Merkel & Associates, Inc.

5434 Ruffin Road, San Diego, CA 92123
Tel: 858/560-5465 • Fax: 858/560-7779

San Diego, CA • Sacramento, CA • Arcata, CA • Nehalem, OR

October 17, 2016
Offshore Geophysical Permit #W6005169

Statewide Geophysical Survey Coordinator
California State Lands Commission
Mineral Resources Management Division
200 Oceangate, 12th Floor
Long Beach, CA, 90802-4331

Subject: Proposed Geophysical Survey Offshore of Carlsbad, CA.

Dear Statewide Geophysical Survey Coordinator:

Attached are the pre-survey requirement notices and information for surveys extending nearshore at Carlsbad, San Diego County, CA. The acoustic survey will be performed using hull mounted interferometric sidescan sonar and CAATI sidescan sonar operating at 468 kHz and 450 kHz, respectively. An ROV and video cameras are also to be employed for groundtruthing. The purpose of this survey is to map the very shallow nearshore habitats from -60 feet MLLW to the back of the surf zone over repeated semiannual events for purposes of completing change analyses.

Figure 1 shows the location of the survey area. The survey will occur within the nearshore environment extending both within and to the immediate south of the Swami's State Marine Conservation Area (SMCA).

Surveys will be completed by running shore parallel tracklines outward from the surf zone to -60 feet MLLW. Surveys will generally be spaced at 25-meter intervals providing for full nadir gap overlap between adjacent survey swaths. Existing obstacles of exposed and shallow rock outcrops, and dense kelp will affect the alignment of survey tracks. As such, only the survey reach bounding box coordinates are known at this time. These are provided in Table 1. Following completion of the acoustic survey, ROV and video groundtruthing will be performed to verify and assess accuracy of habitat mapping. This work will be performed at randomly selected points within the surveyed reach.

Surveys will be completed from sunrise to sunset on each survey day. The work will be completed from a 22-foot Ocean King Weldcraft aluminum survey vessels fitted with 4-stroke gas powered outboard engines and a gasoline generator.

The target dates for survey operations will occur between November 7 and December 30, 2016, with work requiring approximately 3 days to complete surveys. Because surveys are nearshore, high tides and low swell conditions are desired for safe completion of work. As such, surveys will be completed opportunistically over the survey window.

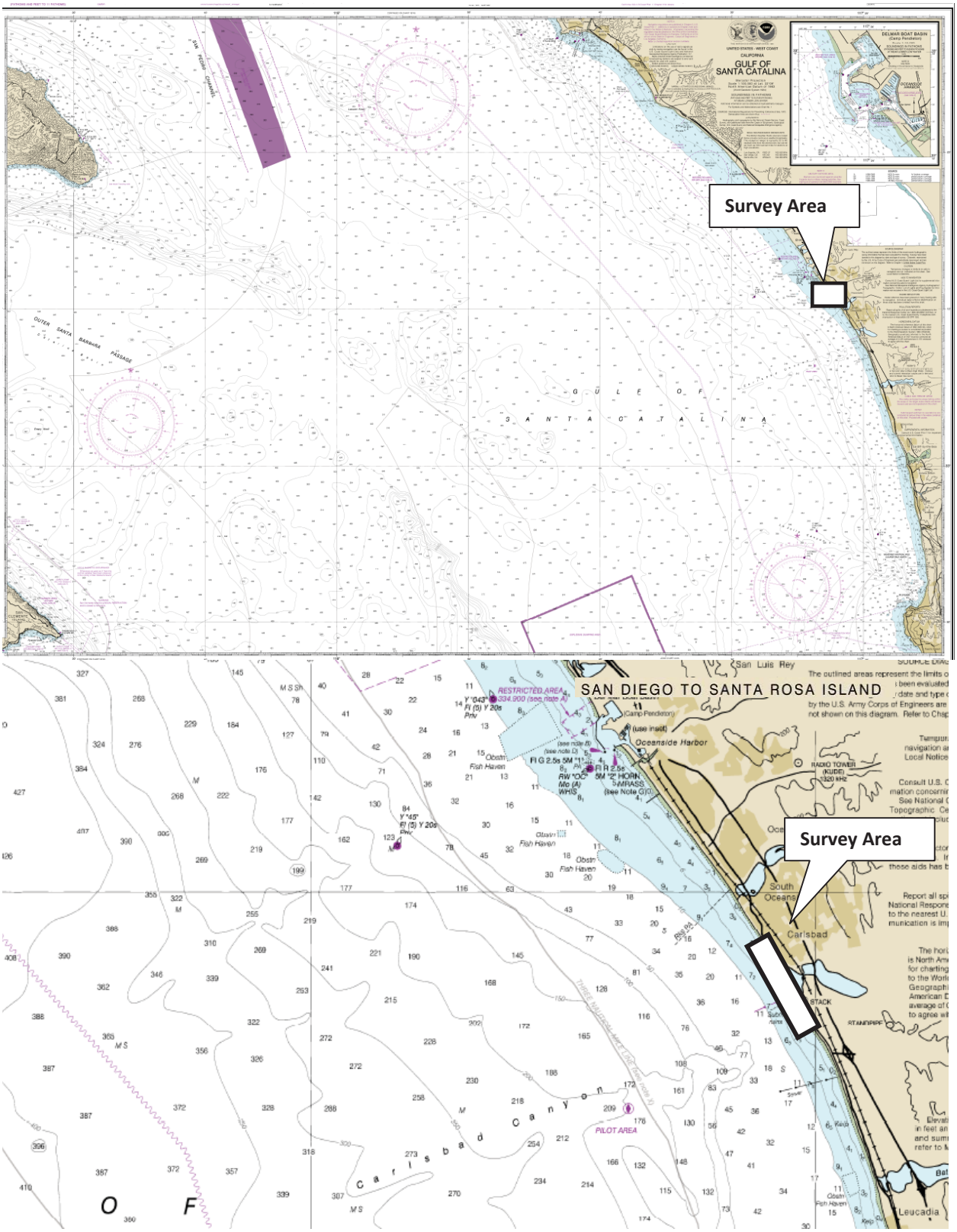


Figure 1. Survey Reach on NOAA Chart 18774 Gulf of Santa Catalina.

Table 1. West and east bounding coordinates for shore parallel surveys extending from -50 feet MLLW to the surf zone.

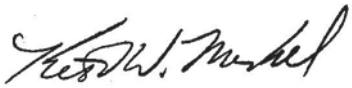
Westerly Survey Limits		Easterly Survey Limits	
33.156426°	117.364805°	33.159693°	117.355227°
33.121191°	117.339601°	33.123849°	117.329611°

Enclosed in this notification you will find: 1) Exhibit G Notice Requirements for Permittees, 2) Exhibit F Pre-survey Notification Form, 3) U.S. Coast Guard Local Notice to Mariners, 4) Harbormaster and Dive Shop Notification, 5) Marine Wildlife Contingency Plan (which covers the MM BIO 1-9 specifications listed in Exhibit H), 6) the Oil Spill Contingency Plan (which covers the MM HAZ-1 –3 specifications listed in Exhibit H), and 7) Verification of Equipment Services and/or Maintenance.

Vessel and onboard generator engines are gasoline engines and exempt from Exhibit C requirements.

If you have any questions, please feel free to contact me.

Sincerely,



Keith W. Merkel
Principal Ecologist

Attachments (Electronic):
a. Exhibit G - Notice Requirements
b. Exhibit F - Pre-survey Notification Form
c. USCG Local Notice to Mariners
d. Harbormaster and Dive Shop Notification
e. Marine Wildlife Contingency Plan
f. Oil Spill Contingency Plan
g. Equipment Verification

EXHIBIT G

California State Lands Commission Presurvey Notice Requirements for Permittees to Conduct Geophysical Survey Activities

All parts of the Presurvey Notice must be adequately filled out and submitted to the CSLC staff a minimum of twenty-one (21) calendar days prior to the proposed survey date to ensure adequate review and approval time for CSLC staff. Note that one or more of the items may require the Permittee to plan well in advance in order to obtain the necessary documentation prior to the Notice due date (e.g., permits from other State or Federal entities).

Please use the boxes below to verify that all the required documents are included in the Presurvey Notice. If "No" is checked for any item, please provide an explanation in the space provided. If additional space is needed, please attach separate pages.

Yes	No	
☑	☐	Geophysical Survey Permit Exhibit F
☐	☑	Survey Location (including a full-sized navigation chart and GPS coordinates for each proposed track line and turning point) Explanation: Because the survey is built off of the surf zone and geologic obstructions are common in the surf zone, pre-set track lines are not possible.
☐	☑	Permit(s) or Authorization from other Federal or State agencies (if applicable) Explanation: None required
☑	☐	21-Day Written Notice of Survey Operations to Statewide Geophysical Coordinator/
☑	☐	U.S. Coast Guard Local Notice to Mariners/
☑	☐	Harbormaster and Dive Shop Notifications Explanation:
☑	☐	Marine Wildlife Contingency Plan Explanation:
☑	☐	Oil Spill Contingency Plan Explanation:
☐	☑	Verification of California Air Resources Board's Tier 2-Certified Engine Requirement Explanation: Gasoline engines exempt
☑	☐	Verification of Equipment Service and/or Maintenance (must verify sound output) Explanation:
☐	☑	Permit(s) or Authorization from California Department of Fish and Wildlife for surveys in or affecting Marine Protected Area(s) (if applicable) Explanation:

NOTE: CSLC staff will also require verification that current biological information was obtained and transmitted as outlined in Section 5 of this permit.

EXHIBIT F

PRE-SURVEY NOTIFICATION FORM

Applicant/Permittee's Mailing Address
Merkel & Associates, Inc.
5434 Ruffin Road
San Diego, CA 92123

Date: 10/17/2016
Jurisdiction: Federal____ State X Both____
If State: Permit #PRC: W6005.169
Region: I
Area: Carlsbad, CA

GEOPHYSICAL SURVEY PERMIT

Check one: X New survey _____ Time extension of a previous survey

Merkel & Associates, Inc. (Applicant/Permittee) will conduct a geophysical survey offshore California in the survey area outlined on the accompanying navigation chart segment. If you foresee potential interference with commercial fishing or other activities, please contact the person(s) listed below:

FEDERAL WATERS (outside 3 nautical miles)

1) Applicant's representative
2) Federal representative (e.g., Bureau of Ocean Energy Management [BOEM] or National Science Foundation [NSF])
   NOTE: Any comments regarding potential conflicts in Federal waters must be received by the Applicant's Representative and lead Federal agency within ten (10) days of the receipt of this notice.

STATE WATERS (Inside 3 nautical miles)

1) Permittee's representative
2) CSLC representative
   NOTE: Any comments regarding potential conflicts in State waters should be received as soon as possible by the Permittee's representative, no more than fifteen (15) days after the receipt of this notice.

