



# United States Department of the Interior

MINERALS MANAGEMENT SERVICE  
Pacific OCS Region  
770 Paseo Camarillo  
Camarillo, California 93010-6064

7300

FEB 11 2005

## Memorandum

To: File: 1703-02a(1) Gato Canyon Unit Correspondence  
1703-02a(1) Undeveloped Leases/Units, Environmental  
Analyses

From: Chief, Office of Environmental Evaluation

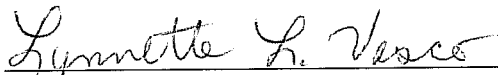
Subject: Finding of No Significant Impact (FONSI)

Proposed Action: MMS to Grant Samedan Oil Corporation a Suspension of  
Production for Gato Canyon Unit (Leases OCS-P 0460 and 0464) <sup>1</sup>

Area: Western Santa Barbara Channel, California  
Date: February 11, 2005

Documents Included: Environmental Assessment

Based on the evaluation of Samedan Oil Corporation's Suspension of Production request, as updated, and potential impacts discussed in the attached EA, the Minerals Management Service has determined that granting a suspension for the Gato Canyon Unit (the proposed action) does not constitute a major Federal action significantly affecting the quality of the human environment, pursuant to the National Environmental Policy Act 102(2)(C).



Lynnette Vesco  
Chief, Office of Environmental Evaluation  
Pacific OCS Region

2-11-05

Date

## Attachment

<sup>1</sup> By decision dated August 16, 1999, the MMS removed one lease from the Gato Canyon Unit (OCS-P 0462) and it expired. The lessees appealed this decision to the Interior Board of Land Appeals. For purposes of environmental analysis, it is included in the Environmental Assessment and this FONSI pending final outcome of the appeal.

**Environmental Assessment (Final)**

**February 11, 2005**

**Proposed Action:** Minerals Management Service to Grant  
Suspension of Production for Samedan Oil Corporation's

**Gato Canyon Unit—Leases OCS-P 0460 and 0464<sup>1</sup>**

**Operator:** Samedan Oil Corporation

**Area:** Western Santa Barbara Channel,  
Offshore Southern Santa Barbara County, California

**Responsible Agency:** Minerals Management Service (MMS)  
Pacific OCS Region  
Office of Environmental Evaluation

**Abstract:** The MMS proposed action is to grant a Suspension of Production (SOP) to Samedan Oil Corporation for 37 months for the Gato Canyon Unit, located in the western Santa Barbara Channel offshore Santa Barbara County. A suspension is defined in 30 CFR §250.105 as "a granted or directed deferral of the requirement to produce (SOP) or to conduct leaseholding operations [Suspension of Operations (SOO)]." Granting the suspension would allow Samedan time to conduct a shallow hazards survey on the Gato Canyon Unit and to conduct administrative activities leading to the submittal of a revised Exploration Plan (EP) to the MMS for subsequent technical and environmental review. MMS would approve, require modification, or disapprove the plan. Based on the implementation of both Samedan's and MMS's mitigation measures identified in this Environmental Assessment, MMS concludes that all of the potential impacts identified for the survey and for granting the suspension are insignificant.

**Documents Available on the web:** <http://www.mms.gov/omm/pacific>

**By Mail:** Minerals Management Service  
Attn: Suspension—EA's  
Office of Environmental Evaluation  
770 Paseo Camarillo  
Camarillo, CA 93010-6064

**By Phone:** 800.672.2627

**For further information, contact:** Maurice Hill, Environmental Coordinator, Minerals Management Service, 770 Paseo Camarillo, Camarillo, CA 93010, (805) 389-7815.

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<sup>1</sup> By decision dated August 16, 1999, the MMS removed one lease from the Gato Canyon Unit (OCS-P 0462) and it expired. The lessees appealed this decision to the Interior Board of Land Appeals. For purposes of environmental analysis, it is included in this Environmental Assessment pending final outcome of the appeal.

**Environmental Assessment (Final)**  
**Samedan Oil Corporation**  
**Gato Canyon Unit—Leases OCS-P 0460 and 0464<sup>1</sup>**

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<sup>1</sup> On August 16, 1999, one lease in the Gato Canyon Unit (OCS-P 0462) expired. This action is under appeal within the Interior Board of Land Appeals. Since this lease is under appeal, it is covered by the analysis in this Environmental Assessment.

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## Environmental Assessment (Final)

Samedan Oil Corporation  
Gato Canyon Unit  
Leases OCS-P 0460 and 0464<sup>1</sup>

### EXECUTIVE SUMMARY

On June 20, 2001, the U.S. District Court for the Northern District of California (hereinafter referred to as the Court) issued a ruling in *California v. Norton* (No. C 99-4964 CW, Northern District of California) ordering the Minerals Management Service (MMS) to provide a reasoned explanation for its reliance on the categorical exclusion under the National Environmental Policy Act (NEPA) and the inapplicability of the extraordinary circumstances exceptions in granting certain suspensions<sup>2</sup>. MMS has decided to forego reliance on the categorical exclusion for the suspensions in this case in favor of preparing Environmental Assessments (EA's). On February 26, 2004, the Court ordered the Federal Defendants to propose a timetable for completing their analyses of applications for suspensions filed by the operators for nine units and one non-unitized lease offshore southern California, and for submitting consistency determinations to the State of California under the Coastal Zone Management Act (CZMA). On June 28, 2004, the Court adopted the proposed timeline which included the time for the MMS to prepare six EA's to analyze the environmental impacts of granting the suspensions.

This EA covers the Gato Canyon Unit operated by Samedan Oil Corporation (hereinafter referred to as Samedan). This unit is located in the western Santa Barbara Channel, offshore Santa Barbara County (Figure ES-1).

The MMS proposed action is to grant a Suspension of Production (SOP) for 37 months to Samedan for the Gato Canyon Unit. Assuming an MMS decision on the SOP in July 2005, this SOP would be from July 2005 to August 2008; the ending date would change proportionately if an MMS decision is made before or after July 2005. Granting the suspension would allow Samedan time to conduct a shallow hazards survey on the Gato Canyon Unit, and to conduct administrative activities leading to the submittal of a revised Exploration Plan (EP) to the MMS for subsequent technical and environmental review and decision. The survey is discussed in the EA because it is an activity that would occur during the suspension period. The survey would be authorized by virtue of MMS granting the suspension. The survey would be conducted in the western Santa Barbara Channel, offshore Santa Barbara County. The preparation of the revised

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<sup>1</sup> By decision dated August 16, 1999, the MMS removed one lease in the Gato Canyon Unit (OCS-P 0462) and it expired. The lessees appealed this decision to the Interior Board of Land Appeals. For purposes of environmental analysis, it is included in this Environmental Assessment pending final outcome of the appeal.

<sup>2</sup> A suspension is defined in 30 CFR §250.105 as "a granted or directed deferral of the requirement to produce [Suspension of Production (SOP)] or to conduct leaseholding operations [Suspension of Operations (SOO)]."

EP is an administrative activity that would be completed by Samedan and/or their consultant(s) in an office setting.

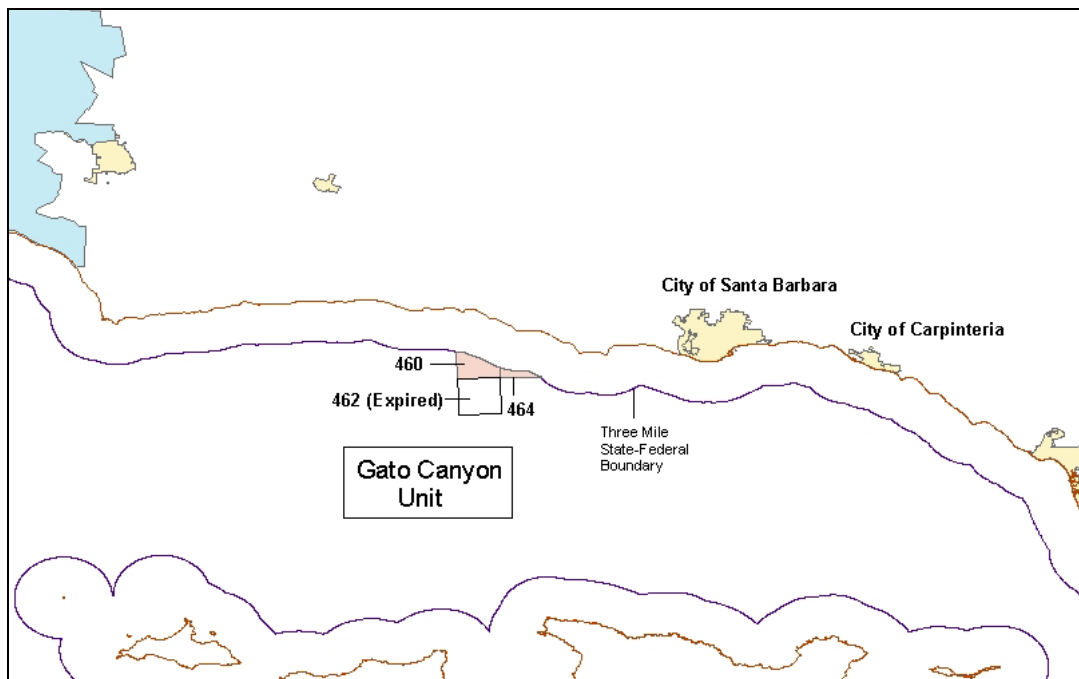


Figure ES-1. Samedan's Gato Canyon Unit.

Alternatives to the proposed action are to deny the suspension, and to take no action on the suspension.

In accordance with NEPA and Council on Environmental Quality (CEQ) guidance, this EA is focused on the survey activities and their impact-producing agents that would occur during Samedan's suspension period since they have the potential to cause impacts to environmental resources. The main impact-producing agents are the impact of sound produced by the single air gun used in the shallow hazards survey, air emissions from the survey vessels, and space-use conflicts caused by the presence of the vessels and the trailing equipment. The environmental resources or issues that could be affected by the survey are:

- Air Quality;
- Protected Species of Marine Mammals and Sea Turtles;
- Fish Resources, Managed Species, and Essential Fish Habitat;
- Commercial Fishing;
- Recreational Fishing and Diving; and
- Environmental Justice.

As part of the NEPA review process, the MMS involved the public and various private and government agencies in the determination of the scope of the EA's for the suspension decisions. On July 21, 2004, MMS sent a public announcement (see Appendix) concerning scoping for the EA's to 260 entities who previously expressed interest in the undeveloped leases. The mailing

list included elected officials, Federal, State and local agencies, public interest groups, and individuals. MMS also published the announcement at

(<http://www.mms.gov/omm/pacific/index.htm>)

and telephoned key public agencies. The public scoping period ended on August 26, 2004 (which provided about 36 days for comment). A total of 129 public scoping comments were received. The process also involved a review of past comments received on the undeveloped leases including the CCC's August 5, 1999, letter.

A number of issues were raised by local, State, and Federal agencies and the public with respect to the scope of the analysis for the suspension decisions. Primarily, the comments focused on:

- Environmental impacts associated with exploration and development activities that would occur after the suspension period ends,
- Reasonably foreseeable and connected actions,
- Requests for MMS to prepare an Environmental Impact Statement to address the exploration and development activities,
- Requests that all the resources of the Channel Islands National Park be considered,
- Questions concerning the suspension process including diligence in developing the leases; the length of the suspensions; unitization; whether the suspensions were undertaken according to MMS regulations and the Court decision of June 20, 2001,
- Concerns about the effects of shallow hazards surveys, and,
- Changed circumstances and new information should be considered in evaluating environmental impacts.

Additionally, several comments were received that expressed support for the exploration, development, and production of oil and natural gas resources offshore southern California.

After MMS's review of the suspension request and the scoping comments received, MMS prepared this EA to determine if there would be any significant environmental impacts as a result of granting the SOP. This analysis includes reasonably foreseeable and connected actions such as the shallow hazards survey that would be conducted during the suspension period. Other activities, including potential exploration and development, were determined to be outside the scope of this analysis because these activities: 1) will not occur while the Unit is under suspension, and 2) require separate review and approval by MMS and other appropriate agencies before they may occur. Specifically, exploration or development activities cannot occur unless: 1) the operator submits revised or new EP('s) and/or DPP('s) to MMS; 2) MMS completes technical and environmental reviews of the EP('s) or DPP('s); and, 3) MMS and other appropriate State and Federal agencies review these activities and approve them as necessary. As stated previously, the need for granting the suspension is to allow the operator time to prepare and submit information needed by MMS and other agencies in order to conduct these reviews, and time for these reviews to occur. Where there are separate, successive stages of regulatory review over a single project, agencies have the discretion to "stage" their consideration of environmental factors to coincide with the development of sufficient definiteness to permit the environmental evaluation. MMS requested the operators to revise and submit information for

their suspensions. And, it is premature to review, for the purposes of NEPA, exploration and development activities that are at this point hypothetical.

Pursuant to Section 7(a)(2) of the Endangered Species Act (ESA), MMS sent a draft of this EA and letter initiating informal consultation to NOAA Fisheries Southwest Region, Office of Protected Species, on November 17, 2004. The MMS received a response dated December 16, 2004, from NOAA Fisheries that concurred with the findings that Samedan's shallow hazards survey will not likely adversely affect marine mammals and listed sea turtle species. No critical habitat is designated for sea turtles or marine mammals in this area. The NOAA Fisheries also provided, in the December 16, 2004 letter, nine specific recommendations. All the recommendations from NOAA Fisheries have been accepted and the necessary changes and/or clarifications have been included in this Final EA.

Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) process as described in 50 CFR §600.920(h), MMS sent a draft EA and letter requesting abbreviated consultation for Essential Fish Habitat, to NOAA Fisheries Southwest Region, Office of Habitat Conservation, on November 17, 2004. The MMS received a response dated December 16, 2004, from NOAA Fisheries that concurred with the findings that Samedan's shallow hazards survey will have minimal impact on managed species and EFH and stated that NOAA Fisheries did not object to the issuance of the SOP for Samedan pursuant to the MSFCMA.

As part of the NEPA review process, on November 15, 2004, the MMS distributed for public review and comment, a draft of this EA, and five other draft EA's, to 352 interested parties. The MMS also posted the six draft EA's on the internet and requested comments electronically.

A total of 110 commenters provided both electronic and written input to the MMS. The commenters included elected officials, State, Federal, and local agencies, environmental interest groups, oil industry, other interest groups, and the general public.

The draft of this EA was revised based on the comments received specifically on this EA, as well as comments which also generally applied to all six of the draft EA's.

The primary issue raised in the comments for this EA concerned the approach MMS has taken in the NEPA process and included requests that an Environmental Impact Statement (EIS) be prepared to assess exploration and development.

Specific issues related to NEPA, regulations, and programmatic topics are summarized below:

- An expansion of the Need for the Proposed Action is needed;
- A reasonable range of alternatives is needed, including energy conservation and efficiency, and renewables;
- The retention of the leases as active over many years was illegal due to the lack of due diligence in exploration and development;
- The current and previous administrations should have notified the current lessees that the tracts were not actually able to be developed;
- Insufficient scientific information exists to justify allowing exploration and development on these leases; MMS has collected little scientific information to meet the recommendations of the National Research Council report of 1991; and MMS has



disregarded the 2004 recommendations of the President’s U.S. Commission on Ocean Policy; and

- The implications of delineation drilling impacts on all West Coast OCS Planning Areas on which congressional moratoria have been placed.

Comments regarding potential impacts to marine resources included:

- Significance criteria for marine mammals and fish resources were incorrect;
- Clarification regarding the use of the words, “taking” and “harassment” as defined in the Endangered Species Act and the Marine Mammal Protection Act;
- Mitigations should include aerial surveys, avoidance of the early part of the gray whale migration season, passive acoustic monitoring, and field-testing of the safety zone;
- Clarifications on issues regarding the shallow hazards survey including, the ramping-up, starting and stopping of the air guns during start-up, turning, and turning in state waters; whether the Aera and Samedan surveys would be run concurrently; and new information about the air gun-associated strandings of various species of whales;
- Incomplete or incorrect technical information including poor referencing and the use of dated studies, not discussing the possibility of masking, concerns regarding the potential for strandings due to the air gun activity, the lack of a complete discussion of sea turtles;
- Questions regarding the data on sea otters in the survey areas and the potential impacts of oil spills on otters;
- The potential impacts of the shallow hazard surveys on fish and fish resources, including invertebrates;
- Specific discussion of the critical habitat of listed species that may be affected by the proposed suspensions; and
- An evaluation of the proposed boundary expansion of the Channel Islands Sanctuary.

Generally, in response to the comments, revisions were made to the draft of this EA to ensure that the proposed suspension activities were properly described, appropriate alternatives were considered, the affected environment was adequately described, and the impact analysis was complete. Other comments were considered to be outside the scope of the EA, and, therefore not applicable.

The potential environmental impacts, impacting agents, mitigation measures, and impact levels for Samedan’s survey are presented in Table ES-1. The Table includes mitigation measures included by Samedan as part of their survey execution plan (Samedan, 2001) and additional measures to be required by MMS. Based on the implementation of both Samedan’s and MMS mitigation measures, MMS concludes that all of the potential impacts identified for the survey and for granting the suspensions (Alternative 1) are insignificant.

This EA also assesses the impacts of Alternative 2—Deny Suspension, and Alternative 3—No Action. No environmental impacts would occur under either of these alternatives.

<b>Table ES-1.</b> Summary of potential impacts, impacting agents, mitigation measures, and impact level for Samedan’s surveys on the Gato Canyon Unit. Refer to Section 4 of the EA for impact analyses.			
<b>Description of Potential Impacts for:</b>	<b>Impacting Agents</b>	<b>Mitigation Measures to Avoid or Minimize Impacts</b>	<b>Impact Level</b>
<b>Air Quality</b>			
Potential violation of ambient air quality standards due to emissions during vessel survey activities.	Emissions from main propulsion engines of survey vessel	<p>Samedan shall prepare and submit to the MMS, an Emissions Reporting Plan 60 days prior to the commencement of the survey. This plan shall provide detailed information regarding the actual vessel to be employed, internal combustion engines used, the duration of their use, the fuel consumed, and the calculated emissions. (AQ-1 - MMS)</p> <p>Samedan shall determine, on a daily basis, fuel use and emissions from the Shallow Hazards Survey. At the conclusion of the survey, Samedan will prepare and submit a summary of the daily and total fuel use and emissions associated with the project to verify compliance with project specific permit conditions. (AQ-2 - MMS)</p>	Insignificant
	Incidental emissions from stationary equipment on the vessel	Samedan shall require the survey vessel and other associated internal combustion engines to use fuel with less than 0.2% sulfur by weight when operating within waters adjacent to Santa Barbara County. (AQ-3 - MMS)	Insignificant

**Table ES-1.** Summary of potential impacts, impacting agents, mitigation measures, and impact level for Samedan’s surveys on the Gato Canyon Unit. Refer to Section 4 of the EA for impact analyses. (continued)

Description of Potential Impacts for:	Impacting Agents	Mitigation Measures to Avoid or Minimize Impacts	Impact Level
<b>Protected Species of Marine Mammals and Sea Turtles</b>			
Localized avoidance	Acoustic energy/sound generated by the shallow hazards survey vessel (1); Scout boat (1).	<p>Samedan shall submit for MMS and NOAA Fisheries approval at least 90 days prior to the commencement of survey operations a current and final MWCP by which Samedan will avoid adversely impacting marine mammals and endangered and threatened species. Samedan shall provide the California Coastal Commission a copy of the approved final MWCP before the survey vessel departs for the survey. (MPS-8-MMS)</p> <p>Samedan shall ensure that all protective measures established apply for marine mammals and sea turtles. (MPS-7-Samedan)</p> <p>Samedan shall require the survey vessel to observe all additional procedures outlined in the Marine Wildlife Contingency Plan (MWCP). (MPS-6-Samedan)</p> <p>Samedan shall ensure that vessel operators and personnel aboard the survey vessels are educated of the potential occurrence of marine protected species in the region, and of the importance to avoid “taking” a marine protected species (e.g., loss of valued wildlife; criminal and/or civil penalties). Samedan shall require all vessel operators and personnel (survey vessel and scout boat) to be alert for marine protected species. (MPS-9-MMS)</p>	Insignificant
Physical injury or mortality resulting from collisions with vessel traffic	Shallow hazards survey vessel (1); Scout boat (1).	<p>Samedan shall require that any personnel observing a marine protected species during vessel operations (e.g., transiting to or from the survey areas, during survey operations) to immediately report the sighting to the vessel operator and/or watchstanding observer (during shallow hazards survey operations). Communications between vessel operators and observers can be accomplished by hand-held radios. Subcontracted personnel, such as technical personnel tending lines, are also required to comply with these requirements. (MPS-10-MMS) (See all previous MPS mitigation measures.)</p> <p>Samedan shall ensure that all vessel operators (survey vessels and scout vessels) shall, in general, when transiting to and from survey sites, remain at least 300 m (approximately 1,000 ft) from marine protected species to minimize the chance of collision or disturbance. Vessel operators should adhere to the following guidelines: DO NOT: (1) move into the path of a whale; (2) move faster than a whale; (3) make rapid speed or erratic</p>	Insignificant

**Table ES-1.** Summary of potential impacts, impacting agents, mitigation measures, and impact level for Samedan’s surveys on the Gato Canyon Unit. Refer to Section 4 of the EA for impact analyses. (continued)

Description of Potential Impacts for:	Impacting Agents	Mitigation Measures to Avoid or Minimize Impacts	Impact Level
<b>Protected Species of Marine Mammals and Sea Turtles</b>			
Acoustic harassment, auditory or physical injury, stranding and mortality	Acoustic energy/sound generated by the single air gun	<p>directional changes, unless to avoid collision with a whale or another vessel; (4) get between two whales; or (5) chase whales. All vessel operators shall follow the appropriate procedures established in the approved MWCP. (MPS-11-MMS)</p> <p>Samedan shall ensure that all vessel operators operate their vessels at speeds not to exceed 12 knots to minimize risking collision with whales. In the unlikely even of a watercraft collision with a marine mammal, Samedan must immediately contact the NOAA Fisheries Stranding Coordinator, at (562) 980-4017 and the MMS POCS Region Office. (MPS-12-MMS)</p> <p>Samedan shall ensure that the single 20 in<sup>3</sup> air gun will be operated only in daylight hours to allow observation of nearby marine protected species (and sport or commercial diving operations) by experienced observers. The air gun will be turned off during the period in which the vessel makes its turn to move from one line to the next. (MPS-1-Samedan) (See all previous MPS mitigation measures.)</p> <p>Samedan shall ensure that a 160 dB impact zone (estimated at 795 m [0.50 mi] radius) around the air gun is established, and the air gun is shut down if marine protected species enter the zone. (MPS-2-Samedan)</p> <p>Samedan shall use two NOAA Fisheries approved observers on the shallow hazards survey vessel to ensure continuous observation during air gun operations. Monitoring will begin at least 30 minutes before the air gun is turned on. Preferred methods include use of 7 X 50 reticulated binoculars and from a vantage point on the vessel with the best view of the 160 dB impact zone (ideally an unobstructed 360° view). (MPS-3-Samedan)</p> <p>Samedan shall require that the air gun will be ramped up to allow marine protected species that may have been missed by the observers to move away as the intensity of the sound pressure level (SPL) gradually increases over several minutes. (MPS-4-Samedan)</p> <p>Samedan shall ensure that if the 160 dB impact zone or survey area cannot be adequately monitored due to weather conditions (e.g., fog) or sea state (greater than Beaufort 4), all operations will be delayed until conditions improve. (MPS-5-Samedan)</p>	Insignificant

**Table ES-1.** Summary of potential impacts, impacting agents, mitigation measures, and impact level for Samedan’s surveys on the Gato Canyon Unit. Refer to Section 4 of the EA for impact analyses. (continued)

Description of Potential Impacts for:	Impacting Agents	Mitigation Measures to Avoid or Minimize Impacts	Impact Level
<b>Protected Species of Marine Mammals and Sea Turtles</b>			
		<p>Samedan shall consult with the Office of Protected Resources, NOAA Fisheries to determine if a small take authorization or incidental harassment authorization is warranted for the shallow hazards survey. Samedan shall obtain the appropriate authorization per NOAA Fisheries advice. NOAA Fisheries advised the MMS that an applicant to the permitting process for harassment authorization should apply at least eight months prior to the intended start date; delays can occur because of other regulatory requirements associated with the ESA and NEPA.) Samedan shall conduct the shallow hazards survey during the mid-October and mid-December window, unless NOAA Fisheries determines via the permitting process that another period is more suitable to avoid impacts to marine mammals. Samedan shall provide the MMS with an updated Execution Plan 60 days prior to survey start-up. The updated Execution Plan shall include documentation regarding the outcome of the consultation with NOAA Fisheries concerning incidental harassment authorization and any additional mitigation measures required or recommended by NOAA Fisheries. Samedan shall also provide a copy of the updated Execution Plan to the California Coastal Commission. (MPS-13-MMS)</p> <p>Samedan shall not operate the air gun in federal waters beyond the boundaries of the area for which the survey is permitted. An exception would exist wherein Samedan may ramp up the single air gun in a buffer area approximately 1 km preceding the immediate trackline to be surveyed inside the permitted area. Samedan shall not operate the air gun in State waters without the appropriate approvals from the California State Lands Commission. Observers will document the time and exact location (i.e., latitude and longitude) that the survey vessel passes into or out of federal waters, as well as to whether the air gun is shutdown or activated at the time. Observers shall document any air gun firings occurring within state waters. (MPS-14-MMS)</p> <p>Samedan shall ramp-up the air gun to operating levels at a rate not to exceed 6 dB per minute to operating level at the start of operations or testing, when beginning a new trackline or any time after the air gun is powered down below 160 dB. (MPS-15-MMS)</p>	

**Table ES-1.** Summary of potential impacts, impacting agents, mitigation measures, and impact level for Samedan’s surveys on the Gato Canyon Unit. Refer to Section 4 of the EA for impact analyses. (continued)

Description of Potential Impacts for:	Impacting Agents	Mitigation Measures to Avoid or Minimize Impacts	Impact Level
<b>Protected Species of Marine Mammals and Sea Turtles</b>			
		<p>Samedan shall empower observers with the authority to delay ramp-up or require shut down of the air gun whenever marine mammals or endangered or threatened species are observed within or appear likely to enter the 160 dB impact zone. (MPS-16-MMS)</p> <p>Samedan shall require that if marine mammals or endangered or threatened species are observed within the 160 dB impact zone or proximate area prior to ramp-up, observers shall delay powering up the air gun for 30 minutes and until protected species are believed beyond the impact zone and unlikely to reenter. (MPS-17-MMS)</p> <p>Samedan shall ensure that observers do not stand watches lasting longer than 4 hours. Two to three hour watches are recommended. (MPS-18-MMS)</p> <p>Samedan shall empower observers with the authority to shutdown, resume, or continue airgun operations under reduced visibility conditions, based on periodic reevaluation that takes into account the densities of observed marine protected species and variations in visibility allowing for intermittent monitoring of the 160 dB impact zone. When operating under conditions of reduced visibility due to adverse weather conditions, operations may continue unless, in the judgment of the shipboard observers, the 160 dB impact zone cannot be adequately monitored and observed marine protected species densities have been high enough to warrant concern that an animal may enter the impact zone undetected. (MPS-19-MMS)</p> <p>Samedan shall log all sightings of marine mammals and/or endangered or threatened species. Data to be recorded includes the species, numbers, and behavior of marine mammals and/or endangered or threatened species observed from the vessel, as well as those occurring in the 160 dB impact zone, the estimated number of animals that may have entered the 160 dB impact zone, any air gun shutdowns due to marine protected species mitigations, and any behavioral responses to vessel or survey activities. Watchstanding observers are best suited for logging data, however, in the case that observers are not on watch, vessel operators will be responsible for ensuring the data is logged. The task may be delegated to a competent note-taker. Samedan shall notify the MMS POCS Office on a daily basis of</p>	

<b>Table ES-1.</b> Summary of potential impacts, impacting agents, mitigation measures, and impact level for Samedan’s surveys on the Gato Canyon Unit. Refer to Section 4 of the EA for impact analyses. (continued)			
<b>Description of Potential Impacts for:</b>	<b>Impacting Agents</b>	<b>Mitigation Measures to Avoid or Minimize Impacts</b>	<b>Impact Level</b>
<b>Protected Species of Marine Mammals and Sea Turtles</b>			
Strike or Entanglement leading to stress, harm, or death	Anchor lines, cables	<p>any sightings data made for that day and the steps Samedan has taken/is taking to avoid adversely impacting protected species. (MPS-21-MMS)</p> <p>Samedan shall submit to MMS and NOAA Fisheries, no later than 60 days after completion of survey operations, a report of all sightings and data collected as specified in MPS-14 and MPS-21. A summary of the sightings data and effectiveness of mitigation measures shall be included as part of the report. The report may also include recommendations for improving the mitigation measures required to protect marine protected species. Samedan shall provide the California Coastal Commission with a copy of the report within two weeks following its delivery to the MMS and NOAA Fisheries. (MPS-22-MMS)</p> <p>Samedan shall not allow offshore anchoring of vessels associated with the survey, unless human harm is likely without anchoring. (MPS-20-MMS) (See also all preceding MPS mitigation measures.)</p>	Insignificant

<b>Table ES-1.</b> Summary of potential impacts, impacting agents, mitigation measures, and impact level for Samedan’s surveys on the Gato Canyon Unit. Refer to Section 4 of the EA for impact analyses. (continued)			
<b>Description of Potential Impacts for:</b>	<b>Impacting Agents</b>	<b>Mitigation Measures to Avoid or Minimize Impacts</b>	<b>Impact Level</b>
<b>Fish Resources, Managed Species, and Essential Fish Habitat</b>			
Damage or injury to resources or habitat	Physical contact during surveying	None	None
Crush species or habitat and cause an increase in turbidity	Anchoring	Refer to MPS-20-MMS	Insignificant
Lethal, potentially lethal, or sub-lethal damage to resources	Single air gun acoustic energy/sound	Refer to MPS-15-MMS	Insignificant

**Table ES-1.** Summary of potential impacts, impacting agents, mitigation measures, and impact level for Samedan’s surveys on the Gato Canyon Unit. Refer to Section 4 of the EA for impact analyses. (continued)

Description of Potential Impacts for:	Impacting Agents	Mitigation Measures to Avoid or Minimize Impacts	Impact Level
<b>Commercial Fishing</b>			
Lost fishing time or damage to fishing gear	Vessel traffic	Samedan shall require that vessels comply with the traffic corridors established by the Joint Oil/Fisheries Committee when going to and from the project area. Nautical charts showing the traffic corridors will be distributed to vessel captains at pre-survey meetings. (CF-1-Samedan)	Insignificant
	Obstructions due to anchoring	Refer to MPS-20-MMS	Insignificant
	Obstructions due to lost debris	<p>Samedan shall require that contractors keep logs documenting equipment lost overboard and shall notify MMS of all lost items. (CF-2-Samedan)</p> <p>Samedan shall, to the extent reasonable and feasible, require contractors to recover all items lost overboard during activities associated with the survey. (CF-12-MMS)</p>	Insignificant
Space use conflicts or lost fishing time	Preclusion of fishing operations	<p>Samedan shall avoid or minimize conflicts and discord with commercial fishermen during and after the shallow hazards survey. Included in this mitigation is a series of steps below. (CF-3-Samedan)</p> <p>Samedan shall consult with the Joint Oil/Fisheries Liaison Office (JOFLO) to identify commercial fishing fleets that could be in conflict with the shallow hazards survey operations and utilize the Joint Oil/Fisheries Committee guidelines for avoiding and reducing conflict between fishing operations and shallow hazards survey. (CF-3a-Samedan)</p> <p>Samedan shall identify a means to meet and develop the appropriate measures to reduce or avoid impacts on commercial fishing. (CF-3b-Samedan)</p> <p>Samedan shall meet with representatives of the potentially affected fishing fleets to provide information describing the location of the proposed survey, the area to be traversed, and planned dates of initiation and completion of the survey to all potentially affected fishermen and to obtain feedback from them on fishing concerns. (CF-3c-Samedan)</p> <p>Samedan shall implement a Fisheries Plan including a Joint Use Strategy</p>	Insignificant



**Table ES-1.** Summary of potential impacts, impacting agents, mitigation measures, and impact level for Samedan’s surveys on the Gato Canyon Unit. Refer to Section 4 of the EA for impact analyses. (continued)

<b>Description of Potential Impacts for:</b>	<b>Impacting Agents</b>	<b>Mitigation Measures to Avoid or Minimize Impacts</b>	<b>Impact Level</b>
<b>Commercial Fishing</b>			
		<p>and Survey Vessel Strategies for avoiding commercial fishing operations. (CF-4-Samedan)</p> <p>Samedan shall time the survey to avoid major conflict with commercial fishing activities. Included in this mitigation is a series of steps below. (CF-5-Samedan)</p> <p>Samedan shall contact JOFLO prior to vessel arrival in the survey area to confirm that the salmon fishing fleet is not present or expected to be present in the area. (CF-5a-Samedan)</p> <p>Samedan shall scout the survey area prior to the shallow hazards survey to ensure salmon fishing is not being conducted. (CF-5b-Samedan)</p> <p>If JOFLO or scouting reports that the salmon fishing fleet is in the area or expected on scene during the probable duration of the shallow hazards survey, Samedan shall reschedule the shallow hazards survey for a later date. Alternately the survey operators will work with JOFLO to determine if the survey can be conducted with minimal impact to commercial fishing efforts. (CF-5c-Samedan)</p> <p>If the shallow hazards survey is on-going and salmon fishers unexpectedly arrive during the survey, Samedan shall contact JOFLO immediately to determine if the survey can continue with minimal impact to the fishing effort. If JOFLO cannot be reached, or if JOFLO so advises, the shallow hazards survey effort may be suspended until such time as the salmon fishing effort is over or JOFLO suggests that it can be continued with minimal impact to the commercial fishing effort. (CF-5d-Samedan).</p> <p>Samedan shall: 1) notify fishermen in writing 30 days prior and verbally three days prior to the commencement of shallow hazards survey operations; 2) notify the U.S. Coast Guard, Santa Barbara County Resource Management Department, Joint Oil/Fisheries Liaison Office, California State Lands Commission and the Marine Advisory Newsletter in Goleta; and, 3) distribute and post notices at area fuel docks, ice supply houses, wholesale fish buyers, and in the Harbor Master’s offices of Santa Barbara, Ventura, Oxnard, and Port Hueneme harbors. (CF-6-Samedan)</p>	

**Table ES-1.** Summary of potential impacts, impacting agents, mitigation measures, and impact level for Samedan’s surveys on the Gato Canyon Unit. Refer to Section 4 of the EA for impact analyses. (continued)

Description of Potential Impacts for:	Impacting Agents	Mitigation Measures to Avoid or Minimize Impacts	Impact Level
<b>Commercial Fishing</b>			
		<p>Samedan shall hold pre-survey coordination meetings with MMS and other interested agencies to review environmental and safety issues, including commercial fishing operations in the project area. (CF-7-Samedan)</p> <p>Samedan shall notify Craig Fusaro at the Joint Oil/Fisheries Committee office immediately following completion of survey operations. (CF-8-Samedan)</p> <p>Samedan shall file an advisory with U.S. Coast Guard for publication in Local Notice to Mariners at least 14 days prior to commencement of survey operations. (CF-13-MMS)</p> <p>Samedan shall notify MMS on a daily basis of any conflict or contact with commercial fishermen (who, what, where, when) and the steps Samedan has taken/is taking to resolve the conflicts during and/or after the survey. (CF-14-MMS)</p> <p>Samedan shall require that contractors use a scout boat captained by a local, knowledgeable fisherman for the shallow hazards survey, to avoid conflicts with commercial fishermen including fixed gear (trap) fishing as well as with other users of the OCS. (CF-15-MMS)</p> <p>Samedan shall educate all key vessel personnel regarding commercial fishing activities, conflict avoidance, and record keeping procedures and shall ensure that all offshore personnel involved in shallow hazards survey attend the Western States Petroleum Association's Fisheries Training Program. (CF-16-MMS)</p> <p>Samedan shall submit for MMS approval at least 90 days prior to the commencement of shallow hazards survey operations a Final Fisheries Contingency Plan by which Samedan will avoid or minimize conflicts with commercial fishing. Include details of coordination with JOFLO and fishermen. (CF-17-MMS)</p> <p>Samedan shall submit to MMS no later than 60 days after completion of shallow hazards survey operations a report of Samedan compliance with its Final Fisheries Contingency Plan and the success or failure of its plan to avoid or minimize conflicts with commercial fishing. Include supporting</p>	Insignificant

**Table ES-1.** Summary of potential impacts, impacting agents, mitigation measures, and impact level for Samedan’s surveys on the Gato Canyon Unit. Refer to Section 4 of the EA for impact analyses. (continued)

Description of Potential Impacts for:	Impacting Agents	Mitigation Measures to Avoid or Minimize Impacts	Impact Level
<b>Commercial Fishing</b>			
<p>Decrease in catchability of target species</p> <p>Interruption or cessation of commercial diving</p>	<p>Acoustic energy/sound</p> <p>Acoustic energy/sound</p>	<p>information and details of coordination with JOFLO and fishermen. (CF-18-MMS)</p> <p>Refer to CF-3,a,b,c; CF-4, CF-7-Samedan; CF-14, CF-15-MMS</p> <p>Samedan shall shut down the air gun if a diver or a boat with a dive flag is observed within a 0.8 km (795 m) (0.5 mi) radius safety zone. The two marine mammal observers aboard the survey vessel will also look for divers and dive boats using the same procedures as for marine mammals. (CF-9-Samedan)</p> <p>If a diver or a dive boat is observed in the survey area or potential safety zone prior to the commencement of the survey, Samedan shall contact them and advise them to leave the area for the duration of the survey. (CF-10-Samedan)</p> <p>Samedan shall assume that boats of unknown function are dive-boats and treat accordingly, unless they can be contacted or otherwise confirmed not be dive boats. (CF-11-Samedan)</p>	<p>Insignificant</p>

**Table ES-1.** Summary of potential impacts, impacting agents, mitigation measures, and impact level for Samedan’s surveys on the Gato Canyon Unit. Refer to Section 4 of the EA for impact analyses. (continued)

<b>Description of Potential Impacts for:</b>	<b>Impacting Agents</b>	<b>Mitigation Measures to Avoid or Minimize Impacts</b>	<b>Impact Level</b>
<b>Recreational Fishing and Diving</b>			
Lost recreational time or preclusion of recreational fishing	Vessel traffic	Refer to CF-1, CF-6-Samedan; CF-13, CF-15-MMS	Insignificant
Decrease in catchability of target species for 1 day	Acoustic energy/sound	Refer to CF-15-MMS	Insignificant
Interruption or cessation of recreational or research diving	Acoustic energy/sound	Samedan shall send information and an advisory regarding the survey at least 30 days prior to commencement to the University of California at Santa Barbara (Eric Hessel, Assistant Diving Safety Officer, Environmental Health and Safety UCSB, Santa Barbara, 93106-5132, 805-893-4559) and charter dive vessel operators in Santa Barbara and Ventura (Truth Aquatics, 301 Cabrillo Blvd., Santa Barbara, CA 93101, 805-962-1127 and CalBoat Diving, 1575 Spinnaker Dr. 105B-59, Ventura Harbor, CA 93001, 805-486-4486). (RFD-1-MMS)  Refer to CF-9, CF-10, CF-11-Samedan	Insignificant
<b>Environmental Justice</b>			
Disproportionately high and adverse impacts to minority/low income populations	Increase in vehicle and truck traffic	None	Insignificant

## Environmental Assessment (Final)

Samedan Oil Corporation

Gato Canyon Unit

Leases OCS-P 0460 and 0464<sup>1</sup>

### 1 Introduction

On June 20, 2001, the U.S. District Court for the Northern District of California (hereinafter referred to as the Court) issued a ruling in *California v. Norton* (No. C 99-4964 CW, Northern District of California) ordering the Minerals Management Service (MMS) to provide a reasoned explanation for its reliance on the categorical exclusion under the National Environmental Policy Act (NEPA) and the inapplicability of the extraordinary circumstances exceptions in granting certain suspensions<sup>2</sup>. MMS has decided to forego reliance on the categorical exclusion for the suspensions in this case in favor of preparing Environmental Assessments (EA's). On February 26, 2004, the Court ordered the Federal Defendants to propose a timetable for completing their analyses of applications for suspensions filed by the operators for nine units and one non-unitized lease offshore southern California, and for submitting consistency determinations to the State of California under the Coastal Zone Management Act (CZMA). On June 28, 2004, the Court adopted the proposed timeline which included the time for the MMS to prepare six EA's (MMS, 2005a-f) to analyze the environmental impacts of granting the suspensions.

This EA covers the Gato Canyon Unit operated by Samedan Oil Corporation (hereinafter referred to as Samedan). This unit is located in the western Santa Barbara Channel, offshore Santa Barbara County (Figure 1-1), and is described in the background section, below.

#### 1.1 Need for the Proposed Action

**MMS's Need:** Pursuant to the 1978 Outer Continental Shelf Lands Act (OCSLA), as amended, the MMS is required to balance expeditious and orderly mineral resource development with the protection of the human, marine, and coastal environment. If MMS grants a Suspension of Production (SOP), it would allow the company time to submit a revised EP pursuant to 30 CFR 250.203. MMS required Samedan to collect certain shallow hazards survey data to determine geo-hazards associated with the potential drilling of a delineation well. The survey is discussed in the EA because it is an activity that would occur during the suspension period. The survey would be authorized by virtue of MMS granting the suspension. Samedan would submit the data from this survey, along with their revised EP, to the MMS. MMS would conduct a technical review, comply with NEPA, and approve, require modification, or disapprove the EP during Samedan's suspension period.

**Samedan's Need:** Samedan needs MMS to grant a suspension for the Gato Canyon Unit to allow time to conduct a shallow hazards survey and to update and submit a revised EP for the

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<sup>1</sup> By decision dated August 16, 1999, the MMS removed one lease from the Gato Canyon Unit (OCS-P 0462) and it expired. The lessees appealed this decision to the Interior Board of Land Appeals. For purposes of environmental analysis, it is included in this Environmental Assessment pending final outcome of the appeal.

<sup>2</sup> A suspension is defined in 30 CFR §250.105 as "a granted or directed deferral of the requirement to produce [Suspension of Production (SOP)] or to conduct leaseholding operations [Suspension of Operations (SOO)]."

unit. This action would allow Samedan's EP revisions to undergo an MMS technical and environmental review and decision process during the suspension period.

The proposed action meets both MMS's and Samedan's needs in this case.

