

CALIFORNIA COASTAL COMMISSION

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**RECORD PACKET COPY****Tu 12c****STAFF RECOMMENDATION****ON CONSISTENCY DETERMINATION**

Consistency Determination No.	CD-16-00
Staff:	MPD-SF
File Date:	2/16/2000
45th Day:	4/1/2000
60th Day:	4/16/2000
Commission Meeting:	4/14/2000

FEDERAL**AGENCY:****U.S. Geological Survey (USGS)****PROJECT****LOCATION:**

Southern California offshore waters, nearshore areas to 20 mi. offshore, between Port Hueneme, Ventura Co., and the U.S.-Mexican Border (Exhibit 1)

PROJECT**DESCRIPTION:**

Seismic survey to map earthquake faults and other subsea stratigraphic information (Exhibit 2)

SUBSTANTIVE**FILE****DOCUMENTS:**

See page 16.

EXECUTIVE SUMMARY

The U.S. Geological Survey (USGS) has submitted a consistency determination for a seismic survey in southern California offshore waters to collect high-resolution seismic reflection data to investigate: (1) landslide and earthquake hazards in the nearshore region from Los Angeles to San Diego; and (2) saltwater intrusion into freshwater aquifers that provide water supply for the Los Angeles-San Pedro area. The survey would take three weeks to complete and is scheduled for June 2000.

Seismic surveys usually involve loud seismic pulses which can disturb marine resources. For example, most oil exploration seismic surveys use very loud and often multiple airguns, with sounds on the order of 230-259 decibels (dB) (water reference standard (at 1 meter))¹. Typical oil company surveys use airgun sizes on the order of thousands of cubic inches. Last year's USGS survey (see next paragraph) used a much smaller, 40 cu. inch airgun, which had a maximum sound level of 220 dB. For this year's survey USGS proposes an even quieter device, a low energy (according to State Land Commission definitions), 1.5 kiloJoule (kJ) "SQUID 2000" minisparker system. The maximum sound level for this minisparker is 209 dB.

On May 11, 1999, the Commission objected to USGS' consistency determination for the 1999 southern California seismic survey, based on concerns over nighttime operation when visibility (and therefore ability to monitor for the presence of marine mammals) is limited. That project was subsequently authorized to proceed when USGS agreed to avoid nighttime use of the main airgun. USGS' current proposal to use the minisparker instead of an airgun has several benefits. From an acoustic standpoint, the 180 dB area of acoustic footprint is much smaller, enabling USGS, even at night, to maintain visibility within the area for preclusion of marine mammals. From a procedural standpoint, use of this device enables USGS to receive State Lands Commission approval and work in State waters. Absent an EIR, the State Lands Commission only allows devices which it considers low-energy, defined as having an energy output of less than 2 kiloJoules. Thus, for this year's survey, unlike the 1999 survey as ultimately carried out, USGS proposes to operate both at night and in State waters.

Nevertheless, even with this reduced output, the USGS' survey is sufficiently loud to raise concerns over effects on marine mammals and trigger the need for monitoring and avoidance measures. Accordingly, USGS has committed to monitoring marine mammals in the survey vicinity and avoiding subjecting marine mammals to sound levels above 180 dB. Because of the different dispersion between deep water (where spherical spreading is the rule) and shallow water (where waves scatter noise at the surface and the subsea floor absorbs a certain percentage of the sound) USGS expects the sound to attenuate to 180 dB at 30 meters (m) from the source in deep water and at 15 m in shallow waters. Therefore, USGS has committed that the minisparker operations will cease when marine mammals are within 30 m of the sound source when operating in deep water, and within 15 m when operating in shallow water. In addition, the project has been timed to avoid the gray whale migration season.

Given the relatively low energy level of the minisparker device, along with USGS' proven ability to monitor and protect marine mammals in its past surveys, with the monitoring and avoidance commitments the project is consistent with the marine resource, environmentally sensitive habitat, commercial and recreational fishing and diving policies (Sections 30230, 30240, 30234, 30234.5, 30213 and 30220) of the Coastal Act.

¹ All decibel references in this report will be based on the water standard (re: 1 micropascal (μPa))

STAFF SUMMARY AND RECOMMENDATION

I. Project Description. USGS proposes a seismic survey in southern California offshore waters in order to: (1) evaluate seismic hazards from active nearshore faults adjacent to densely populated urban areas; and (2) provide stratigraphic control for aquifer models in the Los Angeles Basin necessary for the study and management of saltwater intrusion. The area proposed for study is located within the marine environment of southern California, between Port Hueneme and the U.S.-Mexican Border, extending from nearshore to a maximum of 20 miles offshore (Exhibit 1). The surveys are part of a multiyear effort and are being conducted in cooperation with local city and county groundwater management agencies (e.g., the Los Angeles County Department of Public Works and the Southern California Water Replenishment District). The project is currently scheduled to be conducted for three weeks in June 2000.

During the survey the USGS will operate two sound sources. The primary sound source will be a 1.5 kiloJoule (kJ, or kJoule) sparker "SQUID 2000" minisparker system (manufactured by Applied Acoustic Engineering, Inc.). This minisparker includes eight electrodes that are mounted on a small pontoon sled. The electrodes simultaneously discharge electric current through the seawater to an electrical ground, creating an acoustic signal. The pontoon sled that supports the minisparker is towed on the sea surface, approximately 20 meters behind the ship.

The maximum sound pressure level (SPL) of the minisparker is 209 dB re 1 μ Pa-m RMS². Most of the sound energy lies between 150 Hertz (Hz) and 1700 Hz, with a peak amplitude at 900 Hz (Exhibit 3). The sound pulse has a duration of about 0.8 milliseconds (ms), and for this survey, the minisparker will be discharged every 4 to 6 seconds. A second, higher frequency seismic source, which was also used during last year's survey, is the "Huntec" system. This system uses electro-magnetically driven plates to produce an acoustic pulse every 0.5 seconds. This sound source is towed approximately 100 meters behind the ship in water depths greater than 200 m. In shallow water, this source will be within 5 m of the sea surface. The SPL for this source is 205 dB re 1 μ Pa-m RMS, and the frequencies for this source are between 500 Hz and 8 kiloHertz (kHz), with a peak amplitude at 4.5 kHz.

The following table provides the sources' acoustic characteristics:

² re 1 μ Pa-m RMS stands for one micropascal measured at one meter from the sound source root mean square, which is a term used to describe underwater sound pressure level (SPL) at one meter from the source. Root mean square means "average pressure squared over the pulse duration" (i.e., the average acoustic energy over the duration of the pulse).

Table 1 - Acoustic Source Characteristics

System	"SQUID" minisparker	Huntec (boomer)
Power	1.5 kiloJoules 209 dB RMS	340 Joules 205 dB RMS
Frequency range	150-1700 Hz	0.5 to 8 kHz
Repetition rate	4 to 6 sec	0.5 to 1 sec
Towing depth	surface	10-100 meters
Pulse duration	0.8 msec typical	0.34 msec typical

(Note: all dB units are referenced to 1 micropascal @ 1 meter)

II. History of Commission Review of Oil Industry Seismic Surveys. In the 1980s hundreds of oil company seismic surveys were conducted in California offshore waters pursuant to joint permits issued by the Minerals Management Service (MMS) and the State Lands Commission. The Commission staff received notices of the surveys but did not choose to regulate the activities. The major issues the Commission staff was aware of at that time were: (1) impacts to commercial fishing equipment from the long tow lines used by the oil companies; and (2) impacts of loud noises on fish catch and fish development (e.g., eggs and larvae development). Current concerns over effects of low frequency noise on marine mammals had not evolved at that time. In addition, part of the reason the Commission staff declined to assert jurisdiction at that time was the existence and success of the joint oil and fisheries liaison office in the Santa Barbara Channel, which mediated disputes between fishermen and oil companies.

In once instance in 1988 the Commission attempted to assert jurisdiction over an Exxon seismic survey in northern California waters which conflicted with peak salmon fishing season; however after Exxon met with fishing groups and agreed to modify its activity to avoid the peak fishing season, the Commission rescinded its request to review the "unlisted permit" activity.³

In 1994 the Commission staff issued a "no coastal development permit" letter to the Thums Long Beach Company for a seismic survey in State waters just offshore of Long Beach. Marine mammal and fisheries avoidance measures were incorporated into this survey and the survey was of short duration. In 1995 the Commission staff agreed with a "No Effects" determination by Exxon for a seismic survey at the Santa Ynez unit in federal waters offshore of Santa Barbara County. The Commission agreed not to require a consistency certification in part due to Exxon's incorporation of marine mammal protection measures, including visual,

³ Pursuant to 15 CFR Part 930, Section 930.54, Unlisted federal license and permit activities.

aerial and acoustic monitoring, acoustic model verification, marine mammal preclusion/avoidance areas, and other measures being required under the National Marine Fisheries Service (NMFS) marine mammal harassment permit.

III. History of Commission Review of USGS Seismic Surveys. In 1991 the Commission concurred with USGS' consistency determination for a seismic survey in the San Francisco Bay Region (CD-47-91). The Commission found that the activity would: (1) avoid important fishing grounds; (2) only be conducted for one or two days within areas of Coastal Commission jurisdiction (as opposed to within San Francisco Bay, which comes under the purview of the San Francisco Bay Conservation and Development Commission (BCDC)); and (3) be consistent with the marine resources policies of the Coastal Act. That survey involved use of a relatively large airgun array (10 guns, 5828 cu. in.). The monitoring report concluded that the airgun profiling did not alter the feeding behavior of sea lions, seals, or pelicans, all of which were observed feeding in parts of the study area.

USGS has performed three subsequent surveys in Pacific Ocean waters, two in 1998 and one in 1999. The first was in Puget Sound and the next two in southern California. For the Puget Sound survey, USGS used a 16-gun, 5,300 cu. in. array. Extensive monitoring documented no adverse effects to marine life. The Commission staff was not aware of USGS' 1998 southern California survey, and it was not reviewed by the Commission. That survey took place in December 1998 and included marine mammal protection measures and extensive monitoring. As discussed elsewhere in this report, the Commission did review USGS' consistency determination for the 1999 southern California survey. That survey involved use of a small, 40 cu. inch airgun, and the monitoring results are attached as Exhibit 5.

IV. Project Benefits. The work that the USGS proposes will have definite benefits to the State and to society at large. Near-shore high resolution seismic reflection data allow detailed analysis of the stratigraphy of the uppermost (geologically youngest) sediments, interpretation of geologic structures, and, when used in conjunction with independent data providing age constraints, allow for the analysis of the timing of sedimentation, deformation, or faulting events.

The data that USGS proposes collect will initially be used in two independent studies. The first, an evaluation of aquifers impacted by saltwater intrusion in the Los Angeles basin, promises immediate and direct benefits to the people of the greater Los Angeles area. The City of Los Angeles currently obtains over a third of its freshwater supply from aquifers in the Los Angeles basin. Early in this century, these aquifers began to be impacted by saltwater intrusion related to excessive groundwater withdrawal. As freshwater is removed from the aquifer, saltwater offshore flows into the areas of active pumping. In order to prevent this inflow, local water companies began injecting freshwater into the aquifer to produce three hydraulic pressure ridges to serve as dams against saltwater intrusion. These dams have been largely successful, but the Dominguez Gap Barrier, on the eastern side of the Palos Verde Peninsula, is currently leaking, allowing saltwater to contaminate the aquifer. The leakage seems to be the result of a poor understanding of the detailed geometry of the aquifer in the area immediately

offshore. A better understanding of the configuration of permeable and impermeable layers will allow for a reconfiguration and "repair" of the barrier. The detailed data that would be provided by the USGS study could help provide that understanding.