1. Expected Date of Operation November 7, 2016 – December 30, 2016 (3 survey days)
2. Hours of Operation: 0700-1800
3. Vessel Name: Ocean King Survey
4. Vessel Official Number: CF 3862 UC
5. Vessel Radio Call Sign: N/A
6. Vessel Captain's Name: Jordan Volker
7. Vessel will monitor Radio Channel(s): 16
8. Vessel Navigation System: RTK GPS

9. Equipment to be used: Interferometric Sidescan Sonar / CAATI Sidescan Sonar / ROV

   a. Frequency (Hz, kHz) 468 kHz / 450 kHz / N/A

   b. Source level (dB re 1 Pa at 1 meter (m) [root mean square (rms)]) 187 / 171 / N/A

   c. Number of beams, across track beamwidth, and along track beamwidth 2 / 2 / N/A

   d. Pulse rate and length 4.3 – 250 MS / 33 MS / N/A

   e. Rise time N/A / N/A / N/A

   f. Estimated distances to the 190 dB, re 1 μPa (rms) isopleths 0.6 m / 0.1 m / N/A

      Estimated distances to the 180 dB, re 1 μPa (rms) isopleths 2.9 m / 0.3 m / N/A

      Estimated distances to the 160 dB, re 1 μPa (rms) isopleths 63 m / 11 m / N/A

   g. Deployment depth 0.5 m / 0.5 m / 0-50 feet

   h. Tow speed 2-5 knots / 2-5 knots / N/A

   i. Approximate length of cable tow N/A Hull mount / N/A Hull mount / N/A

Applicant's Representative:
Keith W. Merkel
5434 Ruffin Road
San Diego, CA 92123
(858) 560-5465
kmerkel@merkelinc.com

California State Lands Representative
Richard B. Greenwood
Statewide Geophysical Coordinator
200 Oceangate, 12th Floor
Long Beach, CA 90802
(562) 590-5201

BOEM Representative
Joan Barminski
Regional Supervisor
Office of Strategic Resources
770 Paseo Camarillo
Camarillo, CA 93010
(805) 389-7585

Other Federal Representative (if not BOEM)

LOCAL NOTICE TO MARINERS

Keith Merkel

From: Keith Merkel
Sent: Monday, October 17, 2016 3:34 PM
To: 'D11LNM@USCG.MIL'
Subject: LNM Request for Hydrographic Survey - Carlsbad
Attachments: Notice to Mariners_Carlsbad.pdf

Request for Notice to Mariners,

Nearshore waters Carlsbad, San Diego Co.
Merkel & Associates will be conducting sidescan sonar and ROV surveys in waters from -50 ft MLLW to the surf zone
Surveys will be conducted on approximately 6 days from November 7, 2016 through December 31, 2016.
Work will be conducted from a 22-foot Weldcraft Ocean King (CF 3862 UC). The survey vessel will be traveling at slow speeds parallel to shore with limited mobility. Project vessel will be monitoring VHF Ch. 16. For questions contact Keith Merkel (858) 560-5465. Chart 18740.

If you have any questions please contact me.

Sincerely,
Keith Merkel
Merkel & Associates, Inc.
(858) 560-5465

Notice of Hydrographic Survey Operations

DEPARTMENT OF HOMELAND SECURITY
UNITED STATES COAST GUARD
COMMANDER, 11th COAST GUARD DISTRICT
Building 50-2 Coast Guard Island
Alameda, CA 94501-5100
LNM Point of Contact
BM1 John Hinson: 510-437-2980
D11LNM@uscg.mil

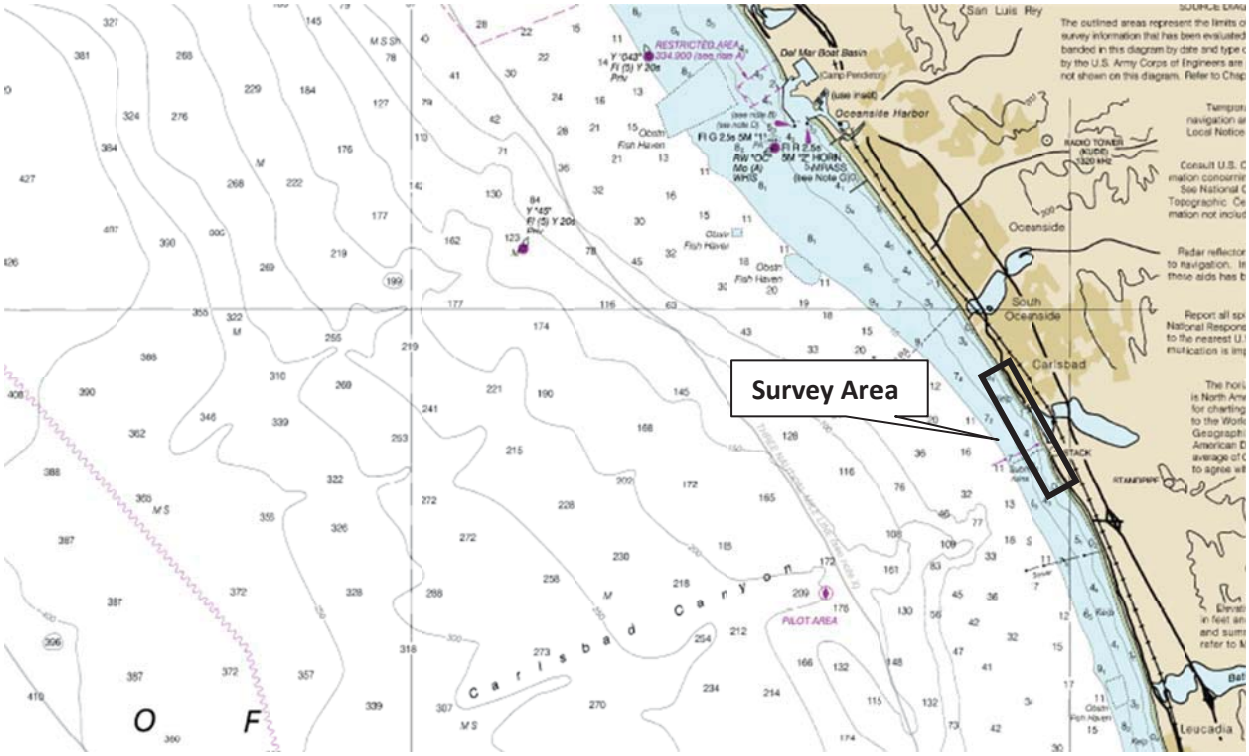
Contractor:	Merkel & Associates, Inc.
Type of Survey Operation:	Side Scan Sonar Survey/ ROV Survey
Location / Position Information:	Carlsbad, San Diego Co., California (see attached coordinates and map)
Survey Dates:	November 7 – December 30, 2016
Vessels for Survey:	22-foot Weldcraft Ocean King (CF3862 UC)
Radio VHF Frequency Monitored:	VHF 16
Additional Information:	Acoustic equipment is hull mounted and not towed. Vessel will be running shore parallel tracklines in waters -50 feet to the surf zone.
POC for Surveys:	Keith Merkel (858) 560-5465
Chart Number:	18774

Notice of survey activities:

Merkel & Associates will be conducting a nearshore survey along the shoreline in Carlsbad, San Diego County, CA as part of a long-term repetitive survey effort to evaluate habitat change within this segment of shoreline. Survey work will be completed from November 4 to December 30, 2016 and will require approximately 6 field days of survey. Work will be conducted from a small survey vessel navigating shore parallel tracklines at speeds from 2 to 6 knots. Surveys will be conducted between the following west and east bounding coordinates for shore parallel surveys extending from -50 feet MLLW to the surf zone (see chart below).

Westerly Survey Limits		Easterly Survey Limits	
33.156426°	117.364805°	33.159693°	117.355227°
33.121191°	117.339601°	33.123849°	117.329611°

The survey vessel will have limited maneuverability during operations and mariners are advised to use due caution when transiting in the area.


Survey Area
Oceanside Harbor
Oceanside
South Oceanside
Carlsbad
Leucadia
San Luis Rey
Del Mar Boat Basin
RESTRICTED AREA
PILOT AREA
Fish Haven
Obstr
RADIO TOWER
Carlsbad Canyon

LOCAL NOTICE TO HARBORMASTER AND DIVE SHOPS

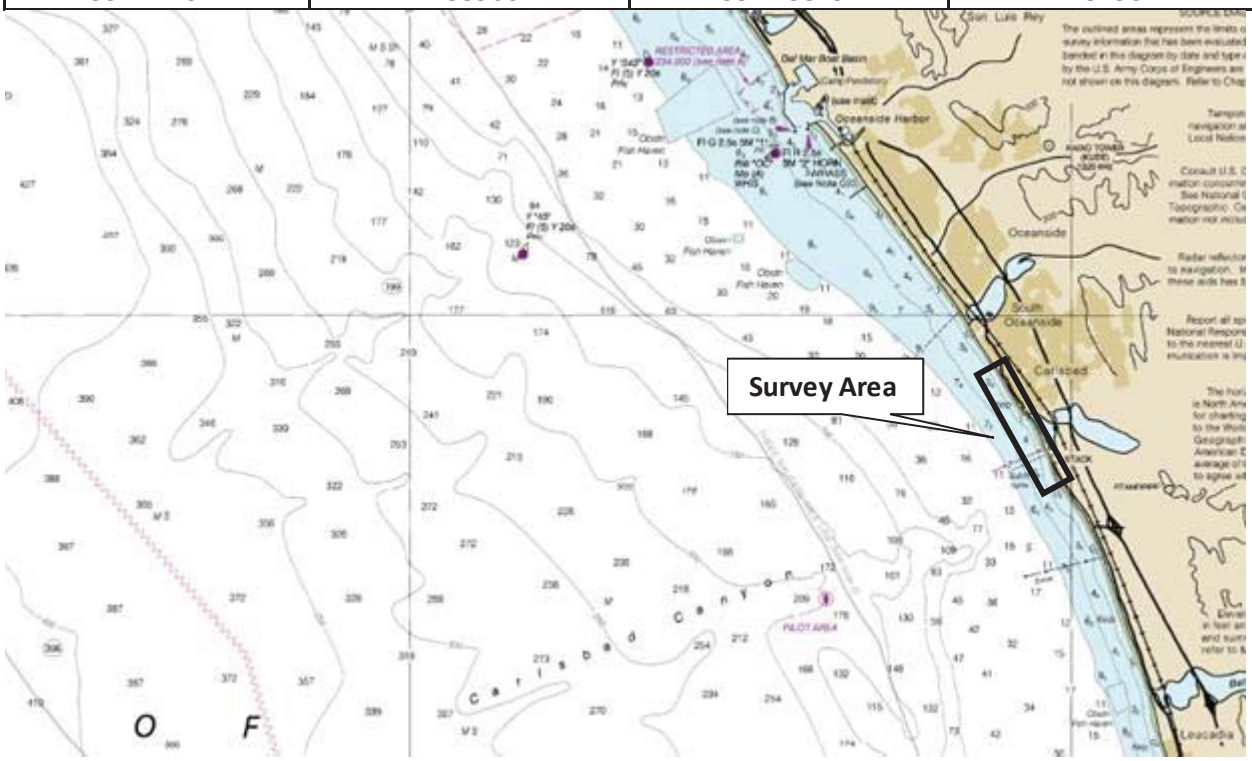
Keith Merkel

From: Keith Merkel
Sent: Monday, October 17, 2016 3:38 PM
To: 'plawrence@ci.oceanside.ca.us'; 'andrew@beachcitiesscuba.com'; 'info@oceansidediveandkayak.com'; 'info@oceansidesidescubaswim.com'
Subject: Notification of nearshore marine geophysical survey work Carlsbad, San Diego County

This email is to notify you of upcoming marine survey work to be conducted by Merkel & Associates along the coast from the surf zone out to -50 feet MLLW extending along the shore of Carlsbad, San Diego County.