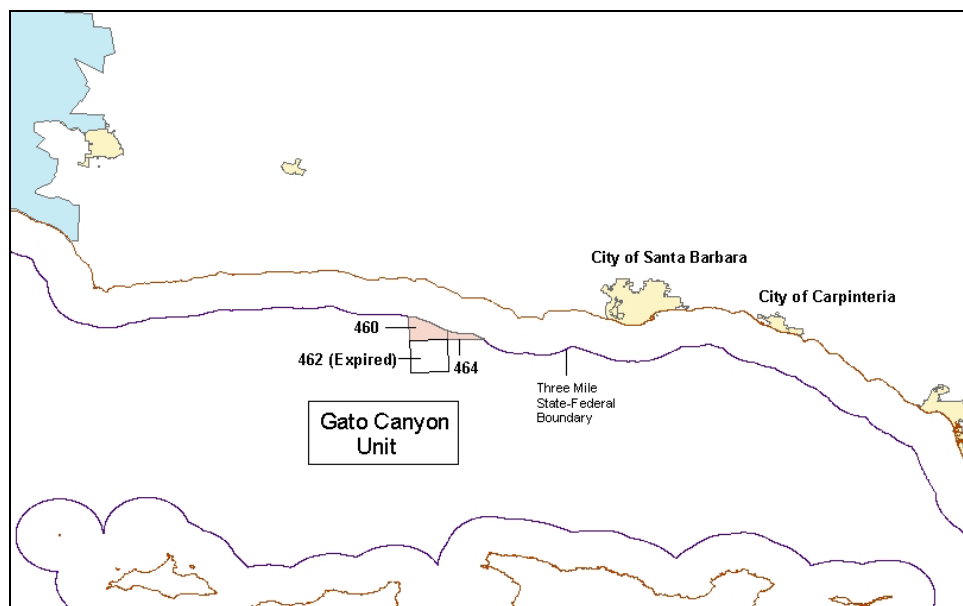


Figure 1-1. Samedan's Gato Canyon Unit.

Samedan's goal beyond their suspension period is two-fold:

- to drill exploratory (delineation) wells into the Gato Canyon Unit, and
- to plan for the development and production of commercial oil and natural gas energy reserves within the unit.

An EP and Development and Production Plan (DPP) would each need to be approved by the MMS and reviewed by other appropriate Federal, State, and local agencies before these activities could occur.

## 1.2 Background

Samedan's leases were issued in OCS Lease Sale 68 on June 11, 1982. From 1985 to 1989, two wells were drilled on Lease OCS-P 0460. MMS issued a Producibility Determination for Lease OCS-P 0460 Well #1. The Gato Canyon Unit was formed in 1987. The unit continued to be held through November 1999 by virtue of a series of suspensions, issued for a variety of reasons (e.g., reinterpretation of seismic data, permitting activities, etc.). A lengthy suspension ending in 1999 was directed by MMS for the development and completion of a multi-interest study (MMS, 1999) on the onshore constraints to offshore oil and gas development.

On May 13, 1999, Samedan submitted to MMS a request for an SOP for the Gato Canyon Unit. On August 13, 1999, the MMS determined that the Gato Canyon Unit was not properly unitized and removed Lease OCS-P 0462 from the Unit. As a result, the lease expired on August 16, 1999. Samedan appealed the MMS decision to the Interior Board of Land Appeals, where the appeal is currently pending. The MMS granted a suspension for the Gato Canyon Unit on November 12, 1999. This November 1999 decision was set aside as a result of the ruling by the Court in *California v. Norton* on June 20, 2001. As ordered by the Court, the MMS issued a

directed Suspension of Operations (SOO) for the Gato Canyon Unit. MMS stated that the directed SOO would terminate when the MMS acted on Samedan's suspension request of May 13, 1999.

In July 2001, MMS offered Samedan an opportunity to update its May 1999 suspension request, which Samedan submitted on July 30, 2001. On March 10, 2004, in accordance with the Court Order, MMS required Samedan to submit updated information related to its suspension request. On April 20, 2004, Samedan submitted an updated SOP request.

## **2 Description of Alternatives Including the Proposed Action and Need for the Proposed Action**

The following sections include a discussion of the proposed action and alternatives.

### **2.1 Alternative 1: Proposed Action—Grant Suspension**

The MMS proposed action is to grant an SOP for 37 months to Samedan for the Gato Canyon Unit. Assuming an MMS decision on the SOP in July 2005, this SOP would be from July 2005 to August 2008; the ending date would change proportionately if a decision is made before or after July 2005. Granting the suspension would allow Samedan time to conduct a shallow hazards survey on the Gato Canyon Unit, and to conduct administrative activities leading to the submittal of a revised EP to the MMS for subsequent technical and environmental review and decision. The survey is discussed in the EA because it is an activity that would occur during the suspension period. The survey would be authorized by virtue of MMS granting the suspension.

#### **2.1.1 Samedan’s Suspension Request**

In the current updated SOP request, dated April 20, 2004, Samedan requested a suspension for 37 months for the Gato Canyon Unit. The time will be used by Samedan to conduct a shallow hazards survey on the Gato Canyon Unit, and to conduct administrative activities leading to the submittal of a revised EP to the MMS pursuant to 30 CFR 250.203 for subsequent technical and environmental review and decision during their suspension period.

Samedan states in their SOP request dated April 20, 2004, that they completed certain shallow hazards surveys (deep-tow surveys including side scan sonar, sub-bottom profiler, and marine magnetometer) during May and June, 2001. Only the shallow hazards survey using a single air gun remains to be conducted on Samedan’s Unit. The Samedan SOP request for the Gato Canyon Unit includes a reference to “begin EP Operations.” However, on November 1, 2004, MMS notified Samedan that should MMS grant a suspension, the suspension period will not include any drilling operations (Appendix). Pursuant to 30 CFR 250.180, drilling is an activity that will hold the unit, and therefore, if drilling activity is occurring, a suspension is not needed. Of course, any such drilling can only occur pursuant to an approved plan and permit to drill, as provided in the regulations.

#### **2.1.2 Description of Samedan’s Survey Activities**

Samedan proposes to conduct a shallow hazards survey to identify and evaluate geologic hazards that might affect the safety of potential drilling operations. The scope of activities to be conducted during Samedan’s shallow hazards survey is described in their survey execution plan and updates submitted to MMS by Samedan in March 2001, June 2001, and April 2004 (Samedan, 2001). In their April 2004 letter to MMS, Samedan provided MMS with an update on the status of survey activities in the Gato Canyon Unit (Samedan, 2004). Samedan advised MMS that the deep-tow survey (side-scan sonar, sub-bottom profiler, and marine magnetometer) had been completed in May and June of 2001. The shallow hazards survey using the single air gun was also scheduled to be conducted at that time but it was canceled when the MMS issued a directed SOO for Samedan’s leases in response to the Court ruling. Therefore, only the air gun survey needs to be conducted during Samedan’s suspension period.



## **Comparison of Shallow Hazards Survey and 3D Seismic Survey**

There are substantial differences in potential impacts from shallow hazards surveys and three-dimensional (3D) seismic surveys. These differences, which are summarized below, are described in greater detail in the “Final Programmatic Environmental Assessment for Geological and Geophysical Exploration for Mineral Resources on the Gulf of Mexico Outer Continental Shelf,” prepared by MMS in 2004.

*Shallow Hazard Surveys:* Shallow hazard surveys are high-resolution site surveys that are conducted to investigate the shallow subsurface for geohazards and soil conditions in relatively small areas. Samedan’s shallow hazards survey, for example, would be conducted in an area that measures about 2 sq km (1.5 sq mi) in size. The geotechnical information collected during a shallow hazard survey is commonly used at the exploratory stage for initial site evaluation for drilling rig emplacement. Shallow hazard surveys are typically conducted by survey vessels that measure 37-47 m (121-154 ft) in length. A typical operation consists of a ship towing an air gun about 25 m (82 ft) behind the ship and a 600 m (1,969 ft) streamer cable with a tail buoy. The ship travels at 3.0-3.5 kn (5.6-6.5 km/h), and the air gun is fired every 7-8 seconds. Geotechnical information is typically collected from the sea floor to a depth of 300-450 m (980-1,475 ft).

*3D Seismic Exploration and Development Surveys:* 3D seismic surveys are conducted to obtain data on geological formations from the sea floor to a depth of several thousand meters. The geotechnical information is used by industry to assess potential hydrocarbon reservoirs and optimally locate exploration and development wells. The areas covered by seismic surveys are typically much larger than those areas covered by shallow hazard surveys. For example, the 1995 3D seismic survey conducted by Exxon Company U.S.A. on its Santa Ynez Unit leases in the western Santa Barbara Channel covered approximately 311 sq km (120 sq mi). The ships conducting seismic surveys commonly measure 80-90 m (262-295 ft) in length. A typical operation consists of a ship towing two source arrays (air guns) that are aligned in parallel with one another 100-200 m (328-656 ft). Following about 100-200 m (328-656 ft) behind the source arrays are 6-12 hydrophone streamer cables 3-8 km (2-5 mi) long that are spread out over a width of 600-1,500 m (1,969-4,922 ft). The survey vessel tows the equipment at a speed of about 4.5 kn (8.3 km/hr), with one of the dual air gun arrays firing about once every 16 seconds. No 3D seismic surveys will be conducted under the suspension.

### **Area to be Surveyed by Samedan**

Samedan would conduct the shallow hazards survey in an area within the Gato Canyon Unit where one potential drilling site has been identified (Figure 1-1 and Figure 2.1-1) on Lease OCS-P 0460. The survey area measures about 4 km<sup>2</sup> (1.5 mi<sup>2</sup>) in size. The survey site is located 6-8 km (4-5 mi) from the coast at depths ranging from about 100-400 m (300-1200 ft).

### **Duration and Timing of Survey**

The duration of the shallow hazards survey is estimated to range from 3-4 days. During that period, the air gun equipment would be operated only during daylight hours. Typically, shallow hazards surveys are conducted 24-hours a day, but Samedan states in its survey execution plan (Samedan, 2001) that it would conduct survey operations only during daylight hours to facilitate observation and monitoring of marine mammals. These mitigation measures are discussed in Section 4.2 of this EA.

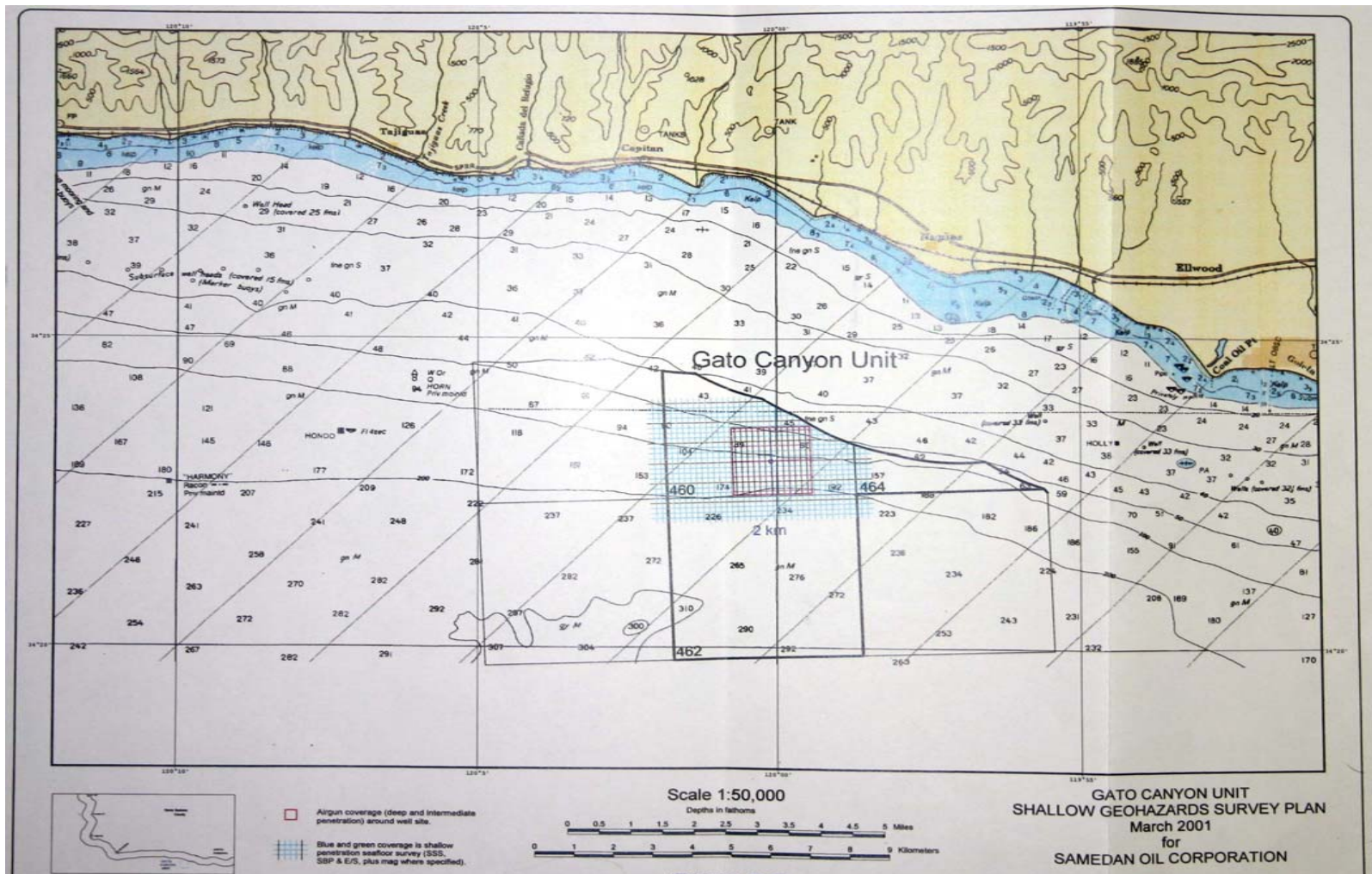


Figure 2.1-1. Shallow hazard survey grid for Samedan's single air gun survey on the Gato Canyon Unit (smallest grid). Note that the shallow penetration seafloor survey was completed by Samedan in 2001.

The shallow hazards survey would be planned for the Fall to avoid interactions with commercial fishing seasons, marine mammal migrations, and weather. Year-to-year variability in the size and exact location of the commercial salmon fishery may allow surveying earlier than the Fall, but that is generally not known until after the salmon season opens in the Spring. Assuming MMS grants the SOP in July 2005, the shallow hazards survey would be conducted during the third and/or fourth quarter of calendar year 2006.

### **Survey Vessel and Staging Area**

The vessel that would be used to conduct the shallow hazards survey is unknown at this time. For the purposes of this EA, it is assumed that the *R/V Auriga* (approximate vessel length, width, draft: 48 m x 10 m x 3 m [147 ft x 33 ft x 10 ft]) or a similar vessel would conduct the shallow hazards survey.

Samedan would additionally be required to use a scout boat (estimated length: 30 ft) during survey operations to avoid potential conflicts between the survey vessel and other vessels. Typically, a scout vessel is captained by a local fisher who is familiar with the area and conditions.

The survey vessel is expected to remain on-station during the survey. During non-daylight hours, the survey vessel would transit at a slow rate of speed within the survey area. In the unlikely event of prolonged bad weather or sea conditions, the vessel may return to Port Hueneme, California. The transit time from Port Hueneme to the project area is about five hours.

### **Survey Operations**

The shallow hazards survey in the Gato Canyon Unit would be conducted as one continuous effort using the *R/V Auriga* or similar vessel. During the shallow hazards survey, a single small air gun (20-in<sup>3</sup>) would be used as the acoustic source to acquire intermediate and deeper penetration seismic data. The survey vessel would also employ an integrated navigation system with an underwater positioning system (Table 2.1-1).

The 20-in<sup>3</sup> air gun produces a sound intensity level of 218 dB re 1  $\mu$ Pa [rms]<sup>1</sup> and is deployed about 3 m (10 ft) below the surface. The hydrophone cables would trail about 0.25 km (820 ft) behind the vessel. Deeper penetration seismic data would be collected by firing the air gun to a 24-channel Stealtharray Seismic Streamer and recorded by a TritonElics Delph24 system or similar system. In shallow hazards work, deeper penetration data are typically collected from the sea floor to a depth of 300 to 450 m (980-1,475 ft). The data would be collected from a streamer and a recording system sampling at a rate of 400-600 msec (1,312-1,969 ftsec) (digital sampling rate of 1 msec [3ftsec]). Intermediate penetration data will be obtained from a separate streamer and recording system sampling at a rate of 0.25 msec (0.82 ftsec) from the air gun source. Digital processing of the 24-channel data would include suppression of multiples, migration where needed to resolve structural complexity, and true amplitude displays.

The air gun would be towed at speeds of 3.0-3.5 kn (5.6-6.5 km/h) in a grid with lines on a 150-m by 600-m spacing (492-1,200 ft) over the potential well site. Geotechnical data would be

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<sup>1</sup> Underwater sound is measured in pressure levels. The zero point of the measurement scale is set at 1 micropascal ( $\mu$ Pa), where 1 pascal (Pa) corresponds to the pressure resulting from a force of 1 newton exerted over an area of 1 m<sup>2</sup>. Root mean square [rms] is a measure of the magnitude of a varying quantity of sound. Thus, sound pressure levels are typically given as decibels (dB) relative to 1  $\mu$ Pa (e.g., 218 dB re 1  $\mu$ Pa [rms]).

collected in a square area, measuring about 4 km<sup>2</sup> (1.5 mi<sup>2</sup>). This would result in collecting approximately 40 line km (25 line miles) of data over the potential well site. To minimize the total air gun operation time, the air gun would be turned off during the period in which the vessel makes its turn to move from one line to the next. The total air gun firing time would be less than six hours.

The surface position of the survey vessel would be determined by a Differential Global Positioning System (GPS) such as the Thales’ Skyfix system with supplemental USCG DGPS signals. The location of the underwater sensors would be integrated with the primary navigation system using acoustic techniques with the Track Point II USBL or similar system.

Table 2.1-1. Description of Shallow Hazards Survey Equipment.

Device	Model	Frequency
Navigation system	SkyFix DGPS w/ supplemental USCG DGPS signals	—
Integrated underwater position	TrackPoint II USBL system	8-14 kHz
20 in <sup>3</sup> air-gun		0 – 128 Hz
24-channel hydrophones	Stealth-array Seismic Streamer	—
Recording system	TritonElics Delph 24	—

## 2.2 Alternative 2: Deny Suspension

Under the Deny Suspension alternative, MMS would deny the SOP for the Gato Canyon Unit. Adoption of this alternative would result in the expiration of the leases in the Gato Canyon Unit. The need for the proposed action would not be achieved. However, this alternative is available only if the applicant fails to meet established requirements (30 CFR §250.172-175) for obtaining suspensions.

## 2.3 Alternative 3: No Action

Under the No Action alternative, MMS would take no action on the SOP for Samedan’s Gato Canyon Unit in the western Santa Barbara Channel. Such action would be inconsistent with the Court Order in *California v. Norton* to implement a plan to prepare Consistency Determinations in contemplation of adjudicating the suspension request. Such action would also be inconsistent with the MMS’s obligation to act upon applications submitted by Lessees. The need for the proposed action would not be achieved.

### **3 Scope of Environmental Analysis, Consultation and Coordination, and Public Review of Draft Environmental Assessment**

#### **3.1 Scope of Environmental Analysis**

MMS determined the temporal scope of the environmental analysis for the proposed action to be 37 months for the Gato Canyon Unit. This represents the amount of time during which Samedan has requested approval to conduct a shallow hazards survey on the Gato Canyon Unit and to conduct administrative activities leading to the submittal of a revised EP to the MMS pursuant to 30 CFR §250.203 for subsequent technical and environmental review and decision by the MMS during the suspension period.

The spatial scope of the action is concentrated in the shallow hazards survey area located offshore the Naples vicinity in the western Santa Barbara Channel (Figure 2.3-1). The survey vessel would need to make one roundtrip from Port Hueneme to the survey area. If inclement weather is encountered during the survey, the vessel would need to transit to Port Hueneme. Refer to individual resource sections in this EA for resource-specific descriptions of the spatial scope of the action.

As discussed in Section 2.1.2, the shallow hazards surveys would last 3-4 days. Aera Energy plans on conducting shallow hazards surveys on the Point Sal and Purisima Point Units in the central Santa Maria Basin using the same shallow hazards survey vessel Samedan would use (see MMS, 2005a). The surveys would be conducted consecutively. Therefore, there would be no temporal overlap between the Samedan and Aera surveys.

MMS is proposing to grant ten suspensions. These actions are administrative in nature. During seven of the suspensions under MMS review, no physical activities would occur offshore, therefore, no environmental impacts would occur. During the remaining three suspensions, operators would conduct biological and/or shallow hazards surveys. Since there is no spatial or temporal overlap of these surveys, and since they have insignificant impacts, they would have no cumulative impacts on the environment. Therefore, the cumulative impact of granting the ten suspensions is not expected to add to existing impacts on the environment.

The OCSLA, as amended, provides a four-phased approach to assessing potential oil and gas operations on the Federal OCS: 1) program development, 2) lease sale, 3) exploration, and 4) development and production. At each phase, a NEPA document is prepared in accordance with NEPA, Council on Environmental Quality (CEQ) regulations, MMS regulations, and MMS NEPA compliance procedures. Subsequent to agency and public review and comment, the MMS must approve each phase before that activity may occur.

Previously for the Gato Canyon Unit, the operator received MMS approval and State CZMA consistency for EP's, drilled a number of exploratory wells, and received a Producibility Determination from MMS. Revisions to the previously approved EP would be reviewed by MMS under 30 CFR §250.203 during the suspension period.

Exploratory drilling occurs after Samedan's suspension period and could only occur if MMS and other appropriate agencies approve the revised EP, as necessary. If exploration results are favorable, development activity could only occur if a DPP were submitted by the operator, MMS conducts a review of the DPP under 30 CFR §250.204, and MMS approves the DPP. Both processes require a NEPA review by MMS. Reviews would also be conducted, as needed, by the State of California, the California Coastal Commission (CCC), Santa Barbara County Air

Pollution Control District, Santa Barbara County Energy Division, NOAA Fisheries, Channel Islands National Marine Sanctuary, Channel Islands National Park, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and U. S. Environmental Protection Agency.

In accordance with NEPA and CEQ guidance, this EA is focused on the survey activities and their impact-producing agents that would occur during Samedan's suspension period since they have the potential to cause impacts to environmental resources. The main impact-producing agents are the impact of sound produced by the air gun used in the shallow hazards surveys, air emissions from the survey vessels, and space-use conflicts caused by the presence of the vessels and the trailing equipment. The environmental resources or issues that could be affected by the surveys are:

- Protected Species of Marine Mammals and Sea Turtles;
- Fish Resources, Managed Species, and Essential Fish Habitat;
- Commercial Fishing;
- Recreational Fishing and Diving; and
- Environmental Justice.

### **3.2 Scoping Process**

As part of the NEPA review process, the MMS involved the public and various private and government agencies in the determining of the scope of the EA's for the suspension decisions. On July 21, 2004, MMS sent a public announcement (Appendix) concerning scoping for the EA's to 260 entities who previously expressed interest in the undeveloped leases. The mailing list included elected officials, Federal, State and local agencies, public interest groups, and individuals. MMS also published the announcement at

<http://www.mms.gov/omm/pacific/index.htm>

and telephoned key public agencies. The public scoping period ended on August 26, 2004 (which provided about 36 days for comment). A total of 129 public scoping comments were received. The process also involved a review of past comments received on the undeveloped leases, including the CCC's August 5, 1999, letter.

A number of issues were raised by Federal, State and local agencies and the public with respect to the scope of the analysis for the suspension decisions. Primarily, the comments focused on:

- Environmental impacts associated with exploration and development activities that would occur after the suspension period ends;
- Reasonably foreseeable and connected actions;
- Requests for MMS to prepare an Environmental Impact Statement to address the exploration and development activities;
- Requests that all the resources of the Channel Islands National Park be considered;
- Questions concerning the suspension process including diligence in developing the leases; the length of the suspensions; unitization; whether the suspensions were undertaken according to MMS regulations and the Court decision of June 20, 2001;

- Concerns about the effects of shallow hazards surveys; and
- Changed circumstances and new information should be considered in evaluating environmental impacts.

Additionally, several comments were received that expressed support for the exploration, development, and production of oil and natural gas resources offshore southern California.

After MMS's review of the suspension request and the scoping comments received, MMS prepared this EA to determine if there would be any significant environmental impacts as a result of granting the SOP. This analysis includes reasonably foreseeable and connected actions such as the shallow hazards survey proposed during the suspension period. Other activities, including potential exploration and development, were determined to be outside the scope of this analysis because these activities: 1) will not occur while the Unit is under suspension, and 2) require separate review and approval by MMS and other appropriate agencies before they may occur. Specifically, exploration or development activities cannot occur unless: 1) the operator submits revised or new EP('s) and/or DPP('s) to MMS; 2) MMS completes technical and environmental reviews of the EP('s) or DPP('s); and, 3) MMS and other appropriate State and Federal agencies review these activities and approve them as necessary. As stated previously, the need for granting the suspension is to allow the operator time to prepare and submit information needed by MMS and other agencies in order to conduct these reviews, and time for these reviews to occur.

### **3.3 Consultation and Coordination Process for Protected Species and Essential Fish Habitat**

This section describes the consultation and coordination process that was conducted by MMS in preparing this EA. The process involved: (1) MMS initial coordination with Federal, State, and local agencies; and, (2) MMS Endangered Species Act and Essential Fish Habitat consultation with NOAA Fisheries and U.S. Fish and Wildlife Service (FWS).

#### **MMS Initial Coordination with Federal and State Regulatory Agencies and Local Organizations**

MMS contacted two Federal agencies, FWS and NOAA Fisheries Southwest Region (NOAA Fisheries); one State agency, California Department of Fish and Game (CDFG); and one local organization, the Joint Oil/Fisheries Liaison Office (JOFLO).

Each contact was made to inform the organization of the shallow hazards survey that would take place during the suspension period, to discuss potential environmental issues specific to the organization's jurisdiction, to inform the organization of the scope of this EA and to determine the level of concern with this project. Comments were received from several organizations. All comments have been incorporated, where appropriate, into the text of this EA. Details on communications are provided below.

On September 20, 2004, MMS contacted Mr. Tom Napoli of CDFG, Marine Region to inform the organization of the proposed shallow hazards survey, to discuss potential environmental issues and the scope of this EA, and to convey that based on MMS's preliminary analysis, the survey that would take place during the suspension period is likely to have insignificant impacts.

The MMS conducted telephone conversations on August 5, 2004, and September 1, 2004, with Ms. Monica DeAngelis and Ms. Tina Fahy of NOAA Fisheries, Southwest Regional Office,



Division of Protected Species, to describe the proposed action and to convey that based on MMS's preliminary analysis, the proposed action is expected to have no adverse effects on marine mammal and sea turtle species listed as endangered or threatened under the U.S. Endangered Species Act (ESA) and that no marine mammals will be 'taken' as defined under the Marine Mammal Protection Act.

The MMS contacted the FWS on August 2, 2004, and spoke to Mr. Greg Sanders at the Ventura Field Office to describe the proposed action and to inform him that based on MMS's preliminary analysis, the proposed action will not affect federally listed species under the purview of the FWS.

On August 24, 2004, MMS contacted Mr. Bryant Chesney of NOAA Fisheries, Southwest Regional Office, Division of Habitat Conservation, to describe the proposed action and to convey that based on MMS's preliminary analysis, the proposed action is expected to have no effects on species managed by the Pacific Fishery Management Council or on Essential Fish Habitat.

On August 30, 2004, MMS contacted Dr. Craig Fusaro of JOFLO by telephone to describe and discuss the proposed project, to discuss potential issues specific to commercial fishing and the scope of this EA, and to convey that based on MMS preliminary analysis, the project is expected to have insignificant impacts on commercial fishing.

### **MMS Endangered Species Act Consultation**

The ESA requires Federal agencies to insure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of listed species or to modify their critical habitat. The following federally listed species were initially identified by MMS as ones that could be potentially impacted by the shallow hazards survey: steelhead trout (*Oncorhynchus mykiss*), brown pelican (*Pelecanus occidentalis californicus*), southern sea otter (*Enhydra lutris nereis*), blue whale (*Balaenoptera musculus*), fin whale (*B. physalus*), sei whale (*B. borealis*), humpback whale (*Megaptera novaeangliae*), northern right whale (*Eubalaena glacialis*), sperm whale (*Physeter macrocephalus*), Guadalupe fur seal (*Arctocephalus townsendi*), Steller sea lion (*Eumetopias jubatus*), green sea turtle (*Chelonia mydas*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), and olive ridley sea turtle (*Lepidochelys olivacea*).

Steelhead Trout. One of the seasonal marine fish species that can occur within the coastal pelagic environment in the south-central California coastal area is the Southern California Evolutionarily Significant Unit (ESU) of west coast steelhead trout (*Oncorhynchus mykiss*). This species was listed as endangered in 1977 under the ESA (62 FR 43937). West coast steelhead trout are migratory, anadromous rainbow trout that inhabit streams and rivers from the Santa Maria River south to Malibu Creek (Behnke 1992; Burgner et al., 1992). Young steelhead remain in fresh water anywhere from less than 1 year to 3 years. Juveniles migrate to sea usually in spring where they spend 1-4 years before maturing and ascending streams for the first time. However, only adult ocean maturing steelhead (winter) are found close to the coast of south-central California. Along the coast in this region, adult winter steelhead typically begin their spawning migration into home streams in late fall and winter and can continue into spring. Spawning takes place from January through May. The survey in the Gato Canyon Unit that would occur during the suspension period would take place about 6-8 km (4-5 mi) from the coast at depths from about 100-400 m (300-1,200 ft) of water during the third and/or fourth quarter of 2006 (Section 2.1.2).



The survey activities would not impact either the Southern California ESU of west coast steelhead trout or its critical habitat, because the surveys would not coincide in time or place with adult winter steelhead or its critical habitat.

From this analysis, MMS has concluded that the activities associated with the shallow hazards survey will not affect the federally listed west coast steelhead trout, that the conclusion of “no effects” is appropriate, and that no further Section 7 consultation with NOAA Fisheries is necessary.

Marine Birds and Sea Otters under the FWS. The only federally listed marine bird species identified by MMS as one that could be potentially impacted by the shallow hazards survey that would take place during the suspension period is the brown pelican (*Pelecanus occidentalis californicus*). The activities associated with the survey that could have an effect on the brown pelican include vessel traffic and use of a single air gun during the shallow hazards survey. Vessel traffic could be a problem if it were in close proximity to nesting birds or were in an area where no traffic had occurred previously. However, no federally listed marine birds including the brown pelican nest in the vicinity of the survey, and vessel traffic of various types is common throughout the area. Therefore, no effects on the brown pelican are expected from survey-related vessel traffic. Although it is possible that a brown pelican may be affected by the impulsive sounds produced during the shallow hazards survey because a pelican dove immediately adjacent to the air gun, this impact is considered highly unlikely. The mitigation measure proposed by Samedan and NOAA Fisheries to reduce impacts on marine mammals (the single air gun will be powered up to operating levels over a 5-minute period at commencement of operations, when beginning a new trackline, and any time the array is powered down) also will serve to warn brown pelicans that are in the area that operations are commencing and give them an opportunity to relocate. Therefore, no effects on brown pelicans are expected from the shallow hazards survey.

From these analyses, MMS has concluded that the activities associated with the shallow hazards survey will not affect the federally listed brown pelican in the Santa Barbara Channel, that the conclusion of “no effects” is appropriate, and that no further Section 7 consultation with the FWS is necessary.

On August 2, 2004, Greg Sanders of the Ventura FWS office informed MMS that southern sea otters (*Enhydra lutris nereis*) present in the waters of the Gato Canyon Unit within the Santa Barbara Channel area are considered to be part of the San Nicolas Island experimental population and are to be treated as a member of a species that is proposed to be listed for purposes of section 7 of the Endangered Species Act (50 CFR 17.84(d)(5)). Consequently, there currently is no requirement to consult under the ESA on sea otters found in most of southern California.

Marine Mammals and Sea Turtles under NOAA Fisheries. Informal consultation on federally listed marine mammals and sea turtles began in August 2004, with a series of telephone discussions with Ms. Monica DeAngelis and Ms. Tina Fahy of the NOAA Fisheries Office of Protected Species. As described in this EA, the proposed project will be conducted over a limited area, will involve a small number of vessels, and will be brief in duration. The effects on marine mammals from the Samedan shallow hazards survey is expected to be limited to short-term disturbance. Potential impacts will be further reduced by mitigation proposed by Samedan including their Marine Wildlife Contingency Plan (Samedan, 2004) and by mitigation

additionally required by MMS (Section 4.2). Samedan plans to implement a 0.8 km (0.5 mi) safety zone around the shallow hazards survey vessel. If a marine mammal or sea turtle happens to enter this zone, all operations will cease. Although blue or humpback whales may be present in the vicinity of the project area in low numbers, they would not be excluded from a significant portion of their foraging habitat in the Santa Barbara Channel. Given their low densities in southern California waters and implementation of mitigation measures including a safety zone and Marine Wildlife Contingency Plan, the listed marine mammals and sea turtles are not likely to be affected by the proposed project activities.

Previously, on March 29, 2001, Samedan sent the NOAA Fisheries Office of Protected Species a copy of the shallow hazards survey Execution Plan and Marine Wildlife Contingency Plan (Samedan, 2004) for review. These documents included a detailed description of the safety zone and monitoring plan for the shallow hazards survey.

The NOAA Fisheries concluded that Samedan's shallow hazards survey has the potential to affect 34 species of cetaceans and seven pinniped species. The NOAA Fisheries identified nine species of whales that potentially could be affected including the blue whale, fin whale, humpback whale, minke whale, sperm whale, pygmy sperm whale, sei whale, Bryde's whale, and gray whale. The gray whale, of course, would only be affected if the shallow hazards survey overlapped with its winter migration through the Santa Barbara Channel. The shallow hazards survey would occur during the third and/or fourth quarter of 2006. Therefore, the survey will not overlap with the gray whale migration period. Acoustic harassment by the shallow hazards survey operations could potentially occur for mysticete whales and possibly the sperm whale, since they represent the only species assumed to hear well the noise associated with air guns.

As a result of the analysis discussed above, NOAA Fisheries concluded, in a letter dated April 27, 2001, that the likelihood that marine mammals will be incidentally taken (including harassed) by the shallow hazards survey is low. Additionally, NOAA Fisheries stated that they do not recommend that Samedan obtain an incidental harassment authorization as long as measures contained in their Contingency Plan and additional mitigation and monitoring measures (as listed in the NOAA Fisheries letter) from NOAA Fisheries are implemented. The MMS has made the additional NOAA Fisheries mitigation and monitoring measures from their April 27, 2001 letter a part of the MMS requirements.

Based on these analyses and actions, MMS has concluded that the activities associated with the shallow hazards survey that would take place during the suspension period may affect, but are not likely to adversely affect, federally threatened and endangered species and marine mammals in the western Santa Barbara Channel. No critical habitat is designated for sea turtles or marine mammals in this area. The MMS sent a draft EA and letter requesting informal consultation to NOAA Fisheries Southwest Region, Office of Protected Species, on November 17, 2004. The MMS received a response (see Appendix 4) dated December 16, 2004, from NOAA Fisheries that concurred with the findings that Samedan's shallow hazards survey may affect, but is not likely to adversely affect marine mammals and sea turtle species listed under the ESA. The NOAA Fisheries also provided, in the December 16, 2004 letter, nine specific recommendations for marine mammals and sea turtles. All the recommendations from NOAA Fisheries have been accepted and the necessary changes and/or clarifications have been included in this Final EA.

## **Essential Fish Habitat Consultation**

Under Section 305 (b) (2) of the Magnuson Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.), as amended by the Sustainable Fisheries Act on October 11, 1996, Federal agencies are required to consult with the Secretary of Commerce on any actions that may adversely affect Essential Fish Habitat (EFH). The Department of Commerce published a final rule (50 CFR §600) in the *Federal Register* (January 17, 2002, Volume 67, Number 12) that detailed the procedures under which Federal agencies would fulfill their consultation requirements.

Congress defined EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 U.S.C. 1802(10)). The EFH regulations further interpret the EFH definition as follows. “Waters” include aquatic areas and their associated physical, chemical, and biological properties which are used by fish and may include aquatic areas historically used by fish where appropriate. “Substrate” includes sediment, hardbottom, structures underlying the waters, and associated biological communities. “Necessary” means the habitat required to support a sustainable fishery and the managed species’ contribution to a healthy ecosystem. “Spawning, breeding, feeding, or growth to maturity” covers a species’ full life cycle.

Section 600.920 (e)(1) of the final rule states that Federal agencies may incorporate an EFH Assessment into documents prepared for other purposes such as NEPA documents. Section 600.920 (h) describes the abbreviated consultation process that the MMS is following for the project proposed by the applicant. The purpose of the abbreviated consultation process is to address specific Federal actions that may adversely affect EFH, but do not have the potential to cause substantial adverse impacts.

Sections of the present document concerning activities that would take place during the proposed suspension period are intended to serve as an EFH Assessment for EFH consultation. As set forth in the regulations, EFH Assessments must include: 1) a description of the action; 2) an analysis of the potential adverse effects of the action on the managed species and EFH; 3) the Federal agency’s conclusions regarding the effects of the action on managed species and EFH; and 4) proposed mitigation measures if applicable.

The risk of mortality or sub-lethal effects on managed species and adverse impacts to EFH would be limited to those eggs and larvae, the random juveniles or adult fish, juvenile fish associated with the occasional moving kelp mat, or that small part of a school that were within 6 m (20 ft) of the air gun when shooting begins.

Based on analyses of the shallow hazards survey that would take place during the suspension period and mitigation measures in the EA, MMS has concluded that the activities would have minimal impact on managed species and EFH in the western Santa Barbara Channel. The MMS sent a draft EA and letter requesting abbreviated consultation to NOAA Fisheries Southwest Region, Office of Habitat Conservation, on November 17, 2004. The MMS received a response (see Appendix 4) dated December 16, 2004, from NOAA Fisheries that concurred with the findings that Samedan’s shallow hazards survey will have minimal impact on managed species and EFH and stated that NOAA Fisheries did not object to the issuance of the SOP for Samedan pursuant to the MSFCMA.

### **3.4 Consultation and Coordination Process for Federal Consistency**

In compliance with CZMA §1456(c)(1) and its implementing regulations, and in compliance with the Court's order of June 28, 2004, the MMS will provide the CCC with a Consistency Determination for the SOP decision for Samedan's Gato Canyon Unit by April 6, 2005. MMS has had ongoing discussions with Ms. Alison Dettmer and Mark Delaplaine of the CCC concerning consistency and the MMS suspension decisions.

### **3.5 Public Review of Draft Environmental Assessment**

As part of the NEPA review process, on November 15, 2004, the MMS distributed for public review and comment, a draft of this EA, and five other draft EA's, to 352 interested parties. These six draft EA's addressed suspensions for a total of nine units and one non-unitized lease. The MMS also posted the six draft EA's on the internet and requested comments electronically. The review period lasted from November 17, 2004 to December 16, 2004. A total of 110 commenters provided both electronic and written input to the MMS. These comments were received from a broad cross section of the public, including elected officials, State, Federal, and local agencies, environmental interest groups, oil industry, other interest groups, and the general public.

The draft of this EA was revised based on the comments received specifically on this EA, as well as comments which also generally applied to all six of the draft EA's.

The primary issue raised in the comments for this EA concerned the approach MMS has taken in the NEPA process and included requests that an Environmental Impact Statement (EIS) be prepared to assess exploration and development. As stated in Section 3.2 of this EA, potential exploration and development were determined to be outside the scope of this analysis because these activities: 1) will not occur while the Units and the non-unitized lease are under suspension, and 2) require separate review and approval by MMS and other appropriate agencies before they may occur. Specifically, exploration or development activities cannot occur unless: 1) the operator submits revised or new EP('s) and/or DPP('s) to MMS; 2) MMS completes technical and environmental reviews of the EP('s) or DPP('s); and, 3) MMS and other appropriate Federal and State agencies review these activities and approve them as necessary. As stated in the EA's, the need for granting the suspensions is to allow the operator time to prepare and submit the information needed by MMS and other agencies in order to conduct these reviews, and time for these reviews to occur. Where there are separate, successive stages of regulatory review over a single project, agencies have the discretion to "stage" their consideration of environmental factors to coincide with the development of sufficient definiteness to permit the environmental evaluation. MMS requested the operators to revise and submit information for their suspensions. And, it is premature to review, for the purposes of NEPA, exploration and development activities that are at this point hypothetical.

Specific issues related to NEPA, regulations, and programmatic topics are summarized below:

- An expansion of the Need for the Proposed Action is needed;
- A reasonable range of alternatives is needed, including energy conservation and efficiency, and renewables;
- The retention of the leases as active over many years was illegal due to the lack of due diligence in exploration and development;

- The current and previous administrations should have notified the current lessees that the tracts were not actually able to be developed;
- Insufficient scientific information exists to justify allowing exploration and development on these leases; MMS has collected little scientific information to meet the recommendations of the National Research Council report of 1991; and MMS has disregarded the 2004 recommendations of the President's U.S. Commission on Ocean Policy; and,
- The implications of delineation drilling impacts on all West Coast OCS Planning Areas on which congressional moratoria have been placed.

Comments regarding potential impacts to marine resources included:

- Significance criteria for marine mammals and fish resources were incorrect;
- Clarification regarding the use of the words, "taking" and "harassment" as defined in the Endangered Species Act and the Marine Mammal Protection Act;
- Mitigations should include aerial surveys, avoidance of the early part of the gray whale migration season, passive acoustic monitoring, and field-testing of the safety zone;
- Clarifications on issues regarding the shallow hazards survey including, the ramping-up, starting and stopping of the air guns during start-up, turning, and turning in state waters; whether the Aera and Samedan surveys would be run concurrently; and new information about the air gun-associated strandings of various species of whales;
- Incomplete or incorrect technical information including poor referencing and the use of dated studies, not discussing the possibility of masking, concerns regarding the potential for strandings due to the air gun activity, the lack of a complete discussion of sea turtles;
- Questions regarding the data on sea otters in the survey areas and the potential impacts of oil spills on otters;
- The potential impacts of the shallow hazard surveys on fish and fish resources, including invertebrates;
- Specific discussion of the critical habitat of listed species that may be affected by the proposed suspensions; and
- An evaluation of the proposed boundary expansion of the Channel Islands Sanctuary.

Generally, in response to the comments, revisions were made to the draft of this EA to ensure that the proposed suspension activities were properly described, appropriate alternatives were considered, the affected environment was adequately described, and the impact analysis was complete. Other comments were considered to be outside the scope of the EA, and, therefore not applicable.

## **4 Environmental Impacts of Alternative 1: Proposed Action—Grant Suspension**

This section discusses the environmental impacts of Alternative 1, the Proposed Action. The discussion is focused on the assessment of impacts on resources as a result of conducting the shallow hazards survey on the Gato Canyon Unit.

