

Cruise Report
U.S. Geological Survey Research Cruise 2016-620-FA
Santa Barbara Littoral Cell, California
March 9 and 10, 2016

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USGS

Summary

On March 9 and 10, 2016, the Pacific Coastal and Marine Science Center of the U.S Geological Survey (USGS) conducted single-beam bathymetric surveys in the nearshore waters of the Santa Barbara Littoral Cell (Figure 1). The work was conducted using two Coastal Profiling Systems (CPS) (personal watercraft outfitted with custom GPS and echosounder survey equipment). Watercraft were launched out of Santa Barbara and Ventura Harbors. The survey was the sixteenth in a series of surveys in this area, starting in October 2005.

The shoreline of the Santa Barbara Littoral cell consists of a diverse assemblage of sandy, rocky and armored segments with a variety of exposures to waves and currents due to differing degrees of sheltering by offshore islands and nearshore reefs. There are two major river systems (Ventura and Santa Clara) that provide highly variable inputs of terrestrial sediment into the littoral cell. The Santa Clara River is particularly noteworthy as it is the largest source of sediment to southern California nearshore waters. Alongshore transport is driven by wave activity and primarily is from NW to SE, with nearshore sediments ultimately feeding into Mugu Canyon at the southern end of the littoral cell. There is significant development along much of the coastline. Surveys in this region are designed to document coastal evolution on a variety of timescales, from large surf and flood events, to seasonal and decadal, to improve our understanding of the coastal processes that affect shoreline erosion and accretion. Data from these surveys are being used in models of coastal change, including future conditions that include sea level rise and climate change, and to support management of existing coastal resources.

It was determined that the operating frequency of the sonar system (200 kHz) is above the cutoff hearing threshold for marine mammals, therefore the CSLC determined that the observance of a safety zone is not a requirement for this survey (personal communications, K. Keen, CSLC), and that a marine wildlife monitor (MWO) was not required due to operational limitations of the personal watercraft used.

USGS research cruise 2016-620-FA took place on March 9 and 10, 2016. A third day at Carpinteria on March 11 was scrubbed due to poor weather conditions. All operations, including transits and surveying took place during daylight hours (0730 – 1330). Mapping was completed using hull-mounted 200-kHz, Odom 9 degree downward conical beam transducers and Odom Echotrac CV100 echo sounders at survey speeds of ~4 knots. Weather observations are provided in Appendix A and marine wildlife observations are provided in Appendix B. As-surveyed track lines are shown in Figures 2-5, with start and end locations listed in Tables 1-4.

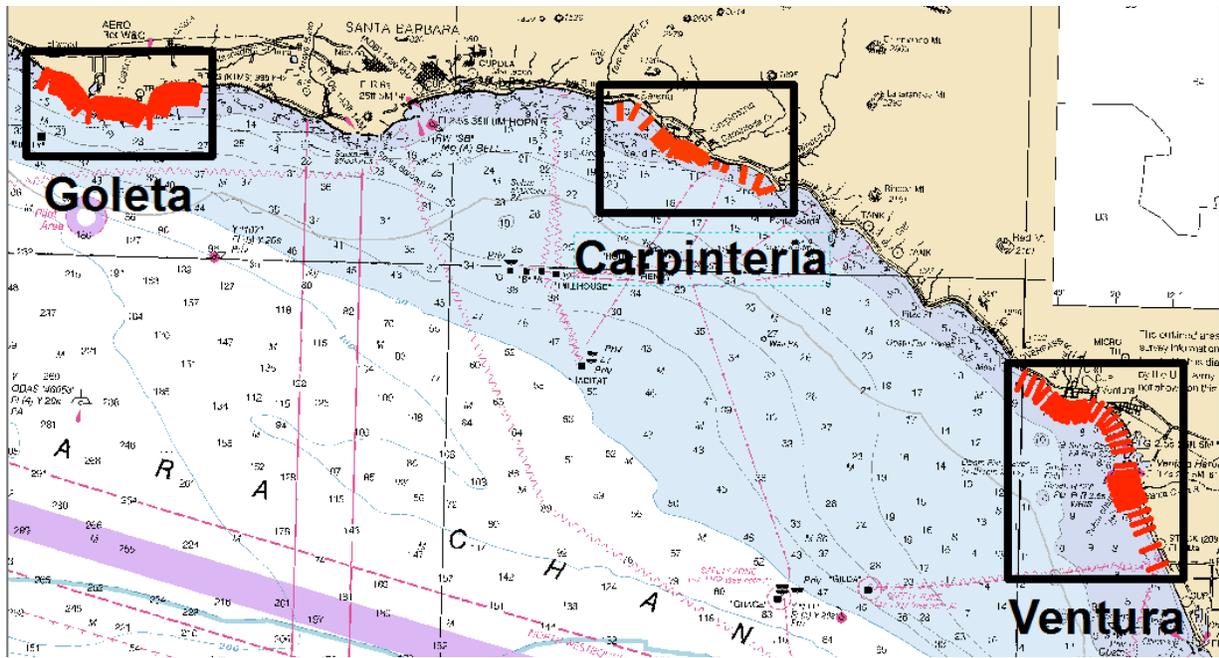


Figure 1. Overview of Santa Barbara Littoral Cell study area and planned survey lines