This work will consist of sidescan sonar and ROV surveys being conducted from a 22-foot survey vessel. Work will be completed over approximately 6 survey days between November 7 and December 30, 2016. The purpose of these surveys is to map the very shallow nearshore habitats from -50 feet MLLW to the back of the surf zone over repeated events for purposes of completing change analyses. The survey vessel will travel in shore parallel tracklines to collect information on bottom conditions. Please post this information for your patron.

Westerly Survey Limits		Easterly Survey Limits	
33.156426°	117.364805°	33.159693°	117.355227°
33.121191°	117.339601°	33.123849°	117.329611°



Thank you much for your assistance,

Keith Merkel
Principal Ecologist
Merkel & Associates, Inc.

CARLSBAD NEARSHORE HABITAT MAPPING

MARINE WILDLIFE CONTINGENCY PLAN

OFFSHORE GEOPHYSICAL PERMIT W6005.169

October 2016

Submitted To:
California State Lands Commission Mineral
Resources Management Division 200
Oceangate, 12th Floor
Long Beach, CA 90802-4331

Submitted by:
Merkel & Associates, Inc.
5434 Ruffin Road
San Diego, CA 92123
858-560-5465

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CARLSBAD NEARSHORE HABITAT MAPPING
MARINE WILDLIFE CONTINGENCY PLAN

Merkel and Associates, Inc.
October 2016

PURPOSE AND OBJECTIVE OF GEOPHYSICAL SURVEY

Merkel & Associates is undertaking a series of field mapping efforts to document nearshore hard and soft bottom habitats from -50 feet MLLW to the surf zone at sites along the shore in Carlsbad, San Diego County. The surveys will be performed annually in fall for at least 4 years to examine habitat changes through time. Figure 1 shows the location of the survey area.

GEOPHYSICAL SURVEY EQUIPMENT

Equipment to be used includes two hull mounted sidescan sonar systems; interferometric sidescan sonar operating at 468 kHz and a CAATI sidescan sonar system operating at 450 kHz. In addition, surveys will utilize remotely operated vehicle (ROV) and video for ground-truthing of the acoustic survey data. Information on the equipment and acoustic pressures produced is provided in Table 1.

Table 1. Survey equipment has the following operational parameters

Equipment	Frequency	Sound (dB re 1µPa at 1m)	Distance to 190/180/and 160 dB re 1µPa at 1m isopleth (meters)
SEA SWATHplus-H Interferometric Sidescan Sonar	468 kHz	187 dB rms	0.6 m / 2.9 m /63 m
Ping DSP 3D CAATI Sidescan Sonar	450 kHz	171 dB rms	0.1 m / 0.3 m /11 m
Seabotix LBV 150	NA	NA	NA

Surveys will be completed by navigating shore parallel tracklines with nominal swath coverage of 35 meters to port and starboard of the vessel. Survey tracks will be spaced at 25 meters to provide full coverage of the nadir gap for prior swaths. The survey vessel will travel at 2-6 knots depending upon the specific conditions in the survey area (e.g., water depth, obstructions). For ROV ground-truthing, the vessel will be stationary, or moving at speeds up to 1 knot.

MARINE PROTECTED AREAS

The survey will occur within the nearshore environment offshore of Carlsbad, CA. The Swami's State Marine Conservation Area (SMCA) is the closest MPA and located approximately 5.5 nm south of project area.

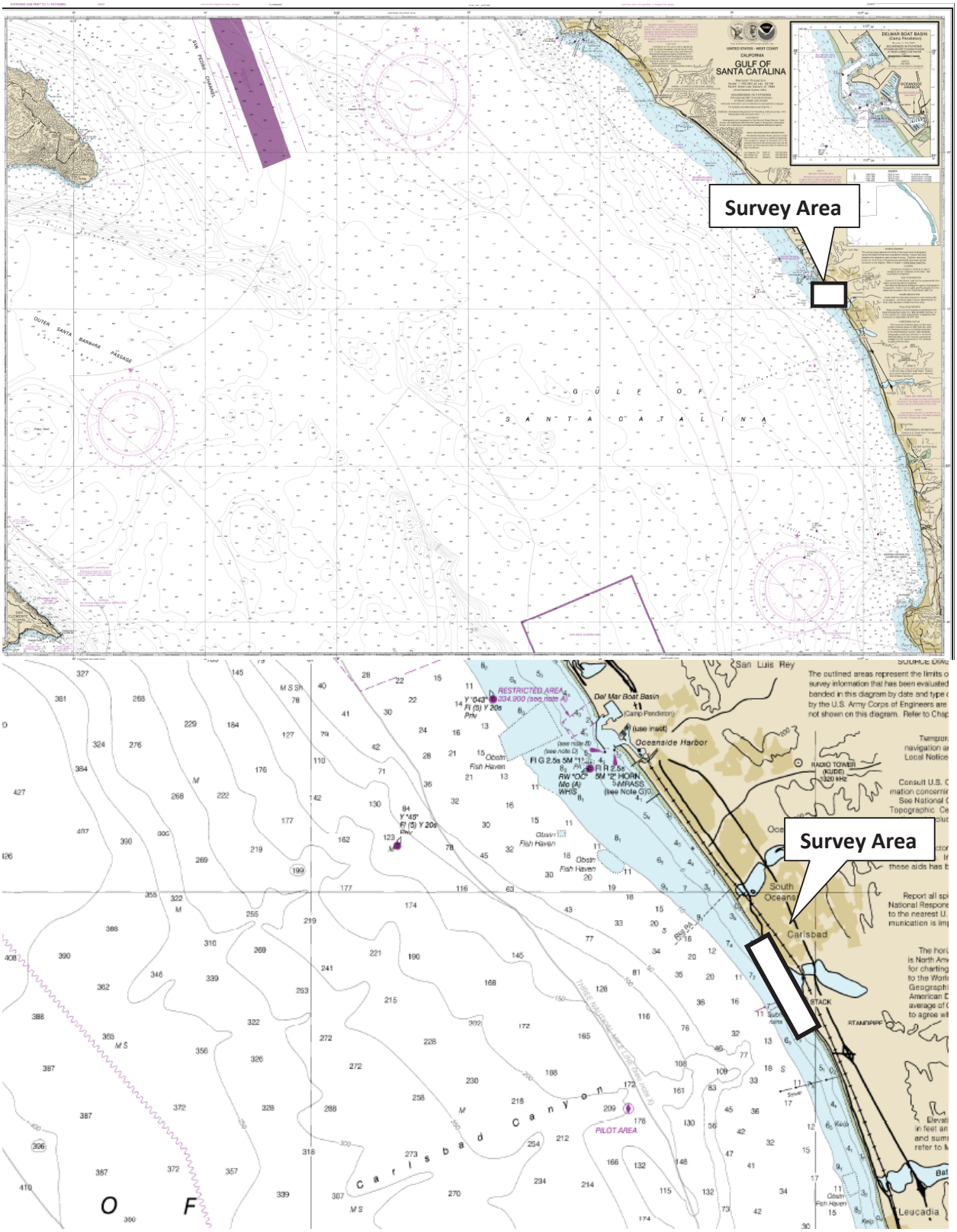

Figure 1. Project survey reach for nearshore habitat mapping

MARINE WILDLIFE IN CALIFORNIA WATERS

The survey area is typically within 700 meters of shore and does not see high use by larger cetaceans. Species that may be encountered include gray whale, multiple species of porpoise and dolphin, and pinnipeds including California sea lion and Pacific harbor seal. Elephant seal may also be encountered in the area. Four species of sea turtle could occur in the study reach as rare encounters. While only a few species would be expected to be encountered, it is not possible to fully rule out encounters with any of the species of marine mammals and reptiles present in California waters. Of the sensitive marine reptiles and mammals in California waters, only a few have a high likelihood of encounter within the shallow nearshore survey area, although some species may be observed in the vicinity of the work especially when transiting to and from port further from shore. Table 2 summarizes these species and their status.

Table 2. Marine wildlife in California and potential to be encountered in survey area

Species	Status	Season in Area	Likelihood of Encounter
REPTILES			
Olive Ridley turtle (T) *Lepidochelys olivacea*	Stable	Widely distributed all seasons	Not expected
Green turtle (T) *Chelonia mydas*	Stable	Jul- Sep	Very Low
Loggerhead turtle (T) *Caretta caretta*	Decreasing	Jul-Sep	Not expected
Leatherback turtle (E) *Dermochelys coriacea*	Decreasing	Jul-Sep	Not expected
MAMMALS			
California gray whale *Eschrichtius robustus*	Fluctuating annually	Feb-May northern migration	Very Low in Fall/ Mod. in Spring
Fin whale (E) *Balaenoptera physalus*	Increasing off California	May-Nov uncommon other times offshore	Low
Humpback whale (E) *Megaptera novaeangliae*	Increasing	May-Nov offshore	Low
Blue whale (E) *Balaenoptera musculus*	Unable to determine	May-Nov offshore and nearshore	Low
Minke whale *Balaenoptera acutorostrata*	No long-term trends suggested	Jan-Dec	Low
Northern right whale (E) *Eubalaena japonica*	No long-term trends suggested	Oct-Feb	Very Low
Sei whale (E) *Balaenoptera borealis*	No long-term trends suggested	Widely distributed all seasons offshore	Not expected
Dall's porpoise *Phocoenoides dalli*	Unable to determine	Dec-May uncommon other times	Low
Harbor porpoise *Phocoena phocoena*	Increasing	Widely distributed all seasons	Very Low
Short-beaked common dolphin *Delphinus delphis*	Unable to determine	Dec-Jun uncommon other times	Low
Long-beaked common dolphin	Unable to	Dec-Jun	Likely

Delphinus capensis	determine	uncommon other times	
Pacific white-sided dolphin *Lagenorhynchus obliquidens*	No long-term trends suggested	Apr-Sep uncommon other times	Low
Risso's dolphin *Grampus griseus*	No long-term trends suggested	Year-round	Very Low
Short-finned pilot whale *Globicephala macrorhynchus*	No long-term trends suggested	Widely distributed all seasons	Not expected
Striped dolphin *Stenella coeruleoalba*	No long-term trends suggested	Widely distributed all seasons offshore	Very Low
Baird's beaked whale *Berardius bairdii*	No long-term trends suggested	Widely distributed all seasons	Not expected
Cuvier's beaked whale *Ziphius cavirostris*	No long-term trends suggested	Widely distributed all seasons	Not expected
Mesoplodont beaked whales	No long-term trends suggested	Widely distributed all seasons	Not expected
Bottlenose dolphin *Tursiops truncatus*	No long-term trends suggested	Common year-round	Very Low
Northern right whale dolphin *Lissodelphis borealis*	No long-term trends suggested	Widely distributed Dec-May	Very Low
Sperm whale (E) *Physeter macrocephalus*	No long-term trends suggested	Widely distributed all seasons far offshore	Not expected
Dwarf sperm whale *Kogia sima*	No long-term trends suggested	Widely distributed all seasons	Not expected
Pygmy sperm whale *Kogia breviceps*	No long-term trends suggested	Widely distributed all seasons	Not expected
Killer whale *Orcinus orca*	No long-term trends suggested	Mar-May uncommon other times	Very Low
California sea lion *Zalophus californianus*	Increasing	Common year-round	Likely
Northern fur seal *Callorhinus ursinus*	Increasing	Nov-Jan widely distributed all seasons	Low
Guadalupe fur seal Arctocephalus townsendi	Increasing	Widely distributed all seasons	Very Low
Northern elephant seal *Mirounga angustirostris*	Increasing	Dec-Apr uncommon other times	Low
Pacific harbor seal *Phoca vitulina richardsi*	Stable	Common year-round	Low
Northern sea lion Eumetopias jubatus	Decreasing	Widely distributed all seasons	Very Low
Fissipedia			
Southern sea otter (T) *Enhydra lutris nereis*	Unable to determine	Small pockets not known in the area	Not expected

(E) Federally listed endangered species

(T) Federally listed threatened species

MARINE WILDLIFE MONITORING AND MITIGATION MEASURES

Current Biological Information

M&A contacted NOAA Fisheries Long Beach office and spoke with Dan Lawson regarding the status of marine mammals and turtles offshore with particular attention to any anomalous distribution patterns. High incidents of turtle encounters, mortalities, and stranding were reported; however, it is not known why this is occurring, but is likely related to last year's warm water expanding the numbers of tropical and subtropical turtles further north than is normal. Three days prior to initiation of survey activities, M&A will contact the NOAA Long Beach office staff again to acquire information on the current composition and relative abundance of marine wildlife offshore. Prior to departure, this data will be provided to the vessel operator and crew, including the Marine Wildlife Monitor.