### **4.1 Air Quality**

See Section 2.1.2 and Figure 1-1 for a detailed description of activities that would take place during Samedan's suspension period.

#### **Environmental and Regulatory Setting**

The Samedan suspension for the Gato Canyon Unit is for an oil and gas unit located on the OCS, offshore Santa Barbara County (Figure 1-1) within the South Central Coast Air Basin. The climate, meteorology, air quality, and air quality trends of the Santa Barbara County area have been described in detail in several planning and environmental documents and are best summarized in the Santa Barbara County 2001 Clean Air Plan (CAP) (SBCAPCD, 2001). Santa Barbara County can be described as having a Mediterranean climate, characterized by warm, dry summers and cooler, mildly damp winters. The unique combination of prevailing wind conditions, generated by a persistent offshore high pressure system, and the topography of coastal mountains results in variations of airflow conducive to the formation and retention of air pollutants.

The Federal Government has established ambient air quality standards to protect public health (primary standards) and secondary standards to protect public welfare. The State of California has established separate, more stringent ambient air quality standards to protect human health and welfare. California and national standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulate matter 10 microns (PM<sub>10</sub>), suspended particulate matter 2.5 microns (PM<sub>2.5</sub>) and lead. In addition, California has standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles.

The Federal attainment status of Santa Barbara County is found in 40 CFR 81.305. Currently, Santa Barbara County is in attainment of all the National Ambient Air Quality Standards including the 1-hour ozone standard. The Santa Barbara County Air Pollution Control District (SBCAPCD) Board of Directors adopted the 2001 CAP in November of 2001, which included a request for the EPA to redesignate the County as a 1-hour ozone standard attainment area due to Santa Barbara County not violating the one-hour federal ozone standard for the 3-year period 1997-2000. The CAP includes an approved Maintenance Plan for the Federal 1-hour ozone standard as well as providing for attainment of the 1-hour state ozone ambient air quality standard at the earliest practicable date and demonstration that the County will continue to attain the Federal standard through 2015. On June 6, 2003 EPA redesignated Santa Barbara County as an ozone attainment area. Santa Barbara County is considered a nonattainment area for both the California ozone and 24-hour PM<sub>10</sub> air quality standards.

Section 328 of the 1990 Clean Air Act Amendments (CAAA) transferred authority for air quality on the OCS to the EPA. On September 4, 1992, the EPA Administrator promulgated requirements (40 CFR Part 55) to control air pollution from OCS sources to attain and maintain Federal air quality standards and to comply with CAAA provisions for the Prevention of Significant Deterioration. The promulgated regulations require OCS sources to comply with applicable onshore air quality rules in the corresponding onshore area (COA). The EPA

delegated authority to the SBCAPCD on November 5, 1993 to implement and enforce the requirements of 40 CFR Part 55. The full transfer of authority to SBCAPCD to regulate OCS air emissions pursuant to 40 CFR Part 55 transpired on September 4, 1994; 40 CFR Part 55.2 defines the regulation of vessels on the OCS below. This definition shall include vessels only when they are:

(1) Permanently or temporarily attached to the seabed and erected thereon and used for the purpose of exploring, developing or producing resources there from, within the meaning of section 4(a)(1) of OCSLA (43 U.S.C. §1331 *et seq.*); or,

(2) Physically attached to an OCS facility, in which case only the stationary sources aspects of the vessels will be regulated.

Thus, the critical distinction in this definition determining air quality permit applicability for OCS vessels is whether the proposed survey vessels utilized in support of the suspension can be determined to be “associated with” an existing OCS source and/or attached to the seabed. If the vessels are not associated with an OCS source, an air quality permit would not be required. As there are no existing “OCS sources” associated with the Gato Canyon Unit and the vessels are not attached to the seabed, it has been determined that no air quality permits are required for the short-term shallow hazards survey.

### **Project Impact Assessment**

The significance criteria used in the impact analysis for air quality is whether the proposal would result in a violation of any California or National Air Quality Standard (except Ozone). Emissions resulting from the survey activities related to the suspension may have a potential to increase concentrations of pollutants onshore. The primary regulated pollutants of concern in Santa Barbara County are oxides of nitrogen (NO<sub>x</sub>) and reactive organic compounds (ROC). Both NO<sub>x</sub> and ROC are considered precursors to ozone formation. The major pollutant of concern associated with projects of this type and duration are NO<sub>x</sub> emissions due to the use of propulsion and stationary combustion equipment used by the survey s.

Samedan has proposed to conduct a shallow hazards survey to identify and evaluate geologic hazards that may exist in the Gato Canyon Unit. The shallow hazards survey is proposed to be conducted in an area covering approximately 2 sq km (1.5 sq m) in size. The vessel proposed for this survey is the *R/V Auriga* and was used as the basis for emission assumptions developed by MMS for this analysis. The duration of the shallow hazards survey is estimated to range from 3-4 days. Survey operations will only be performed during daylight hours. The shallow hazards survey is projected to occur during the third and/or fourth quarter of 2006.

The *R/V Auriga* is a 160 ft research vessel powered by two, 855 hp diesel engines. Additional ancillary equipment includes two generator sets (196 hp; 365 hp), one bow thruster (175 hp), one hydraulic crane, one anchor winch and one compressor. The proposed activity would additionally utilize a 30 ft scout boat during survey operations to avoid potential conflicts with other vessels. The projected emissions from the proposed project result primarily from the main diesel engines of the survey vessel. Emission estimates for this air quality analysis were based on the reasonable worst-case operation of the equipment to be utilized for the shallow hazards survey. Estimated emissions from the survey vessel and scout boat are contained in Table 4.1-1.

Table 4.1-1. Estimated Shallow Hazards Survey Emissions.

<i>Survey Vessels</i>	<b>NO<sub>x</sub></b>	<b>ROC</b>	<b>CO</b>	<b>SO<sub>x</sub></b>	<b>PM</b>	<b>PM<sub>10</sub></b>
<b><i>Peak Hourly (lb/hr)</i></b>	59.9	3.1	10.2	0.7	3.8	3.7
<b><i>Peak Daily (lbs/day)</i></b>	841.1	30.6	125.4	10.4	50.7	49.1
<b><i>Total (tons/year)</i></b>	1.7	0.1	0.3	0.0	0.1	0.1

### **Air Quality Modeling Analysis**

The MMS studied the impacts of the projected offshore emissions from the proposed shallow hazards survey using the Offshore and Coastal Dispersion (OCD) Model. The model was used to predict the ambient non-reactive, or inert concentrations of nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), and fine particulates (PM<sub>10</sub>) that could result from the proposed survey to onshore areas.

Peak hour emissions contained in Table 4.1-1 were utilized to estimate the potential air quality impact from the proposed survey. The OCD model computes both short-term (one-hour, 3-hour, 8-hour and 24-hour average) and annual averaged pollutant concentrations. Air quality modeling utilizing the OCD model determines the incremental contribution of the proposed activities to regional air quality and can be used to indicate the potential of the shallow hazards survey to result in an exacerbation of State or Federal air quality standards. Meteorological inputs to the model consist of source parameters and emissions, along with source and receptor coordinates.

The OCD model requires separate data sets for characterizing the dispersion meteorology occurring offshore and onshore. Offshore meteorological data utilized for the model runs were compiled for the year 1994 using the NOAA offshore moored buoy (Buoy 46053). Onshore meteorological surface data were obtained from the Santa Barbara National Weather Service site for 1994. Mixing heights were determined from the twice-daily observations at the Vandenberg AFB site. In the modeling analysis, the vessel emissions were placed at a single point, rather than spread along the route. A single source point of emissions results in a more conservative estimate of onshore impacts. The OCD model predicts the highest concentrations from the peak hour emissions using an entire year of hourly meteorological data. Therefore, it is unlikely that the worst-case meteorology will occur during the exact day and peak hour of the proposed activities and are thus a conservative estimate of air quality impacts.

Table 4.1-2 lists the highest predicted concentrations to onshore pollutant concentrations from the modeled suspension activities at the Gato Canyon Unit and compares them with the maximum allowable increases over the baseline concentration established by Federal and State of California standards and the SBCAPCD. The concentrations demonstrate that the modeled concentrations are well within the maximum NO<sub>2</sub>, SO<sub>2</sub> and PM<sub>10</sub> allowable limits for a Class II area. Therefore, it is expected that increases in the onshore average concentrations of NO<sub>2</sub>, SO<sub>2</sub> and PM<sub>10</sub> are estimated to be well below the maximum increases allowed under Federal, State and Santa Barbara APCD ambient standards.

Onshore incremental concentrations from the proposed projects are compared to Prevention of Significant Deterioration (PSD) allowable increments (40 CFR 51.166(c)) to determine the potential for significant impacts. In addition, the incremental concentrations are added to existing background pollutant levels and then compared to applicable Federal and State ambient air quality standards to determine potential violations.



Table 4.1-2. Modeling Results and Corresponding Maximum Allowable Increases.

Pollutant	Averaging Period	Class II Maximum Allowable Increase	Federal/State Ambient Air Quality Standard	Gato Canyon Shallow Hazards Survey
NO <sub>2</sub>	1-hour	100-470 <sup>1</sup>	470 <sup>2</sup>	72.5
	Annual Average	25.0	100	0.00
PM <sub>10</sub>	24-hour Average	12-30	150	0.14
	Annual Average	17.0	50	0.00
SO <sub>2</sub>	1-hour	NS	655 <sup>3</sup>	0.87
	3-hour Average	512.0	1300	0.24
	24-hour Average	91.0	365	0.04
	Annual Average	20.0	80	0.00

(micrograms per cubic meter (µg/m<sup>3</sup>))

1. Santa Barbara APCD incremental limit.

2. State of California ambient standard.

3. State Standard. No National Standard.

Table 4.1-3 demonstrates that OCD adjusted model results of the maximum predicted onshore pollutant concentrations are within Santa Barbara APCD allowable limits for a Class II area reflected in SBCAPCD Rule 803. Concentrations of SO<sub>2</sub> and PM<sub>10</sub> are additionally well below the allowable increases for those pollutants. The table further demonstrates that based on the modeled emission estimates, the onshore impacts on air quality from the projects are estimated to be well below federally allowable increases in NO<sub>2</sub>, SO<sub>2</sub>, and PM<sub>10</sub> emissions as regulated by 40 CFR 51.166(c). Thus, peak hour emission potentials for the proposed shallow hazards survey demonstrate that NO<sub>x</sub>, SO<sub>2</sub>, and PM<sub>10</sub> emissions from the proposed suspension activities are expected to be well below the allowable increases for those pollutants.

**MMS Mitigation Measures:** MMS will require Samedan to ensure the proposed shallow hazards survey in support of suspension for the Gato Canyon Unit will further reduce and minimize impacts to air quality by implementing the following MMS required mitigation measures:

**AQ-1.** Samedan shall prepare and submit to the MMS, an Emissions Reporting Plan 60 days prior to the commencement of the survey. This plan shall provide detailed information regarding the actual vessels to be employed, internal combustion engines used, the duration of their use, the fuel consumed, and the calculated emissions.

**AQ-2.** Samedan shall determine, on a daily basis, fuel use and emissions from the Shallow Hazards Survey. At the conclusion of the survey, Samedan will prepare and submit a summary of the daily and total fuel use and emissions associated with the project to verify compliance with project specific conditions.

**AQ-3.** Samedan shall require the survey vessels and other associated internal combustion engines to use fuel with less than 0.2% sulfur by weight when operating within waters adjacent to Santa Barbara County.

Table 4.1-3. Maximum Predicted Onshore Pollutant Concentrations.

Pollutant	Averaging Period	Class II Maximum Allowable Increase	Ambient Air Quality Standard	Santa Barbara Maximum Background Concentration <sup>3</sup>	Maximum Modeled Concentration	Total Pollutant Concentration
NO <sub>2</sub>	1-hour	100-470 <sup>1</sup>	470 <sup>2</sup>	105	72.5	177.5
	Annual Average	25.0	100	14.2	0.00	14.2
PM <sub>10</sub>	24-hour Average	12-30	150	39	0.14	39.14
	Annual Average	17.0	50	18.5	0.00	18.5
SO <sub>2</sub>	1-hour	NS	655 <sup>4</sup>	10.65	0.87	11.52
	3-hour Average	512.0	1300	7.99	0.24	8.23
	24-hour Average	91.0	365	2.66	0.04	2.70
	Annual Average	20.0	80	2.66	0.00	2.66

(micrograms per cubic meter (µg/m<sup>3</sup>))

1. Santa Barbara APCD incremental limit.
2. State of California ambient standard.
3. El Capitan 2003 ambient data
4. State Standard. No National Standard.

**Conclusion:** The potential impacts to air quality resulting from emissions from the vessels and equipment used in survey activities proposed in support of the suspension for the Gato Canyon Unit are considered to be insignificant based on the significance criteria utilized in this analysis. The potential for violations of the ambient air standards are considered negligible due to the short duration and localized nature of the projects and the implementation of MMS required mitigation measures to further minimize air quality impacts.

### Cumulative Analysis

Major sources of cumulative air quality impacts include emissions from on-going oil and gas activities in Federal and State waters, offshore shipping and tankering operations, and onshore projects. For this analysis, it is assumed that due to the prevailing onshore wind conditions, the geographic scope for cumulative air quality impacts will be those projects or actions that exist or are pending or approved in the central Santa Barbara Channel and southern Santa Barbara County.

On-going Oil and Gas Activities. There are presently a total of 19 OCS platforms located in the South Central Coast Air Basin, with 15 platforms located in the OCS offshore of Santa Barbara County and 4 platforms in Federal waters offshore of Ventura County. In addition, Platform Holly is located in State waters off southern Santa Barbara County. The existing platforms are within the jurisdiction of the adjacent onshore air agencies and all have current Permits to Operate. The emission sources from those facilities have been controlled and fully offset and are in full compliance with applicable Air District Rules and Regulations. The platforms located in Ventura County waters are considered outside of the geographical scope of this analysis and are not considered to cumulatively interact with the proposed survey.

Proposed surveys in support of other suspension activities in the POCS will not occur simultaneously with the Gato Canyon Unit shallow hazards survey and thus will not temporally overlap or cumulatively interact with the proposed activity.

Marine Shipping and Tankering. Other OCS-related emission sources considered in this analysis are marine shipping and tankering operations. Emissions from marine vessels traversing the Santa Barbara Channel are not regulated by Federal, State or local air authorities and may combine with emissions from the proposed project to affect onshore air quality. Emissions from marine shipping and tankering operations are assumed to be reflected in background ambient air monitoring data utilized with OCD modeled concentrations to determine potential air quality standards violations.

Onshore Projects. No new major onshore projects are pending or approved in the vicinity of the Gato Canyon Unit survey during the third and/or fourth quarters of 2006.

Ambient air monitoring levels from the nearest air monitoring station were combined with the predicted OCD modeled concentrations from the Gato Canyon Unit and results demonstrate a negligible short-term impact to overall regional air quality. Therefore, the survey is not expected to result in any violation of Federal or State ambient air quality standards. It is assumed that the monitoring data represent ambient concentrations from the existing oil and gas facilities and marine shipping and tankering operations in the project area. Thus, emission increases associated with the proposed project are not expected to significantly contribute to cumulative emissions from existing offshore oil and gas and marine shipping and tankering activities.

No other projects are presently proposed for the affected OCS area during the proposed project period, and there will be no temporal overlap between other proposed OCS surveys. Thus, the emissions associated with the shallow hazard survey in support of the Gato Canyon Unit suspension are not expected to result in any cumulative exceedences of applicable air quality standards.

## **4.2 Protected Species of Marine Mammals and Sea Turtles**

See Section 2.1.2 and Figure 1-1 for a detailed description of activities that would take place during the proposed suspension period.

### **Environmental and Regulatory Setting**

Marine mammals are valued resources and protected under the Marine Mammal Protection Act of 1972 (MMPA). Some marine mammal and all sea turtle species are currently federally listed as being endangered or threatened with extinction, are valued resources, and are protected under the Endangered Species Act of 1973 (ESA). This section addresses marine protected species (i.e., marine mammals and sea turtles).

Marine mammals in the Santa Barbara Channel have been described in detail in previous studies and environmental documents (e.g., Bonnell et al., 1981; 1983; Bonnell and Dailey, 1993; Dohl et al., 1981; 1983; Barlow, 1995; Barlow et al., 1995, 1997; Barlow and Gerrodette, 1996; Koski et al., 1998; U.S. Fish and Wildlife Service (USF&WS), 2000; DeLong and Melin, 2000; Stewart and Yochem, 2000; Angliss and Lodge, 2004; Carretta et al., 2004; Estes et al. 2004). At least 34 species of marine mammals inhabit or visit California waters (Table 4.2-1). These include 6 species of pinnipeds (seals and sea lions), 27 species of cetaceans (whales, porpoises, and dolphins), and the sea otter. Mammalogists distinguish cetaceans as of two types: mysticete or baleen cetaceans, and odontocete or toothed cetaceans (Table 4.2-1). Some marine mammal species are purely migrants that pass through central and southern California waters on their way to calving or feeding grounds elsewhere, some are seasonal visitors that remain for a few weeks or months; and others are resident for much or all of the year. At certain times of the year, hundreds of thousands of marine mammals may be present. Pinnipeds breed on the Channel Islands and on offshore rocks and isolated beaches along the mainland coast; thousands also move through the area during their annual migrations. Cetaceans, including a number of endangered species, use area waters as year-round habitat and calving grounds, important seasonal foraging grounds, or annual migration pathways. The sea otter, a year-round resident of the mainland coast north of Point Conception, has expanded its range southward past Point Conception (USF&WS, 2003) in the western Channel and around the northern Channel Islands (USF&WS, 2000; 2003; Hatfield, 2004).

In comparison with other areas, California marine mammals have been relatively well studied. Much of the information gathered during recent decades resulted from systematic aerial and vessel surveys sponsored by MMS's Environmental Studies Program (e.g., Bonnell et al., 1981, 1983; Bonnell and Dailey, 1993; Dohl et al., 1981, 1983). Pelagic data from these and more recent MMS studies in the area have been computerized, standardized, and compiled in the Marine Mammal and Seabird Computer Database Analysis System. More recently, pelagic surveys of marine mammals and studies of pinniped populations on land in California have been conducted by NOAA Fisheries and associated institutions (e.g., Barlow, 1995; Barlow et al., 1995, 1997; Barlow and Gerrodette, 1996; DeLong and Melin, 2000; Forney et al., 2000; Stewart and Yochem, 2000; Angliss and Lodge, 2002; Carretta et al., 2002). Koski et al. (1998) provide a recent synthesis of much of the information generated by these studies for central and southern California waters. An on-going study of marine mammals and seabirds off southern California conducted by the U.S. Geological Survey, with MMS as a cooperating agency, is also yielding information on marine mammals in the project area (McChesney et al., 2000; Orthmeyer et al., 2000; Estes et al., 2004). Table 4.2-2 lists marine mammal species that may reasonably be expected to be encountered by vessels operating along the California coastline and their periods of occurrence.

Of the marine mammals possibly occurring in the Channel, six species of large whales (blue, fin, sei, humpback, northern right, and sperm) are listed as endangered, and two species of pinnipeds (Guadalupe fur seal and Steller sea lion) and the southern sea otter are listed as threatened under the Endangered Species Act.

Table 4.2-1. Protected Species of Marine Mammals and Sea Turtles Potentially Occurring in the Santa Barbara Channel.

Species	Stock Abundance Estimate <sup>1</sup>	Protected Status	Relative Abundance in Region <sup>2</sup>
<b>Mysticete (Baleen) Whales</b>			
Northern right whale ( <i>Eubalaena glacialis</i> )	Not available for region although limited to extremely few animals	Protected, and strategic under MMPA. Endangered under ESA.	Extremely rare
Gray whale ( <i>Eschrichtius robustus</i> )	Eastern North Pacific 26,635 <sup>4</sup>	Protected under MMPA	Common
Blue whale ( <i>Balaenoptera musculus</i> )	Eastern North Pacific 1,940	Protected, depleted, and strategic under MMPA. Endangered under ESA.	Common in Season
Fin whale ( <i>Balaenoptera physalus</i> )	California/Oregon/Washington 1,851	Protected, depleted and strategic under MMPA. Endangered under ESA.	Uncommon
Sei whale ( <i>Balaenoptera borealis</i> )	Eastern North Pacific No abundance estimates	Protected, depleted, and strategic under MMPA. Endangered under ESA.	Very rare
Bryde's whale ( <i>Balaenoptera edeni</i> )	Eastern North Pacific—13,000 Calif.-Or.-Wash. region—12	Protected under MMPA	Rare
Minke whale ( <i>Balaenoptera acutorostrata</i> )	California/Oregon/Washington 631	Protected and strategic under MMPA	Uncommon
Humpback whale ( <i>Megaptera novaeangliae</i> )	California/Oregon/Washington 856-1,177	Protected, depleted, and strategic under MMPA. Endangered under ESA.	Common in season
<b>Odontocete (Toothed) Whales and Dolphins</b>			
Sperm whale ( <i>Physeter macrocephalus</i> )	California/Oregon/Washington 1,407	Protected, depleted, strategic under MMPA. Endangered under ESA	Rare
Pygmy sperm whale ( <i>Kogia breviceps</i> )	California/Oregon/Washington 4,746	Protected under MMPA	Uncommon
Dwarf sperm whale ( <i>Kogia simus</i> )	California/Oregon/Washington <sup>3</sup>	Protected under MMPA	Known from three strandings <sup>2</sup> . No records since early 1970s <sup>1</sup>
Blainville's beaked whale ( <i>Mesoplodon densirostris</i> )	California/Oregon/Washington All mesoplodont spp. combined: 4,098 (including at least 360 positively identified <i>M. densirostris</i> )	Protected under MMPA	Known from one stranding
Hubbs' beaked whale ( <i>Mesoplodon carlhubbsi</i> )		Protected under MMPA	Extremely rare
Ginkgo-toothed whale ( <i>Mesoplodon ginkgodens</i> )		Protected under MMPA	Presence unlikely
Hector's beaked whale ( <i>Mesoplodon hectori</i> )		Protected under MMPA	Rare
Stejneger's beaked whale ( <i>Mesoplodon stejnegeri</i> )		Protected under MMPA	Rare
Baird's beaked whale ( <i>Berardius bairdii</i> )		California/Oregon/Washington 379	Protected under MMPA
Cuvier's beaked whale ( <i>Ziphius cavirostris</i> )	California/Oregon/Washington 5,870	Protected under MMPA	Rare

Table 4.2-1. Protected Species of Marine Mammals and Sea Turtles Potentially Occurring in the Santa Barbara Channel. (continued)

Species	Stock Abundance Estimate <sup>1</sup>	Protected Status	Relative Abundance in Region <sup>2</sup>
<b>Odontocete (Toothed) Whales and Dolphins (cont.)</b>			
Long-beaked common dolphin ( <i>Delphinus capensis</i> )	California/Oregon/Washington 32,239	Protected under MMPA	Common
Short-beaked common dolphin ( <i>Delphinus delphis</i> )	California/Oregon/Washington 373,573	Protected under MMPA	Common
Bottlenose dolphin ( <i>Tursiops truncatus</i> )	Calif./Ore./Wash.-Offshore 956	Protected under MMPA	Common
Bottlenose dolphin ( <i>Tursiops truncatus</i> )	California –Coastal 206	Protected under MMPA	Common
Pacific white-sided dolphin ( <i>Lagenorhynchus obliquidens</i> )	California/Oregon/Washington Northern & Southern 25,825	Protected under MMPA	Sporadically abundant
Rough-toothed dolphin ( <i>Steno bredanensis</i> )	Not available for area	Protected under MMPA	Known only from a few strandings
Striped dolphin ( <i>Stenella coeruleoalba</i> )	California/Oregon/Washington 20,235	Protected under MMPA	Uncommon
Long-snouted spinner dolphin ( <i>Stenella longirostris</i> )	Not available for area	Protected under MMPA	Possible during El Niño events
Spotted dolphin ( <i>Stenella attenuata</i> )	Not available for area	Protected under MMPA	Known only from strandings
Northern right whale dolphin ( <i>Lissodelphis borealis</i> )	California/Oregon/Washington 13,705	Protected under MMPA	Sporadically abundant
Risso's dolphin ( <i>Grampus griseus</i> )	California/Oregon/Washington 16, 843	Protected under MMPA	Common
Short-finned pilot whale ( <i>Globicephala macrorhynchus</i> )	California/Oregon/Washington 970	Protected under MMPA	Uncommon
Orca or Killer whale ( <i>Orcinus orca</i> )	Eastern No. Pacific-Transient + East. No. Pacific-Offshore $346 + 285 = 631$	Protected under MMPA	Uncommon
False killer whale ( <i>Pseudorca crassidens</i> )	Not available for region	Protected under MMPA	Rare
Dall's porpoise ( <i>Phocoenoides dalli</i> )	California/Oregon/Washington 117,545	Protected under MMPA	Uncommon
Harbor porpoise ( <i>Phocoena phocoena</i> )	Morro Bay stock 932	Protected under MMPA	Uncommon

Table 4.2-1. Protected Species of Marine Mammals and Sea Turtles Potentially Occurring in the Santa Barbara Channel. (continued)

Species	Stock Abundance Estimate <sup>1</sup>	Protected Status	Relative Abundance in Region <sup>2</sup>
<b>True Seals, Fur Seals, and Sea Lions</b>			
California sea lion ( <i>Zalophus californianus</i> )	United States 204,000 to 214,000	Protected under MMPA	Common
Steller sea lion ( <i>Eumetopias jubatus</i> )	Eastern (California portion) ~ 5004	Protected and strategic under MMPA. Threatened under ESA.	Now extremely rare.
Northern fur seal ( <i>Callorhinus ursinus</i> )	San Miguel Island 4,336	Protected under MMPA	Uncommon
Guadalupe fur seal ( <i>Arctocephalus townsendi</i> )	7,408	Protected, depleted, and strategic under MMPA. Threatened under ESA.	Extremely rare
Northern elephant seal ( <i>Mirounga angustirostris</i> )	California breeding 101,000	Protected under MMPA	Common in season (winter)
Harbor seal ( <i>Phoca vitulina richardsi</i> )	California 30,293	Protected under MMPA	Common
Ribbon seal ( <i>Histriophoca fasciata</i> )	Not applicable	Protected under MMPA	Extremely rare
<b>Sea Otters</b>			
Southern sea otter ( <i>Enhydra lutris nereis</i> )	California 2100-2300 <sup>5,6</sup>	Protected under MMPA. Threatened under ESA. Experimental Population, non-essential south of Pt. Conception	Typically within two miles of the coast; sometimes as far offshore as approximately six miles <sup>7</sup>
<b>Sea Turtles</b>			
Leatherback sea turtle ( <i>Dermochelys coriacea</i> )	Not available for region	Endangered under ESA	Uncommon
Green sea turtle ( <i>Chelonia mydas</i> )	Not available for region	Threatened under ESA, except Pacific Coast of Mexico breeding population is Endangered	Uncommon
Pacific (olive) ridley sea turtle ( <i>Lepidochelys olivacea</i> )	Not available for region	Threatened under ESA, except Mexican nesting population is Endangered	Uncommon
Loggerhead sea turtle ( <i>Caretta caretta</i> )	Not available for region	Threatened under ESA	Uncommon

1. Source: Caretta et al. (2002)

2. Source: NOAA (2000)

3. Too rare to justify a stock assessment for U.S. west coast<sup>1</sup>.

4. Source: Angliss and Lodge (2002)

5. Source: California Marine Mammal Center (2000)

6. Source: Marine Mammal Commission Annual Report (2002)

7. Source: Tinker, M.T. (2005)

Table 4.2-2. Some Marine Mammal Species and Periods of Occurrence.<sup>1</sup>

Species	Month of Occurrence											
	J	F	M	A	M	J	J	A	S	O	N	D
California gray whale	■	■	■	■	■							■
Fin whale						■	■	■	■	■		
Minke whale			■	■							■	■
Blue whale						■	■	■	■	■		
Humpback whale					■	■			■	■	■	■
Common dolphin (both spp.) <sup>2</sup>	■	■	■	■	■	■	■	■	■	■	■	■
Northern right-whale dolphin	■				■							■
Pacific white-sided dolphin <sup>3</sup>	■	■			■	■	■	■	■	■	■	■
Risso's dolphin	■	■	■	■	■	■	■	■	■	■	■	■
Dall's porpoise <sup>2</sup>	■	■	■	■	■	■	■	■	■	■	■	■
Bottlenose dolphin	■	■	■	■	■	■	■	■	■	■	■	■
Short-finned pilot whale	■	■	■	■	■	■	■	■	■	■	■	■
California sea lion	■	■	■	■	■	■	■	■	■	■	■	■
Northern fur seal <sup>4</sup>	■	■	■	■	■	■	■	■	■	■	■	■
Northern elephant seal <sup>5</sup>	■	■	■	■	■	■	■	■	■	■	■	■
Pacific harbor seal	■	■	■	■	■	■	■	■	■	■	■	■
Guadalupe fur seal <sup>6</sup>	■	■	■	■	■	■	■	■	■	■	■	■
Northern (Steller) sea lion <sup>6</sup>	■	■	■	■	■	■	■	■	■	■	■	■
Southern sea otter <sup>7</sup>	■	■	■	■	■	■	■	■	■	■	■	■

Relatively uniform distribution  Peak distribution  As seasonally described 

- (1) Where seasonal differences occur, individuals may also be found in the “off” season. Also, depending on the species, the numbers of abundant animals present in their “off” season may be greater than the numbers of less common animals in their “on” season.
- (2) Winter-Spring distribution is mostly south of Pt. Conception.
- (3) Spring-Summer distribution is mostly south of Pt. Conception.
- (4) Only a small percent occur over continental shelf (except near San Miguel rookery, May-November).
- (5) Common near land during winter breeding season and spring molting season.
- (6) Now very rare in area.
- (7) Only nearshore (diving limit 30 m). Only small numbers south of Pt. Conception.

Sources: Bonnell and Dailey (1993), NOAA (2000).

The blue whale and humpback whale feed on krill in the western Santa Barbara Channel during summer and fall (Calambokidis et al., 1990; Calambokidis, 1995; Reeves et al., 1998; Mate et al., 1999; Calambokidis et al., 2000). Although also present in the Channel during summer, fin whales generally are distributed somewhat farther offshore and south of the northern Channel Islands chain (Leatherwood et al., 1987; Bonnell and Dailey, 1993). Sei and northern right whales are rare in California waters (Barlow et al., 1997). Sperm whales are present in California offshore waters year-round, with peak abundance from April to mid-June and again from late August through November (Dohl et al., 1981, 1983; Gosho et al., 1984; Barlow et al., 1997). They are primarily an oceanic species and generally inhabit waters with depths of greater than 1,000 m. Aerial and shipboard surveys conducted between 1991 and 2001 have not documented sperm whales occurring in the Santa Barbara Channel (Carretta et al., 2004).



The two threatened pinniped species, Steller sea lions and Guadalupe fur seals, do not breed in the area and presently are uncommon in southern California waters (Stewart et al., 1987; Bonnell and Dailey, 1993).

Southern sea otters now range in coastal waters from near Half Moon Bay south past Point Conception (Riedman and Estes, 1990; USF&WS, 2000; 2003). The total sea otter count is up appreciably for a second spring count in a row to 2825, 12.8 percent above the spring 2003 count of 2505 (Hatfield, 2004). Since 1998, sea otters have been documented occurring south and east of Point Conception along the Channel in winter and spring, with most returning to waters north of the point by mid-summer (USF&WS, 2000; 2003; Hatfield, 2004). Spring surveys between 2002 and 2004 documented between 50 and 100 sea otters occurring between Point Sal to Point Conception, and less than 50 sea otters occurring south of Point Conception (Hatfield, 2004). However, numbers of sea otters occurring south of Point Conception may be higher, as sightings data from aerial surveys conducted by the California Department of Fish and Game show counts of 100 to 152 sea otters occurring in that area during January and February of 1999 (dataset provided by The Otter Project). The aerial survey dataset, as well as other sources of information, indicate considerable interannual variability of sightings southeast of Point Conception. Otters occurring around Point Conception and southeastward along the Santa Barbara Channel are chiefly adult males. Tinker (2004) reported that at Point Conception, females were not captured in his study because only males utilize this southern-most portion of the range. Tinker also reported that males captured at Point Conception tended to move frequently and over great distances throughout the range. Adult males are known to leave female areas to the north during non-breeding seasons and aggregate into “male areas” which are typically along the range fronts (Kage et al., 2004 citing Garshelis and Garshelis, 1984; Jameson, 1989). Traveling to range edges constitutes a long distance movement on the part of the males (Kage et al, 2004). Animals from Point Conception were found to experience higher survival than animals from the center of the range to the north (Tinker, 2004).

Sea otters generally live and forage in hard- and soft-sediment marine habitats from the littoral zone to depths up to 100 m (330 ft), including protected bays and exposed outer coasts (USF&WS, 2003). Most individuals occur between shore and the 20 m (65 ft) isobath (USF&WS, 2003). Sea otters are sometimes observed farther offshore, as much as 8-10 km (5-6 mi) (G. Sanders, pers. comm.; S. Shimek, pers. comm.; M.T. Tinker, pers. comm.), however, such sightings are considered uncommon.

Between 1987 and 1990, the U.S. Fish and Wildlife Service translocated 140 southern sea otters to a translocation zone at San Nicolas Island. A management zone adjacent to the translocation zone was established whose northern boundary is Point Conception. The purposes of the management zone are (1) to facilitate management and containment of the experimental population and (2) to minimize to the maximum extent feasible conflict between the experimental population and fishery resources and oil and gas exploration and development activities (Federal Register: August 11, 1987, Vol. 52, No. 154, pgs. 29754 – 29784). Any sea otter found within the management zone is considered a member of the experimental population and is to be treated as a species proposed to be listed under the ESA.

The gray whale breeds and calves in lagoons along the west coast of Baja California and in the Gulf of California in the winter (Rice and Wolman, 1971). At the end of the season, the population begins an 8,000-km coastal migration to summer feeding grounds in the Bering and Chukchi seas, where they remain until fall. The southbound migration of gray whales through the

Southern California Bight begins in December and lasts through February; the northbound migration is more prolonged, lasting from February through May with a peak in March (Leatherwood, 1974; Bonnell and Dailey, 1993). Gray whales are generally absent from southern California waters from August through November. Migrating gray whales generally travel within 3 km of the shoreline over most of the route, unless crossing mouths of rivers and straits (Dohl et al., 1983; Braham, 1984a). Off southern California, where gray whales often travel through the Channel Islands, offshore movements of up to 80 km have been observed (Jones and Swartz, 1987; Dohl et al., 1981; Bonnell and Daily, 1993).

Minke whales, the smallest of the baleen whales, occur year-round in southern California waters (Dohl et al., 1983; Barlow et al., 1997; Forney et al., 2000), where they are often sighted near the northern Channel Islands (Leatherwood et al., 1987; Bonnell and Dailey, 1993).

Beaked whales are small to medium sized whales that inhabit open oceans and feed on deep water squid and fishes (Mead, 2002). The mesoplodontid beaked whales normally inhabit deep ocean waters (>2000 m) or continental slopes (200-2000 m) and only rarely stray over the continental shelf (Pitman, 2002). Almost nothing is known about mesoplodont behavior, partly because they are so rarely sighted, but also because their behavioral repertoire at the surface appears to be very limited and stereotyped (Pitman, 2002). The most commonly reported behavior has been slow swimming, usually away from a vessel, and often a mile or more away (Pitman, 2002). Aerial and shipboard surveys conducted between 1991 and 2001 reported no sightings of mesoplodontid beaked whales in the Santa Barbara Channel, and one sighting approximately 46 km (25 nm) west of Purisima Point in waters greater than 200 m (Carretta et al. 2004). Leatherwood et al., (1987) suggested that Hubb's beaked whale (*Mesoplodon carlhubbsi*) might be present in or near the Southern California Bight, and Channel Islands National Marine Sanctuary at any time of year that the California current is flowing strongly near shore. Sightings of unidentified mesoplodontid beaked whales have been mostly over the Santa Rosa-Cortez Ridge, near Rodrigues Sea Mount and west of the outer Channel Islands (Leatherwood et al., 1987). It is not known whether forays of these species onto continental shelf waters of the Southern California Bight are common or exceptional, but it is the present working hypothesis that the likelihood is extremely low that beaked whales would occur in the Santa Barbara Channel or are likely to be seen in the Southern California Bight except in deep water regions (Leatherwood et al., 1987; DeAngelis; pers. comm., 2005).

Along the U.S. west coast, Baird's beaked whale (*Berardius bairdii*) are primarily seen along the continental slope from late spring to early fall (Carretta et al., 2004). It is seen less frequently and is presumed to be farther offshore during the colder water months of November through April (Carretta et al., 2004). Aerial and shipboard surveys conducted between 1991 and 2001 revealed no sightings of Baird's beaked whale in the Santa Barbara Channel. One sighting was documented approximately 111 km (60 nm) west of Purisima Point and is the nearest sighting reported (Carretta et al., 2004). Leatherwood et al. (1987) remarked of 17 sightings of Baird's beaked whale in the Southern California Bight and adjacent pelagic waters from 1952 through 1978. Thirteen of those records are from deep waters off the Patton Escarpment. Two were along the escarpment in August. The only two within the Southern California Bight are a sighting in July just south of San Nicolas Island (in deep water of the San Nicolas Basin) and one in January off Pyramid Head, San Clemente Island (also in deep water). Leatherwood et al (1987) listed this species as a deep water species unlikely to occur over the Southern California Bight, but noted

evidence of inshore-offshore movement off Central and Northern California that the species might also be sighted over the Southern California Bight in coming years.

Cuvier's beaked whale (*Ziphius cavirostris*) is distributed widely in deep waters of the oceans. Off the U.S. west coast, it is the most commonly encountered beaked whale (Carretta et al., 2004). Aerial and shipboard surveys conducted between 1991 and 2001 revealed no sightings of Cuvier's beaked whale in the Santa Barbara Channel. The nearest surveys sighting of Cuvier's beaked whale is more than 111 km (60 nm) west of Purisima Point much deeper than 200 m.

The pygmy sperm whale (*Kogia breviceps*) and dwarf sperm whale (*Kogia simus*) are rare to uncommon off the California coast, and are found along continental slopes and in deep waters (Carretta et al., 2004). Shipboard and aerial surveys conducted between 1991 and 2001 reveal no sightings of either *Kogia* sp. in waters proximate to Purisima Point or in the Santa Barbara Channel (Carretta et al., 2004).

The small odontocetes, or toothed whales, most often seen in the southern California waters are common dolphins (*Delphinus capensis* and *D. delphis*), Dall's porpoise (*Phocoenoides dalli*), Risso's dolphin (*Grampus griseus*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), and bottlenose dolphin (*Tursiops truncatus*) (Bonnell and Dailey, 1993; Barlow et al., 1997; MMS, unpubl. data). Common dolphins, the most abundant cetaceans off California, move through area waters in groups of up to several thousand animals.

Two species of pinnipeds, California sea lions and harbor seals, commonly occur in the Santa Barbara Channel. San Miguel Island is the major southern California rookery island for California sea lions, the most frequently encountered marine mammals in southern California waters (Bonnell and Dailey, 1993; MMS, unpubl. data). Sea lions haul out on the lower decks and structures of OCS platforms and on associated mooring buoys.

Harbor seals haul out on nearshore rocks and beaches along the mainland coast and on the northern Channel Islands; major mainland haul-out sites near the project area are located at near the Ellwood Pier, Point Conception, and Rocky Point (Hanan et al., 1992). Individual harbor seals are frequently sighted in waters near the Point Arguello facilities (MMS, unpubl. data).

Northern elephant seals and northern fur seals also breed on San Miguel Island, but are uncommon in project area waters (Bonnell and Dailey, 1993; MMS, unpubl. data). Elephant seals range widely at sea and spend much of their time under water (Le Boeuf et al., 1989; DeLong et al., 1992). Fur seals forage in deeper waters beyond the continental shelf, generally 40 km or more from shore (Bonnell et al., 1983; Bonnell and Dailey, 1993).

Sea turtle populations have been greatly reduced in the last century by over harvesting and, to a lesser extent, coastal development of nesting beaches in developed countries (Ross, 1982). Four species of sea turtles occur in California waters: leatherback, green, olive ridley, and loggerhead. These four species are listed as threatened or endangered and protected under the Endangered Species Act (Table 4.2-1).

Little is known regarding the distribution of sea turtles in the Southern California Bight, most likely because they are rarely observed or encountered. The NOAA Fisheries conducts regular shipboard surveys for marine mammals and during these surveys, sea turtle are occasionally seen and documented. Perhaps the best known information for sea turtle distribution in this area includes observed and logged incidental take in fisheries operating off southern California and reported sea turtle strandings.

The California/Oregon drift gillnet fishery has been observed by NOAA Fisheries' trained observers since 1990. Since that time, observers have documented the incidental take of 21 sea turtles in the Southern California Bight, including 1 green turtle, 1 leatherback, 15 loggerheads, 1 olive ridley, and 3 unidentified sea turtles (likely loggerheads). The 21 sea turtles were taken by fisheries well outside of the Santa Barbara Channel.

Sea turtle sighting records from northern Baja California to Alaska indicate that the green turtle was the most commonly observed sea turtle on the U.S. Pacific Coast, with 62% reported in a band from southern California and southward. California stranding reports from 1990-2002 show that the green turtle is the most commonly found stranded sea turtle (70 total, averaging 5-6 annually). The northernmost reported resident population of green turtles occurs in south San Diego Bay, where approximately 50-60 mature and immature turtles concentrate in the warm water effluent discharged by a power plant.

Aerial surveys conducted during late summer and fall of 1990-2001 reveal that leatherbacks forage off central California, generally at the end of the summer, when upwelling relaxes and sea surface temperatures increase. Here, researchers estimated an average of 170 leatherbacks were present between the coast and roughly the 91 m (50 fathom) isobath off California. Abundance over the study period was variable between years, ranging from an estimated 20 leatherbacks (1995) to 366 leatherbacks (1990). No abundance estimates are available for leatherbacks in southern California; however, anecdotal reports show that leatherbacks are occasionally sighted in both nearshore and offshore waters, or in bays (e.g. Santa Monica Bay). Stranding reports from 1990 through 2002 for California reveal that the leatherback is the second most commonly stranded sea turtle, with an average of nearly five per year.

Based on observed captures of loggerheads in the driftnet fishery, this species is more likely to be found off southern California during El Niño years, when unusually warm sea surface temperatures and northward flowing equatorial currents bring hundreds of thousands of pelagic red crabs from Baja California north up the coast of California. Loggerheads taken by the driftnet fishery had most likely moved north from Baja California, following their primary food source. No abundance estimates are available for loggerheads in the southern California area and they rarely strand on California beaches (average 2 per year, based on stranding records from 1990-2002).

