STATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, *Governor*

CALIFORNIA COASTAL COMMISSION
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DATE: **November 20, 2002**

TO: **Coastal Commissioners and Interested Parties**

FROM: **Peter M. Douglas, Executive Director**
Elizabeth A. Fuchs, Manager, Statewide Planning and Federal Consistency Division
Mark Delaplaine, Federal Consistency Supervisor

RE: **Background Discussion for Commission Briefing by Dr. Peter Tyack High-frequency sonar tests to detect gray whales offshore of the San Luis Obispo County coast**

Under the Marine Mammal Protection Act, in August 2000 the National Marine Fisheries Service (NMFS) granted a scientific research permit (No. 981-1578) to Dr. Peter Tyack, a researcher with the Woods Hole Oceanographic Institution, to conduct a number of studies of the impact of noise on cetaceans in various oceans of the world. NMFS recently granted an amendment to this permit (No. 981-1578-03) authorizing an additional study within the California coastal zone, off the San Luis Obispo County coast near the Diablo Canyon Nuclear Power Plant. This particular study would involve using two types of high-frequency whale testing sonars, operating in the range of 20 to 40 kilohertz (kHz), to test the sonars' ability to detect gray whales migrating past the central California coast.

This area of the coast between Point Buchon and the Diablo Canyon Nuclear Power Plant provides a number of characteristics making it ideal for such types of research efforts, which is why it previously been used for several historic research efforts (Malme et al. 1983, 1984[1]; Tyack and Clark 1998), the latter of which the Commission reviewed and which consisted of a Navy-funded January 1998 research of the effects of low frequency sonar (100-500 Hertz (Hz))[2].

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[1] Malme CI, PR Miles, CW Clark, P Tyack and JE Bird (1984), Investigations of the potential effects of underwater noise from petroleum industry activities on migrating gray whale behavior. Phase II: January 1984 migration; and Malme CI, PR Miles, CW Clark, P Tyack and JE Bird (1983), Investigations of the potential effects of underwater noise from petroleum industry activities on migrating gray whale behavior. Bolt Beranek and Newman Report No. 5586 and 5366, respectively, submitted to Minerals Management Service, U. S. Dept. of the Interior.

[2] CD-153-97 (Navy, LFA, Phase II, off Big Sur) - Tyack, P.L. and C.W. Clark. 1998. Quick look -- Playback of low frequency sound to gray whales migrating past the central California coast - January, 1998.

Dr. Tyack's criteria for an ideal site include:

- *Initial tests of large baleen whale should not involve endangered species until detection probability is determined and potential for behavioral disruption is checked*

- *Should involve simple and reliable ability to track whales independent of the sonar*

- *Should occur in a difficult sonar environment for a challenging test*

- *Should involve a large sample size where hundreds of whales can be tested in a few weeks*

- *Ideally will enable testing of Target Strength of Whale as a function of aspect*

Dr. Tyack explains why this area meets these criteria as follows:

> *The proposed research is designed to address all three goals in a setting where hundreds of whales can be tested in a few weeks. This proposal suggests a test with gray whales migrating past the central California coast. The gray whale population has rebounded so well that it has been delisted, and in fact there are signs it is at or above carrying capacity. During 1999 and 2000 many emaciated whales were sighted and there was an elevated stranding rate, thought to result from inadequate feeding. During the past two years, 2001 and 2002, this problem has resolved and there is little reason to expect it to cause any changes to the study compared to earlier work. This is a setting where land stations can track with great reliability whales migrating a few kilometers offshore. The shallow waters provide a very challenging sonar environment, as there is a great deal of reverberation from the bottom. Several hundred whales pass by this coast each day. They are so well oriented on the migration, that it is easy to infer the aspect of the whale as it passes the sonar. The proposed study setting meets the criteria for a sonar validation test very well.*

Dr. Tyack intends to test two high-frequency (20 – 40 kilohertz (kHz)) active sonar systems designed to detect marine mammals within a mitigation zone: (1) a mechanically steered system; and (2) a more expensive phased array system (know as the "IMAPS" or "Integrated Marine Mammal Monitoring and Protection System"). These systems are described further in the attached study proposal (see Exhibit 1). NMFS' permit conditions (issued on October 1, 2002) for the amended permit (which includes the other activities being conducted in the North Atlantic Ocean, the Mediterranean/Ligurean Seas, and the Pacific Ocean near Hawaii) are also attached (see Exhibits 2 & 3). Research efforts *outside* California include cetacean tagging, following and sound playbacks in the Mediterranean and Ligurean Seas, the Bahamas, Gulf of Mexico and off the coasts of the Azores in the Atlantic Ocean, and the Hawaiian Islands in the North Pacific, in an effort to record acoustic stimuli cetaceans hear, and to measure vocal, behavioral, and physiological responses to sound over a five year period. The California research, however, would be limited to a three-week effort.

Dr. Tyack's application describes the purpose, methods, marine mammal monitoring measures and other provision for the California coast portion of the research effort. The following abstract summarizes the research; a complete description of the proposal is attached in full (Attachment 1):

> *The proposed research will track gray whales migrating past the central California coast, in collaboration with a group operating an innovative whale-finding sonar from a ship moored in the migration corridor. The tracking effort is designed to meet three objectives: validating the performance of the whale-finding sonar, measurement of whale return echo strength and characteristics, and measuring avoidance responses to the sonar of migrating whales. Whales will be tracked using surveyor's theodolites at two shore stations to pinpoint the location of about 1400 gray whale groups as they migrate past the study site in January 2003 on their southward migration from the Bering Sea to Mexico. By interpolating the expected position of the whales between surfacings, each sonar detection can be related to the whale tracks, and the range of detection and the probability of detection can be estimated as a function of range. Migrating whales are so oriented that it may also be possible to study the Target Strength of whales as a function of their aspect with respect to the sonar. Whales hearing a low frequency source in the migration corridor show an avoidance reaction, with about 50% avoiding exposure to received levels of about 140 dB re 1 μPa. The whale-finding sonar for the proposed research is normally operated at a source level after ramp-up of about 210 dB re 1 μPa, for which the avoidance reaction would be expected to range out to about 3 km. The theodolite tracking technique has proven well suited to quantifying these avoidance reactions at these ranges, and we will do so for the different frequencies at which the whale-finding sonar operates, from 20 – 40 kHz. The mechanics of the basilar membrane in the gray whale cochlea suggests an upper limit of hearing within or below this range (Ketten 2000). By testing whether this avoidance response disappears at higher frequencies, this study may also bracket the upper threshold of hearing in gray whales. If the lowest frequency of the sonar does not elicit the avoidance typical of low frequency sources, we propose to test one or more lower frequency sources to test for the normal avoidance reaction and to test how low a frequency below the sonar operating frequency is required to evoke the response.*

The primary concerns that have been raised in the past decade about the effects of noise on the marine environment have been related to low-frequency (i.e., less than 1 kHz) and mid-frequency (i.e., 1-10 kHz) sound. High frequency sounds (i.e., greater than 10 kHz) with anthropogenic sources in the marine environment include: (1) fish finding sonars, which operate in the 18-200 kHz region (of which there are thousands deployed world-wide and many off the California coast); (2) depth sounding sonars, with operating frequencies often at 12 kHz (most ships transiting California use these sonars); (3) bottom profilers, which range from 400 Hz to 30 kHz; (4) side scan sonars (50-500 Hz); (5) navigation transponders (7-60 kHz); and (6) various military search and surveillance (2-57 kHz) and mine avoidance (25-500 kHz) sonars. (To date, the Coastal Commission has not attempted to regulate these high frequency sonars, which are fairly commonly used in coastal waters and whose sounds attenuate rapidly in the marine environment.)

Attachments: (1) Dr. Tyack Proposal; (2) NMFS Permit and Conditions; (3) NMFS Federal Register Notice

Sonar Validation study with migrating gray whales.

Proposal to the Office of Naval Research ALSO TO BE SENT TO Cal Coastal Commission in addition to permit info

Peter Tyack
Biology Department Woods Hole Oceanographic Institution

2. Technical Information

a. Abstract

The proposed research will track gray whales migrating past the central California coast, in collaboration with a group operating an innovative whale-finding sonar from a ship moored in the migration corridor. The tracking effort is designed to meet three objectives: validating the performance of the whale-finding sonar, measurement of whale return echo strength and characteristics, and measuring avoidance responses to the sonar of migrating whales. Whales will be tracked using surveyor's theodolites at two shore stations to pinpoint the location of about 1400 gray whale groups as they migrate past the study site in January 2003 on their southward migration from the Bering Sea to Mexico. By interpolating the expected position of the whales between surfacings, each sonar detection can be related to the whale tracks, and the range of detection and the probability of detection can be estimated as a function of range. Migrating whales are so oriented that it may also be possible to study the Target Strength of whales as a function of their aspect with respect to the sonar. Whales hearing a low frequency source in the migration corridor show an avoidance reaction, with about 50% avoiding exposure to received levels of about 140 dB re 1 μPa. The whale-finding sonar for the proposed research is normally operated at a source level after ramp-up of about 210 dB re 1 μPa, for which the avoidance reaction would be expected to range out to about 3 km. The theodolite tracking technique has proven well suited to quantifying these avoidance reactions at these ranges, and we will do so for the different frequencies at which the whale-finding sonar operates, from 20 – 40 kHz. The mechanics of the basilar membrane in the gray whale cochlea suggests an upper limit of hearing within or below this range (Ketten 2000). By testing whether this avoidance response disappears at higher frequencies, this study may also bracket the upper threshold of hearing in gray whales. If the lowest frequency of the sonar does not elicit the avoidance typical of low frequency sources, we propose to test one or more lower frequency sources to test for the normal avoidance reaction and to test how low a frequency below the sonar operating frequency is required to evoke the response.

b. Discussion of how the proposed research effort will respond to the objectives of ONR.