The second study will use the seismic reflection data to help understand how deformation related to active faulting is distributed offshore. Our understanding of the relative activity of the many active and potentially active faults paralleling the southern California coast is incomplete. Many important faults, including the Newport-Inglewood and Rose Canyon Faults, lie just offshore and have not been accurately imaged by modern techniques. Knowing the location and geometry of these and other fault systems is critical to estimating the location and severity of ground shaking associated with earthquakes occurring along them. Placing age constraints on breaks in sedimentation associated with these faults will provide information on long-term slip rates and earthquake recurrence intervals, allowing the assessment of earthquake probability on the offshore segments of these fault systems. This information is of obvious important to planners in making decisions about land use and hazard zonation.

Both of these projects are interdisciplinary, and are undertaken in close cooperation with interested institutions and agencies, including the Los Angeles County Department of Public Works, the Water Replenishment District of Southern California, Scripps Institute of Oceanography, and the Southern California Earthquake Center. USGS plans to disseminate this information not only through their own publications and refereed journal articles, but also in the form of public meetings and workshops.

V. Federal Agency's Consistency Determination. The USGS has determined the project consistent to the maximum extent practicable with the California Coastal Management Program.

VI. Staff Recommendation. The staff recommends that the Commission adopt the following motion:

MOTION:

I move that the Commission agree with consistency determination CD-16-00 that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the California Coastal Management Program (CCMP).

STAFF RECOMMENDATION:

Staff recommends a YES vote on the motion. Passage of this motion will result in an agreement with the determination and adoption of the following resolution and findings. An affirmative vote of a majority of the Commissioners present is required to pass the motion.

RESOLUTION TO AGREE WITH CONSISTENCY DETERMINATION:

The Commission hereby **agrees** with the consistency determination by USGS, on the grounds that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the CCMP.

VII. Findings and Declarations:

The Commission finds and declares as follows:

A. Marine Resources/Environmentally Sensitive Habitat.

1. Coastal Act Policies. Section 30230 of the Coastal Act provides:

Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

Section 30240 provides:

(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas.

(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas.

2. Marine Species. The Southern California Bight supports a diverse assemblage of 29 species of cetaceans (whales, dolphins and porpoises) and 6 species of pinnipeds (seals and sea lions). The species of marine mammals that are likely to be present in the seismic research area include the bottlenose dolphin (*Tursiops truncatus*), common dolphin (*Delphinus delphis*), killer whale (*Orcinus orca*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), northern right whale dolphin (*Lissodelphis borealis*), Risso's dolphin (*Grampus griseus*), pilot whale (*Globicephala macrorhynchus*), Dall's porpoise (*Phocoenoides dalli*), sperm whale, humpback whale (*Megaptera novaengliae*), gray whale (*Eschrichtius robustus*), blue whale (*Balaenoptera musculus*), minke whale (*Balaenoptera acutorostrata*), fin whale (*Balaenoptera physalus*), harbor seal (*Phoca vitulina*), elephant seal (*Mirounga angustirostris*), northern sea lion (*Eumetopias jubatus*), and California sea lion (*Zalophus californianus*), northern fur seal (*Callorhinus ursinus*) and sea otter (*Enhydra lutris*) (NMFS, Fed. Reg., 3/5/99).

3. Issues. Marine mammals rely on sound for communication, orientation, and detection of predators and prey. In recent years the Commission's and the public's awareness of the effects of underwater noise, particularly low frequency noise, has increased significantly. In reviewing the Scripps' ATOC⁴ and the Navy's LFA⁵ research efforts, the Commission noted: (1) the growing evidence that anthropogenic sounds can disturb marine mammals (Richardson et al. 1995); (2) that observed mammal responses to such sounds include silencing, disruption of activity and movement away from the source; and (3) that low frequency sound carries so well underwater that animals "... have been shown to be affected many tens of kilometers away from a loud acoustic source."

Seismic surveys, when conducted with extensive airgun arrays, are among the very loudest of anthropogenic sounds. Richardson et al. (1995) notes that "Peak-levels of sound pulses from airgun arrays are much higher than the continuous sound levels from any ship or industrial noise." The maximum noise attributed to an oil exploration array is 259 dB; the general range for such surveys is 230-259 dB. Last year's USGS survey, which used a single (and relatively small) airgun, had a maximum source level of 220 dB. USGS' current proposal would be significantly quieter than even last year's small airgun; the proposed "SQUID" minisparker has a maximum source level of 209 dB RMS.⁶ Nevertheless, as noted in the Commission's previous review of last year's USGS survey, any *received* level above 180 dB may raise cause for concern and warrant the need for monitoring and avoidance measures. The proposed survey is partly located within the coastal zone, and it triggers the need for National Marine Fisheries Service (NMFS) "take" permit under the Marine Mammal Protection Act (MMPA).⁷ Therefore the Commission believes the survey would clearly affect the coastal zone and needs to be carefully reviewed for its marine resource impacts.

4 Scripps Institution of Oceanography, Acoustic Thermometry of Ocean Climate (ATOC) Project and Marine Mammal Research Program (MMRP), CC-110-94/CDP 3-95-40.

5 Consistency Determinations No. CD-95-97 and CD-153-97 (Navy, Low-Frequency Active (LFA) Sonar, Phases I and II).

6 Root mean square - see footnote, page 3.

7 For purposes of NMFS review under the Marine Mammal Protection Act of 1973 (MMPA) and, for endangered marine mammals, the Endangered Species Act (ESA) of 1973, and their respective amendments, which prohibit taking (including harassment, harm, and mortality), unless under permit or authorization or exempted from the provisions of these Acts.

4. Project Impacts. USGS' application to NMFS for an Incidental Harassment Authorization describes the sound sources' maximum potential noise levels as follows:

Maximum Sound Exposure Levels for Marine Mammals

The adverse effects of underwater sound on mammals have been documented for exposure times that last for tens of seconds or minutes, but effects have not been documented for the brief pulses typical of the minisparker (0.8 ms) and the Hunttec system (typically 0.3 ms). The Natural Marine Fisheries Service (NMFS) proposed that the maximum SPL to which mysticetes and sperm whales can be exposed is 180 dB re 1 μ Pa-m RMS, but for odontocetes and pinnipeds, the level is 190 dB re 1 μ Pa-m RMS. In 1999, the California Coastal Commission limited this maximum sound exposure level to 180 dB re 1 μ Pa-m RMS for all marine mammals.

Below we provide two estimates of how closely marine mammals can approach the minisparker source before it needs to be shut off. The first estimate follows the procedure required by the California Coastal Commission in 1999, in that underwater sound is assumed to attenuate with distance according to $20\log(R)$, and the maximum SPL to which marine mammals can be exposed is 180 dB re 1 μ Pa-m RMS. The alternative estimate of safe distance is proposed for operations in shallow water. In shallow water, sound from the minisparker will decay with distance more sharply than $20\log(R)$ because some of the sound energy will exit the water and penetrate the sea floor when the minisparker source is physically close to the sea floor.

In the deeper water (> 50 m) areas of the proposed survey, the zone of influence for the minisparker is a circle whose radius is the distance from the source to where the SPL is reduced to 180 dB re 1 μ Pa-m RMS. For a $20\log(R)$ sound attenuation, the zone of influence for a 209 dB RMS source has a radius of about 30 m.

Much of that part of the 2000 survey that focuses on saltwater intrusion of coastal aquifers will be conducted close to shore, where water is shallow. In such areas, underwater sound commonly attenuates more sharply than $20\log(R)$ because sound exits the water layer and penetrates into the substrate. In 1999 the USGS measured a sound attenuation of $27\log(R)$ off southern California, so we propose that for inshore areas, underwater sound attenuates approximately like $25\log(R)$. Strictly for inshore areas, then, an attenuation of $25\log(R)$ yields a zone of influence with a radius of 15 m.

Because of this short radius of the zone of influence in shallow water, we propose that the minisparker can be used at night, using spotlights to illuminate the zone of influence around the tow sled.

As originally proposed for last year's USGS survey (but objected to by the Commission) USGS proposes 24-hour surveying. USGS states:

The Need for 24hour Seismic Operations Reasons for around the clock operation that benefit the environment are: 1) when the minisparker ceases to operate, marine mammals might move back into the survey area and incur an increased potential for harm when operations resume, and 2) daylight only operations prolong our activities in a given area, thus increasing the likelihood that marine mammals will be harassed. The 2000 survey will require only three weeks, and it will be spread out geographically from Los Angeles to San Diego, so no single area will see long term activity. In our view, the best course is to complete the experiment as expeditiously as possible.

Operating less than 24 hours each day incurs substantially increased cost for the leased ship, which the USGS cannot afford (Normark et al., 1999). The ship schedule provides a narrow time window for this project; typically, other experiments are scheduled to precede and follow ours. Thus we are not able arbitrarily to extend the survey time to include large delays for dark or poor visibility.

For these reasons, we request that the Incidental Harassment Authorization allow 24-hour operations. We specifically request permission to operate at night with the understanding that we will survey only in shallow water.

USGS analyzes the project's impacts on marine mammals as follows:

Potential Effects of Seismic Surveys on Marine Mammals During seismic reflection surveys, the chief concern is that marine mammals might be disturbed by underwater noise from the seismic sources. The survey vessel may constitute a secondary noise source. Also, the physical presence of a vessel could lead to some nonacoustic effects involving visual or other cues. Depending upon ambient conditions and the sensitivity of the receptor, underwater sounds produced by open water seismic operations may be detectable a substantial distance away from the activity. Any sound that is detectable is (at least in theory) capable of eliciting a disturbance reaction by a marine mammal or of masking a mammalian signal of comparable frequency content. An incidental harassment take is presumed to occur when marine mammals in the vicinity of the seismic source (or vessel) react to the generated sounds or visual cues.

Seismic pulses are known to cause some species of whales, including gray and bowhead whales, to behaviorally respond within a distance of several kilometers (Richardson et al. 1995). Although some limited masking of low frequency sounds is a possibility for those species of whales using low frequencies for communication, the intermittent nature of seismic source pulses will limit the extent of masking. Bowhead whales, for example, are known to continue calling in the presence of seismic survey sounds, and their calls can be heard between seismic pulses (Richardson et al. 1995).

When the received levels of noise exceed some behavioral reaction threshold, cetaceans will show disturbance reactions. The levels, frequencies, and types of noise that will elicit a response vary between and within species, individuals, locations and season. Behavioral changes may be subtle alterations in surface dive respiration cycles. More conspicuous responses, include changes in activity or aerial displays, movement away from the sound source, or complete avoidance of the area. The reaction threshold and degree of response are related to the activity of the animal at the time of the disturbance. Whales engaged in active behaviors such as feeding, socializing, or mating are less likely than resting animals to show overt behavioral reactions, unless the disturbance is directly threatening.

We emphasize that marine mammals are not expected to suffer permanent hearing damage from the survey proposed herein. Temporary threshold shift (TTS), a protective accommodation for loud sounds by mammalian ears, might occur in animals that venture to within a few meters of the minisparker source. However, planned monitoring and mitigation measures (described below) are designed to detect marine mammals occurring near the seismic array and to avoid, to the greatest extent practicable, exposing them to sound pulses that have any possibility of causing even temporary hearing damage.

***Estimated Number of Marine Mammals that Might be Incidentally Harassed Table 1** [Exhibit 4] gives our estimate of the number of marine mammals that might be incidentally harassed during the 2000 survey. The estimated mammal populations (Calambokidis and Francis, 1994) are also shown in Table 1. In 1998 the USGS conducted a survey using a GI gun off southern California, under the supervision of marine mammal biologists; one biologist was on watch at any given time during survey activities.*

We emphasize that the survey planned for this year (2000) will not use a GI gun and that the minisparker is a much less powerful sound source, so the number of mammals that might be incidentally harassed will be substantially lower than in 1998 and 1999.