Olive ridleys are the most common sea turtle observed in the eastern tropical Pacific; however, because they prefer more warm tropical waters, they are rarely found in southern California and no abundance estimates are available. The California/Oregon drift gillnet fishery has only documented capturing one olive ridley off southern California, in 1999. Less than 2 olive ridleys per year have been reported stranded in California (23 total, from 1990 through 2002).

Marine protected species are protected under the ESA and/or MMPA from "taking." The ESA defines "take" to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect a threatened or endangered species, or attempt to engage in such conduct. Critical habitat may also be protected for threatened or endangered species; however, critical habitat has not been designated in the California region for any of the listed species identified in Table 4.2-1. The MMPA prohibits the killing or harassment ("taking") of marine mammals with few exceptions. The MMPA further defines the term "harassment" to mean any act of pursuit, torment, or annoyance which—(i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) 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 (Level B harassment).

The NOAA Fisheries has cited temporary threshold shift (TTS) as an example of an impact that could be considered harassment (60 FR 28379, May 31, 1995) and accepted the use of TTS as a harassment criterion in its Final Rule for the *Seawolf* (63 FR 66069, 1 December 1998) and *Winston S. Churchill* shock tests (66 FR 22450, 4 May 2001). The NOAA Fisheries recommends a sound pressure level (SPL) threshold of 160 dB re 1  $\mu$ Pa [rms] for impulse sound that may potentially modify the behavior of marine mammals (Level B harassment), as marine mammals have shown a behavioral response to received sound pressure levels of 160 dB and greater. Also, NOAA Fisheries recommends a threshold of 180 dB re 1  $\mu$ Pa [rms] for Level A harassment, as a precautionary measure to ensure that a marine mammal (i.e., cetacean; the recommended SPL threshold for pinnipeds is slightly higher) is protected from harm. Due to a paucity of information regarding sea turtle hearing sensitivities, resource agencies apply acoustic harassment and harm thresholds developed for marine mammals to sea turtles as a precautionary measure to avoid harassing or harming them until more scientific information is available.

Exposing a marine protected species to an SPL of between 160 and 180 dB, thereby conceivably resulting in harassment, constitutes an adverse impact. Such harassment of one or a few animals from noise attributed to a single air gun would amount to an insignificant, adverse impact to the overall population. If an impact agent is likely to adversely impact a protected species, additional federal reviews or consultations are required under the ESA and/or MMPA. Mitigation measures may reduce the potential for an adverse effect or “take” to the point that an adverse effect is unlikely.

### **Significance Criteria and Impacting Agents**

The purpose of this analysis is to assess the potential impacts of the proposed action upon protected species of marine mammals and sea turtles (i.e., marine protected species). The impact analysis for this EA adopts significance criteria for all protected marine mammals and sea turtle species. An impact from the proposed action is significant if it is likely to cause any of the following:

- A measurable change in population abundance and/or species composition beyond normal variability. For strategic stocks of marine mammals, or threatened and endangered species, this includes any change in population that is likely to hinder the recovery of a species;
- Displacement of a major part of the population from either feeding or breeding areas, or from migration routes for a biologically important length of time;
- A measurable loss or irreversible modification of habitat in several localized areas or in 10 percent of the habitat in the affected area. An example of a significant change in habitat would be one that prevents the re-establishment of pre-disturbance biological communities over a significant portion of their range. Loss or irreversible modification of habitat protected by Federal, State or local laws or regulations is considered significant; or,
- Disturbance resulting in biologically important effects on behavior patterns.

For marine protected species, the phrase “biologically important length of time” is assumed to mean one season or more. Depending on the species and the circumstances, a season could be a breeding season (e.g., California sea lion breeding season), feeding or foraging season (e.g., blue whale feeding period off southern California), or a migratory period (e.g., gray whale migration).

The chief impacting agents associated with the shallow hazards survey that could affect marine mammals and/or sea turtles include: a) sound produced by vessel traffic, b) acoustic energy produced by a single air gun, and c) temporarily introducing cables into the sea. Vessel traffic introduces sound into the sea, as well as poses the potential for collisions with protected species. Survey cables involve introducing flexible lines into the sea that may strike or entangle protected species. The air gun would introduce acoustic energy (e.g. sound) into the sea that has the potential for harming protected species or modifying the behavior of individuals that may subsequently reduce their fitness.

### **Impact Analysis**

As described in Section 2.1.2, Samedan’s suspension request would involve conducting a shallow hazards survey on their lease. This section analyzes impacts to marine mammals and sea turtles that may occur as a result of the shallow hazards survey.

Sound Produced by Vessel Traffic. There is no evidence that sound generated by increased vessel traffic (of which OCS vessels are a very small part) has impacted marine mammal or sea turtle populations in the eastern Pacific. A low level of vessel sound related to the proposed action is not believed to harass a protected species such that it disrupts their migration, breathing, nursing, breeding, feeding, or sheltering. Impacts are not likely to be adverse and are negligible, and therefore considered to be insignificant.

Odontocete whales and dolphins often tolerate vessel traffic, but may react at long distances if confined (e.g., in shallow water) or previously harassed by boats (Richardson et al., 1995). For example, sperm whales may react to the approach of vessels with course changes and shallow dives (Reeves, 1992), and startle reactions have been observed (Whitehead et al., 1990; Richardson et al., 1995). Depending on the circumstances, reactions may vary greatly, even within species. Although the avoidance of vessels by odontocetes has been demonstrated to result in temporary displacement, there is no evidence that long-term or permanent abandonment of areas has occurred.

There have been specific studies of reactions to vessel sound by several species of baleen whales, including gray (e.g., Wyrick, 1954; Dahlheim et al., 1984; Jones and Swartz, 1984), humpback (e.g., Bauer and Herman, 1986; Watkins, 1986; Baker and Herman, 1989), bowhead (e.g., Richardson and Malme, 1993), and right whales (e.g., Robinson, 1979; Payne et al., 1983). There is limited information on other species. Low-level sounds from distant or stationary vessels often seem to be ignored by baleen whales (Richardson et al., 1995). The level of avoidance exhibited appears related to the speed and direction of the approaching vessel. Observed reactions range from slow and inconspicuous avoidance maneuvers to instantaneous and rapid evasive movements. Baleen whales have been observed to travel several kilometers from their original position in response to a straight-line pass by a vessel (Richardson et al., 1995).

In general, seals often show considerable tolerance of vessels. Sea lions, in particular, are known to tolerate close and frequent approaches by boats (Richardson et al., 1995)

Riedman (1983) reported that playback experiments of recorded industrial sounds associated with offshore oil and gas operations did not affect the behavior, density, or distribution of sea otters within the vicinity of the sound projection study area. Included in the playback experiments were recordings of a geophysical survey vessel using a multiple air gun array. Hence, sea otters are not likely to be adversely affected by sound generated by vessel traffic.

Specific information is lacking on sea turtle responsiveness to sounds produced by vessel traffic. Sea turtles are sometimes observed from moving or anchored vessels. Sea turtles are believed to tolerate vessel sounds, based on sea turtle sightings made from vessels underway. There is no evidence that sea turtles are attracted to vessel traffic that is underway.

Collision with Vessel Traffic. The shallow hazards survey would require the use of a vessel for 3-4 days in the third or fourth quarter (July-December) of 2006. The vessel would mobilize and de-mobilize from Port Hueneme. Additionally, the MMS would require that Samedan use a scout boat captained by a local fisherman during the shallow hazards survey to avoid conflicts with commercial fishermen and other users of the area. The survey is expected to result in a temporary, minor increase in area vessel activity. Following the survey, vessel traffic would return to current baseline levels.

Collisions between marine mammals and vessels can cause major wounds on cetaceans and/or be fatal (e.g., northern right whale, Kraus, 1990, and Knowlton et al., 1997; bottlenose dolphin, Fertl, 1994; sperm whale, Waring et al., 1997). Slow moving cetaceans (e.g., northern right whale) or those spending extended periods of time at the surface (e.g., sperm whale) might be expected to be the most vulnerable. Smaller cetaceans (e.g., dolphins) often approach vessels underway to bow ride; such animals are agile and capable of easily avoiding being struck by vessels.

Vessel collisions can significantly affect small populations of whales (Laist et al., 2001). Of 11 cetacean species known to be hit by vessels, fin whales are struck most frequently, right whales, humpback, sperm whales, and gray whales are hit commonly. There were comparatively few collisions recorded for minke whales, blue whales, and sei whales. Records of collisions with Bryde's whales are rare (Laist et al., 2001). In the areas to be surveyed, fin whales are uncommon; gray, blue, and humpback whales are common in season; sperm whales and other noted whale species are rare to extremely rare (Table 4.2-1). Data compiled from 58 collisions indicate that all sizes and types of vessels can hit whales; the majority of collisions appear to occur over or near the continental shelf; most lethal or severe injuries are caused by ships 80 m or longer; because whales usually are not seen beforehand or are seen too late to be avoided; and most lethal or severe injuries involve ships traveling 14 knots or faster.

The NOAA Fisheries publishes the Potential Biological Removal (PBR) level as part of its stock assessment for each marine mammal stock under its jurisdiction (Angliss and Lodge, 2002; Carretta et al., 2002). The PBR is defined as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimal sustainable population (16 USC 1362 § 3 (20)). The PBR's for some species stocks are low (e.g., blue whale [1.2 animals], humpback whale [1.35 animals], and sperm whale [1.8 animals]), whereas it is higher for other species (e.g., fin whale [15 animals], gray whale [575 animals]) (Angliss and Lodge, 2002; Carretta et al., 2002). Using the PBR as a proxy for a threshold for assessing the potential impacts of the proposed action, a vessel collision with a single marine mammal or sea turtle constitutes an adverse, and insignificant impact.

Collision(s) involving two or more of the same protected species may amount to an adverse and significant impact, particularly if the impacted species is a blue whale, humpback, or sperm whale. Given that sperm whales are rare in the survey area, a collision with a sperm whale in the survey area is extremely unlikely.

Based on past experiences in southern California, the MMS believes that accidental collisions between cetaceans and OCS vessel traffic are unlikely events. Survey vessels are less than 52 m in length, and would operate at speeds below 12 knots. Much of the time, vessels would be operated at speeds of 5 knots or less. Although large cetaceans have occasionally been struck by freighters or tankers, and sometimes by small recreational boats, no such incidents have been reported with OCS vessels off California (MMS, unpubl. data).

The MMS also believes accidental collisions between vessels and sea otters and sea turtles are unlikely events. Sea otters and sea turtles are rare in the offshore areas to be surveyed. Therefore, the likelihood of a vessel encountering a sea otter or sea turtle is very unlikely.

Pinnipeds are nimble and considered unlikely to be struck by vessels. There is a single documented collision between a pinniped and a support vessel – an adult male elephant seal struck and presumably killed by a supply vessel in the Santa Barbara Channel in June 1999.

Increased vigilance of the potential for collisions with protected species by vessel operators and personnel greatly decreases an already low potential for such collisions to occur. Additionally, trained observers would be monitoring the impact zone (radius of 795 m) and adjacent waters for protected species during the shallow hazards survey. The mitigation measures (proposed and required) further reduce the risk of collision with a marine protected species to the point that a significant or adverse impact is not likely.

Acoustic Energy Produced by an Air Gun. An air gun is designed to project sound downward toward the sea floor, although some sound is also propagated horizontally. Sound intensity is usually expressed in decibels (dB), units for expressing the relative intensity of sounds on a logarithmic scale. Since sound pressure is easier to measure than intensity, sound pressure level (SPL) is usually reported in units of decibels relative to a standard reference pressure. In this section, “dB” is used as shorthand for “dB re 1  $\mu$ Pa @ 1 m<sub>[rms]</sub>” (decibels referenced to 1 micropascal at 1 meter<sub>[rms]</sub>). Readers may find additional details regarding acoustic concepts and terminology in Richardson et al. (1995) and Appendix C of MMS (2004).

Table 4.2-3 compares the received sound level using the different propagation assumptions (spherical vs. over a sloping sea floor) and the source level from the 20-inch<sup>3</sup> air gun. It can be seen that the low source level of this single air gun results in a very small area of received sound levels greater than 180 dB.

Peak sound pressure for the proposed air gun would be approximately 218 dB. The frequency range of the single air gun is 0-128 Hz, although the generated signal would be roughly constant in amplitude over a frequency range of 8-80 Hz. Much of this total output is directed downward. The strongest horizontal propagation of energy occurs along a line perpendicular (broadside) to the array axis; the weakest occurs in line with the array axis (endfire). Air gun pulse components are strongest around 50-100 Hz, although there is considerable energy in the 20-250 Hz range (Richardson and Malme, 1993).



Table 4.2-3. Distances to received sound levels, given a source level of 218 dB, under different propagation assumptions.

Method:	Range*		
	Gausland (2000)	NMFS (1999b)	
Received sound level	Attenuation factor		
	A = 20 (spherical propagation)	A = 25 (sloping seabottom)	
190 dB	25 m (82 ft)	26 m (80 ft)	14 m (44 ft)
180 dB	78 m (254 ft)	80 m (261 ft)	34 m (109 ft)
160 dB	638 m (2092 ft) (0.40 miles)	795 m (2607 ft) (0.50 miles)	209 m (686 ft) ( 0.13 miles)

\* rounded up to the next whole number

Source: Samedan Oil Corporation (2001)

Evidence shows that sonar pulses can, in some circumstances, lead to hearing damage, and indirectly, mortality suggests that caution is warranted when dealing with high-energy pulsed sound and marine mammals (Scripps, 2004). However, seismic pulses from an air gun are quite different from mid-frequency sonar pulses (Scripps, 2004). Typical military mid-frequency sonars operate at frequencies of 2 to 10 kHz, generally with a relatively narrow bandwidth at any one time (though the center frequency may change over time). Because seismic air guns and sonar sounds have considerably different characteristics and duty cycles, it is inappropriate to assume that there is a direct relationship between the effects of military sonar and seismic air guns on marine mammals (Scripps, 2004).

Among the most recent published summaries of information regarding marine mammal hearing and sensitivities relative to acoustic impacts, and specifically relevant to seismic air guns are Thillet (2000), NMFS (2002), NRC (2003), and Appendix G of MMS (2004), which are incorporated here by reference.

Richardson et al. (1991, 1995) concluded that anthropogenic sound in the sea may have several direct, negative effects on marine mammals:

- 1) Intense anthropogenic sounds may physically injure marine mammals' auditory systems, resulting in temporary or permanent reductions in hearing sensitivity (hearing loss, pain or discomfort, or injury);
- 2) Anthropogenic sound may interfere with marine mammals' abilities to detect calls from conspecifics, echolocation pulses, or other important natural sounds such as the calls of predators (audibility and masking); and,
- 3) Anthropogenic sound may disturb or alter the behavior of marine mammals (responsiveness).

Recent stranding mortality events associated with the use of military sonars and seismic air gun arrays have generated additional concerns and hypotheses about direct and indirect impacts of anthropogenic noise on marine mammals. There was a recent (September 2002) stranding of two

Cuvier's beaked whales in the Gulf of California, Mexico when a seismic survey conducted from the R/V *Maurice Ewing* was underway in the general area (Scripps, 2004, citing Malakoff, 2002). The air gun array used during the project was the *Ewing's* 20 air gun 8490-in<sup>3</sup> array (Scripps, 2004). The timing and location of the *Ewing's* research relative to the stranding event suggests that air gun noise may have caused the whales to strand, although one animal disappeared before a necropsy could be completed, and results from the other animal were inconclusive due to its advanced state of decomposition (MMC, 2004). The R/V *Maurice Ewing* was also conducting a seismic survey off the Galapagos Islands in April, 2000 when three Cuvier's beaked whales stranded on Santa Cruz Island, one of the Galapagos Islands (Gentry, 2002). High energy (3D) seismic surveys have also been implicated in an unusual increase of strandings of adult humpback whales at Abrolhos Bank, northeastern coast of Brazil (Engel, et al., 2004) during the 2002 breeding season. Hence, the use of air guns has been implicated in the injury and mortality of cetaceans, specifically Cuvier's beaked whale and the humpback whale, which appear more sensitive to air gun emissions. The link is uncertain but probable that the use of seismic air gun arrays were responsible for the stranding events. What is certain is that the array size used by the *Ewing* is considerably larger with commensurate increases in air gun output (Appendix C of MMS, 2004) relative to the 20-in<sup>3</sup> single air gun to be used for the shallow hazards survey. Further studies are desirable to understand factors associated with such stranding events to minimize future impacts to cetaceans.

As a result of recent strandings of beaked whales in the Bahamas linked to the use of military sonars, new hypotheses have been proposed and discussed among scientists. Chief among them are resonance effects with respect to military sonars and seismic sources, and the possibility of acoustically induced decompression sickness in deep diving cetaceans, particularly beaked whales.

Marine mammals possess air spaces within their bodies that include the lungs, tracheal cavities, sinuses, and the middle ear. It appears that if the correct stimulus were applied, relatively large amplitude oscillations could occur in soft-bounded air spaces of the cetacean middle ear, sinus cavities, and lungs (Appendix G of MMS, 2004). Balcomb (2001) suggested that resonance in the cranial air spaces of beaked whales, from strandings in the Bahamas, was responsible for traumatizing tissues around the brain and ears. He further hypothesized that as the sacs resonate in response to external stimuli (e.g., military sonar), trauma is caused to the surrounding tissue structures. More recently, a workshop of acoustic/marine mammal experts assembled to examine the hypothesis of acoustic resonance as a source of trauma in cetaceans, and used the March 2000 stranding of beaked whales in the Bahamas as a focal point. Workshop participants concluded that resonance in air filled structures was not likely to have played a primary role in the Bahamas stranding for seven specific reasons (NMFS, 2002). The workshop considered a second hypothesis as a possible cause of the beaked whale strandings, that being that sonic-induced bubble formation or growth in tissues that are supersaturated with nitrogen. Such bubble formation may lead to tissue damage associated with decompression sickness. Brain hemorrhages found in the Bahamas whales and full body hemorrhaging and fat embolism found in beaked whales from another stranding event that occurred in the Canary Islands are symptoms consistent with decompression sickness (Appendix G of MMS, 2004). As the decompression sickness hypothesis takes shape, its implications to seismic surveys is yet unclear (Appendix G of MMS, 2004). The hypothesis suggests that decompression sickness may be induced either directly through acoustic stimuli or indirectly through behavioral modification (Appendix G of MMS, 2004). At this time, however, information from stranding events indicate that acoustic

noise from military sonar, and possibly seismic air gun sources, have potential for causing non-auditory physical trauma to several species of cetaceans, most notably the beaked whales.

Richardson et al. (1991; 1995) discussed the possibility that the intense but intermittent sound pulses produced by air guns might damage the auditory systems of marine mammals. Comparing with humans, the authors hypothesized that a received level of 195-215 dB might cause immediate hearing damage. Hearing loss, pain or discomfort, and injury are the most serious potential impacts (Appendix G of MMS, 2004) to marine mammals short of mortality. These impacts can be lethal, or non-lethal, with some impact to the anatomy or physiology of a marine mammal. At the lower spectrum is a condition known as temporary threshold shift (TTS), whereby hearing becomes less sensitive when exposed to a critical combination of sound intensity and duration (Appendix G of MMS, 2004). Higher up the effects spectrum, permanent threshold shift (PTS) occurs, whereby the hearing threshold shift results in permanent damage to the auditory system (Appendix G of MMS, 2004). Repeated exposure to TTS levels without sufficient recovery time can lead to PTS. The most severe effects of acoustic trauma are organ and tissue ruptures. Generally such an event is only expected to occur to an animal in the near-field of an air gun. However, in light of the new hypotheses stemming from recent strandings, physical trauma (especially decompression sickness) may be acoustically induced in deep diving cetaceans at received sound levels considerably lower than those required to produce TTS and PTS in auditory structures of marine mammals (Appendix D of MMS, 2004 citing NMFS, 2001; Potter 2003).

Whether air gun sound may interfere with the communication of marine mammals or affect their behavior must be discussed in the context of what is known about marine mammal hearing and vocalization.

Baleen whale vocalizations are composed primarily of frequencies below 1 kHz (Thomson and Richardson, 1995) and some contain fundamental frequencies as low as 20 Hz (Watkins et al., 1987). Ketten (1998) suggests an upper functional hearing range in baleen whales extending to some 30 kHz. Table G-1 and Table G-2 of Appendix G of MMS (2004) lists the vocalization characteristics and hearing sensitivities of select baleen and toothed whales. The dominant frequencies in baleen whale sounds overlap with those in many industrial sounds, including seismic pulses. Although baleen whales must be sensitive to low and moderate frequency sounds, specific data on sensitivity, frequency or intensity discrimination, or localization abilities are lacking.

Odontocete vocalizations range from whistles to clicks depending on the species. Typically most of their sound energy is between 2-20 kHz (Richardson, 1995b), which is above the low-frequency range where most industrial sounds are concentrated. Source levels for whistles may be as high as 100-180 dB (Richardson et al., 1991). Odontocete echolocation pulses are generally much higher in frequency, 30 to 100 kHz or higher, and source levels may range up to 220-230 dB in medium size species (e.g., bottlenose dolphin) (Au et al., 1974; Au, 1993). Sperm whales produce clicks which may be used to echolocate (Mullins et al., 1988), with a frequency range of less than 100 Hz to 30 kHz (Watkins, 1980).

Odontocetes appear to be most sensitive to sounds at frequencies above about 10 kHz, with sensitivity deteriorating progressively below that level. Although data are sparse, sensitivity seems to be poor below 1 kHz (Richardson et al., 1991), where most industrial noise energy is concentrated, with the possible exception of the sperm whale (Carder and Ridgway, 1990).

Most pinniped vocalizations are airborne, and underwater sounds appear to be limited to barks and clicks with frequencies ranging from less than 1 kHz to about 4 kHz (Richardson et al., 1991). However, some true seals or phocids that mate in water produce underwater sounds with frequencies ranging from less than 1 kHz to 10 kHz and source levels of about 95-160 dB. The best underwater hearing sensitivity of phocids is about the same from 1-2 kHz to 50 kHz; sensitivity at lower frequencies (<760 Hz) has not been tested (but for one harbor seal that had a 100 Hz hearing threshold at 96 dB [Kastak and Schusterman, 1995]). The underwater hearing sensitivity of eared seals is similar, but their upper frequency limit is lower. For example, California sea lion hearing deteriorates rapidly above 20 kHz (Richardson, 1995b), and their hearing sensitivity decreases below 1 kHz (Schusterman et al., 1972; Kastak and Schusterman, 1995).

Evidence is growing that baleen whales avoid seismic air guns. Weller et al. (2001) found that 10 percent of gray whales occurring off Sakhalin Island, Russia avoided broadband levels of 164 dB, and that 90 percent avoided an SPL of 180 dB. McCauley et al. (2000) reported that humpback whales in Australian waters avoided a seismic survey vessel that was at least 3 km distant. Mother-calf pairs reacted at even greater distances (McCauley et al., 2000). In another study, McDonald et al., (1995) (cited by Perry, 1999) acoustically tracked a blue whale while an air gun survey was underway and producing an 215 dB re 1  $\mu$ Pa-m SPL (cited from Engel et al., 2004). The whale commenced a call sequence as the seismic vessel was 15 km distant, and approached the vessel to a range of 10 km. After some silent time, the whale commenced a new call sequence and moved diagonally away from the vessel.

Controlled experiments have been conducted to determine the reactions of bowhead, gray, and humpback whales to air gun sound. In addition, the behavior of several baleen whale species has been observed opportunistically in the presence of sound from distant seismic exploration. Several studies (Reeves et al., 1984; Richardson et al., 1986; Ljungblad et al., 1988) have shown that bowhead whales exhibit strong response behavior when an operating seismic vessel approaches within a few kilometers. Response behavior, as described by Ljungblad et al. (1988), includes active avoidance (swimming rapidly and directly away from the sound source, up to several kilometers), reduced time spent at the surface or per dive, fewer blows per surfacing, and longer intervals between successive blows. These behavioral reactions continued for up to an hour. The observed responses were greatest at ranges of less than three miles (5 km) from the source, but did occur at three to six miles (5-10 km).

Although bowheads exposed to pulses from vessels more than about four miles (7.5 km) away usually did not show avoidance, their diving patterns tended to change in the same manner as those of whales closer to the vessels. Ljungblad et al. (1988) detected behavioral changes up to five miles (8.2 km) away (received sound levels 142-157 dB). Avoidance by all animals occurred up to four miles (7.2 km) away from vessels with air gun arrays.

In one study of gray whales (Malme et al., 1988), diving patterns have been observed to change in the presence of seismic sound, with less time spent both at the surface and submerged, fewer breaths per surfacing, and longer intervals between breaths. In both bowhead and gray whales, strong avoidance behavior has become evident when received sound levels reach 150-180 dB (Richardson and Malme, 1993). This sound pressure level is much higher than the threshold for continuous sounds (e.g., from vessels, dredging, drilling, or oil production).

Richardson et al. (1991, 1995) concluded that baleen whales appear to tolerate low- and moderate-level sound from marine seismic exploration, continuing normal activities when exposed to pulses at received levels of up to 150 dB (and sometimes higher). These levels are 50 dB or more above typical ambient sound levels. It is suspected that subtle behavioral effects do occur at least some of the time at lower received levels. Bowhead and gray whales, at least, actively avoid seismic survey vessels when received levels reach 160-180 dB.

Davis et al. (1998) considered masking to be of insignificant consequence in relation to possible impacts of seismic surveys on the Scotian Shelf, largely due to the low duty cycle of seismic pulses (Appendix G of MMS, 2004 citing Davis et al. 1998). They suggest only behavioral and physical effects rank with any consequence in relation to seismic surveys (Appendix G of MMS, 2004 citing Davis et al. 1998).

Richardson et al. (1991, 1995) reported scant published information on the reaction of odontocetes to seismic sound. They pointed out that the sounds emitted by air guns are at frequencies well below the frequency ranges of the vocalizations and optimum hearing of odontocetes, but that sound pulses recorded underwater many kilometers away from gun arrays sometimes include substantial energy at frequencies of several hundred Hertz (Greene and Richardson, 1988). They concluded that air gun pulses would probably be audible to odontocetes under these circumstances.

Sensitivity to low frequency sounds has been reported for sperm whales by some researchers. Sounds at 57 Hz with source levels of 209 to 220 dB may have caused sperm whales to cease vocalizing and/or leave the area of sonification (Appendix G of MMS, 2004, citing Bowles et al., 1994). Sperm whales in the Gulf of Mexico apparently moved away, possibly by 50 km (31 miles) or more when seismic surveys began (Richardson et al., 1995 citing Mate et al., 1994). Startle reactions in sperm whales were induced using 10 kHz pulses with source levels of 180 dB (Appendix G of MMS, 2004, citing Andre et al., 1997). In contrast, sperm whales did not alter their vocal activity when exposed to received levels of 173 dB from 1 g TNT detonators (Appendix G of MMS, 2004, citing Madsen and Mohl, 2000).

There have been few studies of the impact of seismic surveys on members of the Delphinidae (ocean dolphins) (Appendix G of MMS, 2004). Richardson et al., (1995) comments on an almost total lack of studies on effects of seismic activities on delphinid species. Appendix G of MMS (2004) details recent information on behavioral and physical effects of seismic air guns on delphinids, and cites Stone (1996, 1997ab, and 1998) as reporting that common dolphins, white beaked dolphins, and whitesided dolphins were sighted less often in the vicinity of seismic surveys when the guns were firing than when they were not firing. Others suggest that dolphins habituate to such sound, for Turnpenny and Nedwell (1994) cite the fact that a stable population of bottlenose dolphins (*Tursiops truncatus*) lives in Scotland's Moray Firth, where seismic surveying has occurred regularly since 1965. Also, seismic operators occasionally see dolphins near operating air guns (Duncan, 1985).

Recent measurements of air gun emissions at sea (Appendix G of MMS, 2004, citing Goold and Fish, 1998; Sodal, 1999) have demonstrated that although air gun arrays are a source of primarily low frequency energy, there is also significant energy at higher frequencies. These energies encompass the entire audio frequency range of 20 Hz to 20 kHz (Appendix G of MMS, 2004, citing Goold and Fish, 1998) and extend well into the ultrasonic range up to 50 kHz (Appendix G of MMS, 2004, citing Sodal, 1999). This high frequency energy must be considered with respect

to seismic interactions with delphinids (Appendix G of MMS, 2004). Contrary to early perceptions, the low frequency components of air gun emissions are of sufficient level to exceed dolphin auditory thresholds at these low frequencies, even after considerable spreading loss (Appendix G of MMS, 2004).

Some delphinids are adept divers, such as pilot whales which regularly dive to 500 m (Appendix G of MMS, 2004, citing Baird et al., 2003). Therefore, it is prudent to consider that there is some risk of acoustically and or behaviorally induced decompression sickness. This may not be isolated solely to the larger deeper diving delphinids, as there is some evidence of decompression sickness type pathology in Risso's dolphin, common dolphin, and harbor porpoise (Appendix G of MMS, 2004, citing Jepson et al., 2003).

There have been no published, detailed studies of the reactions by pinnipeds to sound from open-water seismic exploration (Richardson et al., 1991; Richardson, 1995c). However, evidence from the use of small explosive devices (i.e., firecrackers, or "seal bombs") to drive pinnipeds away from fishing operations (Shaughnessy et al., 1981; Mate and Harvey, 1987) indicates that the animals sometimes tolerate intense impulsive sounds when they are strongly attracted to an area for feeding or reproduction. A California sea lion was observed diving approximately 80 ft (25 m) behind an operating air gun array in Long Beach Harbor, although the survey boat ceased firing once the animal was sighted (Chambers Group, Inc., 1995).

Reidman (1983) found that the behavior, density, and distribution of sea otters exposed to sound from a seismic vessel and air gun array were not affected by the acoustic experiments. Although there are no data on the reaction of sea otter greater than 400 m from shore, nearshore otters did not react to full scale seismic work passing as close as 0.9 km (Richardson, 1995c). Sea otters are not expected in the survey area as the area lays further seaward in waters deeper than where sea otters typically occur along the California coast, and hence, are unlikely to be exposed to acoustic harm or disturbance from the shallow hazards survey.

Little research has been conducted on sea turtle hearing and sensitivity, relative to what is known regarding marine mammal hearing and sensitivity. The most recent published summaries of information regarding sea turtle hearing and sensitivities relative to acoustic impacts are Thillet (2000) and Appendix H of MMS (2004), which are incorporated here by reference.

Auditory testing and behavioral studies show that sea turtles can detect and respond to low frequency sound (250 to 1,000 Hz) from air guns. Trials suggest an alarm response of turtles to an approaching air gun array at 166 dB (Thillet, 2000). There is indication of avoidance, at least initially, of air gun pulses with source levels of 175 to 179 dB (Moein et al., 1995). The same study produced possible evidence of temporary threshold shift (TTS) in juvenile loggerhead sea turtles. However, sound pressure levels received by the turtles were not ascertained. McCauley et al. (2000) exposed sea turtles (green and loggerhead) to pulses from a 20-in<sup>3</sup> seismic air gun. The caged turtles noticeably increased swimming speed when received SPL were above 166 dB. Sea turtle behavior became increasingly erratic as received levels exceeded 175 dB. McCauley et al. (2000) suggested that the erratic behavior exhibited by caged sea turtles was evidence for expecting an avoidance response in free swimming turtles.

The NOAA Fisheries has adopted 160 dB as an acceptable level of impulsive underwater sound, as marine mammals have shown a behavioral response (to avoid TTS) to received sound pressure levels of 160 dB and greater. Based on available scientific evidence, acoustic harassment of marine mammals was presumed not to occur below this conservative level. The NOAA Fisheries

adopted 180 dB for all cetaceans, and 190 dB for pinnipeds, as the maximum impulse SPL to which these marine mammals should be exposed (to avoid PTS).

As seen in Table 4.2-3, the estimated distance to expected received sound levels depends on the assumed form of propagation and the inclusion of attenuating modifiers. Using the simple attenuation ( $A \log_{10} R$ ) model (where  $A$  = attenuation factor of propagation type, and  $R$  = the distance in meters from a sound source to a specific attenuated sound level) recommended by the NOAA Fisheries, being more conservative than Gausland (2000) because it does not use any modifiers, and adopting the conservative spherical attenuation factor ( $A = 20$ ) rather than using the less conservative sloping seafloor attenuation factor ( $A = 25$ ), the resulting ranges to the isopleths of the sound pressure levels from the air gun to be used in shallow hazards survey are as follows:

- 190 dB 26 m (80 ft)
- 180 dB 80 m (261 ft)
- 160 dB 795 m (2607 ft) (0.50 miles)

The use of an attenuation factor of  $A=20$  is further justified by existing field verification data.

The 180 and 160 dB isopleths are considerably smaller than those calculated for an air gun array with a sound source of 260 dB SPL (calculated at approximately 300 m [984 ft] and 3000 m [1.86 miles] respectively (Appendix G of MMS, 2004). The 180 dB isopleth forms a zone within which PTS might occur if marine mammals are present. Likewise, the 160 dB isopleth forms a zone within which TTS might occur if marine mammals are present. The 160 dB zone (hereafter referred to as the “impact zone”) forms the basis for assessing potential impacts to marine protected species, as well as the basis for some mitigation measures applied to the proposed shallow hazards survey.

Recall that much of the air gun’s total output is directed downward. Samedan’s survey is to be conducted in waters ranging in depth from 100-400 m (300-1200 ft). Therefore, the vertical axis of the 160 dB isopleth below the air gun certainly extends to the seafloor. The 180 dB isopleth extends down 80 m from the air gun source toward the seafloor. Also recall that the strongest horizontal propagation of energy occurs along a line perpendicular (broadside) to the array axis; the weakest occurs in line with the array axis (endfire). Consequently, the actual dimensions of the 180 dB and 160 dB isopleths are more an elliptical bubble, and the 160 dB isopleth intersects the seafloor of the area to be surveyed. The impact zone used for assessment and mitigation purposes here is conservative, because the impact zone is larger than and encompasses the elliptical 160 dB isopleth.

If no marine mammals occur in the 160 dB impact zone, then the animals are not likely to be harassed by the air gun. The 180 dB impact zone is much smaller. Animals exposed to SPL’s of 180 dB or greater may be harassed or harmed (e.g., PTS); harmed animals may lead to stranding and mortality. The stranding of multiple animals of the same strategic marine mammal stock or endangered or threatened species may result in a significant impact to the overall population. Mitigation measures specific to the shallow hazards survey (see below) make impacts on marine protected species unlikely and negligible, and therefore insignificant.

The High Energy Seismic Survey (HESS) Team prepared interim operational guidelines for high-energy seismic surveys (February 18, 1999). The team was convened by MMS and included members of Federal, State, and local agencies, industry, and environmental interest groups. The guidelines were prepared for 2D and 3D seismic surveys that employ multiple air

guns in arrays to acquire geophysical data, and excluded seafloor data acquisition processes, such as side scan sonar and shallow hazards surveys. However, the HESS Guidelines are useful to mitigating potential impacts associated with using a single air gun for the shallow hazards survey. It is important to note that the HESS Guidelines recommend using the radius of the 180-dB isopleth as the impact zone to be used for all seismic surveys within the southern California study area (HESS, 1999); the assessment and mitigation measures for Samedan's proposed shallow hazards survey uses the 160 dB isopleth as the impact zone; another conservative measure adding to the protection of marine protected species.

Table 4.2-2 lists the seasonal occurrence of some marine mammals in the region. The shallow hazards survey is to occur over approximately 3-4 days during July through December, a period when a variety of marine mammals may be present in the survey area. Sea turtles, are believed to be rare in the Santa Barbara Channel. Some other species are not known in the general vicinity of the proposed survey site. Table 4.2-4 lists marine protected species under Group headings. Each group is taxonomically distinct, although one group combines the sea lions and seals (pinnipeds) with the sea otter (a fissiped). The Groups are: (A) baleen whales; (B) toothed whales; (C) ocean dolphins and porpoises; (D) sea lion, seals, and sea otter; and (E) sea turtles. Group B (which includes the sperm whale and the beaked whales) inhabits deep waters over the continental slope and seaward. While waters in the Santa Barbara Channel are of sufficient depth to be used by members of Group B, available information (e.g., Leatherwood et al., 1987; Barlow, 1995; Forney et al., 1995; Carretta et al., 2004; DeAngelis; pers. comm., 2005) indicates that the likelihood is extremely low that Group B species would occur in the Santa Barbara Channel. For this reason, we do not expect Group B species to inhabit the Channel, although it is possible that they may rarely enter it. As such, impacts to Group B are not expected.

Table 4.2-5 summarizes in tabular format the impacts assessment for the proposed shallow hazards survey. Using the groups identified in Table 4.2-4, it provides a synopsis of anticipated presence in the vicinity of the survey sites, relevant general characteristics about the animals, known strandings attributed to the use of air guns, behavioral responses, sensitivity, and potential impacts without the mitigation measures developed for the proposed survey. It then synthesizes assessment information addressing required and considered mitigation measures that include: restricting survey period, use of 160 dB Impact Zone radius, use of trained observers aboard the survey vessel, use of ramp-up, use of a scout vessel, operating procedural restrictions, use of aerial surveys, and use of passive acoustic monitoring. It concludes with an assessment of likely impacts with the implementation of the required mitigation measures. The following discussion is to complement Table 4.2-5.

HESS Guidelines (1999) recommend that aerial surveys be conducted for seismic surveys lasting 7 days or longer in duration and when marine mammals that have been identified as first or second priority species of concern are known to be present in substantial numbers in or near the survey area. These periods include, but are not restricted to: (a) during the gray whale migration period (approximately mid-December through mid-May); and (b) when blue and humpback whales are present and foraging in the Santa Barbara Channel and Santa Maria Basin (roughly June to October). This probably would also be the period of greatest fin whale abundance in these waters. First-priority species were identified as gray, blue, humpback, and fin whales. The second-priority species include the sperm whale (absent from survey area) and the remaining baleen whale species. HESS Guidelines therefore identify the period of October to mid-



Table 4.2-4. Assessment Groups of Marine Protected Species Which May Occur in the Region (Excluding Very Rare Species).

<b>Group A</b>	<b>Group B</b>	<b>Group C</b>	<b>Group D</b>	<b>Group E</b>
Baleen whales	Toothed whales	Ocean Dolphins & Porpoises	Sea lion, Seals & Sea Otter	Sea Turtles
<ul style="list-style-type: none"> <li>• Gray whale</li> <li>• Blue whale</li> <li>• Fin whale</li> <li>• Minke whale</li> <li>• Humpback whale</li> </ul>	<ul style="list-style-type: none"> <li>• Sperm whale</li> <li>• Pygmy sperm whale</li> <li>• Mesoplodont beaked whales (rare)</li> <li>• Baird's beaked whale (rare)</li> <li>• Cuvier's beaked whale (rare)</li> </ul>	<ul style="list-style-type: none"> <li>• Common dolphins</li> <li>• Bottlenose dolphin</li> <li>• Pacific white-sided dolphin</li> <li>• Striped dolphin</li> <li>• Northern right whale dolphin</li> <li>• Risso's dolphin</li> <li>• Pilot whale</li> <li>• Killer whale</li> <li>• False killer whale (rare)</li> <li>• Dall's porpoise</li> <li>• Harbor porpoise</li> </ul>	<ul style="list-style-type: none"> <li>• California sea lion</li> <li>• Northern fur seal</li> <li>• Northern elephant seal</li> <li>• Harbor seal</li> <li>• Southern sea otter</li> </ul>	<ul style="list-style-type: none"> <li>• Leatherback</li> <li>• Green</li> <li>• Pacific (olive) ridley</li> <li>• Loggerhead</li> </ul>

Table 4.2-5: Summary of The Impacts Assessment for the Proposed Shallow Hazards Survey.