The Navy operates a variety of systems that generate sufficient noise to potentially impact marine mammals or endangered species that are protected by US law (Evans and England 2000; Richardson et al. 1995). Regulations to protect marine mammals from intense sound may call for shutting down a sound source whenever sensitive animals are

EXHIBIT NO. 1

within a zone of potential harm. Current methods to detect the presence of animals involve visual monitoring, but many marine mammals only are at the surface for short periods of time, and many noise-making activities run when visibility is limited, such as at night, fog or bad weather. Listening for the vocalizations of marine mammals enables detection of animals during all stages of the dive cycle, but only when the animals make sound.

Under funding from the Navy, Scientific Solutions has developed two active sonar systems designed to detect marine mammals within a mitigation zone. One is a less expensive mechanically steered system and the other is a much more expensive phased array system (know as the "IMAPS" or "Integrated Marine Mammal Monitoring and Protection System"). These systems are discussed in a companion document. The more expensive system is expected to work much better in a shallow water environment. The advantages of such sonar systems are that they operate day and night, in all visibility conditions, and detect whales whether they vocalize or not. The disadvantages are that this approach has had limited at-sea testing and its own sounds may affect marine mammals. The mechanically steered version of Scientific Solutions sonar has been tested with artificial sonar targets and with open-ocean trained dolphins. Similar tests are feasible with pinnipeds, but there are no trained baleen whales. These are some of the most endangered marine mammals and they are a prime focus for this kind of sonar. The proposed research addresses this gap with a test of baleen whales at sea.

I propose the following criteria for at-sea validation of whale-finding sonar:

- Initial tests of large baleen whale should not involve endangered species until detection probability is determined and potential for behavioral disruption is checked.
- Should involve simple and reliable ability to track whales independent of the sonar
- Should occur in a difficult sonar environment for a challenging test
- Should involve a large sample size where hundreds of whales can be tested in a few weeks
- Ideally will enable testing of Target Strength of Whale as a function of aspect

The proposed research is designed to address all three goals in a setting where hundreds of whales can be tested in a few weeks. This proposal suggests a test with gray whales migrating past the central California coast. The gray whale population has rebounded so well that it has been delisted, and in fact there are signs it is at or above carrying capacity. During 1999 and 2000 many emaciated whales were sighted and there was an elevated stranding rate, thought to result from inadequate feeding. During the past two years, 2001 and 2002, this problem has resolved and there is little reason to expect it to cause any changes to the study compared to earlier work. This is a setting where land stations can track with great reliability whales migrating a few kilometers offshore. The shallow waters provide a very challenging sonar environment, as there is a great deal of reverberation from the bottom. Several hundred whales pass by this coast each day. They

are so well oriented on the migration, that it is easy to infer the aspect of the whale as it passes the sonar. The proposed study setting meets the criteria for a sonar validation test very well.

The proposed research also offers the potential to bracket the upper threshold of hearing in gray whales. There are no audiograms for any baleen whale, so these data would be unique. Since it is generally accepted that animals will not be affected by sounds above their upper limit of hearing, these data will also be important for regulatory policy.

c. Statement of Work

The proposed research requires extensive preparation. A permit is required for any potential takes by harassment. Tyack has already applied for an amendment to his permit for marine mammal research from the National Marine Fisheries Service, since it takes months to be processed. The parts of this request that are relevant to the proposed gray whale project are sent as a separate document. The National Marine Fisheries Service sent the amended permit on 25 September 2003. He has also applied for permission to operate from Point Buchon, which is owned by Pacific Gas and Electric Co. Its Diablo Canyon Power Plant is an excellent site for the gray whale observations, but has extensive security, especially since 9/11. This will require extra planning in advance of the field work. Planning the research will require at least one meeting with the operators of the sonar. This research will also likely require a hearing in front of the California Coastal Commission, and Tyack will request a slot for a hearing during November or December 2002. The field work will require at least one scoping trip to organize logistics, and to establish the shore sites. A surveyor will need to be hired prior to the field work to measure the altitude of any shore stations above sea level. It will require a logistics coordinator with significant involvement for two months prior to the field work.

The research vessel to carry the sonar has been reserved for 5-31 January 2003. It is likely to get on station by 8 January. It will take at least three days of observation for the field team to double check the survey information for each observation site, to learn to operate at top quality and to get a sense of the center of the migratory corridor, so we propose to arrive at the field site on 5 January, observe for three days before the ship arrives, and then operate for the entire time the ship is present until 29 January.

The shore observation technique is well established for migrating gray whales (Malme et al. 1983, 1984; Tyack and Clark 1998). Each shore station requires four people: a theodolite operator, a data recorder, and two observers. The theodolites have a serial I/O connection to the laptop operated by the data recorder, and the data recorder works closely with the theodolite operator to enter all data in a form suitable for immediate plotting and error checking. For personnel at each shore station, we plan to have two experienced theodolite operators, one person trained to enter and doublecheck data using the data entry program, and one experienced whale observer. We propose to operate two sites to cover an area at least 3 km upstream of the sonar. Each shore station will arrive soon after sunrise, and track whales from about 0730 until 1630 to leave the Diablo Canyon Power Plant near 1700, as requested by the site. During similar field work from

8-27 Jan 1998, 20 days on site yielded 150 observation hours over 18 days, with daily observations lasting on average 8.3 hours/day. Over 1200 whale groups were tracked swimming past a moored sound source vessel, an average of 60 whale groups/day.

As soon as sighting data have been entered into the laptop, the data will be transmitted via a RF computer link to the source vessel. The goal of this will be to get the sighting data to the sonar operators as soon as possible. This will allow the sonar operators to compare their own detections to the interpolated locations of whales tracked at that time from shore. Achieving this goal will require purchase of the RF link along with programming to link the two sites.

Tyack will inquire of NMFS whether his permit for research requires that every vessel involved in the research have a co-investigator listed in his permit. Peter Stein of Scientific Solutions is listed as a co-investigator, and WHOI will also provide two whale observers who will observe for marine mammals near the source vessel, and who will also maintain radio communication with the shore stations. If it is a permit requirement to have a co-Investigator on board the source ship in addition to those at the shore stations, then one of these observers will be a co-Investigator whenever Stein is not on board.

The sonar will be operated in a mode to minimize exposure to whales being tracked. The sonar will be started with a source level below 180 dB re 1 μPa. If the sonar indicates no marine mammal has been detected near enough the sound source to be exposed above 180 dB at the new higher source level, the source level is gradually increased. In addition, if any marine mammal surfaces within a potential impact zone that has not been detected by the sonar, the shore stations and vessel-based observer will ensure that the source is shut down or operated at a low enough level to protect the sighted animal.

During the 1998 study in this site (Tyack and Clark 1998), the ship-based observers seldom sighted gray whales that were not also tracked by the shore stations, but they did facilitate precise localization of the whales nearest the source vessel. In addition, they sighted 189 California sea lions (*Zalophus californianus*), one group of 5-10 common dolphins (*Delphinus delphis*), two sea otters (*Enhydra lutra*), and one northern elephant seal (*Erignathus rosmarus*) that were not visible from shore. Ship-based observations may allow validation of the whale-watching sonar for these smaller marine mammals, as well as monitoring to prevent exposure above the 180 dB allowed in the permit.

At the end of every observation day, data from the two shore stations will be converted to XY coordinates, merged, plotted, and doublechecked for consistency. This review allows checking for any potentially worrisome reactions that might not have been detected in real time. Once data are checked, they will be transmitted to the source ship and backed up in duplicate. The shore station teams will also perform more intensive data analyses during periods of bad weather when they cannot observe from the shore stations. If there is a bad weather day where the source vessel is forced to come to dock, both the shore and ship-based groups will work together to collate these two data sets. After the field season, the tracks may need to be edited in the lab to make sure that the identity of each sighting is correct and that the north station correctly passes off each whale group to the

south station. For the '98 data, this took about two months of RA time. The vetted data will provide the primary data for the sonar validation study

Studying avoidance responses of whales to the whale-finding sonar will require the avoidance analysis outlined in the description section below. Tyack analyzed the 1998 data in collaboration with John Buck, Professor of Computer and Electrical Engineering at the University of Massachusetts at Dartmouth, and he proposes the same collaboration for the analysis of avoidance of these data.

d. Description

The ideal transmission schedule in terms of comparing reactions to the sonar compared to no-exposure controls involves a 2-day use of the same stimulus, with sound broadcast in the morning of one day and the afternoon of the other. This allows comparison of sound on and off conditions matched for time of day and adjacent within the migration season. However, depending upon the relative priority of this response study and the sonar validation, more time may need to be devoted to transmission than silence. Once data in any one exposure condition have all been collected, the data will be organized and plotted for exposure and control conditions. After the first full block or two, we plan to have the source ship leave its mooring and come in to port so that the shore and ship teams can coordinate in detail. This meeting can occur in the evening, and should not interfere with the ability to conduct an experiment the next day.

