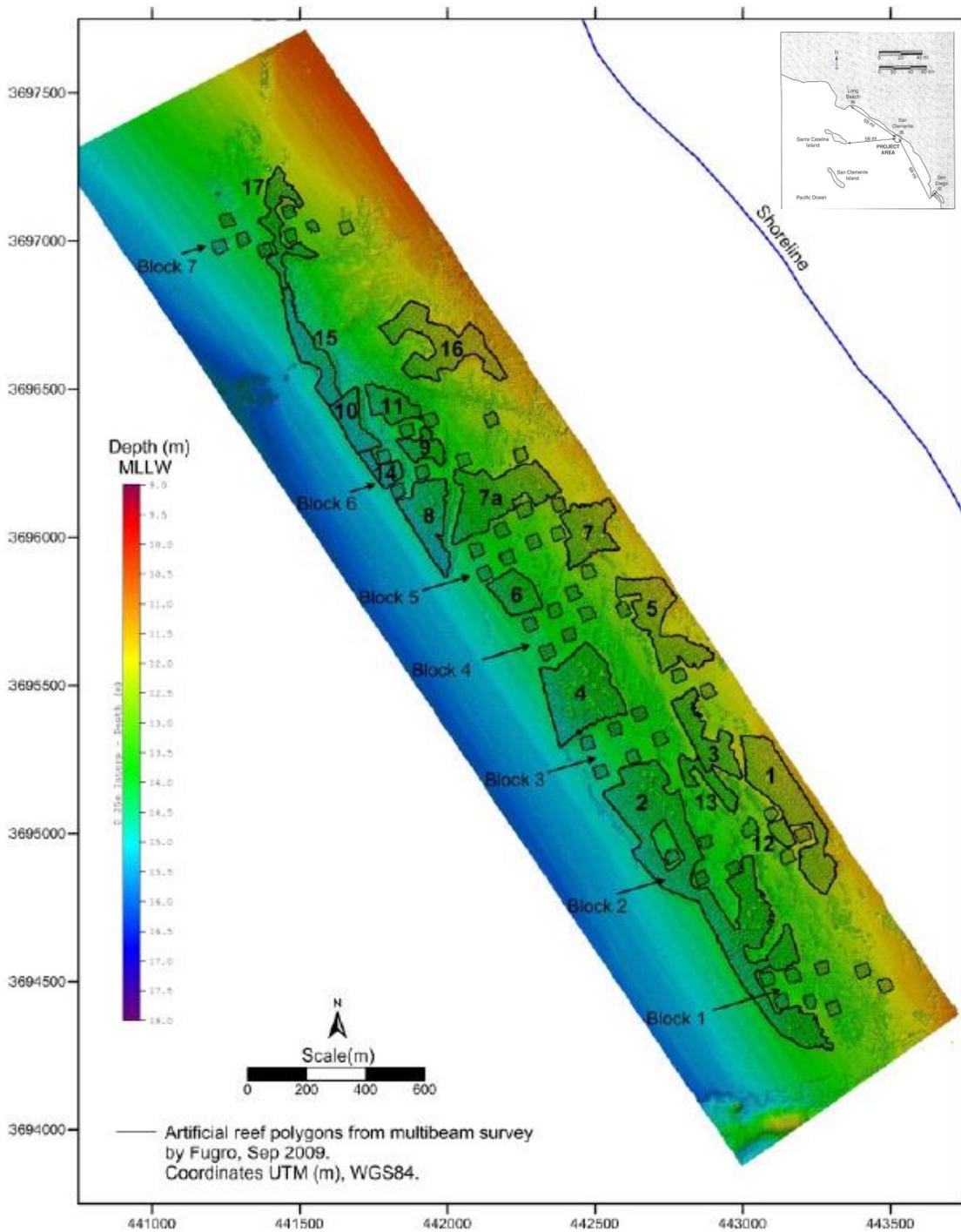


Figure 2. Results of the 2009 bathymetric survey at the Wheeler North Reef.

2.1 BIOLOGICAL INFORMATION

Prior to survey operations, the Ocean Institute out of Dana Point was contacted to acquire information on the current composition and relative abundance of marine wildlife offshore. Inquiries with the Ocean Institute indicated that marine mammal sightings within the past month included blue whales, a humpback whale pair, one Minke whale, fin whales, and common and bottlenose dolphins. Most of these species are found about 3-5 miles offshore, at the drop off for the continental shelf (in about 180 m of water). The locations of pinniped haul-out sites in the area were also identified, using a pinniped haul-out site map supplied by Justin Greenman, Assistant Stranding Coordinator at the NOAA Long Beach office (Figure 3). Since survey activities were conducted between 0.6 and 1.2 miles offshore in water depths not exceeding 15 m, and because pinniped haul out sites or rookeries are not present in the area, we assumed the likelihood of encountering marine mammals was low.

Due to new amendments to Safety Zone Monitoring (Condition 7(i) and MM BIO-3) that specify that the monitoring of safety zones for surveys using passive geophysical equipment and surveys where any and all active geophysical equipment is operated at frequencies ≥ 200 kHz are no longer required, a marine wildlife observer (MWO) was not present during this survey. However; ECO-M staff still implemented safety measures to ensure marine wildlife was not disturbed or injured during survey activities. This included utilizing experienced crew members not performing functions directly related to data acquisition to monitor the area for signs of wildlife, which could include:.

- a. Sounds - such as splashing, vocalizations (by animals and birds), and blowing (breathing).
- b. Visual indications - birds aggregating, changes in water character such as areas of rippled water, white water caused by splashing, changes in color or shape of the ocean surface, spume, the disturbance of the normal sea view that can be caused by animals floating, rolling, diving, or leaping.
- c. Smell - on occasion marine organisms can be associated with smell from breath or defecation.
- d. Electronic observation - often the presence of schools of “bait fish” can be seen on some of the geophysical survey equipment. That presence, along with an increasing number of schools, can suggest that this area could possibly be associated with increased feeding activity of marine mammals and thereby suggest that increased awareness efforts should be undertaken. Under these circumstances, ECO-M’s personnel will be alerted to be more observant.