The second column from the right in Table 1 gives the numbers of marine mammals that were observed during the 1998 survey, which was conducted with a 40 [cu.] in. airgun. The last (rightmost) column gives the number of actual sightings during the 1999 seismic reflection survey, during which there were two marine mammal biologists on watch during all hours of operation (Quan and Calambokidis, 1999). The high number of sightings of dolphins during the 1999 cruise is consistent with the observation in the report by Quan and Calambokidis (1999) that the (common dolphin) "..... species often approaches the boat to bow ride thus causing the high number of shutdowns when this species was encountered."

We note especially that the marine mammal observers who accompanied the 1999 survey concluded that "Marine mammal movements and behaviors observed during the

seismic reflection operations, revealed no apparent patterns of avoidance and none could be interpreted as harassment." (Quan and Calambokidis, 1999).

Our estimate of the number of marine mammals that might be harassed (Table 1) is based on the population of each mammal type, on its distribution relative to the nearshore survey area, and on the number of individuals that were observed during the 1998 and 1999 seasons.

As it agreed to for last year's survey, USGS: (1) has agreed to use a 180 dB exclusion area for both odontocetes and mysticetes; (2) will avoid the gray whale migration season; (3) will monitor marine mammal presence and cease operating whenever a mammal would be exposed to > 180 dB. USGS has committed that the minisparker operations will cease when mysticetes and odontocetes approach within 30 m of the sound source when operating in deep water, and within 15 m when in shallow water. However, for pinnipeds (seals and sea lions), USGS is proposing the same exclusion radii, with the following exception:

For pinnipeds (seals and sea lions), if the research vessel approaches a pinniped, a safety radius of 30 m around the seismic source when operating in deep water and 15 m when in shallow water, as outlined above, will be maintained from the animal(s). However, if a pinniped approaches the towed minisparker source, the USGS will not be required to shutdown the minisparker. Experience indicates that pinnipeds will come from great distances to scrutinize seismic reflection operations. Seals have been observed swimming within airgun bubbles, 10 m (33 ft) away from active arrays. More recently, Canadian scientists, who were using a high frequency seismic system that produced sound closer to pinniped hearing than will the USGS minisparker, describe how seals frequently approached close to the seismic source, presumably out of curiosity. Therefore, because pinnipeds indicate no adverse reaction to seismic noise, the abovementioned mitigation plan has been proposed. Instead, the USGS will gather information on how often pinnipeds approach the minisparker on their own volition, and what effect the minisparker appears to have on them.

5. Monitoring. USGS will maintain marine biologists onboard the seismic vessel who will have the authority to stop minisparker operations whenever a mammal enters the safety zone. These observers will monitor the safety zone to ensure that no marine mammals enter the zone, and record observations on marine mammal abundance and behavior. If observations are made that one or more marine mammals of any species are attempting to beach themselves when the seismic source is operating in the vicinity of the beaching, the minisparker will be immediately shut off. Finally, any stranding in the vicinity of the survey will be investigated to determine whether a reasonable chance exists that the minisparker survey caused the animal's death. If NMFS determines, based upon a necropsy of the animal(s), that the death was likely due to the seismic source, the survey shall cease until procedures are altered to eliminate the potential for future deaths.

USGS describes its monitoring program as follows:

***Monitoring Minisparker Use** Monitoring of marine mammals while the minisparker is active will be conducted 24 hours each day. Trained marine mammal observers will be onboard the seismic vessel to mitigate the potential environmental impact from minisparker use and to gather data on the species, number and reaction of marine mammals to the minisparker. Each observer will use Tasco 7x50 binoculars with internal compasses and reticules to record the horizontal and vertical angle to sighted mammals. Nighttime operations in shallow water will be conducted with a spotlight to illuminate the radius of influence around the minisparker tow sled.*

Monitoring data to be recorded during minisparker operations include which observer is on duty and what the weather conditions are like, such as Beaufort Sea state, wind speed, cloud cover, swell height, precipitation and visibility. For each mammal sighting the observer will record the time, bearing and reticule readings, species, group size, and the animal's surface behavior and orientation.

Observers will instruct geologists to shut off the minisparker whenever a marine mammal enters a safety zone.

***Reporting** The USGS will contract with the qualified marine mammal observers to provide an initial report to NMFS within 160 days of the completion of the 2000 phase of the marine seismic project. This report will provide dates and locations of seismic operations, details of marine mammal sightings, and estimates of the amount and nature of all takes by harassment. A final technical report will be provided by USGS within 1 year of completion of the 2000 phase of the marine seismic project. The final technical report will contain a description of the methods, results, and interpretation of all monitoring tasks.*

Monitoring reports from USGS' southern California 1998 survey indicated no adverse environmental impacts. Monitoring results for the 1999 survey (CD-32-99) state: "Marine mammal movements and behaviors observed during the seismic-reflection operations revealed no apparent patterns of avoidance and none could be interpreted as harassment." Those monitoring results are attached as Exhibit 5. Also, USGS agrees to submit the monitoring report for the currently proposed survey to the Commission staff.

6. Commission Conclusion. As noted in its review of USGS's 1999 survey, NMFS' recent "pulsed power" exercise, and Navy LFA and Scripps ATOC acoustic research activities, the Commission remains concerned over the lack of reliable information regarding the effects of underwater sounds on the marine environment. To the extent it can be argued that a consensus exists, a 180 dB threshold for impulse noises such as those in seismic surveys has generally been accepted in determining the appropriate preclusion areas for marine mammals. USGS' proposed survey would be consistent with this "guideline." As discussed above, because of the different dispersion between deep water (where spherical spreading is the rule) and shallow water (where waves scatter noise at the surface and the subsea floor

absorbs a certain percentage of the sound) USGS expects the sound to attenuate to 180 dB at 30 meters (m) from the source in deep water and at 15 m in shallow waters.

The Commission staff has requested that USGS elaborate on its different dispersion models for deep versus shallow water and indicate the extent of field verification for its assumptions. USGS responded that it measured a 27 log R attenuation at 200 m from the source, and that:

An important attribute of the minisparker that the USGS proposes to use is that the sound source is towed very close to the sea surface, at depths less than 1 m but mainly less than 0.5 m. This shallow tow depth results in most of the sound energy's being projected downward--horizontally directed sound energy diminishes sharply with distance from the source. Horizontally traveling sound is the kind that would most strongly affect marine mammals. Explanations for the strong, horizontal attenuation are in Richardson et al. (1995, p. 73-75) and especially in Urick (1983; p. 130-134) under the topic of "Lloyd mirror." Because of this mirror effect, the sound field around an acoustic source is divided into near-source and far-field zones. For the parameters of the survey proposed by the USGS, the boundary between these zones is located about 5 m from the minisparker. At near-source ranges less than 5 m the amplitude of underwater sound varies spatially in a complex manner. At far-field ranges (greater than about 5 m), however, the amplitude variation is smooth. Theoretically in the far field, sound amplitude decreases according to $40\log R$, but because the sea surface is not really a perfect reflector, such strong attenuation is not observed. But sound attenuation like $25\log R$ could typify horizontally traveling sound.

We stress that horizontally traveling sound would most affect marine mammals. Also, attenuation like $25\log R$ could result solely from the shallow tow depth of the seismic source, irrespective of water depth.

In shallow water, additional sound attenuation can result from bottom interaction---sound energy exits from the water layer into the seabottom, so that attenuation with distance is enhanced over what it would be in deep water (Richardson et al., p 68 et seq. and Figure 4.7).

We propose that simultaneous action of these two modes of attenuation, makes $25\log R$ a reasonable estimate for sound attenuation in shallow-water areas of the USGS survey. This belief is bolstered but not proved by the $27\log R$ attenuation that we actually measured, even though such measurement was done at distances greater than 200 m from the source, ie in the far field zone.

Another issue of Commission concern has been operations during nighttime and other reduced-visibility conditions (such as fog). In reviewing last year's survey, the Commission objected to USGS' consistency determination because during nighttime operations of the airgun USGS marine mammal monitors would be unable to see the 100 m preclusion area needed for that

airgun for the noise to attenuate to 180 dB. USGS admitted it could only reliably see up to 30 m at night. USGS subsequently modified the project to avoid nighttime operations. For the current survey, USGS calculates the 180 dB preclusion area to be no more than 30 m, a distance which can be effectively monitored because it can be seen at night with the lights USGS will use. USGS therefore proposes 24-hour operations for the current survey, stating:

Night operations: Because the sound pressure levels are lower, the necessary safety zone is reduced. We propose that the safety zone can be illuminated, and safe operations conducted at night.

In conclusion, the Commission notes that: (1) USGS would use a minisparker, which would emit a maximum sound level of 209 dB, far less than a typical oil exploration seismic survey (230-259 dB), and quieter than the airgun USGS used in its 1999 survey; (2) the higher frequency supplemental "Huntec" source has not historically raised concerns over effects on marine mammals (its frequency and intensity are comparable to typical underwater bottom profiling sonars); (3) USGS has committed to monitoring and avoiding subjecting marine mammals to above 180 dB; (4) USGS has established a successful track record in monitoring and avoiding adverse effects during past Pacific Ocean surveys; and (5) USGS is also avoiding operating during the gray whale migration period. Considering these factors, the Commission concludes that, with the monitoring and mitigation commitments incorporated by USGS, the proposed surveys would not cause significant adverse reactions or physiological effects on marine resources, and, therefore, that the project is consistent with the marine resource and environmentally sensitive habitat policies (Sections 30230 and 30240) of the Coastal Act.

B. Commercial and Recreational Fishing. Section 30230 of the Coastal Act, quoted on page 7 above, provides for the protection of economically (as well as biologically) significant marine species. Section 30234 provides that: "Facilities serving the commercial fishing and recreational boating industries shall be protected and, where feasible, upgraded." Section 30234.5 provides that: "The economic, commercial, and recreational importance of fishing activities shall be recognized and protected."

In reviewing last year's USGS survey, the Commission noted:

One of the concerns the Commission has historically had with oil exploration seismic surveys, aside from noise issues, has been the multi-mile tow lines attaching the survey ships to the airgun arrays, which can disrupt fishing gear. The proposed USGS's survey, with its single airgun and short tow line, does not raise this concern, and, as noted in the previous section of this report, the survey would be significantly less noisy than a typical oil exploration seismic survey. These facts, along with the nature of USGS' survey, which is to continue transiting along a long stretch of coastline over a relatively short period of time, lead to the conclusion that the project will minimize adverse effects on commercial and recreational fishing in the area. The Commission therefore finds that the project is consistent with Sections 30230, 30234 and 30234.5 of the Coastal Act.

For this year's survey, which will be quieter than last year's, the Commission reiterates these findings and agrees that the project would not adversely affect commercial and recreational fishing and is consistent with Sections 30230, 30234 and 30234.5 of the Coastal Act.

C. Public Access and Recreation. Sections 30210-30212 of the Coastal Act provide for the maximization of public access and recreational opportunities. Section 30213 provides that "Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided." Section 30220 provides that: "Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses."

In previous Commission reviews of the impacts of Navy acoustic tests on recreational diving activities, the Navy has committed to avoiding active acoustic operations within 0.5 miles of diving activities. In reviewing LFA Phase I research (CD-95-97), the Commission concluded that Navy avoidance of exposing divers to sounds exceeding 130 dB would be adequate, based in part on advice and research from the Navy's Bureau of Medicine and Surgery. USGS has agreed to post Coast Guard Notice to Mariners and to observe a 1 km (0.5 nautical mile) safety zone around any vessels displaying a "diver down" flag. The Commission finds that, with this commitment, the proposed survey will minimize adverse effects on recreational diving in the project vicinity, and that the project is consistent with Sections 30210-30212, 30213 and 30220 of the Coastal Act.

