DRAFT Stranding Response Plan

Diablo Canyon, CA

November 1, 2012 through December 31, 2012.

PURPOSE

The purpose of this plan is 1) to ensure efficient responses to and investigation of live and dead stranded marine mammals in the Diablo Canyon area during the seismic survey work to be conducted by Pacific Gas & Electric (PG&E), as authorized under the Marine Mammal Protection Act (MMPA) and Endangered Species Act, and 2) to describe the adaptive management triggers resulting from detection of stranded marine mammals that would require a suspension of seismic airgun activities (additional adaptive management triggers resulting from other monitoring are discussed in other parts of the authorization). Specifically, the plan provides for rapid response to live stranded marine mammals and the timely recovery, necropsy, and examination of dead stranded marine mammals, resulting in appropriate information for the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Game (CDFG), and other agencies to assess the impacts of the seismic survey work.

BACKGROUND

Strandings

Marine mammal strandings, as defined by the MMPA, have occurred throughout recorded history, although U.S. stranding programs have only been keeping consistent records for (in some cases) the last three decades or (more commonly) the last decade. Strandings may result from many different causes, including infectious agents, biotoxicosis (usually associated with Harmful Algal Blooms), shark bites, starvation, fishery interactions, ship strikes, unusual oceanographic or weather events, sound exposures, or combinations of these stressors sustained concurrently or in series. In many cases, and for a number of reasons, the cause of a live stranding or death cannot be determined.

There is considerable scientific uncertainty about the behavioral and physiological responses of marine mammals when exposed to unusual stimuli, including airguns. One of the potential responses is a stranding event. Cetacean strandings have been associated with mid-frequency active sonar and underwater detonations; the potential for cetacean strandings to occur during seismic testing activities exists and must therefore be assessed. The responses of other marine mammals to seismic survey airguns are largely unknown. The plan outlined below describes the active monitoring and responses to marine mammal strandings that will be undertaken in the near shore area of the Diablo Canyon seismic survey study area. The goal of the plan is to ensure a rapid response to strandings, to provide information that will be used to assess potential impacts of the seismic survey activity on marine mammals, including whether adaptive management triggers have been reached, and to contribute scientific data that will improve our understanding of why marine mammal strandings occur.

This stranding response plan and adaptive management triggers contained within are part of the required mitigation and monitoring for the seismic study being conducted by PG&E around the Diablo Canyon Power Plant (DCPP), Avila Beach, CA. This plan is specifically intended to outline the requirements of the authorizations

issued by NMFS and USFWS in the event that marine mammal strandings are detected within the seismic study zone during or following the seismic testing. NMFS and USFWS will consider all plausible causes within the course of a stranding investigation, and the development of this plan in no way presumes that any strandings are related to, or caused by, the seismic testing conducted by PG&E, unless and until a determination is made following a Stage 2 investigation as outlined in this plan.

Stranding Network

Pinnipeds and Cetaceans

Response to stranded pinnipeds and cetaceans in California is conducted by members of the California Marine Mammal Stranding Network. There are two stranding network response groups authorized by NMFS for this geographic area. For live animals (primarily pinnipeds, but live cetacean triage and stabilization), the authorized response group is The Marine Mammal Center (TMMC), which has its main campus in the Marin Headlands north of San Francisco, but which maintains a satellite facility in Morro Bay (TMMC-SLO), approximately 45 minutes north of Avila Beach. Rehabilitation of live cetaceans would occur in Santa Cruz, San Diego, or Sausalito (typically a single cetacean each; multiple pinnipeds would be rehabilitated in Sausalito).

The authorized response group for dead cetacean response is the Santa Barbara Museum of Natural History (SBMNH), located in Santa Barbara, which is approximately 2 hours south of Avila Beach. Both groups operate primarily with volunteers with only a few (or 1) paid staff member, and typically handle minimal case loads during this time of year (see Appendix 1 for historical stranding information). Neither organization is well equipped for a drastic increase in the number of stranded animals, particularly with the distances involved to respond to each stranded animal. In addition neither organization has an active beach or near shore surveillance programs. No organization is responsible for assessment of dead pinnipeds, and most of the dead stranded pinnipeds are not examined.