During this survey, there were no instances where there were any encounters with marine wildlife that caused survey operations to be shut-down and there were no incidences of collisions with marine wildlife. Appendix A contains the field logs, which verify that no animals were encountered or harmed during these survey operations. Appendix B contains a copy of the Table in Exhibit H, with dates of and initials of implementation and/or compliance with each MM.

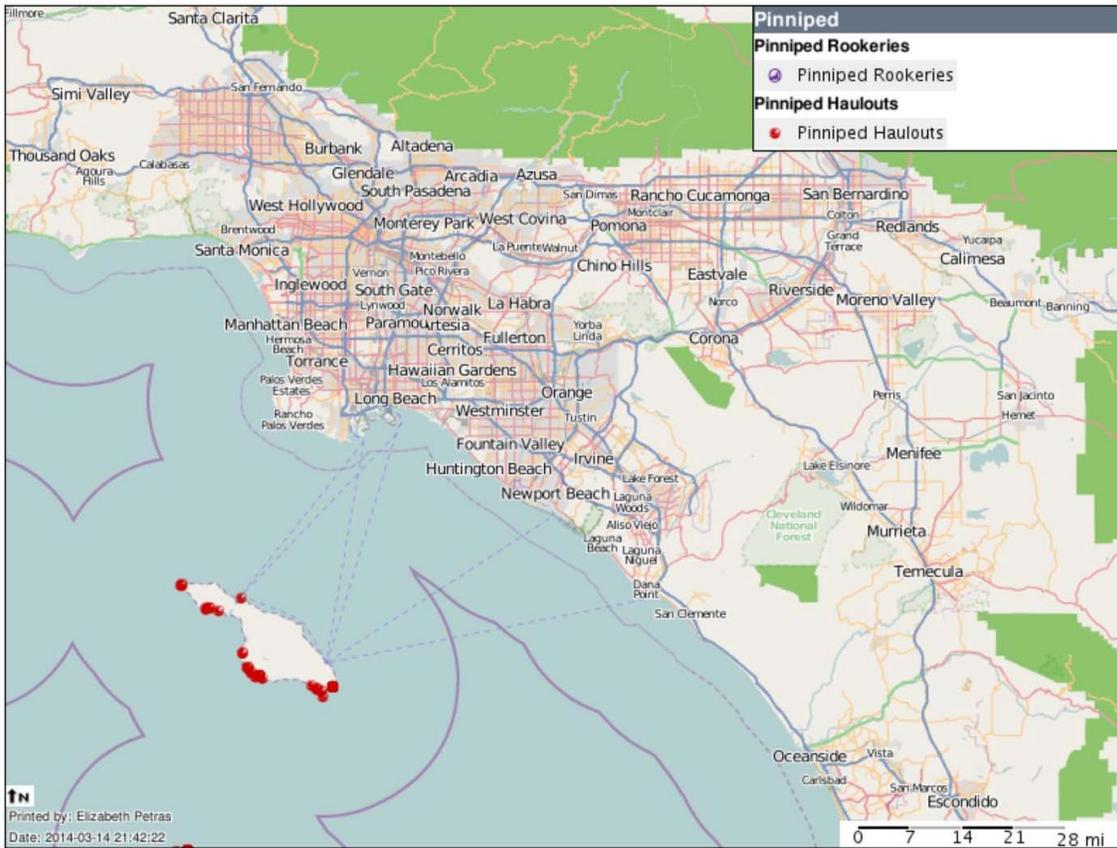


Figure 3. Location of the known pinniped haul out sites and rookeries in the project vicinity.

3.0 OFFSHORE GEOPHYSICAL SURVEY

3.1 GEOPHYSICAL SURVEY DESIGN

Survey data was collected during daylight hours, from approximately 7 am to 5 pm daily from 09 October to 11 October 2014. This survey included 58 multibeam sonar survey lines and single beam echosounder survey lines. Since the singlebeam echosounder data was used as a secondary method of providing real time validation of observed multibeam sonar depths, they were collected simultaneously with the multibeam survey lines. Survey lines ran shore-parallel (upcoast/downcoast), as shown in Figure 4. Due to the presence of giant kelp on modules, many of the lines were not straight. The start and end points for each trackline are shown in Table 1. Appendix A contains the field logs for each collection day. Note that although the multibeam and singlebeam tracklines are the same, they are named differently for the singlebeam lines. This is because the singlebeam lines were referenced to the Hypack Navigation software system, which was used to navigate the vessel along the pre-plotted tracklines.

Prior to the start of the survey, on 09 October 2014, an initial traverse of the survey area was conducted to ensure that fishing gear was not present in the survey area. No fishing gear was found in the survey area.

3.2 GEOPHYSICAL SURVEY EQUIPMENT

The following equipment was used for this survey:

- Kongsberg EM3002 dual multibeam sonar
- Ross Laboratories 825B portable singlebeam echosounder
- C-Nav 3050 GNSS DGNSS positioning and attitude system
- Applanix POS MV 320v4
- YSI Castaway CTD
- 27' Survey vessel (*Survey Vessel Farallon*)

Equipment specifications for the multibeam sonar and singlebeam echosounder are in Table 2.

3.2.1 Kongsberg EM3002 Dual Multibeam Sonar

The Kongsberg EM3002 dual multibeam sonar can provide high resolution and accurate (IHO Order 1 or better) bathymetry, water column, and calibrated backscatter data. Backscatter information can be used to confirm areas of rock and hard substrate as well as zones of sediment deposition and transport. Water column data will be used to confirm areas of kelp growth.