Marine Wildlife Monitors

As the equipment used for this survey will be operating at frequencies ≥200kHz, only one Marine Wildlife Monitor (MWM) will be required to be on board for this survey. The MWM will be will responsible for the visual monitoring of marine wildlife during all transit and data collection activities. The MWM will monitor from the highest practical vantage point on the survey vessel and will use binoculars, as appropriate. The MWM will have the authority to:

- Stop operations if a mammal or turtle is observed within the specified safety zone and may be negatively affected by survey activities
- Recommend continuation (or cessation) of operations during period of limited visibility (i.e. fog, rain) based on the observed abundance of marine wildlife
- Recommend that equipment be shut down if an animal's actions are observed to be irregular during operations

The resume for the MWM to be used for this project is included in Appendix A.

Vessel Transit

The survey vessel will transit from either Oceanside Harbor or Mission Bay to the survey area and return after each day of survey. During vessel transit to and from the survey area and between survey locations, there is a potential for encountering marine wildlife. Therefore, during transit periods, a MWM will be positioned on the vessel to view of the area of ocean that ahead of the survey vessel. The MWM will observe marine wildlife and will institute measures to avoid potential collisions with those animals. To minimize the chance of collision with or disturbance of marine wildlife, the vessel will maintain a minimum distance of 91 m (300 ft) from marine wildlife. If the MWM should observe a marine mammal or reptile within the path of the transiting vessel, the monitor will report that observation to the vessel operator who will, unless those actions will jeopardize the safety of the vessel or crew, slow the vessel and/or change course in order to avoid contact.

Safety Zone Monitoring and Geophysical Equipment Operations

The interferometric and CAATI sidescan sonar to be used for this survey operates at frequencies ≥200kHz. As such, a safety zone monitoring and enforcement is not required. Regardless of this, the MWM will monitor for marine wildlife and record all observations and responses to the survey vessel and/or equipment.

Soft Start Technique

In order to allow any marine mammals that may be in the immediate area to leave before the sound sources reach full energy, a soft-start (i.e., ramp-up) technique will be used at the beginning of survey activities each day, as well as following any shutdowns throughout the day. The soft start technique requires initiating each piece of equipment at the lowest practical sound level, increasing the output in steps not exceeding approximately 6 decibels per 5-minute period. The MWM will begin to visually monitor the area 30 minutes prior to ramp-up and will continue to monitor throughout the ramp-up activities. If a marine mammal or reptile is sighted within the area during ramp-up, a shut-down or power-down must be implemented, and ramp-up will not be reinitiated until the marine mammal or reptile has left the area.

Avoidance of Pinniped Haul-Out Sites

No known pinniped haul out sites are located within 300 meters of the survey area (Figure 2). The nearest known haul out site is for harbor seals and is located approximately 17 nm south of the site in La Jolla.

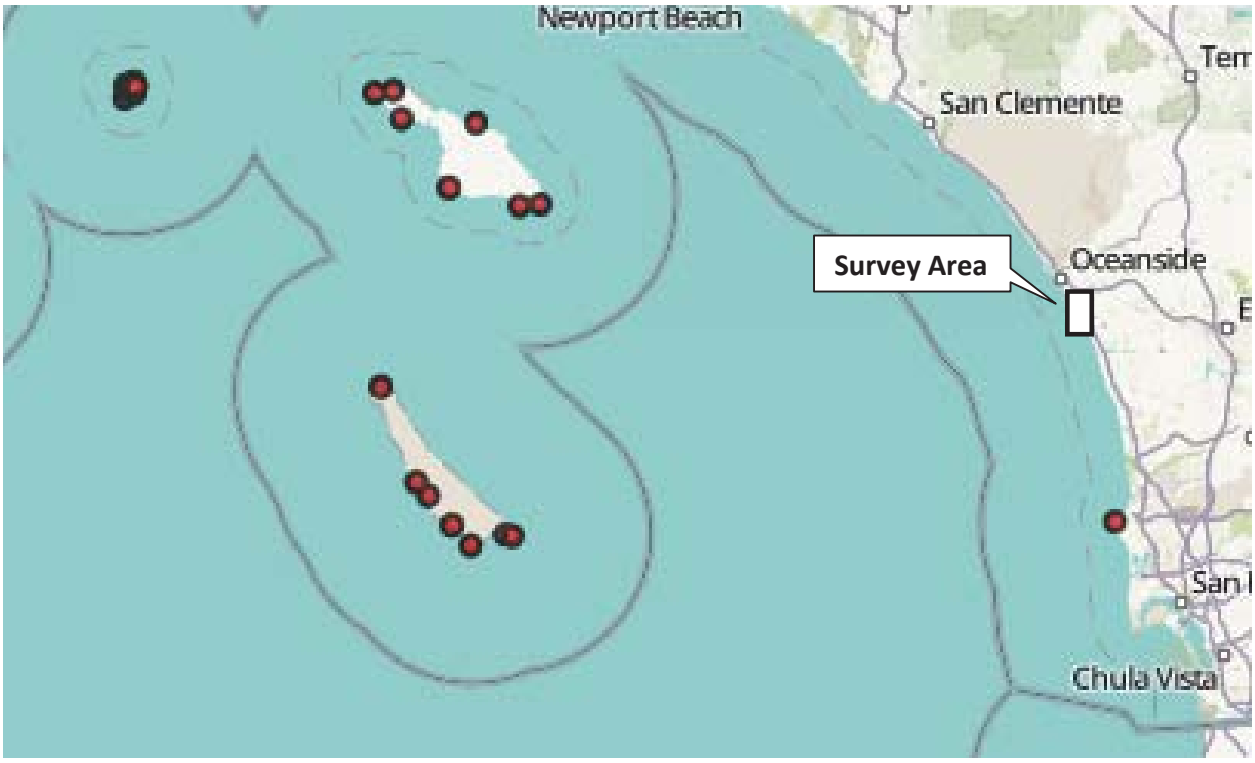

Figure 2. Pinniped haul-out areas within the Southern California Bight (from CDFW 2013)

Additional Marine Wildlife Monitoring Guidelines

In order to reduce the likelihood of collision or disturbance to marine wildlife, the MWM will notify the vessel operator if a marine mammal or reptile is observed in the path of the vessel. The vessel operator will slow and/or change course to avoid contact with the animal, unless those actions would jeopardize the safety of the vessel or crew.

In the event that any whales or other cetaceans (i.e., dolphins) are observed, the vessel operator will observe the following guidelines:

- Maintain a minimum distance of 100 yards (330 feet) from sighted whales;
- Do not cross directly in front of or across the path of sighted whales;
- Transit parallel to whales and maintain a constant speed that is not faster than that of the whale;
- Do not position the vessel in such a manner to separate female whales from their calf(ves);
- Do not use the vessel to herd or drive whales; and,
- If a whale engages in evasive or defensive action, slow the vessel will reduce and move away from the area until the animal calms or moves out of the area.

DATA COLLECTION AND REPORTING FOR MARINE WILDLIFE MONITORS

The MWM will be familiar with and follow procedures in the ***Data Collection Guidelines for Marine Wildlife Monitors***, prepared by CSLC staff (Appendix B). The minimum information will be collected:

- Descriptions of any encounters with marine mammals, reptiles, and/or unusual concentrations of diving birds/seabirds (e.g., species, group size, age/size/sex categories [if determinable], behavior, distance and bearing from vessel) and the outcome of those encounters;
- The number of times equipment shut-downs or vessel slow-downs were ordered due to animals being observed in the safety zone or due to poor visibility conditions;
- A summary of observations of pinniped behavior at haul-out sites, if applicable, and any recommendations made related to pinniped avoidance;
- The number of collision events, if applicable, and the species and disposition of animal; and
- Any additional information relevant or necessary for compliance with the post- survey reporting requirement identified in the General Permit (Term and Condition 9.a.ii).

MARINE MAMMAL AND REPTILE COLLISION RESPONSE AND REPORTING

In the event of a collision between the vessel and a marine mammal or reptile, the vessel operator will document the conditions under which the accident occurred. These conditions include:

- 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 the presence of rain, fog) at the time of collision;
- Species of marine wildlife contacted (if known);
- Whether an observer was monitoring wildlife at the time of collision, and;
- Name of the vessel, owner/operator, and captain officer in charge of the vessel at the time of collision.

After a collision, the vessel shall stop, if it is safe to do so. Operations will continue once it is confirmed that no further damage will result to the animal by doing so. The vessel shall then immediately communicate by radio or telephone all details to the vessel's base of operations. The vessel's base of operations or the vessel captain will then immediately call the NOAA Southwest Region (Long Beach) Stranding Coordinator to report the collision and will then follow any instructions received from the Coordinator. The Stranding Coordinator will coordinate subsequent action, including enlisting the aid of marine mammal rescue organizations, if appropriate.

While NOAA Fisheries has primary responsibility for marine mammals in both state and federal waters, CDFG will also be advised that an incident has occurred in state waters affecting a protected species. Reports should be communicated to the agencies listed below:

FEDERAL

Justin Viezbicke
Stranding Coordinator
National Marine Fisheries Service
(562) 980-3230 office
justin.viezbicke@noaa.gov

STATE

Enforcement Dispatch Desk
California Department of Fish & Wildlife
Long Beach, CA 90802
(562) 598-1032

California State Lands Commission
Environmental Planning and Management
Sacramento, CA
(916)574-1938
slc.ogpp@slc.ca.gov

FISHING GEAR CLEARANCE

In addition to submitting the required Notice to Mariners that will alert commercial fishermen of pending on-water activities prior to the start of each survey location, the vessel will traverse the proposed survey to note and record the presence of deployed fishing gear. The type and location of fishing gear (buoys) will be noted, and CDFW Enforcement Office will be notified. The survey crew will not remove or relocate any fishing gear; removal or relocation will only be accomplished by the owner or by an authorized CDFW agent (Table 3).

