Chapter 6
Cumulative Impact Analysis For The 36 Undeveloped Leases (2002 - 2030)

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Chapter 6

Cumulative Impact Analysis For The 36 Undeveloped Leases (2002 - 2030)

6 CUMULATIVE IMPACT ANALYSIS FOR THE 36 UNDEVELOPED LEASES (2002-2030)

6.0 INTRODUCTION

As discussed earlier, section 5 provides an analysis of how the Proposed Action will likely affect the resources in or migrating through the study area. The likely effects of the Proposed Action over the near-term future (2002-2006) provide a clear understanding of the contribution of the Proposed Action to the effects of other ongoing activities during this time period. After 2006 no further residual effects associated from the Proposed Action are expected to occur. This section (section 6) provides an analysis of the effects over the near- and long-term future (2002-2030). This timeframe includes the contribution of potential activities on all 36 currently undeveloped leases, through decommissioning.

The assumptions made concerning the near-term foreseeable future activities in and influencing the study area are in sections 5.1.2.1, and 5.1.2.2. The long-term future is based on the MMS developed hypothetical development scenario for the 36 undeveloped leases. This is described in detail in sections 6.1.2, and 6.1.3. Environmental effects on each of the resources are presented in section 6.2.1-6.2.24.

6.1 BACKGROUND INFORMATION FOR IMPACT ANALYSIS

6.1.1 IMPACT CAUSING AGENTS OF THE CUMULATIVE CASE

This section identifies additional impact producing factors (IPF) that are associated with the potential development of the 36 undeveloped leases and any potential future development of existing leases. As discussed in section 5.1.1.1, exploring for, producing, and transporting hydrocarbon resources that could be developed require a complex and interrelated series of operations. The IPF's involving the proposed action delineation drilling activities will not be restated here. However, the effects from those activites and the cumulative activities are considered and discussed in each resource section for the near-term (2002-2006) in section 5.2.1, through 5.2.24, and the long-term (2002-2030) in section 6.2.1 through 6.2.24.

Impact producing factors including past and present activities were already discussed in Section 4.0.1. Tables in Section 6.1.2 and 6.1.3 show the magnitudes of the impact-producing factors that are projected to occur in the various offshore/onshore areas from the potential development of the 36 undeveloped leases in the study area. These quantities are expressed as the total amount generated over the life for the development of the undeveloped leases (2002-2030).

- *Geological and Geophysical Surveys*
- *Development and Production activities (Development activities include the installation of jackets, topsides, pipelines, and drilling. Production activities include bringing the oil and gas to the surface, handling of oil and gas on the platform, and sending the oil and gas to shore).*
- *Vessel and Helicopter Support Activities*
- *Produced Water*
- *Decommissioning*
- *Site Characterization Surveys for OCS Development*
- *Shallow Hazards Surveys*
- *Subsurface Investigation and Testing*
- *Extended Reach Drilling*
- *Pipeline Installation and Abandonment*
- *Crude Oil Tankering*

Table 6.1.1-1. Summary of activities projected for existing and future OCS and state leases (2002-2030).

Activity	Future Activity on Existing OCS Facilities	Future Activity on State Existing Facility[1]	Activity on 36 Undeveloped Leases	Total
Wells Drilled	50	0	50	50+?
Platforms Installed	0	0	5	5
Miles of Pipelines Installed	0	0	130	130
Platforms Removed	23	9	5	37
Crew and Supply Boat Trips	122,416	105,542	4212[2]	232,170
Helicopter Trips	50,264	13,260	41245[2]	104,769

[1] Assumes THUMS platforms are removed in 2010

[2] Gato Canyon Platform would be served at same time as SYU until 2025 and Bonito Platform would be served at same time as Platform Irene through decommissioning.

- *Oil Spills*
- *Fiber Optic Data Tranmission Cables*
- *State Tidelands Projects*
- *Spill Remediation*
- *Point and Nonpoint Source Discharges*
- *Commercial Fishing Activities*
- *Military Operations and Commercial Space Launches*

Table 6.1.1-1 provides a summary of activities projected for existing and future OCS and State leases (2002-2030). Section 4.0.1 presents a detailed discussion of these factors for Past and Present activities and Section 5 discusses those factors as they relate to reasonable foreseeable and future activities (2002-

6.1.2 REASONABLY FORESEEABLE ACTIVITIES (2002-2030)

The projects described in this section include Federal OCS oil and gas projects, State Tidelands oil and gas projects, and other energy and non-energy activities (Military Activities, Commercial Fishing Activities, Crude Oil Tankering, etc.). All of the projects described are located in the vicinity of the Santa Barbara Channel and Santa Maria Basin offshore Santa Barbara County, Ventura County, and San Luis Obispo County. It should be noted that information on many of these projects is limited because they are in the preliminary stages of development.

Two categories of Reasonably Foreseeable activities are examined:

First are activities that are ongoing and expected to continue during the period 2002-2030. Non-point source discharges are included in the category.

Second are oil and gas activities that could occur in the period 2002-2030.

Many of the activities described in this section are the same as in section 5.1.2.2 Reasonably Foreseeable Activities. This section differs from section 5 in that it considers the delineation drilling and additional reasonably foreseeable activities for the period 2002-2006 in addition to all activities that could occur during the 2002-2030 timeframe including: 1) delineation drilling, 2) decommissioning and removal of existing production facilities, and 3) development of the 36 undeveloped leases (see section 6.1.3 Hypothetical Development Scenario For The 36 Undeveloped Leases). Delineation drilling would occur during the 2002-2003 timeframe and was considered in the analysis in chapter 5. However, potential future exploratory and development activities that could occur after all residual effects from the proposed action are gone are considered in this section.

ONGOING ACTIVITIES

ANTICIPATED FUTURE ACTIVITIES ON EXISTING LEASES

Section 4.0.1 describes past and present offshore oil and gas activities in State and Federal waters. Original recoverable reserves and peak production from State and Federal offshore facilities is shown in figure 4.0.1-1. Production on existing State and Federal offshore facilities peaked in approximately 1969 and 1995 respectively and we assume production will continue to decline.

Additional production from new wells would slow the decline of production and is expected to occur over the life of the existing facilities. Table 5.1.2.2-1 shows the number of wells expected to be drilled by field from existing Federal platforms. No new production wells are are expected on State Platforms with the exception of Platform Holly (see State Tidelands below). Discharge volumes are expected to be at or below the levels identifed in table 4.0.1-7. Helicopter and vessel support is assoumed to be at or below the levels identified in table 4.0.1-5.

Operational impacts associated with the development and production of oil and gas resources from these existing facilities have been fully analyzed, mitigated and permitted by applicable Federal, State and local authorities.

The risk of an oil spill from the existing OCS facilities has previously been individually and cumulatively analyzed and reviewed (section 5.1.3). Oil spill response planning as required by MMS has been implemented and is currently in place. Oil spill prevention and response efforts offshore California are coordinated between the MMS and the California Office of Spill Prevention and Response (OSPR). Among other measures, this coordination provides for the sharing of technical expertise in drilling, production, pollution prevention, and other related areas of offshore operations and safety.

There are no scheduled or anticipated oil and gas lease sales scheduled or anticipated in Federal or State waters. Therefore, with no new leasing, once the development of the 36 undeveloped leases occurs, no additional new production platforms would be installed.

DECOMMISSIONING

Over the next 28 years all existing oil and gas platforms in Federal and State waters are expected to be removed (table 4.0.1-5). Some decommissioning has already occurred. For example, the Offshore Storage and Treatment Vessel and Single Anchor Leg Mooring was removed from the Santa Ynez Unit in Federal waters in 1994 and Platforms Hazel, Heidi, Hilda, and Hope were removed from State waters in 1996.

For purposes of analysis in this EIS, we make the following assumptions:

- Platforms will be decommissioned in groups of 3-9 based on age, size, geographic location, and heavy lift vessel (HLV) lifting capability.
- Pipelines will be abandoned in place.
- Platform decommissioning projects will be phased and occur in the following chronological sequence: (1) South Coast (2) Eastern Santa Barbara Channel, (3) Western Santa Barbara Channel and Southern Santa Maria Basin (4) Western Santa Barbara Channel, (5) Southern Santa Maria Basin (6) Northern/ Southem Santa Maria Basin and Gato Canyon (see table 6.1.2-1).
- HLV's spreads (see table 6.1.2-2) will be mobilized from the GOM, North Sea, or Asia. No more than one HLV will be operating at a time. Decommissioning of platforms will be phased to minimize environmental impacts. Associated onshore processing facilities will be decommissioned immediately after the offshore component of the project has been completed.

CRUDE OIL TANKERING

Oil spills resulting from vessel collisions and other marine transportation-related accidents have the potential to cause significant impacts on the marine, coastal, and human environments, and contribute to cumulative environmental impacts. Marine transportation of Alaskan and foreign-import oil is an activity that occurs offshore California. Table 4.0.1-8 shows volume and number of oil tankers offshore California visiting Ports of San Francisco and of Los Angeles/ Long Beach and El Segundo. In 2000, 877 oil tankers visited the ports of Los Angeles/Long Beach and El Segundo. Of these tankers, 192 were United States

Table 6.1.2-1. Platform decommissioning project scenarios.

Project I - South Coast (Los Angeles/Orange County)				
4 OCS Platforms: Eureka, Ellen, Elly, Edith 3 State Tidelands Platforms: Emmy, Eva, Esther	Time-period: Decommissioning could occur between 2010-2015	Project Duration/Scheduling- 230 days	Vessel Spread B	Disposal Site: Long Beach, CA
Project II - Eastern Santa Barbara Channel (Ventura and Santa Barbara County)				
9 OCS Platforms: Hogan, Houchin, A, B, C, Gina, Gilda, Henry, Hillhouse	Time-period: Decommissioning could occur between 2012-2017	Project Duration/Scheduling - 200 days	Vessel Spread A	Disposal Site: Long Beach, CA
Project III - Santa Barbara Channel and Southern Santa Maria Basin (Santa Barbara County)				
7 OCS Platforms: Gail, Grace, Hermosa, Harvest, Hidalgo, Irene, Habitat 1 State Tidelands Platform: Holly	Time-period: Decommissioning could occur between 2015-2020	Project Duration/Scheduling - 400 days	Vessel Spread B	Disposal Site: Portland, OR
Project IV - Western Santa Barbara Channel (Santa Barbara County)				
3 OCS Platforms: Hondo, Harmony, Heritage	Time-period: Decommissioning could occur between 2020-2025	Project Duration/Scheduling - 270 days	Vessel Spread C	Disposal Site: Portland, OR
Project V - Northern/Southern Santa Maria Basin and Gato Canyon (Santa Barbara County)				
5 OCS Platforms (to be constructed)	Time-period: Decommissioning could occur between 2040-2050	Project Duration - 250 days	Vessel Spread B	Disposal Site: Portland, OR

Table 6.1.2-2. Conventional decommissioning vessel spreads.

Derrick Barge	Anchor Handling	Support Vessel	Cargo Barges	Tug Boat(s)	Support Craft
Spread A (for platforms in 50 - 200 foot water depths)					
1 HLV (Derrick Barge Valhalla - 400 ton lift capability)	1 anchor handling tug	1 support vessel	3 cargo barges	2 tugboats	crew boats (use current level) supply boats (use current level) helicopters (use current level)
Spread B (for platforms in 200 - 700 foot water depths)					
1 HLV (Derrick Barge Balder or DB 50 - 4000 ton lift capability)	1 anchor handling tug	1 support vessel	6 cargo barges	4 tugboats	crew boats (use current level) supply boats (use current level) helicopters (use current level)
Spread C (for platforms in 700+ feet of water)					
1 HLV (Derrick Barge Thialf or Saipem 7000: 6600 - 7000 ton lift capability)	1 anchor handling tug	1 support vessel	10 cargo barges	10 tugboats	crew boats (use current level) supply boats (use current level) helicopters (use current level)

flagged oil tankers and 685 were foreign flagged oil tankers (pers. Comm., Reed Crispino, Marine Exchange, March, 2001).

The long-term oil supply outlook for California remains one of declining in-State and Alaska supplies leading to increasing dependence on foreign oil sources, according to the California Energy Commission (CEC) (1999). Since 1989, California refineries have received about half of Alaska's total production. If this trend remains unchanged into the 20-year future, then supply volumes from Alaska to California would decline by 61 percent from current levels. Although it is possible that Alaska production could increase with the opening of new areas for development, no decisions have yet been made. In 1998, the foreign component of California's oil supply represented 16 percent of total supply - triple the amount in 1992 (CEC, 1999).

California refineries receive about half of their total oil supplies by marine tankers. As California petroleum product demand increases and in-State crude oil supplies decline, marine tanker deliveries will increase. Based on the CEC estimates, the rate of import growth varies between 2 to 3 percent per year, while the total demand increases at 1 percent per year (California Energy Commission, 1999).

The CEC (1999) estimates that import of 168 to 257 million more bbls per year are expected by 2017 based on a very gradual decline in California in-state supply. The volume of 168 million bbls translates into the equivalent of about 220 more oil tanker deliveries to California ports per year in 2017, based on the use of medium class size tankers (about 120, 000 dead weight tons). The 257 million barrel estimate means 337 more tanker deliveries per year, about one per day.

MILITARY OPERATIONS AND COMMERCIAL SPACE LAUNCHES

The Point Arguello Unit and Rocky Point Unit leases are located in the Naval Air Warfare Center Weapons Division (NAWCWD) Point Mugu Sea Range (PMSR). The PMSR covers a 36,000 square-mile area offshore San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, and San Diego Counties. The PMSR currently supports test and evaluation of sea, land, and air weapons systems as well as various categories of training activities. The NAWCWD has recently proposed to expand operations in the PMSR and has prepared a Draft Environmental Impact Statement/ Oversea Environmental Impact Statement for the proposal (U.S. Navy, 2000), which provides a detailed discussion of the operations conducted in the PMSR. The operations include missile testing, and training exercises including fleet, amphibious, and special warfare training. The PMSR has been operated by the Department of the Navy for more than 50 years

The Point Arguello and Rocky Point Units are also in the vicinity and operational area of the Western Space and Missile Center (WSMC) at Vandenberg Air Force Base. Space vehicles launched at WSMC fly over various sectors of the project area. During such overflights, the area beneath the flight path may be subject to hazards resulting from falling debris and jettisoned components; but such events are extremely rare.

To minimize potential hazards and conflicts with military operations, the MMS has placed stipulations on the OCS leases in the project area. The stipulations control vessel traffic in designated areas, include "hold-harmless" requirements, and reserve the right

of the United States to suspend offshore operations temporarily for national security reasons. Prior to a vehicle launch, provisions for control of air and marine traffic, stabilization of platform operations, and for personnel shelter and evacuation measures are coordinated by the WSMC, U.S. Coast Guard, MMS, and the platform operators. These measures have proven to be effective in minimizing hazards and conflicts.

COMMERCIAL FISHING ACTIVITIES

Commercial fisheries in the Southern California Bight (SCB) and Santa Maria Basin (SMB) date back to the mid-nineteenth century. Commercial fishing occurs at various locations off the coast of southern and central California. The nearshore waters along the coast from Los Angeles to Monterey counties and the waters just off the Channel Islands contain giant kelp beds that provide habitats for numerous species of commercially important fish and shellfish species. The majority of fish are caught within these areas.

Fishes in the SCB and SMB support important commercial and recreational fisheries; more than 100 species appear in the catches. The commercial landings at ports within the southern and central California account for about 4 percent of the total U.S. catch (approximately 2.7 x 10^9 kg, or 6 x 10^9 lb). Los Angeles area ports rank among the top 10 ports in the United States in quantity and value of commercial catch. Recreational fishermen in the SCB and SMB land about 60 percent of the total recreational catch in California. Fishermen on private and commercial passenger vessels account for more than 80 percent of the recreational catch. Recreational landings in the SCB and SMB account for about 5 percent of the total recreational landings in the continental United States

About 64 commercial fish and shellfish species are fished using up to 15 gear types, the most common of which are trawl, drift and set nets, purse seines, traps, and hook-and-line gear. Troll gear, harpoons, and diving are also common in certain areas of the SCB and SMB. Many fishers of the area do not fish for just one species, or use only one gear-type. Most switch fisheries during any given year depending on market demand, prices, harvest regulations, weather conditions, and fish availability. There are twelve major ports between San Diego and Point Sur, California which provide over 1,500 commercial fishing berths for the commercial fleet.

POINT SOURCE DISCHARGES

Only five Publicly-Owned Treatment Works (POTWs), or sewage treatment plants, discharge into either rivers or the Pacific Ocean in San Luis Obispo County. All the dischargers are small, according to EPA criteria (less than 25 million gallons discharged per day [mgd]). The six POTWs that discharge treated effluent to the Santa Barbara Channel are all small dischargers whose effluents are at a mixed primary/secondary level of treatment (SCCWRP, 1996).

There are no other industrial wastewater discharges north of Point Conception. However, several power plants spaced along the coastlines of southern Santa Barbara county, and Ventura and northern Los Angeles Counties, do discharge heated water, and some chlorine is used to prevent fouling of heat exchangers.

NONPOINT SOURCE DISCHARGES

Urban and storm water runoff is the largest source of unregulated pollution to waterways and coastal areas of the United States. Locally, urban and storm runoff results in an increase in health risks to swimmers near storm drains, high concentrations of toxic metals in harbor and ocean sediments, and toxicity to aquatic life.

Storm water runoff from urban areas is a major source of pollution in the coastal waters of the Southern California Bight (SCB). Because runoff is an untreated pollution source, it contains high concentrations of contaminants and is a significant health hazard to humans. The SCB has multiple sources of nutrients, particulates and contaminants that discharge into the coastal ocean, including submerged outfalls, rivers, creeks, storm drains, atmospheric inputs, ocean dumping, and advection (Anderson et al., 1993).

The runoff systems in southern California are different from those in other areas because the flow is mostly confined to the winter months. Over the dry months, contaminants accumulate in the flow systems and are then released as pulses when winter storms strike. During winter storms, these drainage systems release most of the fresh water that flows into the coastal ocean.