The sonar can operate at frequencies ranging from 20-40 kHz. We propose three exposure conditions: operating the sonar at 20, 30 and 40 kHz. If we have 8-29 Jan available for work, the 21 days should provide time for 8 2-day blocks along with 5 weather days. Just in case fewer days are available because of more prolonged bad weather, we propose to do 2-day blocks for each stimulus before we replay a stimulus. Both sonar systems developed by SSI will be tried. The focus will be on the newer "IMAPS" system as it is expected to have better performance in the shallow waters. If after having tested all three frequencies using the IMAPS system over 6 days, we have sighted an avoidance response for at least one of the three stimuli, but not for higher frequencies, we propose to play all 3 stimuli again. At this point we may test the mechanically steered sonar instead of reusing the IMAPS sonar. Depending upon the optimal distribution of whales from the sonar, we may continue with the source in the middle of the migration corridor, or may place it offshore where little avoidance has been observed, even for whales that pass offshore close to the source. If none of the stimuli have elicited a response, we propose to spend at least one 2-day block broadcasting sounds of a lower frequency. The decisions about which sonar to use, where to place the source, and whether to test responses to a lower frequency source will depend upon the responses of the whales and the performance of the sonar. These decisions will be made adaptively during the experiment.

We assume that the sonar team on the source vessel will conduct any transmission loss measurements necessary to validate propagation models in the study area. This may be achieved by placing passive sonar targets in the area, coupled with passive acoustic

measurements from a small vessel deployed from the source ship. Neither of these activities are expected to interfere with whale observations. Once the field component is over, we will analyze the avoidance data to relate avoidance to the received level of sound at the closest point of approach of the whale. We will require a validated TL model from Scientific Solutions in order to conduct the avoidance analysis. Tyack has worked closely with John Buck of U Mass Dartmouth to analyze avoidance, and he proposes to continue this collaboration with assistance from a WHOI graduate student.

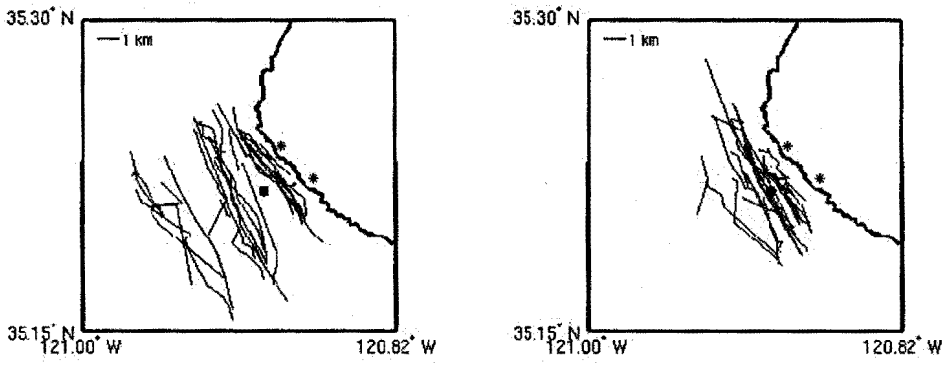

Figure 1. Tracks of gray whales migrating past Pt Buchon. The two red asterisks mark the shore stations and the black square marks the sound source location.

Figure 1 shows tracks of gray whales migrating past Pt Buchon in 1998. Comparison of control and experimental tracks shows obvious avoidance of a low frequency source transmitting 42 sec signals every 6 min at a source level of 185 dB. The first step in avoidance analysis is calculating a probability density of whale tracks as a function of range from the source. Using the TL model, the tracks can be referred to received level rather than range. An avoidance index can be calculated by comparing the probability density of control vs experimental tracks at each received level. If fewer tracks are sighted in experimental conditions, this indicates avoidance. A randomization test can be used to develop confidence intervals for the avoidance effect. Analysis of responses to the low frequency sonar signals indicate the following avoidance response:

Responses of southward migrating gray whales to exposure to LFA sonar signals from a source placed in the center of the migration corridor.

–50% Avoidance at RL	= 141 ± 3 dB
–95 % confidence no avoidance	< 135 dB
–95% confidence some avoidance	> 138 dB

The avoidance response only occurred when the sonar source was placed in the migration corridor. When the source was placed offshore, little avoidance was obvious in the track plots, and the avoidance index never was greater than 50% for exposure in the 120-160 dB range of received level (Figure 2). Similar comparisons of the whale watching sonar

operated at different frequencies will be used to test whether a reduction in avoidance indicates a higher threshold of hearing.

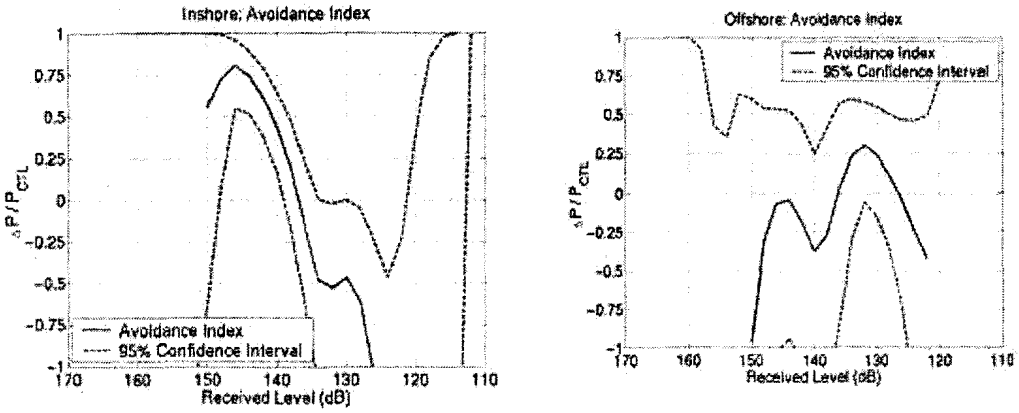

Figure 2. Avoidance of migrating gray whales as a function of received level of a low frequency sonar signal. The avoidance index is defined as the difference in track density between control and experimental conditions divided by the track density under control conditions. Data from different source levels were pooled after the received level was calculated for each track CPA.

One complication of the proposed research compared to the low frequency sonar involves directionality of the source. The low frequency sonar tests involved an omnidirectional source, while the whale-finding sonar involves a directional source. However, the newer IMAPS system transmits omnidirectionally in the horizontal plane, so this is not really an issue. The mechanically steered system has rotating beams. However, for a relatively slow moving animal, they will be ensonified every 45 seconds, so we should see a similar response. In the shallow water environment it is not likely that the animal will be out of the beam in the vertical for either sonar.

One benefit of working with whales as oriented as migrating gray whales is that we can assume that the animals are oriented south. As the animals pass the source, their aspect to the sonar will change (Figure 3). This will be correlated with range, but we anticipate that the interpolated track data may enable study of changes in TS as a function of aspect of the target.

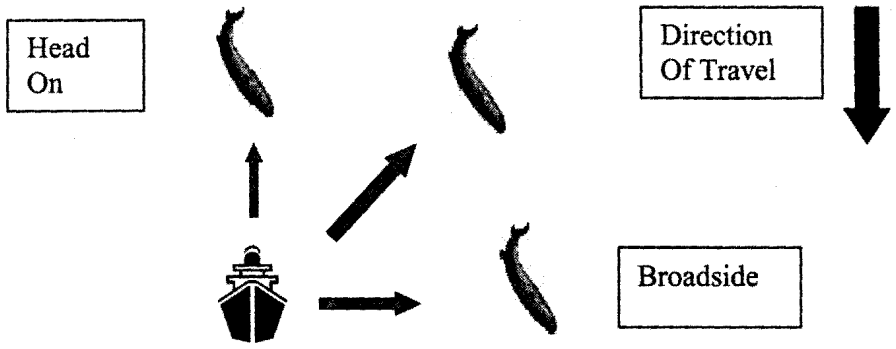

Figure 3. Variation in aspect of southward migrating whales as a function of location of track with respect to source vessel.

Operation in reduced visibility.

After the first several days of operation of the sonar, the sonar operators will meet with the visual observers to evaluate the effectiveness of the sonar in detecting whales. By comparing visual tracks and sonar detections, they will calculate the percentage of whales that might not be detected within the 180 dB mitigation zone. If this percentage is very low, then we propose to test the sonar at night. During nighttime transmissions, there would be no shore-based visual observers, but ship-based observers would use night vision equipment to monitor for whales near the sound source. Since this sonar is designed to allow nighttime operation, it is critical to test whether there are any differences in operating it at night. For example, in some areas a deep scattering layer may rise closer to the surface, increasing the volume reverberation. We doubt that there will be any day/night difference in performance of the sonar, but if there is any indication that nighttime use of the sonar may have a lower detection rate than daytime, the nighttime use will be reevaluated.

References

Evans, D.L. and G.R. England (2001) Joint interim report Bahamas marine mammal stranding event of 15-16 March 2000. Report available at http://www.nmfs.noaa.gov/prot_res/overview/Interim_Bahamas_Report.pdf

Ketter, D.R. 2000. Cetacean ears. In: Hearing by whales and dolphins. (W. Au, A.S. Popper, and R. Fay, eds), Springer Handbook of Auditory Research Series, Springer Verlag, New York.

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Malme, C.I., P.R. Miles, C.W. Clark, P. Tyack, and J.E. Bird. 1984. Investigations of the potential effects of underwater noise from petroleum industry activities on migrating gray whale behavior. Phase II: January 1984 migration. Bolt Beranek and Newman Report No. 5586 submitted to Minerals Management Service, U. S. Dept. of the Interior.

Richardson WJ, Greene CR Jr, Malme CI, Thomson DH (1995) Marine mammals and noise. New York: Academic Press.