Table 3. Fishing Gear Conflict Contact Information

Enforcement Dispatch Desk California Department of Fish and Wildlife, Southern District	California Department of Fish & Wildlife, Marine Division
(562) 598-1032	(831) 649-2870

MITIGATION MEASURES

The following operation-related actions will be implemented in accordance with CSLC permit requirements:

- Prior to commencing of Survey activities in an MPA, M&A will coordinate with CSLC staff, CDFW, and any other appropriate permitting agencies regarding proposed operations within MPAs.
- Survey operator shall use a "soft start" technique at the beginning of survey activities each day (or following a shutdown) to allow any marine mammal that may be in the Project area to leave before the sound sources reach full energy. The survey operator will initiate each piece of equipment at the lowest practical sound level, increasing the output no greater than six (6) decibels (dB) per 5-minute period;
- During operations, if an animal's actions are observed to be "irregular" the MWM will have the authority to recommend the cessation of data collection until the animal moves out of the Project area. If the behavior is observed, the equipment will be shut-off and will be restarted and ramped-up to full power or will not be started until the animal(s) is/are outside of the Project area;
- The monitor will have the authority to recommend halting data collecting operations if a large concentration of diving birds/sea birds is observed in the immediate vicinity;
- Unless the safety of the vessel or crew would be in jeopardy, avoidance measures instituted during vessel transit will be implemented during geophysical data collection as well.
- Survey operator shall follow, to the maximum extent possible, the guidelines of Zykov (2013) as they pertain to the use of side-scan sonar, including:
    a. Using the shortest possible pulse length; and
    b. Lowering the pulse rate (pings per second) as much as feasible.

With the incorporation of the mitigation measures presented in this document, the proposed offshore survey activities are unlikely to cause injury and/or disturb marine wildlife.

RECORDING AND REPORTING PROCEDURES

Within 30 days following completion of survey activities, a Post-survey Field Operations and Compliance Report will be submitted to CSLC staff.

REFERENCES

California Department of Fish and Game (CDFG). 2013. Guide to southern California marine protected areas. 120 pp.

National Marine Fisheries Service. 2016a. Marine Mammal Stock Assessment Reports by Species. Website: http://www.nmfs.noaa.gov/pr/sars/species.htm.

National Oceanic and Atmospheric Administration (NOAA), 2013a. Pinniped rookeries and haul-out sites, Southern California. Coastal Response Research Center.

National Oceanic and Atmospheric Administration (NOAA), 2013b. Gray whale (*Eschrichtius robustus*) http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/graywhale.htm.

National Park Service, 2015. Whales at Cabrillo National Monument. http://www.nps.gov/cabr/learn/nature/whales.htm

Ocean Institute, 2008. California gray whale. http://www.ocean-institute.org/visitor/gray_whale .html

APPENDIX A: MARINE WILDLIFE OBSERVER RESUME

Cory Ann Hom-Weaver

Associate Biologist, Merkel & Associates, Inc., *San Diego, California. August 2016 to present.*

Ms. Hom-Weaver is an Associate Biologist and has over 8 years of professional biological experience focusing on marine mammal biology and bio-acoustics. Her work has included work throughout the tropical to polar waters of the Pacific and Atlantic where she has worked on completion of cetacean inventories as well as development of bio-acoustic signatures for monitoring and tracking marine mammals using passive acoustic arrays. She has served as a lead marine mammal observer for multiple cruises and has worked as a lead bio-acoustician for recurrent NOAA survey programs. She has completed marine mammal and reptile monitoring for marine construction activities. Ms. Hom-Weaver has also completed field data collection and analyses for anthropogenic hydroacoustic environments including pile-driving, vessel traffic, and sonar equipment sources.

PROFESSIONAL EXPERIENCE

Associate Biologist/Bio-Acoustician/Marine Mammal Observer: *Merkel & Associates, Inc.*
San Diego, CA. (August 2016-present)

- Marine mammal and turtle monitor for the BAE Systems Pier 1 North Drydock Project
- Bio-acoustician for field data-collection and analyses for impact and vibratory pile driving for the BAE Systems Pier 1 North Drydock Project
- Water quality and photosynthetically active radiation (PAR) monitoring for dredging impacts for the Redwood City, Richmond Harbor, and Oakland Harbor maintenance dredging projects.

Marine Biologist/ Bio-Acoustician: *Bio-Waves Inc.*
San Diego, CA. (February 2009-August 2016)

- Lead bio-acoustician for the 2016 Santos Basin Cetacean Monitoring Project in Brazil
- Lead bio-acoustician for the 2015 Visual and Acoustic Survey of the Remote Pacific Islands for Conservation International in collaboration with Silversea Cruises.
- Lead bio-acoustician for: the 2016&2015 PODS, 2014 SWATT, and 2013 AMMAPS surveys for the Northwest and Southeast Fisheries Science Centers.
- Management of passive acoustic monitoring/tracking operations for marine mammal surveys.
- Responsible for all software configuration and setup of computer systems used during the 2016&2015 PODS, 2014 SWATT, 2013 AMAPPS, and 2012 Palau Cetacean surveys.
- Bio-acoustician on the ONR sponsored Kauai minke whale surveys during 2009 and 2010.
- Experience using PAMGuard software for passive acoustic monitoring, tracking, and localization.
- Writing detailed reports on data collection methods, analysis, and results for clients.
- Responsible for data-acquisition and recording of marine mammal vocalizations in the field.
- Trained in towed-hydrophone array construction, maintenance, and troubleshooting.

Marine Mammal Observer: *Bio-Waves Inc.*
San Diego, CA. (January 2009-2012)

- Served as a lead marine mammal observer on the 2012 Palau Marine Mammal Research Project.
- Marine mammal observer on the ONR funded Kauai Minke whale surveys during 2009 and 2010.
- Proficient at data entry using Logger software.
- Skilled at using reticle range finding binoculars for distance estimation of marine mammals.
- Experienced in identification of South Pacific, North Pacific, and West Atlantic cetacean species.
- Assisted with deployment, maintenance, and operations of oceanographic monitoring equipment including: CTDs, XBTs, and EK60.
- Experience with ridged-hull inflatable boat (RHIB) operations.

Data Analyst: *Bio-Waves Inc.*
San Diego, CA. (June 2008-August 2016)

- Responsible for writing and compilations of acoustic reports and protocols.
- Management of large acoustic datasets.
- Use of PAMGuard software for measurement and analysis of acoustic data.
- Measurement of delphinid whistles for random forest classification using a real-time odontocete call classification algorithm (ROCCA).
- Use of Triton software to create/annotate long-term spectral averages (LTSAs) for cetacean classification.
- Experienced in identification of marine mammal sounds in LTSAs.
- Proficient in the post-processing localization of Minke whales using Boinger (custom Matlab software).
- Experienced at developing automated detectors in Ishmael software for minke whale boings.

EDUCATION

2009 - Bachelor of Science in Animal Science, California Polytechnic State University, San Luis Obispo

SELECTED PUBLICATIONS & REPORTS

Yack, T., Ferguson, E., Walker, R., Hom-Weaver, C., and Norris, T., 2016. Assessment of Vocal Behavior of Sperm Whales in the Northwestern Atlantic Ocean. Final Report. Submitted to HDR Environmental, Operations and Construction, Inc. Norfolk, Virginia, under contract no. CON-005-4394-009. Prepared by Bio-Waves, Inc., Encinitas, California.

Dominello, T., Norris, T., Yack, T., Ferguson, E., Hom-Weaver, C., Kumar, A., Nissen, J., and Bell, J. 2013. Vocalization behaviors of minke whales in relation to sonar in planned Undersea Warfare Training Range off Jacksonville, Florida. Abstract. Journal of the Acoustical Society of America 134(5): 4046.

Ferguson, E., Norris, T., Hom-Weaver, C., and Dunleavy, K. 2013. Sperm whale coda repertories in the western Pacific Ocean. Abstract. Journal of the Acoustical Society of America 134(5): 3987.

Norris, T., Oswald, J., Yack, T., Ferguson, E., Hom-Weaver, C., Dunleavy, K., Coates, S., and Dominello, T. 2012. An Analysis of Acoustic Data from the Mariana Islands Sea Turtle and Cetacean Survey (MISTCS). Prepared for Commander, Pacific Fleet, Pearl Harbor, HI. Submitted to Naval Facilities Engineering Command Pacific (NAVFAC), EV2 Environmental Planning, Pearl Harbor, HI, 96860-3134, under Contract No. N62470-10D-3011 CTO KB08, Task Order #002 issued to HDR, Inc. Submitted by Bio-Waves, Inc., Encinitas, California.

SELECTED PRESENTATIONS

Hom-Weaver, C., Norris, T., Oswald, J., Yack, T., Oedekoven, C., Thomas, L., Hodge, L., Read, A., and Bell, J. 2015 The Acoustic Behavior of Minke Whales in Relation to Mid-Frequency Active Sonar. Poster session presented at: 21st Biennial Society of Marine Mammalogy Conference; 2015 December 13th-18th. San Francisco, CA.

Ferguson, E., Yack, T., Norris, T. and Hom-Weaver, C. 2015. Geographic Variation in Sperm Whale Echolocation Clicks. Poster session presented at: 7th International Workshop on Detection, Classification, Localization, & Density Estimation of Marine Mammals using Passive Acoustics; 2015 July 13th-16th. La Jolla, CA.

Walker, R., Oswald, J., Hom-Weaver, C., Dunleavy, K., and Norris, T. 2015. True or False: Developing Methods for Pruning False and Inaccurate Detections from an Automated Whistle Detector. Poster session presented at: 7th International Workshop on Detection, Classification, Localization, & Density Estimation of Marine Mammals Using Passive Acoustics; 2015 July 13th-16th. La Jolla, CA.

Coates, S., Yack, T., Hom-Weaver, C., and Rone, B. Use of Passive Acoustic Monitoring to Assess Beaked Whale Distribution and Habitat use in the Gulf of Alaska. 2014. Poster session presented at: 5th Annual Southern California Marine Mammal Workshop; 2014 January 31st -February 1. Newport Beach, CA.

Hom-Weaver, C., and Andrews, O. 2013. A Preliminary Investigation of Cetaceans in Palau's Marine Mammal Sanctuary. Poster session presented at: 4th Annual Southern California Marine Mammal Workshop; 2013 February 1-2. Newport Beach, CA.

Ferguson, E., Hom-Weaver, C., Dunleavy, K., and Norris, T. 2013. Western Pacific Ocean Sperm Whale Coda Repertoires. Poster session presented at: 4th Annual Southern California Marine Mammal Workshop; 2013 February 1-2. Newport Beach, CA.

Norris, T., Steckler, D., Smultea, M., Wursig, B., Dominello, T., Hom-Weaver, C., and Bacon, C. 2013. Sights and Sounds in the Sky: Integrated Acoustic/Visual Aerial Monitoring of Marine Mammal Behaviors Using Sonobuoys and Videography. Poster session presented at: 4th Annual Southern California Marine Mammal Workshop; 2013 February 1-2. Newport Beach, CA.

Norris, T., Dominello, T., Yack, T., Ferguson, E., Oswald, J., and Hom-Weaver, C. 2013. Vocalization Behaviors of Minke Whales and Potential New Call Type off the Coast of Jacksonville, FL. Poster session presented at: 4th Annual Southern California Marine Mammal Workshop; 2013 February 1-2. Newport Beach, CA.