VIII. SUBSTANTIVE FILE DOCUMENTS:

1. Consistency Determination No. CD-32-99, USGS, 1999 Southern California seismic survey, and accompanying monitoring reports.

2. "Low-frequency Sound and Marine Mammals: Current Knowledge and Research Needs, Committee on Low-frequency Sound and Marine Mammals," Ocean Studies Board, Commission on Geosciences, Environment, and Resources, National Research Council, March 21, 1994.

3. "Marine Mammals and Noise," Richardson, W. J., C. R. Greene, et al., New York, Academic Press, 1995.

4. Consistency Determination No. CD-102-99, National Marine Fisheries Service, small test of "pulsed power" acoustic harassment device to protect recreational fishing from sea lions.

5. "Request by the U.S. Geological Survey for an Incidental Harassment Authorization Under the Marine Mammal Protection Act, to Use a Small Airgun Near Marine Mammals in the Southern California Bight," USGS, submitted February 10, 1999.

6. National Marine Fisheries Service, Federal Register Notice of March 5, 1999: "Small Takes of Marine Mammals Incidental to Specified Activities; Seismic Hazards Investigation in Southern California; Notice of receipt of application and proposed authorization for a small take exemption; request for comments."

7. Consistency Determinations No. CD-95-97 and CD-153-97 (Navy, Low-Frequency Active (LFA) Sonar, Phases I and II).

8. Draft Environmental Assessment for Low-Frequency Sound Scientific Research Program in the Southern California Bight, September/October 1997, National Marine Fisheries Service, June 1997.

9. Consistency Certification CC-110-94/Coastal Development Permit Application 3-95-40, Scripps Institution of Oceanography, Acoustic Thermometry of Ocean Climate (ATOC) Project and Marine Mammal Research Program (MMRP).

10. "Investigations of the potential effects of underwater noise from petroleum industry activities on migrating gray whale behavior. Phase II: January 1984 migration," Malme CI, PR Miles, CW Clark, P Tyack and JE Bird, 1984, (Bolt Beranek and Newman Report No. 5586 submitted to Minerals Management Service, U. S. Dept. of the Interior).

11. "Investigations of the potential effects of underwater noise from petroleum industry activities on migrating gray whale behavior," Malme CI, PR Miles, CW Clark, P Tyack and JE Bird, 1983 (Bolt Beranek and Newman Report No. 5366 submitted to Minerals Management Service, U. S. Dept. of the Interior).

12. Quick Look – Playback of low frequency sound to gray whales migrating past the central California coast – January, 1998, Peter Tyack, Christopher Clark, 23 June 1998.

13. Summary Record and Report SACLANTCEN Bioacoustics Panel, NATO (A. D'Amico, Editor), El Spezia, Italy, 15-17 June 1998.

14. Consistency Determination No. CD-109-98, Advanced Deployable System (ADS) acoustic undersea surveillance system tests.

15. "High Energy Seismic Survey Review Process and Interim Operational Guidelines for Marine Surveys Offshore Southern California," the High Energy Seismic Survey Team (HESS), for the California State Lands Commission and the U.S. Minerals Management Service Pacific OCS Region, September 1996 – February 1999.

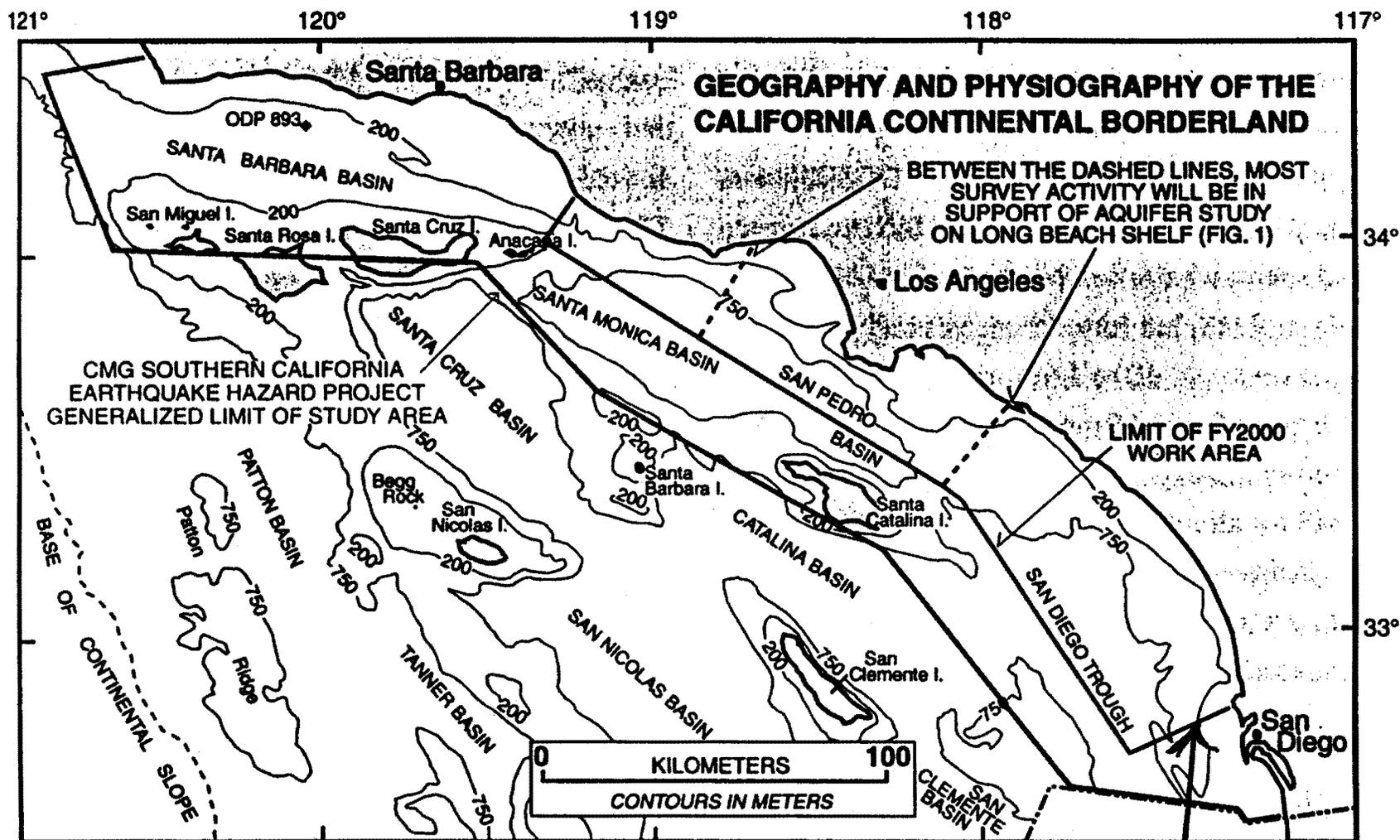


Figure 3. Study area for marine, earthquake-hazard project extends offshore to the limit shown by the heavy red line. The survey area for the year 2000 cruise is limited by the brown line. Between the dashed lines, the planned survey is limited to shallow water (<50 m), primarily the aquifer study concerning seawater intrusion (Fig. 1).

EXHIBIT NO.	1
APPLICATION NO.	CD-16-00
	USGS

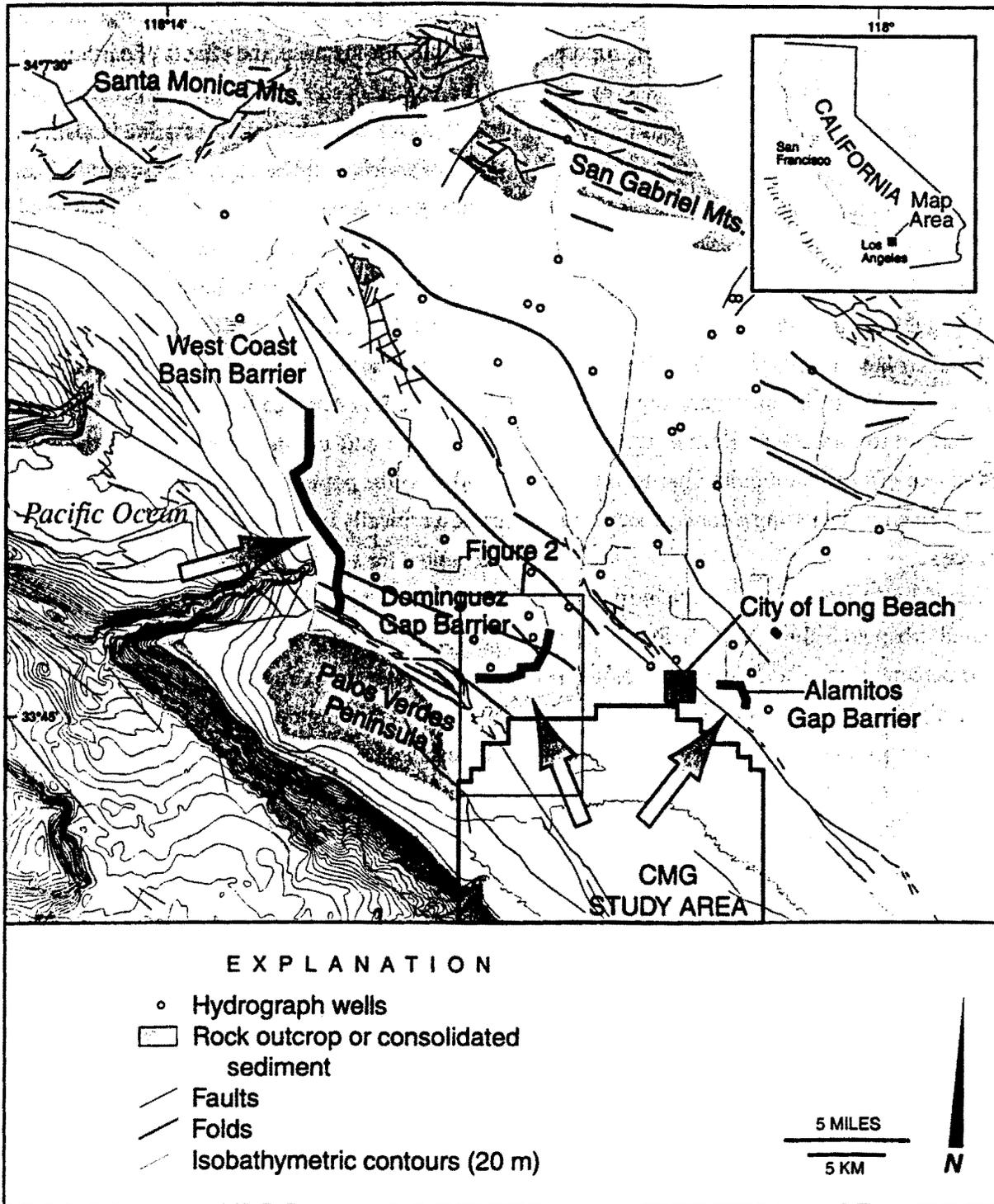


Figure 1. Map showing location of saltwater intrusion (arrows) in the Los Angeles Basin region. Hydraulic injection barrier projects are shown as red lines. The proposed survey area is outlined in black.