Animal Characteristics, Potential Impacts, and Proposed Mitigation Measures	<b>Group A</b> Baleen whales	<b>Group B</b> Toothed whales	<b>Group C</b> Dolphins & Porpoises	<b>Group D</b> Sea lion, Seals, & Sea Otter	<b>Group E</b> Sea Turtles
Anticipated Presence in Vicinity of Survey Site	Yes	No. Possibly very rare in the Channel.	Yes	Yes	Rare
Relevant Characteristics	<ul style="list-style-type: none"> <li>• Very large body size</li> <li>• Surface Profile: High to intermediate</li> <li>• Surface periodically to breathe</li> <li>• Some surface behavior (breaching, tail slaps, etc.)</li> <li>• Chief activity beneath sea surface</li> <li>• Spend more time beneath surface than Group C</li> </ul>	<ul style="list-style-type: none"> <li>• Large to intermediate body size</li> <li>• Surface Profile: High to low</li> <li>• Deep-diving; extended dive times; chief activity beneath sea surface</li> <li>• Spend more time at depth than other groups, with possible exception - Group E</li> <li>• Some surface activity expected</li> </ul>	<ul style="list-style-type: none"> <li>• Intermediate to small body size</li> <li>• Surface Profile: High to intermediate</li> <li>• Few species capable of diving to moderate depths, but not like Group B</li> <li>• Frequent surface activity, to include breaching, tail slapping, flipper slapping, spyhopping, surfing</li> </ul>	<ul style="list-style-type: none"> <li>• Intermediate to small body size</li> <li>• Surface Profile: Intermediate</li> <li>• Frequent surface activity</li> </ul>	<ul style="list-style-type: none"> <li>• Intermediate to small body size</li> <li>• Surface Profile: Low to very low</li> <li>• Surface periodically to breathe</li> <li>• Extended diving times; chief activity beneath sea surface</li> <li>• </li> </ul>
Known Strandings Attributed to Air gun Use	Yes – Humpbacks in Brazil	Yes – beaked whales	None identified	None identified	None identified
Behavioral Response	<ul style="list-style-type: none"> <li>• Local Avoidance</li> <li>• Alter vocalizations</li> <li>• Possible stranding during mating season</li> </ul>	<ul style="list-style-type: none"> <li>• Local avoidance or displacement</li> <li>• Alter vocalizations</li> </ul>	<ul style="list-style-type: none"> <li>• Local avoidance or displacement</li> </ul>	<ul style="list-style-type: none"> <li>• Pinnipeds: unknown; have been observed swimming ~ 25 m behind an operating air gun</li> <li>• Sea otter: None observed from study</li> </ul>	<ul style="list-style-type: none"> <li>• Local avoidance; displacement unknown but believed unlikely.</li> </ul>

Table 4.2-5: Summary of The Impacts Assessment for the Proposed Shallow Hazards Survey. (continued)

Animal Characteristics, Potential Impacts, and Proposed Mitigation Measures	<b>Group A</b> Baleen whales	<b>Group B</b> Toothed whales	<b>Group C</b> Dolphins & Porpoises	<b>Group D</b> Sea lion, Seals, & Sea Otter	<b>Group E</b> Sea Turtles
Sensitivity to Air gun Noise	Yes- High to moderate given the avoidance behavior and strandings attributed to air gun noise.	Yes- High to moderate; given the avoidance behavior and strandings attributed to air gun noise.	Yes – Low, given that dolphins sometimes approach seismic survey vessels to bow ride.	<ul style="list-style-type: none"> <li>• Pinnipeds: Very low; based on very limited information;</li> <li>• Sea otters: Very low; one playback study with no adverse impacts.</li> </ul>	Low; based on very limited information. Not known to experience decompression sickness attributed to high energy acoustic exposure.
Potential Impact without Mitigation Measures	Adverse and Moderate (Significant) Impacts Likely; possible stranding events; possible physical harm; possible behavioral responses.	Impacts unlikely as group inhabits waters beyond the Channel.	Possible adverse impacts, but unlikely; only if approaching vessel and voluntarily enter impact zone. Anticipate no more than negligible impacts.	<ul style="list-style-type: none"> <li>• Pinnipeds: Possible adverse impacts, but unlikely. Only if voluntarily approach air gun closely; physical impacts uncertain.</li> <li>• Sea otter: Not expected given the survey is to be performed in waters much deeper than typically inhabited by sea otters. Also have shown no impacts from playback study.</li> <li>• Anticipate no more than negligible impacts for pinnipeds and sea otters.</li> </ul>	<ul style="list-style-type: none"> <li>• Possibly adverse impacts, but unlikely given avoidance behavior and apparently low sensitivity.</li> <li>• Anticipate no more than negligible impacts.</li> </ul>

Table 4.2-5: Summary of The Impacts Assessment for the Proposed Shallow Hazards Survey. (continued)

Animal Characteristics, Potential Impacts, and Proposed Mitigation Measures	<b>Group A</b> Baleen whales	<b>Group B</b> Toothed whales	<b>Group C</b> Dolphins & Porpoises	<b>Group D</b> Sea lion, Seals, & Sea Otter	<b>Group E</b> Sea Turtles
Restricting Survey Period to mid-Oct thru mid-Dec <ul style="list-style-type: none"> <li>• Required</li> </ul>	<ul style="list-style-type: none"> <li>• Limits survey activity to period that HESS Guidelines and available data indicate that baleen whale activity and abundance are not substantial in the general area</li> </ul>	Not applicable, as toothed whales are not anticipated in the area.	Of limited use.	Of limited use, although does minimize potential for encountering Northern elephant seals which are abundant during winter.	<ul style="list-style-type: none"> <li>• Leatherback: surveys during summer/fall indicate foraging off central CA at end of summer. Abundance and activity annually variable; uncertain during mid-Oct to mid-Dec.</li> <li>• Green: unlikely to be in area; typically more southern distribution</li> <li>• Pacific Ridley: prefers warmer waters and is not expected in area</li> <li>• Loggerhead: likely occurring during El Nino yrs. Uncertainty re: seasonal abundance.</li> <li>• Overall, timing restriction is of limited application to sea turtles</li> </ul>

Table 4.2-5: Summary of The Impacts Assessment for the Proposed Shallow Hazards Survey. (continued)

Animal Characteristics, Potential Impacts, and Proposed Mitigation Measures	<b>Group A</b> Baleen whales	<b>Group B</b> Toothed whales	<b>Group C</b> Dolphins & Porpoises	<b>Group D</b> Sea lion, Seals, & Sea Otter	<b>Group E</b> Sea Turtles
160 dB Impact Zone Radius based on conservative model <ul style="list-style-type: none"> <li>• Required</li> </ul>	<ul style="list-style-type: none"> <li>• HESS Guidelines recommend using the 180 dB radius as the safety zone distance for all seismic surveys.</li> <li>• Mitigation measures require using the more conservative and larger 160 dB radius to monitor for animals.</li> <li>• Provides expanded observer coverage for animals potentially approaching air gun.</li> </ul>	<ul style="list-style-type: none"> <li>• Same as for Group A</li> </ul>	<ul style="list-style-type: none"> <li>• Same as for Group A</li> </ul>	<ul style="list-style-type: none"> <li>• Same as for Group A</li> </ul>	<ul style="list-style-type: none"> <li>• Same as for Group A</li> </ul>
Use of Trained Observers Aboard Survey Vessel <ul style="list-style-type: none"> <li>• Required</li> </ul>	<ul style="list-style-type: none"> <li>• Recommended by HESS</li> <li>• Useful for detecting animals at surface to breathe, socialize, etc.</li> <li>• Commonly used for collecting scientific data on marine protected species in the field.</li> <li>• Likely capable of detecting surfacing marine protected species in area before ramping up</li> </ul>	<ul style="list-style-type: none"> <li>• Same as for Group A</li> </ul>	<ul style="list-style-type: none"> <li>• Same as for Group A</li> <li>• Air guns to be shutdown immediately if observers detect dolphins approaching survey vessel to bow ride while air gun is firing.</li> </ul>	<ul style="list-style-type: none"> <li>• Same as for Group A</li> <li>• Air guns to be shutdown immediately if observers detect pinnipeds or sea otters approach survey vessel</li> </ul>	<ul style="list-style-type: none"> <li>• Same as for Group A</li> <li>• Group more difficult to visually detect as present smaller surface profile and are thought to spend less time at surface than marine mammals.</li> <li>• Nonetheless, observers have proven capable of detecting sea turtles at the</li> </ul>

Table 4.2-5: Summary of The Impacts Assessment for the Proposed Shallow Hazards Survey. (continued)

Animal Characteristics, Potential Impacts, and Proposed Mitigation Measures	<b>Group A</b> Baleen whales	<b>Group B</b> Toothed whales	<b>Group C</b> Dolphins & Porpoises	<b>Group D</b> Sea lion, Seals, & Sea Otter	<b>Group E</b> Sea Turtles
	and during air gun operations. <ul style="list-style-type: none"> <li>Air gun to be shutdown immediately if observers detect a marine protected species inside of or closely approaching the impact zone</li> </ul>				surface during seismic operations and the air gun was shutdown.
Use of Ramp-up <ul style="list-style-type: none"> <li>Required.</li> </ul>	<ul style="list-style-type: none"> <li>HESS recommendation</li> <li>Technique used to warn whales of seismic activity being commenced in area</li> <li>Baleen whales anticipated to move out of immediate area as ramp-up commences.</li> </ul>	<ul style="list-style-type: none"> <li>HESS recommendation</li> <li>Technique used to warn whales of seismic activity being commenced in area</li> <li>Toothed whales anticipated to move out of immediate area as ramp-up commences.</li> </ul>	<ul style="list-style-type: none"> <li>HESS recommendation</li> <li>Technique used to warn dolphins and porpoises of seismic activity being commenced in area</li> <li>Cetaceans anticipated to move out of immediate area as ramp-up commences.</li> </ul>	<ul style="list-style-type: none"> <li>HESS recommendation</li> <li>Technique used to warn pinnipeds and sea otters of seismic activity being commenced in area</li> </ul>	<ul style="list-style-type: none"> <li>HESS recommendation</li> <li>Technique used to warn sea turtles of seismic activity being commenced in area</li> </ul>
Use of Scout Vessel <ul style="list-style-type: none"> <li>Required</li> </ul>	Provides additional “eyes” to alert observers to protected species observed from the scout vessel.	Same as Group A	Same as Group A	Same as Group A	Same as Group A

Table 4.2-5: Summary of The Impacts Assessment for the Proposed Shallow Hazards Survey. (continued)

Animal Characteristics, Potential Impacts, and Proposed Mitigation Measures	<b>Group A</b> Baleen whales	<b>Group B</b> Toothed whales	<b>Group C</b> Dolphins & Porpoises	<b>Group D</b> Sea lion, Seals, & Sea Otter	<b>Group E</b> Sea Turtles
Operating Procedures (daytime air gun operation, slow vessel speed, air gun off during turns) <ul style="list-style-type: none"> <li>Required</li> </ul>	<ul style="list-style-type: none"> <li>Minimizes air gun noise introduced into water</li> <li>Slow vessel speed enhances opportunity for observers to detect animals in general area that vessel is moving through</li> <li>Daylight operations facilitate use of observers for detecting animals</li> </ul>	Same as Group A	Same as Group A	Same as Group A	Same as Group A
Use of Aerial Surveys <ul style="list-style-type: none"> <li>Not a required mitigation measure.</li> </ul>	Recommended by HESS if survey occurs during period when species of concern are known to be present in substantial number in or near the survey area. These periods include, but are not restricted to: <ul style="list-style-type: none"> <li>During gray whale migration period (~mid-Dec through mid-May)</li> <li>When blue and humpback whales are present and foraging in the SBC and SMB (~June to October).</li> </ul>	<ul style="list-style-type: none"> <li>May qualify under HESS Guideline scenarios, but not specific to toothed whales as is for baleen whales.</li> <li>Useful for detecting toothed whales, as scientists use aerial surveys for toothed whale studies</li> <li>Not applicable to Samedan’s survey because survey area is in waters not known to be inhabited by toothed whales</li> </ul>	<ul style="list-style-type: none"> <li>Not recommended by HESS Guidelines.</li> <li>Useful for detecting animals, as scientists use aerial surveys for cetacean studies</li> <li>Likely an excessive mitigation if applied to this Group given that animals are relatively easily detectable by shipboard observers.</li> </ul>	<ul style="list-style-type: none"> <li>Not recommended by HESS Guidelines</li> <li>Useful for detecting animals, as scientists use aerial surveys for pinnipeds and sea otter studies</li> <li>Likely an excessive mitigation if applied to this Group given that animals are relatively easily detectable by shipboard observers.</li> </ul>	<ul style="list-style-type: none"> <li>HESS Guidelines were developed for marine mammals; application of the guidelines to sea turtles has been adopted by many agencies.</li> <li>Used to successfully by scientists for gathering data on sea turtles at sea.</li> <li>May cause animals to retreat from surface to avoid aircraft noise.</li> <li>Insufficient information</li> </ul>

Table 4.2-5: Summary of The Impacts Assessment for the Proposed Shallow Hazards Survey. (continued)

Animal Characteristics, Potential Impacts, and Proposed Mitigation Measures	<b>Group A</b> Baleen whales	<b>Group B</b> Toothed whales	<b>Group C</b> Dolphins & Porpoises	<b>Group D</b> Sea lion, Seals, & Sea Otter	<b>Group E</b> Sea Turtles
	MMS requires that the survey be conducted during a period when species of concern are not anticipated to be of substantial numbers in the general area of the survey.				available to determine effectiveness of using aerial surveys during seismic surveys to monitor for sea turtles.
Use of Passive Acoustic Monitoring <ul style="list-style-type: none"> <li>• Not a required mitigation measure.</li> </ul>	<ul style="list-style-type: none"> <li>• Not recommended by HESS for baleen whales.</li> <li>• Only functional for vocalizing animals</li> <li>• Not likely to be effective given inability to monitor for real-time activities</li> </ul>	<ul style="list-style-type: none"> <li>• Recommended by HESS if sperm whales are present.</li> <li>• Survey area is in waters not inhabited by sperm whales.</li> <li>• Only functional for vocalizing animals</li> </ul>	<ul style="list-style-type: none"> <li>• Not recommended by HESS for dolphins or porpoises.</li> <li>• Not likely to be effective given inability to monitor for real-time activities</li> <li>• Only functional for vocalizing animals</li> </ul>	<ul style="list-style-type: none"> <li>• Not recommended by HESS for pinnipeds or sea otters.</li> <li>• Not likely to be effective given inability to monitor for real-time activities</li> <li>• Only functional for vocalizing animals</li> </ul>	<ul style="list-style-type: none"> <li>• Not likely to be effective given inability to monitor for real-time activities and lack of information regarding sea turtle vocalizations</li> <li>• Only functional for vocalizing animals</li> </ul>
Likely Impacts with Required Mitigation Measures	Negligible impacts, not adverse.	None, since animals not likely to be present in area.	Negligible impacts, not adverse.	Negligible impacts, not adverse.	Negligible impacts, not adverse.



December as a window in which the abundance of blue, gray, and humpback whales are low relative to other times during the third and fourth quarter of the year.

The mid-October to mid-December period appears to be a period that minimizes potential impacts to large whales (HESS, 1999), as this period lies outside of, or is on the cusp of, their predictable periods of occurrence in the region. Recent literature also supports this assessment. For example, gray whales migrating south in the fall, exit the Bering Sea via Unimak Pass, Alaska into the North Pacific Ocean (Jones and Swartz, 2002). Some pass through into the North Pacific as early as October, but 90 percent leave from mid-November to late December. Females in late pregnancy go first, followed by other adults and immature females, and then immature males. Cows with newborn calves migrate northward from winter feeding areas (i.e., south of California) between March and June along the U.S. west coast (Angliss and Lodge, 2004). Blue whales and humpback whales appear to feed off California from June to November (Carretta et al., 2004). Conversely, shallow hazards surveys conducted outside the mid-October to mid-December window have an increased possibility of encountering blue, fin, humpback, or gray whales.

Based on the HESS Guidelines and seasonal distribution described above, the MMS is requiring that the survey be performed within the mid-October to mid-December window. All MPS mitigation measures are obligatory. Furthermore, the MMS requires that Samedan consult with the Office of Protected Resources, NOAA Fisheries to determine if a small take authorization or incidental harassment authorization is warranted for the shallow hazards survey, and obtain the appropriate authorization per NOAA Fisheries advice (MPS-13). NOAA Fisheries advised the MMS that an applicant to the permitting process for harassment authorization should apply at least eight months prior to the intended start date; delays can occur because of other regulatory requirements associated with the ESA and NEPA.)

A shallow hazards survey conducted during the period that baleen whales are not expected in the survey area (mid-October to mid-December) is expected to have non-adverse, negligible, and therefore insignificant impacts. In addition, the shallow hazards survey (conducted in mid-October to mid-December, as required by MMS in MPS-13 below) is not likely to encounter gray whale cow-calf pairs and therefore, is not likely to affect conceivable cow-calf communications. Toothed whales are not known occurring in the survey area, and sea turtles are believed to be rare there, therefore there would be no impacts expected. The timing restriction is of limited application to the dolphins and porpoises. It potentially reduces the potential for encountering Northern elephant seals which are abundant during winter months off California. The mid-October to mid-December window may see more sea otters in coastal waters, but the survey area lies in deeper waters than areas that sea otters typically utilize. Overall, conducting the shallow hazards survey between mid-October and mid-December minimizes the potential for impacting marine protected species in the greater third and fourth quarter period.

Trained shipboard observers would be used to monitor the 160 dB Impact Zone and adjacent waters for protected species prior to commencing and during air gun operations. Observers have been successfully used in previous shallow hazards surveys for detecting wildlife. Some marine protected species are more easily detected than others. For example, dolphins exhibit frequent surface activity and of a size that are readily discernable. Some species lift their flukes from the water when commencing a dive. Some whales have larger surface profiles (e.g., dorsal fins) than others, others have very distinguishable blow (i.e., exhaled moist air). Of all the groups identified

in Table 4.2-4, the sea turtles are regarded as the most difficult to detect by observers. Slow vessel speeds during the survey (approximately 5 knots or less) greatly facilitate the observer's potential to detect sea turtles and marine mammals as the vessel and air gun move through the sea. The requirement that all personnel aboard both the survey and scout vessels maintain vigilant watch for marine protected species increases both the physical coverage (from two vessels) and the number of potential eyes watching.

Observers would have the authority to immediately suspend air gun operations if a protected species appears entering or within the 160 dB Impact Zone. This mitigation measure is critical to the protection of marine protected species. Some species have been reported to approach seismic vessels conducting operations, such as various dolphins and the California sea lion. Shutting down the air gun when a marine protected species is observed approaching or inside the impact zone has potential to protect the wildlife from harm.

Prior to commencing air gun operations, observers would monitor the 160 dB Impact Zone for at least 30 minutes before ramping up the air gun. This measure minimizes the potential for commencing ramp-up when protected species are present in the impact zone.

HESS Guidelines recommend ramping up the air gun. Ramp-up is a common sense measure; it is assumed ramp-up of the air gun to operating levels serves to warn protected species of the survey operations in the general area. It is believed that most protected species would avoid the air gun sound by making minor adjustments in their positions to remain beyond the 160 dB Impact Zone. Available information indicates that baleen whales, toothed whales, dolphins, and sea turtles appear to avoid air gun noise to some degree. Pinnipeds and sea otters appear least likely to avoid air gun noise; sea turtles may or may not avoid air gun noise, however they are believed rare in the survey area; more information on these species sensitivities would be useful.

The air gun would not be operated at night when observers would find detecting marine protected species ineffective. This measure, as well as the measure whereby the air gun would cease firing between survey legs, decreases the total energy output potentially introduced into survey area.

The MMS is not requiring that aerial surveys be performed. Recall that the HESS Guidelines recommend aerial surveys be performed if the survey period when species of concern are known to be present in substantial numbers in or near the survey area. It specifically identified the period during the gray whale migration (mid-December through mid-May), and the period when blue and humpback whales are present and foraging in the Santa Barbara Channel and Santa Maria Basin (June to October), as windows wherein aerial surveys are prudent. Although dolphins, porpoises, pinnipeds, and sea otters may occur in the survey area, HESS Guidelines do not recommend aerial surveys for these species. Aerial surveys may be useful for detecting animals of these groups, however, aerial surveys are regarded as an excessive mitigation measure because shipboard observers are likely effective for detecting these animals. Aerial surveys may be useful for detecting sea turtles, however, noise generated from aircraft used for aerial surveys may cause marine wildlife to avoid the surface, thereby making their detection more difficult in the area. Shipboard observers are known to detect sea turtles and have shutdown seismic survey operations in the past to avoid adversely impacting sea turtles (M. DeAngelis, NOAA Fisheries, 2005, pers. comm.).

HESS guidelines (HESS, 1999) briefly discuss the use of passive acoustic monitoring (PAM) technology for seismic surveys. The guidelines note that PAM is not recommended for inclusion

in the mitigation protocol, although PAM methods may be incorporated into the protocol in the future, as more feasible systems become available. There is one partial exception relative to sperm whales; if there is evidence indicating that sperm whales may be present in substantial numbers in an area proposed for a seismic survey, the use of PAM should be considered. That is not the case for these surveys. PAM technology is only functional for vocalizing animals, such as some baleen and toothed whales, dolphins and porpoises, and pinnipeds. It does not appear useful for detecting sea otters or sea turtles.

More recently, Appendix E of the Geological and Geophysical Exploration for Mineral Resources on the Gulf of Mexico Outer Continental Shelf (2004) discusses PAM. It notes “Although the hardware and software for passive acoustic monitoring are available and technologically advanced, complete integrated systems specifically designed and validated for use with marine mammals during seismic surveys are not. Systems for detecting and recording sounds from marine mammals and determining their bearing and distance relative to the receiver are readily available. However, systems that can provide real-time information to allow operational decisions to be made during a seismic survey are limited.” Given that (1) sperm whales and beaked whales are not known to occur in the area to be surveyed, and that (2) PAM systems capable of providing real-time information to allow operation decisions are limited, the MMS is not requiring the use of PAM technology for the shallow hazards survey.

Samedan has included in its proposal a suite of mitigations (included below) that serve to minimize the potential exposure of protected species to acoustic energy greater than or equal to a 160 dB SPL. Additional mitigation measures required by the MMS further minimize potential impacts to marine protected species. The shallow hazards survey is not likely to cause a measurable change in population abundance, displace the population of a marine protected species from a major part of either feeding or breeding areas or migratory routes for a biologically significant length of time. Breathing, nursing, feeding or other typical behaviors are expected to continue. No measurable loss or irreversible modification of habitat is likely. The mitigation measures reduce potential acoustic impacts from the proposed action so that adverse impacts are unlikely, and only negligible, and therefore insignificant impacts are anticipated.

Strikes or Entanglement with Lines. Survey operations would temporarily introduce flexible cables or lines that hang freely from one or more fixed points into the survey area. Airgun and hydrophone lines (cables) present some risk of striking or entangling a marine protected species. A line striking or entangling a marine protected species may result in harm or mortality, but amounts to an insignificant impact. There are no documented cases of such strikes or entanglement attributed to OCS activities. Sound generated by the engines or other machinery aboard the survey vessel may motivate animals to avoid the proximate area of the vessel where lines are deployed. Localized avoidance is regarded as a negligible and beneficial impact. Requiring onboard personnel to immediately report sightings of protected species to vessel operators decreases the risk of adverse vessel-animal interactions. Once aware that protected species are nearby, vessel operators may take actions as outlined in the MWCP to avoid adverse interactions. Adverse or significant impacts to marine protected species are not anticipated from anchoring since the MMS would prohibit offshore anchoring unless human harm is likely without anchoring. Also, given the limited time that lines may be deployed, that trained observers would be monitoring a 795 m (0.5 mile) impact zone around the air gun for protected species, and that technical personnel tending lines would be required to immediately notify the

vessel operator of observed protected species in the area, it is unlikely that a marine protected species would be struck by or become entangled in lines associated with the survey.

Impacts to Critical Habitat of Threatened and Endangered Species: Critical habitat has not been designated in the California region for any of the listed marine mammal and sea turtle species listed in Table 4.2-1. The proposed shallow hazards survey would not impact any critical habitat given that there is none located in the region.

**Samedan Mitigation Measures:** To minimize potential adverse impacts to marine protected species (i.e., marine mammals and sea turtles) from the shallow hazards survey, Samedan plans to implement the following mitigation measures (Samedan, 2004):

**MPS-1:** Samedan shall ensure that the single 20 in<sup>3</sup> air gun will be operated only in daylight hours to allow observation of nearby marine protected species (and sport or commercial diving operations) by experienced observers. The air gun will be turned off during the period in which the vessel makes its turn to move from one line to the next.

**MPS-2:** Samedan shall ensure that a 160 dB impact zone (estimated at 795 m [0.50 mi] radius) around the air gun is established, and the air gun is shut down if marine protected species enter the zone.

**MPS-3:** Samedan shall use two NOAA Fisheries approved observers on the shallow hazards survey vessel to ensure continuous observation during air gun operations. Monitoring will begin at least 30 minutes before the air gun is turned on. Preferred methods include use of 7 X 50 reticulated binoculars and from a vantage point on the vessel with the best view of the 160 dB impact zone (ideally an unobstructed 360° view).

**MPS-4:** Samedan shall require that the air gun will be ramped up to allow marine protected species that may have been missed by the observers to move away as the intensity of the SPL gradually increases over several minutes.

**MPS-5:** Samedan shall ensure that if the 160 dB impact zone or survey area cannot be adequately monitored due to weather conditions (e.g., fog) or sea state (greater than Beaufort 4), all operations will be delayed until conditions improve.

**MPS-6:** Samedan shall require the survey vessel to observe all additional procedures outlined in the Marine Wildlife Contingency Plan (MWCP).

**MPS-7:** Samedan shall ensure that all protective measures established apply for marine mammals and sea turtles.

**MMS Mitigation Measures:** Many of the mitigations recommended by the HESS Team have been incorporated into the proposed action or required by MMS to minimize potential adverse impacts on marine mammals or federally listed endangered and threatened species from the shallow hazards survey that would take place during the suspension period. The MMS will require the following:

**MPS-8:** Samedan shall submit for MMS and NOAA Fisheries approval at least 90 days prior to the commencement of survey operations a current and final MWCP by which Samedan will avoid adversely impacting marine mammals and endangered and threatened species. Samedan shall provide the California Coastal Commission a copy of the approved final MWCP before the survey vessel departs for the survey.

**MPS-9:** Samedan shall ensure that vessel operators and personnel aboard the survey vessel are educated of the potential occurrence of marine protected species in the region, and of the importance to avoid “taking” a marine protected species (e.g., loss of valued wildlife; criminal and/or civil penalties). Samedan shall require all vessel operators and personnel of the survey vessel and scout boat to be alert for marine protected species.

**MPS-10:** Samedan shall require that any personnel observing a marine protected species during vessel operations (e.g., transiting to or from the survey area, during survey operations) to immediately report the sighting to the vessel operator and/or watchstanding observer (during shallow hazards survey operations). Communications between vessel operators and observers can be accomplished by hand-held radios. Subcontracted personnel, such as technical personnel tending survey lines, are also required to comply with these requirements.

**MPS-11:** Samedan shall ensure that all vessel operators (survey vessels and scout vessels) shall, in general, when transiting to and from survey sites, remain at least 300 m (approximately 1,000 ft) from marine protected species to minimize the chance of collision or disturbance. Vessel operators should adhere to the following guidelines: DO NOT: (1) move into the path of a whale; (2) move faster than a whale; (3) make rapid speed or erratic directional changes, unless to avoid collision with a whale or another vessel; (4) get between two whales; or (5) chase whales. All vessel operators shall follow the appropriate procedures established in the approved MWCP.

**MPS-12:** Samedan shall ensure that all vessel operators operate their vessels at speeds not to exceed 12 knots to minimize risking collision with whales. In the unlikely even of a watercraft collision with a marine mammal, Samedan must immediately contact the NOAA Fisheries Stranding Coordinator, at (562) 980-4017 and the MMS POCS Region Office.

**MPS-13:** Samedan shall consult with the Office of Protected Resources, NOAA Fisheries to determine if a small take authorization or incidental harassment authorization is warranted for the shallow hazards survey. Samedan shall obtain the appropriate authorization per NOAA Fisheries advice. NOAA Fisheries advised the MMS that an applicant to the permitting process for harassment authorization should apply at least eight months prior to the intended start date; delays can occur because of other regulatory requirements associated with the ESA and NEPA.) Samedan shall conduct the shallow hazards survey during the mid-October and mid-December window, unless NOAA Fisheries determines via the permitting process that another period is more suitable to avoid impacts to marine mammals. Samedan shall provide the MMS with an updated Execution Plan 60 days prior to survey start-up. The updated Execution Plan shall include documentation regarding the outcome of the consultation with NOAA Fisheries concerning incidental harassment authorization and any additional mitigation measures required or recommended by NOAA Fisheries. Samedan shall also provide a copy of the updated Execution Plan to the California Coastal Commission.

**MPS-14:** Samedan shall not operate the air gun in federal waters beyond the boundaries of the area for which the survey is permitted for, with one exception. That exception being that Samedan may ramp-up the single air gun in a buffer area approximately 1 km preceding the immediate trackline to be surveyed inside the permitted area. Samedan shall not operate the air gun in state waters without the appropriate approvals from the California State Lands Commission. Observers will document the time and exact location (i.e., latitude and longitude) that the survey vessel passes into or out of federal waters, as well as to whether the air gun is

shutdown or activated at the time. Observers shall document any air gun firings occurring within state waters.

**MPS-15:** Samedan shall ramp-up the air gun to operating levels at a rate not to exceed 6 dB per minute to operating level at the start of operations or testing, when beginning a new trackline or any time after the air gun is powered down below 160 dB.

**MPS-16:** Samedan shall empower observers with the authority to delay ramp-up or require shut down of the air gun whenever marine mammals or endangered or threatened species are observed within or appear likely to enter the 160 dB impact zone.

**MPS-17:** Samedan shall require that if marine mammals or endangered or threatened species are observed within the 160 dB impact zone or proximate area prior to ramp-up, observers shall delay powering up the air gun for 30 minutes and until protected species are believed beyond the impact zone and unlikely to reenter.

**MPS-18:** Samedan shall ensure that observers do not stand watches lasting longer than 4 hours. Two to 3-hour watches are recommended.

**MPS-19:** Samedan shall empower observers with the authority to shutdown, resume, or continue airgun operations under reduced visibility conditions, based on periodic reevaluation that takes into account the densities of observed marine protected species and variations in visibility allowing for intermittent monitoring of the 160 dB impact zone. When operating under conditions of reduced visibility due to adverse weather conditions, operations may continue unless, in the judgment of the shipboard observers, the 160 dB impact zone cannot be adequately monitored and observed marine protected species densities have been high enough to warrant concern that an animal may enter the impact zone undetected.

**MPS-20:** Samedan shall not allow offshore anchoring of vessels associated with the survey, unless human harm is likely without anchoring.

**MPS-21:** Samedan shall log all sightings of marine mammals and/or endangered or threatened species. Data to be recorded includes the species, numbers, and behavior of marine mammals and/or endangered or threatened species observed from the vessel or aircraft (if used), as well as those occurring in the 160 dB impact zone, the estimated number of animals that may have entered the 160 dB impact zone, any air gun shutdowns due to marine protected species mitigations, and any behavioral responses to vessel or survey activities. Watchstanding observers are best suited for logging data; however, in the case that observers are not on watch, vessel operators will be responsible for ensuring the data is logged. The task may be delegated to a competent note-taker. Samedan shall notify the MMS POCS Region on a daily basis of any sightings data made for that day and the steps Samedan has taken/is taking to avoid adversely impacting protected species.

**MPS-22:** Samedan shall submit to MMS and NOAA Fisheries, no later than 60 days after completion of survey operations, a report of all sightings and data collected as specified in MPS-14 and MPS-21. A summary of the sightings data and effectiveness of mitigation measures shall be included as part of the report. The report may also include recommendations for improving the mitigation measures required to protect marine protected species. Samedan shall provide the California Coastal Commission with a copy of the report within two weeks following its delivery to the MMS and NOAA Fisheries.

**Conclusion:** The shallow hazards survey associated with the proposed lease suspension has the potential for harassing or harming protected marine mammals and sea turtles. Without imposing the listed mitigation measures on the shallow hazard survey, there is a greater likelihood that marine protected species might be harassed or harmed, including the possibility of a stranding event resulting in mortality of some cetaceans. However, the incorporation of the listed mitigation measures, based on available information, reduce the potential of impacting marine protected species to negligible, and therefore insignificant effects are anticipated. Some individual animals detecting the vessel operations are anticipated to locally adjust their positions to avoid such operations. Localized avoidance is a negligible, and therefore insignificant impact. Migration, breathing, nursing, feeding, or other typical behaviors are expected to continue unabated. Some mitigation measures are required in the event that animals do not avoid vessel operations; mitigation measures specific to the shallow hazards survey make impacts on marine protected species unlikely and negligible, and therefore insignificant. Collisions, strikes, and entanglements with protected species are avoidable and mitigated to unlikely; only negligible and therefore insignificant impacts are anticipated. The mitigation measures, individually and collectively applied to the proposed survey, greatly limit the potential for adversely impacting marine protected species. The MMS concludes that marine mammals and sea turtles are unlikely to be adversely impacted by the shallow hazards survey associated with the proposed suspension. Potential impacts on marine protected species are mitigated to that being anticipated as negligible, and therefore insignificant, and non-adverse.

**Cumulative Analysis:** Cumulative impacts are defined pursuant to the NEPA regulations (40 CFR 1508.7) as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions.”

The incremental impact of the proposed action (including the shallow hazards survey with obligatory mitigation measures) on marine protected species is anticipated to be negligible and therefore insignificant impacts are expected; adverse impacts are unlikely. Some individual animals detecting the vessel operations are anticipated to locally adjust their positions to avoid such operations. Localized avoidance is a negligible impact to animals as they continue their activities beyond the 160 dB impact zone (Level B harassment) and are therefore not harmed or harassed. Migration, breathing, nursing, feeding, or other typical behaviors are expected to continue unabated. Consequently, the proposed action’s contribution to other past, present, and reasonably foreseeable future actions does not change cumulative impacts appreciably and are not expected to be biologically important.

Ongoing and proposed oil and gas activities in Federal and State waters, Alaskan and foreign-import tankering, military operations, commercial fishing activities, shipping activities, subsistence hunting, whale watching, and marine pollution are potential anthropogenic sources of cumulative impacts to marine mammals in the area. Potential non-anthropogenic sources of potential cumulative impact identified include disease, marine toxins and El Niño events. The incidental take of marine mammals and sea turtles in commercial fishing operations is currently the primary source of anthropogenic harm.

Multiple sources of noise and disturbance, including stationary oil and gas activities (construction, drilling, and production), ship and boat noise, aircraft, and seismic survey noise, occur in the Santa Barbara Channel and nearby waters. Although some oil and gas activities off southern California, (e.g., construction and seismic surveys) have declined over the last decade,

overall vessel traffic, including commercial, military, and private vessels, is increasing. These increasing levels of noise and disturbance should result in more frequent masking of marine mammal communications, behavioral disruption, and short-term displacement. And, in other areas, there is some evidence for long-term displacement of marine mammals due to disturbance, particularly in relatively confined bodies of water (summarized in Richardson et al., 1995).

Marine mammal populations in California waters have generally been growing in recent decades (Bonnell and Dailey, 1993; Barlow et al., 1997, 2001; Forney et al., 2000) despite a gradual increase in a wide variety of human activities in the area. There is no evidence that these activities have resulted in significant impacts on marine mammal or sea turtle populations.

Samedan's shallow hazards survey is mitigated to negligible and therefore insignificant by mitigation measures that Samedan proposes to implement, and by the additional mitigation measures MMS would require. Since these mitigation measures would be implemented and we believe them to be effective, adverse impacts are unlikely. Additional shallow hazards surveys may occur north of those proposed by Samedan. MMS is currently reviewing a proposal by Aera Energy LLC (Aera) to conduct shallow hazards surveys on the Point Sal and Purisima Point Units (Santa Maria Basin) between July and December 2006 (MMS, 2005a). Aera's surveys would likely use the same vessels, crew, geophysical personnel, and airgun. The Aera surveys are likely to be part of the same vessel trip offshore as that for the Samedan shallow hazards survey. Hence, the Aera and Samedan shallow hazards surveys are not simultaneous to one another, but instead are to follow each other with minimal intermission. The Aera surveys are similarly mitigated for marine protected species, and are believed likely to result in only negligible and non-adverse impacts. The cumulative impacts attributable to the combined Aera and Samedan surveys on marine protected species are not believed to be more than negligible, and therefore insignificant. Given the sound levels and disturbance associated with the proposed shallow hazards survey, the MMS expects that the incremental addition of the survey impacts to the cumulative impacts on marine protected species in the Santa Barbara Channel to be insignificant.

### **4.3 Fish Resources, Managed Species, and Essential Fish Habitat**

See Section 2.1.2 and Figure 1-1 for a detailed description of activities that would take place during the proposed suspension period.

#### **Environmental and Regulatory Setting**

Following is a discussion of fish, invertebrate, and shellfish resources, including those managed by the Pacific Fishery Management Council (PFMC), which may be present during the time and within the area where the survey would take place, and an impact analysis of the shallow hazards survey on fish resources together with managed species and EFH including proposed mitigations, cumulative impacts, and conclusions.

There are some rocky areas on the seafloor above which the Samedan shallow hazards survey will take place. These areas are likely exposed for prolonged periods, may be scattered, or may be consolidated into rocky outcrops or ledge/shelving habitat. These areas may be low relief (< 1 m (3 ft)) or high relief (> 1 m (3 ft)) in height but generally do not rise much above that level and do not constitute pinnacles that rise 10-100's m (10-100's ft) from the seafloor. Chambers Group (1987a,b) noted species in rocky habitat within the depth range of the Samedan shallow hazards survey to include the solitary coral *Paracyathus stearnsi*; the anemones *Metridium senile* and



*Corynactis californica*; the crinoid *Florimetra serritissima*, the sea star *Mediaster aequalis*; and various species of hydroids, tube worms, bryozoans, and sponges. Several species of crab, *Cancer magister*, *C. productus*, and *C. antennarius*., commonly inhabit rocky areas from the lower intertidal zone down to moderately deep areas at about 120 m (400 ft). Lobster (*Panulirus interruptus*), several abalone, and red and purple urchins (*Strongylocentrotus franciscanus* and *S. purpuratus*) are also found in rocky habitat, especially where kelp is abundant, but generally in water depths shallower than about 40 m (120 ft) (Leet et al, 2001).

Sea urchins may be locally abundant in kelp beds along the mainland coast of the Santa Barbara Channel and play an important ecological role in the structure of kelp forest communities. Catches in southern California have exhibited a pattern resembling the serial depletion that characterized the decline and collapse of the abalone fisheries in the mid- 1990s. The northern Channel Islands supplied most of the catch over the years, but beginning in 1992 catches in the northern islands began to decline as effort and harvests started to increase in the southern islands of San Nicolas and San Clemente, signaling a shift away from the northern islands. Recently, San Clemente Island catches have declined precipitously indicating that the fishable stock there may be largely depleted. Whether the harvestable stocks can recover to their previous levels in these heavily fished areas remains a concern, particularly if fishing effort remains largely uncontrolled. Sea urchins may be present at San Miguel Island (more than 80 km (50 mi) away) or on the mainland coast (more than 8 km (5 mi) away) in water depths less than 40 m (120 ft) (Leet et al, 2001). Sea urchins would not be affected by the Samedan shallow hazards survey at that distance.

One abalone species is listed as endangered under the Endangered Species Act; the white abalone (*Haliotis soenoni*). The white abalone has been found in very shallow subtidal waters along the mainland west of Santa Barbara and in very deep water south of the Channel Islands (Leet et al, 2001; SBC and MMS, 2003). All other California abalone species (black, pink, red, green) are non-listed but considered regionally rare along the California coast. Currently, all five major species of abalone in central and southern California are depleted, a result of cumulative impacts from commercial harvest, increased market demand, sport fishery expansion, an expanding population of sea otters, pollution of mainland habitat, disease, loss of kelp populations associated with El Niño events, and inadequate wild stock management (Leet et al, 2001). It is highly unlikely that green or black abalone are within the Santa Barbara Channel (Leet et al, 2001; SBC and MMS, 2003). Red and pink abalone may be present at San Miguel Island (more than 40 km (25 mi) away), at Naples Reef (5-6 km (3-4 mi) away) or in the closest kelp bed (more than 5 km (4 mi) away) from the closest kelp beds (Leet et al., 2001; SBC and MMS 2003). White abalone may be on the mainland coast (more than 8 km (5 mi) away) in very shallow subtidal depths (SBC and MMS 2003). Abalone would not be affected by the Samedan shallow hazards survey at that distance.

Marine fish in the Santa Barbara Channel have been described in detail in previous studies and environmental documents (e.g., Miller and Lea, 1976; Horn and Allen, 1978; ADL, 1984; MBC, 1986; Dailey et al., 1996; Moser, 1996; Love et al., 1999, 2003; MMS 2001). At least 554 species of California marine fishes inhabit or visit California waters. The high species richness is probably due to the complex topography, convergence of several water masses, and changeable environmental conditions (Dailey et al., 1996). Point Conception is widely recognized as a faunal boundary, with mostly cold-water species found to the north and warm-water species found to the south, although extensive migrations do occur as a result of fluctuating environmental

conditions. In fact, warm- and cool-water events in the Southern California Bight (SCB) affect fish recruitment and can alter the composition of some fish assemblages for years (Love et al., 1985, 1986).

The pelagic realm is the largest habitat in the Santa Barbara Channel and the home of 40 percent of the species and 50 percent of the families of fish. The neritic pelagic zone includes those waters and biological communities living in the water column more than 10 m (30 ft) above the continental shelf sea floor. The fish resources from the neritic zone are a mix of semi-permanent residents such as sardine, northern anchovy, mackerel, and squid, and periodic visitors such as thresher, soupfin, and white sharks, Pacific whiting (hake), and salmon. The rocky shelf includes those waters, substrates, and associated biological communities living on or within 10 m (30 ft) overlying rocky areas, including reefs, pinnacles, boulders, and cobble, along the continental shelf, excluding canyons, from the high tide line to the shelf break at about 200 m (~600 ft). The fish resources from the rocky shelf are dominated by resident or semi-resident rockfish. The non-rocky shelf includes those waters, substrates, and associated biological communities living on or within 10 m (30 ft) overlying the substrates of the continental shelf, excluding the rocky shelf and canyon composites, from the high tide line to the shelf break at about 200 m (~600 ft). The fish resources from the non-rocky shelf include several semi-permanent species of skate and rockfish, sablefish, sole, halibut, flounder, and sanddab.

The PFMC manages over 100 species of fish under four Fishery Management Plans (FMP): 1) Coastal Pelagics FMP; 2) Pacific Salmon FMP; 3) Pacific Groundfish FMP; and, 4) Highly Migratory Species FMP. See Table 4.3-1 for a list of the species that could be present in the area of the survey during some life stage (Leet, et al., 2001; NMFS, 1998, 1999, 2003a, b; Orr et al., 1998). The groundfish managed under the Pacific Groundfish FMP include more than 80 different species that, with a few exceptions, live on or near the bottom of the ocean (NMFS, 2003a; PFMC, 2005). Eight species of West Coast groundfish have been declared overfished (PFMC, 2005). Lingcod, Pacific ocean perch and bocaccio were designated overfished in 1999; canary rockfish and cowcod in 2000; darkblotched rockfish and widow rockfish in 2001; and yelloweye rockfish and whiting in 2002. The PFMC is managing these stocks under interim rebuilding plans while it develops a framework for rebuilding plans and adopts final rebuilding plans. The Secretary of Commerce declared a disaster for the west coast groundfish fishery in January 2000. The West Coast groundfish fishery is under great pressure from several factors, including: inadequate scientific data to understand the health of many stocks; too many boats chasing too few fish (overcapacity); steady declines in amounts of groundfish available for sustainable harvest (stock biomasses); failure of many groundfish stocks to replace themselves (recruitment failure); overfishing; and changing ocean conditions (NMFS, 2003a; PFMC, 2005).

Adult and juvenile groundfish species would be found for relatively long periods of time at or close to the seafloor while highly migratory and coastal pelagics would be present in a limited area of the water column for short-time periods as single or schooling adults. If they occur at all, eggs, larvae, and juveniles of managed fish species that could be present in the survey areas generally occur below 10 m (30 ft) from the sea surface (per. comm., Milton Love, 2004). The exceptions are those young-of-the year and juveniles such as treefish and splitnose rockfish that can be found under floating kelp mats (Milton Love, pers. comm., 2004). Floating kelp mats are common in the survey areas, can measure up to 15 m (45 ft) in diameter, and are moved rapidly by surface currents across the region (Leet et al. 2001; Love, 1996, Milton Love, pers. comm., 2004; NMFS, 1998, 1999, 2003a, b; Orr et al., 1998).

## Significance Criteria and Impacting Agents

As described in Section 2.1.2, Samedan's suspension period would involve conducting a shallow hazards survey. This analysis examines potential impacts of the proposed survey on fish resources, managed species, and EFH. For purposes of this EA, an impact from the survey activities on fish resources, managed species, and EFH is considered to be significant if it is likely to cause any of the following:

- A measurable change in population abundance and/or species composition beyond normal variability;
- Substantially limited reproductive capacity through losses of individuals or habitat;
- Displacement of a major part (10 percent or more) of the population from either feeding or breeding areas, or from migration routes for one or more seasons; or
- A measurable loss or irreversible modification of habitat in several localized areas or 10 percent of the habitat in the affected area.

Impacts of regional significance are judged by the same criteria as those for local significance, except that the impacts cause a change in the ecological function within several localized areas or a single large area. The amount of affected area, relative to that available in the region, is determined in the same way as that for locally significant impacts. This determination considers the importance of the species and/or habitat affected and its relative sensitivity to environmental perturbations.