GUADALUPE DILUENT SPILL AND REMEDIATION (1998 TO 2003)

The Guadalupe Oil Field site is located on the central coast of California approximately 15 miles south of San Luis Obispo. It is part of the Unocal LeRoy Lease which covers approximately 3,000 acres within the Nipomo Dunes system, a Secretary of the Interior-designated National Natural Landmark. The City of Guadalupe is located approximately three miles east of the site. Oil exploration and production began on the site with the Sand Dune Oil Company in October 1947. Unocal acquired the field in the early 1950s and continued to operate it until March 1990. At its peak, in 1988, there were 215 potential producing wells. The crude oil produced from the site was ex-

tremely viscous, with a density that causes the crude oil to behave like asphalt at ambient conditions. Unocal used several methods to enhance recovery of this heavy crude, including diluent mixing. The term diluent is derived from "dilute" and it refers to any additive (in this case a refined hydrocarbon blend piped into the field from the Santa Maria refinery) that is used to thin the crude. Over time, leaks that developed in the tanks and pipelines used to distribute it around the field, have led to serious contamination of the ground water below the site. Diluent has accumulated in 64 plumes (separate-phase) at the water table in the dune sand aquifer, about 3 to 40 m(10 to 130 feet) down, with some plumes as much as 1.8 m (6 ft thick). Ground water passing through these areas, has become contaminated because some of the diluent dissolves (dissolved-phase) into the water and moves downstream with the ground water flow. This has resulted in ground water contamination beneath much of the site, with a flux towards the Pacific Ocean (to the west) and the Santa Maria River (to the south).

Remedial activities that have already taken place at the Guadalupe Oil Field under emergency permits issued by the County of San Luis Obispo or the Coastal Commission, include installation of a bentonite wall, beach excavation, installation of an High-density polyethylene (HDPE) wall, installation of a sheetpile wall, breaching of the Santa Maria River, installation of a polyvinylchloride (PVC) barrier wall, the removal of a sump, and other work. The technologies that are proposed will be used to either remove the diluent through excavation, bioremediation or pumping, or contain the diluent through physical or hydraulic barriers. Unocal has also proposed to abandon the site. This would include removal of most pipelines from the field, and all surface facility tanks, buildings and other miscellaneous equipment.

AVILA BEACH TANK FARM SPILL AND REMEDIATION (1997 TO 2002)

The community of Avila Beach, California is located on the northern end of San Luis Bay near Point San Luis. The Unocal Avila Terminal facility has been used for petroleum hydrocarbon storage and transfer activities since 1910. Petroleum products, including gasoline, diesel, fuel oil and crude oil, were pumped from the tank farm located on a bluff overlooking the town through a network of underground pipelines beneath Front Street to Avila Beach Drive and over the San Luis Obispo Creek bridge to the Unocal pier. In addition, gasoline and diesel fuel were pumped from tankers to the tank farm for distribution to county consumers. Unocal has spilled petroleum products including: gasoline, diesel and crude oil to soil and ground water beneath the beach, roads, commercial and residential properties of Avila Beach. These spills were reportedly caused by historic leaks from Unocal's pipelines and possibly the tank farm. Five pipelines are currently active, and another 5 to 10 lines are abandoned in place under Front Street. There are no known leaks in the active pipelines at this time. Unocal has not used these pipelines since the summer of 1996.

Unocal's remediation efforts are divided into four main areas of concern: the beach, which is divided into the west and east beaches; under Front Street; north of Front Street, and the intertidal plume. All four areas have underground gasoline-grade, diesel-grade, and crude or residual-grade hydrocarbon contamination. The hydrocarbons are found both above and below ground water, are attached to the soil grains (sand and silt) and within the soil pore spaces. Over 460 soil borings and 70 monitoring wells were taken and analyzed by various agencies. Levels of hydrocarbon contamination exceeded those found to cause cancer, reproductive toxicity, and other acute and chronic health problems.

Legal efforts on the part of local activist groups, joined by the California Attorney General's office, and the Regional Water Quality Control Board, the County of San Luis Obispo produced an agreement that will require Unocal to fully remediate the contamination and rebuild the town and economy of Avila Beach. Unocal's remediation project includes two general aspects: excavation of all petroleum contamination under the beach, Front Street, and all areas where contamination exceeds 100 parts per million, and excavation and removal of the petroleum, and replacement with new, clean soil and nutrients. Monitoring and sampling, including testing of groundwater four times a year will help ensure the project meets State standard.

FIBER OPTIC DATA TRANMISSION CABLES

The timing of fiber optic cable installation is unknown, however the operations are expected to be conducted in the period 2001-2003.

GLOBAL WEST (GLOBAL PHOTON) FIBER OPTIC CABLE PROJECT

Global West is a proposed fiber optic telecommunications project that would link major metropolitan areas along the California coast using buried undersea cable. The cable would contain seven landfalls including San Francisco, Monterey Bay North, Monterey Bay South, San Luis Obispo, Santa Barbara, Manhattan Beach and San Diego. The currently proposed routing of this cable is through a portion of the Sword Unit.

MCI WORLDCOM FIBER OPTIC CABLE PROJECT

The MCI Worldcom fiber optic cable project is proposed to consist of five cables that will be landed at the Montana de Oro State Park landing site. These cables would land through new directional bore pipes constructed adjacent to the AT&T landing. Currently only three of the five cables would be installed, the remaining two to be installed once demand requires.

PAC LANDING CORP (TYCO/GLOBAL CROSSING) FIBER OPTIC CABLE SYSTEM

The proposed PAC Landing Corp fiber optic cable project entails the offshore landing of three cables and consolidation of cables into one line extending to a telecommunications switching facility located in the City of Grover Beach. The telecommunications facility has already been constructed. Three cables would be installed in State waters, two of which would be part of the Pacific Crossing Submarine Cable (**PC-1**) System and the third cable would be part of the Pan-American Crossing Submarine Cable System (**PAC**). The Grover Beach landing site would provide a connection for cable originating in Japan and proceeding to Washington State. The site would also be the Pacific origin of the PAC Cable System, which would proceed to Mexico from Grover Beach.

AT&T CHINA-U.S. CABLE E1 AND CHINA-U.S. CABLE S7 SYSTEMS

The AT&T China/U.S. fiber optic cable project is proposed to consist of two cables that will be landed at the Montana de Oro State Park landing site. The two cables will be housed within the last remaining directional bore pipe constructed by AT&T in 1992. The China-U.S. Cable E1 cable is proposed to follow an alignment that is located north of the AT&T TPC-5 Segment T1 cable. The China-U.S. Cable S7 cable is proposed to follow an alignment located between the AT&T TPC-5 Segment T1 and AT&T HAW-5 cables.

OIL AND GAS ACTIVITIES THAT MAY OCCUR IN THE PERIOD 2002-2030

The following oil and gas activities could occur the period (2002-2030) and include Federal Offshore OCS Projects; Cavern Point Unit Exploration, development of some of the 36 undeveloped leases, Exploration Well OCS-P 0320 #2 Abandonment, Exploration Well OCS-P 0241 #2 Abandonment, and State Tidelands Projects; the Tranquillon Ridge Project, the South Elwood Project, the Cojo Point Project, and the Molino Gas Project.

FEDERAL OFFSHORE OCS PROJECTS

DELINEATION DRILLING (2002-2003)

Delineation drilling activities are described in chapter 2.

CAVERN POINT UNIT EXPLORATION: 2002-2003

Venoco Inc. (Venoco) is the current operator of the Cavern Point Unit. The unit includes Leases OCS-P 0210 and 0527 in the Santa Barbara Channel offshore Ventura County. The Cavern Point Unit is bounded by the Channel Islands National Marine Sanctuary on the south and the producing Santa Clara Unit on the north and east. Up to two exploratory wells are planned to be drilled into the unit from Platform Gail (Santa Clara Unit). Drilling, evaluating, and (if appropriate) abandoning the first well will occur during the third and fourth quarters of 2002 and take approximately 100 days. No construction of either offshore or onshore facilities is proposed. If the exploratory wells find hydrocarbons in the Cavern Point Unit, they will serve as the basis for planning and future evaluation of potential development. According to current scenarios, oil and gas would be transported from Platform Gail via existing pipeline to Platform Grace, then onshore to the Carpinteria facility. Gas also would be transported to shore via existing pipeline.

DEVELOPMENT OF THE 36 UNDEVELOPED LEASES

A hypothetical development scenario for the 36 undeveloped leases is presented in section 6.1.3.

EXPLORATION WELL ABANDONMENT, OCS-P 0320 #2 (2003)

Well OCS-P 0320 #2 was drilled and temporarily abandoned in 1985. Samedan proposes to permanently abandon well OCS-P 0320 #2. The well would be abandoned using the Mobile Offshore Drilling Unit (MODU) used for delineation drilling after the delineation drilling operations have been completed.

Sequence of activities is as follows; 1) the MODU would anchor over the well, 2) the well would be entered and temporary plugs removed, 3) permanent cement plugs would be placed, 4) the wellhead and casing would be removed, and 5) anchors removed and the MODU moved offsite. Samedan estimates 11 days to conduct abandonment activities.

EXPLORATION WELL ABANDONMENT, OCS-P 0241 #2 (2003)

Torch Operating Company (Torch) proposes to permanently abandon well OCS-P 0241 #2. The well was drilled and temporarily abandoned in 1968. The well would be abandoned using a MODU when delineation drilling is completed.

Sequence of activities is as follows; 1) the MODU would anchor over the well, 2) the well would be entered and temporary plugs removed, 3) permanent cement plugs would be placed, 4) the wellhead and casing would be removed, and 5) anchors removed and the MODU moved offsite. It would likely take 11 days to conduct abandonment activities.

STATE TIDELANDS PROJECTS

MOLINO GAS PROJECT (2001 AND 2005)

Molino Energy Company gained approval for the project from the County of Santa Barbara in 1996. The project involves use of ERD technology from an onshore site to recover sweet gas reserves in offshore State Tidelands. The drilling site is located just east of the Gaviota facility. It was initially envisioned that the project could produce up to 60 MMcfd of sales quality sweet gas and up to 1,050 BPD of natural gas liquids (NGL)s over a project life of 20-25 years. The gas would be sold to SoCal Gas and transported directly into the transmission line. The NGLs would initially be trucked to the Gaviota facility and later shipped to the facility via a new pipeline. The ERD wells that have been drilled to date have not been successful and exploratory drilling ceased in 1998.

Benton Oil and Gas Company assumed all project responsibilities in 2001. Benton plans to drill 3-6 exploration wells between 2001 and 2005.

COJO POINT PROJECT (2002-2003)

The County of Santa Barbara has received a preliminary application from Union Oil of California to proceed with the decommissioning of the marine terminal facility and associated oil storage tanks that are no longer in use at Cojo Point. Cojo Point is located along the northern margin of the Santa Barbara Channel, just east of Point Conception. Details regarding the project are not available at this time.

TRANQUILLON RIDGE PROJECT (2003-2030)

Nuevo Energy Company (Nuevo), is seeking approval to develop the Tranquillon Ridge area offshore Point Pedernales in the southern Santa Maria Basin from an existing OCS platform, Platform Irene. Platform Irene is located on Lease OCS P-0441, approximately 6 miles northwest of Point Pedernales. State and local agencies are preparing an Environmental Impact Report (EIR) on the proposed project. The California State Lands Commission's decision on the project will be contingent in part upon the EIR, and its decision to grant a State Tidelands lease for the project.

Current operations at Platform Irene include drilling and production of the Federal Point Pedernales Field, transportation of production via pipeline from offshore to onshore, and oil dehydration and gas processing at the Lompoc processing facility. One well from Platform Irene is producing from Tranquillon Ridge. Processed oil is transported by pipeline to refineries. Liquefied petroleum gas and NGLs are shipped by truck. The Lompoc facility is currently permitted to operate under a County of Santa Barbara FDP. The permitted production and processing capacities are 36,000 BPD oil and 15 MMcfd of gas.

The proposed Tranquillon Ridge Project would involve the drilling of up to 30 Extended Reach Drilling (ERD) wells (22 development wells and 8 utility and re-drills) from Platform Irene into State Tidelands. Total well drilling and completion times are anticipated to range between 60 and 120 days per well. Oil and gas produced by the proposed project would be transported to shore via the existing pipeline system to the Lompoc processing facility.

The Tranquillon Ridge project would extend over approximately 15 years. Nuevo estimates that the project will recover 180-200 MMbbl of oil and 40 Bcf of gas.

6.1.3 HYPOTHETICAL DEVELOPMENT SCENARIO FOR THE 36 UNDEVELOPED LEASES

This scenario was developed for the purpose of cumulative analysis for this EIS and provides assumptions for the analysis of development of the 36 undeveloped leases. The scenario is based on:

- Project Descriptions (**PD's**) provided by Unit Operators(Aera, 2000a, Aera, 2000b, Nuevo, 2000, and Samedan 2000) indicating: 1) where a production platform might be located and, 2) production destinations.
- Operator submitted Rocky Point PD and Revised Development and Production Plans (**DPP's**) for Platforms Hermosa, Harvest, and Hidalgo.
- MMS resource estimates.

- Based on those resource estimates, MMS estimates of platforms, piplines, power cables, onshore facilities characteristics, and other information.
- MMS requirements for site investigation prior to installation of platforms and pipelines.
- MMS requirements for periodic inspections after installation of platforms and pipelines.

Resources from eight leases are planned to be produced from existing POCSR platforms:

- Rocky Point, OCS-P 0452, 0453, Plaforms Harvest, Hermosa, and Hidalgo.
- Sword Unit, OCS-P 0319, 0320, 0322, and 0323A, Hermosa.
- Cavern Point, OCS-P 0210 and 0527, Plaform Gail.

Resources from 28 leases are planned to be produced from five new POCSR platforms:

- Lease OCS-P 0409.
- Lion Rock Unit, OCS-P 0396, 0397, 0402, 0403, 0408, and 0414.
- Point Sal Unit, OCS-P 0415, 0416, 0421, and 0422.
- Purisima Point Unit, OCS-P 0426, 0427, 0432, and 0435.
- Santa Maria Unit, OCS-P 0425, 0430, 0431, 0433, and 0434.
- Bonito Unit Unit,, OCS-P 0443, 0445, 0446, 0449, 0499, and 0500.
- Gato Canyon Unit, OCS-P 0460 and 0464.

SITE CHARACTERIZATION SURVEYS FOR OCS DEVELOPMENT

A Development and Production Plan for a platform must include a complete site investigation program. The site investigation program generally consists of three major phases (30 CFR 250.909):

- Shallow hazards survey to obtain data needed to analyze seafloor and subsurface geologic and manmade hazards
- Geological survey to obtain data of a regional nature concerning the site
- Subsurface investigation and testing to obtain the necessary geotechnical data.

SHALLOW HAZARDS SURVEY

A high-resolution or acoustic-profiling survey is required to obtain information on the conditions existing at and near the surface of the seafloor. A survey is required for proposed production platform sites and proposed pipeline routes. The Pacific OCS Region issues guidance in regional Notice to Lessees and Operators for developing survey strategies capable of detecting and evaluating hazardous conditions that might be in the vicinity of the proposed development site(s).

Table 6.1.3-1 Shallow Hazards Surveys for Development, summarizes the number and timing of shallow hazards surveys by three development areas.

GEOLOGICAL SURVEY

Background geological data is required to provide regional information that can affect the design and siting of a platform or route of a pipeline.

Table 6.1.3-1. Shallow hazards surveys, hypothetical development of the 36 undeveloped leases.

Area	Survey Plans	Platforms		Pipelines		Time-frames
		Number	Survey Area per Platform (mi^2)	Length of Pipeline Corridor (mi)	Area of Pipeline Corridor (mi^2)	
NSMB	1	3	1.2	25	19	2003
Bonito Unit	1	1	1.2	$4\ ^1/_2$	3.4	2004
Gato Canyon Unit	1	1	1.2	$5\ ^1/_3$	4.3	2003

SUBSURFACE INVESTIGATION AND TESTING

A detailed geotechnical evaluation of the platform's foundation is required. For pile supported platforms, such as those likely to be installed in the Pacific OCS Region, this will entail at least one borehole having a minimum depth of the anticipated length of the pile plus a zone of influence to be drilled at the proposed installation site. The regulations at 30 CFR 250.909 provide specific requirements for subsurface investigation and testing for platforms.

In addition, the operator will be required to perform sufficient geological/geotechnical sampling and testing of foundation soils within a proposed pipeline corridor to thoroughly categorize foundation-engineering conditions.

The MMS will review the results of the site investigation program prior to approving a proposed platform site or pipeline route. Based on the review, the operator may be required to verify hazards, archaeological resources or sensitive habitats to ensure safety of personnel and equipment and protection (or avoidance) of archaeological resources, etc. This may require the use of equipment and techniques such as underwater video/photography, hydrocarbon sniffer surveys, diver inspection, current velocity measurements, additional seafloor sampling and/or geologic age dating.

PERIODIC INSPECTIONS

All platforms and pipelines installed in the Pacific OCS Region will be inspected periodically in accordance with applicable regulations and regional Notice to Lessees and Operators. Inspections for platforms could include, but is not limited to, visual, cathodic protection, magnetic particle, or ultrasonic testing.

Routine inspections on pipelines include visual (diver and/or remotely operated vehicle), side scan sonar (**SSS**), and high resolution internal surveys. Pipeline SSS surveys must be conducted at least once every six years.

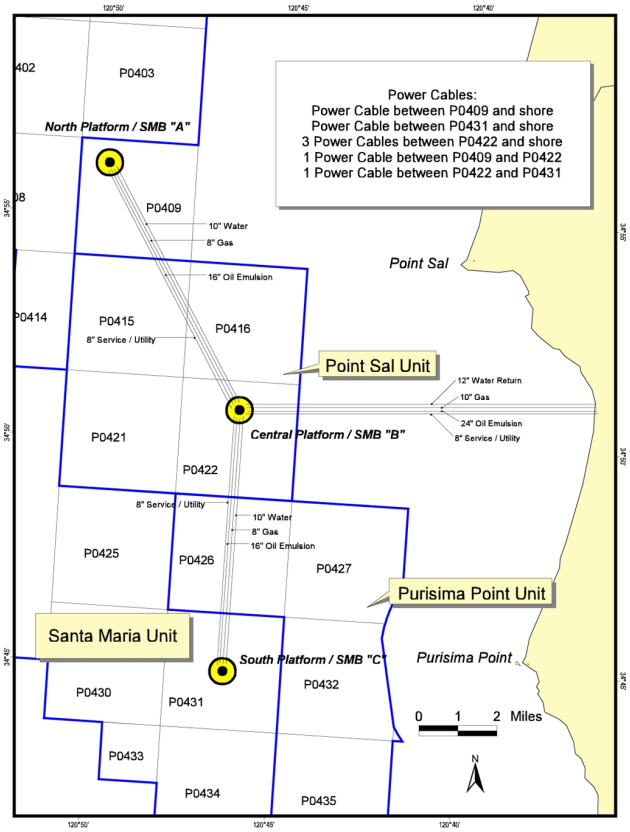

Figure 6.1.3-1. Potential platform, pipeline, and power cable locations, northern Santa Maria Basin units.