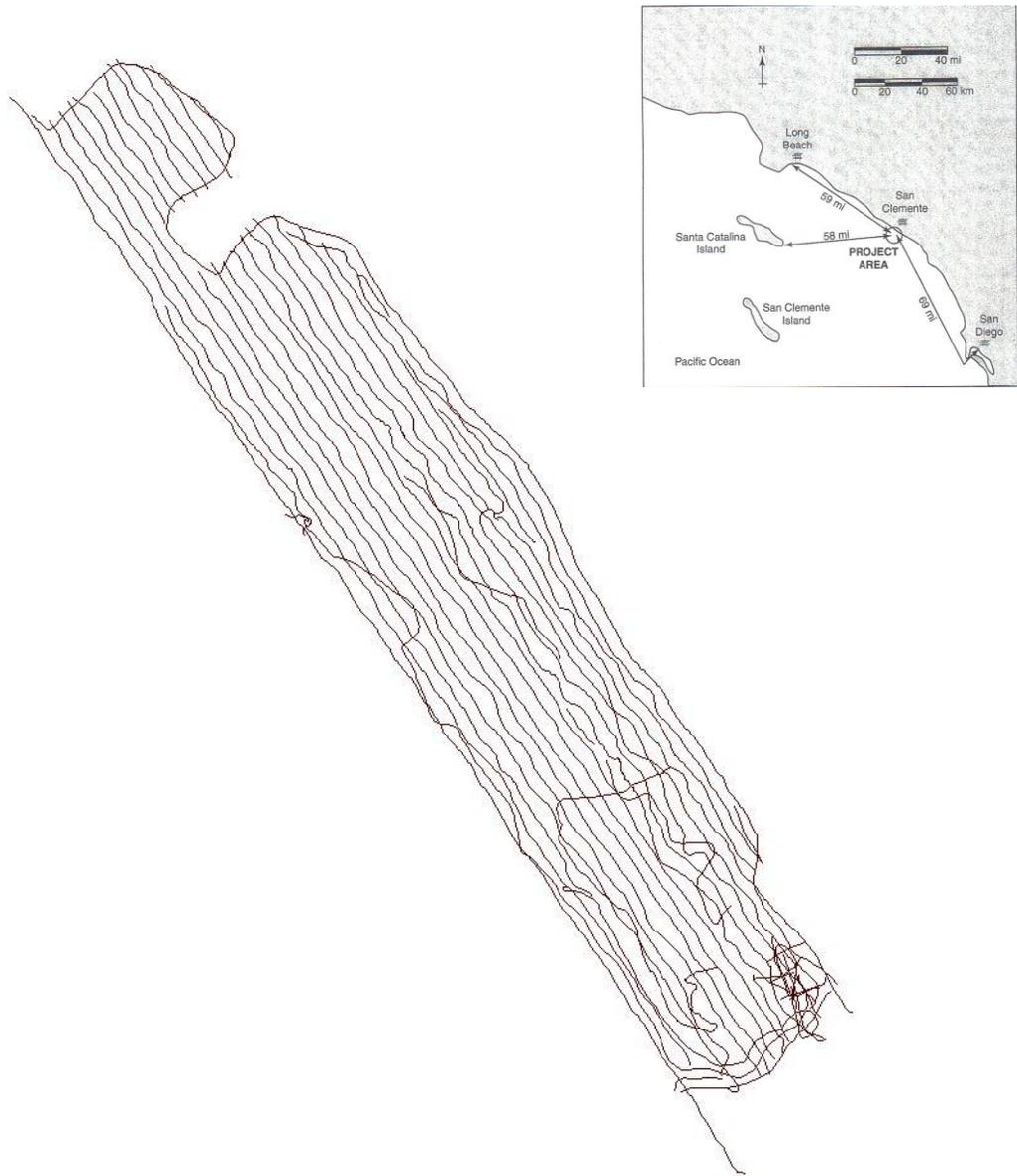


Figure 4. Wheeler North Reef survey tracklines performed on 09-11 October 2014.

Table 1. Coordinates for the multibeam and single beam sonar tracklines for the WNR survey performed on 09-11 October 2014. Coordinates in UTM, Zone 11, WGS84.

Line #	Easting Start	Northing Start	Easting End	Northing End
0	443296.52	3693938.25	441589.68	3696436.94
1	441589.49	3696437.20	441094.21	3697169.83
2	441160.82	3697113.89	442728.32	3695924.84
3	442728.42	3695924.59	443571.79	3694507.16
4	443106.74	3694185.47	443552.73	3694485.32
5	443133.65	3694266.93	442758.88	3694789.34
6	442760.23	3694789.00	443307.20	3694296.40
7	443307.45	3694297.47	442508.09	3695886.73
8	442507.40	3695888.18	442557.34	3695902.61
9	442556.82	3695910.02	443617.95	3694424.16
10	443537.57	3694342.08	442034.36	3696503.16
11	442034.15	3696503.51	441823.03	3696804.26
12	441800.22	3696777.57	442969.69	3695082.79
13	442973.04	3695079.57	443451.82	3694434.37
14	441754.78	3696989.10	441636.73	3697165.75
15	441757.93	3696928.86	441515.71	3697262.12
16	441707.35	3696929.88	441474.23	3697266.55
18	441414.52	3697281.03	441686.72	3696896.48
19	441387.54	3697268.15	441655.80	3696871.37
20	441374.44	3697239.27	441617.60	3696857.25
21	441344.02	3697184.57	441580.31	3696833.49
22	441285.40	3697166.91	441557.90	3696792.00
23	441212.45	3697100.38	442760.78	3694804.63
24	442838.16	3694775.16	441242.51	3697127.26
25	441268.49	3697157.64	443114.27	3694425.67
26	443114.52	3694425.35	443241.43	3694198.83
27	443226.44	3694235.47	441658.93	3696644.81
28	441698.17	3696672.93	443344.27	3694233.28
29	443373.35	3694240.53	441735.44	3696675.75
30	441753.63	3696707.73	443385.93	3694286.06
31	443408.96	3694305.49	441782.50	3696755.17
32	441887.39	3696814.43	443493.98	3694435.31
33	443347.53	3694871.58	441924.24	3696766.12
34	441960.72	3696778.58	442529.75	3695934.54
35	442546.31	3695920.27	442030.26	3696734.15