Impacting Agents. The impacting agents associated with the survey activities that would take place during the suspension period that could affect fish resources, managed species, and EFH include potential offshore anchoring by the survey vessel and acoustic energy/sound from the use of a single air gun for the shallow hazards survey. Anchoring could directly crush species or habitat and could also cause an increase in turbidity. Acoustic energy has the potential for direct damage (lethal, potentially lethal, or sub-lethal effects) to any fish or shellfish life stage.

### Impact Analysis

Anchoring by survey vessels. Anchors can drag on the seafloor disrupting and damaging habitat. There are no plans to anchor survey vessels offshore, and it is likely if rough weather interrupts the survey that the vessels would either tie to one of the large mooring buoys found at the four platforms offshore in the Santa Barbara Channel or return to port. However, MMS would additionally require that Samedan prohibit offshore anchoring. With the no-anchoring mitigation in place, it is expected that there would be no impacts from offshore anchoring on fish resources, managed species, or EFH.

Acoustic Energy/Sound. During a typical shallow hazards survey, an air gun towed behind a vessel is fired every 7-8 seconds. The firing process involves the release of compressed air that provides a strong sound impulse followed by a period of silence. The Samedan shallow hazards survey would use a single air gun (20<sup>3</sup>-in) for no more than 6 hours and would emit a sound intensity level of 218 dB re 1  $\mu$ Pa @ 1 m at a frequency of 0-128 Hz with multiple hydrophones trailing about 0.25 km (0.16 mi) behind the vessel and 3 m (10 ft) below the sea surface.

Table 4.3-1. Species managed under the Groundfish, Coastal Pelagic, and Highly Migratory Fishery Management Plans that could be present in the survey area.

Common Name	Scientific Name	Common Name	Scientific Name
<b>Groundfish:</b>			
Arrowtooth flounder	<i>Atheresthes stomias</i>	Copper rockfish	<i>Sebastes caurinus</i>
Butter sole	<i>Isopsetta isolepis</i>	Cowcod rockfish	<i>Sebastes levis</i>
Curlfin sole	<i>Citharichthys sordidus</i>	Flag rockfish	<i>Sebastes rubrivinctus</i>
Dover sole	<i>Microstomus pacificus</i>	Gopher rockfish	<i>Sebastes carnatus</i>
English sole	<i>Parophrys vetulus</i>	Greenspotted rockfish	<i>Sebastes chlorostictus</i>
Flathead sole	<i>Hippoglossoides elassodon</i>	Greenstriped rockfish	<i>Sebastes elongatus</i>
Pacific sanddab	<i>Citharichthys sordidus</i>	Speckled rockfish	<i>Sebastes ovalis</i>
Petrale sole	<i>Eopsetta jordani</i>	Starry rockfish	<i>Sebastes constellatus</i>
Rex sole	<i>Glyptocephalus zachirus</i>	Stripetail rockfish	<i>Sebastes saxicola</i>
Rock sole	<i>Pleuronichthys decurrens</i>	Thornyhead	<i>Sebastolobus sp.</i>
Sand sole	<i>Psettichthys melanosrietus</i>	Lingcod	<i>Ophiodon elongatus</i>
Starry flounder	<i>Platichthys stellatus</i>	Pacific ocean perch	<i>Sebastes alutus</i>
Ratfish	<i>Hydrolagus colliei</i>	Treefish	<i>Sebastes serriceps</i>
Leopard shark	<i>Triakis semifasciata</i>	Cabezon	<i>Scorpaenichthys marmoratus</i>
Soupin shark	<i>Galeorhinus galeus</i>	Kelp greenling	<i>Hexagrammos decagrammus</i>
Spiny dogfish	<i>Squalus acanthias</i>	Blue rockfish	<i>Sebastes mystinus</i>
Big skate	<i>Raja binoculata</i>	Brown rockfish	<i>Sebastes auriculatus</i>
California skate	<i>Raja inornata</i>	California scorpionfish	<i>Scorpaena guttata</i>
Longnose skate	<i>Raja rhina</i>	Canary rockfish	<i>Sebastes pinniger</i>
Pacific whiting (hake)	<i>Merluccius productus</i>	China rockfish	<i>Sebastes nebulosus</i>
Sablefish	<i>Anoplopoma fimbria</i>	Darkblotched rockfish	<i>Sebastes crameri</i>
Widow rockfish	<i>Sebastes entomelas</i>	Greenblotched rockfish	<i>Sebastes rosenblatti</i>
Bank rockfish	<i>Sebastes rufus</i>	Olive rockfish	<i>Sebastes serranoides</i>
Bocaccio	<i>Sebastes paucispinis</i>	Pink rockfish	<i>Sebastes eos</i>
Calico rockfish	<i>Sebastes dalli</i>	Quillback rockfish	<i>Sebastes maliger</i>
California scorpionfish	<i>Scorpaena guttata</i>		
Rosethorn rockfish	<i>Sebastes helvomaculatus</i>	<b>Coastal Pelagic:</b>	
Rosy rockfish	<i>Sebastes rosaceus</i>	Northern anchovy	<i>Engraulis mordax</i>
Sharpchin rockfish	<i>Sebastes zacentrus</i>	Pacific sardine	<i>Sardinops sagax</i>
Shortbelly rockfish	<i>Sebastes jordani</i>	Jack mackerel	<i>Trachurus symmetricus</i>
Speckled rockfish	<i>Sebastes ovalis</i>	Pacific mackerel	<i>Scomber japonicus</i>
Splitnose rockfish	<i>Sebastes diploproa</i>	Market squid	<i>Loligo opalescens</i>
Squarespot rockfish	<i>Sebastes hopkinsi</i>	Pacific herring	<i>Clupea payáis</i>
Starry rockfish	<i>Sebastes constellatus</i>	Pacific saury	<i>Colobis saira</i>
Stripetail rockfish	<i>Sebastes saxicola</i>	Pacific bonito	<i>Sarda chiliensis</i>
Tiger rockfish	<i>Sebastes nigrocinctus</i>		
Vermilion rockfish	<i>Sebastes miniatus</i>	<b>Highly Migratory:</b>	
Yelloweye rockfish	<i>Sebastes ruberrimus</i>	Thresher shark	<i>Alopias vulpinus</i>
Yellowtail rockfish	<i>Sebastes flavidus</i>	Albacore tuna	<i>Thunnus alauunga</i>
Chilipepper	<i>Sebastes goodei</i>	Broadbill swordfish	<i>Xiphias gladius</i>

Two specific concerns have been raised by fishermen, PFMC, and others in California regarding the potential effects on fish resources, managed species, and EFH from exposure to acoustic energy/sounds produced by air gun sources. These issues are 1) the potential for direct damage (lethal, potentially lethal, or sub-lethal effects) to any fish or shellfish life stage, but especially eggs and larvae that may eventually reduce the abundance of harvestable adult populations, and 2) behavioral changes in adult fishes that cause them to be less vulnerable to capture. The second concern, which is a consideration of a possible decrease in catchability, pertains exclusively to commercial and recreational fishing and is discussed in detail under Section 4.4 and 4.5, respectively. The following section will consider the potential damage from the acoustic energy/sound on fish, invertebrate, and shellfish life stages.

Fish or shellfish eggs and larvae may be damaged or killed if exposed to intense acoustic energy at very close range. However, Pearson et al., (1988) reported that peak sound pressures much higher than those from a seismic air gun array did not significantly affect Dungeness crab larvae survival, development rates, or behavioral responses compared to controls. In general, the acoustic pulse from air guns has relatively little effect on marine invertebrates (sea stars, sea urchin, abalone, sea cucumber, etc.) and shellfish (shrimp, prawn, lobster, crab, etc.) presumably due to their lack of a swim bladder (Pearson et al., 1988).

Fish eggs and larvae differ in their reaction to acoustic energy/sound depending on their age and distance from the sound source (Holliday et al., 1987). However, it has been found that energy/sound from air guns has little effect on even the most sensitive fish eggs or larvae at distances beyond 5 m (16 ft) from the discharge (Chamberlain, 1991; Falk and Lawrence, 1973).

Juvenile and adult fishes may suffer potentially lethal injuries when in close range to acoustic energy/sound from air guns (Holliday et al. in Laychak and Pieper, 1990; Turnpenny and Nedwell, 1994). Studies indicate that direct damage to juvenile and adult fishes is mainly to the swimbladder and at fairly close ranges to the air gun (Dalen and Knutsen, 1986; Falk and Lawrence, 1973; Greene, 1985; Holliday, et al., 1987; Kostyuchenko, 1973; Pearson, et al., 1987; Turnpenny and Nedwell, 1994). Damage (and likely death) to juvenile or adult anchovies does not extend past 1.5 m (3 ft) from the air gun source (Holliday et al., 1987). The lethal range for coregonid fishes (e.g. cisco, whitefish, trout, and salmon) does not extend past 6 m (20 ft) (Falk and Lawrence, 1973).

Recent investigation (McCauley et al., 2003) has shown that acoustic energy/sound from an air gun at or above 180 dB may temporarily or irreversibly damage hearing in fish which could lead to sub-lethal behavioral changes not conducive to survival. McCauley et al. (2003) caveat their research and note that in all cases their caged subjects attempted to flee the air gun sound source and both adult and juvenile fish in the open ocean would likely actively move beyond the potentially lethal and sub-lethal range of an air gun. During the Samedan and shallow hazards survey, the emitted acoustic energy will begin at or below 160 dB and ramp-up to operating level at about 218 dB at a rate not to exceed 6 dB per minute at the start of operations or testing, when beginning a new trackline, or any time after the air gun is stopped or powered down below 160 dB. This ramp-up period would alert fish resources to the presence of the acoustic energy and provide time for fish resources and managed species to actively move beyond the potentially sub-lethal range ( $\geq 180$  dB) of an air gun where hearing may be impaired.

The volume of water influenced by the energy/sound pressure field during the course of the Samedan shallow hazards survey is small relative to the much larger area and water volume

through which the vast majority of fish and shellfish eggs, larvae, juveniles, and adults are normally distributed. The sound source would be located 3 m (10 ft) underwater. In general, the normal distribution for eggs, larvae, juveniles, and adults of fish resources and managed fish species that could be present in the survey area generally occur below 10 m (30 ft) from the sea surface (Milton Love, pers. comm., 2004). Groundfish including most adult rockfish live on or near the bottom (NMFS 2003a; PFMC 2005). There are no pinnacles on the seafloor within the area to be surveyed; therefore, most groundfish including rockfish would be over 350 feet from the sound source and would experience sound below 180 dB. For the Samedan shallow hazards survey that would take place during the suspension period, the risk of mortality or sub-lethal effects on fish, invertebrate, and shellfish would be limited to those eggs and larvae, the random juveniles or adult fish, juvenile fish associated with the occasional moving kelp mat, or that small part of a school that were within 6 m (20 ft) of the air gun when shooting begins. Other juvenile and adult fish would move beyond the potentially lethal and sub-lethal range (Turnpenny and Nedwell, 1994).

**MMS Mitigation Measures:** To avoid or minimize potential impacts on commercial fishing from the Samedan shallow hazards survey that would take place during the suspension period, MMS will require that Samedan do the following:

**MPS-15.** Samedan shall ramp-up the air gun to operating levels at a rate not to exceed 6 dB per minute to operating level at the start of operations or testing, when beginning a new trackline, or any time after the air gun is powered down below 160 dB. This mitigation applies to Marine Protected Species and shall apply here.

**MPS-20.** Samedan shall not allow offshore anchoring of vessels associated with the survey, unless human harm is likely without anchoring. This mitigation applies to Marine Protected Species and shall apply here.

**Conclusion:** The risk of mortality or sub-lethal effects on fish, invertebrate, and shellfish would be limited to those eggs and larvae, the random juveniles or adult fish, juvenile fish associated with the occasional moving kelp mat, or that small part of a school that were within 6 m (20 ft) of the air gun when shooting begins. The effects would not result in: 1) a measurable change in population abundance and/or species composition beyond normal variability; 2) substantially limit reproductive capacity through losses of individuals or habitat; 3) displacement of a major part (10 percent or more) of the population from either feeding or breeding areas or from migration routes for one or more seasons; or, 4) a measurable loss or irreversible modification of habitat in several localized areas or 10 percent of the habitat in the affected area. Therefore, it is expected that the Samedan shallow hazards survey would have an insignificant and undetectable impact on fish resources, managed species, and EFH.

**Cumulative Analysis:** Cumulative impacts are defined pursuant to the NEPA regulations (40 CFR 1508.7) as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions.”

Impacts from other onshore or offshore projects or natural events must overlap temporally and spatially with the proposed survey to be considered in the cumulative impact analysis for this project. The proposed survey would be conducted in a defined area on the Gato Canyon Unit in the Santa Barbara Channel (Figure 1-1). The duration of the shallow hazards survey is estimated to range from 3-4 days and would be conducted during the third or fourth quarter of 2006.

The California Department of Fish and Game, Marine Region (Leet et al., 2001) has identified several fishing and non-fishing activities that may cause adverse impacts on fish resources, managed species, or EFH along the Pacific Coast and within the Santa Barbara Channel. These include environmental events like El Niño and their impact on animal and plant species, over-harvest of species such as shelf rockfish, interactions between fishing gear and marine mammals, pollution from human activities, and competition among user both consumptive and non-consumptive user groups.

The National Marine Fisheries Service (1998; 2003a,b) also has also identified several fishing and non-fishing activities that may cause adverse impacts on fish resources, managed species, or EFH along the Pacific Coast and within the Santa Barbara Channel. These include dredging and discharge of dredged material, intake of water and associated fish and shellfish resources by coastal intake structures, wastewater discharge, oil and hazardous waste spills, coastal development and coastal environmental degradation, agricultural runoff, and recreational fishing. In addition, fish resources, managed species, or EFH could be impacted by degradation of water quality which has resulted from municipal, industrial, and agricultural waste discharges and runoff in much of the Southern California Bight (MMS, 1992).

The cumulative effect of the above activities has had major influence on fish resources, managed species, and EFH off the south-central California coast. However, given the short duration of the shallow hazards survey and the insignificant impacts that are expected, the incremental contribution of Samedan's survey activities to the cumulative impact on fish resources, managed species, and EFH is inconsequential. In conclusion, the additional effect of the impact-producing agents related to the shallow hazards survey that would take place during the proposed suspension period are not expected to add significantly to cumulative impacts on fish resources, managed species, and EFH.

#### **4.4 Commercial Fishing**

See Section 2.1.2 and Figure 1-1 for a detailed description of activities that would take place during the proposed suspension period.

#### **Environmental and Regulatory Setting**

The shallow hazards survey would occur in an area that supports a diverse assemblage of valuable fish resources (See Section 4.3). These resources, in turn, support important commercial fishing as described in previous studies and environmental documents (Fusaro et al., 1986; Kronman 1995; Leet, et al., 2001; MMS 1995, 1997, and 2001; SAI, 1984)). The shallow hazards survey would be located 6-8 km (4-5 mi) from the coast at depths from about 100-200 m (300-600 ft) of water. The survey area measures approximately 2 km<sup>2</sup> (1.5 mi<sup>2</sup>) in size. The area is relatively close to ports for commercial fishing, weather conditions are often favorable, and fishing can be a regular occurrence when target species are present. Many fishers in the area do not fish for a single species or use only one gear type. Most switch fisheries during any given year depending on the market demand, prices, harvest regulations, and fish availability.

Samedan would perform the survey within two California Department of Fish and Game (CDFG) Fish Blocks, specifically 654 and 655 (Jana Robertson, pers. comm., 2004; Mecklenberg, 2004). Blocks 654 and 655 are each "10-minute squares," encompassing 214 km<sup>2</sup> (82 mi<sup>2</sup>) for a total area of 428 km<sup>2</sup> (164 mi<sup>2</sup>). Historically the area where the survey would occur has been fished using several gear types targeting multiple species: 1) purse seine for coastal pelagics such as sardine, northern anchovy, mackerel, and market squid; 2) trawl for

Pacific ocean shrimp, sole, flounder, and halibut; 3) hook and line/longline for rockfish and other rocky outcrop fish; 4) trap for crab and lobster; 5) drift/set gillnet for shark and swordfish; and, 6) troll for albacore and salmon (Fusaro et al., 1986; Craig Fusaro, pers. comm., 2004). Commercial fishing occurs within the survey area on a seasonal, quota, and trip limit basis and in response to market forces throughout the year.

Purse Seining. The numbers of purse seiners and their location within the Santa Barbara Channel are highly variable and uncertain. Because purse seiners follow schools of pelagic fish, it is difficult, if not impossible, to predict how large or where the fleet will be at a given time. Market squid and mackerel dominate the catch. When working an area, the purse seine fleet is made up of a group of vessels. While searching, the vessels often move on erratic or zigzag courses, trying to spot schools visually or on their sonar. Although the season for pelagic fishes is open all year, the CDFG sets catch quotas. When quotas are filled, the fishery is over for that year unless an extended quota is subsequently issued.

Trawling. This is a mobile fishery in which a trawl net or double rig is towed behind the fishing vessel at slow speed, either in midwater or, more commonly in the Santa Barbara Channel, along the bottom. The trawler deploys the net(s) in areas where fish or shellfish are noted on the fathometer, or where trawling has been successful previously and most often continues along an isobath at the same depth. Trawling can occur seasonally in the survey area for flatfish, flounder, and sole at depths of 55-330 m (180-1,080 ft) (Fusaro et al., 1986). Pacific Ocean shrimp/pink shrimp are fished in the survey area from October 1 through May 30 in water depths of 165 m (540 ft) and shallower (Mike McCorkle, pers. comm., 2003). The peak season is in the spring from late February to June.

Hook-and-Line/Longline. A small number (three or less) of hook-and-liners currently fish the Santa Barbara Channel on an irregular basis during late summer and early fall. They target several species of rockfish, black cod (sablefish) and thornyheads. Those who operate hook-and-line gear as their primary or sole fishery use anchored (not attached to the vessel) or drifting horizontal longlines (attached to the vessel at one end) or a buoyed vertical longline technique (not attached to the vessel). In general, for drifting longline, with the vessel under way the buoy is dropped over the side or stern of the vessel. As the line is pulled into the water, baited hooks are attached. Longline fishing is done over rocky outcropping where aggregations of fish are visible on sonar or over known productive areas. Longlines may take 20 minutes or more to reach the desired fishing depth. Once put in the water drifting longlines are carried through the fishing areas by the prevailing currents. Hauling the line is done by picking up the buoy and winching in the line. The hooks and the fish are removed as the line comes aboard, and the buoy and line are stored. Drifting longlines may be worked continuously. After the fish have been removed the hooks are rebaited and may be redeployed. Anchored longlines are left to fish for up to 12 hours at which time they are retrieved and may be rebaited and fished in a new location.

Trap Fishing. Trap fishing for lobster and crab is a fixed gear operation. The crab season can be year-round at the eastern edge of the survey area with rock/cancer crab dominating the catch while lobster season occurs in shallower water to the east of the survey area and starts around the beginning of October 1 and continues to about the middle of March. Traps (pots) are baited and deployed in fishing grounds. The pots are commonly left to fish or soak for about three days, and then are retrieved. The fishing vessel pulls alongside the pot buoy(s), grapples the buoy on deck, feeds the line through a pinch-puller of some kind, and raises the pot from the sea floor. The crabs are taken from the pot; it is rebaited and redeployed. Normal fishing practice dictates the



movements of trap location: if the traps are fishing well, they are left where they are. If the traps are not catching much, they will usually be moved to a new location. In practice this means that groups, or strings, of gear will be moving from one location to another on an unpredictable time schedule dictated by crab and lobster population movements. It is therefore difficult to predict the location of any particular string of gear at a given time. Most full-time fishermen have at least 50-70 pots, and many fishermen have upwards of several hundred pots arranged in strings of from 5 to 25 individual traps set along particular depth contours.

Drift/Set Gillnetting. Due to drift/set gillnetting restrictions in State waters, all drift/set gillnetting occurs in Federal waters. The target species are thresher shark and swordfish. In the Santa Barbara Channel, gillnetting may occur on a sporadic basis for swordfish and thresher shark from early September through January 31 and for other shark year-round. The peak season is from September through December. For set gillnetting, the gear is set or anchored in place and tended on a regular basis. For drift gillnetting, one end of the net may be attached to the fishing vessel, while the other is secured to a free-floating buoy marked with a flag, light, and radar reflector. The net also has floats on top and weights on the bottom that can be changed to make the net fish at or below the surface. The vessel and net drift together. The net is either stacked on the deck or rolled on a reel. With the vessel under way, the buoy is set over the stern or side, pulling the net into the water. Rollers on the stern or side keep the net from snagging as it is played out. The net and buoy are hauled in from the leeward side of the vessel. As the net comes aboard, the fish are removed from the net, which is then restacked or reeled up for the next set.

Trolling. In trolling, lines are pulled through the water from the stern of a boat that is underway. This method targets highly migratory and widely ranging fish and is primarily employed to catch salmon, although it is also used to catch species like albacore, California halibut, and occasionally bonito. Salmon trolling gear consists of up to six stainless steel (wire) mainlines unwound from electrically powered, hydraulically powered, or hand-cranked gurdies (spools). The wires are suspended from outrigger poles on either side of a boat (occasionally including two sets of poles, one amidships and one on the bow), which help spread out the gear. Monofilament leaders with attached hooks (either lures or baited hooks) are clipped to the mainline at intervals depending on geographic location, water temperature, water color, or depth. As the troll lines are hauled, a leader with a fish on it is unclipped from the mainline as it nears the surface. The fish is then pulled carefully to the boat, where it is netted or gaffed aboard. The timing of trolling during any season varies from year to year. A troller is most often a relatively small vessel (6-12 m (20-40 ft)) that employs comparatively expensive equipment and gear that can trail the vessel by 30-100 m (100-300 ft). As in the hook and line fishery, trollers are often in another fishery, and enter the troll fishery in the off-season of their principal fishery.

Diving. Commercial diving targets two species of sea urchin and sea cucumber. The dive fishery is restricted by limited entry, season, size limitation, and bag limits. Commercial dive boats are generally small (less than 10 m (35 ft) in length), high-speed vessels equipped with multi-hose hookah gear. Diving operations can be done with the boat anchored or with the boat holding position. In either case, since the diver is connected to the vessel by an air hose, dive boats are not maneuverable when fishing. One to several divers can be in the water with another diver or deck hand on the boat to operate the vessel and air compressor and to attend to the air hose(s) and game bags. Typically a diver will work a bed of urchin or sea cucumber until his bottom time is exhausted or the bed is fished of all target species. Then the diver will decompress if necessary, surface and spend some time on deck before moving to another location or returning

to port. The dive fishery is usually found in relatively shallow rocky reef areas. Historically the coastal region was dived extensively for abalone and urchin; the primary fishing grounds for these species are now the Channel Islands. Most commercial diving takes place in less than 20 fms (56 m) of water. The shallow hazards survey would be located about 5-6 km (3-4 mi) from Naples reef and 5-7 km (3.5-4.5 mi) from the closest kelp beds at depths from about 100-200 m (300-600 ft) of water.

There are two ways of considering fishing data: by landing in pounds and by value in dollars. Using CDFG commercial fishing data, a summary of total and average annual pounds and dollars from the two CDFG Fish Blocks was generated for the period 1998-2002 (Table 4.4-1). As seen in Table 4.4-1, these data indicate a large fluctuation between blocks for any given year as well as between years for any given block. Ridgeback prawn, a high poundage and valuable fishery for California, greatly inflates the landing (pounds) total from these blocks for the year in which it is harvested. Lobster, crab, and/or sea urchin greatly inflates the value (dollars) total from these blocks for the year in which it is harvested. All landings for these years from these blocks went into the port of Santa Barbara. Greatly increased fishing restrictions, the ability of fishermen to have the correct fishing gear, and the ability to market their catch are also likely elements responsible for deviations and fluctuations in commercial fishes caught and landed from the two CDFG Fish Blocks.

Table 4.4-1. Estimated annual landings and value from California Department of Fish and Game Fish Blocks 654 and 655, 1998-2003.

Year	Block 654		Block 655	
	Landings (pounds-lb)	Value (dollars-\$)	Landings (pounds-lb)	Value (dollars-\$)
1998	129,499	233,221	334,570	615,773
1999	221,631	282,161	203,874	358,040
2000	216,241	276,415	137,943	229,251
2001	84,544	158,710	203,054	242,086
2002	153,192	236,728	135,867	190,412
Total	805,107	1,187,235	1,015,308	1,635,562
Average	161,021	237,447	203,062	327,112

### Significance Criteria and Impacting Agents

As described in Section 2.1.2, Samedan's suspension period would involve conducting a shallow hazards survey. This analysis examines potential impacts of the proposed survey on commercial fishing, both during the activities and after completion. For purposes of this EA, an impact from the survey activities on commercial fishing is considered to be significant if it is likely to cause any of the following:

- Fishermen are precluded from 10 percent or more of the fishing grounds during or after survey operations;
- 10 percent or more of the fishermen are precluded from a fishing area for all or most of a fishing season; or
- Decrease in catchability of target species exceeds 10 percent of the annual landings.

Impacting Agents. The impacting agents resulting from Samedan's survey that would take place during the suspension period and could affect commercial fishing include vessel traffic, survey-associated obstructions due to anchoring and lost debris, space-use conflicts resulting in the preclusion of fishing operations, acoustic energy/sound resulting in a decrease in catchability of target species or resulting in abrupt interruption or end to commercial diving. Vessel traffic, survey-associated obstructions, space-use conflicts, and disruptions could cause lost fishing time or damage to fishing gear. Acoustic energy/sound from air gun use during shallow hazard survey could cause behavioral changes in target species that could make them more difficult to catch after the survey's completion. Acoustic energy/sound from air gun use during the shallow hazards survey could annoy and disturb divers such that commercial diving is interrupted or ended at Naples reef and at the closest kelp beds. Overall, these effects have the potential to cause a financial hardship on commercial fishers.

### **Impact Analysis**

Vessel traffic. The shallow hazards survey would require the use of a single vessel for up to 3-4 days in the third or fourth quarter (July-December) of 2006. The vessels would mobilize and demobilize from Port Hueneme. The survey is expected to result in a temporary, minor increase in area vessel activity. Following the survey vessel traffic would return to current baseline levels. The Santa Barbara Channel Oil Service Vessel Traffic Corridor Program is intended to minimize interactions between oil industry operations and commercial fishing operations. It was developed cooperatively between the two industries through the Joint Oil/Fisheries Liaison Office (JOFLO). This method of reducing vessel conflicts has been shown to be effective during past OCS activities. Samedan has proposed a mitigation to ensure that the survey vessels comply with the traffic corridors established by JOFLO when going to and from the project area. With the vessel-traffic-corridor mitigation in place, it is expected that there would be negligible impacts from vessel traffic on commercial fishing.

Obstructions due to anchoring. Anchors can drag on the seafloor and produce scars that may cause short to long-term trawling difficulties depending on the bottom soils where the anchors are placed (Centaur Associates, Inc., 1984). There are no plans to anchor survey vessels offshore, and it is likely if rough weather interrupts the survey that the vessels would either tie to one of the large mooring buoys found at nearby platforms offshore in the Santa Barbara Channel or return to port. However, MMS would additionally require that Samedan prohibit offshore anchoring. With the no-anchoring mitigation in place, it is expected that there would be no impacts from offshore anchoring on commercial fishing.

Obstructions due to lost debris. Commercial fishing gear damage or loss problems attributed to lost debris related to offshore California oil and gas activities have been identified since at least 1966 (Richards, 1990). Since 1983, JOFLO has served as an information clearinghouse with primary responsibility for inter-industry communications. A search of the MMS and JOFLO inter-industry interactions records on the survey area has found no incidents. Samedan has

proposed a mitigation that its survey contractors maintain logs during all operations that identify the date, time, location, water depth, and description of all items lost overboard and report lost items to MMS. The MMS would additionally require, to the extent reasonable and feasible, that Samedan require its contractors to recover all items lost overboard during activities associated with the project. With the lost-debris mitigations in place, it is expected that there would be negligible impacts from lost debris on commercial fishing.

Preclusion of fishing operations. The survey would occur over a 3-4 day period, trail 0.25 km (0.16 mi) of equipment, cover an approximate 2 km<sup>2</sup> (1.5 mile<sup>2</sup>) area, and result in the need to restrict other vessel activity within the area. Some types of fishing could be potentially affected by the proposed project more than others but the non-stop nature of the survey makes it nearly impossible to avoid interference with commercial fishing operation that would happen to be within the survey area. Purse seine, trawl, hook and line/longline, trap, driftnet, and troll fishing would all be precluded from 2 km<sup>2</sup> (1.5 mi<sup>2</sup>) of Fish Blocks 654 and 655 that encompass 428 km<sup>2</sup> (164 mi<sup>2</sup>) for 3-4 days. Preclusion from the survey area would cause a temporary, short-term impact on commercial fishing. It would preclude fishermen from less than 10 percent of the Santa Barbara Channel fishing area of similar water depths and topography during survey operations. In addition, since a relatively small number of fishermen choose to fish the Santa Barbara Channel where the operations would take place, the survey would not preclude more than 10 percent of any one group of southern California fishermen. Samedan has proposed a number of mitigations (see below) that avoid or minimize conflicts with commercial fishing during and after the shallow hazards survey. Included in Samedan's proposed mitigations is consultation with JOFLO to identify commercial fishing fleets and individual fishers that could be in affected by the survey and the use of the Joint Oil/Fisheries Committee guidelines for reducing conflict between fishing operations and shallow hazard survey. However, since all historic fisheries could be impacted, MMS would require a number of additional mitigation measures (see below). Among the additional measures is that Samedan submit for MMS approval a Final Fisheries Contingency Plan by which Samedan will avoid or minimize conflicts with commercial fishing. With the Samedan-proposed and MMS additional mitigations in place, it is expected that there would be insignificant impacts from preclusion of fishing operations on commercial fishing as a result of the shallow hazards survey.

Acoustic energy/sound resulting in a decrease in catchability of target species. During a typical shallow hazards survey, an air gun towed behind a vessel is fired every 7-8 seconds. The firing process involves the release of compressed air that provides a strong sound impulse followed by a period of silence. The Samedan shallow hazards survey would use a single air gun (20<sup>3</sup>-in) for no more than 6 hours and would emit a sound intensity level of 218 dB re 1 μPa @ 1 m at a frequency of 0-128 Hz with multiple hydrophones trailing about 0.25 km (0.16 mi) behind the vessel and 3 m (10 ft) below the sea surface.

Two specific concerns have been raised by fishermen, PFMC, and others in California regarding the potential effects on fish resources directly and subsequently indirect effects on commercial fishing from exposure to acoustic energy signals produced by air gun sources. These issues are 1) the potential for direct damage (lethal, potentially lethal, or sub-lethal effects) to any fish or shellfish life stage, but especially eggs and larvae that may eventually reduce the abundance of harvestable adult populations, and 2) indirect behavioral changes in adult fishes that cause them to be less vulnerable to capture. The first concern, which is a consideration of direct impact on fish/shellfish as a resource is discussed in this EA under Section 4.3. Since it is expected that

shallow hazards survey will have an insignificant impact on fish resources directly, it is expected that there will be an insignificant impact on commercial fishing from direct damage to these resources. The following section will consider the potential possible behavior changes and decrease in catchability.

A decrease in catchability of target species would cause a temporary, short-term impact on commercial fishing. Behavioral effects on fish/shellfish are potentially the most important group of effects on marine fisheries. There is concern that the shallow hazards survey would have residual effects on the catch of shark, shrimp/prawn, crab, and rockfish in the Santa Barbara Channel. There is well-substantiated evidence to demonstrate that fish distribution and feeding behavior can be affected by the sound emitted from air gun arrays (Dalen and Knutsen, 1986). This can potentially reduce catchability by driving the fish away from fishing grounds or by reducing their inclination to bite on a baited hook.

A number of experiments have exposed adult invertebrates to high level sounds and the intense shock waves generated by high velocity explosives with apparently little effect. The effects from shallow hazards survey would be far less than those seen from high explosives. McCauley (1994) reports one of the few instances where pre- and post-seismic survey effects on the prawn/shrimp fishery have been monitored. No changes were observed in the catch rate of prawn before and after a seismic survey in summer 1991 off the southwest coast of Australia. The study monitored cooperative fish data which is believed to reflect a true test of the catchability of prawn/shrimp by trawl fishing in that area. In general the acoustic pulse from air guns has relatively little effect on marine invertebrates and shellfish, presumably due to their lack of a swim bladder (Pearson et al., 1988). Based on these findings, it is unlikely that shallow hazards survey using a single air gun would have an effect on the catchability of prawn/shrimp, lobster, crab, sea urchin, or sea cucumber.

There appear to be no experiments specific to effects of sound from the use of air guns or from a seismic survey on shark behavior. The diving and avoidance responses to intense sound reported for many fish species is in some part due to the presence of a swimbladder (Turnpenny and Nedwell, 1994). Since all sharks lack a swimbladder the magnitude of avoidance response is expected to be limited. There is no doubt that sharks exhibit a rapid, direct approach to a variety of underwater sound sources. Certain observations suggest that under specific circumstances sharks may also withdraw from such a source as quickly as they are attracted to it. Myberg et al. (1978) elicited a limited rapid withdrawal response from two species of pelagic sharks and discussed a similar pattern observed from one species of inshore shark. After initial attraction to within 10 feet of a sound source, both pelagic and coastal sharks would immediately and rapidly veer away from the source if there was an abrupt and large increase in sound transmission. The sharks would withdraw beyond 100 ft of the sound source for 20 to 60 minutes. Habituation (no withdrawal) of all species to changes in sound transmission was apparent during successive tests and occurred within 2 to 40 minutes (Myberg et al., 1978). Based on these findings, it is unlikely that shallow hazards survey would have an effect on the catchability of sharks.

Pearson et al. (1987; 1992) studied the behavior of captive rockfish to establish the sound exposure level in the subsequent fishing experiment by Skalski et al. (1992). Captive rockfish exhibited alarm responses to repeated firing of a single air gun. There is an obvious difference between this series of experiments and an actual shallow hazards survey in the open ocean. Fish are not held captive during actual survey and Mc Cauley et al. (2003) found that in all cases their caged subjects attempted to flee the sound source. Both adult and juvenile fish in the open ocean would

likely actively move beyond the potentially lethal and sub-lethal range of an air gun (Turnpenny and Nedwell, 1994). However, the purpose of this experiment was to determine if startle behavior occurred under controlled conditions (controlled conditions being a necessary aspect of any scientific experiment) not to necessarily mimic actual survey conditions.

Skalski et al. (1992) conducted a series of controlled experiments to test the effects of air gun sound on hook-and-line catch rates of rockfish along the central California coast. During air gun exposure periods with an operating array towed slowly over a test pinnacle, a measure of catch-per-unit-effort decreased by an average of 52.4 percent compared with control periods. Echo-soundings made before and during air gun firings indicated that the height of the fish schools became compressed downward but there was no significant change in the aggregation size. The change in height of rockfish aggregations but not area implies that the rockfish higher in the water column increased in depth to avoid the sound but did not disperse from the outcrop over which they originally located. The primary reason for the decline in catch rates was believed to result from behavior changes of the fish rather than dispersion of aggregations (Skalski et al., 1992). The length of time after exposure to the air gun array that the behavior changes continued, which could alter catch rates, was not determined.

Studies by Engas et al. (1993) and Lokkeborg and Soldal (1993) have attempted to look at the areal extent of seismic survey effects on behavior and catch-rates of cod and haddock during air gun operations and on catchability after cessation of all seismic activity. Although the species in question are not found in the Santa Barbara Channel, they have swimbladders, form aggregations and are fished using hook-and-line gear similar to fish species that are found locally. The experiment was conducted with a multiple air gun array for several weeks. Significant catch reductions were found to be at least 10 km (6 mi) in extent from the seismic survey area (Lokkeborg and Soldal, 1993). Engas et al. (1993) found that distribution of both species had not returned to all pre-survey levels (as seen by hydroacoustics, trawl, and hook-and-line sampling) during the five days after air gun shooting had ceased. There was some indication of a return to normality in hook-and-line/longline catches of cod, but not haddock, within the five days, but no recovery was found by either trawling or acoustic methods. Both studies concluded that the fish would not have continued to actively avoid the survey area after the cessation of air gun shooting. The above cited studies demonstrate that it is difficult to support statements that attempt to measure the magnitude of behavior effects and to translate them into a decrease in catchability. Due to this sparcity of applicable data, a worse-case conservative analysis follows which will serve as the basis for a conclusion of no significant impact.

There are indications that fisheries for shark or shrimp/prawn would be little affected by sound from air gun use during the shallow hazards survey (McCauley, 1994; Myberg et al., 1978), whereas the catchability of rockfish, coastal pelagics, albacore, and salmon could be temporarily affected for a short-term period. The true areal extent of decreased catchability is difficult to quantify but indications are that it extends about 10 km (6 mi) from the center of a seismic survey sound source (Lokkeborg and Soldal; 1993). Considering the size of the proposed survey, it is reasonable to conclude that a possible decrease in catchability would extend over most of the CDFG Fish Blocks 654 and 655.

The time period of decreased catchability is also difficult to quantify but indications are that it could last at least 5 days from a 3D seismic survey with multiple air guns that lasts several weeks (Engas et al., 1993). Without any supporting studies to the contrary, a reasonable conservative estimate may be that catchability would return to normal from the Samedan 6-hour, shallow

hazards survey, using a single air gun within one day. A 1-day decrease in catchability within Fish Block 654 and 655 would constitute less than 10 percent of the annual landings/value. Samedan has proposed a number of mitigations (see below) that avoid or minimize conflicts with commercial fishing during and after the shallow hazards survey. Included in Samedan's proposed mitigations are consultation with JOFLO to identify commercial fishing fleets and individual fishers that could be in affected by the survey and the use of the Joint Oil/Fisheries Committee guidelines for reducing conflict between fishing operations and shallow hazard survey. However, since all historic fisheries could be impacted, MMS would require a number of additional mitigation measures (see below). Among the additional measures is that Samedan submit for MMS approval a Final Fisheries Contingency Plan by which Samedan will avoid or minimize conflicts with commercial fishing. With the Samedan-proposed and MMS additional mitigations in place, it is expected that there would be insignificant impacts from acoustic energy/sound on commercial fishing.

Acoustic energy sound from air gun use interrupting commercial diving. Sound (see above) from the Samedan shallow hazards survey using a single air gun could potentially be heard underwater by commercial divers at Naples reef and the nearest coastal kelp beds and could potentially annoy and interrupt or end commercial diving for the duration of the survey. The survey would fire the air gun for a total of no more than 6 hours over a 3-4 day period. It is assumed that the air gun would fire for several hours throughout each day. This time-frame could potentially impact commercial diving that was taking place on a nearby reef or at nearby mainland locations. The island locations frequented by commercial divers is greater than 32 km (20 mi) away and it is unlikely that the survey will disturb diving at that distance. During the late 1990's MMS scientific divers took the opportunity to perform a number of observations to qualitatively gauge the discomfort, annoyance, and interruption of diving during a 3D seismic survey near the Flower Gardens National Marine Sanctuary in the Gulf of Mexico (Ann S. Bull and Greg Boland, pers. comm., 2004). While underwater the divers found that dives would be interrupted and abruptly ended when the seismic vessel came closer than 0.8 km (0.5 mi) of the dive site. The Samedan shallow hazards survey site would be about 5-6 km (3-4 mi) from Naples reef and 6-8 km (4-5 mi) from the closest mainland kelp beds. Samedan has proposed mitigations to ensure that the air gun is not fired within 0.8 km (0.5 mi) of a dive boat or vessel of unknown function. With the diver mitigations in place, it is expected that there will be insignificant impacts from acoustic energy/sound on commercial diving.

**Samedan Mitigation Measures:** To minimize potential impacts on commercial fishing from the shallow hazards survey, Samedan has implemented or plans to implement the following mitigation measures (paraphrased from Samedan):

**CF-1.** Samedan shall require that the vessels comply with the traffic corridors established by the Joint Oil/Fisheries Committee when going to and from the project area. Nautical charts showing the traffic corridors will be distributed to the vessel captains at pre-survey meetings.

**CF-2.** Samedan shall require that contractors keep logs documenting equipment lost overboard and shall notify MMS of all lost items.

**CF-3.** Samedan shall avoid or minimize conflicts and discord with commercial fishermen during and after the shallow hazards survey. Included in this mitigation is a series of steps below.

**CF-3a.** Samedan shall consult with the Joint Oil/Fisheries Liaison Office (JOFLO) to identify commercial fishing fleets that could be in conflict with the shallow hazards survey operations

and utilize the Joint Oil/Fisheries Committee guidelines for avoiding and reducing conflict between fishing operations and shallow hazards survey.

**CF-3b.** Samedan shall identify a means to meet and develop the appropriate measures to reduce or avoid impacts on commercial fishing.

**CF-3c.** Samedan shall meet with representatives of the potentially affected fishing fleets to provide information describing the location of the proposed survey, the area to be traversed, and planned dates of initiation and completion of the survey to all potentially affected fishermen and to obtain feedback from them on fishing concerns.

**CF-4.** Samedan shall implement a Fisheries Plan including a Joint Use Strategy and Survey Vessel Strategies for avoiding commercial fishing operations.

**CF-5.** Samedan shall time the survey to avoid major conflict with commercial fishing activities. Included in this mitigation is a series of steps below.

**CF-5a.** Samedan shall contact JOFLO prior to vessel arrival in the survey area to confirm that the salmon fishing fleet is not present or expected to be present in the area.

**CF-5b.** Samedan shall scout the survey area prior to the shallow hazards survey to ensure salmon fishing is not being conducted.

**CF-5c.** If JOFLO or scouting reports that the salmon fishing fleet is in the area or expected on scene during the probable duration of the shallow hazards survey, Samedan shall rescheduled the survey for a later date. Alternately the survey operators will work with JOFLO to determine if the survey can be conducted with minimal impact to commercial fishing efforts.

**CF-5d.** If the shallow hazards survey is on-going and salmon fishers unexpectedly arrive during the survey, Samedan shall contact JOFLO immediately to determine if the survey can continue with minimal impact to the fishing effort. If JOFLO cannot be reached, or if JOFLO so advises, the shallow hazards survey effort may be suspended until such time as the salmon fishing effort is over or JOFLO suggests that it can be continued with minimal impact to the commercial fishing effort.

**CF-6.** Samedan shall: 1) notify fishermen in writing 30 days prior and verbally three days prior to the commencement of shallow hazards operations; 2) notify the U.S. Coast Guard, Santa Barbara County Resource Management Department, Joint Oil/Fisheries Liaison Office, California State Lands Commission and the Marine Advisory Newsletter in Goleta; and, 3) distribute and post notices at area fuel docks, ice supply houses, wholesale fish buyers, and in the Harbor Master's offices of Santa Barbara, Ventura, Oxnard, and Port Hueneme harbors.