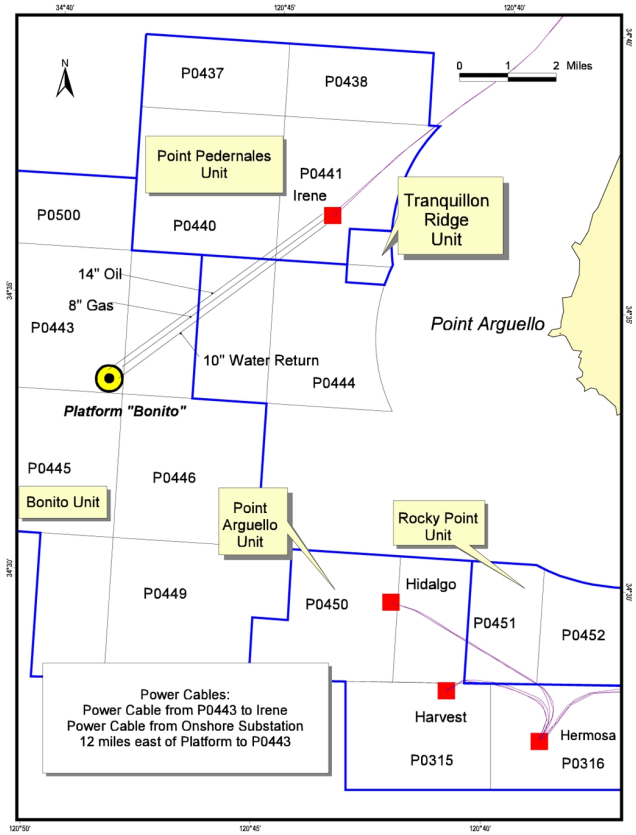

Figure 6.1.3-2. Potential platform, pipeline, and power cable locations, Bonit Unit.

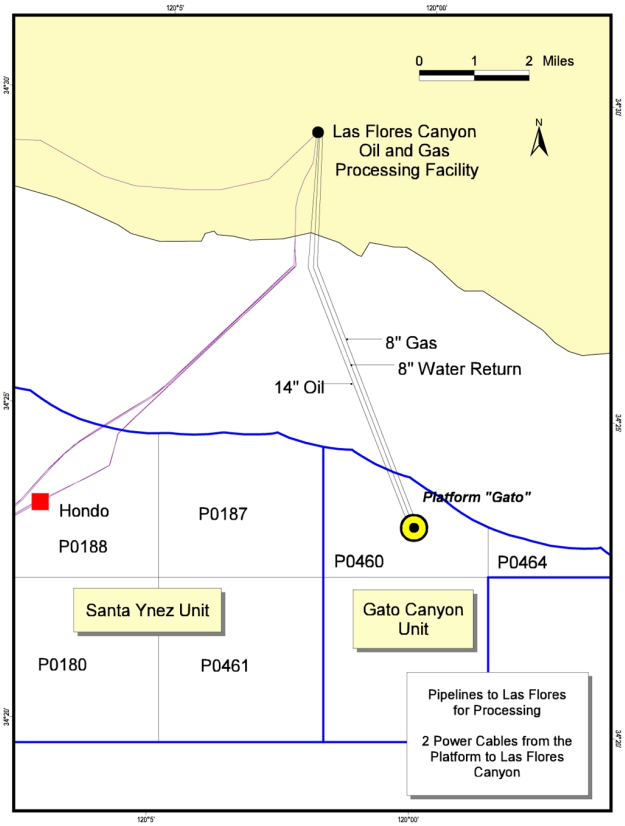

Figure 6.1.3-3. Potential platform, pipeline, and power cable locations, Gato Canyon Unit.

HYPOTHETICAL DEVELOPMENT SCENARIO

The hypothetical development scenario includes development 1) from existing platforms and 2) development that requires new platforms. The Rocky Point Unit would be developed from Platforms Hermosa, Harvest, and Hidalgo. The Sword Unit would be developed from Platform Hermosa. The Cavern Point Unit would be developed from Platform Gail. Five new platforms are estimated to develop most of the remaining 36 undeveloped leases. Three platforms would develop the northern Santa Maria Basin area (figure 6.1.3-1, one would develop the Bonito Unit (figure 6.1.3-2), and one would develop the Gato Canyon Unit (figure 6.1.3-3). Tables 6.1.3-2 and 6.1.3-3 provide scenario estimates of 1) reserves, platforms, pipelines, power cables, and production, 2) dates and length of time for installation, 3) dates for production and decommissioning, 4) pipeline destination, and 5) support activities.

Extended reach drilling technologies would be used to produce the fields efficiently with the minimum number of new facilities. MMS has assumed in this scenario that all new platforms would be conventional fixed platforms similar to existing Pacific OCS facilities and that development activities, processing, and other operations both offshore and onshore would

Table 6.1.3-2. Surface structures, pipelines and power cables, and production offshore Southern California, hypothetical development of the 36 undeveloped leases.

Platforms					Pipelines and Power Cables			Production				
Platform	Operator	Location	Well Slots Production Wells Service Wells Remaining Well Slots	Year To Be Installed	Size, Type, and Number	Year Installed	Onshore Facility (pipeline destination)	Field	Date 1st Production	Peak Production: Oil and Gas Volume (bbls/day) (MCF/day)	Year	Reserves Expected To Be Developed by Field: oil (MMbbl) gas (Bcf)
SMB "A"	AERA	Point Sal	60 45 6 9	2008	16" oil/water 8"gas 10" water return 8" service 2 power cables	3/2008 – 1/2009	To SMB Central	Lease OCS-P 0409, Lion Rock, and Point Sal	2009	35,000 10,500	2016	115 47
SMB "B"			60 49 6 5	2007	24" oil/water 10"gas 12" water return 8" service 3 power cables		Casmalia	Point Sal and Purisima Point	2009	32,000 6,400	2017	118 24
SMB "C"			60 46 6 8	2008	16" oil/water 8"gas 10" water return 8" service 2 power cables		To SMB Central	Santa Maria, and Purisima Point	2009	25,000 5,000	2017	90 18
Bonito	Nuevo	Point Arguello	36 21 6 9	2008	14" oil/water 8"gas 10" water return 2 power cables	4/2009 – 9/2009	To Platform Irene to Lompoc	Bonito and Electra	2010	26,000 13,000	2015	68 34
Rocky Point	Arguello Inc.	Point Arguello	N/A 14 6 N/A	Existing Plaforms Harvest, Hermosa, and Hidalgo	See Table 4.0.1-4	See Table 4.0.1-4	Gaviota	Rocky Point	2002	18,500 5,550	2006	39 11.7
Sword Uses Existing Plaform Hermosa	Samedan	Point Arguello	N/A 10 1 N/A	Existing Plaform Hermosa	See Table 4.0.1-4	See Table 4.0.1-4	Gaviota	Sword	2003	12,500 3,125	2007	29 7.3
Gato Canyon	Samedan	Naples Beach	28 20 4 4	2007	14" oil/water 8"gas 8" water return 2 power cables	11/2007 – 2/2008	Corral Canyon	Gato Canyon	2008	22,500 13,500	2013	77 46
Cavern Point Uses Existing Plaform	Venoco	Anacapa Island	N/A 10 1 N/A	Existing Plaform Gail	N/A	N/A	Carpenteria via Platform Grance	Cavern Point	2003	9,600 8,640	2006	22 20

Table 6.1.3-3. Surface structures offshore Southern California, construction timing, production support activities, and decommissioning timing, hypothetical development of the 36 undeveloped leases.

Platforms			Construction	Production and Support Activities				Decommissioning
Platform Water Depth	Operator	Location Of Nearest Land	Year Installed	Field	Date 1st Production	Helicopter Trips per week with Yearly Total[4]	Crew and Supply Boat Trips with Yearly Total[4]	Estimated Removal Date
SMB North 450 ft.	AERA	Point Sal	2008	Lion Rock and Point Sal	2009	5/day - 1825/yr	3/wk – 156/yr	2024 – 2029
SMB Central 300 ft.			2007	Point Sal, Santa Maria, and Purisima Point	2009			
SMB South 300 ft.			2008	Santa Maria, and Purisima Point	2009			
Bonito 700 ft.	Nuevo	Point Arguello	2008	Bonito and Electra	2010	Existing rates for Arguello Platforms and Irene	Existing rates for Arguello Platforms and Irene	2015-2020 (w/o Tranquillion Ridge Development) 2030-2035 (with Tranquillion Ridge Development)
Rocky Point Existing Plaform Hermosa , Harvest, and Hidalgo	Arguello Inc.	Point Arguello	Existing Plaform Hermosa , Harvest, and Hidalgo	Rocky Point	2002	Existing rates for Arguello Platforms and Irene	Existing rates for Arguello Platforms and Irene	2015-2020
Sword Existing Plaform Hermosa	Samedan	Point Arguello	Existing Plaform Hermosa	Sword	2003	Existing rates for Arguello Platforms and Irene	Existing rates for Arguello Platforms and Irene	2015-2020
Gato Canyon 560 ft.	Samedan	Naples Beach	2007	Gato Canyon	2008	1/day	2-3/ week	2023 - 2028
Cavern Point Existing Plaform Gail	Venoco	Anacapa Island	Existing Plaform Gail	Cavern Point	2003	Existing rates for Platforms Gail	Existiing rates for Platforms Gail	2015-2020

Table 6.1.3-4. Estimates of the number of days required for the phases of construction, hypothetical development of the 36 undeveloped leases.

Platform	Launch Jacket	Drive Piles/ Set Topsides	Install Pipelines	Install Power Cables	Comissioning
Gato	1	153	93	63	214
SMB “B”	1	93	276	123	456
SMB “A”	1	121			335
SMB “C”	1	92			243
Bonito	1	183	92	63	304

be very similar to the existing facilities and operations. These platforms are assumed to have a number of curved conductors to allow for reaching remote targets using extended reach drilling technology. MMS has assumed that gas and oil production would be sour with limited offshore processing. All jackets would most likely be fabricated overseas and require 12-14 months to fabricate and 3 months to loadout and transport to the hypothetical platform location. Topside modules would most likely be fabricated in the Gulf of Mexico. Table 6.1.3-4 provides estimates of the number of days required for the phases of construction for each platform.

All crew and supply boat operations would originate from Port Hueneme or Carpinteria pier. All helicopter operations would originate from either the Santa Maria or the Santa Barbara airports.

Peak production for new facilities may be lower than that attained by existing platforms in the Pacific Region. The new platforms would contain extended reach wells, which, based on industry’s current experience, take longer to drill. This fact causes the peak production to occur later in the life of the field, and stretches the peak out so that the actual peak production is lower.

With proper planning, the 5 potential platforms could be installed in a sequential order over a 2-3 year period using a single derrick barge (also called a Heavy Lift Vessel or Crane Vessel) rather than 5 separate derrick barges required if the platforms were installed independently. A derrick barge with a 2999-metric ton (3000-ton) capacity should be adequate to install all the platforms in the scenario described below. The timing of the operation including first production for each facility would have to allow for a coordinated effort for this to be possible. Using the information from the operators’ PD’s and development and production activity timelines, a coordinated effort of sharing a derrick barge appears possible. We assume all the 5 new platforms would be electrified due to Santa Barbara Air Pollution Control District requirements. We also assume pipelines would be installed using a pipeline lay barge and the power cables would be installed using a power cable vessel. With proper planning it may also be possible for the pipelines and power cables to be installed in a sequential manner sharing the needed pipeline and power cable lay vessels.

SANTA MARIA BASIN DEVELOPMENT

Three platforms would be located in the northern Santa Maria Basin (**NSMB**) area and would be used to recover reserves in the Lion Rock Unit, Purisima Point Unit, Point Sal Unit, and Santa Maria Unit and Lease OCS-P 0409, see figure 6.1.3-1 Platforms names are used as follows:

SMB "A" is the northern Santa Maria Basin platform located on Lease OCS-P 0409.

SMB "B" is the central Santa Maria Basin platform located on Lease OCS-P 0422.

SMB "C" is the southern Santa Maria Basin platform located on Lease OCS-P 0431.

SMB "A"

Reservoirs up to 6.44 km (4 mi) horizontally away could be reached from this platform using current drilling technology. The production from this platform would go by pipelines to SMB "B".

SMB "B"

Reservoirs up to 4.83 km (3 mi) to 6.44 km (4 mi) horizontally away could be reached from this platform using current drilling technology. The production from SMB "A" and SMB "C" would go by pipelines to this central platform and then on to shore.

SMB "C"

Reservoirs up to 4.83 km (3 mi) to 6.44 km (4 mi) horizontally away could be reached from this platform using current drilling technology. The production from this platform would go by pipelines to SMB "B".

The oil emulsion and gas would go to shore in separate pipelines for processing. The processing of the production would be mainly accomplished at the onshore facility. Because of the nature of the crude oil and its high viscosity, pipeline transport of the oil emulsion is predicated on having water content of at least 50% in the pipeline (known as "wet-flow" transport). We estimate that a 61-cm (24-inch oil) emulsion and a 25-cm (10-inch) gas pipeline to the onshore processing facility should be adequate for this purpose.

The OSMB crude is highly viscous, API Gravity 5-15, by industry standards and requires special consideration to optimize transportation and refining. The optimum product of the OSMB crude has not been decided on; refining options continue to be studied and evaluated. At this time, it cannot be definitively said what transportation method(s); pipelines, rail, truck, or a combination of all three, would be used for the OSMB crude from the hypothetical processing facility. As stated in the COOGER study, rail and truck transportation, may be required due to viscosity and delivery limitations of pipelines.

The oil emulsion and gas would be sent to a hypothetical processing facility located in the Casmalia area, similar to the Lompoc Oil and Gas Processing facility, where the oil and gas would be processed for further distribution through local pipelines. There is also the potential for a co-located asphalt facility. All oil would be sold. Some of the gas may be used as fuel on the platform for production operations. Gas may be 1) re-injected at one or more of the NSMB platforms or 2) used at a hypothetical co-located onshore co-generation facility and be returned to the platforms as electrical power, or 3) sold to the gas utility. A combined processing, asphalt, and co-generation facility would be roughly twice the size of the of the Lompoc Oil and Gas Processing facility. Pipelines from the hypothetical processing facility would probably tie into the All American Pipeline system at an existing pump station.

The North County Siting Study (Santa Barbara County, 2000) identifies constraints to the siting of new oil and gas processing facilities. The study identifies a number of potential sites and identifies two sites as a prefered location; Casmalia East or West. For purposes of this analysis the Casmailia East site was chosen as the location of the onshore oil and gas processing facility.

The pipelines from SMB "B" would come onshore through the sandy shoreline associated with the Pt. Sal and Lion Rock area, south of the area with surface outcrops of the Monterey formation and north of the mouth of Shuman Creek. The pipeline would be placed in a ½ mile-wide corridor from the landfall to the Casmalia East site. The northern boundary runs due east to the Casmalia site. The southern boundary of the corridor runs along Pt. Sal Road and maintains a separation from the town of Casmalia, slopes prone to landslides, and Shuman Creek.

Produced water would be treated at the hypothetical oil and gas processing facility and then transported offshore by a 30-cm (12-inch) water return line to the OCS-P 0422 platform for offshore disposal or down-hole injection there or at one of the interconnected platforms. There would also be 25.4 cm (10-inch) produced water pipelines between the platforms. Included are 20.3 cm (8-inch) service/utility pipelines between the platforms and between the OCS-P 0422 platform and shore for additional options and operational flexibility due to the nature of the heavy oil. A 40 by 0.8 km (25 by ½ mile) corridor (4 pipelines for a total of 161 km (100 miles)) of new pipelines that would be needed to complete the offshore portion of the NSMB project (see figure 6.1.3-1).

The three platforms are assumed to be electrified and there would be three power cables from shore to the central platform (**SMB "B"**), one power cable

each from shore to the SMB "A" and SMB "C", and one power cable each between SMB "B" and SMB "A" and SMB "B" and SMB "C".

BONITO UNIT DEVELOPMENT

One platform located on OCS-P 0443 (Platform Bonito) would be used to develop the Bonito Unit area. Reservoirs up to 6.44 km (4 mi) horizontally away could be reached from this platform using current drilling technology. API Gravity of Bonito crude oil is estimated at 11-22. The production from Platform Bonito would go by new pipelines to Platform Irene on Lease OCS-P 0441 where existing J-tubes have previously been installed to accommodate future pipelines. A new 35.5 cm (14-inch) oil pipeline, a new 20.3 cm (8-inch) gas pipeline and a new 25.4 cm (10-inch) water return line between the platforms would be adequate for this purpose. The 3 pipelines would be placed in a 7.2 km by 0.8 km (4 ½ by ½ mile) corridor, with a total of approximately 22.5 km (14 miles) of new pipelines (see figure 6.1.3-2).

At Platform Irene, the Bonito production would be commingled with the Point Pedernales and Tranquillon Ridge production before being sent to shore via Platform Irene's existing pipeline system to the Lompoc Oil and Gas Processing facility. The oil and gas would be dehydrated at the facility using existing capacity. The excess water would either be injected onshore, sent back to Irene for ocean disposal or formation injection at Irene or transported via pipeline to the Bonito Unit for ocean disposal or formation injection. From the Lompoc Oil and Gas Processing facility, the dehydrated oil would be sold to Tosco. The dehydrated gas would go to the Southern California Gas pipeline system. Electric power to the platform would most likely be supplied from an existing substation located onshore approximately 19.3 km (12 miles) northeast of the Bonito Unit. One power cable would be run from Platform Irene to the platform and another power cable would go to the Bonito Unit Platform from the substation.

ROCKY POINT UNIT DEVELOPMENT

The Rocky Point Unit includes Leases OCS-P 0451, 0452, and 0453 in the southern Santa Maria Basin. Twenty development wells, 14 oil wells and 6 service wells, would be drilled from Platforms Harvest, Hermosa, and Hidalgo.Seven wells each would be drilled from Platforms Harvest and Hermosa and six from Platform Hidalgo. The wells would be extended-reach wells with horizontal displacements of 4.6-6.4 km (2.5-3.5 miles). Drilling each well would require 3 to 4 months beginning in 2002.