Tyack, P.L. and C.W. Clark. 1998. Quick look -- Playback of low frequency sound to gray whales migrating past the central California coast - January, 1998.

Peter L. Tyack, Ph.D.
Woods Hole Oceanographic Institution
Biology Department
MS #34, Redfield 1-32
46 Water Street
Woods Hole, Massachusetts 02543

Dear Dr. Tyack:

Enclosed is a major amendment to Scientific Research Permit No. 981-1578-02. The amendment is reflected in the new Permit No. 981-1578-03, which replaces all previous versions. This Permit authorizes you to conduct behavioral and acoustic studies on numerous species of cetaceans in the North Atlantic, Mediterranean/Ligurian Seas, and in the Pacific Ocean near the Hawaiian Islands and California, with incidental harassment of some pinnipeds. The Permit was amended to extend the research area to include waters near the Hawaiian Islands for the purpose of monitoring behavioral and physiological responses of humpback whales during breeding season; to increase the maximum source level for a whale-finding sonar used off the coast of California; and increase the maximum received level for non-airgun sounds. The amended portions appear in **bold**. The overall format of the permit has been revised to conform to the new standard format of our permits. A number of new sections have been printed in bold to draw them to your attention. The authority of this permit will expire on September 30, 2005.

Condition B.4 requires that you terminate research activities on humpback whales in Hawaii at the end of each permit year and must request authorization to resume research for each succeeding year. Re-authorization to resume research activities will be based primarily on NMFS' evaluation of the annual report required by Part D.1. This is a standard condition for all permits authorizing research on humpback whales in Hawaii.

Part C requires that you contact the appropriate NMFS regional administrator at least 2 weeks in advance to coordinate the specific dates and locations of the authorized activities. You are encouraged to participate in the National Marine Mammal Laboratory (NMML) humpback whale centralized computer photo-identification and retrieval system. Please contact Sally Mizroch, Coordinator, NMML Centralized Computer Photo-identification and Retrieval System, NMML, NMFS, 7600 Sand Point Way, NE, BIN C15700, Seattle, Washington 09115 (tel. 206/526-4030) for further information. You are also encouraged to share, when appropriate, any photographs with other researchers who are working on the same species.

EXHIBIT NO. 2

Please note that the importation and exportation of species listed on the Appendices to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) require a valid CITES Permit. You should contact the appropriate CITES authorities concerning the need for a CITES permit. For further information regarding CITES requirements please contact Ms. Pam Hall, U.S. Fish and Wildlife Service, Office of Management Authority, 4401 N. Fairfax Drive, Arlington, VA 22203 (1-800-358-2104, ext. 5422). I have forwarded a copy of this permit to that office for her information.

As Holder and Principal Investigator of this Permit, you are ultimately responsible for all activities of any individual operating under its authority. All personnel involved in the conduct of the research must perform a function directly supportive of and necessary for the research, or be one of a reasonable number of support personnel. The Permits Division must approve in advance any additional co-investigators not named in the application. Approval is based on submission and review of the researcher's curriculum vitae. Moreover, research activities must be conducted under the direct supervision of the Principal Investigator (PI) or a Co-investigator (CI) identified in the Permit (50 CFR 216.41(c)(1)(iii)).

Please review the Permit to ensure that it accurately reflects what was requested, that you understand what is authorized, and that you comply with the Permit conditions. Please provide a copy of this amended permit to all Co-Investigators and make certain they read and understand the terms and conditions. The original permit and a copy of the signature page are enclosed. Please sign and date both, and return the signature page marked **file copy** to our office.

Please note that this Permit is not valid until our office receives the signed copy. You may submit the copy by facsimile to 301/713-0376 and confirm it by mail. If you have any problems or questions, please contact Tammy Adams or Ruth Johnson at 301/713-2289.

Sincerely,

Eugene T. Nitta
Acting Chief, Permits, Conservation
and Education Division
Office of Protected Resources

Enclosures

Permit No. 981-1578-03
Expiration Date: September 30, 2005

SCIENTIFIC RESEARCH PERMIT TO TAKE MARINE MAMMALS
Amendment No. 3

Authorization:

Peter L. Tyack, Ph.D., Woods Hole Oceanographic Institution, Biology Department, 46 Water Street, Woods Hole, MA 02543, is hereby authorized to take the marine mammals specified below for the purpose of scientific research as described in the application request subject to the provisions of the Marine Mammal Protection Act of 1972, as amended (16 U.S.C. 1361 et seq.), the Regulations governing the Taking and Importing of Marine Mammals (50 CFR part 216), the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), the Regulations Governing Endangered Fish and Wildlife (50 CFR parts 222 - 226), and the conditions hereinafter set out. Researchers may conduct activities by the means and for the purposes described in the application, except as limited by the terms and conditions of this Permit.

Abstract:

The purpose of the authorized research, as stated in the application, is to study the impact of noise on cetaceans. The primary research objective is to determine what characteristics of exposure to specific sounds evoke behavioral responses in marine mammals. The primary research method will involve tagging cetaceans with an advanced digital sound recording tag (DTAG) that can record the acoustic stimuli an animal hears, along with measuring vocal, behavioral, and physiological responses to sound. Once sufficient baseline data have been recorded from animals followed in the wild, playback experiments will be conducted. During these playbacks, subjects whose responses are being measured will be exposed to specific sounds in a carefully controlled manner at received levels of 120-**180** dB re 1μPa. The research activities will involve a variety of potential takes by harassment including: close approach for tagging; attachment of tags; focal follows; and playbacks of sound. In addition, the applicant requests authorization to import to the U.S. and export to foreign countries skin samples collected during the course of suction-cup tag retrieval. Incidental harassment of all species of cetaceans may occur through vessel approach, photographic identification and behavioral research. The research will be carried out over a five-year period in the Mediterranean/Ligurian Seas, off the coast of the Azores, in the Bahamas and Gulf of Mexico in the North Atlantic, and in the North Pacific.

A. Number and Kind of Marine Mammals and Locations

1. The species/numbers of animals listed in Table 1 may be approached[1] as many times as necessary in the specified geographic locations during the conduct of behavioral observations, photo-identification, tagging and acoustic playback experiments, **provided the animals are not harassed[2] more than three times per day**. All age and sex classes may be approached for observational and photo-identification studies. For tagging studies, all age and sex classes may be tagged, except calves less than six months of age or females accompanied by calves less than six months of age. Tagging of such calves or females accompanied by such calves will require separate authorization from NMFS' Permits Division, based on its receipt and review of information showing that these animals do not react to tagging more strongly than other age/sex classes, and will not result in adverse reactions.

2. Sloughed skin which comes off on suction-cups used in tagging or is found floating from free-swimming animals may be collected and preserved for genetic analyses. Such samples may be imported to the United States and/or exported for analyses to the University of Auckland in New Zealand.

3. The animals authorized by A.1., above, may be taken by harassment[2] only by the means and only for the specific purposes described in the application and as conditioned by the terms of this permit. An animal will be considered to have been taken by harassment if it exhibits visible signs of disturbance, as described in Footnote 2, either:

   -- during an approach; or
   -- during research activities conducted at distances from the whale(s) **closer than** 100 yards.

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[1] For purposes of this permit, an "approach" is described as a continuous sequence of vessel maneuvers (episode), including drifting, directed toward a whale or group of whales for the purpose of conducting authorized research which involves one or more instances of coming closer than 100 yards to that whale or group of whales.

[2] For purposes of this permit, "harassment" is considered to have occurred if an animal exhibits an abrupt disruption of its normal behavior immediately after any act or omission of an act by a researcher. A disturbance or disruption of an animal's normal behavior shall be considered to be any of the following: a rapid change in direction or speed; escape tactics such as prolonged diving, underwater course changes, underwater exhalation or evasive swimming patterns; interruptions of breeding, nursing, or resting activities; attempts by a whale to shield a calf from a vessel or human observer by tail swishing or by other protective movements; or the abandonment of a previously frequented area.

4. **Research activities shall not be conducted in U.S. waters south of the U.S. Canada border in the area of Neah Bay, WA (west of 124° W. longitude and north of 48° N. latitude).**

Table 1. List of number of takes of each type. Takes are authorized to occur in the North Atlantic Ocean (NAtl), Mediterranean Sea (Med), and North Pacific Ocean (NPac). **Note that takes of pinnipeds and cetaceans associated with testing the whale-finding sonar are limited to waters off the coast of California, rather then the entire North Pacific Ocean, in accordance with the description of the activity in the application.**

Species	Type of take	Maximum number of individuals to be taken /year	Repeat takes*	Locations
Humpback whale	PB	400	N	NAtl, Med
(*Megaptera novaeangliae)*	**CA**	**180**		NAtl, Med, **NPac**
	TAG	**60***		NAtl, Med, **NPac**
*These are a subset of the 180 whales for CA; some whales may be taken by all 4 activities	**FF**	**120***		NAtl, Med, **NPac**
	biopsy	**60***		**NPac**
Minke whale	CA	180	N	NAtl, Med, **NPac**
(*Balaenoptera acutorostrata*)	TAG	60		"
	FF	120		"
	PB	400		"
Brydes whale	PB	400	N	NAtl
(*Balaenoptera edeni*)				
Sei whale	PB	400	N	NAtl
(*Balaenoptera borealis*)				
Fin whale	CA	180	N	MED
(*Balaenoptera physalus*)	TAG	60		MED
	FF	120		MED
	PB	400		Med, NAtl, **NPac**
Blue whale	PB	400	N	NAtl, **NPac**
(*Balaenoptera musculus*)				
Gray whale (*Eschrichtius robustus*)	**PB**	**3000**	**N**	**California**
Sperm whale	CA	1800	Y	NAtl, Med
(*Physeter macrocephalus)*	SC-DTAG	600		"
	IM-DTAG	600		"
	FF	180		"
	PB	800		"
Beaked whales	CA	1200	Y	NAtl, Med
(*Ziphius cavirostris*, *Mesoplodon* sp.)	TAG	400		"
	FF	120		"
	PB	400		"