EXHIBIT NO. 2
APPLICATION NO.
CD-16-00

Table 1

Species of Marine Mammal	Estimated Population (Calambokidis and Francis, 1994)	Notes	Number That May be Incidentally Harassed	Number Sighted During the 1998 Survey	Number Sighted During the 1999 Survey
Bottlenose dolphin	2,340	1	100		2
Common dolphin	250,000	1	10,000-12,000	3,981	11,569
Killer whales	307	2	5		
Pacific white-sided dolphin	103,734	2	100-200		118
Northern right-whale dolphin	17,118	2	100		
Risso's dolphin	10,000	2	100	8	27
Unidentified dolphin				2,159	1637
Pilot whale		3	0		
Dall's porpoise	78,422	2	100		25
Unidentified porpoise				5	
Cuvier's beaked whale				1	
Sperm whale	756	2	0		
Gray whale	20,000	4	0		
Humpback whale	581	5	50		39
Blue whale	1,000-2,000	2	50	3	32
Minke whale	71-659	2	10	4	
Fin whale	935	6	0		1
Unidentified whale				1	12
California sea lion	111,000	7	200	146	21
Northern sea lion	2,000	2	50		
Harbor seal	23,000	2	200		
Northern elephant seal	100,000	8	100		
Northern fur seal	980,000	9	100	2	1
Unidentified pinniped				2	2
Sea otter	1,864	10	10		

Notes on population estimates:

1. off southern California
2. off all of California
3. population peaks in winter, rare at other times
4. December-March migrations, mainly west of the Channel Islands
5. June-July population peak in the Santa Barbara Channel
6. in all of offshore California, mainly west of the Channel Islands
7. mainly in the Channel Islands
8. worldwide population
9. Pribilof Islands, Alaska
10. mainly off of central and northern California

EXHIBIT NO. 3

APPLICATION NO.

CD-16-00

Squid 2000 sparker source characteristics

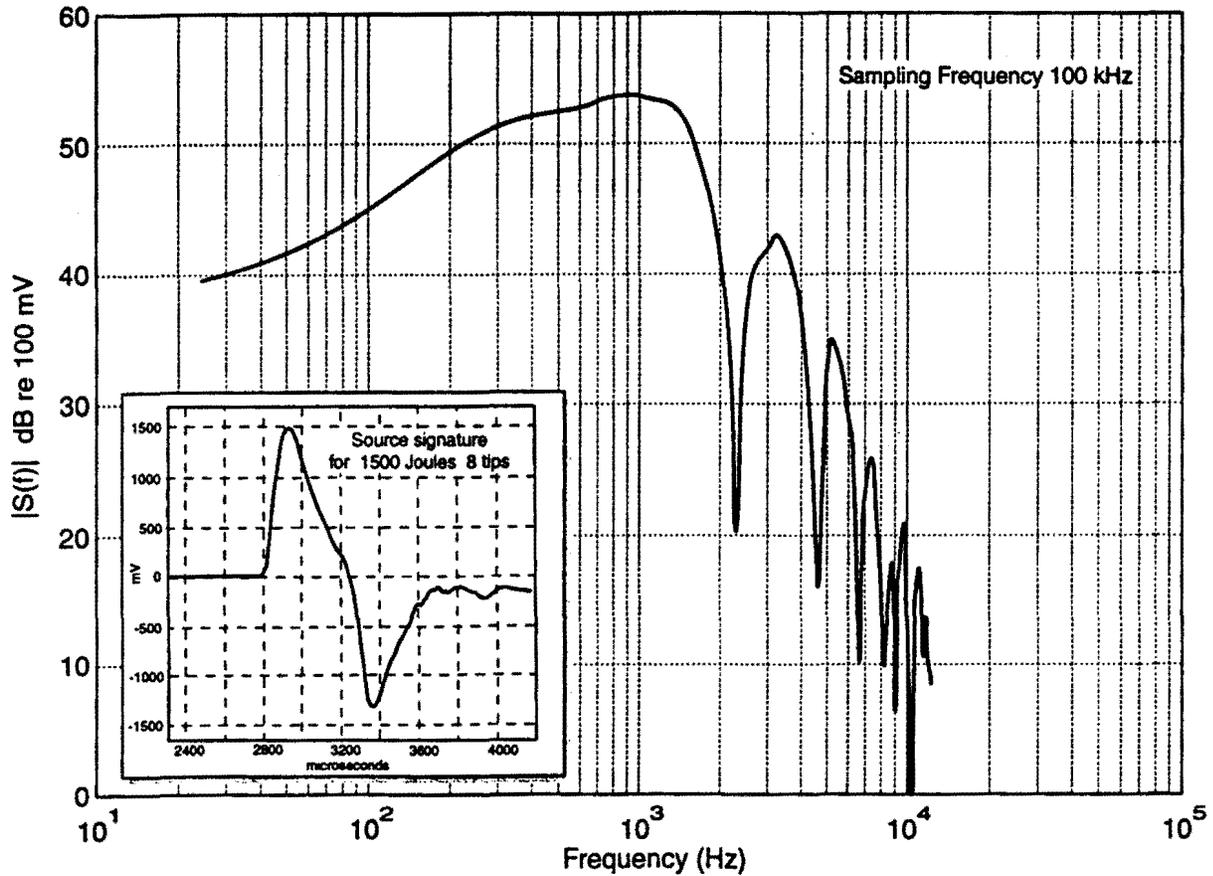


Figure 4. Magnitude of mini-sparker spectrum ($|S(f)|$) for the 1.5 kJoule, 8-tip configuration; inset graph shows outgoing pulse in the time domain. Data are from Applied Acoustic Engineering, Inc. (written communication, 1999).

EXHIBIT NO. 4
APPLICATION NO.
CD-16-00

FINAL REPORT

**MARINE MAMMAL OBSERVATIONS AND MITIGATION ASSOCIATED WITH
USGS SEISMIC SURVEYS IN THE SOUTHERN CALIFORNIA BIGHT IN 1999**

Prepared for

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September 1999

EXHIBIT NO. 5
APPLICATION NO.
CD-16-00

ACKNOWLEDGEMENTS

A number of people and organizations assisted in this project. Tamara Gunther and Annie Douglas conducted marine mammal observations from the *Ocean Olympic*. The captain and crew of the *Ocean Olympic* were very helpful, providing technical assistance, comfort, and company throughout the survey. The U.S. Geological Survey provided funding for this project.

INTRODUCTION

From 6 to 17 June 1999 (4 to 5 June were transit days), the U.S. Geological Survey conducted seismic-reflection surveys in the coastal waters of the Pacific Ocean, between Los Angeles and San Diego, to investigate earthquake hazards. As a part of this project, Cascadia Research was contracted by the USGS to monitor marine mammals from the survey platform and provide mitigation on impacts on marine mammals by requesting shutdown of the sound sources when marine mammals were close to the operations.

This report summarizes the results of a marine mammal mitigation and monitoring program conducted in conjunction with these USGS surveys and adds information to similar work conducted by Cascadia Research in 1998 (Calambokidis et al 1998b). There were several modifications to observations and mitigation operations made for the 1999 survey from that in 1998: 1) Three observers were on board with two on duty during daylight observations, 2) the mitigation safety zone was extended from 200 meters to 250 meters for baleen and sperm whales, and 3) airgun operations during the night time hours were suspended.

BACKGROUND ON OVERALL PROJECT AND SOUND SOURCE DESCRIPTION

The following background on the overall project and sound source description was provided by USGS:

The focus of this project is to identify the landslide and earthquake hazards, as well as related deformation processes, that have great potential to impact the social and economic well being of the inhabitants of the Southern California coastal region--the most heavily populated urban corridor along the U.S. Pacific margin. We are studying Pleistocene-Holocene sedimentation and deformation patterns and related seismicity and strain within the coastal zone and adjacent continental borderland basins. Our findings will help us evaluate the hazard potential for large, destructive earthquakes and identify how deformation is distributed in space and time between onshore and offshore regions. The results of this project will contribute to decisions involving land use, hazard zonation, and building codes in the area.

The active field program for the project focuses on those areas with the greatest impact potential on the Southern California populace:

- 1) The coastal strip (coastal zone and continental shelf) between Los Angeles and San Diego, where much of the hazard appears to be associated with strike-slip or oblique-slip faults;
- 2) Active faults within the Santa Monica, San Pedro, and San Diego Trough basins, where more extensive sedimentation has left a greater stratigraphic record;
- 3) The offshore extension into the Santa Barbara Channel of the fold and thrust belt;
- 4) The boundary (Channel Islands region) between the inner California Borderland (strike-slip dominated deformation) and the Santa Barbara Channel (thrust and fold deformation).

Tracklines were planned at a 2 km spacing aligned perpendicular to the shelf break and basin slope and on an "orthogonal" set aligned to intercept major structural features that are oblique to the trend of the basin slope and shelf edge. For the FY 1999, only one set of tracklines was attempted because of time limitation on hours of operation. As a result, generally only every other line was run, i.e., the grid was 4 km spacing with only one set of the planned grid over most of the area.

The FY 1999 field program was conducted using a leased vessel, the 156-ft-long M/V OCEAN OLYMPIC, owned and operated by F/V NORTH WIND INC.

Two sound transmissions were used:

Huntec: A high-resolution Huntec DTS boomer system, towed between 6 m and 160 m below the sea surface (depending upon the water depth), was used to image the upper few tens of milliseconds of strata with a resolution of better than 0.5 ms (0.4 m). Power output was 350 Joules (540) with a firing rate that was also dependent on water depth, ranging from 0.4 sec over the shelf and upper basin slopes to 1.3 sec over the shelf and upper basin slopes to 1.25 sec over the deeper parts of the basins. Returning signals were received with a 7.6 m long 25-element hydrophone array. Signals were filtered at 700-8000 Hz and recorded at a 0.25 sec sweep. The data were recorded both on paper using an EPC recorder and on magneto-optical disc.

Multichannel seismic-reflection system (MCS): The sound source used during this years survey was a 35/35 in³ double-chamber GI gun firing every 12 seconds at a pressure of about 3000 psi. A Sureshot system was used to fire the gun in "harmonic mode" wherein the second chamber is delayed relative to the initial trigger pulse in order to achieve the cleanest signal by minimizing the bubble pulse. The GI gun was towed 12 meters behind the vessel and suspended from a float to maintain a depth of about 1 meter.

The streamer used for the mcs operation was a 24-channel ITI streamer with 10-m-long groups and 3 phones per group.

OBJECTIVES

The objectives of the marine mammal study were as follows:

1. Mitigate impacts on marine mammals by monitoring the presence of these species from the survey ship and requesting shut-down of the airgun array when marine mammals were seen within specified safety zones representing distances close enough to potentially cause physical injury.
2. Document the number of animals of each species present in the vicinity of sound transmissions.
3. Evaluate the reactions of marine mammals to the sound transmissions at different distances from the airgun array.
4. Conduct limited tests of night vision equipment.

METHODS

General Approach

The research effort consisted of observations made directly from the survey vessel (*Ocean Olympic*) to provide mitigation, document marine mammals exposed to the airgun during daylight hours, and monitor reactions of marine mammals close to the seismic-reflection survey vessel. Three observers were placed on board the vessel and observations were conducted from the bridge deck that put the observers eye level at 7.8 m above the water. This external platform provided good mobility and a clear view from the front, sides and rear of the vessel. The observation platform was near the front of the vessel 7.2 m behind the bow and 47 m from the stern of the vessel.