Oil would be dehydrated and stabilized on the platforms, then sent to the Gaviota facility via the PAPCO pipeline. At Gaviota, the oil would be metered and heated, stored temporarily in the Gaviota Terminal Company storage tanks, then transported via the All-American Pipeline to various refining destinations.

Rocky Point gas would be sweetened on the platforms and used 1) to generate electricity and heat for platform operations, 2) sent to shore to fuel the Gaviota co-generation units, and 3) injected into the Point Arguello Field, the Rocky Point Field or both.

SWORD UNIT DEVELOPMENT

The Sword Unit includes leases OCS-P 0319, 0320, 0323, and 0323A. Samedan Oil Company is the Unit operator. A portion of lease OCS-P 0323 has been relinquished and the remaining lease was redesignated 0323A to reflect the change. Eleven development wells, 10 oil wells and 1 service well would be drilled from Platform, Hermosa, OCS-P 0316. The wells would be extended-reach wells with horizontal displacements of 6.4-8.3 km (3.5-4.5 miles). Drilling each well would require 3 to 4 months beginning in 2002.

Oil would be dehydrated and stabilized on the platforms, then sent to the Gaviota facility via the PAPCO pipeline. At Gaviota, the oil would be metered and heated, stored temporarily in the Gaviota Terminal Company storage tanks, then transported via the All-American Pipeline to various refining destinations.

Sword gas would be sweetened on Platform Hermosa and used 1) to generate electricity and heat for platform operations, 2) sent to shore to fuel the Gaviota co-generation units, and 3) injected into the Point Arguello Field.

GATO CANYON DEVELOPMENT

One platform located on Lease OCS-P 0460 (**Platform Gato**) would be used to develop the Gato Canyon Unit area. Reservoirs up to 4.8 km (3 miles) horizontally away could be reached from this platform using current drilling technology. API Gravity of Gato Canyon crude oil is estimated at 10-26. The jacket be installed starting in 2007. First oil and gas production would be in 2008. Oil production would peak at 22,500 bopd in 2013. Gas production would peak at 13,500 MCFD in 2013. The production from Platform Gato would be sent to shore via 3 new pipelines. A 35.5 cm (14-inch) oil pipeline, an 5.5 cm (8-inch) gas pipeline and an 5.5 cm (8-inch) return pipeline would be adequate. The 3 pipelines would be placed in a 8.8 by 0.8 km (5 $^1/_3$ by ½ mile) corridor, a total of approximately 25.7 km (16 miles) of new pipelines for the offshore portion of this project (see figure 6.1.3-3).

The oil and gas would be sent to shore to the ExxonMobil operated facilities at Las Flores Canyon. The gas sent to shore would be sour and that there would be limited processing offshore. The pipelines

would run from the platform and transverse State Lease PRC 2991.1 to and landfall through the the existing Exxon SYU pipeline crossings and corridor. New pipelines would be run to Las Flores Canyon. Production from the platform would be processed at Las Flores Canyon using existing capacity and the oil shipped in the All American Pipeline, now owned by Plains All American Pipeline, L.P. The gas would be processed at the Exxon Gas Plant using existing capacity and sold to the Gas Company. The produced water would be treated at the existing water treatment plant at Las Flores Canyon, transported offshore by pipeline and disposed of at the Gato Canyon Unit Platform. The platform is assumed to be electrified and two power cables would be run to the platform from the existing co-generation facility located in Las Flores Canyon.

PIPELINE AND POWER CABLE INSTALLATION

We assume that the pipelines between platforms and platforms to the landfalls (Gato Canyon Unit and Northern Santa Maria Basin) are accomplished with a pipeline lay barge with one pass per pipeline. The number of passes with the lay barge is dependent on the number of pipelines between the inter-connecting platforms and the platform to shore pipelines. The number of pipelines between the platforms is three for Bonito Unit to Irene, three for Gato Canyon Unit to shore and four for NSMB development, both between the platforms and between SMB "B" and shore. Installation of power cables would be completed by reeling the power cable off a power cable vessel into the same corridors as the pipelines. The power cables are connected to the platforms by pulling them through J-tubes at the platform.

CAVERN POINT UNIT DEVELOPMENT

The Cavern Point Unit includes Leases OCS-P 0210 and 0527 north of Santa Rosa Island in the Santa Barbara Channel. Eleven development wells, 10 oil wells and 1 service wells, would be drilled from Platform Gail. The wells would be extended-reach wells with horizontal displacements of 6.4-8.3 km (3.5-4.5 miles). Drilling each well would require 3 to 4 months beginning in 2003. The service would be drilled into the Sockeye Field and would not be an extended reach well.

The oil and gas would be sent to the Carpenteria onshore processing facility via Platform Grace using existing pipelines. The gas sent to shore would be sour and that there would be limited processing offshore. The oil and gas would be processed using existing capacity. Produced water is injected or disposed overboard.

6.2 ENVIRONMENTAL IMPACTS OF DEVELOPMENT OF THE 36 UNDEVELOPED LEASES

6.2.1 CUMULATIVE AIR QUALITY IMPACTS (2002-2030)

Section 6.1 describes the assumptions and lists the projects considered in the cumulative air quality analysis. Cumulative air emission data and assumptions are further documented in Appendix 5.4. The EIS analyzes cumulative impacts in two different time periods: 2002-2006 and 2002-2030. All of the cumulative projects and activities occur in the South Central Coast Air Basin composed of San Luis Obispo, Santa Barbara and Ventura Counties. 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 Santa Maria Basin and central Santa Barbara Channel and Southern Santa Barbara County. Major sources of cumulative air quality impacts include emissions from on-going oil and gas activities in Federal and State waters, proposed oil and gas activities, natural petroleum seeps, and offshore shipping and tankering operations.

Section 5.2.1 discuss the major impacting agents associated with past, present and foreseeable activities, including the proposed activities, that result in cumulative contributions to regional air quality during the expected duration of the proposed delineation activities (2002-2006). These include emissions from proposed oil and gas projects, existing oil and gas activities, natural petroleum seeps, and marine shipping and tankering.

The projects discussed in this section include past, present and reasonably foreseeable actions that may produce impacts during the period that the development of the 36 undeveloped leases would likely occur. The temporal period used for this analysis is the years 2002-2030. Two separate scenarios will be evaluated for potential cumulative effects on regional air quality. The first analysis will discuss the cumulative air impacts expected without the development of the 36 undeveloped leases. The second analysis will evaluate the incremental contribution to cumulative air quality impacts associated with the expected development of the leases.

CUMULATIVE AIR QUALITY IMPACTS WITHOUT DEVELOPMENT OF THE 36 UNDEVELOPED LEASES

It is assumed that without development of the 36 undeveloped leases, no new production platforms

or pipelines would be installed during the period 2002-2030. Therefore, the primary sources of air quality impacts expected during this time period would occur from the continued production phase of the existing 15 production platforms located within the geographical scope of this project, natural petroleum seeps, marine shipping and tankering, and the eventual decommissioning of older oil and gas facilities.

Existing Platforms Production Phase. There are presently 15 OCS platforms located within the geographical scope of this analysis which have ongoing development and production operations. The existing platforms are assumed to be in a normal operating mode for the life of the analysis. Production activities are assumed to continue on all existing, active platforms, with projected future well drilling estimates presented in Table 5.1.2.2-1.

Air quality impacts of the OCS platforms to the Santa Barbara area have been discussed above. The existing platforms are all within the jurisdiction of the SBCAPCD and all have current Permits to Operate. The existing facilities have been in full compliance with SBCAPCD Rules and Regulations since September 4, 1994, and any new or modified emission source will be subject to NSR requirements. As discussed in Section 5.2.1.2.1, total NOx emissions attributable to OCS oil and gas activities represent approximately 6.4% of the annual OCS emission inventory. That level is expected to decline in the future due to the decline of recoverable oil and gas resources experienced in the OCS. Therefore, the continued operation of the existing OCS oil and gas facilities are expected to remain in compliance with air regulations to ensure that no violations of the ambient air standards or interference with expeditious attainment of the standards occur.

Facility Decommissioning. Offshore oil and gas facility decommissioning activities include the removal of all wells, platform topsides and jackets, and associated pipelines and power cables. These construction activities are of short duration and involve combustion intensive equipment such as lift barges with ancillary construction equipment and marine vessels.

Projected dates for the decommissioning of OCS facilities is largely speculative at this time. The Point Arguello platforms (Harvest, Hermosa, Hidalgo) are projected to be decommissioned sometime between 2015-2020. Platform Irene is projected to be decommissioned sometime between 2020-2025 and may be extended depending on the successful development of the Tranquillon Ridge Field to 2030-2035. The remaining platforms have been projected to be decommissioned somewhere in the 2012-2025 time frame. Emission estimates for these future OCS infrastructure decommissioning activities have not been calculated due to their speculative nature at this time.

It is expected that the SBCAPCD will require permits for the decommissioning operations to ensure the projects do not result in violations of the ambient air standards. SBCAPCD Rule 202.F.3 exempts from permit requirements internal combustion engines used in construction activities that result in less than 25 tons of any pollutant in a 12 month period. Additionally, California Health & Safety Code provides an emission offset exemption related to the decommissioning of OCS facilities. H&S 42301.13(a) (Offset Requirements; Demolition/Removal/Relocation) states; *notwithstanding any other provision of law, a district shall not require, as part of its permit system or otherwise, that any form of emission offset or emission credit be provided to offset emissions resulting from any activity related to, or involved in, the demolition or removal of a stationary source*. Therefore, it is expected that future OCS facility decommissioning activities will require permitting and compliance with Santa Barbara APCD Rules and Regulations and will be designed to minimize regional air quality impacts.

Marine Shipping and Tankering. Air quality impacts associated with marine shipping and tankering in the Santa Barbara Channel have been discussed in Section 5.2.1.2.1 above. As previously discussed, the most recent Santa Barbara CAP calculates that approximately 96% of the OCS NOx emissions inventory is attributable to shipping and commercial vessels, and 97% of the particulate matter emissions. It is expected that the cumulative air quality impact of marine shipping and tankering will continue to be the most significant contributor to cumulative air quality in the OCS for the period 2002-2030. As emissions from U.S. and foreign flagged marine vessels traversing the Santa Barbara Channel are not regulated by federal, state or local air authorities, emissions will be assumed to remain at existing levels. However, as OCS emissions attributable to oil and gas operations are projected to decline over the 2002-2030 time period of this analysis, the proportion of total Santa Barbara County offshore emissions attributable to marine tankering and shipping operations is expected to increase.

INCREMENTAL AIR QUALITY IMPACTS OF DEVELOPMENT OF THE 36 UNDEVELOPED LEASES

The analyses will utilize a building block approach based on the sequential phases of offshore oil and gas development. It is assumed that the delineation phase of the proposed actions has been addressed in previous sections and the temporal overlap of those operations does not coincide with the eventual development of the 36 undeveloped leases. The impacting agents are the same as those discussed in the previous sections and will build upon the hypothetical development scenarios for the construction, development,

production and abandonment phases of oil and gas development of the 36 undeveloped leases as provided in the project descriptions. Potential cumulative impacts are discussed below.

Platform Installation. Offshore platforms are specifically constructed to account for such factors as water depth, sea floor characteristics and storage capacity. Fabrication of the platforms take place onshore at locations far removed from the area of emplacement and those emissions will not be considered in this analysis. A generic approach was utilized for this analysis as exact locations and commensurate physical characteristics are not known at this time for the proposed platform emplacements. Projected platforms include 3 platforms to develop the Santa Maria Basin Units, 1 platform on the Bonito Unit, and 1 platform on the Gato Canyon Unit. Emission estimates for platform installation were obtained from estimates used for proposed OCS Lease Sale No. 95 (Jacobs, 1989) and applied to the proposed development scenario.

The jackets and deck modules are fabricated onshore and towed to the offshore site. Once on location, the jacket is sunk to the sea bottom and secured to the sea floor by pilings. The topsides and components are then attached to the jacket. The primary impacting agents to air quality associated with platform installation are emissions resulting from derrick barges used to lift and secure the jacket and topsides, combustion equipment used to secure components, and support vessels used to tow the infrastructure to the site and support installation.

The derrick barge generator is typically the primary power source used to operate platform installation equipment for both the jacket and topsides installation activities. For assumption purposes, Jacobs assigned the total platform construction power requirement to the derrick barge generator to eliminate the variability of the size and number of individual pieces of equipment that could be used. Support vessels including tugboats, supply boats and crew were estimated and included in the overall platform installation emission estimates.

Platform installation activities are projected to occur during the 2007-2009 timeframe. Jacket launch dates are projected for Gato Canyon (2nd quarter, 2007), Central Santa Maria Basin (4th quarter, 2007), Northern Santa Maria Basin (1st quarter, 2008), Southern Santa Maria Basin (2nd quarter, 2008), and Bonito (4th quarter, 2008). Pile driving and topside installation activities are set to follow the individual jacket launches and will average between 3-6 months per facility. Emission estimates for platform installation is provided in Table 6.2.1-1.

Offshore Pipeline Installation. Pipeline laying techniques depend on multiple factors including pipe length and diameter, water depth and sea floor conditions. Pipeline installation activities are projected to commence following the installation of the topsides. The primary impacting agents to air quality associated with pipeline installation are emissions resulting from the lay barge, ancillary equipment used in welding the pipe, marine vessels used in movement of the lay barge and support vessels. The number of pipelines estimated between platforms is 3 from Bonito to Irene, 3 for Gato Canyon Unit to shore and 4 for the entire Santa Maria Basin platforms. Estimated dates for installing pipelines are Gato Canyon Unit (4th quarter, 2007), Santa Maria Basin (2nd quarter, 2008), and Bonito Unit (2nd quarter, 2009). Each individual Unit pipeline construction is projected to last approximately 3 months.

For this analysis, it is assumed that the pipelines would be installed using a lay barge. It is assumed that the pipelines will be laid at an average rate of 0.25 miles per day. Emission estimates for pipeline installation were obtained from estimates used for proposed OCS Lease Sale No. 95 (Jacobs, 1989) and applied to the proposed development scenario to

Table 6.2.1-1. Total projected emissions by source.

Total Cumulative Emissions With Development of 36 Leases (tons over the period 2002-2030)					
Activity	**NOx**	**CO**	**SOx**	**VOC**	**PM10**
Delineation Wells	125.5	31.3	3.1	17.8	8.3
Platform Construct	877.6	208.0	60.0	64.3	14.1
Pipeline Install	801.3	322.2	16.7	92.1	39.7
Power Cable Install	141.9	29.9	7.5	4.0	10.0
Development Wells	644.4	305.9	95.9	88.7	94.1
Production	19,811.3	10,432.8	3,858.5	14,804.6	1,512.5
Spills	0	0	0	7.8	0
Service Vessels	151.7	15.3	2.0	6.9	8.8
Helicopters	54.4	129.0	10.9	9.4	12.4
Total	**22,608.1**	**11,474.4**	**4,054.6**	**15,095.6**	**1,699.9**

determine peak year and total emissions. Emission estimates for pipeline installation is presented in Table 6.2.1-1.

Offshore Power Cable Installation. All the projected platforms are assumed to be electrified and will require power cables from shore or adjacent electrified platforms. Power cable installation would be completed by reeling the power cable off a power cable vessel into the same corridors as the pipelines. The power cables are then connected to the platforms by pulling them through J-tubes at the platform.

Power cable laying operations are scheduled to occur for Gato Canyon Unit (4th quarter, 2007), Santa Maria Basin (2nd quarter, 2008), and Bonito Unit (2nd quarter, 2009). Each individual power cable laying activity will last approximately 2 months. Emission rates for cable laying operations were obtained from the 1991 SBCAPCD Authority to Construct for the SYU topsides project. Emission estimates for power cable installation is presented in Table 6.2.1-1.

Production Phase. The production phase is considered the longest emission phase of all oil and gas development activities. The production phase considered for these projects will be approximately 15 years. Emission sources during this phase primarily include turbines, flares, support vessels, fugitive hydrocarbon sources, cranes and other sources.

Production phase emissions are generally proportional to the recoverable resources to be produced, and typically generate the maximum emissions during the peak production year. Initial production is projected for Gato Canyon Unit in 2008, the Santa Maria Basin Units in 2009, and Bonito Unit in 2010. Peak production year for Gato Canyon is 2013, Bonito Unit is 2015, Northern Santa Maria Basin is 2016, and Central and Southern Santa Maria Basin is 2017.

Emission estimates for the production phase were obtained by averaging oil and gas production related emissions from the 1996 Santa Barbara OCS Emission Inventory to a per platform average. These averages were applied to the 15 existing and 5 proposed platforms for the period 2002-2030 time period to determine peak year and total emissions. For conservative estimates, the production emission estimates were considered to be constant over the projected life of the project and were not based on projected production and peak production year estimates. Emission estimates for production phase emissions is presented in Table 6.2.1-1.

Facility Decommissioning. Offshore oil and gas facility decommissioning activities include the removal of all wells, platform topsides and jackets, and associated pipelines and power cables. These construction activities are of short duration and involve combustion intensive equipment such as lift barges with ancillary construction equipment and marine vessels.

Decommissioning dates for the proposed facilities are based on a 15-year production life. Estimated removal dates for the Gato Canyon Unit is scheduled between 2023-2028, Santa Maria Basin between 2024-2029, and Bonito Unit between 2025-2030. The projected dates for the most likely removal of these proposed facilities occur several years after projected decommissioning dates for the existing platforms. Emission estimates for these future OCS facility removal activities have not been calculated due to their speculative nature at this time. However, emissions associated with decommissioning the proposed facilities are not expected to overlap with removal activities for the existing platforms and are therefore not expected to result in cumulative air quality impacts.

Oil Spills. As discussed in the oil spill section, the cumulative oil spill risk for the project area may result from several sources including existing OCS and state oil and gas facilities, proposed delineation and development projects in OCS and state waters, and tankering of Alaskan and foreign-import oil through area waters.

A number of processes that alter the chemical and physical characteristics of the original hydrocarbon mixture occur when oil is spilled into the ocean. This weathering of the oil, together with atmospheric and oceanographic conditions, determines the time that the oil remains on the surface of the water and the characteristics of the oil at the time of contact with the particular resource. A primary agent in the weathering process is the evaporation of volatile hydrocarbons into the atmosphere.