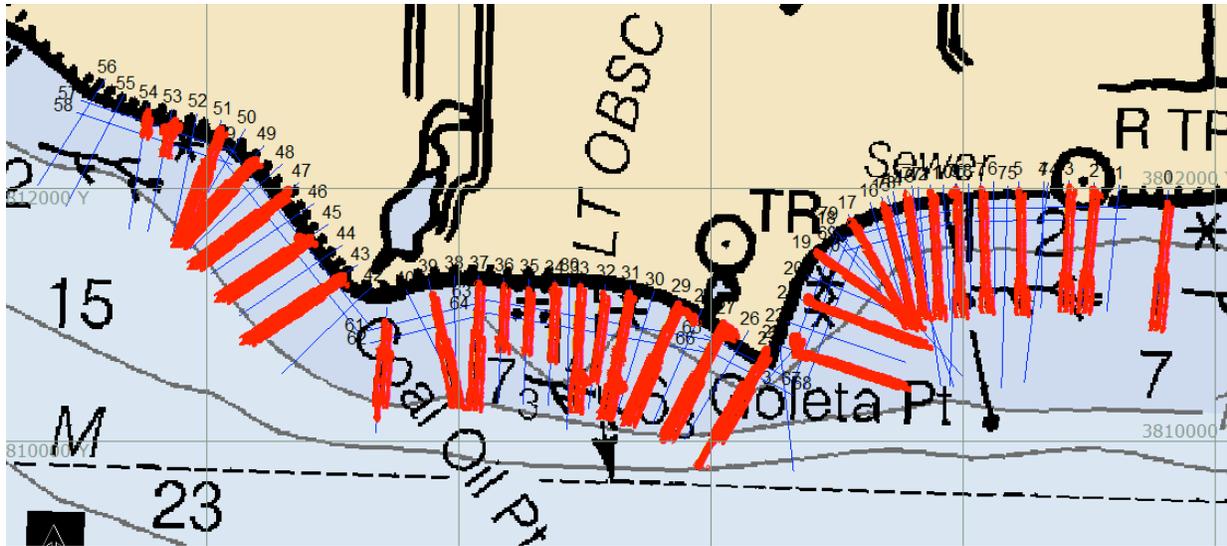


Figure 2. As-surveyed lines, Goleta, Green boat

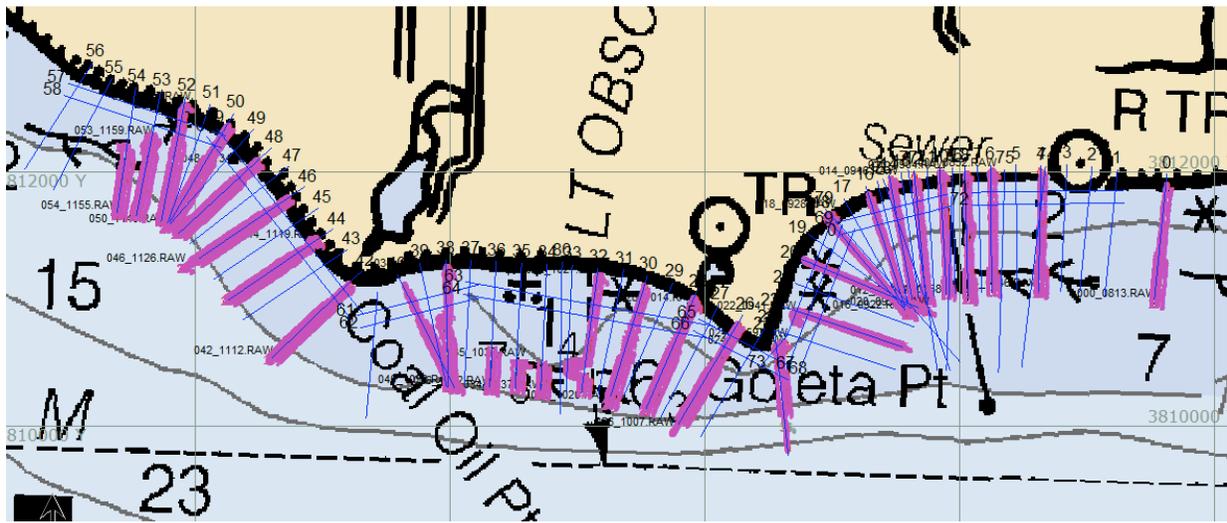


Figure 3. As-surveyed lines, Goleta, Red boat

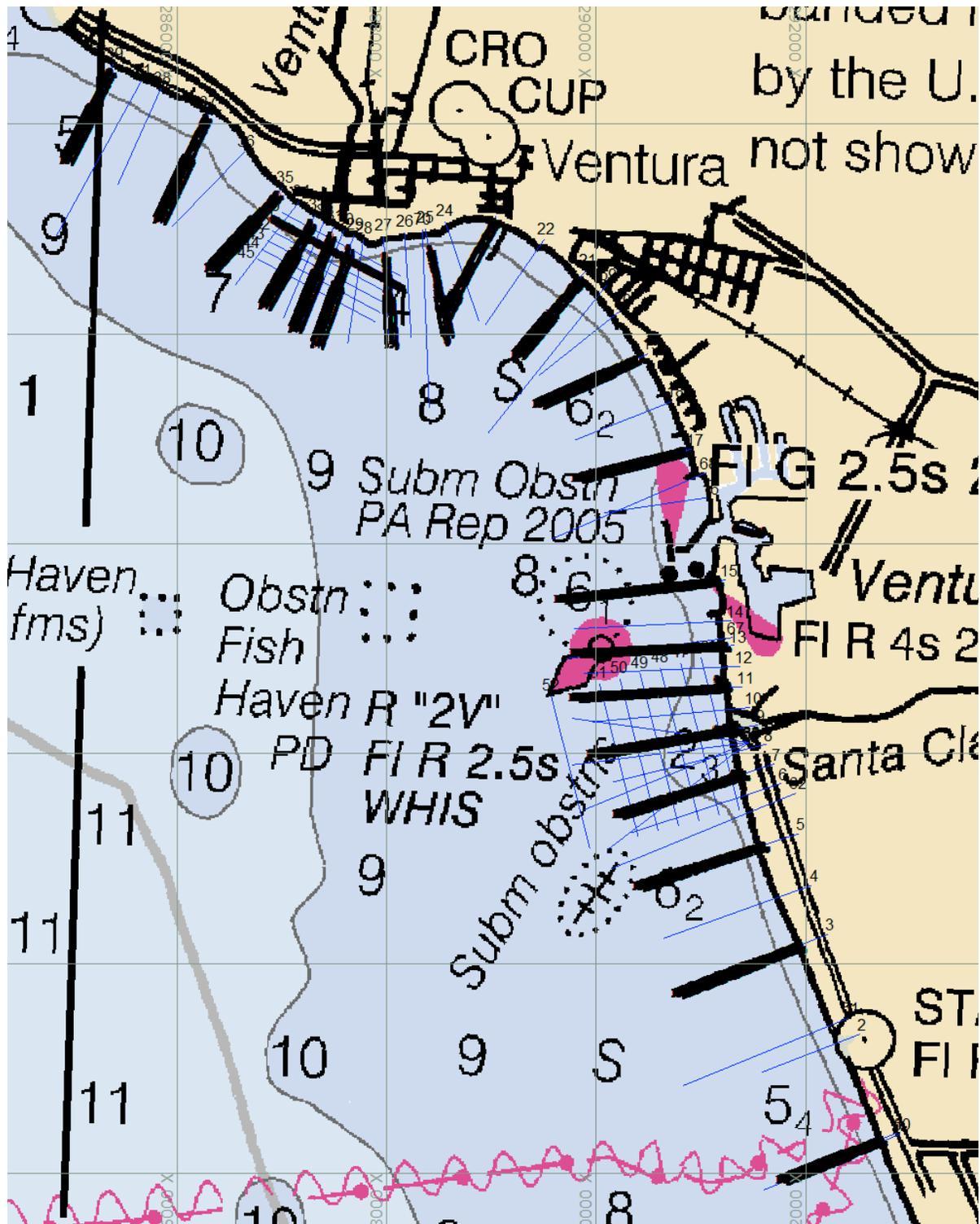


Figure 4. As-surveyed lines, Ventura, Green boat

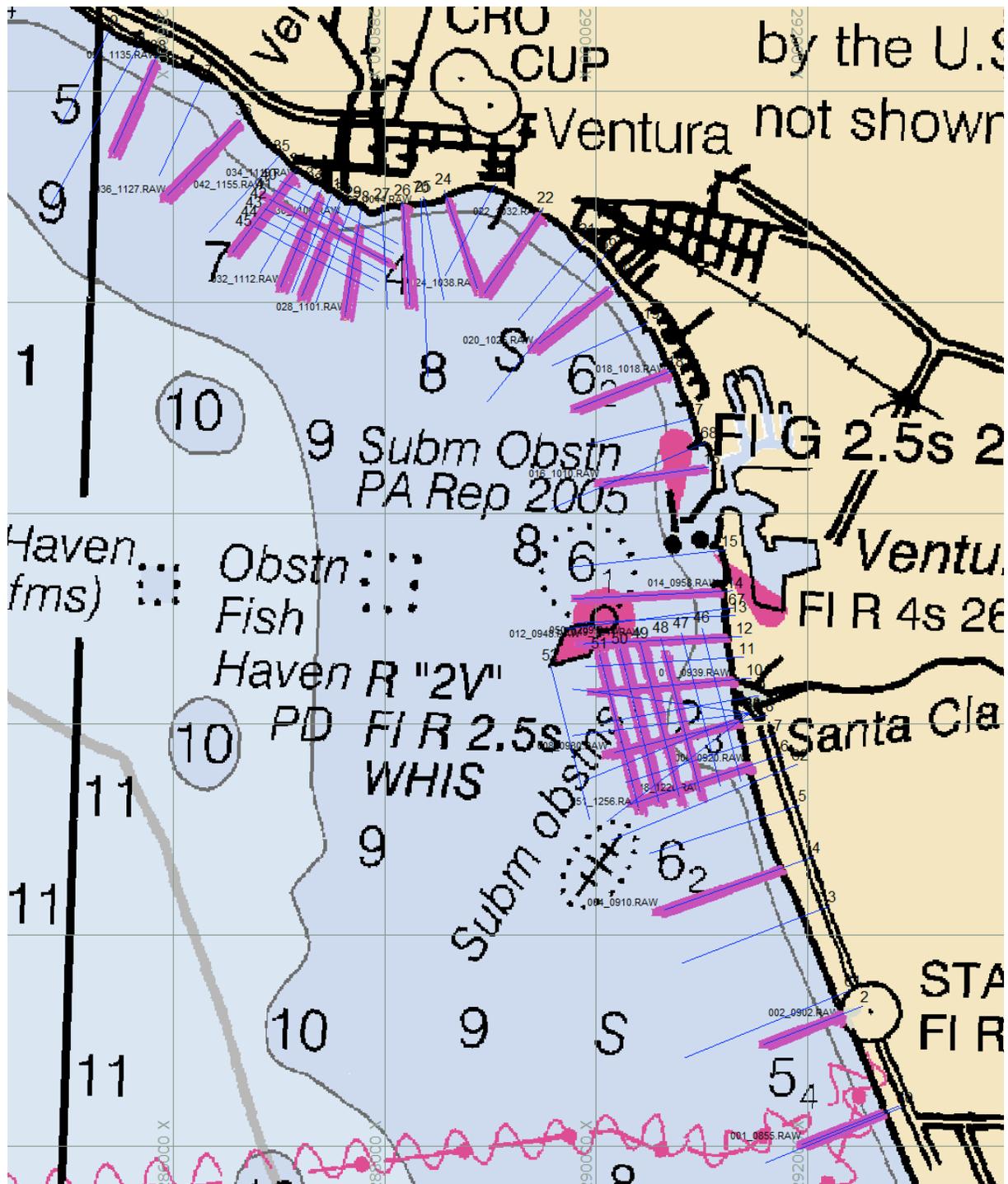


Figure 6. As-surveyed lines, Ventura, Red boat

Table 1. As-surveyed line endpoints, Goleta, Green boat

Line	Start			End		
	Date/time (PST)	Lat	Lon	Date/time (PST)	Lat	Lon
000_0824	3/9/2016 8:24	34.407314	-119.812067	3/9/2016 8:28	34.416051	-119.811159
002_0830	3/9/2016 8:30	34.416721	-119.81734	3/9/2016 8:34	34.408373	-119.818329
003_0848	3/9/2016 8:48	34.408408	-119.819927	3/9/2016 8:52	34.416954	-119.81956
005_0854	3/9/2016 8:54	34.416657	-119.82402	3/9/2016 8:59	34.40811	-119.823634
007_0900	3/9/2016 9:00	34.408185	-119.826654	3/9/2016 9:04	34.416688	-119.827234
009_0906	3/9/2016 9:06	34.407818	-119.82889	3/9/2016 9:11	34.416352	-119.829831
011_0912	3/9/2016 9:12	34.416438	-119.831634	3/9/2016 9:16	34.407633	-119.830713
013_0917	3/9/2016 9:17	34.407631	-119.831995	3/9/2016 9:21	34.416203	-119.833717
015_0923	3/9/2016 9:23	34.415406	-119.835634	3/9/2016 9:27	34.407121	-119.832853
017_0927	3/9/2016 9:27	34.406913	-119.833161	3/9/2016 9:32	34.41413	-119.838459
019_0933	3/9/2016 9:33	34.411905	-119.8413	3/9/2016 9:38	34.406933	-119.832509