Observations were conducted from the fishing vessel (*Ocean Olympic*), during a short transit period (between June 4 and 5) and in the daylight when seismic-reflection operations were underway. While the seismic-reflection operations were underway observations began within a half hour of sunrise, when lighting conditions allowed for the sightings to be made within the mitigation zones and ended within an half an hour after sundown, when lighting conditions became too dark for sightings to made within the mitigation zone. During the daylight observation periods, two observers stood watch, one on the port and the other the starboard. The third observer would rotate in every two hours. Generally, each observer worked shifts of four hours on and two hours off (averaging about 11 hour per day). Observers used *Tasco 7x50* binoculars with internal compasses and reticles to record the horizontal and vertical angle to sightings.

Data on survey effort and sightings were recorded on a datasheet recording information to track survey effort which includes observers on duty and weather conditions (Beaufort sea state, wind speed, cloud cover, swell height, precipitation, visibility, etc.). For each sighting, the time, bearing and reticle reading to sighting, species, group size, surface behavior, and orientation were recorded.

Distances to sightings were calculated using the vertical angle to the animal (based on either the reticle reading through the binoculars or a hand held clinometer

for close sightings) and the known elevation above the water. This was then used to evaluate whether a sighting was within the mitigation safety zones.

Mitigation safety zones

Two safety zones were used for this project. These were:

1. For pinnipeds and odontocetes (all toothed cetaceans except sperm whales) seismic operations would be shut down when an animal was seen close to a distance of 100 m or less.
2. For mysticetes (baleen whales) and sperm whales, the safety zone was 250 m.

To allow a quick determination of status, safety zones were calculated in three arcs around the ship and the safety distance was applied using the closest part of the ship or array. Three different cut-off distances (based on distance and angle from the observers) were calculated for off the bow (60 degrees to either side of the bow), to either side of the vessel (from 60 to 120 degrees off the bow and off the stern (120 to 180 degrees off the bow).

Observers were instructed to call for a shut-down when a marine mammal was seen inside the safety zone or close enough to the safety zone that given measurement-error, it could be within the safety zone. Shut-down was also considered when animals were ahead of the vessel path outside the safety zone, but it appeared likely that the direction of travel of the vessel would result in the marine mammal being within the safety zone shortly. Marine mammals were tracked until they were outside the safety zone at which time seismic-reflection operations resumed.

For effective mitigation, the observers needed to know very quickly whether a sighting was within the safety zone. We used a polaris (angle board) for the observers to estimate the angle to the sighting. The cut-off vertical angle, which represented each of the safety zones, was also written on the polaris, allowing quick determination of the proximity of a sighting to the safety zone.

Night Observations

A total of 6 hours and 36 minutes, over the span of seven nights, was devoted to night observations. Two different sets of night vision viewers supplied by USGS were tested (ITT night vision binoculars model 200/210 and model 250/260). Night observations were conducted by one observer and took place from the bridge, bridge wings and bridge deck. Observations were limited toward the front of ship to 95 degrees either side of the bow, as deck lights on the stern of the vessel created light conditions (too bright) that were not conducive for viewing with the night vision viewers. Observations were conducted in weather conditions that ranged from 0% cloud cover to 100%, and in Beaufort sea states ranging from 1-5. Two sightings of common dolphin were recorded during night observations, both occurring on the evening of 6 June 1999. The first sighting was a "re-sight" of animals originally observed during daylight observation operations. Both observations were made by "naked-eye", and as the dolphins approached the ship to ride the bow waves and

wake waves made by the vessel. No sighting of marine mammals were made with the aid of either night scope.

RESULTS AND DISCUSSION

Marine mammal mitigation – Shut-downs

Shut-down of the airgun was called for in 21 instances during the daylight observations (Table 1). In all shut-down cases both the airgun and the Hunttec were in firing operation. Seventeen of the shut-downs were for common dolphin (in seven of these shut-downs the dolphins approached the ship to bow ride) and in one of the shut-downs the dolphins were associated with a California sea lion. The other shut-downs requested were: one for a California sea lion, one for an unidentified pinniped, one for a large baleen whale (sei whale or fin whale), and one for a group of Pacific white-sided dolphin (which approached the ship to bow ride). Shut-downs lasted anywhere from less than one minute to 13 minutes. Twelve of the shutdowns were called when the animal was just outside the safety zones but appeared likely to be within the safety zone shortly, and nine shut-downs were called when the animals were seen already within the safety zones.

Marine mammal sightings

There were a total of 181 sightings (not including re-sightings), comprised of 13,486 marine mammals encountered during observation operations (Table 2) and more than half (60%) of the sightings were made while the airgun and Hunttec were in operation (Table 3). Some of these groups were seen more than one time, and account for 156 re-sightings. Nine species of marine mammals made up these sightings. Humpback whales and Dall's porpoise were seen only in the transit area (from roughly San Francisco to just north of Los Angeles – during which time no seismic-reflection equipment was deployed). Within the survey area, common dolphin, blue whales, and California sea lions were the most frequently observed. Other large whale species included a number of unidentified whales, one of, which was likely to be either a sei or fin whale. Other small cetaceans included Risso's dolphin, Pacific white-sided dolphin, and one sighting of bottlenose dolphin. Sightings of unidentified dolphin were likely to be either common dolphin or Pacific white-sided dolphin. Beside California sea lions, no other pinnipeds were positively identified.

Orientation and behavior of marine mammals in relation to firing status of seismic equipment

Marine mammals were observed moving in all directions in relation to the heading of the vessel (Table 4). Sightings of animals seen while both the airgun and Hunttec were firing tended to be slightly more towards (22%) than away (11%) and the re-sightings slightly more away (23%) than towards (15%). A large portion of the animals observed moving towards the ship, during these times, were common dolphin which are well known for approaching ships to ride the bow wake, and which may

account for the higher number of animals seen moving toward the ship when initially sighted. Some of these groups did approach the ship to bow ride and when ceased bow riding were re-sighted moving away from the ship which may account for the higher number of animals observed moving away when re-sighted. Overall there were no major differences in the movements observed in relation to firing status of the airgun and Hunttec or when the equipment was not firing at all. Further, it is not possible to determine if any of the observed movements could be attributed to marine mammals reacting to the seismic equipment.

Marine mammals were observed exhibiting a variety of behaviors (Table 5). The most common behaviors that were observed were classified as slow or fast travel. Other common behaviors were milling, which can indicate feeding activity, porpoising (California sea lions), and bow riding (common dolphins, Pacific white-sided dolphin, and Dall's porpoise). Less common behaviors included slow rolling, breaching, fluke diving, medium travel, and hauled, splashing and vertical sinks (the last three behaviors describe those associated only with pinnipeds). It is not possible to determine if any of these activities could have been related to the seismic-reflection operations.

Night Observations

The objective of the night observations was to test the utility of night vision viewers as a tool for observing for and detecting marine mammals at night. Of the two sets of viewers used, the Viewer 200/210 was favored for its consistent clarity and focus, while the Viewer 250/260 was highly variable in its over all performance, was too grainy, and did not hold it's focus. While the Viewer 200/210 provided some assistance in night observations it was limited by the following factors:

- **Distance Detection** – There are no methods for determining distance (as with reticule binoculars) while observing through the scope, and observers felt that confidence in estimating distance in the dark and while observing through the viewers did not extend beyond 100 meters.
- **Field of View** - The field of view is limiting, allowing roughly, only a span of 40 degrees to be observed at a time.
- **Ambient light conditions** - Ambient light conditions may have an affect on sighting ability. Conditions seem to improve when some ambient light is present, as with water lit by a cityscape or moon light. In conditions of complete darkness/ cloud cover, the possibility of detection seems lower, as not even the horizon is visible.
- **Lights from the Observation Vessel** - Deck lights on the stern of the ship were too bright, and made observation around the sound source itself impossible.
- **Sea State** - Observation of the dolphins made with the viewers, on 6 June 1999, were in Beaufort 3 conditions. The animals were only distinguishable from white caps when within roughly 6 meters of the bow.

- Physical Constraints - The viewers were physically constraining, allowing the observer to safely move around at a slow speed, and use of the goggle for an hour produced eye strain for some of the observers.

DISCUSSION AND CONCLUSIONS

Shut-downs were more common in 1999 compared to 1998. Most of the shut-downs were related to common dolphins. This species was sighted more times in 1999 than during the 1998 surveys. Surveys were conducted slightly earlier in the year in 1999 and also covered a slightly different area. Either of these or the annual differences in oceanographic conditions could have been responsible for the higher number of sightings of this species and resultant higher shut-downs. This species often approaches the boat to bow ride thus causing the high number of shut-downs when this species was encountered.

There were also larger numbers of baleen whales encountered in 1999 compared to 1998. Some of these sightings, including those of humpback whales were primarily made while the vessel was in transit to the study area prior to airgun operations. Sightings of blue whales were still far more common within the study area during airgun operations in 1999 compared to 1998; 15 sightings were made in 1999 during operations compared to only 3 in 1998 (includes possible fin whales). Again the timing of the surveys or inter-annual oceanographic changes could have been responsible for the differences.

Marine mammal movements and behaviors observed during the seismic-reflection operations, revealed no apparent patterns of avoidance and none could be interpreted as harassment.

No sightings were made with the aid of the night vision viewers, and therefore the utility of the night vision viewers as a tool for detecting marine mammals at night is difficult to determine. This assessment of night observations operations has revealed that for night observations to be marginally effective while using the night vision viewers requires:

- Methods for detection of distance would need to be established
- Viewing conditions would have to have some level of ambient light
- Deck lights on the stern of the ship would have to be dimmed or extinguished
- Sea State conditions would have to be at a Beaufort three or lower
- To compensate for the 40 degree field of view, at least three observers per shift would be needed.
- Observation shifts no longer than two hours to allow for relief of eye strain, or until the observers eyes adjust to such sighting conditions.

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- Calambokidis, J. L. Schlender, and J. Quan. 1998b. Marine mammal observations and mitigation associated with USGS surveys in the southern California Bight in 1998. Final Report to U.S. Geological Survey, Menlo Park, California. Cascadia Research, 218_ W Fourth Ave., Olympia, WA 98501. 14pp.

Table 1. Shut-down requests due to marine mammal occurrences, during the Hunttec and Airgun operations. Distance is based on approximate distance of marine mammals from the observer at the time the shut down was requested. Behaviors are based on the those observed at and during the time of the requested shut-down.

Date	Time	Resume	Species	Distance	Behaviors	Comments
06/07/03	13:17:00	13:20:00	common dolphin, California sea lion	3 meters	Slow travel	
06/07/03	16:53:00	16:55:00	common dolphin	106 meters	Milling	
06/07/03	20:33:00		common dolphin	< 100 meters	Fast Travel, Bow riding	Too dark to continue obs.
06/08/03	6:34:00	6:39:00	common dolphin	106 meters	Fast Travel, Bow riding	
06/08/03	8:41:00	8:41:00	California sea lion	< 100 meters		
06/08/03	9:48:00	9:54:00	common dolphin	2 meters	Slow travel, Milling	
06/09/03	16:05:00	16:18:00	common dolphin	37 meters	Bow riding	
06/10/03	14:18:00	14:20:00	common dolphin	109 meters	Bow riding	
06/11/03	17:23:00	17:24:00	common dolphin	109 meters	Fast Travel	
06/14/03	8:23:00	8:25:00	common dolphin	109 meters	Slow travel, Milling	
06/15/03	10:35:00	10:38:00	common dolphin	109 meters	Bow riding	
06/15/03	12:14:00	12:16:00	common dolphin	< 100 meters	Bow riding	
06/15/03	17:17:00	17:22:00	common dolphin	109 meters	Slow travel, Milling	
06/15/03	20:14:00	20:15:00	common dolphin	97 meters	Slow travel	
06/16/03	6:23:00	7:02:00	common dolphin	111 meters	Slow travel	Resume time includes, shut down for trackline change.
06/16/03	9:23:00	9:34:00	Pacific white-sided dolphin	101 meters	Slow travel, Bow riding, Wake riding	
06/16/03	13:47:00	13:50:00	common dolphin	101 meters	Fast Travel, Bow riding	
06/16/03	13:55:00	13:59:00	common dolphin	111 meters	Fast Travel, Wake riding	
06/16/03	14:51:00	14:53:00	unidentified pinniped	19 meters		
06/16/03	18:35:00	18:40:00	unidentified baleen whale (fin or sei)	158 meters	Slow travel	
06/17/03	10:58:00	11:01:00	common dolphin	109 meters	Slow travel, Milling	

Table 2. Summary of sightings and resightings by species. Resightings represent groups seen more than one time.