Table 1. Continued

Line #	Easting Start	Northing Start	Easting End	Northing End
36	442137.60	3696634.39	442230.33	3696512.50
37	442281.09	3696378.70	443321.71	3694853.83
38	443255.18	3694742.27	442884.57	3695178.91
39	442844.00	3695230.05	442766.16	3695332.82
40	442738.38	3695503.28	442276.04	3696031.61
41	442379.23	3696231.09	442667.73	3695832.81
42	443072.20	3695156.85	443212.78	3694556.34
43	443379.96	3694647.13	443436.85	3694475.05
44	443436.23	3694499.62	443440.63	3694448.70
45	443427.16	3694472.75	443447.71	3694562.25
46	443373.45	3694511.35	443443.78	3694558.26
47	443323.79	3694520.90	443444.25	3694542.58
48	443448.28	3694560.19	443495.41	3694469.28
49	443458.19	3694533.25	443521.92	3694409.55
50	443537.12	3694527.77	443433.93	3694461.77
51	443404.48	3694463.05	443518.69	3694497.95
52	443414.24	3694595.03	443532.72	3694345.87
53	443463.62	3694582.60	441919.26	3695919.58
54	443229.00	3694224.42	443086.73	3694191.66
55	443321.61	3694534.05	443428.29	3694337.81
56	443367.41	3694578.26	443477.24	3694633.74
57	443265.96	3695042.60	443350.01	3694872.16
58	441560.19	3696543.02	441976.25	3695855.73

3.2.2 Ross Laboratories 825b Portable Singlebeam Echosounder

A Ross Laboratories 825B survey-grade single beam echosounder, operating at a frequency of 200 kHz, was used to collect depth measurements within the survey area. This was used as a secondary method of providing real time validation of observed MBES depths. An echosounder measures the depth of the seafloor (bathymetry). When continuous measurements of seafloor depth are made along vessel tracks with accurate navigation positions, these depth measurements can be turned into bathymetric maps by connecting points of equal depth.

3.2.3 DGNSS Positioning and Attitude System

A C-Nav 3050 GNSS receiver was used to provide high accuracy position data during the survey. The 3050 is a 66-channel GPS/GLONASS dual frequency receiver utilizing the worldwide C-NavC2 Corrections Service to provide real-time precise point positioning (PPP) solutions within <10 cm accuracy. Position data will be output to all sensor acquisition systems and raw data logged directly from the receiver.

3.2.4 Applanix POS MV 320v4

The Applanix POS MV system is a GNSS aided inertial navigation system which provides a complete set of position and orientation measurements, including exceptional estimates of heave and ellipsoidal altitude. This was used for position, inertial and integrated heading data.

3.2.5 YSI Castaway CTD

The CastAway CTD is a powerful and intuitive instrument that provides instantaneous profiles of temperature, salinity and sound speed. The CastAway CTD was used to for sound velocity in the water column, salinity, and temperature profiles.

3.2.6 Survey Vessel Farrallon

The survey was conducted using a 27-ft Farrallon trailerable survey boat (Photo 1). This boat is powered by a Panther Marine 350 HP engine with dual counter-rotating props. The boat is equipped with DGPS, RADAR, echosounder, and related electronics with a lifting hoist for the deployment of sonar fish and other marine instrumentation.

Table 2. Equipment specifications for the multibeam sonar and singlebeam echosounder used for the WNR survey performed on 09-11 October 2014.

Equipment	Frequency (kHz)	Source level (dB)	# Beams,	Across track beamwidth/along track beamwidth	Pulse rate and length	Rise time	Estimated distances to 190/ 180/ 160 db dB re 1 μPa (rms) isopleths
Kongsberg EM 3002 dual multibeam sonar	300	214	508	1.5°/1.5°	40 Hz (25 ms); length = 150 μ sec	0.05 ms, 165 μ sec	150/36/5
Ross Laboratories 825B Portable Single Beam Echosounder	200	230	1	2°/2°	10 Hz (100 ms); length = 100 μ sec	0.05 ms, 165 μ sec	95/47/28



Photo 1. ECO-M's survey vessel "Farallon," which was used for data collection for the 09-11 October 2014 WNR survey.

3.3 SURVEY METHODOLOGY

3.3.1 Mobilization

Prior to the start of mobilization all survey systems and components were tested to manufacturer's recommended procedures. Equipment was mobilized on the vessel prior to the survey.

3.3.2 Calibrations

Prior to departure, all computer systems were demonstrated to be receiving data from the various positioning and survey systems. All systems were initiated to demonstrate operability. On-site calibration of geophysical equipment and sensors was completed prior to start of survey and whenever equipment was physically moved (on the mounting system) or replaced.

3.3.3 Positioning Systems

C-Nav

A C-Nav 3050 GNSS receiver was used to provide high accuracy position data during the survey. The 3050 is a 66-channel GPS/GLONASS dual frequency receiver utilizing the worldwide C-NavC2 Corrections Service to provide real-time precise point positioning (PPP) solutions within <10 cm accuracy. Position data was output to all sensor acquisition systems and raw data logged directly from the receiver.

POS MV

An Applanix POS MV 320v4 provided high accuracy position, motion, and heading data to all bathymetric survey systems. The POS MV is an inertially-aided positioning and orientation system commonly used for high-performance hydrographic surveying. The C-Nav 3050 served as both an auxiliary GNSS and RTCM differential correction source to the POS MV. Raw Applanix data was logged and utilized for post-processed kinematic water levels corrected to the project datum.

Hypack Survey

Hypack navigation software provided real-time vessel positioning from DGNSS, motion sensor and heading/gyrocompass inputs. The system provided independent data gathering and logging of echosounder bathymetric data, trackline data and navigation from various system inputs. The system collected, displayed and logged various DGNSS quality information and additional online quality assessment information.