These network participants also work collaboratively with other agencies throughout the region; for example, CDFG personnel in the Morro Bay have historically assisted with pinniped and cetacean strandings, and may be able to provide boat and/or vehicle access to difficult to reach locations during this timeframe.

Sea Otters

The CDFG and the U. S. Geological Survey (USGS) have intensively monitored and studied southern sea otter strandings along the Central California coast for over 40 years. An attempt is made by these groups to verify, examine, and/or collect every stranded sea otter. Under the existing program, dead stranded sea otters are either field necropsied by an experienced CDFG or USGS biologist or collected and examined by a veterinary pathologist at the CDFG Marine Wildlife Veterinary Care and Research Center (MWVCRC) in Santa Cruz. Live stranded sea otters (in the PG&E project area) are collected by the CDFG and/or TMMC and are transferred to the Monterey Bay Aquarium's Sea Otter Research and Conservation (MBA) program for evaluation, care and possible rehabilitation.

MARINE MAMMAL STRANDING RESPONSE AUGMENTATION

Personnel Requirements

To augment local response capabilities, a 2-person trained team (rotating through for two week periods) will be staged on the coast in the geographic area of the proposed seismic survey area. They will rapidly respond to reports of stranded animals and arrange further treatment/assessment/sampling. These teams would receive any reports of strandings (floaters, nearshore or on beach) from the aerial survey teams, the public (via established stranding network hotlines; Appendix 2), or other sources. Notification of strandings would be given following the Communication Plan (Appendix 3). This team will also perform active surveillance, driving or walking stretches of local beach looking for stranded animals on a periodic basis. A minimum of two people at any one time are needed for safety.

Active Surveillance

An active surveillance plan will be implemented to maximize the activities of this two person team. Coordination is planned with the existing stranding network responders (TMMC-SLO and SBMNH) and the Moss Landing Marine Laboratories BeachCOMBERs program, which has volunteers that survey index beaches in the Morro Bay area, as well as with local land management authorities (e.g., State Parks – Environmental Scientists and Rangers) and any aerial survey teams. In addition, up to four sea otter tracking staff working on the USGS-led sea otter monitoring program will be spending considerable time on the coast in the study area and can report any marine mammal strandings.

A seismic study zone is defined as the geographic area from Point Piedras Blancas, San Luis Obispo Co, to Point Arguello, Santa Barbara Co. This area is a broader than merely inshore of the seismic survey, as impacted animals may potentially move out of that area and strand to the north or south. This zone may be redefined during the project (expanded or shifted) based upon observations from aerial surveys or animal movement/distribution data. Within the seismic study zone, surveys will be prioritized in areas with higher deposition rates of animals (based upon historic data). These areas include:

- Point Piedras Blancas
- San Simeon
- Cayucos Beach
- Morro Bay area – Morro Rock and Morro Strand
- Montana de Oro State Park
- Avila State Beach
- Pismo State Beach
- Oceano Dunes State Vehicular Recreation Area
- Guadalupe Dunes
- Point Sal State Beach
- Vandenberg Air Force Base – Sherman Creek, San Antonio Creek, Surf Beach, Purisima Point

A comprehensive survey will be undertaken in the 10 days immediately preceding the start of the seismic activities to document and mark all pinniped and cetacean carcasses present on the beach, so that if they are reported again it will be known that they stranded prior to the start of the survey (all sea otter carcasses will be removed or buried, per current sea otter stranding protocols). Potential marking methods include addition of ropes or twine, paint or dye, removal of particular parts, or some other method to be determined; carcasses may also be removed or buried whenever feasible. During the project, the choice of which beach(es) to survey

on a given day will be determined by the 2-person team, and subject to factors such as weather conditions, but the goal will be to cover all of these beaches in a 7-day period (if no stranding response is needed). A survey will consist of walking or slowly driving the beach from one end to the other. Any observed marine mammal strandings will be examined to determine if they were previously detected or if they are new; if new strandings, they would be reported according to the communication protocol (Appendix 3) and an investigation would be started.