APPENDIX B: DATA COLLECTION GUIDELINES FOR MARINE WILDLIFE MONITORS

Data Collection Guidelines for Marine Wildlife Monitors

California State Lands Commission (CSLC) staff has prepared this guidance document to help Marine Wildlife Monitors (MWMs) record data in a manner that meets the expectations of CSLC staff reviewers. Permittees shall provide these guidelines to onboard MWMs who are responsible for the visual monitoring of marine wildlife, including recording information on survey activities and observations of marine wildlife, and summarizing encounters with marine mammals and reptiles and subsequent actions taken during vessel transit and survey operations. In accordance with the Low Energy Offshore Geophysical Survey Program (OGPP) General Permit requirements, Permittees must submit a Post Survey Field Operations and Compliance Report to CSLC staff no more than 30 days after the completion of any survey activities, which includes the following information collected by MWMs:

- Descriptions of any encounters with marine mammals, reptiles, and/or unusual concentrations of diving birds/seabirds (e.g., species, group size, age/size/sex categories [if determinable], behavior, distance and bearing from vessel) and the outcome of those encounters;
- The number of times equipment shut-downs or vessel slow-downs were ordered due to animals being observed in the safety zone or due to poor visibility conditions;
- A summary of observations of pinniped behavior at haul-out sites, if applicable, and any recommendations made related to pinniped avoidance; and
- Number of collision events, if applicable, and the species and disposition of animal.

The goal of providing data collection guidelines, in addition to a **Marine Environmental Variables Form** and a **Marine Wildlife Observations Form** (see below), to MWMs is to ensure consistency in the documentation of marine wildlife observations and interactions during vessel transit and survey operations. MWMs should refer to the Permittee's **Marine Wildlife Contingency Plan** (MWCP) for additional information regarding MWM responsibilities and marine wildlife that could be expected within the project region.

I. General Information

Record the following information at the start of each shift, and when environmental variables and vessel activity change:

- Record your name, date, time, and environmental variables (refer to Section II)
- Note vessel activity (e.g., transiting, surveying)
- Record start and end times of vessel activity (e.g., start/end of transit, ramp-up)

II. Marine Environmental Variables

Record the following environmental variables on the **Marine Environmental Variables Form** (see below) at the beginning of each shift and if there are any changes during the observation period:

- Weather Conditions – Note weather conditions (e.g., clear, hazy, gray, fog, rain)
- Cloud Cover – Refer to **Table 1** to determine the approximate cloud cover

Table 1. Cloud Cover

Description	Percent (%)
Clear	0-10
Scattered	10-50
Broken	50-90
Overcast	90-100

- Glare – Record intensity (none, mild, medium, or severe) and direction relative to the vessel (e.g., 0° to 30°, or north/northeast)
- Visibility – Measured in kilometers (km) or nautical miles (nm)
- Wind Speed – Refer to **Table 2** to determine the approximate wind speed
- Sea State – Refer to **Table 2** to determine the approximate sea state
- Swell Height – Measured from the crest to the trough of the swell (meters)

Table 2. Beaufort Scale

Beaufort Scale	Wind (knots)	Wind Conditions	Sea Conditions
0	<1	Calm	Sea surface smooth and mirror-like
1	1-3	Light air	Scaly ripples, no foam crests
2	4-6	Light breeze	Small wavelets (0.2 m), crests glassy, no breaking
3	7-10	Gentle breeze	Large wavelets (0.6 m), crests begin to break, scattered whitecaps
4	11-16	Moderate breeze	Small waves (1 m), some whitecaps
5	17-21	Fresh breeze	Moderate waves (1.8 m) taking longer form, many whitecaps, some spray
6	22-27	Strong breeze	Larger waves (3 m), whitecaps common, more spray
7	28-33	Near gale	Mounting sea (4 m) white foam streaks off breakers
8	34-40	Gale	Moderately high waves (5.5 m) of greater length, edges of crests begin to break into spindrift, foam blown in streaks
9	41-47	Strong gale	High waves (7 m), sea begins to roll, dense streaks of foam, spray may reduce visibility
10	48-55	Storm	Very high waves (9 m) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility
11	56-63	Violent storm	Exceptionally high waves (11 m), foam patches cover sea, visibility more reduced
12	64+	Hurricane	Air filled with foam, waves over 14 m, sea completely white with driving spray, visibility greatly reduced

III. Marine Wildlife Observations

When a marine mammal or reptile is first sighted, record the following information on the **Marine Wildlife Observations Form** (see below):

- Time of initial siting – 24-hour format
- Position of vessel – Latitude and longitude
- Distance (meters, kilometers) and bearing (relative to the geographical compass) to the animal(s)
- Species (or identification to the lowest possible taxonomic level) – If species cannot be determined, but species group can, please record, for example, "unidentifiable whale" or "unidentifiable dolphin." In addition, if species cannot be determined, please record any distinguishing marks or characteristics (e.g., size and shape of dorsal fin, fluke shape, size and shape of blow, color, size)
    - Refer to **Appendix A** (California Marine Mammals) and **Appendix B** (California Sea Turtles) for information on marine mammals and reptiles that could be expected in California waters.
- Certainty of identification (unsure/possible, probable, definite)
- Number of individuals
- Age/size/sex categories (if determinable)
- Direction of animal's travel relative to the survey vessel (e.g., toward vessel, away from vessel, parallel to vessel) – Draw/sketch, if necessary
- Behavior – Record behavior of animal(s) when first sighted *and throughout the observation period*; be as explicit and detailed as possible, and note any observed changes in behavior.
    - Examples of behaviors are: fast, moderate, or slow swimming; porpoising; bow riding; breaching/aerobatics; flipper slapping; tail slapping/lobtailing; spyhopping; diving (note whether fluke was raised); frequent/infrequent surfacings; feeding; milling; logging; avoiding/approaching survey vessel/equipment.
- If an animal enters the established safety zones (**Table 3**), please record the following additional information:
    - Time when first observed in safety zone
    - Time when observed exiting safety zone
    - What action was taken, if any, when the animal(s) was observed in the safety zone
    - Behavior of animal(s) in safety zone – (e.g., rapid breathing/increased surfacing, sudden/erratic change in behavior or direction)
    - Duration of power-down/shut-down, if required
    - Behavior of animal(s) after shut-down of geophysical equipment

Table 3. Safety Zone Monitoring by Equipment Type

Equipment Type	Safety Zone (radius, m)
Single Beam Echosounder	50
Multibeam Echosounder	500
Side-Scan Sonar	600
Subbottom Profiler	100
Boomer	100

- Activity of survey vessel (e.g., transit, equipment in operation [note type of equipment and operating parameters])
- Note the number and type (e.g., recreational/commercial fishing vessel, tanker) of other vessels in survey area

Marine Environmental Variables Form

Date: _____ Monitor: _____

Time	Latitude	Longitude	Vessel Activity	Weather	Cloud Cover	Glare	Visibility	Wind Speed	Sea State	Swell Height	Comments

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Marine Wildlife Observations Form

Date: _____ Monitor: _____

Time:	Latitude:	Longitude:
Weather:	Cloud Cover:	Glare:
Visibility:	Wind Speed:	Sea State:
Swell Height:	Survey Vessel Activity:	
Marine Wildlife Observations and Interactions:		

Time:	Latitude:	Longitude:
Weather:	Cloud Cover:	Glare:
Visibility:	Wind Speed:	Sea State:
Swell Height:	Survey Vessel Activity:	
Marine Wildlife Observations and Interactions:		

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Appendix A. California Marine Mammals

Species or Guild	Stock	Status and Species Account for California Waters	Probability of Encounter
Mysticetes – Baleen Whales			
Bryde's whale (*Balaenoptera edeni*)	Eastern Tropical Pacific	Bryde's whales along the California coast are likely part of a larger population inhabiting the eastern part of the tropical Pacific Ocean. As a result, a regular occurrence is likely to be very low.	Very low
Sei whale (*Balaenoptera borealis borealis*)	Eastern North Pacific	Endangered; sei whales are considered rare in California waters.	Low
Minke whale (*Balaenoptera acutorostrata scammoni*)	California/ Oregon/ Washington	Minke whales occur year-round along shelf waters in California and in the Gulf of California, occurring south of California in the summer/fall.	Low to Medium
Fin whale (*Balaenoptera physalus physalus*)	California/ Oregon/ Washington	Endangered; aggregations of fin whales occur year-round in Southern/Central California and the Gulf of California. Fin whale vocalizations are detected year-round off Northern California, with a peak in vocal activity between September and February. Although typically found over the slopes and continental shelves, fin whales have been regularly reported from shore during gray whale migration surveys.	Medium
Blue whale (*Balaenoptera musculus musculus*)	Eastern North Pacific	Endangered; the U.S. west coast represents one of the most important feeding areas in summer and fall for blue whales. Most of this stock is believed to migrate south to Baja California, the Gulf of California, and the Costa Rica Dome during the winter and spring.	Medium
Humpback whale (*Megaptera novaeangliae*)	California/ Oregon/ Washington	Humpback whales in the North Pacific feed in coastal California waters and migrate south to winter. The California/ Oregon/Washington stock includes humpback whales that feed along the U.S. west coast. Humpback whales are found throughout shelf waters, but have been reported with regularity inside the 100-m isobaths.	Medium

Species or Guild	Stock	Species Account for California Waters	Probability of Encounter
North Pacific right whale (*Eubalaena japonica*)	Eastern North Pacific	Endangered; North Pacific right whales primarily occur in coastal or shelf waters in northern latitudes. During winter, right whales occur in lower latitudes and coastal waters where calving takes place. Sightings have been reported as far south as central Baja California in the eastern North Pacific.	Low
California gray whale (*Eschrichtius robustus*)	Eastern North Pacific	Most gray whales in the Eastern North Pacific stock spend the summer feeding in the northern and western Bering and Chukchi Seas before migrating south in the fall along the coast of North America from Alaska to Baja California. The stock winters along the coast of Baja California, using shallow lagoons and bays for calving. The northbound migration generally takes place between February and May with cows and newborn calves migrating northward, primarily between March and June, well within 5 mi of the shoreline.	Seasonal: High to Low
Odontocetes – Toothed Whales			
Short-finned pilot whale (*Globicephala macrorhynchus*)	California/ Oregon/ Washington	Short-finned pilot whales were likely residents off Southern California; however, after a strong El Niño event in 1982-83, short-finned pilot whales virtually disappeared from this region. Since then, there have been infrequent sightings of pilot whales off the California coast.	Low to Medium
Killer whale (*Orcinus orca*)	Eastern North Pacific Offshore[2]	Killer whales are wide-ranging species, with this stock ranging from the outer coasts of Washington, Oregon and California.	Low to Medium
Striped dolphin (*Stenella coeruleoalba*)	California/ Oregon/ Washington	Striped dolphins are typically sighted 100 to 300 nm from the California coast.	Medium