Species	Sighting		Resighting	
	# of sightings	# of Animals	# of sightings	# of Animals
Large whales				
Blue whale	27	32	30	36
Humpback whale	24	39	10	18
Large Balaenopterid (sei or fin)	1	1	1	1
Unidentified whale	12	12	2	2
Small cetaceans				
Common dolphin	66	11,569	87	21,116
Risso's dolphin	4	27	7	58
Pacific white-sided dolphin	3	118	3	98
Dall's porpoise	4	25		
Bottlenose dolphin	1	2		
Unidentified dolphin	15	1,637	9	950
Pinnipeds				
California sea lion	21	21	6	6
Unidentified pinniped	2	2	1	1
Unidentified Oratriid (California sea lion or Northern fur seal)	1	1		
Grand Total	181	13,486	156	22,286

Table 3. Sightings and total number of animals seen by operational status of airgun and Huntec.

Species	Airgun and Huntec		Huntec only		None Firing		Total	
	# of Sight.	# of Animals	# of Sight.	# of Animals	# of Sight.	# of Animals	# of Sight.	# of Animals
Large whales								
Blue whale	15	17			12	15	27	32
Humpback whale					24	39	24	39
Large Balaenopterid (sei or fin)	1	1					1	1
Unidentified whale	5	5			7	7	12	12
							0	0
							0	0
Small cetaceans								
Common dolphin	54	9,443	3	30	9	2,096	66	11,569
Risso's dolphin	3	25			1	2	4	27
Pacific white-sided dolphin	2	53			1	65	3	118
Dall's porpoise					4	25	4	25
Bottlenose dolphin	1	2					1	2
Unidentified dolphin	13	1,367	1	30	1	240	15	1,637
							0	0
							0	0
Pinnipeds								
California sea lion	12	12			9	9	21	21
Unidentified pinniped	1	1			1	1	2	2
Unidentified Oratrid (California sea lion or Northern fur seal)	1	1					1	1
Grand Total	108	10,927 0	4	60 0	69	2,499	181	13,486

Table 4. Percent of total observed headings of marine mammals by sightings and resightings and by sound source(s) firing status. Headings are relative to the direction of the survey vessel.

Heading	Firing Status				Total		Total (n)
	Airgun and Hunttec		Hunttec only and None firing		# of Sight.	# of Resight.	
	# of Sight.	# of Resight.	# of Sight.	# of Resight.	# of Sight.	# of Resight.	
Away	11%	24%	17%	15%	43%	57%	47
Left	36%	30%	17%	33%	54%	46%	83
Right	32%	31%	36%	22%	59%	41%	87
Toward	22%	15%	30%	30%	62%	38%	61
Total (n)	101	97	53	27	154	124	278

Table 5. Primary behaviors of marine mammals observed during sightings and resightings relative to firing status of sound source(s).

Behavior	Firing Status				Total for both
	Airgun and Huntec		Huntec only and None firing		
	# of Sightings	# of Resightings	# of Sightings	# of Resightings	
Slow travel	51	55	36	28	170
Fast travel	32	36	11	2	81
Milling	7	13	2	3	25
Porpoising	3		3		6
Bow riding			4	8	12
Slow roll	3				3
Breaching	1		1		2
Medium travel	1	1			2
Fluke diving	1				1
Hauled	1				1
Splashing			1		1
Vertical sink			1		1
Total	100	105 0	59	41 0	305



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COASTAL COMMISSION

Mr. Mark Delaplaine
Federal Consistency Supervisor
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

August 19, 1999

SWEF "Virtual Test Capability"

Dear Mr. Delaplaine:

The Consistency Determination submission by the U.S. Navy dated July 14, 1999 states (page 5): "The purpose of establishing the Virtual Test Capability (VTC) is to enhance and expand SWEF [Surface Warfare Engineering Facility] capabilities..."

The proposed action purports to be in accord with the Federal Coastal Zone Management Act (CZMA) Section 307 requirement that the proposed action be "...consistent to the maximum extent practicable" with the California Coastal Act.

Pursuant to CZMA regulations (15 CFR 930.34) Federal agencies are required to provide the State with a consistency determination for proposed activities affecting the coastal zone "... at the earliest practicable time in the planning or reassessment of the activity..." and "... before the Federal agency reaches a significant point of decision making in its review process."

This proposal comes to the Coastal Commission after the proposed action has been internally approved and funded, desired implementation is imminent, and a public relations campaign has been launched. The professed urgency occasioned by the Navy delay in submission must not be allowed to short cut full Coastal Commission review in compliance with its obligations under the Coastal Zone Management Act.

The submission fails the CZMA regulation requirement (15 CFR 930.39) that:

"The consistency determination shall ... include a detailed description of the activity, its associated facilities, and their coastal zone effects, and comprehensive data and information to support the Federal agency's consistency statement."

This consistency determination fails to provide the reader with even the most basic information necessary to understand the nature and scope of the proposed action.

EXHIBIT NO.	10
APPLICATION NO.	

Withholding of the Environmental Assessment for the Proposed Action.

The paucity of information in the consistency determination is glaring in view of the Navy announcement that contemporaneously with the consistency determination it is also completing an Environmental Assessment (EA) for the proposed action. The Navy has announced that both the consistency determination and the EA will be completed this summer. Under these circumstances it violates informed decision making to ask the CCC to approve a consistency determination without providing the Environmental Assessment for Coastal Commission review.

Leap Frogging the Lacking Baseline.

A decision maker cannot rationally act on the consistency determination or the Environmental Assessment without an underlying baseline environmental review of existing operations of the Surface Warfare Engineering Facility. The decision maker is being asked to evaluate a proposal to "enhance and expand" SWEF operations when there has never been an environmental review of the SWEF operations to which the proposed action is additive.

The Coastal Commission has been seeking an after-the-fact consistency determination on SWEF operations since September of 1995. In August 1995 The Beacon Foundation provided the Commission with a copy of a Navy preconstruction report detailing "unavoidable" radio frequency and other coastal zone impacts of SWEF operations. These impacts were described in the Navy pre-construction document as violations of Coastal Act policy. Despite actual knowledge of potential impacts and despite an obligation under the Coastal Zone Management Act to submit a consistency determination, the Navy proceeded to build and operate the facility without ever completing or filing an environmental review with the Coastal Commission or any other agency.

After first claiming that a consistency determination had been filed, the Navy finally admitted in 1998 that it can find no such environmental documents regarding the SWEF. Despite this admission, the Navy refuses to submit an after-the-fact consistency determination. This impasse caused the CCC Executive Director to initiate an informal mediation of this "serious disagreement" in August of 1998. The Navy consented to participate and a year has been spent establishing ground rules and selecting a panel of experts to advise the Coastal Commission. The Office of

Coastal Resource Management of the U.S. Department of Commerce is facilitating the mediation and it describes the process as follows:

"The purpose of the informal negotiations is to assist the Commission in determining, relying on input from an independent and objective technical panel, whether radar emissions from the SWEF will adversely affect the public's use of coastal resources and the resources themselves."¹

The Navy has had since 1985, when it commenced construction of the SWEF, to submit a consistency determination on SWEF operations. It has chosen not to.

The consistency determination for the proposed additions to SWEF operations follows bizarre logic. By this filing, the Navy acknowledges that the new actions require a consistency determination while continuing to deny that a consistency determination is required for the underlying SWEF operations to which the proposed action is added.

The consistency determination filing is an attempt to leap frog over the informal mediation. At a minimum, consideration of additive proposed actions needs to await completion of the informal mediation process. If, in the end, the Coastal Commission affirms its prior staff determination that SWEF operations may impact the coastal zone, environmental documentation will be required on the whole operation and not just on its expansion and enhancement.

Analytical Elements Missing.

The consistency determination withholds the specific functional parameters of the proposed action. Aircraft, ship, radar and laser operations are all elements. However, no comprehensive data is provided on characteristics of the chosen equipment or on the manner in which it will be operated. Under these circumstances, it is impossible to evaluate the conclusions of no impact on human and biological resources.

To illustrate the consequences of withholding comprehensive data, we comment below on the consistency determination treatment of impacts of aircraft on avian species. This exhibits the lack of facts necessary to evaluate the conclusions stated and also illustrates erroneous understandings of science and avian behavior.

¹. David Kaiser "Memorandum for: John D'Andrea, Ed Mantiply, and Robert Beason" July 19, 1999.

Aircraft and Avian Impacts

A key element of the proposal involves use of aircraft. The Consistency Determination (page 2) indicates the SWEF was sited to "... afford clear paths for the installed radar systems to the open ocean and allow line-of-sight flight paths to the building."

The proposed action would (page 2) "... test equipment and warfare scenarios using a mix of real, prototype, and simulated equipment." Only a fragmentary description is provided of aircraft operations:

(1) The Number of Aircraft is Unlimited. The "Proposed Action" section of the consistency determination (page 4) states "10 additional aircraft operations" will be required annually. "Aircraft operations" are not further defined in the text and Table 1 (page 4) offers only the additional information that they will be "2-4 hours per event." No limitation is stated on use of multiple aircraft during an event or on repeated passes during an event.

(2) The Type of Aircraft is not Defined. The "Proposed Action" section (page 4) contains no information whatsoever on the type of aircraft to be utilized. Elsewhere, in comments on noise (page 14), an anecdotal comment appears that jet aircraft used would be "primarily Lear jets:"

(3) Flight Profiles are Neither Defined nor Limited. The "Proposed Action" section (page 4) states flight operations would be "conducted primarily on the Point Mugu Sea Range (Sea Range), which ends 3.5 nautical miles from shore." This would allow up to half of the operations to be somewhere outside the range including closer to the shoreline or to the Channel Islands National Park. Precisely limited flight corridors need to be defined if adjacent restricted habitat airspace is to be avoided. Instead, only the uninformative comment is offered that "Flight profiles, trajectories and flight attitudes would continue to comply with local regulatory restrictions." Although not disclosed in the "Proposed Action" section of the consistency determination, it is elsewhere noted (page 15) that "... flight altitudes of 100 feet to 6,000 feet above the ocean surface for Lear jets, reduce the potential for bird strikes" This comment suggests some test flights will be as low as 100 feet from the surface of the ocean but provides no actual flight profiles and geometries.

(4) No Restrictions are Imposed on Times of Operation. There is no limitation provided on either time of day or season of the year of flight operations.

Absent the four above categories of information regarding aircraft usage, the Coastal Commission lacks the "detailed description of the activity" and the "comprehensive data" the proponent is required to provide. Based on what is provided, no evaluation by the Coastal Commission is possible that will support the Navy conclusion that the proposed action has no impact on coastal zone resources protected by policies of the Coastal Act. The filing is not only deficient for its failure to include an adequate description of the proposed action. It is also deficient for its often erroneous and unsupported scientific conclusions regarding the types of impacts that could result from actions of the type proposed. This is illustrated below in a review of the consistency determination conclusions regarding birds.