021A0938	3/9/2016 9:38	34.405576	-119.831899	3/9/2016 9:43	34.408609	-119.84174
023_0945	3/9/2016 9:45	34.404774	-119.842541	3/9/2016 9:52	34.402597	-119.833674
025_1001	3/9/2016 10:01	34.396468	-119.851012	3/9/2016 10:07	34.40467	-119.845601
027_1009	3/9/2016 10:09	34.406098	-119.8496	3/9/2016 10:16	34.398256	-119.854074
029_1018	3/9/2016 10:18	34.399461	-119.857337	3/9/2016 10:24	34.406688	-119.851804
031_1027	3/9/2016 10:27	34.408463	-119.857472	3/9/2016 10:34	34.399914	-119.859446
033_1038	3/9/2016 10:38	34.400262	-119.86193	3/9/2016 10:43	34.408881	-119.861541
032_1044	3/9/2016 10:44	34.408498	-119.859612	3/9/2016 10:48	34.40249	-119.860302
034_1050	3/9/2016 10:50	34.403795	-119.863941	3/9/2016 10:53	34.408654	-119.864063
035_1054	3/9/2016 10:54	34.408617	-119.866024	3/9/2016 10:56	34.404345	-119.86619
036_1057	3/9/2016 10:57	34.404389	-119.868322	3/9/2016 11:00	34.408836	-119.868164
037_1103	3/9/2016 11:03	34.409004	-119.870458	3/9/2016 11:08	34.400229	-119.87065
039_1109	3/9/2016 11:09	34.400365	-119.872008	3/9/2016 11:14	34.408133	-119.874253
041_1116	3/9/2016 11:16	34.406049	-119.878388	3/9/2016 11:20	34.399273	-119.878809
043_1124	3/9/2016 11:24	34.404485	-119.890326	3/9/2016 11:29	34.408996	-119.882934
045_1130	3/9/2016 11:30	34.411646	-119.885585	3/9/2016 11:35	34.407419	-119.89265
047_1138	3/9/2016 11:38	34.409701	-119.895071	3/9/2016 11:43	34.415113	-119.887296