The active surveillance and readiness component will also persist past the end of the seismic work to account for animals that may have been impacted at the end of the seismic activities but do not strand until days later. At a minimum, this will be one week after the end of the seismic work. Following this week, the 2-person team will be demobilized and the active surveillance work will be concluded, but the local stranding network responders will continue to respond to all reports of stranded animals, and may complete a detailed investigation.

RESPONSE ACTIONS – PINNIPEDS AND CETACEANS

1. **Initial stranding response –** The 2-person team, acting in coordination with the local stranding network responders, will respond to reports of stranded pinnipeds or cetaceans within the seismic study zone when feasible. All marine mammals that are responded to will receive examination appropriate to the condition code of the animal and the feasibility of the logistics.

    a. **Dead animals -** Once observed, a dead animal will be recovered (including towed or picked up if observed floating) if feasible. Following recovery, the animal will be removed from the beach for necropsy, or a beach necropsy performed if carcass retrieval is not possible (depending on carcass decomposition and logistics/weather/safety conditions). If possible, necropsies will be done in a laboratory setting following diagnostic imaging (for fresh animals. At the necropsy, samples will be taken and may be shipped to appropriate laboratories for diagnosis.
    b. **Live animals -** Live animals will be evaluated and determined whether they are rehabilitation candidates, should be released from the scene, or euthanized. Cetaceans will receive auditory evoked potential (AEP) examination(s) when appropriate to determine the hearing capabilities of each animal at stranding or at release according to permit requirements and with approval of the veterinarian. Rehabilitation candidates will require transport to the appropriate rehabilitation facility.
    c. **Mass strandings or other elevated stranding rates –** If a mass stranding occurs, or if stranding rates are very elevated, additional personnel from other stranding network organizations may be brought in for response or animals transported to more distant necropsy or rehabilitation facilities. Significant additional resources must be made available for both live and dead mass stranding response. Costs would be very high if there is a mass stranding event. Depending on the number of animals that strand and on the veterinary assessment for each, animals may be returned to the water and released, taken to a rehabilitation center, or they may be euthanized or die on the beach or during transport. All dead animals would require a necropsy.
    d. **Phase 1 investigation** – The Phase 1 investigation refers to the initial investigation on a stranded animal (both alive and dead). The specific assessment performed will depend upon the species, condition code, and logistics, but generally includes the following:

i. General description of the stranding event (numbers, location, environmental parameters, behavioral assessment of live animals)
ii. Live animals – physical examination, morphometrics, photographs, blood work, diagnostics such as AEP or ultrasound
iii. Dead animals – external examination, morphometrics, photographs, diagnostic imaging including CT/MRI scans as appropriate and feasible, gross necropsy with internal examination, descriptions, photographs and sample collection
iv. Preliminary analysis of information collected during Phase 1

e. **Phase 2 investigation** – The Phase 2 investigation is a more comprehensive investigation into a stranded animal for purposes of documentation of lesions, determining the cause of stranding or determining the cause of death. Again, the specific assessment will depend upon many factors, and will be informed by the findings obtained during the Phase 1 investigation, but may include:
i. Further analyses and review of information obtained in Phase 1 (potentially including formation of an expert panel)
ii. Histopathology, including special stains where needed
iii. Ancillary diagnostics (e.g., PCR for infectious agents, air bubble sampling when emboli were discovered, domoic acid levels)
iv. Additional diagnostic imaging as needed
v. Histology of ears, where indicated