Air quality impacts from spills would be dependent on a variety of factors including location, meteorological conditions at the time of the spill, and duration of the spill. Air pollutant concentrations reaching shore will generally be lower than at the site of the spill due to dispersion with distance over water. Additionally, the spill emissions would be expected to decrease with time and become more diffuse as the spill spreads over a larger area.

The most likely oil spill scenario for the proposed development projects is that one or more oil spills in the 50-1,000 bbl range would occur from offshore oil and gas activities over the life of the project (2002-2030), and that such a spill would be 200 bbl or less in volume. The maximum reasonably foreseeable oil spill volume from all offshore oil and gas activities would be a 2,000 bbl pipeline spill. Based on data from tanker spills in U.S. waters, the mean size of a tanker spill is assumed to be 22,800 bbl.

It is assumed that an oil spill of 200 bbl would likely occur during the life of the project. Information from OCS accidents indicate that the majority of the aromatic compounds will be lost to volatilization within 24 to 48 hours, with a high percentage evaporating within the first hours of the spill (Jordan and

Payne, 1980). Thus, it is assumed that oil spills would result in low, short-term impacts to onshore air quality due to the size of the projected spill, the rapid volatilization of the hydrocarbons, the short duration and localized nature offshore away from urban areas. Emission estimates for the most likely 200 bbl oil spill is presented in Table 6.2.1-1.

The most likely maximum size of an oil spill from future oil and gas development is estimated to be a 2,000 bbl pipeline spill as stated above. A 2,000 bbl spill will have a more serious impact on regional air quality due to the larger volume and overall surface area of the spill. The location of the spill nearer to onshore areas may expose sensitive receptors to a greater short-term risk than if the spill was located further offshore. However, the hydrocarbon concentrations expected from the maximum 2,000 bbl spill would be considered to result in low short-term air quality impacts due to the rapid volatilization of the hydrocarbons and dispersion with distance from shore.

The air quality effects of a 22,800 bbl tanker spill on the project area would produce the largest concentration of emissions of the three oil spill scenarios evaluated. The short-term air quality impacts would be expected to diminish within days of the spill due to the rapid volatilization of the light end hydrocarbons and oil weathering processes. Though a marine tanker spill would result in a much greater magnitude of hydrocarbons exposed to the atmosphere, the location of such a spill is expected to be far from nearshore areas with their greater susceptibility to health effects. Oil tankers offshore of southern California voluntarily transit the coast north of Point Conception at distances of 90 km (50nm) or more offshore. Therefore, the concentration of hydrocarbon emissions reaching sensitive onshore areas will generally be low due to dispersion of the emissions with distance over water and that oil spill emissions decrease with time and become more diffuse as the spill spreads over a larger area with time.

Summary. The total OCS emissions projected from the development of the 36 undeveloped leases for the period 2002-2030 is presented by activity in Table 6.2.1-1. The emission potentials demonstrate that the largest contributor to regional air quality impacts occur during the platform production stage of development accounting for over 90% of the emissions over this time period. These emissions are spread out over the 15 existing and 5 proposed facilities in the Santa Maria Basin and the Santa Barbara Channel over the next quarter of a century and may be considered as the long-term effects of OCS oil and gas development.

CUMULATIVE AIR QUALITY MODELING ANALYSIS

Modeling runs utilizing the Offshore and Coastal Dispersion (OCD) model were conducted to determine the potential cumulative air quality impacts to onshore areas. Due to the compressed nature of the platform installation activities, including pipeline and power cable installation, there is expected to be considerable temporal and spatial overlap resulting in elevated cumulative emissions for the period 2007-2008. Therefore, peak year emissions for the projected development have been estimated to occur during 2008. Peak year and peak hour emissions are presented in Table 6.2.1-2.

Peak hour emissions for the year 2008 were utilized to provide a conservative estimate of the potential for regional air quality impacts resulting from the development of the 36 leases. Emissions associated with the proposed exploratory projects do not overlap temporally or spatially with the emissions potential projected for 2008 and therefore do not contribute any increment to peak year cumulative air quality impacts. Thus, cumulative air quality modeling for the development of the 36 undeveloped leases is solely based on hypothetical development assumptions and does not reflect any contribution from the proposed projects. The peak emissions provide the most conservative estimates to predict potential impacts to onshore air quality from the hypothetical development of the 36 undeveloped leases.

The modeled concentrations demonstrate that the cumulative development scenario emissions exceed the 1 hour maximum increment range established by the SBCAPCD for NOx allowable limits for a Class II area. Concentrations of SO_2 are well below allowable increases and PM_{10}, 24 hour concentrations marginally exceed the allowable increment. It should be noted that ambient PM_{10} background levels in Santa Barbara County are above the allowable increments set by SBCAPCD.

The most recent validated ambient air concentrations were obtained from the SBCAPCD and added to the incremental concentrations predicted by the OCD model for a comparison against Federal and State ambient air quality standards. The EPA screening approach of using the national default of an NO_2 /NOx ratio of 0.75 was applied to the predicted concentrations to account for the atmospheric conversion of NO to NO_2. As the ambient standards apply only to NO_2, a conversion factor of NO to NO_2 must be applied. The 1-hour NO_2 standard of 470 m/m^{3}is approached (460 m/m^3) but not exceeded for the near-shore pipeline installation portion of the project as the pipeline installation approaches the surf zone. The comparison indicates that increases in the onshore average concentrations of NO_2, SO_2 and PM_{10} from the proposed

Table 6.2.1-2. Peak year cumulative emissions.

Peak Year Cumulative Emissions With Development of 36 Leases (2008)					
Activity	**NOx**	**CO**	**SOx**	**VOC**	**PM10**
Platform Construct	497.3	117.9	34.0	36.5	36.7
Pipeline Install	649.4	260.8	13.6	74.6	64.4
Power Cable Install	88.1	18.6	4.7	2.5	6.2
Development Wells	21.4	10.1	3.2	2.9	3.1
Production	717.8	378.0	139.8	536.4	54.8
Spills	0	0	0	7.84	0
Service Vessels	6.07	0.61	0.08	0.28	0.35
Helicopters	2.18	5.16	0.44	0.38	0.49
Total (tons)	**1,982.25**	**791.17**	**195.82**	**661.4**	**166.04**
Peak Hour (lbs)	**452.57**	**180.63**	**44.71**	**151.00**	**37.90**

development projects are estimated to be less than the maximum increases allowed under both the Federal and State standards. Table 6.2.1-3 presents the modeled concentrations per pollutant in relation to maximum allowable increases and federal and state ambient air quality standards.

SUMMARY AND CONCLUSIONS (2002 – 2030)

Without development of the 36 undeveloped leases, regional air impacts during the period 2002-2030 are assumed to result from ongoing oil and gas activities, marine shipping and tankering operations and the eventual decommissioning of the existing offshore facilities. The largest contributor to OCS air quality will continue to be marine shipping and tankering with incremental contributions from facility decommissioning exhibited in the later years. OCS emissions attributable to existing oil and gas operations are projected to decline over the 2002-2030 time period of this analysis.

The largest contributor to short-term air quality impacts result from platform and pipeline installation activities during the years 2007-2009. The worst-case scenario emissions are predicted during the near-shore pipeline installation activities and are expected to be limited in duration to very short time frame. Emissions associated with the proposed exploratory projects do not overlap temporally or spatially with the cumulative peak year emissions projected for 2008 and therefore do not contribute any increment to peak year emissions.

All of the projected development projects are expected to be above NSR threshold emission levels for BACT, emission offsets and air quality impact analyses and will be required to comply with those provisions in SBCAPCD Rules and Regulations. Any project and emission sources eventually determined to be subject to SBCAPCD permit requirements will be subject to BACT and be fully offset at a greater than a 1:1 ratio and will result in a net air quality benefit to Santa Barbara County in accordance with SBCAPCD Rules and Regulations. However, future year emission offsets may be problematic based on the limited present day availability of offsets and the requirement that all new or modified projects have an air quality benefit per NSR requirements.

Anticipated air quality impacts from the three oil spill scenarios are expected to be rare, of short duration, and very localized. Ambient air concentrations resulting from oil spills are expected to result in low to moderate, short-term impacts to regional air quality dependent upon the location and duration of the spill, and meteorological conditions exhibited at the time affecting the evaporation rate of the hydrocarbons.

Given the current trends in air quality and the regulatory mandate for nonattainment areas to come into attainment of the air quality standards as expeditiously as possible, it is expected that Santa Barbara County will be considered in attainment for the federal and state ambient air quality standards by the time these eventual development projects are expected to commence. These projects would then be considered in relation to the regulations enforce at the time, with Santa Barbara County being considered a maintenance area for air quality and no longer a nonattainment area as the proposed projects have been evaluated. Thus, future permitting and compliance of these projects would most likely be subject to Prevention of Significant Deterioration (PSD) standards, and emission threshold requirements designed to ensure the continued protection of air attainment areas.

Table 6.2.1-3. Maximum predicted onshore pollutant concentrations.

Maximum Predicted Cumulative Onshore Pollutant Concentrations (micrograms per cubic meter (• g/m^3)						
Pollutant	**Averaging Period**	**Class II Maximum Allowable Increase**	**Ambient Air Quality Standard**	**Santa Barbara Maximum Background Concentration[3]**	**Model Concentration**	**Total Pollutant Concentration**
NO_2	1-hour	100-470[1]	470[2]	58	402	460
	Annual Average	25.0	100	26	1.9	27.9
PM_{10}	24-hour Average	12-30	150	45.2	13.1	58.3
	Annual Average	17.0	50	30.9	0.24	31.14
SO_2	1-hour Average	NS	655[4]	10.44	10.8	15.84
	3-hour Average	512.0	1300	7.8	8.0	15.8
	24-hour Average	91.0	365	2.6	2.9	5.5
	Annual Average	20.0	80	5.0	0.07	5.07

1. Santa Barbara APCD incremental limit.
2. State of California ambient standard.
3. Vandenberg (south) 1999 ambient data (Provided by SBCAPCD)
4. State Standard. No National Standard.

The hypothetical nature of the full development of the 36 undeveloped leases over the next 25 years most probably results in a low confidence for the prediction of regional air quality impacts. The assumptions utilized for the estimating of peak hour, peak year and total emissions provided in previous sections are the best information available and are conservative estimates of the overall emission potential for these projects. Should the proposed delineation projects prove successful, eventual development of the Units will be subject to a more comprehensive and less speculative review during the mandated environmental impact analysis of the respective Development and Production Plans (DPP). The supporting technical and environmental information required in the DPPs shall provide for a more definitive evaluation of the associated air quality impacts expected with the development of the 36 undeveloped leases.

6.2.2 CUMULATIVE WATER QUALITY IMPACTS (2002-2030)

Cumulative Impacts Without Development of the 36 undeveloped leases (2002-2030). The following analysis is based on the assumption that the proposed exploratory activities will lead to development, including installation of up to 5 platforms and associated pipelines. This section examines:

- The cumulative impacts to water quality without the development of the 36 leases in the period 2002 to 2030;
- The additional cumulative impacts to water quality from development of the 36 leases in the period 2002 to 2030.

Refer to Section 5.2.2 for a discussion of effects from the proposed action for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in Section 5.2.2.

The potential sources of impacts to water quality without development of the MODU undeveloped leases include the following:

- Offshore oil and gas development and production and other activities, including:
- Pacific Offshore Operators, Inc. (POOI) Federal/State development;
- Full-field development of the South Ellwood Field;
- Tranquillon Ridge Unit development;
- Oil spills from facilities and pipelines;
- Decommissioning activities.
- Non-OCS oil and gas activities including:
- Municipal and industrial wastewater discharges;
- River runoff and other nonpoint sources;
- Oil spills from non-OCS tankering activities.

OFFSHORE OIL AND GAS

For offshore oil and gas development and production activities such water quality-related impacting agents would include, turbidity not associated with drilling activities, drilling discharges, produced water, and other effluents. These are discussed below.

Turbidity. Of the potential impacting agents listed above, only decommissioning activities would cause turbidity in the water column due to anchors from the derrick barge vessel used to conduct most of the decommissioning activities. As discussed in section 5.2.2.1 (table 5.2.2.1-1), anchoring activities can cause increases in turbidity but only for a limited time and for a limited extent into the water column (from the bottom up, as opposed to the top down) and not into the photic zone. Thus, only negligible impacts to water quality are expected from decommissioning activities.

Drilling Discharges. Drilling muds and cuttings impacts to water quality were discussed extensively in sections 5.2.2.1 and 5.2.2.2. Only the first three projects listed above would entail the discharge of drilling muds and cuttings. Impacts to water quality would be no different from those described in the previous sections. That is, a low impact to the water quality, including the resuspension of drilling muds, turbidity, and effects of metals and additives. In addition, there are indications from the California State Lands Commission that for those projects that include the accessing of oil under state tide lands, even if the point of drilling discharges is in Federal waters, no discharge of drilling muds and cuttings would be allowed. This could be the case for all three of the development and production projects, above. In that event, no impacts to water quality would arise from those projects.

Produced water. While no produced water is anticipated to be discharged during the proposed delineation drilling, produced water from existing and future offshore oil and gas facilities may have an effect on water quality. Materials such as oil and grease and other hydrocarbons (for example, benzene, toluene, xylene, phenol, naphthalene, and compounds of similar structure), metals, including arsenic, cadmium, chromium, lead, mercury, nickel, silver and zinc, and some inorganic compounds, such as sulfides and cyanides may be present in produced waters.

Produced water discharges are regulated under the National Pollutant Discharge Elimination System (NPDES) regulations under the purview of the Environmental Protection Agency (EPA). The effluent is treated prior to discharge by various means. The most common treatment system used involves a combination of heat, chemicals (for example, emulsion breakers) and the use of mechanical forces (such as corrugated plates, bubbling air, etc.). Since NPDES permits allow some dissolved components of oil to remain in the effluent (currently ranging in the Pacific OCS Region from 29 to 72 ppm) some amount of oil is discharged into the sea with this effluent.

The National Research Council (NRC, 1985) used estimates of the amount of oil dissolved in produced water effluents and multiplied by the amount of produced water discharged for the United States as a

whole. The authors gave three levels of dissolved oil in produced water: 35 ppm, 50 ppm, and 70 ppm (due to a range of NPDES permit limits). The resulting annual, U. S.-wide, amount of oil discharged into the sea per year from produced water effluents were 10,900 bbl (30 ppm); 15,600 bbl (50 ppm); and 21,800 bbl (70 ppm); no estimate was given for MMS OCS Regions.

For the decade from 1989 to 1998, a spreadsheet compiled by MMS (Dave Panzer, MMS, pers. comm., 2001) indicated that a range of 615.5 bbl (30 ppm), 1,025.9 bbl (50 ppm); and 1,477 bbl (72 ppm) were estimated to have been discharged into the Pacific OCS waters. All of these estimates are high because not all of the currently-discharging 13 platforms discharged produced water for the entire decade. Table 6.2.2-1 shows the number of platforms in the Pacific OCS Region and how many discharged produced water. Also, the NPDES permit limit for oil and grease is given. As the table shows, 8 platforms discharged produced water for the entire decade, while others discharged for fewer years. Of a total of 160 possible platform-years (16 discharging platform times 10 years) of discharging produced water, 129 platform-years of produced water was actually discharged, or a factor of 80 percent of the total possible platform-years (129/160). Modifying the values given above by a factor of 80 percent results in barrels of oil discharged in the produced water effluent by all platforms in the Pacific OCS Region of 492 bbl (30 ppm); 820.7 bbl (50 ppm) and 1,182.7 bbl (72 ppm). To reiterate, this is the estimated amount of dissolved oil discharged into Pacific OCS water for the decade from 1989 to 1998. It would be inaccurate to estimate the amount of oil discharged into the sea from produced water effluent by year since the number and identity of the platforms changed throughout the period, including the amount of oil and grease allowed in any particular platform's NPDES permit.

All of the components in produced water, except the temperature of the discharge in most cases, are high relative to the ambient characteristics of the receiving water. All of these aspects, thus, could affect or change the water quality. However, EPA allows dilution of the regulated components of the effluent (except oil and grease) to a 100-m (320 ft) radius, at which point the effluent must meet the permit limits. The calculated dilution ratio for many platforms range from about 500:1 to nearly 2,000:1. This means that any value of a monitored produced water parameter sampled at the NPDES sampling point on the platform will be divided by 500 to 2,000 to determine compliance with the permit. While this does not ameliorate any of the affects, noted above, within 100 m (320 ft) of the discharge point, it does help to ensure that water quality limits are not exceeded beyond 100 m (320 ft) from the platform.

The above discussion notwithstanding, a few studies on produced water have shown that, while changes in water quality parameters may not be detectable, some results have suggested that processes may occur that may be more far-reaching than EPA's 100-meter (320 ft) regulatory limit. For example:

- Osenberg, et al. (1992) found that mussel tissue growth increased with increasing distance from the Carpinteria produced water outfall[1]. This trend was noted out to at least 500 m (1,600 ft).
- Osenberg et al. (1992) also found that barium uptake in the shells of outplanted mussels generally decreased with distance from the outfall. This data was somewhat confounded since for some data collections, for unknown reasons, there was no clear trend with distance. This was unexpected since barium commonly precipitates (forms solids) in the presence of sulfates, which are abundant in nearshore waters (Higashi et al., 1997).
- Raimondi and Schmitt (1992) found that planktonic larvae (red abalone larvae) can be adversely affected by produced water plumes, even from the open coast, high energy environment outfall at Carpinteria, and at distances beyond which modeled produced water effluents indicated that background concentrations should be occurring.
- Water-borne contaminants may have caused effects over a much greater spatial scale than did the particulate fractions (Osenberg, et al., 1992). This was consistent with laboratory findings where the water-soluble fraction of the Carpinteria produced water was responsible for the most biological effects (Higashi et al., 1992).
- Krause et al. (1992) found that laboratory tests on sea urchin larvae development showed effects at concentrations down to 1 ppm, about what the concentration would be at 500 m (1,600 ft) from the open coast, high energy environment outfall at Carpinteria.
- Krause (1993) found up to a 10 percent reduction in sea urchin egg fertilization at concentrations of greater than a factor of 10^6.

[1] Since this particular study site was in 10 to 12 m (33 to 40 ft) water depth, it may not be directly applicable to a similar situation at an offshore platform because of the water depth and the ability of a produced water plume to spread and disperse vertically as well as horizontally.