Species or Guild	Stock	Status and Species Account for California Waters	Probability of Encounter
Pygmy and dwarf sperm whales (*Kogia* spp.)	California/ Oregon/ Washington	Pygmy and dwarf sperm whales are distributed throughout deep waters and along the continental slopes of the North Pacific; however, little population data are available for these species. *Kogia* sightings may underestimate their presence due to their inconspicuous behavior. Due to their deep diving habits, they may be more susceptible to sound impacts than other species.	Low to Medium
Small beaked whales[1] (Ziphidae)	California/ Oregon/ Washington	At least five species of Mesoplodont whales have been recorded off the U.S. west coast. They are grouped here due to the infrequent records and difficulty of positive identification. Ziphid beaked whales are distributed widely throughout deep waters of all oceans, but have been seen primarily along the continental slope in western U.S. waters from late spring to early fall. They have been seen less frequently and are presumed to be farther offshore during the colder water months of November through April. Due to their deep diving habits, they may be more susceptible to sound impacts than other species.	Low to Medium
Sperm whale (*Physeter macrocephalus*)	California/ Oregon/ Washington	Endangered; sperm whales are widely distributed across the entire North Pacific during the summer, while in winter, the majority are thought to be south of 40° N (roughly Eureka, CA). Sperm whales are found year-round in California waters with peak abundances from April to June, and again from September to November. They are typically found on slopes in waters deeper than 200 m.	Medium
Bottlenose dolphin (offshore) (*Tursiops truncatus truncatus*)	California/ Oregon/ Washington	Offshore bottlenose dolphins are evenly distributed at distances greater than a few kilometers from the mainland and throughout the SCB.	Medium
Bottlenose dolphin (coastal) (*Tursiops truncatus truncatus*)	California Coastal	California coastal bottlenose dolphins are typically found within 1 km from shore from Point Conception south into Mexican waters.	High (South Coast region)

Species or Guild	Stock	Status and Species Account for California Waters	Probability of Encounter
Long-beaked common dolphin (*Delphinus capensis capensis*)	California	Long-beaked common dolphins are commonly found within 50 nm of the coast from Southern to Central California.	Medium
Short-beaked common dolphin (*Delphinus delphis*)	California/ Oregon/ Washington	Short-beaked common dolphins are the most abundant cetacean off California and can be seen in coastal and shelf waters up to 300 nm from shore.	High
Northern right whale dolphin (*Lissodelphis borealis*)	California/ Oregon/ Washington	Northern right whale dolphins are primarily seen in shelf and slope waters with seasonal movements into California waters during the colder water months.	Medium
Dall's porpoise (*Phocoenoides dalli dalli*)	California/ Oregon/ Washington	Dall's porpoises are commonly seen in shelf, slope, and offshore waters with occurrences common off Southern California in winter.	Medium (location, season)
Risso's dolphin (*Grampus griseus*)	California/ Oregon/ Washington	Risso's dolphins are commonly seen in shelf waters within the SCB and in slope and offshore waters of California.	Medium
Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)	California/ Oregon/ Washington	Pacific white-sided dolphins are common along continental margins and offshore, with peak occurrences off California during the colder winter months.	Medium to High
Common dolphin (long- and short-beaked) (*Delphinus* spp.)	California/ Oregon/ Washington (short-beaked); California (long-beaked)	Many stock assessment and cetacean surveys list *Delphinus* species rather than distinguish between short- and long-beaked common dolphins; consequently, this species group has been considered as a whole in the density model.	High
Harbor porpoise (*Phocoena phocoena vomerina*)	Central California (incl. bay Stocks & N. California/ S. Oregon Stock)	Four geographic stocks in California waters are identified as separate stocks mainly due to varying fisheries pressures. The combined range extends from Southern Oregon/Northern California to Point Conception. Harbor porpoise are found almost exclusively in coastal and inland waters.	High

Species or Guild	Stock	Status and Species Account for California Waters	Probability of Encounter
Pinnipeds – Seals and Sea Lions			
Harbor seal (*Phoca vitulina richardsi*)	California	Harbor seals inhabit nearshore coastal and estuarine areas from Baja California to the Pribilof Islands in Alaska. In California, approximately 400 to 600 harbor seal haul-out sites are widely distributed on the mainland and on offshore islands, intertidal sandbars, rocky shores, and beaches. Rookeries are located from Santa Rosa to Mexico.	High
Northern elephant seal (*Mirounga angustirostis*)	California (breeding)	Northern elephant seals breed and give birth in California primarily on offshore islands from December to March from about San Francisco southward. Adults return to land between March and August to molt. Adults return to their feeding areas again between their spring/summer molting and their winter breeding seasons.	High (seasonal)
Northern fur seal (*Callorhinus ursinus*)	San Miguel Island	All northern fur seals in California waters are found along San Miguel Island off Southern California.	High (Channel Islands region)
California sea lion (*Zalophus californianus*)	California	California sea lions are distributed along the entire coastline year round, and breed on islands in Southern California.	High
Northern (Steller) sea lion (*Eumetopias jubatus*)	Eastern Pacific US	Threatened; rookeries for Steller sea lions (eastern DPS) are located between Cape Fairweather, Alaska and Ano Nuevo Island, California. Breeding takes place from May to July, outside of which they are widely dispersed.	High (seasonal)
Guadalupe fur seal (*Arctocephalus townsendi*)		Threatened; Guadalupe fur seals pup and breed mainly at Isla Guadalupe, Mexico, with a second rookery at Isla Benito del Este, Baja California. In 1997, a pup was born at San Miguel Island, California. Individuals have stranded or have been sighted as far north as Blind Beach, California, inside the Gulf of California, and as far south as Zihuatanejo, Mexico.	Extremely low

Species or Guild	Stock	Status and Species Account for California Waters	Probability of Encounter
Mustelid – Sea Otter			
Southern sea otter (*Enhydra lutris nereis*)	California	Threatened; southern sea otters occupy nearshore waters along the California coastline from San Mateo County to Santa Barbara County. A translocated colony has been established at San Nicolas Island, Ventura County.	High (location)

[1] Includes *Mesoplodon* species and *Ziphiidae* species
[2] Stocks overlap in some California waters; however, this stock encompasses the waters along the entire California coast

Probability of encounter during low energy geophysical surveys is based on population estimates and distribution facts in the NOAA Stock Assessment Reports, and the density calculations are from the SERDP-SDSS density models and are not referenced from the NOAA Stock Assessment Reports. The probability of occurrence for marine mammal species in the Project area was determined based on the overall population density of the species, spatial and seasonal distribution patterns (particularly those associated with water depth), and species behavioral characteristics. These descriptors are partially subjective in that they assume an overall equal possibility of an OGPP operation occurring anywhere in State waters at any given time. Species with very low and low probability of occurrence (N= 3) during operations were those that have a low overall population density off the California coast combined with either a narrow seasonal occurrence, or are typically found well outside State waters (e.g., outside the 200 m isopleth). Species with a low to medium probability of occurrence are those that have (or have had) a documented population (seasonal or year round) in waters off the coast of California, but tend to occur at depths beyond those delineated as State waters. Species with documented sightings within State waters and those that use of shelf and slope waters or have a widely distributed resident population fell to the medium rather than low end of the occurrence scale. Species meeting both the low and medium criteria with behaviors that make them less conspicuous (e.g., deep diving, less gregarious), or lacking population data were given a higher occurrence rating as a precautionary approach. Species that have documented populations in State waters were given a high probability of occurrence even if found in a localized geographic region or only during specific seasons.

Appendix B. Sea Turtles of California

Taxonomic Classification and Common Name	Status and Species Account for California Waters	Presence in California Waters
Family – Cheloniidae		
Loggerhead sea turtle (*Caretta caretta*)	FE[1]; occupies three different habitats – oceanic, neritic, and terrestrial (nesting only) depending upon life stage; omnivorous.	Rare
Green sea turtle (*Chelonia mydas*)	FE; resident populations in San Diego County (San Diego Bay); aquatic, but known to bask onshore; juvenile distribution unknown; omnivorous.	Common
Pacific hawksbill sea turtle (*Eretmochelys imbricata bissa*)	FE; Rare in CA; pelagic; feeding changes from pelagic surface feeding to benthic, reef-associated feeding mode; opportunistic diet.	Rare
Olive ridley sea turtle (*Lepidochelys olivacea*)	FT[2]; primarily pelagic, but may inhabit coastal areas, including bays and estuaries; most breed annually, with annual migration (pelagic foraging, to coastal breeding/nesting grounds, back to pelagic foraging); omnivorous, benthic feeder.	Rare
Family – Dermochelyidae		
Pacific leatherback sea turtle (*Dermochelys coriacea*)	FE; pelagic, lives in the open ocean and occasionally enters shallower water (bays, estuaries); omnivorous (jellyfish, other invertebrates, vertebrates, kelp, algae); local aggregations evident (e.g., Monterey Bay); seasonal migrant.	Frequent

FE: Federally Endangered; FT: Federally Threatened

[1] North Pacific Ocean Distinct Population Segment (DPS)
[2] Coastal Mexico population endangered (threatened elsewhere)

CARLSBAD NEARSHORE HABITAT MAPPING

OIL SPILL CONTINGENCY PLAN

OFFSHORE GEOPHYSICAL PERMIT #W6005.169

October 2016

Submitted To:
California State Lands Commission Mineral
Resources Management Division 200
Oceangate, 12th Floor
Long Beach, CA 90802-4331

Submitted by:
Merkel & Associates, Inc.
5434 Ruffin Road
San Diego, CA 92123
858-560-5465

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ENCINITAS TO DEL MAR NEARSHORE HABITAT MAPPING
OIL SPILL CONTINGENCY PLAN

Merkel and Associates, Inc.
October 2016

INTRODUCTION

Merkel & Associates (M&A) will be conducting survey operations on the 24-foot Weldcraft Ocean King Survey vessel. This Oil Spill Contingency Plan (OSCP) has been prepared in accordance with Exhibit H (Mitigation Monitoring Program) of the General Permit to help ensure that accidental release of petroleum and/or non-petroleum products during survey operations is minimized.

OPERATIONAL SPILLS

Operational spills might involve one or more of the following substances carried on board the vessel: (i) fuel, (ii) lube oil, (iii) hydraulic oil, or (iv) waste oil. The vessel is equipped with a Buffalo Quick-Response Oil Spill Kit, which includes three 4-inch socks for fast spill containment, 15 woven polypropylene sheets for rapid absorption of surface oil and protective gear, 1 pair of protective gloves, 1 disposal bag, and a set of instructions. This oil spill kit is located in the forward cabin of the vessel. This spill kit is rated to clean up 5 gallons of liquid. All of the liquids (listed below) that could cause a hazardous spill are either in the fuel tank or in the vehicle or on-deck portable 2000 Watt generator engines. If a spill occurs it would most likely be during fueling, in the event of grounding, or if any instance occurred that punctured the gas tank. In the event a spill occurred from the fuel tank or within the vessel, the absorbent sheets would be used to contain the hazardous liquids and the bilge would not be emptied until it could be pumped out at a hazardous waste facility. External to the vessel hull, a spill could occur as a result of a leak from a damaged outboard motor, hydraulic lines for steering, or trim tabs. We do not anticipate a release spill of greater than 0.25 gallons from any of the non-catastrophic sources.

(i) Fuel:

A spill kit shall be available for use in the event of a spill. If the fuel is spilled on the deck, it shall be immediately removed, bagged and disposed of at an appropriate hazardous waste reception facility. In the event of spillage in the water, the vessel master shall notify the Coast Guard and port facility. The maximum fuel capacity on the vessel is 120 gallons as such, this is the potential release volume from a catastrophic event discharge.

(ii) Lube oil:

A spill kit shall be available for use in the event of a spill. If the oil is spilled in the machinery space, it shall be immediately removed, bagged and disposed of at an appropriate hazardous

waste reception facility. In the event of spillage in the water, the vehicle operator shall notify the Coast Guard and port facility.