049_1146	3/9/2016 11:46	34.416976	-119.89067	3/9/2016 11:51	34.411279	-119.896381
051_1152	3/9/2016 11:52	34.411212	-119.89651	3/9/2016 11:57	34.418797	-119.892924
053_1159	3/9/2016 11:59	34.419134	-119.897417	3/9/2016 12:02	34.417652	-119.897841
054_1204	3/9/2016 12:04	34.419	-119.899685	3/9/2016 12:05	34.420489	-119.899298

Table 2. As-surveyed line endpoints, Goleta, Red boat

Line	Start			End		
	Date/time (PST)	Lat	Lon	Date/time (PST)	Lat	Lon
000_0813	3/9/2016 8:13	34.407773	-119.811967	3/9/2016 8:19	34.416156	-119.811109
004_0846	3/9/2016 8:46	34.408278	-119.821893	3/9/2016 8:50	34.416949	-119.821928
006_0852	3/9/2016 8:52	34.416715	-119.825856	3/9/2016 8:57	34.408254	-119.825796
008_0858	3/9/2016 8:58	34.407673	-119.827799	3/9/2016 9:03	34.416589	-119.828155
010_0904	3/9/2016 9:04	34.416456	-119.830151	3/9/2016 9:09	34.407982	-119.82965
012_0910	3/9/2016 9:10	34.407521	-119.831326	3/9/2016 9:15	34.416374	-119.832695
014_0916	3/9/2016 9:16	34.415912	-119.8343	3/9/2016 9:22	34.407449	-119.832546
016_0922	3/9/2016 9:22	34.406488	-119.832841	3/9/2016 9:27	34.414963	-119.836505
018_0928	3/9/2016 9:28	34.413444	-119.839494	3/9/2016 9:33	34.406648	-119.83293
020_0934	3/9/2016 9:34	34.40678	-119.83129	3/9/2016 9:39	34.41022	-119.841896
022_0941	3/9/2016 9:41	34.4062	-119.842659	3/9/2016 9:47	34.404231	-119.833238
024_0959	3/9/2016 9:59	34.404242	-119.843332	3/9/2016 10:03	34.396778	-119.842858