Species	Type of take	Maximum number of individuals to be taken /year	Repeat takes*	Locations
Bottlenose whale (*Hyperoodon ampullatus*)	PB	400	N	NAtl
Pilot whales (*Globicephala* sp.)	CA	4000	N	Med, N Atl
	TAG	400		"
	FF	400		"
	PB	2000		"
Bottlenose dolphin (offshore) (*Tursiops truncatus*)	CA	4000	N	Med, N Atl
	TAG	400		"
	FF	400		"
	PB	2000		Med, N Atl, **NPac**
Short-beaked common dolphin (*Delphinus delphis*)	CA	4000	N	MED
	TAG	400		MED
	FF	400		MED
	PB	2000		Med, N Atl,**NPac**
Long-beaked common dolphin (*Delphinus capensis*)	**PB**	**400**	**N**	**NPac**
Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)	**PB**	**400**	**N**	**NPac**
Atlantic spotted dolphin (*Stenella frontalis*)	CA	4000	N	NAtl
	TAG	400		"
	FF	400		"
	PB	2000		"
Pantropical spotted dolphin (*Stenella attenauta*)	CA	4000	N	NAtl
	TAG	400		"
	FF	400		"
	PB	2000		"
Striped dolphin (*Stenella coeruleoalba*)	CA	4000	N	MED
	TAG	400		MED
	FF	400		MED
	PB	2000		Med, N Atl, **NPac**
Spinner dolphin (*Stenella longirostris*)	**PB**	**2000**	**N**	**NAtl**
Clymene dolphin (*Stenella clymene*)	**PB**	**2000**	**N**	**NAtl**
Rough-toothed dolphin (*Steno bredanensis*)	CA	4000	N	Med, N Atl
	TAG	400		"
	FF	400		"
	PB	2000		"
Dwarf and pygmy sperm whale (*Kogia simus* and *K. breviceps*)	CA	1200	Y	Med, N Atl
	TAG	400		"
	FF	120		"
	PB	400		"

Species	Type of take	Maximum number of individuals to be taken /year	Repeat takes*	Locations
Risso's dolphin (*Grampus griseus*)	CA	4000	N	Med, N Atl
	TAG	400		"
	FF	400		"
	PB	2000		Med, N Atl, **NPac**
Killer whale (*Orcinus orca*)	CA	4000	N	Med, N Atl
	TAG	400		"
	FF	400		"
	PB	2000		Med, N Atl, **NPac**
False Killer whale (*Pseudorca crassidens*)	CA	4000	N	Med, N Atl
	TAG	400		"
	FF	400		"
	PB	2000		"
Dall's porpoise (*Phocoenoides dalli*)	**PB**	**50**	**N**	**California**
Harbor porpoise (*Phocoena phocoena*)	**PB**	**50**	**N**	**California**
Northern right whale dolphin (*Lissodelphis borealis*)	**PB**	**400**	**N**	**Califiornia**
California sea lion (*Zalophus californianus*)	**PB**	**500**	**Y**	**California**
Northern elephant seal (*Mirounga angustirostris*)	**PB**	**50**	**Y**	**California**
Northern fur seal (*Callorhinus ursinus*)	**PB**	**50**	**N**	**California**
Harbor seal (*Phoca vitulina*)	**PB**	**50**	**N**	**California**
Guadalupe fur seal (*Arctocephalus townsendi*)	**PB**	**50**	**N**	**California**

CA= close approach for tag attachment/photo-id; TAG=tagging attempt for digital archival recording tag, SC = suction cup, IM = invasive steel tip; FF=focal follow; PB=playback; * if reliable identification is possible, individual animals will not be tagged **or biopsied** more than once during one year, repeat tagging **and biopsy sampling** between years is possible; # if playbacks are performed, reliable identification of all exposed animals may not be possible, leading to multiple exposures of individuals to the playbacks. MED=Mediterranian, refers to international waters near the specified site.

B. Research Conditions

1. General

a. In addition to the Holder and Principal Investigator (PI), the following individuals may participate in the conduct of the research authorized herein as (Co-investigators (CIs)): Robin Baird, Nicoletta Biassoni, Alessandro Bocconcelli, J. Fabrizio Borsani, Jonathan Gordon, Mark Johnson, Michael

Moore, Douglas Nowacek, Simona Panigada, and Patrick Miller, Carol Carson, Natacha Aguilar de Soto, Susan Parks, Maria Elena Quero, Peter Stein, and Valeria Teloni.

b. **This Permit specifically does not authorize the conduct of research activities aboard or in cooperation with organizations that do both research and whale watching and any vessel or aircraft engaged in commercial whale watching or other commercial recreational activities. Further, this Permit does not authorize the cooperation with any vessel or aircraft carrying any nonessential passengers (*i.e.*, not essential for the conduct of the research) who either pay a fee in return for being allowed onboard the vessel or aircraft or who, prior to or after the trip, give "donations" to the Holder(s), principal investigator(s), Co-investigators, or research assistant(s).**

2. **Specific**

a. **At all times when vessels engaging in research activities near Hawaii in the North Pacific Ocean are on the water ("port-to-port") in Hawaii, such vessels shall fly a clearly visible triangular pennant. The pennant shall be yellow in color with minimum dimensions of 18"H x 26"L and with the Permit number displayed in 6" high black numerals.**

b. **For research activities on humpback whales near Hawaii inthe North Pacific Ocean, the Permit Holder/Principal Investigator shall terminate research activities at the end of each permit year (*i.e.*, September 30) and must request authorization to resume research for each succeeding year. Re-authorization of research activities will be based primarily on NMFS evaluation of the annual report required by Special Condition D.1. Authorization of each year's research does not in any way guarantee or imply that NMFS will authorize subsequent years' activities.**

c. Researchers may "approach" an animal as necessary for authorized activities. However, an approach or specific research activity must be discontinued if during the approach/activity either target animals (*i.e.*, those being actively studied by the researcher) or non-target animals exhibit three instances of harassment per day.

d. Researchers must approach the animals gradually to minimize or avoid any sort of startle response. Activities must be terminated if the animals exhibit extremely evasive or high energy behaviors.

e. Researchers must take extra care when conducting activities near mothers and calves, and:

-- must immediately terminate efforts if there is any evidence that the activity may be interfering with pair-bonding or nursing; and

-- must not position the research vessel between a mother and calf.

f. Accidental mortality or serious injury: In the event of accidental mortality or serious injury, the Researchers must immediately suspend research activities until the protocol and biopsy procedures have been reviewed and, if necessary, revised to the satisfaction of NMFS, in consultation with the Marine Mammal Commission, so as to ensure that the risk of additional mortality is minimized.

g. The Researchers shall not tag cetacean females with attending calves of nursing age until sufficient numbers of males and females without calves have been tagged and tracked to be able to show, with reasonable confidence, that the study methods do not adversely affect their behavior. The Permit Holder must provide such information to the NMFS' Permits Division for review and approval before conducting such tagging.

h. A tag attachment attempt or a playback episode shall be discontinued if an animal exhibits a strong adverse reaction to the tagging or playback activity or the vessel (*e.g.*, breaching, tail lobbing, underwater exhalation, or disassociation from the group).

i. No more than four attempts per day shall be made to tag an individual non-endangered/non-threatened animal on a given day.

No more than three attempts shall be made to tag endangered/threatened species (*i.e.*, sperm whales, fin whales, or **humpback whales**) on a given day.

j. An animal will be considered to have been taken by harassment if it exhibits signs of disturbance, either:

-- during an approach (see footnote 1) closer than 100 yards; or

-- during research activities conducted at any distance from the whales(s).

k. The Researchers shall exercise caution when approaching or conducting research activities around animals, and shall immediately terminate an approach/activity with respect to a particular pod, individual animal, or mother/calf pair if that pod, individual animal, or mother/calf pair appears in any way to be affected adversely by the approach/activity. An individual animal may not be inadvertently harassed more than four times daily.

l. For sea turtles, the Holder must determine the distance to the 180 dB re 1 μPa isopleth of the airgun or airgun arrays for the playback experiments in the Gulf of Mexico and the Bahamas to monitor the region between the airgun(s) and 180 dB isopleth before and during the experiment. If sea turtles are found, wait until the area is clear of turtles before proceeding with the experiment and cease the sounds if sea turtles enter the area. The Holder must include any observations of sea turtles in their annual report. This information must include location, description of steps taken to avoid take of sea turtles, and any effects that occur.