**CF-7.** Samedan shall hold pre-survey coordination meetings with MMS and other interested agencies to review environmental and safety issues, including commercial fishing operations in the project area.

**CF-8.** Samedan shall notify Craig Fusaro at the Joint Oil/Fisheries Committee Office immediately following completion of survey operations.

**CF-9.** Samedan shall shut down the air gun if a diver or a boat with a dive flag is observed within a 0.8 km (795 m) (0.5 mi) radius safety zone. The two marine mammal observers aboard the survey vessel will also look for divers and dive boats using the same procedures as for marine mammals.



**CF-10.** If a diver or a dive boat is observed in the survey area or potential safety zone prior to the commencement of the survey, Samedan shall contact them and advise them to leave the area for the duration of the survey.

**CF-11.** Samedan shall assume that boats of unknown function are dive-boats and treat accordingly, unless they can be contacted or otherwise confirmed not be dive boats.

**MMS Mitigation Measures:** To avoid or minimize potential impacts on commercial fishing from the Samedan shallow hazards survey that would take place during the suspension period, MMS will require that Samedan do the following:

**MPS-20.** Samedan shall not allow offshore anchoring of vessels associated with the shallow hazard survey, unless human harm is likely without anchoring. This mitigation applies to Marine Protected Species and shall apply here.

**CF-12.** Samedan shall, to the extent reasonable and feasible, require contractors to recover all items lost overboard during activities associated with the survey.

**CF-13.** Samedan shall file an advisory with U.S. Coast Guard for publication in Local Notice to Mariners at least 14 days prior to commencement of survey operations.

**CF-14.** Samedan shall notify MMS on a daily basis of any conflict or contact with commercial fishermen (who, what, where, when) and the steps Samedan has taken/is taking to resolve the conflicts during and/or after the survey.

**CF-15.** Samedan shall require that contractors use a scout boat captained by a local, knowledgeable fisherman for the shallow hazards survey, to avoid conflicts with commercial fishermen including fixed gear (trap) fishing as well as with other users of the OCS.

**CF-16.** Samedan shall educate all key vessel personnel regarding commercial fishing activities, conflict avoidance, and record keeping procedures and shall ensure that all offshore personnel involved in shallow hazards survey attend the Western States Petroleum Association's Fisheries Training Program.

**CF-17.** Samedan shall submit for MMS approval at least 90 days prior to the commencement of shallow hazards survey operations a Final Fisheries Contingency Plan by which Samedan will avoid or minimize conflicts with commercial fishing. Include details of coordination with JOFLO and fishermen.

**CF-18.** Samedan shall submit to MMS no later than 60 days after completion of shallow hazards survey operations a report of Samedan compliance with its Final Fisheries Contingency Plan and the success or failure of its plan to avoid or minimize conflicts with commercial fishing. Include supporting information and details of coordination with JOFLO and fishermen.

**Conclusion:** There would be a 3-4-day preclusion of fishing operations from 2 km<sup>2</sup> (1.5 mi<sup>2</sup>) of Fish Blocks 654 and 655 that encompass a total of 428 km<sup>2</sup> (164 mi<sup>2</sup>) and an estimated potential 1-day decrease in catchability of target species following the operations of the shallow hazards survey. These temporary impacts would be mitigated to insignificant by the measures Samedan has already adopted and by the additional mitigation measures MMS would require. Since it is expected that these mitigation measures would be implemented and would be successful, any adverse impacts would be avoided or minimized. Therefore, it is expected that the Samedan shallow hazards survey would have an insignificant impact on commercial fishing.

**Cumulative Analysis:** Cumulative impacts are defined pursuant to the NEPA regulations (40 CFR 1508.7) as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions.”

Impacts from other onshore or offshore projects or natural events must overlap temporally and spatially with the proposed survey to be considered in the cumulative impact analysis for this project. The proposed survey would be conducted in a defined area on the Gato Canyon Unit in the Santa Barbara Channel (Figure 1-1). The duration of the shallow hazards survey is estimated to range from 3-4 days and would be conducted during the third or fourth quarter of 2006.

The California Department of Fish and Game, Marine Region, (Leet et al., 2001) has identified several fishing and non-fishing activities that may cause adverse impacts on commercial fishing along the Pacific Coast and within the Santa Barbara Channel. These include environmental events like El Niño and their impact on animal and plant species, over-harvest of species such as shelf rockfish, interactions between fishing gear and marine mammals, pollution from human activities, and competition among user both consumptive and non-consumptive user groups.

The National Marine Fisheries Service (1998; 2003a, b) has also identified several fishing and non-fishing activities that may cause adverse impacts on commercial fishing along the Pacific Coast and within the Santa Barbara Channel. These include dredging and discharge of dredged material, intake of water and associated fish and shellfish resources by coastal intake structures, wastewater discharge, oil and hazardous waste spills, coastal development and coastal environmental degradation, agricultural runoff, and recreational fishing. In addition, fisheries could be impacted by degradation of water quality which has resulted from municipal, industrial, and agricultural waste discharges and runoff in much of the Southern California Bight (MMS, 1992).

The cumulative effect of the above activities has had major influence on commercial fishing off the south-central California coast. However, given the short duration of the shallow hazards survey and the insignificant impacts that are expected, the incremental contribution of Samedan’s survey activities to the cumulative impact on commercial fishing is inconsequential. In conclusion, the additional effect of the impact-producing agents related to the shallow hazards survey that would take place during the proposed suspension period are not expected to add significantly to cumulative impacts on commercial fishing.

#### **4.5 Recreational Fishing and Diving**

See Section 2.1.2. and Figure 1-1 for a detailed description of activities that would take place during the proposed suspension period.

##### **Environmental and Regulatory Setting**

The survey would be located in an area that supports a diverse assemblage of valuable fish resources (See Section 3.3). These resources, in turn, support important recreational opportunities including fishing and diving as described in previous studies and environmental documents (Leet, et al., 2001; MMS 2001). Marine recreational fishing and diving are an important, social, cultural, and economic activity for southern California.

Almost all recreational diving is done with Self Contained Underwater Breathing Apparatus (SCUBA) from charter vessels and can be a year-round activity, but is mostly concentrated in the warmer months of the summer through fall. Beach diving in Ventura and Santa Barbara counties

is uncommon. The charter vessel fleet for SCUBA diving consists of six specialized charter vessels based in local harbors; three in Santa Barbara and 3 in Ventura (Cal-Boat Diving, 2004; Saint Brendan Corp., 2004). All of these vessels make near-daily trips from July through October with vessels from Santa Barbara each carrying 46 divers and vessels from Ventura each carrying about 30-40 passengers. The SCUBA diving is done for consumptive reasons for both fish and shellfish and non-consumptive reasons such as underwater photography and enjoyment. The SCUBA divers target a wide variety of finfish with spearguns and take lobster and crabs by hand. From July to December of 2004, all charter SCUBA trips from Santa Barbara and Ventura were to destinations over 32 km (20 mi) from Samedan's survey location (Saint Brendan Corp., 2004). A small number of private vessels for SCUBA diving from Santa Barbara, Ventura, and/or Oxnard each carrying 2-4 persons may visit coastal reefs and kelp beds on an irregular basis. When the weather is good, private vessels usually head for the Channel Islands National Marine Sanctuary (CINMS) more than 32 km (20 mi) from the survey location. Private SCUBA diving takes place often on the weekends during the summer months (Truth Aquatics, pers. comm., 2004). The SCUBA diving for research purposes occurs monthly, weather permitting, at coastal reefs and kelp beds within the Santa Barbara Channel and/or at CINMS usually on the same day (Donna Schroeder, pers. comm., 2004). Usually SCUBA divers remain fairly close (within ~ 100 m (300 ft)) to the dive boat.

Recreational fishing is a year-round activity concentrated during late spring through fall involving a number of gear types using three different modes of fishing: shore, private/rental, and charter/party boats. The most prevalent gear type for recreational fishing is the rod and reel. Hoop nets, spears, shovels, and hands are also used. Hoopnetters generally target crabs, lobsters, or shrimp. Shovels, rakes, and hands are used to harvest a number of clam species and California grunion. The Commercial Passenger Fishing Vessels/Fleets (CPFV) consists of two facilities each for Santa Barbara, Ventura, and Oxnard, and one for Port Hueneme (Fine Fishing, 2004). Each facility may operate a tackle/bait shop and a fleet of up to 10 vessels and each vessel may carry from 20-99 passengers per trip (Channel Islands Sportfishing, 2004).

The following synopsis of recreational fishing in southern California is based on information as summarized by Leet et al. (2001) and NMFS. (2003c). The private/rental boat mode continues to dominate the recreational fishery followed by charter/party and shore modes. Those recreational anglers that fish by charter/party boat have a higher success rate. In 2002, about 2.5 million marine recreational fishers took over 9.3 million trips and caught a total of 42 million fish. About 70 percent of these trips were made in California. In southern California nearly 50 percent of the recreational catch is thought to be taken from private/rental boats with another 20-23 percent taken from CPFVs and 25-27 percent taken from shore. The private/rental boat catch from state waters accounts for the largest proportion of the total number of fish caught with about 51 percent of the recreational catch coming from within state waters which are three miles or less from shore.

The shallow hazards survey would be located 6-8 km (4 -5 mi) from the coast at depths from about 100-200 m (300-600 ft) of water. The proposed survey would be located about 24 km (15 mi) from the CPFV and boat launches of Santa Barbara, more than 64 km (40 mi) from the CPFVs, harbors, and boat launches of Oxnard or Port Hueneme, and over 80 km (50 mi) from Port San Luis or Avila Beach to the north. The survey site would be about 5-6 km (3-4 mi) from Naples reef and 5-7 km (3.4-4.5 mi) from the closest kelp beds. Both Naples reef and coastal kelp beds may be recreational fishing and diving destinations for private vessels on an irregular

basis. For the most part, private recreational fishers remain within State coastal waters either stationary near kelp beds or trolling further offshore; when aboard CPFV they travel across the Santa Barbara Channel to fish the Channel Islands (Tom Raftican, pers. comm., 2003).

### **Significance Criteria and Impacting Agents**

As described in Section 2.1.2, Samedan's suspension period would involve conducting a shallow hazards survey. This analysis examines potential impacts of the proposed survey on recreational fishing and diving. For purposes of this EA, an impact from the survey activities on recreational fishing and diving is considered to be significant if it is likely to cause any of the following:

- Fishermen or divers are precluded from 10 percent or more of the fishing grounds during the survey operations;
- 10 percent or more of the fishermen or divers are precluded from a fishing area for all or most of a fishing season;
- Decrease in catchability of target species exceeds 10 percent of the annual landings or 10 percent of the annual expenditures for recreational fishing and/or diving; or,
- Abrupt interruption of recreational diving by shallow hazards survey within 0.8 km (0.5 mi) of the dive site.

Impacting Agents. The impacting agents resulting from Samedan's survey that would take place during the suspension period and could affect recreational fishing and diving include vessel traffic, space-use conflicts resulting in the preclusion of fishing operations, acoustic energy/sound resulting in a decrease in catchability of target species or resulting in abrupt interruption or end to recreational diving. Vessel traffic and space-use conflicts and disruptions could cause the preclusion of recreational fishing and diving in the survey area. Acoustic energy/sound could also cause behavioral changes in target species that could make them more difficult to catch by recreational fishers after the survey's completion. Acoustic energy/sound from air gun use during the shallow hazards survey could annoy and disturb divers such that recreational diving is interrupted or ended at Naples reef and at the closest kelp beds. Overall, these effects have the potential to decrease the recreational fishing and diving opportunities or the enjoyment of such opportunities.

### **Impact Analysis**

Vessel traffic. The survey would require the use of a single vessel for a maximum time period of 3-4 days in the third or fourth quarter (July-December) of 2006. The vessel would mobilize and de-mobilize from Port Hueneme. The survey is expected to result in a temporary, minor increase in area vessel activity and will probably go unnoticed by recreational fishing and diving vessels. Following the survey, vessel traffic would return to current baseline levels. Samedan has proposed a mitigation to ensure that the survey vessels comply with the traffic corridors established by the Joint Oil Fisheries Liaison Office when going to and from the project area. This method of reducing vessel conflicts has been shown to be effective during past OCS activities. With the vessel-traffic-corridor mitigation in place, it is expected that there would be negligible impacts from vessel traffic on recreational fishing and diving.

Preclusion of fishing operations. The survey will occur over a 3-4day period in 100-200 m (300-600 ft) of water, trail 0.25 km (0.16 mi) of equipment, cover an approximate 2 km<sup>2</sup> (1.5 mi<sup>2</sup>) area, and result in the need to restrict other vessel activity within the area. Recreational diving

will not occur in these water depths; thus there should be no direct impacts to diving from preclusion and/or space-use conflicts. Some types of recreational fishing (e.g., private boat trolling) could be potentially affected by the proposed project more than others but the non-stop nature of the survey makes it nearly impossible to avoid interference with recreational fishing operation that would happen to be within the survey area. Preclusion from the survey area would cause a temporary, very short-term impact on recreational fishing. It would preclude recreational fishing from less than 10 percent of the western Santa Barbara Channel fishing area of similar water depths and topography during survey operations. As most recreational fishers would likely be at the Channel Islands or to a lesser extent at coastal kelp beds or Naples reef, the survey would preclude far fewer than 10 percent of recreational fishers. It is expected that there will be insignificant impacts from preclusion of fishing operations on recreational fishing and diving.

Acoustic energy/sound resulting in a decrease in catchability of target species. During a typical shallow hazards survey, an air gun towed behind a vessel is fired every 7-8 seconds. The firing process involves the release of compressed air that provides a strong sound impulse followed by a period of silence. The Samedan shallow hazards survey would use a single air gun (20<sup>3</sup>-in) for no more than 6 hours and would emit a sound intensity level of 218 dB re 1  $\mu$ Pa @ 1 m at a frequency of 0-128 Hz with multiple hydrophones trailing about 0.25 km (0.16 mi) behind the vessel and 3 m (10 ft) below the sea surface.

Two specific concerns have been raised by fishermen, PFMC, and others in California regarding the potential effects on fish resources directly and subsequently indirect effects on commercial fishing from exposure to acoustic energy signals produced by air gun sources. These issues are 1) the potential for direct damage (lethal, potentially lethal, or sub-lethal effects) to any fish or shellfish life stage, but especially eggs and larvae that may eventually reduce the abundance of harvestable adult populations, and 2) indirect behavioral changes in adult fishes that cause them to be less vulnerable to capture. The first concern, which is a consideration of direct impact on fish/shellfish as a resource is discussed in this EA under Section 4.3. Since it is expected that shallow hazards survey will have an insignificant impact on fish and shellfish resources directly, it is expected that there will be an insignificant impact on recreational fishing and diving from direct damage to these resources. The following section will consider the potential possible behavior changes and decrease in catchability.

A decrease in catchability of target species would cause a temporary, short-term impact on recreational fishing. Behavioral effects on fish/shellfish are potentially the most important group of effects on marine fisheries. There is concern that the shallow hazards survey would have residual effects on catch of a number of species in the Santa Barbara Channel. There is well-substantiated evidence to demonstrate that fish distribution and feeding behavior can be affected by the sound emitted from air gun arrays (Dalen and Knutsen, 1986). This can potentially reduce catchability by driving the fish away from fishing grounds or by reducing their inclination to bite on a baited hook.

In general, the acoustic pulse from air guns has relatively little effect on marine invertebrates and shellfish, presumably due to their lack of a swim bladder (Pearson et al., 1988). Based on these findings, it is unlikely that shallow hazards survey using a single air gun would have a residual effect on the catchability of lobster or crab.

There are indications that the recreational fishing for sharks will be little affected by the seismic survey (McCauley, 1994; Myberg et al., 1978) whereas the catchability of rockfish, coastal

pelagics, albacore and salmon would be temporarily affected for a short-term. The true areal extent of decreased catchability is difficult to quantify but indications are that it extends about 10 km (6 mi) from the center of the seismic source (Lokkeburg and Soldal; 1993). Considering the size of the survey area, it is reasonable to conclude that a possible decrease in catchability will extend over a local area 10 km (6 mi) from the sound source including Naples reef and the nearest coastal kelp beds.

The time period of decreased catchability is also difficult to quantify but indications are that it could last at least 5 days from a 3D seismic survey lasting several weeks (Engas et al., 1993). Without any supporting studies to the contrary, a reasonable conservative estimate may be that catchability would return to normal from the Samedan 6-hour, shallow hazards survey, using a single air gun, within one day. A 1-day decrease in catchability within the area including Naples reef and the nearest coastal kelp beds would constitute less than 10 percent of the annual landing or 10 percent of the annual expenditures for recreational fishing and/or diving. It is expected that there will be insignificant impacts on recreational fishing and diving from acoustic energy/sound resulting in a decrease in catchability of target species.

Acoustic energy sound from air gun use interrupting recreational or research diving at Naples reef and nearby kelp beds. Sound (see above) from the Samedan shallow hazards survey using a single air gun could potentially be heard underwater by recreational or research divers at Naples reef and the nearest coastal kelp beds and could potentially annoy and interrupt or end diving for the duration of the survey. The survey would fire the air gun for a total of no more than 6 hours over a 3-4 day period. It is assumed that the air gun would fire for several hours throughout each day. This time-frame could potentially impact 1-2 dives per day. During the late 1990's MMS scientific divers took the opportunity to perform a number of observations to qualitatively gauge the discomfort, annoyance, and interruption of recreational diving during a 3D seismic survey near the Flower Gardens National Marine Sanctuary in the Gulf of Mexico (Ann S. Bull and Greg Boland, pers. comm., 2004). While underwater the divers found that dives would be interrupted and abruptly ended when the seismic vessel came within 0.8 km (0.5 mi) of the dive site. The Samedan shallow hazards survey site would be about 5-6 km (3-4 mi) from Naples reef and 6-8 km (4-5 mi) from the closest kelp beds. Samedan has proposed mitigations to ensure that the air gun is not fired within 0.8 km (0.5 mi) of a dive boat or vessel of unknown function. With the diver mitigations in place, it is expected that there will be insignificant impacts from acoustic energy/sound on recreational diving.

**Samedan Mitigation Measures:** To minimize potential impacts on recreational fishing and diving from the shallow hazards survey, Samedan has implemented or plans to implement the following mitigation measures (paraphrased from Samedan):

**CF-1.** Samedan shall require that the vessels comply with the traffic corridors established by the Joint Oil/Fisheries Committee when going to and from the project area. Nautical charts showing the traffic corridors will be distributed to the vessel captains at pre-survey meetings. This mitigation applies to Commercial Fishing and shall be applicable here.

**CF-6.** Samedan shall: 1) notify fishermen in writing 30 days prior and verbally three days prior to the commencement of shallow hazards operations; 2) notify the U.S. Coast Guard, Santa Barbara County Resource Management Department, Joint Oil/Fisheries Liaison Office, California State Lands Commission and the Marine Advisory Newsletter in Goleta; and, 3) distribute and post notices at area fuel docks, ice supply houses, wholesale fish buyers, and in the

Harbor Master's offices of Santa Barbara, Ventura, Oxnard, and Port Hueneme harbors. This mitigation applies to Commercial Fishing and shall be applicable here.

**CF-9.** Samedan shall shut down the air gun if a diver or a boat with a dive flag is observed within a 0.8 km (795 m) (0.5 mi) radius safety zone. The two marine mammal observers aboard the survey vessel will also look for divers and dive boats using the same procedures as for marine mammals. This mitigation applies to Commercial Fishing and shall be applicable here.

**CF-10.** If a diver or a dive boat is observed in the survey area or potential safety zone prior to the commencement of the survey, Samedan shall contact them and advise them to leave the area for the duration of the survey. This mitigation applies to Commercial Fishing and shall be applicable here.

**CF-11.** Samedan shall assume that boats of unknown function are dive-boats and treat accordingly, unless they can be contacted or otherwise confirmed not be dive boats. This mitigation applies to Commercial Fishing and shall be applicable here.

**MMS Mitigation Measures:** To satisfy MMS requirements and to avoid or minimize potential impacts on recreational fishing and diving from the Samedan shallow hazards survey that would take place during the suspension period, MMS will require that Samedan do the following:

**RFD-1:** Samedan shall send information and an advisory regarding the survey at least 30 days prior to commencement to the University of California at Santa Barbara (Eric Hessel, Assistant Diving Safety Officer, Environmental Health and Safety UCSB, Santa Barbara, 93106-5132, 805-893-4559) and charter dive vessel operators in Santa Barbara and Ventura (Truth Aquatics, 301 Cabrillo Blvd., Santa Barbara, CA 93101, 805-962-1127 and CalBoat Diving, 1575 Spinnaker Dr. 105B-59, Ventura Harbor, CA 93001, 805-486-4486).

**CF-13.** Samedan shall file an advisory with U.S. Coast Guard for publication in Local Notice to Mariners at least 14 days prior to commencement of survey operations.

**CF-15.** Samedan shall require that contractors use a scout boat captained by a local, knowledgeable fisherman for the shallow hazards survey, to avoid conflicts with commercial fishermen including fixed gear (trap) fishing as well as with other users of the OCS. This mitigation applies to Commercial Fishing and shall be applicable here.

**Conclusion:** There would be 3-4-day preclusion of recreational fishing from about a 2 km<sup>2</sup> (1.5 mi<sup>2</sup>) area and an estimated potential 1-day decrease in catchability of target species following the operations of the shallow hazards survey. These temporary impacts would be mitigated to insignificant by the measures Samedan has already adopted and by the additional mitigation measures MMS will require. Since it is expected that these mitigation measures will be implemented and will be successful, any adverse impacts will be avoided or minimized. Therefore, it is expected that the Samedan shallow hazards survey would have an insignificant impact on recreational fishing and diving.

**Cumulative Analysis:** Cumulative impacts are defined pursuant to the NEPA regulations (40 CFR 1508.7) as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions."

Impacts from other onshore or offshore projects or natural events must overlap temporally and spatially with the proposed survey to be considered in the cumulative impact analysis for this

project. The proposed survey would be conducted in a defined area on the Gato Canyon Unit in the Santa Barbara Channel (Figure 1-1). The duration of the shallow hazards survey is estimated to range from 3-4 days and would be conducted during the third or fourth quarter of 2006.

The California Department of Fish and Game, Marine Region, (Leet et al., 2001) has identified several fishing and non-fishing activities that may cause adverse impacts on recreational fishing and diving along the Pacific Coast and within the Santa Barbara Channel. The major issues or cumulative activities that could affect recreational fishing and diving in the project area are environmental events like El Niño and their impact on animal and plant species, over-harvest of species such as shelf rockfish, interactions between fisheries and marine mammals, pollution from human activities and competition among user groups, both consumptive and non-consumptive.

The National Marine Fisheries Service (1998; 2003a, b) has also identified several fishing and non-fishing activities that may cause adverse impacts on commercial fishing along the Pacific Coast and within the Santa Barbara Channel. These include dredging and discharge of dredged material, intake of water and associated fish and shellfish resources by coastal intake structures, wastewater discharge, oil and hazardous waste spills, coastal development and coastal environmental degradation, agricultural runoff, and recreational fishing. In addition, fisheries could be impacted by degradation of water quality which has resulted from municipal, industrial, and agricultural waste discharges and runoff in much of the Southern California Bight (MMS, 1992).

The cumulative effect of the above activities has had major influence on commercial fishing off the south-central California coast. However, given the short duration of the shallow hazards survey and the insignificant impacts that are expected, the incremental contribution of Samedan's survey activities to the cumulative impact on recreational fishing and diving is inconsequential. In conclusion, the additional effect of the impact-producing agents related to the shallow hazards survey that would take place during the proposed suspension period are not expected to add significantly to cumulative impacts on recreational fishing and diving.

#### **4.6 Environmental Justice**

See Section 2.1.2 and Figure 1-1 for a detailed description of activities that would take place during the proposed suspension period.

##### **Environmental and Regulatory Setting**

On February 11, 1994, President Clinton issued Executive Order 13084 to address questions of equity in the environmental and health conditions of impoverished communities. In response to this Executive Order an Environmental Justice analysis of the community affected by a Federal action is required.

##### **Significance Criteria and Impacting Agents**

To determine whether the proposed project would be likely to result in disproportionately high and adverse human health or environmental effects on minority/low-income populations, demographic information was obtained from the U.S. Census Bureau on the potential area of effect (the coastal area from which project operations will be staged). The definitions of minority/low-income populations used for the purposes of this environmental justice analysis are those of the Council of Environmental Quality, whose definitions are widely used to assess the potential for adverse effects on environmental justice in the environmental review process. The



potential for adverse effects on minority/low-income populations occurs when the following criteria are met:

- Where the minority/low-income population percentage of the affected area is greater than 50 percent; or;
- Where the minority/low-income population percentage of the affected area is meaningfully greater than the minority/low-income population percentage or other appropriate unit of geographic analysis.

The primary onshore areas affected by the proposed project are the City of Oxnard and Port Hueneme which are both included in the City of Oxnard demographic area used in this analysis. In the year 2000, the City of Oxnard was reported to have a minority population of 58.1 percent which is higher than the State of California minority population of 40.6 percent, and higher than the 24.9 percent for the entire U.S. Based on the criteria described above, the proposed project has the potential to impact minority/low-income populations and environmental justice, so an analysis is required. For this environmental justice analysis, an effect on environmental justice is considered to be significant if it would:

- Result in disproportionately high adverse environmental effects that would substantially and adversely affect minority/low-income populations.

Impacting Agents. The impacting agents associated with this project that could have an effect on environmental justice are an increase in passenger vehicle and truck traffic. Such an increase could have adverse impacts on minority/low-income populations.

### **Impact Analysis**

As described in Section 2.1.2, Samedan's suspension would involve conducting a shallow hazards survey. This section analyzes impacts that would be expected to occur on minority/low-income populations as a result of the survey activities.

Passenger Vehicle and Truck Traffic: The scope of activity generated by the proposed project includes a negligible increase in vehicle and truck traffic in the City of Oxnard/Port Hueneme.

Based on the scope of the proposed project, it is estimated that there will be less than 10 additional passenger vehicle trips generated each day during the 1-2 day period the survey vessels will be stationed at Port Hueneme. The trips will be made by project personnel who commute to and from the staging area (Port Hueneme). In addition, an estimated 1-2 additional truck trips will be made to transport equipment and supplies to the vessels. Based on this level of activity, impacts to minority/low-income populations are expected to be negligible.

**Conclusion:** Considering the limited scope of the project, its short duration, and the negligible increase in vehicle and truck traffic that would occur, the impact on minority/low-income populations and environmental justice is expected to be insignificant.

**Cumulative Analysis:** Cumulative impacts are defined pursuant to NEPA regulations (40 CFR §1508.7) as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions." The cumulative impacts of offshore oil and gas operations and other non-oil and gas activities on environmental justice in the project area have been addressed in the Final Environmental Impact

Statement/Point Mugu Sea Range (U.S. Navy, 2002). As summarized in this document, the coastal areas (Ventura County, Santa Barbara County, Los Angeles County) surrounding the project area are characterized by ethnically diverse populations. The analysis demonstrated that no significant cumulative effects on matters of environmental justice were expected to result from oil and gas operations, military activities and other activities. Given the limited scope and duration of the proposed project, no significant cumulative impacts are expected.

## **5 Environmental Impacts of Alternative 2: Deny Suspension**

Under the Deny Suspension alternative, MMS would deny the SOP for Samedan's Gato Canyon Unit only if the applicant fails to meet established requirements (30 CFR §250.172-175) for obtaining a suspension. Adoption of this alternative would result in the expiration of the leases in Samedan's Gato Canyon Unit in the western Santa Barbara Channel. No environmental impacts would result from denial of the suspension.

## **6 Environmental Impacts of Alternative 3: No Action**

Under the No Action alternative, MMS would take no action on the SOP for Samedan's Gato Canyon Unit in the western Santa Barbara Channel. Such action would be inconsistent with the Court Order in *California v. Norton* to implement a plan to prepare Consistency Determinations in contemplation of adjudicating the suspension requests. Such action would also be inconsistent with the MMS's obligation to act upon applications submitted by Lessees. No environmental impacts would occur under this alternative.

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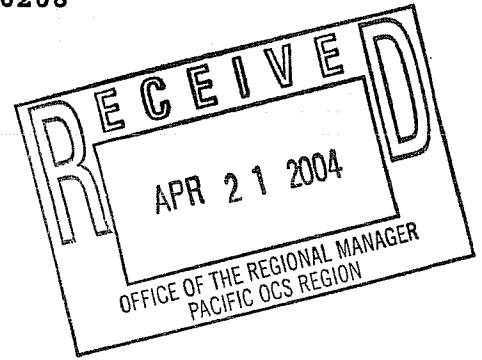
## **APPENDICES**

1. Samedan letter to MMS updating suspension request, dated April 20, 2004
2. MMS Public Announcement requesting scoping comments, dated July 21, 2004
3. MMS letter to Samedan clarifying suspension action, dated November 1, 2004
4. NOAA Fisheries Southwest Region response to MMS request for ESA and EFH consultation, dated December 16, 2004

**SAMEDAN OIL CORPORATION**  
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Houston, Texas 77067  
(281) 872-3100 FAX (281) 876-6208

April 20, 2004

Mr. Peter Tweedt  
Regional Manager  
Minerals Management Service  
U. S. Department of the Interior  
770 Paseo Camarillo  
Camarillo, California 93010



Re: Gato Canyon Unit; OCS Leases P 0460, P 0462\* and P 0464,  
Santa Barbara Channel, California; Update of Request for Previously Approved  
Suspension of Production

Dear Mr. Tweedt:

Introduction

On November 12, 1999, the Minerals Management Service ("MMS") granted Samedan Oil Corporation's May 13, 1999 suspension of production ("SOP") request for the Gato Canyon Unit. As of June 20, 2001, Samedan had complied with all milestone activities set forth in MMS' approval letter that had arisen as of that date. However, on June 20, 2001, the federal district court for the Northern District of California held that, as a result of the 1990 amendments to the Coastal Zone Management Act ("CZMA"), MMS's grant of the November 1999 SOP was "subject to a consistency determination as a federal activity affecting the coastal zone" under CZMA § 307(c)(1), 16 U.S.C. § 1456(c)(1). *California v. Norton*, 150 F. Supp.2d 1046, 1053 (N.D. Cal. 2001) ("*Norton case*"), *aff'd*, 311 F.3d 1162 (9th Cir. 2002). Based on this ruling, Samedan joined by other lessees filed a breach of contract action against the United States in the U.S. Court of Federal Claims, *Amber Resources Co. v. United States*, No. 02-30C (the "*Amber case*"). Pursuant to the requirements of the *Norton case*, MMS on July 2, 2001, set aside its approval of the November 1999 suspension and directed a suspension of operations ("SOO") for the unit until MMS "has acted on" the lessees' suspension request.

On February 26, 2004, the California court in the *Norton case* ordered MMS to obtain "updated lease suspension applications from the lessees." By letter dated March 10, 2004, MMS directed that "in accordance with the Court's order and the requirements of 30 C.F.R. 250.171, you must submit to the regional manager, MMS Pacific Regional Office, updated information relating to your suspension request..."

\* Lease P 0462 was not included in the Gato Canyon Unit SOP by MMS and it expired August 16, 1999. Samedan has appealed this decision by MMS to the Interior Board of

## **Gato Canyon Unit, Updated Request for SOP, April 20, 2004**

*Land Appeals. If that appeal is successful, Lease P 0462 will be reinstated, and subject to this updated SOP request in the same manner as the other Gato Canyon leases.*

This letter provides the updated information that MMS has instructed Samedan to submit. The information previously submitted in connection with the SOPs granted in November 1999, which had been found by MMS to meet all of the requirements of 30 C.F.R. 250.171, remains effective, except as modified in this letter.

Samedan submits this information without waiving any of the rights of the Gato Canyon Unit lessees, and specifically without waiving their assertion that the application of the 1990 CZMA amendments to the Gato Canyon Unit and other undeveloped offshore California leases constituted a material breach of those leases as asserted in the *Amber* case.

The "going forward" activities described in this update are based on the previously approved milestones that the lessees were prevented from completing as a result of the July 2001 SOO. Because the Gato Canyon Unit lessees have been barred from conducting any operations on the leases since July 2001, they have no new substantive information to report regarding their progress toward those milestones or the prospectivity of the Gato Canyon Unit, beyond that contained in the May 1999 SOP request that MMS had already granted, and the quarterly progress reports that Samedan submitted pursuant to the November 1999 SOP. All of these documents are incorporated herein by reference.

Pursuant to MMS's direction, Samedan has updated the time-frames for accomplishing the outstanding milestones. These updates reflect current estimates for certain work and necessary equipment and permits in light of the cessation of ongoing activity that was necessitated by the June 20, 2001 court Order and the July 2, 2001 MMS-directed SOO.

Specifically, at the time of the July 2001 SOO, the Gato Canyon Unit lessees had two months remaining before the deadline for the submission of a revised Exploration Plan ("EP") required by MMS' November 12, 1999 SOP approval letter. As described further below, the lessees had hired a contractor to conduct certain shallow hazard surveys necessary for preparing the revised EP. Upon receiving the MMS order, Samedan was forced at great expense to instruct the contractor, which had just mobilized equipment toward California, to terminate its planned work and to return the equipment to Houston, Texas.

In response to MMS's direction, Samedan estimates that it would take four months from the time that MMS re-approves the "updated" SOP request to retain a contractor and complete the shallow hazard survey. We have adjusted the previously approved work schedule accordingly. For example, the enclosed schedule provides that Samedan would submit a revised EP six months after the SOP is re-approved--four months to complete the surveying plus the previously allotted two months to finalize the revised EP. As noted, this six month period is

## Gato Canyon Unit, Updated Request for SOP, April 20, 2004

entirely due to the premature termination of ongoing work caused by the imposition of the SOO.

For purposes of responding to MMS, we have assumed an SOP effective date of January 2005. For other assumed SOP effective dates, factors such as weather, marine mammal migration, and fisheries interaction may affect the timing of the milestone activities and thus the duration of the SOP period. We have provided the attached Table 1 to illustrate the effect different SOP starting times have on the remaining milestones.

### Activities during SOP from November 1999 to June 2001

1. In February 2000 Samedan timely submitted the Project Description for the Gato Canyon Unit. Following review of the document by MMS a revised Project Description was submitted in August 2000 with additions and corrections in accordance with the comments by MMS.
2. On August 23, 2000 Samedan submitted a plan for the geohazards survey of the Gato Canyon Unit. The plan was accepted with clarifications, additions and revisions as set out in MMS letter to Samedan of November 28, 2000.
3. Geohazards field operations were conducted during May and June 2001 until the order by the U.S. District Court for the Northern District of California in the case of *California v. Norton*, issued on June 20, 2001, set aside the SOP for the Gato Canyon Unit leases and a Suspension of Operations was directed by the MMS on July 2, 2001 thereby halting operations.
4. The survey boat was in port at the time of the court's order waiting on delivery of equipment (air guns) to complete the survey. The carrier was halted en route and returned to Houston. The contract was terminated and the survey boat released.
5. Under the November 1999 SOP, Samedan was required to submit proof to MMS by November 2001 that a Request for Proposal ("RFP") for a Mobile Offshore Drilling Unit ("MODU") had been sent out to potential contractors. The operators of the undeveloped Pacific OCS units on which delineation drilling would require a single MODU formed the Offshore Rig Activation Committee ("ORA") to prepare such an RFP. Samedan is a member of ORA and participated in 20 ORA meetings between December 1998 and July 2001. Significant planning, logistical, and coordination progress was made before the July 2001 SOO, including development of a draft formal agreement between the ORA participants and submission of bid requests to hire a third party "Schedule Administrator" capable of overseeing numerous ORA tasks. These and

## Gato Canyon Unit, Updated Request for SOP, April 20, 2004

other ORA matters would have to be reactivated, updated, and finalized during the SOP period prior to the time a drilling rig is contracted.

### Going Forward Activities

#### Exploration Plan Update

The Exploration Plan (EP) would be reviewed and updated where necessary and submitted for approval. The geohazards air gun survey would be completed over the proposed wellsite area and the geohazards report would be incorporated into the EP. The oil spill plan would be updated and submitted for approval.

#### Proposed delineation well OCS-P 0460 #3

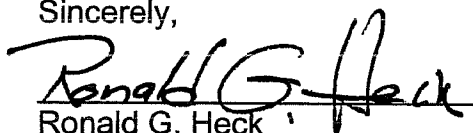
Simultaneously with the update of the Exploration Plan, Samedan would be participating in the Offshore Rig Activation (ORA) Group as described above. The purpose of ORA is to identify and locate a mobile drilling unit (MODU), preferably a semi-submersible, to mobilize to California to drill additional delineation wells on existing POCS leases.

Prior to taking the MODU to drill the Gato Canyon Unit well, Samedan would be a participant in the ORA process. ORA would do a global search to identify appropriate MODU candidates, generate a Request for Proposal to solicit bids by contractors and enter contract negotiations with the selected contractor. Mobilization to California will take 90 to 150 days depending on distance and availability of transportation.

Please see the Gato Canyon Unit Project Description of August 2000 for details on the well location, proposed drilling program and description of the proposed type of drilling equipment. Also please see the Fisheries Plan, Marine Wildlife Contingency Plan and Worst Case Oil Spill Calculation for the OCS-P 0462 #3 well that were submitted to MMS on July 31, 2000.

The attached Table 1 Sliding Calendar shows the activities described above. The time frames are best estimates based on current knowledge.

Sincerely,



Ronald G. Heck

Attorney-in-fact

Offshore California Projects Coordinator



## **Gato Canyon Unit, Updated Request for SOP, April 20, 2004**

cc: Cam Countryman, Houston  
GCU Partners

### **Attachments**

1. Table 1 Gato Canyon Unit Sliding Calendar for Unit Activities
2. Figures
  - a. Figure 1- Gato Canyon Unit Location Map (previously submitted)
  - b. Figure 2 - Well Location Map (previously submitted)
3. Gato Canyon Unit lease ownership (updated)

## GATO CANYON UNIT SLIDING CALENDAR FOR UNIT ACTIVITIES

Suspension of Production – Starting Date vs. Milestone Dates

SOP Starting Date	Complete Shallow Hazard Surveying 1 & 2	Submit Revised Exploration Plan 3	Provide Copy of RFP for MODU 4	Begin EP Operations 5
October 2004	October 2005	December 2005	February 2006	August 2007
November 2004	October 2005	December 2005	February 2006	August 2007
December 2004	October 2005	December 2005	February 2006	August 2007
<b>January 2005</b>	<b>October 2005</b>	<b>December 2005</b>	<b>February 2006</b>	<b>August 2007</b>
February 2005	October 2005	December 2005	February 2006	August 2007
March 2005	October 2005	December 2005	February 2006	August 2007
April 2005	October 2005	December 2005	February 2006	August 2007
May 2005	October 2005	December 2005	February 2006	August 2007
June 2005	October 2005	December 2005	February 2006	August 2007
July 2005	October 2006	December 2006	February 2007	August 2008
August 2005	October 2006	December 2006	February 2007	August 2008
September 2005	October 2006	December 2006	February 2007	August 2008
October 2005	October 2006	December 2006	February 2007	August 2008
November 2005	October 2006	December 2006	February 2007	August 2008
December 2005	October 2006	December 2006	February 2007	August 2008

<sup>1</sup> Four months would be required after the effective date of the SOP to rebid & negotiate a contract for survey vessel, provide notices to affected parties, and mobilize the survey vessel.

<sup>2</sup> October would be the optimum month to conduct shallow hazard surveying using an air gun. This timing will avoid possible conflict with gray whale migration (Nov. – May), salmon fishery (May – September), and rough seas characteristic during winter weather.

<sup>3</sup> Revised Exploration Plan (EP) would be submitted two months after completing shallow hazard surveys.

<sup>4</sup> Request for Proposal (RFP) for Mobile Offshore Drilling Unit (MODU) would be submitted two months after submitting revised Exploration Plan.

<sup>5</sup> Operations that are approved under the Revised Exploration Plan would begin 18 months after submitting the RFP for the MODU.

Attachment 2a, Gato Canyon Unit Updated Request for SOP, April 20, 2004

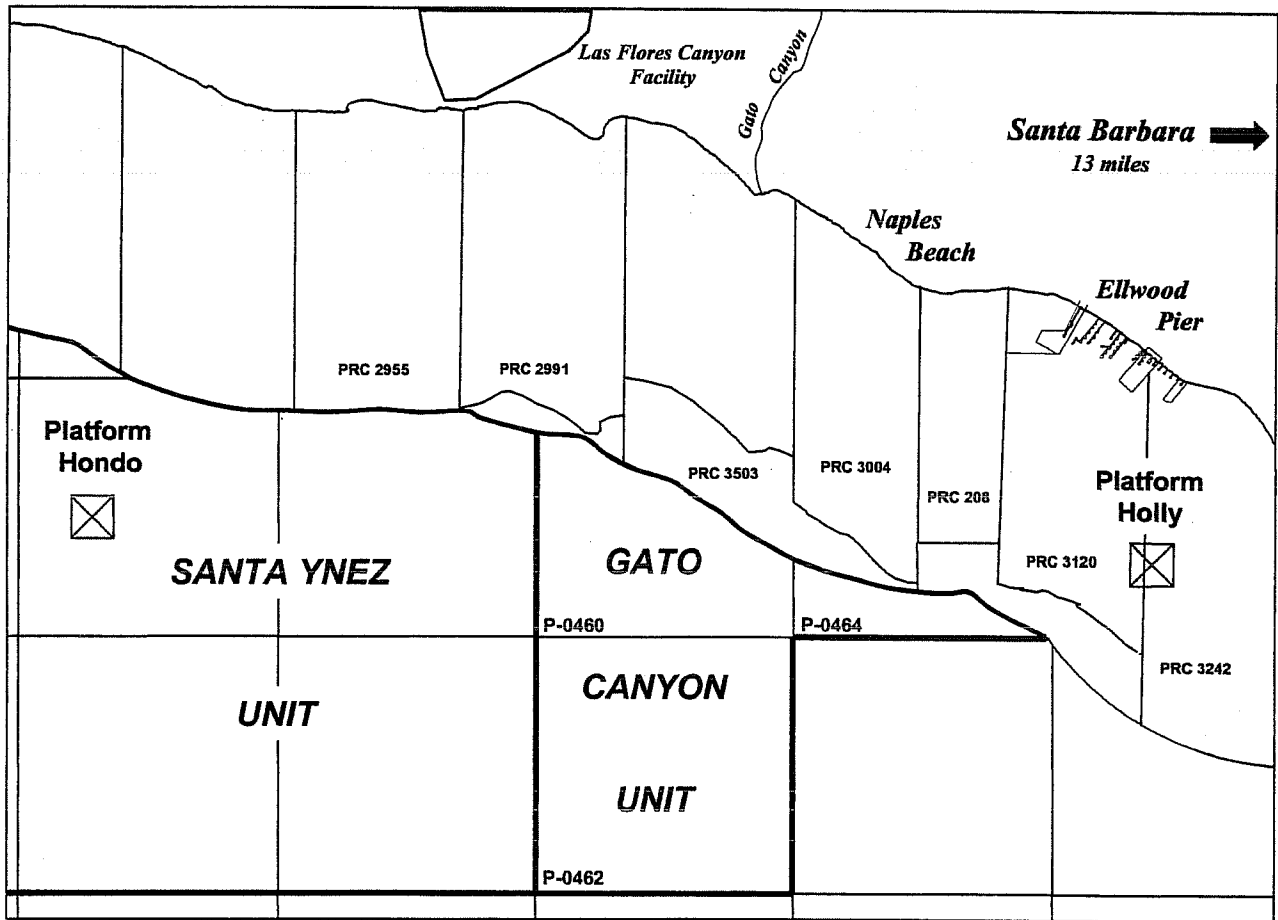


Figure 1: Location map showing Gato Canyon Unit relative to State Leases, Santa Ynez Unit, and Santa Barbara County shoreline.