026_1007	3/9/2016 10:07	34.397684	-119.852769	3/9/2016 10:12	34.405495	-119.847357
028_1014	3/9/2016 10:14	34.406562	-119.850988	3/9/2016 10:19	34.399141	-119.855141
030_1020	3/9/2016 10:20	34.399487	-119.858342	3/9/2016 10:26	34.407985	-119.855477
032_1027	3/9/2016 10:27	34.408357	-119.859043	3/9/2016 10:34	34.400327	-119.860596
034_1037	3/9/2016 10:37	34.400114	-119.86415	3/9/2016 10:38	34.402308	-119.863994
035_1039	3/9/2016 10:39	34.402301	-119.865656	3/9/2016 10:41	34.400432	-119.866228
036_1042	3/9/2016 10:42	34.400298	-119.868381	3/9/2016 10:43	34.403193	-119.868319
038_1047	3/9/2016 10:47	34.408508	-119.872051	3/9/2016 10:53	34.400402	-119.871974
040_1053	3/9/2016 10:53	34.400315	-119.871434	3/9/2016 10:58	34.407635	-119.875934
042_1112	3/9/2016 11:12	34.402006	-119.887225	3/9/2016 11:17	34.407557	-119.880678
044_1119	3/9/2016 11:19	34.410343	-119.883453	3/9/2016 11:24	34.406129	-119.891086
046_1126	3/9/2016 11:26	34.40832	-119.894899	3/9/2016 11:32	34.413551	-119.886092
048_1134	3/9/2016 11:34	34.415561	-119.888734	3/9/2016 11:39	34.410743	-119.895495
050_1140	3/9/2016 11:40	34.411095	-119.896501	3/9/2016 11:45	34.41851	-119.891321
052_1147	3/9/2016 11:47	34.419829	-119.894836	3/9/2016 11:53	34.411589	-119.896886
054_1155	3/9/2016 11:55	34.411975	-119.900578	3/9/2016 11:58	34.416864	-119.900472
053_1159	3/9/2016 11:59	34.417315	-119.897959	3/9/2016 12:05	34.411955	-119.899037