(iii) Hydraulic oil:
A spill kit shall be available for use in the event of a spill. If the oil is spilled on deck or in the machinery space, it shall be immediately removed, bagged and disposed of at an appropriate hazardous waste reception facility. In the event of spillage in the water, the vessel operator shall notify the Coast Guard and port facility.

(iv) Pipe or hose leakage:
The vessel operator shall check the piping and rubber hose daily for leakage. Where leakage is found, it shall be repaired immediately. In the event of leakage, the vessel deck engineer shall secure valve(s) at the appropriate tank before repairing the leak. Spilled fuel on the vessel shall be immediately removed, bagged and disposed of at an appropriate hazardous waste reception facility. In the event of spillage in the water, the vessel foreman shall notify the Coast Guard and port facility.

EMPLOYEE TRAINING

This Oil Spill Contingency Plan will be provided to all survey crew members prior to initiation of survey activities. All crew members will have read the plan, and be familiar with the procedures to reduce risk of spills, as well as procedures to be followed in the event of a spill, and know where oil spill clean up supplies are located.

VESSEL FUELING

Vessel fueling shall only occur at an approved docking facility. No cross vessel fueling shall be allowed. Appropriate spill avoidance measures will be taken during filling procedures.

ACTIONS TO ENSURE PERSONNEL AND VESSEL SAFETY

Safety of vessel crew and the vessel are paramount. In the event that a crewman's injuries require outside emergency assistance, the site safety officer shall be contacted immediately and emergency personnel contacted. While awaiting emergency assistance, another crew member will render first aid and/or CPR.

MITIGATION ACTIVITIES FOLLOWING A SPILL

Once the safety of both the vessel and the crew has been addressed, the vessel foreman shall care for the following issues:

a. Assessment of the situation and monitoring of all activities as documented evidence.
b. Care for further protection of the personnel, use of protective gear, assessment of further risk to health and safety.

c. Containment of the spilled material by absorption and safe disposal within leakproof containers of all used material onboard until proper delivery ashore, with due consideration to possible fire risk.
d. Decontamination of personnel after finishing the cleanup process.

All personnel shall refer to the MSDS's on board for additional information.

EMERGENCY CONTACTS FOR STATE AND FEDERAL AGENCIES

Any oil spill in U.S. marine waters shall be reported immediately (on the same day) to the state and federal phone numbers below:

West Coast Oil Spill hot-line	800-OILS-911, *or*
Department of Fish and Wildlife CalTIP	888-CFG-CALTip
(Californians Turn In Poachers & Polluters)	(888-334-2258). *and*
U.S. Coast Guard National Response Center	800-424-8802
California Office of Emergency Services (OES)	800-OILS-911 or 800-852-7550.

During the phone call, the following information will be given over the phone.

a. Name and telephone number of caller.
b. Location of spill
c. Substance that was spilled (oil, gas, diesel, etc.)?
d. Estimated size of spill?
e. Date and time spill was first observed
f. List of any oiled or threatened wildlife
g. Source of the spill
h. Spill site activites

After taking the necessary actions, the spill will be reported in writing to the Governor's Office of Emergency Services on their forms.

Additionally, California Department of Fish and Wildlife certified wildlife rescue/response organizations will be contacted about the spill. These include the following contacts:

Oiled Wildlife Care Network	1-877-823-6926
Animal Advocates	1-323-651-1336
California Wildlife Center	1-818-222-2658
All Wildlife Rescue & Education	1-562-434-0141

Ping DSP Inc. / 905 Grilse Lane,
Brentwood Bay BC, Canada V8M 1B5
P. 778-351-3377
www.pingdsp.com

Ship Date: September 22, 2016

Ping DSP 3DSS-DX-450 System

A. 1 x 3DSS-DX-450 Sonar
B. 1 x 3DSS-DTB Sonar Topside Box

3DSS-DX-450 System: Serial #: A02-00000024

The sonar specifications are as follows:

Sonar Model	**3DSS-DX-450**
Sonar Specifications	
Operating Frequency	450 kHz
Transmit Waveforms	CW, Broadband
Pulse Lengths	120-700 cycles
Dynamic Range	108 dB
Time Varying Gain Method	Digital
Horizontal Beamwidth (2 way)	0.4 0
Vertical Beamwidth (selectable)	15°-90°
Fixed Transducer Tilt	200
Electronic Transmit Tilt	-45° to 45°
Max. Ping Rep. Rate	30 Hz
2D Sidescan Specifications Per Side	
Data Output	32 bit floating point backscatter amplitude and range
Typical 2D Imaging Range	5 to 10 times sonar altitude per side depending on sound profile and bottom type
Max Range	100+ m
Max Range Resolution	1.67 cm
3D Sidescan (Bathymetry and 3D Imagery) Specifications Per Side	
Data Output	32 bit floating point range, elevation angle, and amplitude
Typical Bathymetry Range	3 to 7 times sonar altitude per side, depending on sound profile and bottom type
Max Range	100+ m
Max Range Resolution	1.67 cm
Bathymetry Accuracy	Bottom type and range dependent
Integrated MRU Specifications	
Pitch Range, Res., Rep., Acc.	±90°, < 0.05°, < 0.2°, 0.5° @ 25 C
Roll Range, Res., Rep., Acc.	±180°, < 0.05°, < 0.2°, 0.50 @ 25 C
Heading Rng, Res., Rep., Acc. 2	±180°, < 0.05°, < 0.5°, 2° @ 25 C
Motion Sensor Output Rate	100 Hz
Interface Specifications	
Control Input / Data Output	Gigabit Ethernet, standalone software providing sonar control GUI and TCP data server
Time Reference3	Topside PC, optional external PPS via RS-485 interface
External MRU Input3	RS-485 interface, NMEA and TSS protocols (38.4Kbaud,8N1)
GPS Input3	RS-485 interface, NMEA protocol (38.4Kbaud,8N1)
External Trigger Input3	RS-485 signal level rising-edge trigger initiates ping
External Trigger Output3	RS-485 signal level output mirrors internal receive window
Computer Requirements4	PC (Dual Core, 2.4GHz, 4GB), MS Windows 7-64 bit, .NET 4.0, MSVS C++ 2010 Redistrib.
Control Input / Data Output	Gigabit Ethernet, standalone software providing sonar control GUI and TCP data server
Physical Specifications	
Voltage Requirements	24 VDC +/- 10%
Power Consumption	14 W (not including transmit power)
Length	56.8 cm (22.35”) (-DXT, -DXO length TBD)
Diameter	9.8 cm (3.88”)
Weight in Air, Water	8 kg (17.6 lbs.), 4.7 kg (10.3 lbs.) (-DXT, -DXO weight TBD)
Pole Mount Adapter Diameter	1.49” (fits standard thickwall 1.5” I.D. Aluminum pipe)
Ambient Operating Temp.	-5° C – 45° C
Depth Rating	100 m

Integrated Data Systems

February 9, 2016

Merkel & Associates, Inc.
5434 Ruffin Road
San Diego, CA, 92123

RE: SEA SwathPlus Interferometric Sidescan Sonar System Maintenance and Upgrades

Keith,

This is to confirm that your 468 kHz SwathPlus interferometric sidescan sonar system has been serviced and all transducers and sensors recalibrated. In addition the navigation system integration for RTK has been completed. We checked cables and fittings, changed stave assignments on the starboard transducer for amplitude data logging, and verified power settings and outputs as requested.

We reviewed signal interference you reported and verified that this was due to top-side equipment chassis grounding issues which have been corrected working with Jordan.

Your system has been field operated and confirmed to be working in conformance with original range and resolution performance standards.

If you have any additional needs, please let me know.

Regards,

Alan Merkel
Principal

TELEDYNE SEABOTIX

2877 Historic Decatur Road, Suite 100
San Diego, CA 92106, USA
Tel: 619-450-4000 x124 Fax: 619-450-4005
seabotixservice@Teledyne.com

RMA #	3320
Revised Date:	30-Mar-16

Distributor:		Customer:	
		Merkel & Associates 5434 Ruffin Road Attn: Kathy Rogers San Diego, CA 92123 United States of America krogers@merkelonc.com	
Tel:		Tel:	858-560-5465
Fax:		Fax:	
Email:		Email:	krogers@merkelinc.com

Ship via:		**Evaluation Date :**		**LBV S/N:**	LBV1209063
Shipping Acct #:		**Job Technician:**	Tucc	**Part S/N:**	
Warranty?:		**Completion Date:**		**Original Invoice Date:**	

System Diagnosis

Client: Please be advised that this document is an estimate only and that actual final charges may vary. If charges increase significantly SeaBotix, Inc. will contact the client prior to continuing work.

Client changed out the thruster and now the system is not working

System Repairs

Tether has approximately 1 meter of electrical tape wrapped around the tether near the end. When the client was dropping off the system, they stated that there was a slice in the the tether and we assume that this was the location of the slice. We did not remove the electrical tape to confirm but we do recommend reterminating the tether. The client does not want to hae the tether reterminated. The spare thruster is not functioning (Halls Sensor Fault) and we recommend replacing it with a discounted refurbished thruster. A second thruster failed during the 3 hour depth test. The vertical knob on the OCU is corroded and and we would recommend replacing it. Vacuum test passed. GFI test passed. Sonar Ready test passed. Grabber function test passed. All other system functions passed. Joystick is intermittantly causing the lateral thruster to remain on at slow speed. This is intermittant and unless this has been a problem for the client, I would not recommend replacing it at this time. We wanted to make the client aware of the findings and let them decide if they feel that replacing the joystick is beneficial. The cost is

All prices shown are in United States Dollars, and are exclusive of sales tax, shipping costs, insurance costs, import and local taxes, tariffs and duties, unless otherwise stated.

Part #	Description	Quantity	Action	Minutes Per Unit	Ext. Minutes	Labor Price Per Unit	Ext. Labor Price	Unit Price	Ext. Unit Price	Sub Total	Invoice
EVAL	System Evaluation	1	Utilized	0	0	$0.00	$900.00	$0.00	$0.00	$900.00	$900.00
R-HPDC1502	Refurbished, Brushless Thruster, Spare Assembly,	2	Utilizec	0	0	$0.00	$0.00	$1,250.00	$2,500.00	$2,500.00	$2,500.00
				Total Minutes			Total Labor		Materials Total	List Total	Invoice Total
			List Subtotal	0	0		$900.00		$2,500.00	$3,400.00	$3,400.00
			Tax							272.00	272.00
			Shipping&Handling					20% Early Pay Discount		-680.00	-680.00
			Deposit								
			List Total							$2,992.00	$2,992.00

Teledyne SeaBotix Inc. will not be held liable for any penalties, monetary or other, that may occur as a result of late delivery. Everything possible will be done.

****Terms**

"Sellers offer, and any order issued by buyer to Seller for the goods and/or services specified herein, is strictly limited to Sellers Terms and Conditions of Sale, which can be found at www.seabotix.com"

2% per 30 days charge for late payments.

All prices are in United States Dollars.

Labor Rate per Hour in USD: $150.00

Labor Rate per Minute in USD: $2.50

Warranty Labor		
Warranty Parts	+	
Warranty Total	=	*$0.00*

Client Name: Keith Merkel **Signature:** **Date:** 4/1/16

SeaBotix Name: **Signature:** **Date:**

Notes:

Old Parts will be returned to customer as indicated at time of approval!