Horizontal / Vertical Control

All instrument locations were referenced to a common point located near the survey vessel's center of mass (typically POS MV IMU). Data from all positioning systems were logged using ellipsoidal datums (WGS84/IGS08) for post-processing to appropriate datums as dictated by the project. Survey data was acquired in UTM, all units in meters for compatibility amongst survey instruments. Observed tides at a local NOAA tide station will be used as the initial water level corrections source. However, water levels across the survey corridor may be different than those measured at the station, especially at peak tidal flows. This was investigated using post-processed kinematic techniques on raw C-Nav and POS MV GNSS data.

3.3.4 Single Beam Sonar (SBES)

A Ross Laboratories 825B survey-grade single beam echosounder, operating at a frequency of 200 kHz, was used to collect depth measurements within the survey area. This was used as a secondary method of providing real time validation of observed MBES depths.

Calibration

To ensure accurate echosounder installation, a bar check and leadline comparison was performed dockside prior to survey activities. Both techniques involve comparing a physical measurement over the side of the vessel to depth readings on the echosounder. Sound velocity profiles taken during survey operations were applied in real-time and in post-processing. Tidal corrections will be applied in post-processing only.

Positioning, Attitude, and Sound Velocity

The single-beam sonar was coupled with the Applanix POS MV, described above, for real-time position, heading, and motion compensation. Sound velocity in the water column was collected using an YSI Castaway CTD.

Data Acquisition

The single-beam sonar was logged using Hypack Survey software, also used as the primary navigation program. Data from the POS MV 320 provided motion correction to soundings.

3.3.5 Multibeam Sonar System (MBES)

A Kongsberg EM3002 dual head, 300 kHz high-resolution, dynamically-focused multibeam sonar was used for bathymetric, backscatter and water column information. The system was hard mounted using a portable hard mount.

Calibration

Multibeam sonar calibration and testing was conducted using an internal systems check and a patch test standard with IHO standards and common hydrographic practice. Recalibrations were done if the mounting/fitting is removed and/or refitted. Daily draft measurements were made at the beginning and end of each day.

Positioning, Attitude, and Sound Velocity

The multibeam system was coupled with the Applanix POS MV, described above, for real-time position, heading, and motion compensation. Sound velocity at the sonar head was measured with a Valeport MiniSV, while water column profiles were taken frequently using the YSI Castaway CTD.

Data Acquisition

The Kongsberg Seafloor Information System (SIS) multibeam acquisition system was used to acquire and store all multibeam data. Data from all ancillary sensors including position, attitude, and sound velocity, were sent to SIS and integrated within the data packet for each sonar ping. All data was stored in SIS's binary *.all data format for post-processing, analysis, and archiving. Real-time acquisition displays provide data quality control and sonar coverage assessment during the survey. The MBES status, line log, health and integration with ancillary systems was recorded in the appropriate system logs.

3.4 DATA PROCESSING AND INTERPRETATION

3.4.1 Processing Single Beam Echosounder Data

Soundings were processed in CARIS HIPS 8.1. After applying sound velocity and water-level corrections, soundings are reviewed and edited to remove outliers. Sounding data were then exported in both full-density and thinned ASCII xyz format. Gridded data products and contours were then created using GIS.

3.4.2 Processing Multibeam Sonar Data

Multibeam bathymetry was processed using CARIS HIPS 8.0. Water level corrections were first applied to the data prior to editing. Data are iteratively gridded and examined for vertical discrepancies needing localized editing. Swath and area-based editing techniques were then employed to remove acoustic noise and data outliers. Corrected, cleaned and gridded DTM products were then exported as ASCII xyz files. These were then converted to GIS/CAD formats for hillshade and contouring products. Multibeam backscatter was processed using Fledermaus 7.3.2 Geocoder Toolkit (FMGT). EM3002 sonars are factory-calibrated; therefore data processing typically involves loading and selecting the channel of interest (beam average amplitude, time-series or "snippets") and resolution. After inspection of image quality, an

optimized histogram stretch was applied and data exported as a GeoTIFF for further use in interpretation. Multibeam water column data processing was done using Fledermaus (FM Midwater, DMagic). Navigation information is attributed to each file and data is georeferenced and positioned. Data displayed as an along track fan view was used to search, identify and select features. Data can also be stacked to view each line of data stacked at nadir, which allows viewing of the entire data set of a line. Identified anomalies were selected and exported as an ASCII XYZ or TIF image.

4.0 RESULTS

Multibeam and singlebeam data for this project are still being worked up; therefore only preliminary results are available at this time. Figure 5 shows the shaded relief map of the area. From this map, bottom features, such as the boundaries of reef modules can be seen. Once more data is available, this can be sent to the CSLC.