3. **Import/Export: No animal shall be harassed or killed for the express purpose of providing specimens to be obtained and/or imported under this Permit. Marine mammal parts imported under the authority of this Permit must be taken in a humane manner, and in compliance with the Acts and any applicable foreign law. Importation of marine mammal parts is subject to the provisions of 50 CFR parts 14 and 216. Attached is section 216.37 of the Regulations Governing the Taking and Importing of Marine Mammals that contains additional conditions applicable to maintaining marine mammal parts. These regulations are made a part hereof.**

a. Any specimens of species listed in the Appendices to CITES must be accompanied by valid CITES documentation from the exporting country, and, in the case of Appendix-I species, from the U.S. Fish and Wildlife Service.

b. All specimens imported into the United States shall be accompanied by documentation giving a description of each animal from which specimen materials were taken including, if possible, identification,

age, size, sex, reproductive condition; date and location of acquisition; and circumstances causing the death.

c. **All specimen materials obtained under this authority shall be maintained according to accepted curatorial standards.**

d. **Designated Ports of Entry: The Permit Holder shall provide written notice of the date, time, and port of entry at least two weeks in advance of any import to the appropriate Regional Administrator. Port of entry other than the designated ports listed below must be approved in writing by the appropriate Regional Administrator (Addresses enclosed).**

The following Customs ports of entry are designated for the importation or exportation of wildlife and are referred to hereafter as "designated ports." (50 CFR part 14.12). Please notify the USFWS wildlife inspectors [list attached] at these ports at least 48 hours prior to import or export.

1)	Los Angeles, CA	8)	New Orleans, LA
2)	San Francisco, CA	9)	Honolulu, HI
3)	Miami, FL	10)	Chicago, IL
4)	New York, NY	11)	Seattle, WA
5)	Dallas/Fort Worth, TX	12)	Boston, MA
6)	Portland, OR	13)	Atlanta, GA
7)	Baltimore, MD	14)	Anchorage, AK

4. Expiration Date: Researchers may conduct activities authorized by this Permit through September 30, 2005.

C. Notification and Coordination Conditions

1. Notification: For NMFS to coordinate activities authorized herein with other research that may be occurring in the same area, the Permit Holder must notify the following Regional Administrator(s), as appropriate given the location of the research, at least two weeks prior to initiation of the research. This notification must include specific dates, locations, and participants (*i.e.*, all CIs and research assistants) involved in the study.

Northwest Region, NMFS, 7600 Sand Point Way NE, BIN C15700, Bldg. 1, Seattle, WA 98115-0700; phone (206)526-6150; fax (206)526-6426

Southwest Region, NMFS, 501 West Ocean Blvd., Suite 4200, Long Beach, CA 90802-4213; phone (562)980-4001; fax (562)980-4018

Pacific Islands Area Office, NMFS, 1601 Kapliolani Blvd., Room 1110, Honolulu, HI 96814-4700; phone (808)973-2935; fax (808)973-2941

Northeast Region, NMFS, One Blackburn Drive, Gloucester, MA 01930-2298; phone (508)281-9250; fax (508)281-9371

Southeast Region, NMFS, 9721 Executive Center Drive North, St. Petersburg, FL 33702-2432; phone (727)570-5301; fax (727)570-5300

2. NMFS observers: NMFS Regional Offices are responsible for coordinating research activities within their jurisdictions and reserve the right to place observer(s) on research vessels and/or aircraft to monitor the effects of authorized activities on the animals and provide the Permit Holder with sufficient notice to ensure that adequate accommodations will be provided to the observer(s).

3. Coordination: In order to avoid unnecessary duplicative research and unnecessary disturbance of animals, the Permit Holder must coordinate research authorized herein with other researchers conducting the same or similar studies on the same species, in the same locations and at the same time.

4. 30-Day Import Notification:

a. Within 30 days of the initial importation of any marine mammal part, the Permit Holder must submit a written report to the Office Director. The report must include a description of the part and the unique number assigned to the part; and

b. The Permit Holder must provide written notification to the Regional Administrator within 30 days after any transfer, export, or re-import of a marine mammal part.

c. Notification must include:

1) A description of the part and unique number;

2) The person to whom the part was transferred, exported or re-imported and, if applicable, the recipient's permit number;

3) The purpose of the transfer, export or re-import; and

4) For transfers, certification that the recipient has agreed to comply with the attached requirements of § 216.37(a) for subsequent transfers.

D. Reporting Conditions

1. The Permit Holder shall submit an annual report by **December 31** of each year the permit is valid. The report shall describe, in two sections, as detailed in Special Conditions D.1.a. and D.1.b. below, the activities that have been conducted under the permit during the preceding year.

a. Section 1: Data/Results to Determine the Number of Animals Approached and to Assess the Bona Fide and Unnecessarily Duplicative Nature of the Research.

In tabular form:

i Dates and locations of the field work;
ii. the number of approach episodes conducted;
iii. the number of animals involved in each approach episode;
iv. the number of animals successfully tagged and exposed to playback experiments; and
v. the number of unsuccessful attempts to tag animals.
vi. any sea turtles observed

In narrative form:

i. How the results of the research pertain to or further the research goals stated in the permit application;
ii what steps were taken to coordinate with other researchers so as to minimize disturbance to the subject animals; and
iii. the information gained from the tagging studies.

b. Section 2: Data/Information to Evaluate Possible Effects of the Research.

In tabular form:

i. The number of incidents in which animals were "taken" (*e.g.*, incidents in which animals were observed to exhibit possible avoidance behavior possibly due to the research activities);
ii. For each such incident, the number of animals taken;
iii. The reactions of animals to tagging on a per-animal basis, including behavior before, during, and after tagging;
iv. The reaction of animals to playback experiments, insofar as possible; and
v. The number of approaches to within one body length of a whale.

In narrative form:

i. How individual animals and groups of animals responded to tagging and playback experiments; and
ii. A brief summary evaluation of the success of the use of the DTAG suction cup tagging method on species tagged during the past year's research.

c. The Holder shall keep, maintain, and provide to NMFS, on demand, records of daily activities with respect to whale research activities, *e.g.*, daily logbooks for each vessel. These daily records must include the full name of all persons involved, their assigned duties, as well as full and complete details concerning approaches, harassments, and other types of takes and activities. These records must be complete and accurate, and must specify how closely whales were approached and all other information necessary to complete the required annual report and to meet the stated research objectives, as required in D.1.a. and D.1.b., above. Falsification of information will be considered a violation of this permit.

2. In addition to the annual report required by Special Condition D.1., the Permit Holder shall submit a final report within 180 days of the expiration date of the permit, describing the activities that were conducted under the permit. This report shall include:

a. A summary of the results of the research and how they pertain to or further the research goals in the permit application; and

b. An indication, to the extent possible, of where and when the research results will be published or otherwise made available.

3. Reports shall be submitted to the Director, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, F/PR1, Silver Spring, MD 20910.

E. Photography and Filming Conditions [216.36(b)]

1. The Permit Holder and all researchers working under this Permit must obtain prior approval by the NMFS Permits, Conservation and Education Division for the following:

   a. Non-research related use of photographs, video and/or film that were taken to achieve the research objectives; and

   b. All activities not essential to achieving the research objectives (*e.g.* still photography, videotaping, motion picture film making). Such activities must not influence the conduct of research in any way.

2. The Permit Holder and researchers are hereby notified that failure to obtain NMFS approval prior to conducting or facilitating such activities will be considered a violation of the Permit. The Permit Holder and researchers must agree, upon request by NMFS, to make space available on the vessel or aircraft for a NMFS observer during any trips where activities identified in E.1.b. may be conducted.

3. Any commercial/documentary film approved for use must include a credit, acknowledgment, or caption indicating that the research was conducted under a permit issued by NMFS under the authority of the MMPA and/or the ESA.

F. General Conditions [50 CFR 216.35]

1. The Permit Holder is ultimately responsible for all activities of any individual who is operating under the authority of the Permit. The Principal Investigator (PI) shares this responsibility.

2. Co-investigators (CIs) are individuals identified by the Holder or PI, and approved by the NMFS, who are qualified to conduct research activities authorized by the Permit without the on-site supervision of the Holder or PI.

   i. Restrictions: Only the Holder, PI, or CI(s) may conduct the research activities authorized by this Permit. The qualifications and experience of the CI(s) must be commensurate with his/her assigned responsibilities.

ii. CI designation: The Holder or PI must submit a CI designation request to the Chief, Permits, Conservation and Education Division, Office of Protected Resources. The request must include the individuals' resume, curriculum vitae, or bio-sketch, and duty(s) to be performed. Approval by NMFS is based on the individual's qualifications to perform the requested activity(s). To expedite this process, the letter and CV may be submitted by facsimile (301/713-0376) followed by mail confirmation. Research may commence upon review and letter of authorization from the Chief, Permits, Conservation and Education Division. The Holder or PI shall notify, in writing, any designated CI importing specimens under this Permit about limitations and conditions, and reporting requirements of this Permit.

iii. Research Assistants are individuals who work under the direct supervision of the PI or CI(s) and who are authorized to record data and serve as safety observers and boat tenders.

i. Restrictions: With the exception of professional and/or experienced photographers/videographers (see 3.b. below) or licensed and/or experienced boat operators, Research Assistants are NOT authorized to carry out underwater observations and/or photography or to operate vessels. Paying interns are not authorized to operate vessels for research purposes under any circumstances. The qualifications and experience of the Research Assistant(s) must be commensurate with his/her assigned responsibilities.

ii. Photographer/videographer: A professional and/or experienced videographer/photographer under the direct, on-site supervision of the Researchers [Holder, PI, or CI(s)], may conduct research activities requiring underwater observations and/or photography. The Holder, PI, or CI(s) must be present at all times when research is being conducted.

iv. Persons who require state or Federal licenses to conduct activities authorized under the Permit must be duly licensed when undertaking such activities.

v. For research conducted in a National Marine Sanctuary, the Permit Holder must consult with and, as appropriate, obtain the necessary permits from the National Marine Sanctuaries Office, National Ocean Service.