- Raimondi and Reed (1996) found that, in general, physical/chemical predictors were poor indicators of biological impact. For example, they noted that although barium uptake in the shells of mussels was seen at 500 and 1,000 m (1,600 and 3,200 ft, respectively) from the Carpinteria outfall, concentrations of produced water and the barium were as low as 0.0001 percent of the whole effluent.
- Washburn et al. (1998) found that modeled runs of the Carpinteria outfall produced results similar to and supportive of the biological effects found by the above authors.

Within 100 m (320 ft) of the discharge point, Wagner (1994) conducted bioassays on two species of mysids (opossum shrimp) with produced water at concentrations ranging from 0.18 percent to 10 percent of the whole produced water effluent. These ranges of concentration would certainly be within 100 m (320 ft) of any produced water discharge point in the offshore California OCS. For example the range of current dilution ratios is 467:1 to 2,481:1. Putting these ratios in terms of concentrations reveals that, for example, a dilution ratio of 10:1 would equal a concentration of 10 percent.

Wagner's endpoints were Lowest Observed Effect Concentration (LOEC) for both survival and growth, defined as the lowest concentration at which survival or growth effects are statistically significantly different from the control (the lower the value, the more toxic the produced water). The LOECs for survival ranged from 3.2 percent to 10 percent while the LOECs for growth ranged from 0.18 percent to 7 percent. As is evident, Wagner's test concentrations, in dilution ratio terms, ranged from 180:1 to 10:1 , all of which would be well within 100 m (320 ft) of the discharging platforms (although it is unknown how far this might be).

One important aspect of the results presented in Wagner (1994) can be seen in her figures 10-12. There was no indication of effects on survival until at least concentrations of 1.5 to 2 percent (150:1 to 200:1 dilution). Once that point was reached, however, test animal survival decreased markedly. While growth also decreased with increasing concentration, the "break point" at which changes began to appear occurred at slightly lower concentrations than those of survival (1 to about 1.5 percent). While this conclusion may be intuitive (that is, nonlethal effects would occur at lower concentrations than lethal ones), Wagner's results are nevertheless instructive regarding application of the laboratory results to the field, such as the distance between the discharge point and where those effects might occur.

Similarly, Cherr et al. (1993) found that at [what the investigators stated to be] low concentrations of produced water, ranging from 3 to 10 percent, caused morphological changes in purple sea urchin (*Strongylocentrotus purpuratus*) embryos. Contrarily, experimental results indicated that kelp gametophytes were not particularly sensitive to produced water. However, preliminary results did indicate that produced water caused inhibition in the nuclear processes of gametophyte development (Cherr and Fan, 1996).

Table 6.2.2-1. Platforms that have discharged produced water, the number of years discharging and the NPDES permit limit for oil and grease.

Platform	Years Discharged (1989 - 1998)	NPDES Oil and Grease Permit Limit (ppm)	Platform	Years Discharged (1989 - 1998)	NPDES Oil and Grease Permit Limit (ppm)
Edith	10	72	C	8	72
Gail	10	29	Harmony	7	29
Gilda	10	72	Harvest	7	72
Habitat	10	72	Hidalgo	7	72
Hogan	10	72	Hermosa	7	72
Hillhouse	10	72	Grace	6	29
A	10	72	Gina	4	72
B	10	72	Irene	3	29

The results given above, when taken together, indicate that more information is needed to ensure that produced water discharges, indeed, do not change water quality parameters to the extent that biological systems are impacted. Ongoing and future studies are anticipated to provide a better estimate of concentrations and dilution with distance both from the discharge point to 100 m (320 ft) as well as to points beyond 1,000 m (3,200 ft).

Other effluents. A list of the discharges that could emanate from other existing and future platforms is given in sections 5.2.2.1 and 5.2.2.2. None of these discharges, will cause any water quality impacts due to the small volume of the discharge and the treatment systems required.

Oil spills. Section 5.1.3 discusses the cumulative oil spill risk for the project area. Tables 5.1.3.1-2 and 5.1.3.1-3 present the estimated mean number of spills of various sizes and the probability of their occurrence as a result of the described activities. The probability of one or more spills 200 bbl or less in size occurring from existing and proposed offshore oil and gas activities during the period 2002-2030 is 73.9 percent. The probability that one or more spills in the 2,000-bbl range will occur from these activities is 59.1 percent. The risk of a major tanker spill (22,800-bbl) during this period is estimated to be 90.5 percent.

Impacts to water quality from any oil spills occurring during this period would be similar to those described in section 5.2.2.2.1 for the 200- and 2,000-bbl spills assumed to occur as a result of offshore oil and gas activities and for the assumed 22,800-bbl tanker spill. Additional information on oil spill risks, fates and effects may be found in section 5.1.3 and appendix 5.3.

NON-OFFSHORE OIL AND GAS ACTIVITIES

As was discussed in sections 5.2.2.1 and 5.2.2.2 and summarized below, water quality in the study area may be generally divided into two subregions. The offshore oil and gas units proposed to be drilled are in the following subregions:

- Point Sur to the western entrance of the Santa Barbara Channel (Point Sal, Purisima, and Bonito); and
- The northern Southern California Bight (SCB): Santa Barbara Channel to Point Fermin (Gato Canyon).

These subregions are generally based on the level of activity that is occurring both onshore and offshore. For example, traveling from north to south, population, shipping traffic, nonpoint pollution sources, and on- and offshore oil and gas activities increase, while river runoff generally decreases. These factors result in a general increase in pollution from north to south in the coastal ocean.

Municipal and industrial wastewater discharges. Only two Publicly-Owned Treatment Works (POTWs), or sewage treatment plants, discharge directly into the Pacific Ocean in San Luis Obispo County (table 4.5-4). Three others discharge into local rivers which empty into the ocean. All the dischargers are small, according to EPA criteria (less than 25 million gallos per day (mgd)). There are six POTWs that discharge treated effluent to the Santa Barbara Channel (table 4.5-6). They are all small dischargers whose effluents are at a mixed primary/secondary level of treatment (SCCWRP, 1996). Only a few other point sources of pollution exist along the shorelines of the Channel, including several power plants spaced along the Santa Barbara, Ventura and northern Los Angeles County coastlines.

The 1975-1978 BLM-sponsored baseline studies in the Southern California Bight (SCB) indicated that most of the metal and hydrocarbon loads of the four basins examined (Santa Barbara Channel, San Pedro, Santa Monica, and San Nicolas) were derived from industrial and municipal wastes, entering the marine environment through direct discharge, indirect runoff and atmospheric transport, all centering around the Los Angeles metropolitan area (BLM, 1979).

There are no known analyses of trends for POTW-related discharges for the time period under consideration here (2002 to 2030). However, historical trends are that population, overall volumes of discharges, and mass emissions of measured pollutants have all increased. Nevertheless, the rate of increase of mass emission has been less than the other two parameters since treatment technology has improved and been upgraded throughout the study area and agency regulation has been intensified (SCCWRP, 1996; 1998).

River plumes. The Santa Maria River, on the border of Santa Barbara and San Luis Obispo Counties, and the Santa Ynez River, which flows into the ocean between Points Purisima and Arguello, are the major sources of pollution that could exist in the San Luis Obispo/northern Santa Barbara County area. Pollutants to the coastal ocean that could be associated with these rivers are predominantly agriculturally-based and may include dairy and ranching-related pollutants (for example, animal wastes) and pesticides. The two major rivers that empty into the Santa Barbara Channel, the Santa Clara and Ventura, both in Ventura County, drain a mix of agricultural and urban lands. The plumes for all these rivers, during these periods of high flow, can extend some distance from the shoreline and affect the offshore areas in terms of sediment and possibly some pollution (Hickey and Kaschel, unpubl; Mertes et al., 1998).

Climatological forecasters from the National Aeronautical and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA) have indicated that the Pacific Basin has entered a Pacific Decadal Oscillation (PDO). The PDO is a long-term ocean temperature fluctuation of the Pacific Ocean that waxes and wanes approximately every 10 to 20 years (see the websites: http://topex-www.jpl.nasa.gov/discover/PDO.html and http://psbsgi1.nesdis.noaa.gov:8080/PSB/EPS/SST/climo.html). As this applies to the rivers in the study area, NASA and NOAA scientists believe that there will be fewer really wet years, such as has often been present during the so called, "El Niño" years. The present cool or negative phase of the PDO looks a lot like, and tends to produce climate similar to, the La Niña of the past two winters and springs, to the extent that rainfall was as much as 20 to 40 percent below normal. While winter rains and the resultant high flows will still occur during this phase of the PDO, the scale of these flows will probably be less and occur less often during any single year.

The largest amount of sediment input into the offshore come from rivers. Consider that from 1986 to 1989, the three Point Arguello platforms, Hermosa, Hidalgo, and Harvest, released an estimated 5,120,000 kg (11,264,000 lb) of barite, with an annual average of 1,280,000 kg (2,816,000 lb) (Steinhauer, et al., 1991 – Chapter 2). At the same time, the rivers draining into the southern Santa Maria Basin (from north to south: Arroyo Grande Creek, the Santa Maria River, San Antonio Creek and the Santa Ynez River) were estimated to have added 650,000 kg/year (1,430,000 lb/year) to the Basin. Since drilling has subsequently ceased on the platforms but runoff has continued, since 1989 an additional 7,150,000 kg (15,730,000 lb) of barium has been added to the southern Santa Maria Basin from river runoff (because this region of California was experiencing a drought during the 1986 to 1989 drilling period, input of suspended material from rivers was probably less than both normal and El Niño conditions). Nevertheless, the rains that did occur caused near-bottom clouds of suspended sediments several orders of magnitude greater than measured background levels (SAIC and MEC, 1995).

Storm drains. Storm drain-associated pollution would be confined to the near-coastal vicinity since, even during high runoff periods, the volume would not be enough to carry pollutants very far offshore.

Natural oil and gas seeps. Natural seeps contribute significant amounts of hydrocarbons to the marine environment in the form of locally-elevated hydrocarbons in the water column and substantial slicks on the sea surface. Most known seeps occur on the mainland shelf, including at Point Conception, Coal Oil Point and Santa Barbara/Rincon in the Santa Barbara Channel, and in the Santa Monica Bay (Anderson et al., 1993). There may also be natural oil and gas seeps along the central California coast, but there is little information on these. Natural seeps, in general, would have little impact on water quality parameters.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): Potential sources of impact to water quality from the full development of the 36 undeveloped leases (a total of five platforms) are as follows:

- Cavern Point Unit exploration and subsequent development;
- Rocky Point Unit development;
- Gato Canyon Unit development;
- Bonito Unit development;
- Santa Maria Basin Unit development;
- Point Sal Unit development;
- Lease OCS-P 0409 development;
- Sword Unit development.

CONSTRUCTION AND INSTALLATION ACTIVITIES

Construction and installation activities include placement of the platforms which entails the use of a large derrick barge and the attendant anchors. Also, the laying pipelines, through the use of a pipelaying barge will also use many anchor placements and retrievals. The two potential impacting agents to water quality could result in the resuspension of sediments from anchor placement and the actual setting of the platform on the sea floor and the discharge of sewage from the vessels involved in the construction activities.

As noted in section 5.2.2.1, resuspension of sediments is a minor water quality issue since these sediments would resettle to the sea floor fairly quickly and be lost in the natural signal of the area. This includes the existing nephaloid layer and episodic pulses of sediments that could come through any of the development sites and arise from onshore river input to the offshore environment. Sewage from the vessels involved in the construction activities are required to be treated in a USCG-approved system. These treatment systems macerate and chlorinate the effluent prior to discharge so that fecal coliform and other harmful bacteria and viruses are killed. At the same time, the amount of chlorine added to the system is carefully controlled so as not to impact marine waters with a high load of chlorine. Some systems

include a dechlorinating step, especially for large vessels, so that a large amount of chlorine is removed from the effluent prior to discharge. Only a negligible impact to water quality would occur from any of the construction and installation activities.

DEVELOPMENT AND PRODUCTION ACTIVITIES

The projects discussed in this section include past, present, and foreseeable actions that may produce impacts during 2002-2030, the period during which development of the 36-undeveloped leases would likely occur. Most of the major impact agents are those discussed in sections 5.2.2.1 and 5.2.2.2. and summarized briefly below. Potential effects from oil spills from offshore oil and gas activities and tankering, were also addressed in section 5.2.2.2.

The following analysis is general, and specific units, or groups of units are noted only when appropriate. Nevertheless, unit-specific development scenarios in section 5.1.2.3 considers the information below and in table 6.2.2-2:

- The location of the platforms due to development of the 36 undeveloped leases;
- The number of well slots available on each platform;
- The number of wells anticipated to be used for development purposes;
- The estimated timeframe for installation and development drilling;
- The amount of drilling muds and cuttings estimated to be discharged during development; and
- The amount of produced water to be discharged during production.

Drilling Discharges. Table 5.1.2.2-1 shows the number of wells expected to be drilled from existing production platforms. Currently, it is estimated that 24 new wells will be drilled from existing OCS platforms in the Santa Barbara Channel and Santa Maria Basin. Production activities are expected to continue on all existing, active platforms until decommissioning (see section on Offshore Facilities Decommissioning, below). As discussed in section 5.2.2.1, potential impacts to water quality from the proposed delineation wells are expected to be low.

When development on the undeveloped leases is considered, a total of up to 181 wells may be drilled over a period of 13 years, discharging up to 2.5 million bbl of drilling muds and 609,000 bbl of cuttings. Figures 5.2.2.2-2 through 5.2.2.2-4, show that the areas of the water column affected by drilling discharges (specifically, the lightest particulate material), do not overlap in space with any other offshore oil and gas activity.

Additionally, figure 5.2.2.2-1 shows a typical river plume situation for flows during winter rains for any rivers from Point Mugu to the northern Santa Maria Basin. The river system with the most particulate discharge is the Ventura/Santa Clara river combination while the Santa Ynez and Santa Maria Rivers do not appear to contribute much sedimentation (Mertes, et al., 1998). Realizing that this is a "typical" snapshot, Hickey and Kaschel (unpublished) show figures during extreme El Niño-like events. These river plumes occur only during periods of very high flow and may cross the Santa Barbara Channel to the waters of the Sanctuary (for the Ventura/Santa Clara Rivers) and reach south, past Point Conception, for the Santa Ynez/Santa Maria River plumes. While these events are episodic (seasonal for those described by Mertes, et al. (1998) and every 5-7 years for the Hickey and Kaschel data), they would nonetheless overwhelm the effects of any particulate material discharged by drilling operations, wherever the two plumes might meet.

Volumes of produced water discharged in the course of developing the 36-undeveloped leases are expected to be equivalent to those estimated for existing OCS platforms (table 4.0.1-8). Of the five platforms presumed to be installed under the development scenarios for this analysis, three would have produced water discharges (Gato Canyon, Bonito and SMB B). As was described in section 5.2.2.2.1, studies of produced water effluents have suggested that water quality parameters can be altered to anywhere from 0 to 1,000 m (0 to 3,200 ft) from the discharge point. However, none of the studies provided any definitive evidence of impacts to either water quality parameters or biological systems. This, combined with the strict limitations and monitoring that will be conducted under the appropriate NPDES permit, will serve to minimize impacts to water quality. None of the other discharges emanating from the platforms would have any effect on water quality.

Offshore Facility Decommissioning. Table 6.1.2-1 presents estimated removal dates for existing oil and gas structures offshore southern California. It is expected that no OCS platforms in the Santa Barbara Channel or Santa Maria Basin will be removed before 2012, and a few may be in place as late as 2025 (or 2035, in the case of Platform Irene if the Tranquillon Ridge development occurs). As discussed in section 5.2.2.2.1, only suspension of sediments from the sea floor and sewage from the vessels in attendance could change water quality parameters. No impacts to water quality is expected from these activities.

Table 6.2.2-2. Key information necessary for the qualitative cumulative analysis including the 36 undeveloped leases (Most Likely Development Scenario).

Unit/Lease Water Depth (ft)	Well slots	Development Wells	Timing of Development Drilling (total years)	Muds and Cuttings Discharged (10^3 bbl)	Produced Water Discharged (10^6 bbl)*
Gato Canyon/0460 560	28	20	2008 – 2012 (5)	Muds – 193 Cuttings – 68	39
Bonito/0443 700	36	21	2009 – 2012 (4)	Muds – 342 Cuttings – 82	102
--/0409 450	60	45	2009 – 2017 (9)	Muds – 603 Cuttings – 145	115
Point Sal/0422 300	60	49	2009 – 2020 (12)	Muds – 650 Cuttings – 156	118
Santa Maria/0431 300	60	46	2008 – 2016 (9)	Muds – 658 Cuttings – 158	90
Totals	**244**	**181**	**--**	**Muds – 2,446 Cuttings – 609**	**464**

*Amount of produced water expected to be discharged for the life of the projects.

Discharges from these decommissioned platforms will also cease. According to table 6.1.2-1, all the existing platforms will be decommissioned by 2025. Meanwhile, three of the 5 platforms, that could result from development of the oil fields proposed to be delineated, may be installed between 2009 and 2010. Discharges from these new platforms will begin shortly after installation, gradually peaking some 10 to 15 years later. Therefore, by 2025, the approximately 33 million bbl per year that were discharged, as of 1999, would no longer be discharged. Since the existing platforms may be decommissioned in small groups, the 33 million bbl will gradually decline. It is estimated that about 70 percent of that volume will disappear by 2020 and the rest by 2025. The three new platforms are estimated to discharge about 3 million bbl per year at peak. Thus, by 2025, compared to today, there will be a net benefit to water quality due to the decommissioning of the existing OCS facilities, even though about 9 million bbl per year will still be discharged until the decommissioning of the new platforms around 2040 to 2050 (table 6.1.2-1).

NON-OCS POLLUTANT SOURCES

These include onshore river input, sewage treatment plants (POTW's), and oil spills from non-OCS tankering activities. As has been discussed in several sections previously, river input is episodic in nature, so that for one or two months during winter, most of the sediment is discharged from river outflow. If this occurs during an El Niño event, these pollutants could travel substantial distances into the offshore area. The usual seasonal sedimentary discharge from rivers provides much less of this type of discharge to the offshore area and less pollutants from the mostly agricultural watersheds (with some urban-associated pollutants, as well).

All the POTW's in the study area are small (< 25 million gallons per day), the largest being Oxnard. All are also subjected to inspections and monitoring by the local Regional Water Quality Control Boards (RWQCB's) according to the NPDES permit specific to the facility. Any impacts associated with these POTWs are limited, at a maximum, to a few hundred meters from the outfall.