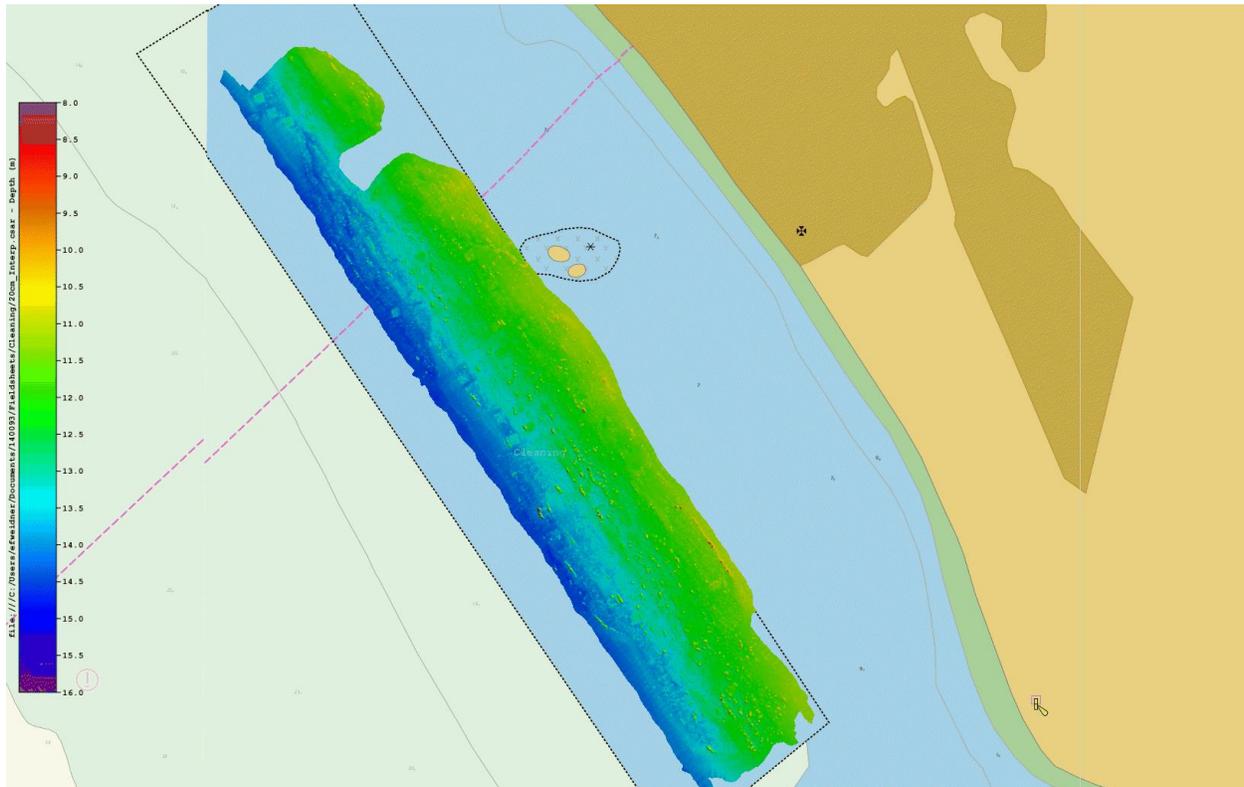


Figure 5. Shaded relief bathymetry map of the Wheeler North Reef.

APPENDIX A
DAILY FIELD LOGS

MBES Survey Log - EM302							Page 1 of 6
Date:	10/09/14	Project Name:	Artificial Reef Insp.	Surveyor:	L Widmer		
Julian Day:		Project Number:	140093	Vessel:	R/V Farrallon		
Client Name:	EcoSystem Man.	Location:	San Clemente				
Time (UTC)	File name (.ALL)	Hypack Line #	Hdg @ SOL	Speed (kts)	SVP @ head	Water Dpth (m)	Comments/Notes
1816							Starting patch test
1818	0013	N/A	318	3.09	1526	12.9	Roll 1
1820	0014	N/A	139	3.51	1525	12.7	Roll 2
1821	0015	N/A	314	4.11	1526	12.8	Roll 3
1824	0016	N/A	4.91	4.24	1526	11.6	Pitch 1 / Latency 1 (S→N)
1827	0017	N/A	182	3.20	1525	11.9	Pitch 2 (N→S)
1829	0018	N/A	6.41	5.61	1526	10.6	Latency 2 (S→N)
1831	0019	N/A	179.1	3.20	1525	12.1	Pitch 3 (N→S)
1834	0020	N/A	7.86	4.04	1525	11.7	Pitch 4 (S→N)
1837	0021	N/A	172	3.54	1525	12.3	Yaw 1 (N→S)
1840	00223	N/A	345	3.67	1525	10.0	Yaw 2 (S→N)
1845	0000	SC-MB-1013	327	3.51	1525	13.5	patch test complete
2022	↓	↓	↓	↓	↓	↓	SOL
2052							EOL, cut due to time
2053	0001	SC-MB-1013	324	2.73	1526	15.3	SOL
2102							EOL
2104	0002	N/A	139	3.51	1526	14.8	SOL, running perimeter
2134							EOL, cut due to time
2134	0003	SC-MB-1001	170	3.02	1526	11.6	SOL, perimeter
2151							EOL
2151	0004	N/A	210	3.19	1525	11.9	SOL, perimeter, south
2157							EOL

MBES Survey Log - EM302

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Date:	10/09/14	Project Name:	Artificial Reef Insp.	Surveyor:	LWynow	
Julian Day:		Project Number:	140093	Vessel:	R/V Farrallon	
Client Name:	EcoSystem Man.	Location:	San Clemente			

Time (UTC)	File name (.ALL)	Hypack Line #	Hdg @ SOL	Speed (kts)	SVP @ head	Water Dpth (m)	Comments/Notes
2202	0005	SC-MB-107	351	4.03	1525	14.0	SOL, fill in
2208							EOL
2208	0006	SC-MB-1011	102	3.58	1526	14.4	SOL, fill in
2216							EOL
2216	0007	N/A	35.9	3.80	1526	13.3	SOL
2239							EOL
2239	0008 0009	N/A	71.3	3.01	1527.0	12.3	SOL
2302							EOL
2303	0010	SC-MB-1005	304	3.76	1525	12.0	SOL
2333							EOL, cut dx to time
2333	0011	SC-MB-1005	323	3.06	1525	12.2	SOL
2337							EOL
2338	0012	SC-MB-1006	129	2.82	1526	12.43	SOL
0009							EOL, new UTC Day
0010	0013	SC-MB-1006	163	2.13	1525	13.47	SOL
0019							EOL
0020							Data Collection finished for day

MBES Survey Log - EM302							Page <u>3</u> of <u>6</u>
Date:	10/10/14	Project Name:	Artificial Reef Insp.	Surveyor:	L. Widner		
Julian Day:		Project Number:	140093	Vessel:	R/V Farrallon		
Client Name:	EcoSystem Man.	Location:	San Clemente				
Time (UTC)	File name (.ALL)	Hypack Line #	Hdg @ SOL	Speed (kts)	SVP @ head	Water Dpth (m)	Comments/Notes
							SVCast taken using "new"
							hypack line file
1456	0014	5	143	1.8	1525	13.1	SOL
1458							EOL
1459	0015	6	331	3.2	1525	13.5	SOL
1503							EOL
1504	0016	7	135	2.3	1525	13.1	SOL
1507							EOL, 0017 not line
1509	0018	8	327	4.6	1525	14.3	SOL
1512							EOL
1513	0019	9	136	3.3	1525	14.4	SOL
1517							EOL
1518	0020	10	316	3.6	1525	14.7	SOL
1522							EOL
1525	0021	11	134	3.4	1525	14.7	SOL
1530							EOL
1531	0022	12	331	3.1	1525	15.6	SOL
1535							EOL
1537	0023	15	139	3.5	1526	15.6	SOL
1607							EOL
1609	0024	14	322	2.5	1525	16.4	SOL
1636							EOL