6. **The Permit Holder must consult with and obtain the necessary ESA permits for activities conducted in the State waters of Hawaii, Washington, and Alabama as well as from Guam and the Commonwealth of the Northern Marianas. Note that these permits are required in addition to this NMFS**

Permit, and that the authority of States, with respect to the ESA, does not supercede that of the NMFS, nor can States issue permits for the taking of marine mammals. In addition, before taking marine mammals in the territorial waters of a foreign country, the Permit Holder must secure consent from, and comply with the appropriate laws of that country.

7. The PI and CI(s) cannot transfer or assign the Permit to any other person. The PI may request authorization to add a person to this Permit, but the PI cannot accept any direct or indirect compensation from the individual, in exchange for doing so.

8. The PI and CI(s) and all other researchers operating under the authority of this Permit must possess a copy of Permit No. **981-1578-03** when engaged in a permitted activity, and as applicable, when a marine mammal is in transit incidental to such activity, and whenever marine mammals or marine mammal parts are in the possession of the Permit Holder, PI or CI(s). The Permit Holder, PI, or CI(s) must affix a copy of the Pemit to any container, package, enclosure, or other means of containment, in which the marine mammals or marine mammal parts are placed for purposes of transit, supervision, or care. Any storage facility repositing marine mammal parts must keep a copy of the Permit on file.

9. Inspection: Upon request of NMFS enforcement agents or personnel designated by the Director, Office of Protected Resources, the Permit Holder, PI and/or CI(s) must make available for inspection: records; facilities; marine mammals; marine mammal parts; copies of photographs, motion picture films, and/or video tapes; and any other information related to any inspection of records associated with this Permit.

10. Permit Amendments: The Director, Office of Protected Resources, National Marine Fisheries Service may amend the provision of this Permit in response to or independent of a request from the Permit Holder. Please allow at least 4 months to process major amendment requests, with additional time where endangered species are involved.

11. NMFS shall be the sole arbiter of whether a given activity is within the scope and bounds of the authorization granted in this Permit. The Holder is on notice that if the Holder is unsure whether an activity is within the scope of the Permit, the Holder should contact the NMFS Permits, Conservation and Education Division for verification before conducting the activity. Failure to verify, where NMFS subsequently determines that the activity was outside the scope of the Permit, may be used as evidence of a violation of the Permit, the MMPA, and the ESA in any enforcement actions.

12. Any falsification of information pertaining to the permitted activities, including information provided to NOAA personnel, will be considered a violation of the Permit.

13. The Permit Holder and PI, in signing this Permit and reading and understanding the "Definitions" (Attachment 1), have accepted and will comply with the provisions of this Permit, applicable Regulations (50 CFR Parts 216 and 222.308), the ESA and the MMPA.

G. Penalties and Permit Sanctions (216.40)

1. Any person who violates any provision of this Permit is subject to civil and criminal penalties, permit sanctions, and forfeiture as authorized under the MMPA, ESA or 15 CFR part 904 [Civil Procedures].

2. All permits are subject to suspension, revocation, modification, and denial in accordance with the provisions of subpart D [Permit Sanctions and Denials] of 15 CFR part 904.

Date: _____

_____
Donald R. Knowles
Director
Office of Protected Resources

Date: _____

_____
Peter L. Tyack, Ph.D.
(Principal Investigator)
Biology Department
Woods Hole Oceanographic Institution:

12. Any falsification of information pertaining to the permitted activities, including information provided to NOAA personnel, will be considered a violation of the Permit.

13. The Permit Holder and PI, in signing this Permit and reading and understanding the "Definitions" (Attachment 1), have accepted and will comply with the provisions of this Permit, applicable Regulations (50 CFR Parts 216 and 222.308), the ESA and the MMPA.

G. Penalties and Permit Sanctions (216.40)

1. Any person who violates any provision of this Permit is subject to civil and criminal penalties, permit sanctions, and forfeiture as authorized under the MMPA, ESA or 15 CFR part 904 [Civil Procedures].

2. All permits are subject to suspension, revocation, modification, and denial in accordance with the provisions of subpart D [Permit Sanctions and Denials] of 15 CFR part 904.

Date: _____

Donald R. Knowles
Director
Office of Protected Resources

Date: _____

Peter L. Tyack, Ph.D.
(Principal Investigator)
Biology Department
Woods Hole Oceanographic Institution:

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Attachment 1 : Definitions

DEFINITION OF TERMS COMMONLY FOUND IN SCIENTIFIC RESEARCH PERMITS

acute behavioral response - Repeated, prolonged or excessive instances of behavior, brought on by any act or omission of the researcher and manifested by, among other actions on the part of the whale, a rapid change in direction or speed; escape tactics such as prolonged diving, underwater course changes, underwater exhalation, or evasive swimming patterns; interruptions of breeding, nursing, or resting activities, attempts by a whale to shield a calf from a vessel or human observer by tail swishing or by other protective movement; or the abandonment of a previously frequented area.

approach - a continuous sequence of maneuvers (episode) involving a vessel, aircraft, or researcher's body in the water, including drifting, directed toward a whale or group of whales for the purposes of conducting authorized research which involves one or more instances of coming closer than 100 yards to that whale or group of whales.

attempt - An effort made to accomplish some permitted activity. For example, a tag or biopsy dart deployment from either a crossbow, airgun or pole.

bona fide research - Scientific research on marine mammals conducted by qualified personnel, the results of which: 1) likely would be accepted for publication in a refereed scientific journal; 2) are likely to contribute to the basic knowledge of marine mammal biology or ecology; or 3) are likely to identify, evaluate or resolve conservation problems. Research that is not on marine mammals, but that may incidentally take marine mammals, is not included in this definition.

Co-Investigator, CI - The on-site representative of a principal investigator who has qualifications comparable to the PI.

harass(ment) - To disrupt the normal behavior or prior activity of a whale by any act or omission. This disruption of normal behavior may be manifested by, among other actions on the part of the whale, a rapid change in direction or speed; escape tactics such as prolonged diving, underwater course changes, underwater exhalation, or evasive swimming patterns; interruptions of breeding, nursing, or resting activities, attempts by a whale to shield a calf from a vessel or human observer by tail swishing or by other protective movement; or the abandonment of a previously frequented area.

hard parts - Any bone, tooth, baleen, treated pelt, or other part of a marine mammal that is relatively solid or durable.

humane - The method of taking, import, export, or other activity which involves the least possible degree of pain and suffering practicable to the animal involved.

intrusive research - A procedure conducted for bona fide scientific research involving: A break in or cutting of the skin or equivalent, insertion of an instrument or material into an orifice, introduction of a substance or object into the animal's immediate environment that is likely either to be ingested or to contact and directly affect animal tissue (i.e., chemical substances), or a stimulus directed at animals that may involve a risk to health or welfare or that may have an impact on normal function or behavior (i.e., audio broadcasts directed at animals that may affect behavior). For captive animals, this definition does not include: 1) A procedure conducted by the professional staff of the holding facility or an attending veterinarian for purposes of animal husbandry, care, maintenance, or treatment, or a routine medical procedure that, in the reasonable judgement of the attending veterinarian, would not constitute a risk to the health or welfare of the captive animal; or 2) A procedure involving either the introduction of a substance or object (i.e., as described in this definition) or a stimulus directed at animals that, in the reasonable judgement of the attending veterinarian, would not involve a risk to the health or welfare of the captive animal.

Level A harassment - Any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild.

Level B harassment - Any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering by which does not have the potential to injure a marine mammal or marine mammal stock in the wild.

Permit Holder - Person, institution, or agency who is ultimately for all activities of any individual who is operating under the authority of the permit.

Ports, Designated and Border -

Designated Ports - U.S. Customs ports of entry that are designated for the importation or exportation of wildlife; they are:

1)	Los Angeles, CA	8)	New Orleans, LA
2)	San Francisco, CA	9)	Honolulu, HI
3)	Miami, FL	10)	Chicago, IL
4)	New York, NY	11)	Seattle, WA
5)	Dallas/Fort Worth, TX	12)	Boston, MA
6)	Portland, OR	13)	Atlanta, GA
7)	Baltimore, MD		

Border Ports - Wildlife whose country of origin is Canada or the United States may be imported or exported at any of the following U.S. Customs ports of entry or "border ports". Authorization from a "designated port" is needed before entry.

1) Alaska - Alcon
2) Idaho - Eastport
C. Maine - Calais, Houlton, Jackman
4) Massachusetts - Boston
5) Michigan - Detroit, Port Huron, Sault Sainte Marie
6) Minnesota - Grand Portage, International Falls, Minneapolis-St. Paul
7) Montana - Raymond, Sweetgrass
8) New York - Buffalo-Niagra Falls, Champlain
9) North Dakota - Dunseith, Pembina, Portal
10) Ohio - Cleveland
11) Vermont - Derby Line, Highgate Springs
12) Washington - Blaine, Sumas

Wildlife whose country of origin is Mexico or the United States may be imported or exported at any of the following U.S. Customs ports of entry or "border ports":

1) Arizona - Lukeville, Nogales
2) California - Calexico, San Diego-San Ysidro
3) Texas - Brownsville, El Paso, Laredo

Wildlife lawfully taken by U.S. residents in the United States, Canada or Mexico and imported or exported for noncommercial purposes, may be imported or exported at any U.S. Customs port of entry.

Principal Investigator, PI - The individual primarily responsible for the taking, importation, exportation, and any related activities conducted under a permit issued for scientific research or enhancement purposes. The PI must have qualifications, knowledge and experience relevant to the type of research activities authorized by the permit.

rehabilitation - Treatment of beached and stranded marine mammals taken with the intent of restoring the marine mammal's health and, if necessary, behavioral patterns.