2. **Adaptive management** - Adaptive management triggers resulting from stranding investigations have been identified. If these triggers are met, suspension of seismic airgun activities will occur. Following suspension of activities, NMFS and our stranding network partners will further evaluate the available information, including new information collected while activities are suspended, and coordinate with PG&E to determine if and how seismic operations may continue. The triggers that have been identified are as follows:
a. A mass stranding (2 or more animals that simultaneously strand, other than cow-calf pairs) or atypical nearshore milling (aka "near mass stranding") of any cetacean species. At a minimum, the shutdown would continue until the disposition of the animals was complete - this could involve herding offshore, refloating/transporting/herding, transport to rehabilitation, euthanasia, or any combination of the above. Shutdown procedures will remain in effect until NMFS determines that, and advises PG&E that, all live animals have left the geographic area (either of their own volition or following herding).
b. If 2 cetaceans within one day, 3 or more cetaceans within a week, or 5 or more pinnipeds within a week are newly detected stranded (sick, injured, in need of medical attention, or dead) on the beach or floating incapacitated or dead within the impact zone during the seismic testing period, the following would occur:
i. For live stranded animals, the stranding team would attempt to capture the animal and perform a Phase 1 examination (detailed above), including auditory evoked potential (AEP) testing of all odontocetes, and any clinical tests deemed necessary by the attending veterinarian. If the animal(s) are determined to be candidates for immediate release (either from the original stranding location or following transport to a new location), shutdown may be needed until the release is complete. If the animal is determined to be a candidate for rehabilitation and the initial examination is

inconclusive regarding a reason for stranding, Phase 2 investigations (see description above) will be conducted.

ii. For all dead stranded animals, the stranding team would attempt to recover the carcass(es) and perform a detailed necropsy with diagnostic imaging scans to rule out obvious causes of death (e.g. a Phase 1 investigation, described above), as appropriate given the decomposition state of the animal and other logistical constraints (size, weight, location, etc.). Then, if Phase 1 tests are inconclusive and the animal(s) is (are) in good body condition, Phase 2 investigations will be conducted.

iii. In either case, if Phase 2 investigations are warranted for enough animals to meet the initial numerical criteria, seismic testing will be suspended.

c. Strandings of single marine mammals with signs of acoustic trauma or barotrauma without another etiology would require a suspension.

d. A shipstrike of a marine mammal by any of the vessels involved in the seismic testing (including observation vessels) would require a suspension.

3. **Final report** - At the end of the survey period, sample and data analyses will be completed and a report will be generated by the SWFSC, SERO, TMMC and SBNHM personnel.

RESPONSE ACTIONS – SEA OTTERS

1. **Initial stranding response –** Using the existing network of collaborators, CDFG, USGS, and TMMC will coordinate an efficient, timely response to all reported sea otters strandings.

    a. **Dead animals –** During the project operation and extending seven days after, all dead stranded sea otters between Point Piedras Blancas (San Luis Obispo County) and Point Arguello (Santa Barbara County) will be collected and transported to the MWVCRC for necropsy. Fresh dead and any tagged (i.e., study animal) dead sea otter will be transported via FedEx overnight shipping or scheduled TMMC transport to the MWCVRC, to ideally arrive within 24 hours of recovery. These fresh and/or tagged cases will receive a detailed necropsy by a veterinary pathologist to determine the cause of death. All non-tagged moderately to severely decomposed sea otters recovered within the study area will be collected, frozen and transported to the MWVCRC for future necropsy. At the necropsy, samples will be taken and may be shipped to appropriate laboratories for diagnosis.

    b. **Live animals -** Following established protocols, all live stranded sea otters will be collected after consultation with CDFG and/or MBA. TMMC has the trained personnel and equipment to provide timely response and transportation. Once a live sea otter is recovered, MBA will direct the treatment for each case. In general, all live sea otters will be transported to MBA as soon as possible.