Impacts on Avian Species

The Consistency Determination lists avian species in the general vicinity of the SWEF. It fails to acknowledge the significance of the location of this facility in the midst of an ecologic-area of great significance and the role of the facility itself as a habitat. Within five miles to the south of the SWEF facility are the Mugu Lagoon and Ormond Beach. Mugu Lagoon is designated by the National Audubon Society and the American Bird Conservancy as a "globally" significant habitat. To the southwest some 12 nautical miles is Anacapa Island, a northern Channel Islands that is also recognized as a globally significant habitat. To the Northwest some 6.5 miles² is McGrath State Beach, a nesting area for the endangered snowy plover. In the immediate foreground of the SWEF is the entrance to the Port of Hueneme and the upwelling of the Hueneme marine trench -- a natural attraction for feeding birds and marine mammals.

Unlike the July 14, 1999 consistency determination, a 1994 Navy Environmental Assessment prepared by the same command (for a now abandoned proposal for special use airspace at the SWEF) did correctly recognized the habitat significance of the SWEF site as follows:

"The SWEF and surrounding area provide an actual or potential habitat or migration area for endangered species. Those endangered species actually sighted in the area include the northern elephant seal, the California brown pelican, and the California least tern."³

2. The consistency determination (page 14) erroneously states a distance of "about 12 miles north."

³. March 1994, Page 34.

The July 14, 1999 consistency determination mentions the presence throughout the year of the California brown pelican but fails to consider the extraordinary numbers found in the immediate area of the SWEF. The consistency determination erroneously states that the peregrine falcon "has not been observed in the Port Hueneme area".

At the March 10, 1998 CCC study session regarding SWEF operations (in which the Navy participated) the Commission received testimony of two eminent avian experts -- Brian Walton, Coordinator of the Predatory Bird Research Group at the University of California at Santa Cruz and Dr. Franklin Gress, Research Specialist with the California Institute of Environmental Studies. In respective letters on file with the Commission, Dr. Gress reported "the number of pelicans roosting on mainland sites in the potentially impacted area [of the SWEF] on any given day during the breeding season varies widely, but could be as many as 3,000." and Mr. Walton reported "I have seen peregrines on the SWEF building" ⁴

Noise.

The consistency determination (page 15) asserts: "There is no evidence that the noise levels or the presence of aircraft would significantly affect the flight behaviour of birds." However, contrary to this assertion, a critically important impact of the proposed action on the California brown pelican, an endangered species, is disclosed in the Consistency Determination and then dismissed as follows (page 14-15):

"Flights of Lear jets and helicopters on the Sea Range could disturb brown pelicans while nesting (March-July) at the west end of Anacapa Island or foraging over the ocean in the flight path. The low number of flights, however, is unlikely to cause disturbances that would adversely affect reproductive success. Infrequent disturbance of foraging brown pelicans would affect few individuals and would have no adverse effect on their survival."

The preparer knows that sound levels on West Anacapa Island and on flight paths over water may be at a decibel levels sufficient to cause scatter and flee harrassment of brown pelicans. However, these noise calculations are not disclosed nor is any factual basis provided for the Navy conclusion that only a "few individuals" would be affected and that it would have "no adverse effect on their survival" or reproductive success.

⁴. Letter of Franklin Gress to Mark Delaplaine, March 6, 1998 and Letter of Brian Walton to Mark Delaplaine, March 18, 1998.

The number and density of brown pelicans on Anacapa Island is extraordinary particularly during the breeding season which in most years is February-September⁵ not March-July as stated in the Consistency Determination. The land area of all parts of Anacapa Island taken together is just 1.1 square miles. During the breeding season "... as many as 6,000 pairs of brown pelicans may be nesting on Anacapa Island; in addition, an estimated 2,000-3,000 non breeders may also be present."⁶

It is well known in the scientific literature that noise, including aircraft noise, can have a significant impact on nesting birds and in some species these consequences may include flushing from nests and resultant damage or abandonment of nesting sites, eggs or newborns. Regarding pelicans:

"Both American white pelicans and brown pelicans appear to be particularly susceptible to disturbance. Pelican biologists have discovered that low-flying aircraft can contribute to dramatic reductions in survivorship of young and in overall productivity of a nesting colony."⁷

Anacapa Island is part of the Channel Islands National Park and is within the Channel Islands National Marine Sanctuary. West Anacapa Island has been given additional protection by the State of California as one of 19 ecological reserves established by the State in marine and estuarine environments.

The State of California established the Anacapa Island Ecological Reserve to protect the brown pelican fledging area on West Anacapa Island by, among other things, restricting all public entry into the area during the period January 1 to October 31. Other California restrictions expressly limit noise.

Air Pollution

The consistency determination concludes (page 15) that "Air emissions from the proposed action would not be expected to significantly impact birds" Detailed

5. Letter of Franklin Gress to Carl Thelander, March 26, 1996.

6. Ibid.

7. U.S. Department of the Interior, Report on Effects of Aircraft Overflights on the National Park System, July, 1995, page 115.

calculations of carbon monoxide and other emissions are reported. In order to make these calculations the preparer had to utilize specific and undisclosed information regarding the number and type of aircraft, flight paths, and geometries. This information is required to evaluate the conclusion that a lack of significant impact is "expected."

RF Exposure

A single scientific work dated 1967 -- more than thirty years ago -- is cited to support the Consistency Determination statement that: "There is little scientific evidence to indicate that RF exposure has adverse impacts to birds." Fundamental changes have occurred in emitters and in knowledge of the effects of their microwave emissions:

"Technological advances have increased the output power of microwave emitters several-fold during the past 30 years, enhancing concerns over inadvertent human exposure."⁸

and:

"Research has shown that exposure to microwave radiation can cause behavioral changes in man and laboratory animals that range from perception of warmth and sound to high body temperatures that can result in grand mal seizures and eventual death. In laboratory animals, trained behavior can be either perturbed or stopped outright."⁹

and further:

"Performance of cognitively mediated tasks may be disrupted at levels of exposure lower than that required to elicit behavioral thermoregulation. Unlike disruption of performance of a simple task, a disruption of cognitive function could lead to profound errors in judgment due to alterations of perception, disruption of memory processes, attention, and/or learning ability, resulting in modified but not totally disrupted behavior."¹⁰

⁸. John D'Andrea, Naval Health Research Center Detachment, Brooks Air Force Base, Texas, "Behavior Evaluation of Microwave Irradiation", *Bioelectromagnetics* 20:64-74 (1999) page 64.

⁹. Ibid.

¹⁰ Ibid, page 69.

In dismissing effect of RF on avian species, the Consistency Determination states that all RFR effects on birds are temporary; that "A flying bird would be too far away and illuminated for too short a time to be affected by any radar beam;"¹¹ that birds roosting on radar antennas are sensitive to heat and will "simply fly off when it began to get too hot"; that RF effects are not additive; and that once a radar begins to move "any bird perched there fly away."¹² None of these conclusions are supported and each requires actual environmental review by the preparer in light of current scientific knowledge. Such a review must include full disclosure of the proposed action. This is not provided in the document now before the California Coastal Commission.

Bird Strikes.

The Consistency Determination comment on bird strikes is based on the premise (page 15) that "The proposed increase of 10 flights per year would have a negligible impact associated with bird strikes." The proposed action is not "10 flights" but rather 10 flight "periods" that will utilize undisclosed numbers, types, speeds, passes and maneuvers of aircraft. Impacts of the actual proposed action are not considered in the Bird Strike discussion.

Furthermore, the bird strike "negligible impact" conclusion depends on the fanciful belief (page 15) that "The brown pelican is a low-altitude forager, usually at heights below 60 feet." The authority for this belief is "PHDNSWC 1995," a document not further described and not listed in the Reference section of the Consistency Determination.

The assertion that pelicans are low-altitude foragers is intended to obviate concern that proposed action flights as low as 100 feet would encounter these birds. In its previous consideration of the SWEF Special Use Airspace proposal, the Commission received expert testimony debunking the very same Navy assertions regarding pelicans.

¹¹. The preparer assumes birds fly across and not toward radar emitters such as those on a stationary structure like the SWEF.

¹². The consistency determination notes (page 2) that among radars at the SWEF are those with "phased array capability" defined as "a type of radar antenna that moves electronically [and] does not physically move...." It is also the case some SWEF radars are encased in radomes and, as to these, even if their antenna move this movement is invisible.

Carl Thelander, Director of the Western Foundation of Vertebrate Zoology stated in a comment on file with the Commission dated March 27, 1996:

"It is my opinion, contrary to the [SWEF Special Use Airspace] EA/SEA, there is a very high probability of mid-air collisions occurring between test aircraft and Brown Pelicans I believe further analysis will reveal that Brown Pelicans regularly fly at or above 100 feet, especially when travelling between Anacapa Island and the mainland, and when moving between foraging locations. Such information could be easily determined through a modest study of daily activity patterns using telemetry in conjunction with field observers."¹³

Dr. Franklin Gress of the California Institute of Environmental Studies noted in a comment on file with the Commission dated March 26, 1996:

"Brown pelican flight elevations vary according to their activities. They can soar, circling about searching for food at heights of well over 1,000 or more feet; they can plunge-dive for food from over 100 feet or less; they can come into mainland or island roost sites from varying heights from circling in from over 100 feet to just circling the water surface. In other words, flying pelicans can be at any altitude within this range; there is no 'typical' elevation for flight."¹⁴

Impacts on avian species are apparent from the above analysis. All impacts are denied in the consistency determination without a factual basis or analysis. The proposed action does not comply, among others, with Section 30230 of the Coastal Act providing:

"Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance...."

It is incompatible also with the policy of Section 30240 that:

"(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas."

¹³. Letter to John Buse.

¹⁴ Letter to Carl Thelander.

"(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas."

General Conclusion

The proposed action is not a free standing activity. The lack of a baseline for existing SWEF operations is the subject of an informal mediation on going at this time between the Coastal Commission and the Navy. That process needs to reach a conclusion before consideration can logically be given to expanded functional operations and additions of radar and other equipment.

In addition to the lack of a baseline, the present filing is deficient in its description of the proposed action making it impossible to evaluate impacts.

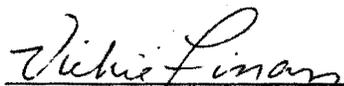
It should be unacceptable that this submission is made to the Coastal Commission without providing the contemporaneously prepared Environmental Assessment for the proposed action. Environmental review should not be a game of hide and seek.

In addition to the failure to factually describe the proposed action , the submission is deeply flawed (as illustrated above in the treatment of impacts on avian species) by its use of erroneous and out of date scientific assumptions.

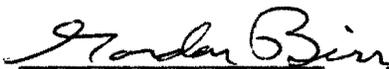
The Navy delayed its filing until the eve of desired implementation. This is contrary to Coastal Zone Management Act requirements. Self created time pressure should not short cut the required Coastal Commission review.

The California Coastal Commission should decline concurrence in this consistency determination for a proposed action to "enhance and expand SWEF capabilities."

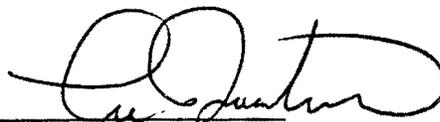
For The Beacon Foundation,



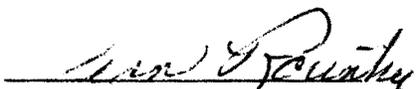
Vickie Finan



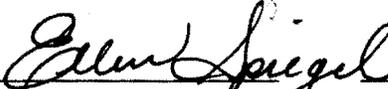
Gordon Birr



Lee Quaintance



Jean Rountree



Ellen Spiegel



Don Dodd