Research Assistant, RA - Individual who works under the direct supervision of the CI or PI, and who is authorized to record data and/or serve as safety observer and/or boat tender. The RA is not authorized to carry out underwater observations and/or photography. The qualifications and experiences of the RA must be commensurate with his/her assigned responsibilities. If the RA is to operate a boat, they must be licensed and/or professionally trained and experienced in maneuvering vessels around marine mammals.

soft parts - Any marine mammal part that is not a hard part, e.g. blood, blubber, or other tissue samples. Soft parts do not include urine or fecal material.

stranded marine mammal - A marine mammal specimen under the jurisdiction of the Secretary of Commerce, if: 1) the specimen is dead and is on a beach or shore, or is in the water within the Exclusive Economic Zone of the U.S.; or 2) the specimen is alive, and is on a beach or shore and is unable to return to the water, or is in the water within the Exclusive Economic Zone of the U.S. where the water is so shallow that the specimen is unable to return to its natural habitat under its own power.

take - To harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal (as defined in the MMPA). To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (as defined in the ESA). This includes, without limitation, any of the following: The collection of dead animals, or parts thereof; the restraint or detention of a marine mammal, no matter how temporary; tagging a marine mammal; the negligent or intentional operation of an aircraft or vessel, or the doing of any other negligent or intentional act which results in disturbing or molesting a marine mammal; and feeding or attempting to feed a marine mammal in the wild.

take table - An outline, by species, age, and sex, of the type of activity(ies) authorized, the number of takes per activity, the number of takes per individual, and the location of takes and activity(ies).

Attachment 2: NMFS REGIONAL ADMINISTRATORS

Northwest Region, NMFS, 7600 Sand Point Way NE, BIN C15700, Bldg. 1, Seattle, WA 98115-0700; phone (206)526-6150; fax (206)526-6426

Alaska Region, NMFS, P.O. Box 21668, Juneau, AK 99802-1668; phone (907)586-7221; fax (907)586-7249

Southwest Region, NMFS, 501 West Ocean Blvd., Suite 4200, Long Beach, CA 90802-4213; phone (562)980-4001; fax (562)980-4018

Pacific Island Area Office, NMFS, 1601 Kapiolani Blvd., Rm, 1110, Honolulu, HI 96814-4700; phone (808)973-2935; fax (808)973-2941

Northeast Region, NMFS, One Blackburn Drive, Gloucester, MA 01930-2298; phone (978)281-9200; fax (978)281-9371

Southeast Region, NMFS, 9721 Executive Center Drive North, St. Petersburg, FL 33702-2432; phone (727)570-5301; fax (727)570-5320.

Attachment 3: Endangered Species Act (ESA) Section 10(A)(1)(a) GENERAL CONDITIONS

For the purpose of these conditions, NMFS refers to the Office of Protected Resources, Division of Permits, Conservation, and Education

1. The Permit Holder must ensure that the ESA-listed species are taken only by the means, in the areas, and for the purposes set forth in the permit application, as limited by the terms and conditions in this permit.

2. The Permit Holder must ensure that all ESA-listed species are handled carefully. Should NMFS determine that a procedure provided for under this permit is no longer acceptable, the Permit Holder must immediately cease such activity until NMFS determines an acceptable substitute procedure.

3. The Permit Holder, in effecting the take authorized by this Permit, is considered to have accepted the terms and conditions of this permit and must be prepared to comply with the provisions of this permit, the applicable regulations, and the ESA.

4. The Permit Holder is responsible for the actions of any individual operating under the authority of this permit. Such actions include capturing, handling, releasing, transporting, maintaining, and caring for any ESA-listed species authorized to be taken by this permit.

5. The Permit Holder, personnel, or designated agent acting on the Permit Holder's behalf must possess a copy of this permit when conducting the activities for which a take of ESA-listed species or other exception to ESA prohibitions is authorized herein.

6. The Permit Holder may not transfer or assign this permit to any other person(s), as person is defined in Section 3(12) of the ESA. This permit ceases to be in force or effective if transferred or assigned to any other person without prior authorization from NMFS.

7. The Permit Holder must obtain any other Federal, state, and local permits/authorizations necessary for the conduct of the activities provided for in this permit. In addition, before taking ESA-listed species in the territorial waters of a foreign country, the Permit Holder must secure consent from, and comply with the appropriate laws of, that country.

8. Any personnel of the Permit Holder requiring Federal or state licenses to practice their profession must be duly licensed under the appropriate law.

9. The Permit Holder must coordinate with other co-managers and/or researchers to ensure that no unnecessary duplication and/or adverse cumulative effects occur as a result of the Permit Holder's activities.

10. The Permit Holder must allow any NMFS employee(s) or any other person(s) designated by NMFS, to accompany field personnel during the activities provided for in this permit.

The Permit Holder must allow such person(s) to inspect the Permit Holder's records and facilities if such records and facilities pertain to ESA-listed species covered by this permit or NMFS's responsibilities under the ESA.

11. Under the terms of the regulations, a violation of any of the terms and conditions of this permit will subject the Permit Holder, and/or any individual who is operating under the authority of this permit, to penalties as provided for in the ESA.

12. The Permit Holder is responsible for biological samples collected from ESA-listed species as long as they are useful for research purposes. The terms and conditions concerning any samples collected under this authorization remain in effect as long as the Permit Holder maintains authority and responsibility of the material taken. The Permit Holder may not transfer biological samples to anyone not listed in the application without obtaining prior written approval from NMFS. Any such transfer will be subject to such conditions as NMFS deems appropriate.

13. NMFS may amend the provisions of this permit after reasonable notice to the Permit Holder.

14. 50 CFR Section 222.23(d)(8) allows NMFS to charge a reasonable fee to cover the costs of issuing permits under the ESA. The fee for this permit has been waived.

15. NMFS may revoke this permit if the activities provided for by it are not carried out, if the activities are not carried out in accordance with the conditions of the permit and the purposes and requirements of the ESA, or if NMFS otherwise determines that the findings made under section 10(d) of the ESA no longer hold.

16. Any falsification of annual reports or records pertaining to this permit is a violation of this permit.

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cc: chron, PHF

[Federal Register: October 1, 2002 (Volume 67, Number 190)]
[Notices]
[Page 61598-61599]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr01oc02-50]

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[I.D. 091202C]

Marine Mammals; File No. 981-1578-03

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Issuance of permit amendment.

SUMMARY: Notice is hereby given that Peter L. Tyack, Ph.D., Woods Hole Oceanographic Institution, Woods Hole, MA 02543 has been issued an amendment to scientific research Permit No. 981-1578-**02**.

ADDRESSES: The amendment and related documents are available for review upon written request or by appointment in the following office(s): See SUPPLEMENTARY INFORMATION.

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FOR FURTHER INFORMATION CONTACT: Tammy Adams or Ruth Johnson, (301)713-2289.

SUPPLEMENTARY INFORMATION: On October 11, 2001, notice was published in the Federal Register (66 FR 51930) that an amendment of Permit No. 981-1578, issued on August 31, 2000 (65 FR 57319), had been requested by the above-named individual. On May 22, 2002, another notice was published in the Federal Register (67 FR 35965) that an additional amendment of Permit No. 981-1578 was requested by the above named individual. The requested amendments have been granted under the authority of the Marine Mammal Protection Act of 1972, as amended (16 U.S.C. 1361 et seq.), the Regulations Governing the Taking and Importing of Marine Mammals (50 CFR part 216), the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 et seq.), the regulations governing the taking, importing, and exporting of endangered and threatened species (50 CFR 222-226), and the Fur Seal Act of 1966, as amended (16 U.S.C. 1151 et seq.).

The amended permit authorizes the holder to: increase the maximum received level for non-airgun sounds to 180 dB re 1 Pa; test a whale-finding sonar's ability to detect gray whales migrating past the central California coast; add tagging of humpback whales (Megaptera novaeangliae) in the vicinity of the Hawaiian Islands; and expand the research area to include the entire North Atlantic Ocean.

Issuance of this amendment, as required by the ESA was based on a finding that such permit (1) was applied for in good faith, (2) ...

EXHIBIT NO. 3

not operate to the disadvantage of the endangered species which is the subject of this permit, and (3) is consistent with the purposes and policies set forth in section 2 of the ESA.

Documents may be reviewed in the following locations:

Permits, Conservation and Education Division, Office of Protected Resources, NMFS, 1315 East-West Highway, Room 13705, Silver Spring, MD 20910; phone (301)713-2289; fax (301)713-0376;

Southwest Region, NMFS, 501 West Ocean Blvd., Suite 4200, Long Beach, CA 90802-4213; phone (562)980-4001; fax (562)980-4018;

Protected Species Coordinator, Pacific Area Office, NMFS, 1601 Kapiolani Blvd., Rm, 1110, Honolulu, HI 96814-4700; phone (808)973-2935; fax (808)973-2941;

Northeast Region, NMFS, One Blackburn Drive, Gloucester, MA 01930-2298; phone (978)281-9200; fax (978)281-9371; and

Southeast Region, NMFS, 9721 Executive Center Drive North, St. Petersburg, FL 33702-2432; phone (727)570-5301; fax (727)570-5320.

Dated: September 25, 2002.

Eugene T. Nitta,

Acting Chief, Permits, Conservation and Education Division, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. **02-24947 Filed** 9-30-**02**; 8:45 am]
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