    c. **Phase 1 investigation** – The Phase 1 investigation refers to the initial investigation on a stranded animal (both alive and dead). The specific assessment generally includes the following:

        i. General description of the stranding event (numbers, location, environmental parameters, behavioral assessment of live animals)

ii. Live animals – physical examination, morphometrics, photographs, blood work, and appropriate diagnostics.
iii. Dead animals – external examination, morphometrics, photographs, gross necropsy with internal examination, descriptions, photographs and sample collection.
iv. Assessment of stranding numbers and locations in comparison to historic stranding data for sea otters (corrected for increased search effort) to determine if stranding is unusual.
v. Preliminary analysis of information collected during Phase 1

d. **Phase 2 investigation** – The Phase 2 investigation is a more comprehensive investigation into a stranded animal for purposes of determining the cause of stranding or determining the cause of death. If the Phase 1 investigation identifies a clear cause of death that is not associated with the project, Phase 2 investigation may not be required. The specific Phase 2 assessment will depend upon many factors, and will be informed by the findings obtained during the Phase 1 investigation, but may include:
    i. Further analyses and review of information obtained in Phase 1 (potentially including formation of an expert panel)
    ii. Diagnostic imaging including CT/MRI scans as appropriate
    iii. Histopathology, including special stains where needed
    iv. Ancillary diagnostics (e.g., PCR for infectious agents, air bubble sampling when emboli were discovered, domoic acid levels)
    v. Additional diagnostic imaging as needed
    vi. Histology of ears, where indicated

2. **Adaptive management** – For sea otters, permitting documents from the USFWS and CDFG call for suspension of activities only in the case of acute mortality found to be associated with the project. There are no interim adaptive management triggers for harassment of sea otters; the USGS sea otter monitoring program may detect potential effects of the project on otters, but sub-lethal effects are not likely to be evident prior to post-project data analysis. If these acute mortality triggers are met, suspension of seismic airgun activities will occur. Following suspension of activities, USFWS and partner agencies will further evaluate the available information, including new information collected while activities are suspended, and coordinate with PG&E to determine if and how seismic operations may continue. The triggers that have been identified are as follows:
    a. Stranding of a single dead sea otter with signs of acoustic trauma or barotrauma without another etiology (based on Phase 2 investigation above) would require a suspension.
    b. A lethal shipstrike of a sea otter by any of the vessels involved in the seismic testing (including observation vessels) would require a suspension.
3. **Final report** - At the end of the survey period, sample and data analyses will be completed and a sea otter stranding report will be generated by the CDFG and USGS personnel.

APPENDIX 1

Historical stranding information from the California Marine Mammal Stranding Network and USGS (for sea otters) from the Monterey/San Luis Obispo County line to Point Conception, 1988-2010.

		Total Strandings (1988-2010)			Average Strandings		
	Species	Nov	Dec	Jan	Nov	Dec	Jan
CETACEANS							
	Common Dolphin*	2	2		0.09	0.09	
	Gray Whale	3	0		0.14	0	
	Minke Whale	1	0		0.05	0	
	Northern Right Whale Dolphin	0	1		0	0.05	
	Pacific White-Sided Dolphin	1	0		0.05	0	
	Pygmy Sperm Whale	0	1		0	0.05	
PINNIPED							
	California sea lion	100	86		4.5	3.9	
	Harbor seal	2	1		0.09	0.05	
	Northern elephant seal	9	13		0.41	0.59	
	Northern fur seal	24	3		1.1	0.14	
	Unidentified pinniped	5	5		0.23	0.23	
MUSTELID							
	Southern Sea Otter	108	89	80	4.7	3.9	3.5

*includes long-beaked, short-beaked, and unidentified common dolphin

APPENDIX 2

Marine mammal stranding response reporting phone numbers.

Field Team:	TBD
Live Marine Mammals (TMMC):	805-771-8300
Dead Pinnipeds or Cetaceans (SBMNH):	805-682-4711 ext. 156
Dead Sea Otters (CDFG):	805-772-1135 (office); 831-212-7090 (mobile)

APPENDIX 3: STRANDING RESPONSE ADAPTIVE MANAGEMENT DURING DCPP SEISMIC WORK DECISION TREE