Table 3. As-surveyed line endpoints, Ventura, Green boat

Line	Start			End		
	Date/time (PST)	Lat	Lon	Date/time (PST)	Lat	Lon
001_0853	3/10/2016 8:53	34.193589	-119.259816	3/10/2016 8:58	34.197149	-119.249505
003_0903	3/10/2016 9:03	34.213487	-119.259268	3/10/2016 9:09	34.209443	-119.271073
005_0913	3/10/2016 9:13	34.218574	-119.275365	3/10/2016 9:19	34.222062	-119.262532
007_0922	3/10/2016 9:22	34.224699	-119.27761	3/10/2016 9:28	34.228463	-119.265705
009_0932	3/10/2016 9:32	34.229821	-119.280454	3/10/2016 9:38	34.23222	-119.267656
011_0941	3/10/2016 9:41	34.23468	-119.282415	3/10/2016 9:48	34.236508	-119.267614
013_0949	3/10/2016 9:49	34.239311	-119.268472	3/10/2016 9:58	34.23849	-119.282482
015_1000	3/10/2016 10:00	34.243112	-119.284166	3/10/2016 10:08	34.24479	-119.267745
017_1012	3/10/2016 10:12	34.253488	-119.282654	3/10/2016 10:17	34.255927	-119.272118
019_1024	3/10/2016 10:24	34.259803	-119.286866	3/10/2016 10:30	34.263851	-119.276792
021_1033	3/10/2016 10:33	34.269817	-119.283528	3/10/2016 10:39	34.263998	-119.289143
023_1044	3/10/2016 10:44	34.267277	-119.29681	3/10/2016 10:48	34.275291	-119.291753
025_1100	3/10/2016 11:00	34.265704	-119.296502	3/10/2016 11:04	34.272876	-119.298303
027_1106	3/10/2016 11:06	34.272261	-119.302967	3/10/2016 11:09	34.264635	-119.302271
029_1112	3/10/2016 11:12	34.264516	-119.310026	3/10/2016 11:16	34.272796	-119.306813
031_1117	3/10/2016 11:17	34.27391	-119.30865	3/10/2016 11:22	34.265761	-119.312323
033_1125	3/10/2016 11:25	34.267728	-119.315503	3/10/2016 11:29	34.274901	-119.310838
035_1130	3/10/2016 11:30	34.277281	-119.314215	3/10/2016 11:35	34.270836	-119.321127
037_1137	3/10/2016 11:37	34.274907	-119.326589	3/10/2016 11:42	34.283687	-119.321879
039_1146	3/10/2016 11:46	34.287515	-119.331912	3/10/2016 11:51	34.279785	-119.336384
041_1157	3/10/2016 11:57	34.275157	-119.314726	3/10/2016 12:04	34.269504	-119.301229