MBES Survey Log - EM302

Date:	10/10/14	Project Name:	Artificial Reef Insp.	Surveyor:	L. Weisner	
Julian Day:		Project Number:	140093	Vessel:	R/V Farrallon	
Client Name:	EcoSystem Man.	Location:	San Clemente			

Time (UTC)	File name (.ALL)	Hypack Line #	Hdg @ SOL	Speed (kts)	SVP @ head	Water Dpth (m)	Comments/Notes
1641	0025	13	142	4.0	1526	15.9	SOL
1710							EOL, cut due to time
1710	0026	13	145	3.7	1525	16.1	SOL
1714							EOL
1715	0027	12 12	330	3.0	1524	15.3	SOL
1742							EOL
1743	0028	11	154	3.7	1526	15.6	SOL
1806							EOL
1807	0029	10-1	332	3.0	1525	14.8	SOL
1831							EOL
1831	0030	9-1	138	2.8	1526	14.8	SOL
1853							EOL
1854	0031	8-1	319	2.7	1525	14.6	SOL
1920							EOL
1923	0032	5-1	147	2.6	1526	13.9	SOL
1952							EOL
1959	0032b	2	305	3.3	1524	12.9	SOL
2021							EOL
2025	0034	4-1	153	3.8	1527	12.9	SOL
2033							EOL
2037	0035	3	356	2.1	1526	13.43	SOL
2043							EOL

MBES Survey Log - EM302							Page <u>5</u> of <u>6</u>	
Date:	10/10/14	Project Name:	Artificial Reef Insp.	Surveyor:	L. Weidner			
Julian Day:		Project Number:	140093	Vessel:	R/V Farrallon			
Client Name:	EcoSystem Man.	Location:	San Clemente					
Time (UTC)	File name (.ALL)	Hypack Line #	Hdg @ SOL	Speed (kts)	SVP @ head	Water Dpth (m)	Comments/Notes	
							running fillins	
2106	0036	5	131	2.9	1527	12.3	SOL	
2108							EOL	
2109	0037	6	145	5.1	1527	12.7	SOL	
2126							EOL	
2127	0038	N/A	235	3.6	1525	13.7	SOL	
2137							EOL	
2138	0039	9	302	2.0	1525	13.9	SOL	
2140	8						EOL	
2144	0040	N/A	325	3.5	1526	13.2	SOL	
2152							EOL	
2155	0041	7	129	3.0	1527	12.1	SOL	
2159							EOL	
2213	0042	N/A	262	3.9	1526	12.8	SOL	
2235							EOL	
2237	0043	1	178	3.3	1525	12.3	starting verification, SOL	
2239	00435	1	4.4	3.4	1525	12.6	SOL (reverse)	
2243	0046	3	234	3.0	1526	14.2	SOL (reverse)	
2246	0047	3	80.1	3.0	1526	12.9	SOL (reverse)	
2248	0048	2	178	3.5	1526	12.3	SOL	
2251	0049	2	315	2.9	1527	12.1	SOL reverse	
2253	0050	4	267	2.8	1527	11.8	SOL	
2256	0051	4	60.1	2.8	1526	12.5	SOL (reverse)	

Navigation & SBES Log - CNAV 3050

Page 1 of 5

Date:	10/9/14	Project Name:	San Clemente	Surveyor:	L. Weber
Julian Day:		Project Number:	140093	Vessel:	R/V Farrallon
Client Name:	EcoSystems Man.	Location:	San Clemente		



Navigation System:

SBES System:

TIME (UTC)	File name (.RAW)	Hypack Line #	Hdg @ SOL	Speed (kts)	Water Dpth (m)	Comments/Notes
1819	004-1819	4	318	3.0	12.9	SOL Patch test
1821	004-1821	4	139	3.5	12.7	SOL
1823	004-1823	4	314	4.1	12.8	SOL
1825	002-1825	2	4.9	4.2	11.6	SOL
1828	002-1828	2	182	3.2	11.7	SOL
1830	002-1830	2	6.4	5.6	12.6	SOL
1832	002-1832	2	179	3.2	12.1	SOL
1835	002-1835	2	7.8	4.0	11.7	SOL
1835	001-1835	1	172	3.5	12.3	SOL
1841	001-1841	1	145	3.6	12.0	SOL End Patch test
1845	SCK-MB-1013	1013	327	3.5	13.5	SOL
2104	SCK-MB-1014	1014	139	3.5	15.3	SOL
2134	SCK-MB-1001	1001	170	3.0	11.6	SOL, cut due to time
	SCK-MB-1001-0001	1001				SOL
2202	SCK-MB-1002	1002	351	4.0	14.0	SOL cut due to time
	SCK-MB-1002-0001	1002				SOL
2208	SCK-MB-1011	1011	102	3.58	14.4	SOL
2216	SCK-MB-1004	1004	35.9	3.8	14.4	SOL
2239	SCK-MB-1003	1003	71.3	3.0	12.3	SOL, cut due to time
	SCK-MB-1002-1002	1002				SOL
2303	SCK-MB-1005	1005	304	3.7	12.0	SOL