*Note: Lease P 0462 was not included in the Gato Canyon Unit SOP by MMS and it expired August 16, 1999. Samedan has appealed this decision by MMS to the Interior Board of Land Appeals. If that appeal is successful, Lease P 0462 will be reinstated, and subject to this updated SOP request in the same manner as the other Gato Canyon leases.*

Attachment 2b, Gato Canyon Unit Updated Request for SOP, April 20 , 2004

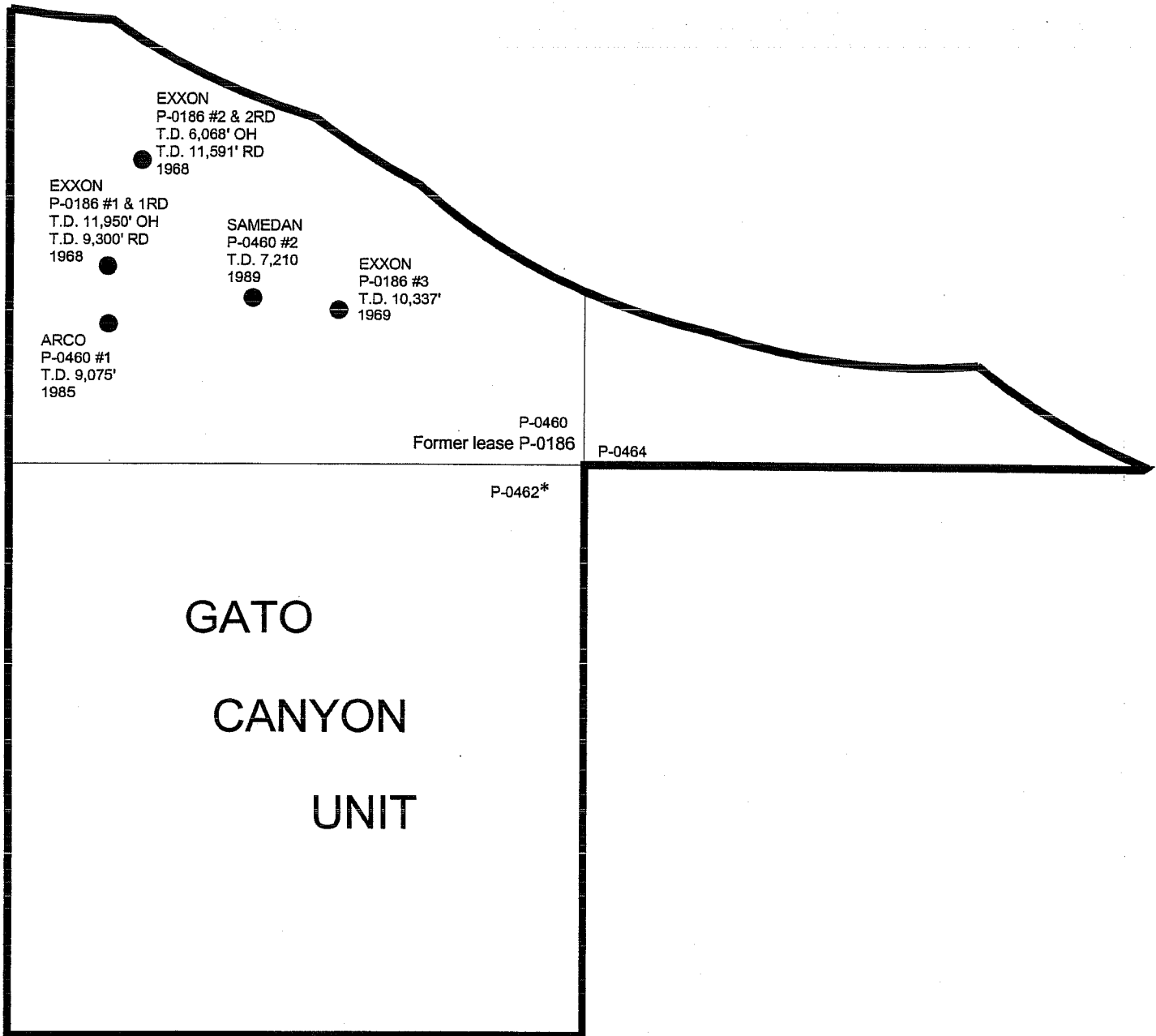


Figure 2: Well location map, Gato Canyon Unit.

*\* Lease P 0462 was not included in the Gato Canyon Unit SOP by MMS and it expired August 16, 1999. Samedan has appealed this decision by MMS to the Interior Board of Land Appeals. If that appeal is successful, Lease P 0462 will be reinstated, and subject to this updated SOP request in the same manner as the other Gato Canyon leases.*

**GATO CANYON UNIT LEASES AND OWNERSHIP**

<u>LEASE</u>	<u>ACRES</u>	<u>DESCRIPTION*</u>	<u>ROYALTY</u>	<u>OTHER</u>
OCS-P 0460	3,375	Block 53N-72W	16.66667%	Section 8g
OCS-P 0462	5,760	Block 52N-72W	12.50000%	Section 8g
OCS-P 0464	966	Block 53N-71W	16.66667%	Section 8g

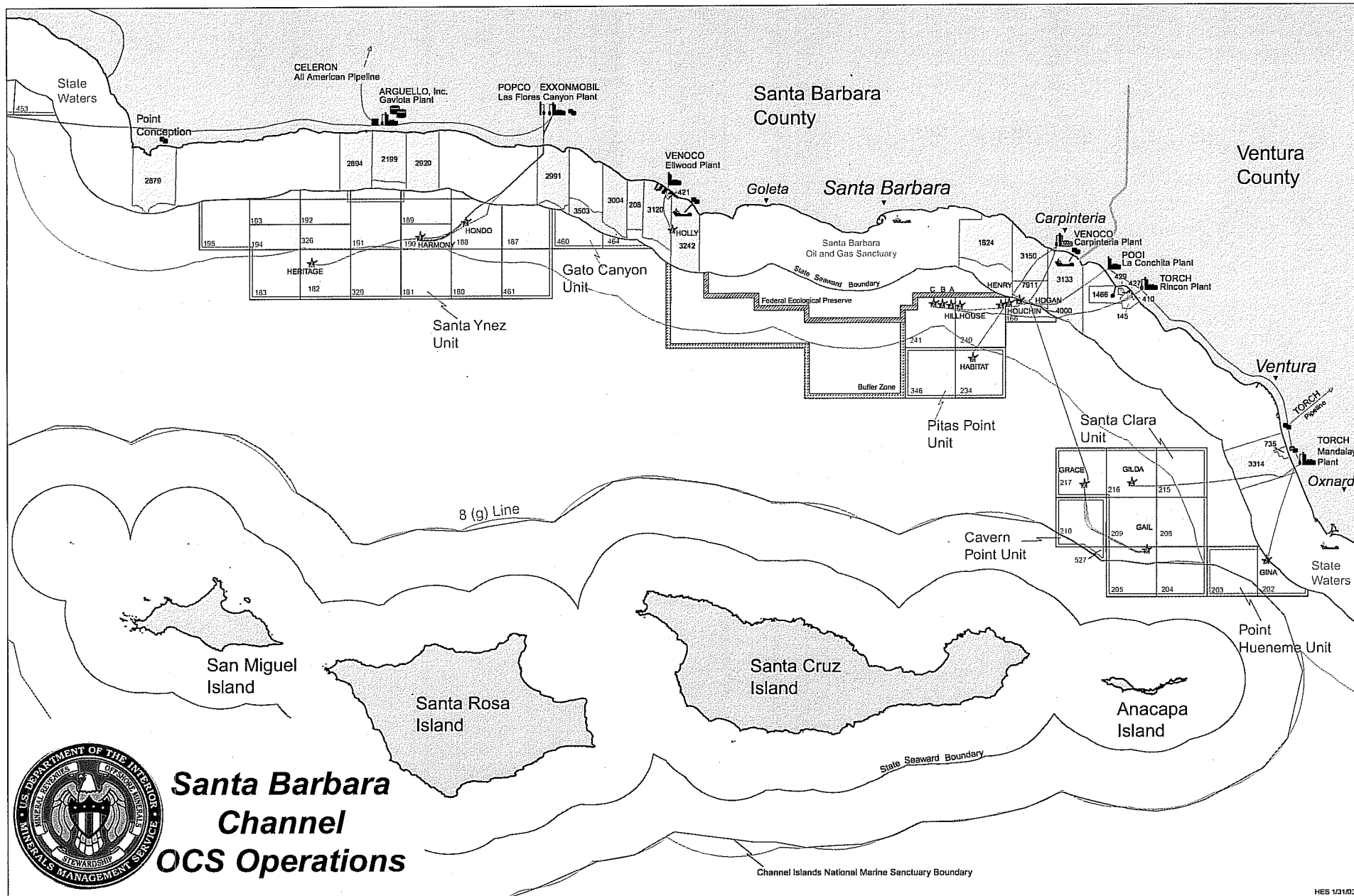
\* POCS leasing maps No. 6A and 6B, Santa Barbara Channel

<u>COMPANY</u>	<u>PERCENTAGE**</u>
Amber Resources Co.	6.97108
Delta Petroleum Company	8.62930
Nuevo Energy Company	15.29297
Nycal Offshore	4.25313
Ogle Petroleum Inc.	3.00000
OLAC Resources, LLC	9.50000
Samedan Oil Corporation***	10.00000
RME Petroleum Company	42.35352

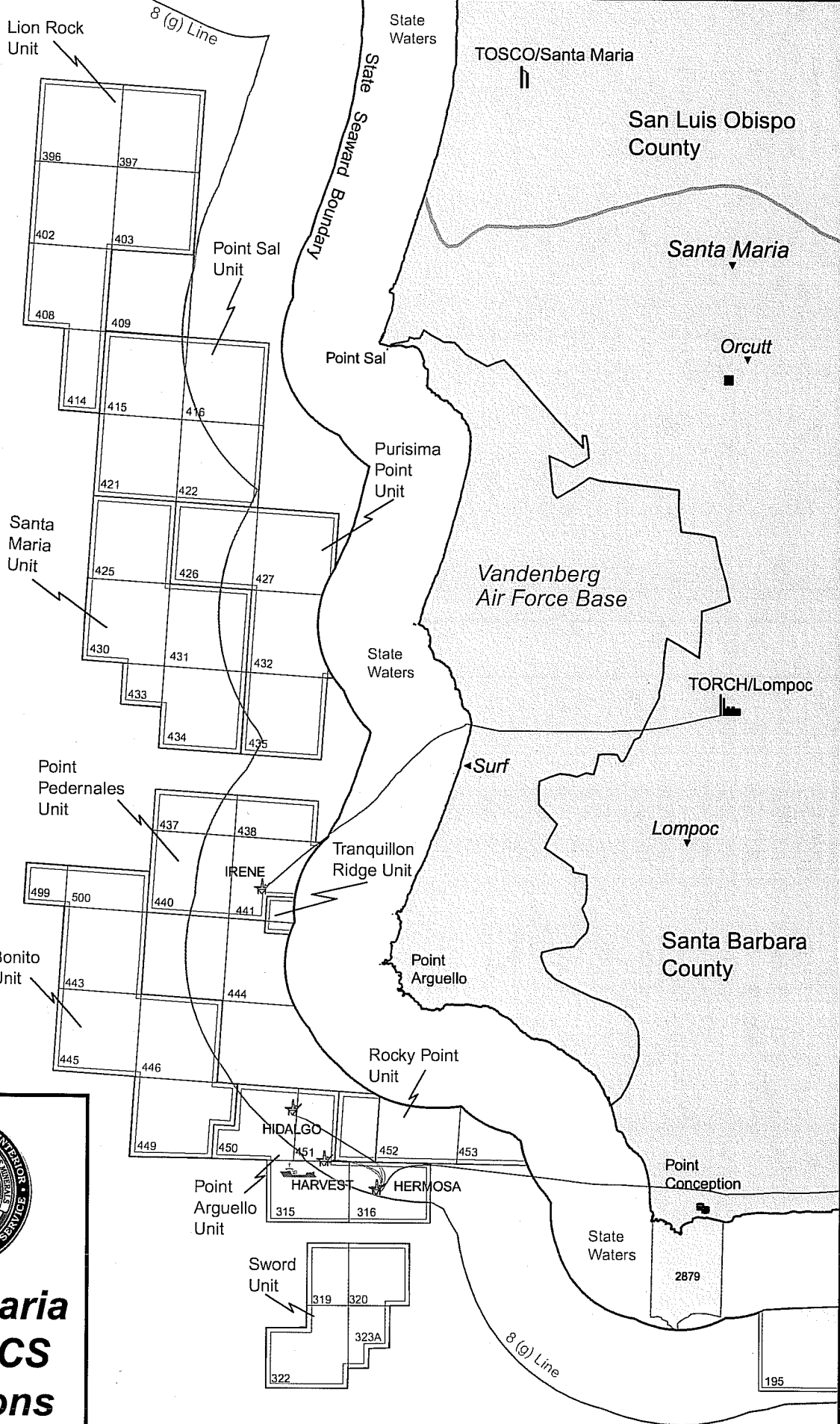
\*\* Ownership in the Gato Canyon Unit leases is the same for all leases

\*\*\* Designated Operator

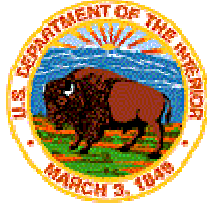
*Note: Lease P 0462 was not included in the Gato Canyon Unit SOP by MMS and it expired August 16, 1999. Samedan has appealed this decision by MMS to the Interior Board of Land Appeals. If that appeal is successful, Lease P 0462 will be reinstated, and subject to this updated SOP request in the same manner as the other Gato Canyon leases.*



**Santa Barbara  
Channel  
OCS Operations**



**Santa Maria  
Basin OCS  
Operations**



**U. S. Department of the Interior  
Minerals Management Service**



**PUBLIC ANNOUNCEMENT**

**Request for Scoping Comments  
For Preparation of Environmental Assessments  
For Granting Lease Suspensions on 36 Undeveloped OCS Leases  
July 21, 2004**

**Agency Action**

On February 26, 2004, the Court in *California v. Norton*, No. 99-4964 (CW) N.D. Cal. ordered the Federal Defendants to propose a timetable for completing their analyses of applications for lease suspensions filed by the operators of 36 undeveloped leases offshore California, and submitting consistency determinations to the State of California under the Coastal Zone Management Act (CZMA). On June 28, 2004, the Court adopted the proposed timeline which included the time to prepare six environmental assessments to analyze the environmental impacts of granting the lease suspension requests.

The MMS action is to grant, deny, or take no action on each of the operator's suspension requests. A suspension is defined in 30 CFR §250.105 as "a granted or directed deferral of the requirement to produce [Suspension of Production (SOP)] or to conduct lease holding operations [Suspension of Operations (SOO)]." A suspension provides an extension of a lease in certain circumstances (see 30 CFR 250.172-175). In certain instances, operators have proposed to conduct geohazards or other surveys to assist in the preparation of their revised Exploration Plans. These surveys will be addressed in the EAs that MMS is preparing and would be conducted after the suspension is granted. The granting of a suspension will not authorize any exploration or development and production operations.

**Description of the Suspension Requests and Location of the 36 Undeveloped Leases**

Refer to the table and maps on the following pages.

**NEPA Process and Public Scoping**

Under the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 *et seq.*) an Environmental Assessment (EA) serves as an information document for government decision makers and the public. The purpose of an EA is to: help decision makers base their decision on an understanding of environmental consequences; identify ways that environmental effects can be mitigated or avoided; identify alternatives that would avoid or reduce effects to the environment by requiring changes in the proposal when feasible; and to disclose to the public the environmental information and analyses upon which Federal decisions will be based.

*Scoping* is the process used to help determine the appropriate content of an EA. Public input is an important part of the scoping process. The purpose of soliciting input is to properly identify as many relevant issues, alternatives, mitigation measures, and analytical tools as possible so they may be incorporated into the EA. The scoping comments assist in determining the breadth and depth of the analysis.



Based on the information received during the initial scoping effort and other information, such as the location of sensitive natural resources, time of year, projected oil and gas activity, alternatives to the proposal are identified that might reduce possible impacts. In addition, reasonable mitigation measures that could reduce or eliminate possible impacts are considered for analysis in the EA.

Detailed information concerning NEPA may be found at <http://ceq.eh.doe.gov/nepa/nepanet.htm>. Frequently asked questions about compliance with the National Environmental Policy Act (NEPA) are provided at <http://www.epa.gov/compliance/resources/faqs/nepa/index.html>.

### **MMS's Environmental Assessment (EA) Preparation Schedule**

1. Public Scoping Comments Due: 8/26/2004
2. Draft EAs Available for Public Comment: 11/17/2004
3. Draft EAs' Public Comment Period Closes: 12/16/2004
4. MMS Finalizes EAs: 2/13/2005

### **Submittal of Scoping Comments**

Comments may be sent to MMS by email or by mail and must be received by MMS no later than **August 26, 2004**. All comments should include the name and mailing address of the person commenting. It is the practice of MMS to make comments, including names and home addresses of respondents, part of the public record. Individual respondents may request that we withhold their home address and/or identity from the record. We will honor such requests to the extent allowable by law. If you wish for us to withhold your name and/or address, you must state this prominently at the beginning of your comments. We will not consider any anonymous comments.

All interested persons, organizations and agencies wishing to provide scoping comments on the proposed actions may do so by sending them in time to reach MMS by **August 26, 2004** to the appropriate address below:

**By Email:**     [Suspension-EA@mms.gov](mailto:Suspension-EA@mms.gov)

**By Mail:**     **Minerals Management Service**  
                  **Attn: Suspension – EA Comments**  
                  **Office of Environmental Evaluation**  
                  **770 Paseo Camarillo**  
                  **Camarillo, CA 93010-6064**

The Draft EAs will be available for public review starting **November 17, 2004**. Draft EAs will be mailed to government agencies and elected officials. A digital copy will be posted on the MMS, Pacific Region homepage (<http://www.mms.gov/omm/pacific/>). Members of the public, who are not able to access the Region's website, and want to receive the Draft EAs, need to submit a written request to MMS at the mailing address given above. Requests for copies of the Draft EAs should specify whether "paper" or "CD" copy is preferred.

**FOR FURTHER INFORMATION:** Questions concerning the Draft EAs should be directed to Mr. Maurice Hill, Office of Environmental Evaluation, Pacific OCS Region, Minerals Management Service, 770 Paseo Camarillo, Camarillo, California 93010-6064; phone 805.389.7815.

Questions concerning the operators' suspension requests should be directed to Ms. Joan Barminski, Office Reservoir Evaluation and Production, Pacific OCS Region, Minerals Management Service, 770 Paseo Camarillo, Camarillo, California 93010-6064; phone 805.389.7707.

Table 1. Description of the Suspension Requests

UNIT/LEASE(S) AND OPERATOR	REQUESTED ACTION	LENGTH OF SUSPENSION REQUESTED AND ACTIVITIES PLANNED DURING THE SUSPENSION PERIOD	NEPA DOCUMENTATION
LEASE 409 – Not unitized. Operator: AERA ENERGY LLC	Aera has requested a Suspension of Production pursuant to 30 CFR 250.171. A Suspension of Production is defined as a deferral of the requirement to produce (30 CFR 250.105). A suspension may extend the term of the lease and may be issued for a period of up to 5 years (30 CFR 250.170).	Aera has requested a suspension of 23 to 34 months, depending on the date that MMS grants the suspension <sup>1</sup> . No activities, during the suspension period, on Lease OCS-P 0409, would be conducted in the offshore area.	MMS will prepare a single Environmental Assessment to encompass lease OCS-P 0409, the Lion Rock Unit, the Purisima Point Unit, the Point Sal Unit, and the Santa Maria Unit
LION ROCK UNIT / LEASES OCS-P 0396, 0397, 0402, 0403, 0408, 0414 Operator: AERA ENERGY LLC	Aera has requested a Suspension of Production pursuant to 30 CFR 250.171. A Suspension of Production is defined as a deferral of the requirement to produce (30 CFR 250.105). A suspension may extend the term of the lease and may be issued for a period of up to 5 years (30 CFR 250.170).	Aera has requested a suspension of 23 to 34 months, depending on the date that MMS grants the suspension <sup>1</sup> . No activities, during the suspension period, on the Lion Rock Unit, would be conducted in the offshore area.	MMS will prepare a single Environmental Assessment to encompass lease OCS-P 0409, the Lion Rock Unit, the Purisima Point Unit, the Point Sal Unit, and the Santa Maria Unit
PURISIMA POINT UNIT / LEASES OCS-P 0426, 0427, 0432, 0435 Operator: AERA ENERGY LLC	Aera has requested a Suspension of Production pursuant to 30 CFR 250.171. A Suspension of Production is defined as a deferral of the requirement to produce (30 CFR 250.105). A suspension may extend the term of the lease and may be issued for a period of up to 5 years (30 CFR 250.170).	Aera has requested a suspension of 23 to 34 months, depending on the date that MMS grants the suspension <sup>1</sup> . During the suspension period, Aera would conduct high resolution geophysical surveys to look for archaeological resources and geohazards on the Unit. A remotely controlled vehicle (ROV) would be used to conduct a biological survey. Aera would plan the surveys for the Fall of the year following approval of their suspension request <sup>2</sup> . Aera is required to submit geophysical information sufficient to provide continuous, overlapping sub-bottom imagery, with varying resolutions, from the seafloor to a depth of 300 to 450 meters. To acquire the data, Aera would use a multi-spectral suite of acoustic reflection profiling systems that may include a sub-bottom profiler, boomer system, and small air gun array. The archaeological remote sensing survey could involve the use of side scan sonar, sub-bottom profilers, magnetometer, and recording fathometer. The surveys for the Purisima Point and Pt. Sal Units would be done together. The estimated time to collect the shallow hazards and archaeological data will be approximately 13 days with good weather. Additionally, the ROV biological survey is estimated to take approximately 5 days with good weather. During the suspension period, Aera would submit revisions to their previously approved Exploration Plan for the leases in the Purisima Point Unit. Preparation of revisions to the Exploration Plan is an administrative activity that would be completed at Aera's offices.	MMS will prepare a single Environmental Assessment to encompass lease OCS-P 0409, the Lion Rock Unit, the Purisima Point Unit, the Point Sal Unit, and the Santa Maria Unit

1 Aera provided a range of suspension lengths because the actual approval date for their request is unknown at this time and because preliminary activities on the Pt. Sal and Purisima Pt. Units require offshore surveys that need to be scheduled to avoid conflicts with marine mammal migration, fishing seasons, and rough weather. If MMS grants their suspension, it would not be for a range of dates; it would be for a finite length.

2 Aera would plan the surveys for the Fall to avoid interactions with commercial fishing seasons, marine mammal migrations, and weather. Year-to-year variability in the size and exact location of the commercial salmon fishery may allow surveying earlier than the Fall, but that is generally not known until after the salmon season opens in the Spring.

Table 1. Description of the Suspension Requests

UNIT/LEASE(S) AND OPERATOR	REQUESTED ACTION	LENGTH OF SUSPENSION REQUESTED AND ACTIVITIES PLANNED DURING THE SUSPENSION PERIOD	NEPA DOCUMENTATION
POINT SAL UNIT / LEASES OCS-P 0415, 0416, 0421, and 0422 Operator: AERA ENERGY LLC	Aera has requested a Suspension of Production pursuant to 30 CFR 250.171. A Suspension of Production is defined as a deferral of the requirement to produce (30 CFR 250.105). A suspension may extend the term of the lease and may be issued for a period of up to 5 years (30 CFR 250.170).	Aera has requested a suspension of 20 to 31 months, depending on the date of approval <sup>1</sup> . During the suspension period, Aera would conduct high resolution geophysical surveys to look for archaeological resources and geohazards on the Unit. A remotely controlled vehicle (ROV) would be used to conduct a biological survey. Aera would plan the surveys for the Fall of the year following approval of their suspension application <sup>2</sup> . Aera is required to submit geophysical information sufficient to provide continuous, overlapping sub-bottom imagery, with varying resolutions, from the seafloor to a depth of 300 to 450 meters. To acquire the data, Aera would use a multi-spectral suite of acoustic reflection profiling systems that may include a sub-bottom profiler, boomer system, and small air gun array. The archaeological remote sensing survey could involve the use of side scan sonar, sub-bottom profilers, magnetometer, and recording fathometer. The surveys for the Pt. Sal and Purisima Point Units would be done together. The estimated time to collect the shallow hazards and archaeological data will be approximately 13 days with good weather. Additionally, the estimated time for the ROV biological survey will be approximately 5 days with good weather. During the suspension period, Aera would submit revisions to their previously approved Exploration Plan for leases in the Point Sal Unit. Preparation of revisions to the Exploration Plan is an administrative activity that would be completed at Aera's offices.	MMS will prepare a single Environmental Assessment to encompass lease OCS-P 0409, the Lion Rock Unit, the Purisima Point Unit, the Point Sal Unit, and the Santa Maria Unit
SANTA MARIA UNIT / LEASES OCS-P 0425, 0430, 0431, 0433, and 0434 Operator: AERA ENERGY LLC	Aera has requested a Suspension of Production pursuant to 30 CFR 250.171. A Suspension of Production is defined as a deferral of the requirement to produce (30 CFR 250.105). A suspension may extend the term of the lease and may be issued for a period of up to 5 years (30 CFR 250.170).	Aera has requested a suspension of 23 to 34 months, depending on the date of approval <sup>1</sup> . No activities, during the suspension period, on the Santa Maria Unit would be conducted in the offshore area.	MMS will prepare a single Environmental Assessment to encompass lease OCS-P 0409, the Lion Rock Unit, the Purisima Point Unit, the Point Sal Unit, and the Santa Maria Unit
BONITO UNIT / LEASES OCS-P 0443, 0445, 0446, 0449, 0499 and 0500 Operator: NUEVO ENERGY CO.	Nuevo has requested a Suspension of Production pursuant to 30 CFR 250.171. A Suspension of Production is defined as a deferral of the requirement to produce (30 CFR 250.105). A suspension may extend the term of the lease and may be issued for a period of up to 5 years (30 CFR 250.170).	Nuevo has requested a suspension of 10 or 17 months <sup>3</sup> . Nuevo may propose to drill delineation wells from an existing platform in the Point Arguello Field. However, if Nuevo decides to conduct delineation drilling from a Mobile Offshore Drilling Unit, then they would be required to conduct high resolution geophysical surveys to look for geohazards on the Unit. A remotely controlled vehicle (ROV) would be used to conduct a biological survey. These surveys would occur during the suspension period. Nuevo is required to submit geophysical information sufficient to provide continuous, overlapping sub-bottom imagery, with varying resolutions, from the seafloor to a depth of 300 to 450 meters. To acquire the data, Nuevo would use a multi-spectral suite of acoustic reflection profiling systems that may include a sub-bottom profiler, boomer system, and small air gun array. The estimated time to collect the data will be approximately 7 days with good weather. Additionally, the ROV biological survey is estimated to take about 5	MMS will prepare an Environmental Assessment for the Bonito Unit.

1 Aera provided a range of suspension lengths because the actual approval date for their request is unknown at this time and because preliminary activities on the Pt. Sal and Purisima Pt. Units require offshore surveys that need to be scheduled to avoid conflicts with marine mammal migration, fishing seasons, and rough weather. If MMS approves their suspension, it would not be for a range of dates; it would be for a finite length.

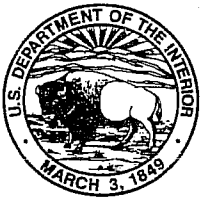
2 Aera would plan the surveys for the Fall to avoid interactions with commercial fishing seasons, marine mammal migrations, and weather. Year-to-year variability in the size and exact location of the commercial salmon fishery may allow surveying earlier than the Fall, but that is generally not known until after the salmon season opens in the Spring.

3 At the present time, Nuevo is undecided as to whether to bring in a Mobile Offshore Drilling Unit (MODU) to drill delineation wells after the suspension period ends, necessitating a 17 month suspension, or to proceed to development from the existing facilities at the Point Arguello Field, necessitating a 10 month suspension. Therefore, their proposed activities during the suspension period differ, depending upon the alternative eventually decided upon.

Table 1. Description of the Suspension Requests

UNIT/LEASE(S) AND OPERATOR	REQUESTED ACTION	LENGTH OF SUSPENSION REQUESTED AND ACTIVITIES PLANNED DURING THE SUSPENSION PERIOD	NEPA DOCUMENTATION
		<p>days with good weather. If Nuevo decides to drill from the existing facilities in the Point Arguello Field, then geophysical and biological surveys are not required.</p> <p>Nuevo would also submit revisions to their previously approved Exploration Plan. Preparation of revisions to the Exploration Plan for leases in this Unit is an administrative activity that would be completed at Nuevo's offices.</p>	
<p>ROCKY POINT UNIT / LEASES OCS-P 0452 and 0453 Operator: ARGUELLO INC.</p>	<p>Arguello Inc. has requested a Suspension of Production pursuant to 30 CFR 250.171. A Suspension of Production is defined as a deferral of the requirement to produce (30 CFR 250.105). A suspension may extend the term of the lease and may be issued for a period of up to 5 years (30 CFR 250.170).</p>	<p>Arguello Inc. has requested a suspension of 30 months. During the suspension period, Arguello Inc. would submit revisions to their previously approved Development and Production Plan for the Point Arguello Unit. Preparation of revisions to the Development and Production Plan for this Unit is an administrative activity that would be completed at Arguello Inc's offices. No activities, during the suspension period, on the Rocky Point Unit, would be conducted in the offshore area.</p>	<p>MMS will prepare an Environmental Assessment for the Rocky Point Unit.</p>
<p>SWORD UNIT / LEASES OCS-P 0319, P 0320, P 0322, P 0323A Operator: SAMEDAN OIL CORP.</p>	<p>Samedan. has requested a Suspension of Production pursuant to 30 CFR 250.171. A Suspension of Production is defined as a deferral of the requirement to produce (30 CFR 250.105). A suspension may extend the term of the lease and may be issued for a period of up to 5 years (30 CFR 250.170).</p>	<p>Samedan has requested a suspension of 25 months. During the suspension period, Samedan would submit revisions to their previously approved Exploration Plan for the Sword Unit. Preparation of a revised Exploration Plan for this Unit is an administrative activity that would be completed at Samedan's offices. No activities, during the suspension period, on the Sword Unit, would be conducted in the offshore area.</p>	<p>MMS will prepare an Environmental Assessment for the Sword Unit.</p>
<p>GATO CANYON UNIT / LEASES OCS-P 0460 and 0464 Operator: SAMEDAN OIL CORP.</p>	<p>Samedan has requested a Suspension of Production pursuant to 30 CFR 250.171. A Suspension of Production is defined as a deferral of the requirement to produce (30 CFR 250.105). A suspension may extend the term of the lease and may be issued for a period of up to 5 years (30 CFR 250.170).</p>	<p>Samedan has requested a suspension of 31 months. During the suspension period, Samedan would conduct high resolution geophysical surveys to look for geohazards on the Unit. Samedan would plan the surveys for the Fall of the year following approval of their suspension application<sup>1</sup>. Samedan is required to submit geophysical information sufficient to provide continuous, overlapping sub-bottom imagery, with varying resolutions, from the seafloor to a depth of 300 to 450 meters. To acquire the data, Samedan would use a multi-spectral suite of acoustic reflection profiling systems, which may include a sub-bottom profiler, boomer system, and small air gun array. The estimated time to collect the data will be approximately 7 days with good weather. During the suspension period, Samedan would submit revisions to their previously approved Exploration Plan for the Gato Canyon Unit. Preparation of revisions to the Exploration Plan is an administrative activity that would be completed at Samedan's offices.</p>	<p>MMS will prepare an Environmental Assessment Gato Canyon Unit.</p>
<p>CAVERN POINT UNIT / LEASES OCS-P 0210 and 0527 Operator: VENOCO INC.</p>	<p>Venoco. has requested a Suspension of Operations pursuant to 30 CFR 250.171. A Suspension of Operations is defined as a deferral of the requirement to conduct leaseholding operations. (30 CFR 250.105). A suspension may extend the term of the lease and may be issued for a period of up to 5 years (30 CFR 250.170).</p>	<p>Venoco has requested a suspension of 13 months. During the suspension period, Venoco Inc. would submit an Exploration Plan for the Cavern Point Unit. Preparation of an Exploration Plan for this Unit is an administrative activity that would be completed at Venoco's offices. No activities, during the suspension period, on the Cavern Point Unit, would be conducted in the offshore area.</p>	<p>MMS will prepare an Environmental Assessment for the Cavern Point Unit.</p>

<sup>1</sup> Geophysical surveys would be planned for the Fall to avoid interactions with commercial fishing seasons, marine mammal migrations, and weather. Year-to-year variability in the size and exact location of the commercial salmon fishery may allow surveying earlier than the Fall, but that is generally not known until after the salmon season opens in the Spring.



# United States Department of the Interior

MINERALS MANAGEMENT SERVICE  
Pacific OCS Region  
770 Paseo Camarillo  
Camarillo, California 93010-6064

7100

November 1, 2004

CERTIFIED MAIL  
Return Receipt Requested

Mr. Ron Heck  
Samedan Oil Corporation  
100 Glenborough Drive  
Suite 100  
Houston, Texas 77067

Re: Updated Suspension of Production Request  
Gato Canyon Unit  
Offshore California

Dear Mr. Heck:

In your updated suspension request letter of April 20, 2004, you indicated that Samedan would drill a delineation well in the Gato Canyon Unit during the suspension period. We are writing to clarify that, should a suspension of production be granted, the suspension period will not include any drilling operations. Pursuant to 30 CFR 250.180, drilling is an activity that will hold the unit, and therefore, if drilling activity is occurring, a suspension is not needed. Of course, any such drilling can only occur pursuant to an approved plan and permit to drill, as provided for in the regulations.

If you have any questions in this regard, please contact Joan Barminski at (805) 389-7707 or Allan Shareghi at (805) 389-7704.

Sincerely,

  
Peter Tweedt  
Regional Manager

**TAKE PRIDE<sup>®</sup>  
IN AMERICA** 



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Southwest Region  
501 West Ocean Boulevard, Suite 4200  
Long Beach, California 90802-4213

DEC 16 2004

In Reply, Refer to:  
151405SWR2004PR20160:MLD

Mr. Maurice Hill  
Minerals Management Service  
Attn: Suspension-EA Comments  
Office of Environmental Evaluation  
770 Paseo Camarillo  
Camarillo, California 93010-6064

Dear Mr. Hill:

This letter responds to your request for the National Marine Fisheries Service (NOAA Fisheries) to review the Draft Environmental Assessment (Draft EA) for Samedan Oil Corporation's (Samedan) Suspension of Production (SOP) for 37 months within the Gato Canyon Unit, located in the western Santa Barbara Channel offshore in Santa Barbara County. NOAA Fisheries also reviewed the Draft EA for Aera Energy LLC's (Aera) SOP for 31 months within the Point Sal Unit and for 34 months within the Purisma Point, Lion Rock and Santa Maria Units, located offshore in northern Santa Barbara County. NOAA Fisheries has prepared the following comments based under the statutory authorities of the Endangered Species Act, the Marine Mammal Protection Act, and the Magnuson-Stevens Fishery Conservation and Management Act.

Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA)

Section 7 of the ESA (16 U.S.C. § 1536(a)(2)) requires Federal agencies to consult with the Secretary of Commerce (delegated to NOAA Fisheries) to insure that "any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species . . ." See also 50 C.F.R. part 400.

In addition, whales, dolphins, seals and sea lions are protected under the MMPA and managed under the jurisdiction of NOAA Fisheries. See 16 U.S.C. § 1361 *et seq.* According to the MMPA, it is illegal to "take" a marine mammal without prior authorization from NOAA Fisheries. "Take" is defined as harassing, hunting, capturing, or killing, or attempting to harass, hunt, capture, or kill any marine mammal. "Harassment" is defined as any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.



In general, NOAA Fisheries concurs with the effects analysis, monitoring and mitigation measures described in the Draft EAs for Samedan and Aera to identify and minimize impacts to marine mammals and sea turtles. Please note that there have been extensive studies of the impacts of seismic surveys on pinnipeds and whales conducted in the late 1990s and beyond and should be included in the final analysis (e.g., LGL Limited environmental research associates; LGL Report TA2230-3; May 1999).

We provide the following specific recommendations for marine mammals and sea turtles based on the information provided in the Draft EA for Samedan. Note that these recommendations can be applied to the Draft EA for Aera, as well.

1. Page 4-14: "The 'taking' of a marine protected species constitutes an insignificant, adverse impact." This sentence likely refers to the number of animals "taken" as being insignificant to the overall population number, not that the activity that caused the take is insignificant. This should be described in more detail as the concept is mentioned throughout the document.
2. Page 4-21: Please note that at 160dB re 1  $\mu$ Pa [rms]<sup>1</sup> marine mammals have shown a behavioral response to received sound pressure levels of underwater noise.
3. Page 4-21: "Animals entering the 160dB impact zone may be harassed, amounting to an insignificant impact." If animals are harassed, then by definition this constitutes a "take" as defined under the MMPA, and authorization from NOAA Fisheries would be required. We recommend changing the first two sentences referenced above to read as follows: "If no marine mammals occur in the 160dB impact zone, then the animals are not likely to be harassed by the air gun."
4. Page 4-21: Please change the following sentence to read as: "The stranding of multiple animals of the same strategic marine mammal stock or endangered or threatened species may result in a significant impact to the overall population."
5. Page 4-22: In reference to the "appropriate harassment authorization," please note that the permitting process will take some time and we advise the applicant to apply at least 8 months prior to the intended start date.
6. Page 4-22: Please clarify if air gun will be ramped up every time it is stopped.
7. Page 4-23 (MPS-3): We recommend changing NOAA "certified" observer to NOAA "approved" observer.

8. In addition to mitigation measures proposed in the Draft EA, vessel operators should adhere to the following guidelines:
- Do not:**
- ▶ Move into the path of a whale;
  - ▶ Move faster than a whale;
  - ▶ Make rapid speed or erratic directional changes, UNLESS to avoid collision with a whale;
  - ▶ Get between two whales;
  - ▶ Chase whales
9. Page 4-24 (MPS-12): Please add; "In the unlikely event of a watercraft collision with a marine mammal, officials must immediately contact the NOAA Fisheries Stranding Coordinator, Joseph Cordaro, at (562) 980-4017."

In conclusion, based on the mitigation and monitoring requirements outlined in the Draft EA, NOAA Fisheries concurs with the determination that the proposed actions may affect, but are not likely to adversely affect marine mammals and sea turtle species listed under the ESA and under the jurisdiction of NOAA Fisheries.

#### Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA)

Pursuant to section 1855(b)(2) of the MSFCMA, Federal agencies are required to consult with the Secretary of Commerce (delegated to NOAA Fisheries) with respect to "any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any essential fish habitat identified under this Act." In addition, the MSFCMA provides that the Secretary of Commerce "shall coordinate with and provide information to other Federal agencies to further the conservation and enhancement of essential fish habitat." See 16 U.S.C. § 1855(b)(1)(D).

The Pacific Fishery Management Council has identified and described Essential Fish Habitat (EFH) for fishes managed under the Pacific Groundfish Fishery Management Plan (FMP), the Highly Migratory Species FMP, and the Coastal Pelagic Species FMP, many of which may occur in the vicinity of the project area.

Granting the SOP would permit Samedan to conduct a shallow hazards survey on the Gato Canyon Unit and conduct administrative activities leading to the submittal of a revised Exploration Plan (EP) to MMS for subsequent technical and environmental review. The shallow hazards survey will be conducted within a two square kilometer area and will take approximately 3-4 days. A single small air gun (20-in<sup>3</sup>) would be used as the acoustic source, which produces a sound intensity level of 218 dB re 1  $\mu$ Pa [rms]<sup>1</sup> and is deployed about three meters below the surface.

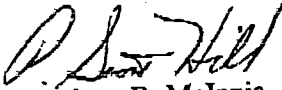


Granting the SOP would permit Aera to conduct a shallow hazards survey on the Point Sal and Purisma Units and conduct administrative activities leading to the submittal of a revised Exploration Plan (EP) to MMS for subsequent technical and environmental review. The shallow hazard surveys would cover an area that totals approximately 21-26 square kilometers and would take approximately 11-13 days. A single small air gun (20-in<sup>3</sup>) would be used as the acoustic source, which produces a sound intensity level of 218 dB re 1  $\mu$ Pa [rms]<sup>1</sup> and is deployed about three meters below the surface.

The proposed shallow hazards surveys occur within EFH for Federally managed fish species in the Coastal Pelagics and Pacific Groundfish FMPs, as defined in MSFCMA. Potential adverse effects may occur as a result of the acoustic energy generated by the air gun. However, the risk of mortality or sub-lethal effects on fish and shellfish would be limited to eggs and larvae, the random juveniles or adult fish, juvenile fish associated with the occasional moving kelp mat, or small portions of fish schools that may occur within 6 meters of the air gun when shooting begins. Given the relatively small survey area and brief survey period, the proposed projects will only have minimal effects to EFH. Therefore, NOAA Fisheries does not object to the issuance of the SOPs for Samedan and Aera pursuant to the MSFCMA.

Thank you for coordinating with NOAA Fisheries regarding these marine events. Please contact Monica DeAngelis at 562-980-3232 or [Monica.DeAngelis@noaa.gov](mailto:Monica.DeAngelis@noaa.gov) if you have any questions concerning this letter.

Sincerely,

  
Rodney R. McInnis  
Regional Administrator

cc:

Ann Bull, MMS-Office of Environmental Evaluation, Camarillo, California  
Jeff Childs, MMS-Alaska Outer Continental Shelf Region, Anchorage, Alaska  
Christina Fahy, NOAA Fisheries-SWR  
Bryant Chesney, NOAA Fisheries-SWR