Table 4. As-surveyed line endpoints, Ventura, Red boat

Line	Start			End		
	Date/time (PST)	Lat	Lon	Date/time (PST)	Lat	Lon
001_0855	3/10/2016 8:55	34.194241	-119.258106	3/10/2016 8:59	34.197209	-119.249749
002_0902	3/10/2016 9:02	34.204865	-119.254557	3/10/2016 9:06	34.202807	-119.262078
004_0910	3/10/2016 9:10	34.213937	-119.273328	3/10/2016 9:17	34.217864	-119.260589
006_0920	3/10/2016 9:20	34.226412	-119.264683	3/10/2016 9:28	34.223128	-119.27615
008_0930	3/10/2016 9:30	34.227246	-119.278853	3/10/2016 9:36	34.230237	-119.265393
010_0939	3/10/2016 9:39	34.233708	-119.266569	3/10/2016 9:46	34.232597	-119.280513
012_0948	3/10/2016 9:48	34.236691	-119.282002	3/10/2016 9:55	34.237576	-119.266864
014_0958	3/10/2016 9:58	34.241382	-119.267849	3/10/2016 10:05	34.240571	-119.282353
016_1010	3/10/2016 10:10	34.250478	-119.280291	3/10/2016 10:15	34.251966	-119.269482
018_1018	3/10/2016 10:18	34.259557	-119.273707	3/10/2016 10:24	34.25673	-119.282937
020_1025	3/10/2016 10:25	34.261712	-119.287393	3/10/2016 10:30	34.267059	-119.279724
022_1032	3/10/2016 10:32	34.272774	-119.286712	3/10/2016 10:37	34.266358	-119.292518
024_1038	3/10/2016 10:38	34.266522	-119.292961	3/10/2016 10:43	34.274259	-119.296084
026_1044	3/10/2016 10:44	34.273541	-119.300208	3/10/2016 10:50	34.265264	-119.300023
028_1101	3/10/2016 11:01	34.264193	-119.306641	3/10/2016 11:05	34.27188	-119.305486
030_1106	3/10/2016 11:06	34.272465	-119.307599	3/10/2016 11:11	34.265759	-119.311165
032_1112	3/10/2016 11:12	34.266453	-119.313416	3/10/2016 11:17	34.274509	-119.309599
034_1119	3/10/2016 11:19	34.275616	-119.312143	3/10/2016 11:25	34.269373	-119.31844
036_1127	3/10/2016 11:27	34.273908	-119.325517	3/10/2016 11:33	34.280541	-119.318033
038_1135	3/10/2016 11:35	34.285411	-119.32669	3/10/2016 11:41	34.27764	-119.330871
042_1155	3/10/2016 11:55	34.274471	-119.315397	3/10/2016 12:02	34.268857	-119.302096
050_1209	3/10/2016 12:09	34.237126	-119.277927	3/10/2016 12:19	34.223252	-119.27322
048_1220	3/10/2016 12:20	34.223813	-119.268982	3/10/2016 12:29	34.236056	-119.273055
049_1244	3/10/2016 12:44	34.237037	-119.275589	3/10/2016 12:53	34.223343	-119.271037
051_1256	3/10/2016 12:56	34.222524	-119.275263	3/10/2016 13:02	34.236233	-119.279734

Appendix A: Weather Observation Forms

Date: 3/9/16 _____

Monitor: __Dan Hoover_____

Time	Latitude	Longitude	Vessel Activity	Weather	Cloud Cover	Glare	Visibility	Wind Speed	Sea State	Swell Height	Comments
0810 – 1205 PST	34.39647 to 34.42049	-119.9006 to -119.8111	surveying	clear	Clear	none	5 km	4-6 kts	Slight chop	1m	Observations based on general conditions throughout PWC survey. PWC operator does not have resources to make detailed weather observations

Date: 3/10/16 _____

Monitor: __Dan Hoover_____

Time	Latitude	Longitude	Vessel Activity	Weather	Cloud Cover	Glare	Visibility	Wind Speed	Sea State	Swell Height	Comments
0830 – 1300 PST	34.19359 to 34.28752	-119.33638 to -119.24950	surveying	clear	Clear	none	5 km	4-6 kts	Slight chop	1m	Observations based on general conditions throughout PWC survey. PWC operator does not have resources to make detailed weather observations

Appendix B: Marine Wildlife Observations

Date: 3/9/16 _____

Monitor: Dan Hoover

Time: 0820 PDT	Latitude:34.406	Longitude:-119.809E
Weather: Clear	Cloud Cover: Clear	Glare: none
Visibility: 5km	Wind Speed: 4-6 kts	Sea State: slight chop
Swell Height: 1m	Survey Vessel Activity: surveying	
Marine Wildlife Observations and Interactions: One whale spout observed briefly offshore of PWCs stopped at offshore end of Goleta line "0". Observation by shore support personnel on Goleta pier, not observed by PWC operators (probably several hundred meters or more offshore of PWCs)		

Note - no other notable observations were made of marine wildlife throughout the rest of the survey days (3/9-10). Sea lions occasionally were noted resting at the surface, but infrequently and not in great abundance, and there were no observations of dolphins or unusual aggregations of seabirds.

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.	8/24/15 JW
	Los Angeles and Orange Counties: Use vessel engines meeting CARB's Tier 2-certified engines or cleaner; the survey shall be operated such that daily NO _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.			
	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.			
	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.			8/24/15 JW
	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.			