Navigation & SBES Log - CNAV 3050							Page <u>3</u> of <u>5</u>
Date:	10/10/14	Project Name:	San Clemente	Surveyor:	L. Weimer		
Julian Day:		Project Number:	140093	Vessel:	R/V Farrallon		
Client Name:	EcoSystems Man.	Location:	San Clemente				
Navigation System:			SBES System:				
TIME (UTC)	File name (.RAW)	Hypack Line #	Hdg @ SOL	Speed (kts)	Water Dpth (m)	Comments/Notes	
1456	005_1458	5	143	3.2	13.1	SOL, new hypack line file	
1459	006_1500	6	331	3.3	13.5	SOL Hom spacing	
1504	007_1505	7	135	4.6	13.1	SOL	
1509	008_1509	8	327	3.3	14.3	SOL	
1513	009_1514	9	136	3.6	14.4	SOL	
1518	010_1518	10	316	3.4	14.7	SOL	
1525	011_1524	11	134	3.1	14.7	SOL	
1531	012_1531	12	331	3.5	15.6	SOL	
1537	015_1537	15	322	2.5	16.4	SOL	
1609	014_1609	14	142	4.6	15.9	SOL	
1641	013_1639	13	145	3.7	16.1	SOL	
1710	012_1715	12	330	3.0	15.3	SOL	
1743 1743	011_1743	11	154	3.7	15.6	SOL	
1807	10_1	10-1	332	3.0	14.8	SOL	
1831	009_1832	9-1	138	2.8	14.8	SOL	
1854	008_1854	8-1	319	2.7	14.6	SOL	
1923	005_1923	5-1	147	2.6	13.9	SOL	
1959	002_1959	2	305	3.3	12.7	SOL	
2023	001_2012	1				SOL	
2025	064_2025	4-1	153	3.8	12.9	SOL	
2033	003_2037	3	356	2.1	15.2	SOL	

Navigation & SBES Log - CNAV 3050

Date:	10/10/14	Project Name:	San Clemente	Surveyor:	L. Wade	
Julian Day:		Project Number:	140093	Vessel:	R/V Farrallon	
Client Name:	EcoSystems Man.	Location:	San Clemente			

Navigation System: SBES System:

TIME (UTC)	File name (.RAW)	Hypack Line #	Hdg @ SOL	Speed (kts)	Water Dpth (m)	Comments/Notes
2107	005 - 2107	5	131	2.9	12.3	SOL
2110	006 - 2110	6	145	5.1	12.7	SOL
2128	007 - 2128	7	235	3.6	13.2	SOL
2130	008 - 2130	8				SOL
2136	009 - 2136	9	302	2.0	13.9	SOL
2145	010 - 2145	10	325	3.5	13.2	SOL
2156	006 - 2156	6	129	3.0	12.1	SOL
2237	001 - 2237	1	178	3.9	12.8	SOL starting verification lines
2240	001 - 2240	1	4.4	3.3	12.3	SOL
2243	001 - 2243	1	234	3.4	12.6	SOL
2249	002 - 2249	2	178	3.0	14.2	SOL
2251	002 - 2251	2	315	3.0	12.9	SOL
2251	004 - 2251	4	267	3.5	12.3	SOL
2253	004 - 2253	4	60.1	2.9	12.1	SOL
2256	004 - 2256	4				SOL
2259	005 - 2259	5	284	3.6	12.4	SOL running fill lines
2307	012 - 2307	12	187	4.2	12.3	SOL
2310						end of survey day

APPENDIX B

EXHIBIT H

EXHIBIT M

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
<i>Air Quality and Greenhouse Gas (GHG) Emissions (MND Section 3.3.3)</i>						
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.	<u>All Counties:</u> 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
	<u>Los Angeles and Orange Counties:</u> Use vessel engines meeting CARB's Tier 2-certified engines or cleaner; the survey shall be operated such that daily NO _x 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 NO _x emissions to verify compliance with limitations.	N/A – exempt – gasoline vessel			
	<u>San Luis Obispo County:</u> 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			
	<u>Santa Barbara County:</u> 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			
	<u>Ventura County:</u> 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			

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
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.	NE 8/14/14
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.	N/A MWM exempt from this survey
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.	N/A MWM exempt from this survey

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												
	<table border="1" data-bbox="554 350 978 521"> <thead> <tr> <th>Equipment Type</th> <th>Safety Zone (radius, m)</th> </tr> </thead> <tbody> <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> </tbody> </table> <p data-bbox="506 545 1024 1127">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 data-bbox="506 1151 1024 1308">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) MWM aboard. The CSLC will consider such authorization on a case-by-case basis and</p>	Equipment Type	Safety Zone (radius, m)	Single Beam Echosounder	50	Multibeam Echosounder	500	Side-Scan Sonar	600	Subbottom Profiler	100	Boomer System	100					<p data-bbox="1619 532 1780 662">N/A MWM exempt from this survey</p>
Equipment Type	Safety Zone (radius, m)																	
Single Beam Echosounder	50																	
Multibeam Echosounder	500																	
Side-Scan Sonar	600																	
Subbottom Profiler	100																	
Boomer System	100																	

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
	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.	MJ 09-11 Oct 14
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.	LW 09-11 Oct 14

Updated: 04/23/2014

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
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 side-scan sonar, including: <ul style="list-style-type: none"> 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 equipment inspection and maintenance shall be provided in the required presurvey notification to CSLC.	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.	LW 09-11 Oct14
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: <ul style="list-style-type: none"> 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 disturbance associated with OGPP surveys. 	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.	NE 8/14/14

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
MM BIO-8: Reporting Requirements – Collision.	<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"> • 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 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. <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>	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 09-11 Oct 14

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
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.	N/A No MPAs in project area
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: <ul style="list-style-type: none"> • 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 3/17/14
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	Contract vessel operator.	Prior to survey.	HE 3/17/14 – supplies confirmed

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
			ability to respond to worst-case spill.			
MM HAZ-1: Oil Spill Contingency Plan (OSCP) Required Information.	Outlined under Hazards and Hazardous Materials (above)					HE 3/17/14
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 3/17/14
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.	

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
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.	NE 8/21/14
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).	MJ 10/9/14
MM FISH-1: USCG and Harbormaster Notification.	Outlined under Commercial and Recreational Fisheries (above)					NE 8/21/14

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_x = Nitrogen Oxide; OGPP = Offshore Geophysical Permit Program; OSCP = Oil Spill Contingency Plan; USCG = U.S. Coast Guard

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