The 22,800-bbl oil spill from a tanker would have similar impacts to water quality as those described in section 5.2.2.2.1.

There are no impacts to water quality that are unit-specific.

Summary and Conclusion (2002-2030): Overall, for the period 2002 to 2030, the installation of five platforms, the associated discharges, eventual decommissioning, the two land-based sources of pollution (rivers and POTW's), and oil spills will cause only a low impact to water quality for the following reasons:

- Installation procedures are limited to sewage discharges from the construction vessels and suspension of sediment from the sea floor. Neither of these will cause impacts to water quality.
- Drilling discharges (muds and cuttings) will either, in the case of cuttings, fall relatively quickly to the sea floor, or, for drilling muds, largely remain in the water column, in which case they will spread and disperse with the predominant currents.

- Produced water, starting early in the development phase, will be discharged for the life of the platforms. The rate of discharge of the effluent will gradually increase, reaching a peak discharge rate some 10 to 15 years after beginning. While there is some evidence that water quality parameters may be changed by this effluent, judging by results from biologically-based studies, there is no firm evidence that this effect is very wide-spread nor ecologically damaging. Further information is needed.
- Decommissioning of existing platforms will cause the cessation of existing discharges, as well. Thus, there will be a gradual net benefit to water quality (even though the overall impact is low), as existing platforms are removed.
- River-based inputs are very episodic, either seasonally or longer, and can bring some unknown amount of land-based (mainly agricultural with some urban) pollutants. While this potential pollutant input would over lap in time and space with any future development activity, their contribution to the pollutant loading of the study area would greatly exceed those of the discharges from this future activity.
- POTW-based pollution causes only a limited amount water quality impacts due to the relatively small volume of the discharges and the inspections and monitoring conducted by the RWQCB's.
- Oil spills are likely to occur over the next 28 years, according to historical statistics. Effects on water quality will vary with the size of the spill, the type of oil, the sea state and other factors. Spills will generally have a minimal impact on water quality over the long-term (MMS, 1996).

6.2.3 CUMULATIVE ROCKY AND SANDY BEACH HABITAT IMPACTS (2002-2030)

The cumulative section introduction describes the projects considered in the cumulative analysis. This section examines:

- the cumulative impacts to rocky and sandy beach habitats without the development of the 36 leases in the time period from 2002 to 2030;
- the additional cumulative impacts to rocky and sandy beach habitats from development of the 36 leases in the time period from 2002 to 2030.

Refer to Section 5.2.3 for a discussion of effects for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in Section 5.2.3.

Cumulative Impacts Without Development of the 36 Undeveloped Leases (2002-2030): There are several sources of natural and anthropogenic impacts to sandy and rocky intertidal beaches that have occurred in the past and would be expected in the future. These include natural diseases, natural weather events, natural oil seeps, public use, pollution events, and construction activities.

Disease. The most obvious example of a significant impact from natural diseases affecting beaches is the affect the withering foot disease has had on black abalone in the Southern California Bight. This fatal bacterial disease is encouraged to spread during warmer water trends. It was first noted on the Channel Islands in 1985, and documented on the mainland at the Diablo Canyon nuclear power plant near the cooling water discharges, and at Point Conception during the 1992 El Nino. Mortality from this disease has resulted in staggering declines in abalone abundance along the mainland and islands. Black abalone along the mainland and island has been reduced at least 90% from population estimates prior to the disease, a high impact. A similar type of wasting disease, which proliferates during warm water conditions, has also affected sea stars and other echinoderms, though exact estimates of the numbers lost to this disease are not known.

El Nino/Extreme Storm Events. Extreme storm events such as those that occur during El Nino years significantly affect beaches, especially high-energy beaches such as on the southern side of the Channel Islands and on the shoreline north of Point Conception. The types of impact caused by extreme storm events was documented at Ocea Beach during the BLM Baseline Study (Littler, 1979).

On sandy beaches, wave action completely removes the sand on one beach and deposits unusually large amounts of sand on another. Storm events can significantly alter the substrate at the beach, changing a sandy beach, for example, to a largely cobble beach, causing moderate impacts). This occurred at the Ventura beaches in 1997, and they are only just now being replenished by sand (pers. comm., L.Roberts, 2001). Storms also bring an influx of large masses of debris (trees, large plants, rocks and man-made items such as dishwashers, tires, and sofas) down the river depositing them on the beaches near the river mouth. The debris deposited on beaches following large storm events has been known to preclude nesting shorebirds such as the least tern (pers. comm., L. Roberts, 2001). Rack (stranded seaweed) found on sandy beaches is often removed in storm events, im-

pacting shorebirds and endangered birds such as the snowy plover whose diet depends heavily on the rack for sources of beetles and insects, a moderate impact.

Impacts to rocky beaches in Southern and Central California have been documented through the ongoing rocky intertidal monitoring program. The heavy pounding surf in the 1997 El Nino broke off large chunks of rock and pounded the shoreline with entrained logs and debris (Raimondi et al., 1999). Statistically significant changes in species abundance and composition were documented in one or more key species key species at 10 of 11 sites, a moderate impact. Species that had significant declines included mussels, barnacles, and a turf algae, *Endocladia,* (Raimondi et al., 1999). While significant changes to abalone habitat were observed due to the strong storm activity, a full analysis could not be done to determine significance due to the black abalone declining trends from withering foot syndrome. (Raimondi et al., 1999). Even in the relatively calmer Channel, the 1997 El Nino storm's heavy wave action buried the rocky shoreline at Alegria under several feet of cobble (personal observation).

Natural Oil Seeps. Over 100 bbl of oil seep naturally every day from shallow oil deposits in the Santa Barbara Channel. This natural occurrence has been documented by several researchers, and has been known to exist along the mainland for hundreds of years dating back to the periods when native Americans inhabited the region (Galloway, 2001). Some of the largest recorded seeps occur at Coal Oil Point; over 2,000 seeps have been recorded in State waters in the Channel alone. The U.S. Geological Survey and MMS are jointly pursuing a study that would document the location and volume of natural seeps in the Santa Maria Basin. Because seep oil looses some of its properties as it migrates to the surface, tarballs from natural oil seeps can be fingerprinted and differentiated from natural oil produced by existing oil and gas facilities. Tarballs found in the Jalama Beach area, for example, have been directly linked with natural seep oil from Coal Oil Point seeps through fingerprinting techniques (pers. comm., K. Kvenvolden, 2001).

In depositional areas and areas close to origin of seeps, the oil deposited on the shoreline can be thick. This is true of rocky intertidal habitat at Government Point which lies inshore of several identified active seeps. In other areas, such as at the rocky intertidal beach at Boathouse on VAFB or at Jalama State Beach, tarballs are most evident in rocky habitat in the barnacle zone or, in sandy habitat, along high tide bands parallel to the shoreline (Engle, 1994). Tarballs which land in the barnacle zone are persistent for many seasons (Raimondi, 1999). Barnacles covered by natural tar die; however, barnacles will recruit and establish new populations on top of residual tar (Raimondi, 2000). Impacts from natural oil seeps are patchy and chronic and represent low impacts.

Public Use. The public heavily visits rocky and sandy beaches in Southern California and, to a lesser extent, visits accessible locations in central and northern California. Most elementary schools, high schools and colleges have programs that include fieldtrips to the beach, particularly the tidepools. Significant impacts from public use have been documented in several locations in Southern California where visitor use is high (Anderson et al., 1993;Engle and Davis, 2000b; Richards, 1998). Potential impacts from public use include: trampling, especially detrimental to fragile algal communities, overturned rocks, displaced marine life, collecting of mussels and other invertebrates for fish bait; collecting of limpets, mussels, seaweeds and snails for consumption, and depositing potentially toxic trash. Because of the high visitor use and extreme pressure on the beaches from populated Southern California, these individual public impacts are cumulatively significant and range from moderate to high impacts. Due to the concern, several programs have been piloted in high use areas to control public use. It appears these programs to control public use and collecting may be successful where they are strictly enforced; however, cumulative impacts from other sources are still impacting resources (Engle and Davis, 2000b).

Construction Activities. Onshore construction of homes, hotels, commercial businesses, roads in the populated Southern California area has impacted sandy and rocky intertidal beaches directly through the construction of water, sewage, cable and oil pipelines, walkways, piers, jettys, and parking lots on and near the beach. These activities significantly modify or eliminate habitat in localized areas, a moderate impact. Indirect impacts include increased public use and increased pollution events (see discussion below) creating moderate to high impacts.

Pollution Events. Anthropogenic sources of pollution include sewage leaks, surface runoff, leaky tank farms, warm water discharges from nuclear energy facilities, and onshore and offshore oil spills from existing Federal and State facilities.

Sewage, surface runoff, and thermal discharges. Sewage leaks are reported often throughout Southern California, especially during heavy rains due to overflow. Small overflow problems would cause temporary beach closure due to public health risks but would only be expected to affect biota on the beach at a low level. Large leaks and smaller, chronic leaks, however, could cause impacts to beach biota due to the increased nutrient load and decreased oxygen. Impacts from sewage outfalls include reduced species diversity and complexity, increased cover of opportunistic algae and diatoms, and increased silt in turf habitats (Engle and Davis, 2000a). Significant changes in species composition over localized areas could occur, particularly in closed systems, due to a species

shift toward organisms tolerant of anoxic conditions, resulting in moderate impacts. Chronic incidents such as the leaking oil tanks at Avila Beach, the seeping diluent at the onshore Guadalupe oil fields and the ongoing chronic sewage problems at Malibu and Huntington Beach have caused moderate to high impacts to beach habitat. Thermal discharges have been shown to cause low to moderate impacts by altering rocky intertidal community structure in the area near the origin of the outfall (Murray and Littler, 1986).

Marine Tanker Spills. Tanker spills, particularly from foreign flag vessels transiting to port in San Francisco or Los Angeles, continue to be the most likely source of a spill and the largest potential source of an oil spill offshore California. No OCS oil is being tankered; the oil tankered offshore California is from foreign sources and Alaska. Based on historic data, it is estimated that there is a 76% chance of one or more spills greater than 1,000 bbl from a tanker. The mean (average) spill size from a tanker is calculated as 22,800 bbl for the period between 1985-1999, based on the U.S. Coast Guard data base for accidents in U.S. waters. The median spill size is 5,600 bbl (See the Oil Spill Risk Section). Glenn Ford's coastline model predicts that between 9 and 161 km of coastline could be contacted if a 22,800-bbl oil spill occurs. The mean length of coastline contacted for that size spill is 38 km.

If a 22,800-bbl spill occurred, it is expected that a substantial portion of shoreline (tens of kilometers in the area closest to the origin of the spill) would be heavily oiled, causing significant impacts to biota over a wide area, a high impact. Beaches closest to the origin of the spill and depositional beaches along the mainland and islands would be the most likely impacted, including areas with protected regions such as the Channel Islands Marine Sanctuary. These depositional beaches occur in the lee of each point along the central California coast and along the calm, sandy beaches found on the Channel side of the offshore islands. On high-energy sandy beaches, oil may be buried fast, making cleanup difficult. High-energy sandy beaches are a high priority for oil spill response for this reason. The deposition process buries pockets of oil, which continue to release toxic compounds into the habitat long after the spill is invisible on the surface. For this size spill, it is assumed that a substantial area of shoreline would be heavily oiled and, therefore, overall impacts to sandy beaches from the oil would be high.

In areas where the oil is heavy and coats rocky intertidal habitat, strands in tidepools, or strands in wide bands in the high intertidal, impacts would be high. The primary concern would be direct contact with long-lived animals such as seastars, limpets, abalone, and important communities such as algal assemblages and mussel beds. Impacts on these animals and communities from oil could result in mortality and/or sublethal changes affecting reproduction, recruitment or settling. For a 22,800-bbl spill, it is assumed that a substantial amount of the shoreline would sustain heavy oiling and, therefore, overall impacts to rocky intertidal resources from the oil would be high.

Significant impacts would be expected also during cleanup activities due to the movement of heavy equipment across the sand, through sensitive dune habitat, and trampling in rocky intertidal areas. If hot water wash is again attempted to clean rocky intertidal habitat as was done in cleanup of the Valdez oil spill, high impacts would be expected to rocky intertidal resources from the cleanup alone. Hot water washing has been proven in numerous studies to render rocky habitat sterile, resulting in irreversible impacts (Lees et al., 1999). Rocky intertidal areas are generally better off not cleaned or only gently cleaned. Trampling activities caused by workers in the intertidal causes significant impacts (Lees et al, 1999). Impacts from the cleanup activity could be lessened if activities are limited to a few people using absorbent pads and picking up tar patties, and all types of pressure washing are avoided. Heavily oiled rocky habitat will be severely impacted by the oil, but without the added significant physical cleanup impacts, the habitat will recover (Lees et al, 1999).

Marine tanker spills are the most likely source of impact to shorelines along the California coastline. Ports such as the San Francisco Bay and Los Angeles Harbor are especially vulnerable due to number of vessels and offloading activities. The majority of American flag tankers voluntarily transit outside the Channel Islands enroute to port, reducing their potential to impact shoreline resources in the Santa Barbara Channel. However, since foreign flag tankers transit through the Santa Barbara Channel in vessel traffic lanes which go within one nautical mile of Anacapa Island, they pose the most serious risk to the protected resources on the islands. In general, shorelines within the Channel Islands National Park and Sanctuary and along the mainland in the Channel are more vulnerable to a vessel spill because of their proximity to vessel traffic lanes.

Oil Spill from Existing Oil and Gas Facilities. Oil spills may also occur from existing platforms in Federal and State waters. Section 5.0 discusses the cumulative oil spill risk for the project area. The size of spill possible from individual facilities is substantially smaller than from a tanker due to volume present, platform technology and oil gravity. The level of impacts from a given spill will depend on many factors, including the type, rate and volume of oil spilled, distance spill originates from shore, weather and oceanographic conditions at the time of the spill, etc. These parameters will determine the quantity of oil that is dispersed into the water column, the degree of weathering, evaporation and dispersion of the oil that

takes place before it contacts the shoreline and the actual amount, concentration and composition of the oil that contacts the shoreline.

During the period between 1970 and 2000, 881 OCS-related oil spills have occurred, totaling 780 bbls. Existing Federal and State facilities have a 97% and 25% chance, respectively, of a spill between 50 and 999 bbl, with a most likely spill size of 200 bbl. (See Oil Spill Risk Section). For a small spill 200 bbl or less, one may expect that the amount of shoreline contacted would range from 1 to 19 km, with a mean of 4 km (See Table 5.1.3.1-3). Existing Federal and State facilities have a 59% and 8% chance, respectively, of a spill over 1,000, with a most likely spill size of 2,000 bbl.

The only Pacific OCS spill outside the 1969 blowout to reach shoreline, the Platform Irene pipeline spill, serves as an example of the types of impacts that might occur from a 200-bbl spill. In the case of the September 1997 Platform Irene pipeline accident, 167 bbl. of oil were spilled approximately 3 miles offshore Surf Beach, 10-15 miles north of the Point Arguello platforms. In general, very little oil was observed along the rocky shoreline as a result of the spill. The primary oiling occurred at the sandy beaches near the location of the pipeline at Surf Beach. Impacts occurred due to oiling of the sand and cleanup activities near Surf Beach in heavily and moderately oiled beaches. Oil was observed at one rocky site near Point Arguello in the lower to middle intertidal. Sticky globs of tar were seen on black abalone and seastars (Raimondi, 1998). Statistical results based on the prespill data from the long term monitoring program found that the spill had little or no affect, however, on the monitored rocky intertidal sites within 3-15 miles of the spill (Raimondi, 1998).

In a 200-bbl spill, the beach initially hit, and closest to the origin of the spill, would be the most heavily impacted, and would be more likely to be affected by fresh oil. Other parts of the shoreline are more likely to be contacted by weathered oil and tarballs. A spill 200 bbl or less would be expected to contribute low to moderate impacts depending on the amount of shoreline heavily contacted. A majority of the shoreline within the total area contacted by oil would be expected to contain a patchy distribution of oil from plate sized tar patties to a light sheen, distributed primarily along bands parallel to the shoreline. Cleanup activities on sandy beaches may cause impacts equal to the oil spill itself. Movement of heavy equipment across the sand, for example, impacts beaches by crushing organisms found in the sand. Longer-lived animals such as the Pismo clam will sustain the longest impact from equipment. Sand crabs, which make up the majority of the biomass on the sandy beach, will take up oil into their tissues in areas of heaviest oiling (pers. comm., Dugan, 2001). Uptake into the food chain of contaminated crabs by shorebirds could also occur, causing longer reaching impacts. Once the oiled sand is removed, however, the sand crabs would be expected to return to prespill abundance and toxicity levels within a few months, by repopulating from cleaner areas. Oil that is buried in sand layers and not removed can continue to cause toxicity affects to buried animals long after the spill occurs. Sandy beach recovery for light to moderately oiled areas can be as short as weeks, if natural wave action assists in sand removal, or, for moderately to heavily oiled areas, as long as two to seven years if the oil is buried quickly or if cleanup operations significantly injure long-lived buried animals.

Rocky intertidal beaches are somewhat less likely to be impacted by oil spills, particularly smaller spills, due to natural wave action which keeps oil away from cliffs and rocky benches (U.S. Coast Guard, 2000). Once impacted, however, primary impacts include smothering, uptake in tissues, and contamination of other animals using rocky habitat such as seabirds and marine mammals. Oil tends to strand high in the intertidal in the barnacle zone. Tarballs in this zone are persistent, lasting several seasons (Raimondi et al., 1999). Oil can also persist in individual tidepools. Seaweeds such as kelp secrete an oily substance that helps prevent oil from adhering to their fronds. However, most algae in the higher intertidal, and algae such as surf grass in the low intertidal, would be susceptible to oiling and would sustain long-term impacts if covered by oil (Foster et al, 1971). The coastline in the Santa Barbara Channel and Santa Maria Basin is regularly exposed to large volumes of natural oil seepage; individual seeps at Coal Oil Point release over 100 bbl per day. Because of this background exposure to low levels of oil, the patchy occurrence of tarballs from a small accidental spill is unlikely to cause any measurable impact. Recovery of the black abalone could exceed seven to ten years if a significant portion of the local population was directly contacted and heavily oiled. Overall impacts from a spill 200 bbl or less would be expected to be low on rocky intertidal resources due to the amount of shoreline expected to be heavily impacted. Impacts could be moderate if the black abalone population is heavily contacted by oil at more than one location.