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.	8/24/15 JW
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.	8/24/15 JW
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.	8/24/15 JW

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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												
	<table border="1" data-bbox="536 318 1010 505"> <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="478 532 1066 1174">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="478 1198 1066 1378">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="1744 665 1883 909">8/24/15 JW</p>
Equipment Type	Safety Zone (radius, m)																	
Single Beam Echosounder	50																	
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	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.	N/A
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.	3/9/16 3/10/16 JW

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MM BIO-6: Practical Limitations on Equipment Use and Adherence to Equipment Manufacturer's Routine Maintenance Schedule.	<p>All State waters; geophysical operators shall follow, to the maximum extent possible, the guidelines of Zykov (2013) as they pertain to the use of subbottom profilers and side-scan sonar, including:</p> <ul style="list-style-type: none"> 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. <p>Geophysical operators shall consider the potential applicability of these measures to other equipment types (e.g., boomer). Permit holders will conduct routine inspection and maintenance of acoustic-generating equipment to ensure that low energy geophysical equipment used during permitted survey activities remains in proper working order and within manufacturer's equipment specifications. Verification of the date and occurrence of such equipment inspection and maintenance shall be provided in the required presurvey notification to CSLC.</p>	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	<p>Document initial and during survey equipment settings.</p> <p>Submit Final Monitoring Report after completion of survey activities.</p>	OGPP permit holder.	Immediately prior to and during survey.	<p>3/9/16 3/10/16</p> <p>JW</p>
MM BIO-7: Avoidance of Pinniped Haul-Out Sites.	<p>The Marine Wildlife Contingency Plan (MWCP) developed and implemented for each survey shall include identification of haul-out sites within or immediately adjacent to the proposed survey area. For surveys within 300 meters (m) of a haul-out site, the MWCP shall further require that:</p> <ul style="list-style-type: none"> 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.	<p>Document pinniped reactions to vessel presence and equipment use.</p> <p>Submit Final Monitoring Report after completion of survey activities.</p>	OGPP permit holder.	Monitoring Report following completion of survey.	<p>3/31/16</p> <p>JW</p>

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Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
<p>MM BIO-8: Reporting Requirements – Collision.</p>	<p>All State waters; if a collision with marine mammal or reptile occurs, the vessel operator shall document the conditions under which the accident occurred, including the following:</p> <ul style="list-style-type: none"> • 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>	<p>No adverse effects to marine mammals or sea turtles due to survey activities are observed.</p>	<p>Submit Final Monitoring Report after completion of survey activities.</p>	<p>OGPP permit holder.</p>	<p>Monitoring Report following completion of survey.</p>	<p>3/31/16 JW</p>

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Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
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.	8/24/15 JW
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.	8/24/15 JW
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.	3/11/16 JW
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.	8/24/15 JW

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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
			ability to respond to worst-case spill.			
MM HAZ-1: Oil Spill Contingency Plan (OSCP) Required Information.	Outlined under Hazards and Hazardous Materials (above)					
MM HAZ-2: Vessel fueling restrictions.	Outlined under Hazards and Hazardous Materials (above)					
MM HAZ-3: OSCP equipment and supplies.	Outlined under Hazards and Hazardous Materials (above)					
MM BIO-9: Limitations on Survey Operations in Select MPAs.	Outlined under Biological Resources (above)					
MM REC-1: U.S. Coast Guard (USCG), Harbormaster, and Dive Shop Operator Notification.	All California waters where recreational diving may occur; as a survey permit condition, the 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.	8/24/15 JW

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Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM FISH-1: U.S. Coast Guard (USCG) and Harbormaster Notification.	All California waters; as a survey permit condition, the CSLC shall require Permittees to provide the USCG with survey details, including information on vessel types, survey locations, times, contact information, and other details of activities that may pose a hazard to mariners and fishers so that USCG can include the information in the Local Notice to Mariners, advising vessels to avoid potential hazards near survey areas. Furthermore, at least twenty-one (21) days in advance of in-water activities, Permittees shall post such notices in the harbormasters' offices of regional harbors.	No adverse effects to commercial fishing gear in place.	Notify the USCG and local harbormasters of planned survey activity. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Prior to survey.	2/9/16 JW
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).	3/9/16 3/10/16 JW
MM FISH-1: USCG and Harbormaster Notification.	Outlined under Commercial and Recreational Fisheries (above)					

Acronyms/Abbreviations: CARB = California Air Resources Board; CDFW = California Department of Fish and Wildlife; CSLC = California State Lands Commission; dB = decibels; kHz = kilohertz; MPA = Marine Protected Area; MWCP = Marine Wildlife Contingency Plan; MWM = Marine Wildlife Monitor; m= meter(s); NOAA = National Oceanic and Atmospheric Administration; NO_x = Nitrogen Oxide; OGPP = Offshore Geophysical Permit Program; OSCP = Oil Spill Contingency Plan; USCG = U.S. Coast Guard