A 2,000-bbl spill is predicted to contact between 3 and 53 km of coastline, with a mean value of 12 km. As previously discussed, the shoreline closest to the spill origin would be expected to be the most heavily impacted. For the purposes of this analysis, it is assumed that 3-12 km of coastline would be moderately to heavily oiled, and another 10 to 40 km would be lightly or very lightly oiled in the patchy pattern typical of offshore spills. Based on this, it is expected that significant impacts could occur at several sandy beaches and several rocky intertidal beaches, result-

ing in moderate impacts. If a significant portion of the abalone habitat were heavily oiled, impacts would be high for that population.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): Refer to the cumulative introduction section for a description of the projects being evaluated as part of the 36 Undeveloped Leases.

Pipeline Construction Activities. Rocky and sandy beach resources can be affected through the construction of onshore pipelines, and by oil spill impacts from existing and future platforms. Pipelines are required by the State Lands Commission to be buried through the surf zone. Depending on the rocky or sandy resources at the landfall, pipelines will be trenched and buried, laid on the surface, or drilled through the surf zone at depth. The California Coastal Commission required Chevron to construct the Point Arguello pipelines using a "drilled" crossing. This approach minimized impacts to sandy beach resources since no trenching was required, but caused erosion impacts elsewhere on the route. (pers. comm., John Storrer, 2001). The Santa Ynez pipelines were trenched through sandy onshore beaches. Given likely landfall locations identified in the hypothetical development scenario, it is likely that pipelines would be trenched through sandy beach landfalls and unlikely that rocky beach resources would be impacted through pipelaying activities.

Impacts to sandy beach resources such as crabs, clams and other buried animals from construction of onshore pipelines occur through the physical displacement by trench digging, and crushing or injuring them through the use of heavy equipment. Disturbance from heavy equipment is localized and expected over a maximum 100-foot wide corridor, a low impact. Animals such as sand crabs would be temporarily displaced, with repopulation of the area occurring within a few weeks to a few months, a low impact. Longer lived animals such as Pismo clams, if they were present and were injured or displaced through trenching, could be expected to require a few years to recover, particularly to the age class prior to the disturbance. However, the impact to Pismo clams is expected to be low given that the number of Pismo clams that could be impacted would be small and would not be expected to cause a measurable change in species abundance or composition. Plant resource impacts would be felt if the pipeline construction occurred in a dune habitat. These would be localized but could be significant if the habitat is altered, a moderate impact. Previous pipeline construction projects have mitigated impacts to fragile dune habitat through several measures including narrowing the construction corridor to less than 50 feet in these areas (ADL, 1985). Mitigation rerouting pipelaying to avoid dune habitat could reduce the impact to low.

Oil Spill Impacts. As discussed in the Oil Spill Risk Section, the cumulative oil spill risk for the area of the 36 undeveloped leases results from several sources including: ongoing and projected oil and gas production from existing OCS facilities in the Santa Barbara Channel and Santa Maria Basin, several potential development projects (Rocky Point, Cavern Point, Tranquillion Ridge, ongoing production from one facility in State waters in the Santa Barbara Channel, two likely oil and gas projects in State waters, and the tankering of Alaskan and foreign-import oil through area waters.

If you assume that a spill occurs from OCS oil and gas activities, the most likely case is that one or more spills in the 50-1,000 bbl range would occur from offshore oil and gas activities over the life of the hypothetical platforms (2002- 2030). It is assumed, based on historical data, that such a spill would be 200 bbl or less in volume. The probability of one or more spills 200 bbl or less in size occurring from existing and proposed offshore oil and gas activities is 73.9 percent. The maximally reasonably foreseeable oil spill volume from future offshore oil and gas activities is 2,000 bbl, assumed for purposes of analysis, to be a pipeline spill. The probability that one or more spills in the 2,000-bbl range will occur from these activities if all 36 leases are developed is 59.1 percent.

Impacts from a 200-bbl spill and a 2,000-bbl spill are discussed in "Oil Spill from Existing Oil and Gas Facilities" above. Assuming that the spill occurs from a pipeline or facility near shore, it is anticipated that the shoreline adjacent to the spill origin would be heavily or moderately oiled and that other rocky and sandy beaches would patchily receive light sheen, and or tarballs. Impacts from a 200-bbl spill would be expected to be low, except if abalone habitat were heavily oiled which would be moderate. Impacts from a 2,000-bbl spill would be expected to heavily to moderately oil several rocky and sandy beaches, causing moderate impacts. There is a higher likelihood that oil from a 2,000-bbl spill could contact enough abalone habitat to affect the population, a high impact.

Summary and Conclusion (2002-2030): Sandy and rocky beaches are impacted in Central and Southern California by many natural and anthropogenic sources. Natural disease can significantly impact certain populations such as the black abalone, causing high impacts due to mortality. Natural events such as the extreme storm conditions and warm water trends associated with El Nino events cause significant localized changes both to the habitat and the species found on rocky and sandy beaches, a moderate impact. Natural oil seeps contribute over a hundred barrels of oil to marine waters each day, resulting in patchy, chronic impacts causing low impacts to biota on sandy and rocky beaches. Beaches in Southern California are especially impacted due to the popu-

lation pressure and high public use. Because of the high public pressure, impacts in Southern California range from moderate to high. Low to moderate impacts are found north of Point Conception and on the Channel Islands due to inaccessibility. Anthropogenic sources of pollution such as surface runoff, leaky oil tanks onshore, and chronic sewage problems have and continue to cause significant impacts ranging from moderate to high. Existing oil and gas facilities pose a potential risk of an oil spill which could cause impacts ranging from low to moderate, unless black abalone habitat is directly contacted resulting in moderate to high potential impacts, depending on the size of the spill. The most serious oil spill risk to shoreline resources is from tankering activities offshore California, estimated to produce high impacts on rocky and sandy beaches.

The proposal to drill five delineation wells does not contribute measurable changes in cumulative impacts to sandy or rocky beach resources. The potential development that could occur if the proposed delineation wells are successful could lead to up to an additional five platforms offshore Santa Barbara County. Pipeline construction activities for the addition of two pipeline corridors through the shore to onshore facilities could impact beach resources during trenching activities which could produce low impacts in sandy areas, or moderate impacts if dune habitat is altered. The potential risk of an oil spill from OCS activities is increased with addition of potential production from the 36 undeveloped leases. Oil spill impacts could be high if the black abalone habitat is heavily oiled in several locations.

6.2.4 CUMULATIVE SEAFLOOR RESOURCES IMPACTS (2002-2030)

This section examines

- the cumulative impacts to seafloor biological resources without the development of the 36
- the additional cumulative impacts to seafloor biological resources from development of the 36 leases in the period 2002 to 2030.

Refer to section 5.2.4 for a discussion of effects from the proposed action for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in section 5.2.4.

Cumulative Impacts Without Development of the 36 Undeveloped Leases (2002-2030): The sources of cumulative impacts during this time period include bottom trawling activities, existing oil and gas activities and fiber optic cable installation activities, and the natural and anthropogenic sources of turbidity. The impacts for this time frame out to 2030 would be essentially the same as those discussed in section 5.2.4 for cumulative impacts occurring between 2002 and 2006. Please refer to this section for additional information.

Overall impacts to seafloor resources are high for hard bottom habitat and low for soft bottom habitat. Moderate to high impacts were identified to hard bottom from ongoing bottom trawl fishing. Due to the rarity of the habitat, the fragility of the resources and the long-term recolonization process, it is expected that ongoing cumulative fishing activiites cause locally significant impacts on individual reefs and to slow growing species such as vase sponges (moderate) and may cause impacts felt at the population level (high). Low impacts to soft bottom habitat were identified due to the ability of the resources to quickly recolonize following disturbances.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): The reasonably foreseeable projects and the hypothetical projects anticipated from the 36 undeveloped leases are detailed in the Cumulative Impact Section. Refer to figures 6.1.3-1,2 and 3 for locations of hypothetical platforms analyzed in this scenario.

The oil and gas activity with the highest potential to impact seafloor resources is pipeline construction during development activities due to the high number of anchoring events. In the proposed hypothetical development scenario, offshore pipelines are proposed to connect the Bonito platform to Platform Irene, to connect the SMB platforms to the most northern SMB platform, and to bring combined production to shore at Casmalia. New pipelines are also proposed connecting the Gato platform to onshore facilities at Los Flores, coming ashore in the same pipeline corridor as for the SYU pipelines. In this scenario, it is assumed that a lay barge would be used to place the pipelines, making one pass per line. Specific impacts from anchors are discussed in detail in section 5.2.4.1.

Assuming platform locations are 1,000 m (3280 feet) from identified hard bottom habitat, drilling discharges would be low. If new platforms were located within 325 m (1,000 feet) of this habitat, impacts from smothering would be likely, causing moderate impacts. If facilities were located between 325 m (1,000 feet) and 1,000 m (3280 feet) from hard bottom, the severity of the impact would depend on the water depth, current direction and other factors (low to moderate). Refer to section 5.2.4.1 for a detailed discussion of impacts from discharges.

Abandonment of platforms have the potential to create similar impacts to those contemplated during installation of the platforms, a moderate impact (anchoring impacts, turbidity increases). Additionally, the loss of the habitat provided by the platform itself will adversely affect the environment. While is it obvious that the platforms provide a hard substrate that is utilized by many plants, animals and fish; it is

not yet understood what the overall contribution the platforms make to the ecosystem in the Channel. This problem is complicated by the fact that the platforms are manmade structures that do not exactly mimic natural rocky reefs. Several MMS-funded studies are looking at different aspects of this problem so that MMS can make a scientific evaluation of their actual contribution to the local ecosystem and what loss of one or more would represent. One study by Continental Shelf Associates will attempt to compare natural reef habitats with adjacent platform habitat. Another study being conducted by the University of California at Santa Barbara is examining the competition and other biological forces that determine zonation patterns seen on platforms. Several studies conducted by USGS and the University of California are addressing fish resources associated with the platforms.

Point Sal and Purisima Unit: Approximately 3,000 anchoring events occurred when the oil, gas and water lines were constructed for the Point Arguello platforms. Of these, roughly two-thirds of the anchoring events occurred in laying the ten-mile lines to shore, which would be comparable to laying three of the four consolidated lines being laid the ten miles to shore from proposed SMB platform B. The other interplatform pipelines are speculated to be almost as long, measuring seven to eight miles each. Based on the estimate from the Point Arguello construction, it is estimated that 7-8,000 anchoring events will be required for all pipeline construction activities in these two units. Due to the lack of rocky features in the Point Sal and Purisima Units, it is reasonable to assume that anchoring on rocky features would be able to avoid impacting hard substrate habitat. However, if pipeline routes were to travel near hard bottom features, impacts could be moderate from anchoring activities given the sheer number of events that could occur on one feature. Abandonment of the platforms could also cause moderate impacts, both from anchoring impacts and also due to the loss of habitat. Impacts from anchoring on the soft bottom habitat would cause localized turbidity near the bottom that would disperse rapidly in the currents and have no significant impacts on benthic organisms (URS, 1986).

Bonito Unit: Anchoring activity for up to 1,000 anchors for interplatform pipelines and installation of a platform could cause moderate impacts if anchors impact identified hard bottom habitat in the canyons due to the high number of anchoring events which could impact hard substrate habitat. Abandonment of the platforms could also cause moderate impacts due to anchoring events and loss of habitat from the platform structure itself.

Gato Canyon Unit: Anchoring activity, several hundred events, could cause moderate impacts due to the high number of anchoring events which could impact hard substrate habitat. Abandonment of the platforms could also cause moderate impacts due to anchoring events and loss of habitat from the platform structure itself.

Impacts from abandonment could be moderate due to the potential to impact hard bottom features on the north part of the lease.

Other OCS activity from other Undeveloped Leases. Reasonably foreseeable activities on the other undeveloped leases include drilling exploratory or development wells from existing platforms into Rocky Point Unit, Cavern Point Unit, and possibly State leases. These activities would add drilling muds and cuttings to the environment, which except for the drilling from Point Arguello platforms into Rocky Point Unit, would not be near hard bottom features. Discharges from Point Arguello platforms were monitored over a ten-year; based on that study, the additional drilling discharges are expected to cause low impacts. The only other reasonably foreseeable activity that could impact seafloor resources is the abandonment of an old well in the Sword Unit. As proposed, anchoring avoids potential hard bottom substrate and anticipated impacts to seafloor resources are low. The potential for accidental oil spills is not discussed because it would not be expected to impact seafloor resources.

Summary and Conclusion (2002-2030): Seafloor resources are impacted by several cumulative sources. Bottom trawling by commercial fishermen has the highest potential to directly impact hard bottom habitat by removing marine plants, corals, and sessile organisms, upending rocks, leveling rock formations and resuspending sediments These impacts are moderate to high. Trawling activities also impact soft bottom habitat by altering the habitat temporarily and increasing turbidity, a low impact. Fiber optic cable installations cross canyons and other hard bottom features and will be buried in soft bottom habitat, a low impact. Natural turbidity flows, which are especially pronounced during extreme flooding events, produce large volumes of sedimentation and turbidity over a large area. These flows can contribute low to moderate impacts on seafloor resources.

The proposal to drill five delineation wells impacts seafloor resources through limited anchoring activities and limited discharges. As proposed, a few wellsites are located near canyons or other hard bottom areas and impacts such as physical disturbance, increased turbidity and smothering could result in moderate impacts. The hypothetical development activities and reasonably foreseeable activities from the 36 undeveloped leases could contribute impacts to seafloor resources through anchoring, discharges during installation and drilling, and removal of habitat during abandonment. Impacts range from low to moderate, depending on whether hard bottom habitat is affected.

Based on studies of anchoring during development activities, properly mitigated anchoring activity offshore during construction should not produce significant impacts on the offshore biota (Hardin et al., 1993). These impacts can be reduced if platforms and pipelines avoid hard bottom and if anchoring activities during installation include vertical handling procedures, anchor handling boats, shut down plans during inclement weather, precautions against dragging individual anchors and post-installation monitoring.

6.2.5 CUMULATIVE KELP BED IMPACTS (2002-2030)

This section examines

- the cumulative impacts to kelp beds without the development of the 36 leases in the period 2002 to 2030;
- the additional cumulative impacts to kelp beds from development of the 36 leases in the period 2002 to 2030.

Refer to section 5.2.5 for a discussion of effects from the proposed action for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in section 5.2.5.

Cumulative Impacts Without Development of the 36 Undeveloped Leases (2002-2030):

The cumulative introduction section describes the projects considered in the cumulative analysis. Cumulative impacts to kelp resources include natural storm events, El Nino events with the increased water temperature, urchin predation and commercial fishing activities, point source discharges, kelp harvesting, boat traffic and nearshore construction activities.

Natural Storms. Seasonal storm events, and especially extreme storm events, can significantly reduce kelp beds by ripping up fronds in the nearshore area, a moderate impact. Storms also introduce large amounts of sedimentation, which impact kelp bed resources by reducing productivity, a low impact.

El Nino. Weather conditions brought about during El Nino significantly impact kelp resources. The increased ocean water temperatures, extreme storm events, and heavy sedimentation of nearshore waters associated periodic El Nino events provide the largest source of impact to nearshore kelp beds. The most significant of these is the increased water temperature. Kelp prefers cool water and significant diebacks occur during warm water trends which last several years, a high impact since it is felt regionally at the population level. Sedimentation associated with the most recent El Nino produced turbid waters over a mile offshore in the Channel, throughout the kelp zone, and lasted several weeks. This turbidity directly impacts the productivity of the kelp and impacts kelp associated animals, a low to moderate impact depending on the duration of the turbidity.

Urchin Predation/Commercial Fishing. Natural factors such as predation by urchins, when combined with other sources of impact, namely, commercial fishing, have a significant impact on the size and health of kelp be. This is a high impact that is felt at the population level. In a healthy kelp bed, urchins play an important role and do not deplete the kelp resource. However, in areas where commercial fishing occurs, natural urchin predators are eliminated, and the natural balance between red and purple urchins is broken, an ecological imbalance occurs. “Urchin barrens” are created, that is, areas heavily populated by urchins and devoid of kelp and other algae.

The size of the kelp beds is highly variable and dependent on environmental and anthropogenic factors. As mentioned before, kelp is very sensitive to changes in water temperature, dying back substantially during El Nino warm water events and reestablishing during cooler water periods. During warm water years, both kelp and urchins die off, but the urchins fare better than the kelp. Urchins will forage large areas, move into the intertidal, and will forage a wide range of species if kelp is not available. Because urchins can survive the warm water periods, when the cooler water returns in urchin barrens, kelp cannot reestablish, even though water temperature is optimal for kelp. In areas actively monitored by the National Park Service, areas off Santa Barbara Island, the south side of Santa Cruz Island and non-reserve parts of Anacapa Island continue to be urchin barrens and have not come back despite a recent influx of cool water. In the National Park Service’s monitoring in 1999, they found 11of 16 kelp monitoring sites were dominated by echinoderms. The purple urchin was dominant at all but two sites; sea cucumbers and the brittle star were also dominant at two sites occupied by purple urchins (Kelp Forest Inquirer, 2000).

This is evidenced by the monitoring of kelp beds within and outside no-take reserves at Anacapa Island and that fact that the beds within the reserve retain healthy kelp communities (pers. comm., D. Lerma, 2001, J. Engle, 2001).

Dredging and Point Source Discharges. A number of factors were considered in a symposium to study the effect of waste disposal on kelp (Bascom, 1983). While it was recognized that there was a general lack of data concerning the complexity of natural and manmade factors that affect kelp (Jackson, 1983), it was speculated that losses of kelp canopy can result from increases in suspended sediment and associated reductions in water clarity resulting from point source discharges (Dean and Deysher, 1983). Thermal dis-

charges are believed responsible for the reduction of kelp beds near San Onofre in near shore waters (Dean and Deysher, 1983). Further it was speculated that sewage outfalls might provide a food source for sea urchins in kelp forests, allowing their persistence long after the kelp was gone and preventing natural reestablishment (North, 1983). This would serve to promote and exacerbate the formation of urchin barrens discussed earlier.

Kelp Harvesting. Kelco regularly harvests the top few feet of kelp for use in a variety of commercial products including ice cream and shampoo. This harvesting is permitted by the California Department of Fish and Game. This practice has occurred in the Channel for over twenty years. There are no known serious impacts to kelp or the kelp community from the harvesting practices. Kelco has voluntarily cut back production during El Nino diebacks (pers. comm. J. Engle). Impacts from continued harvesting is expected to be low.

Boat Traffic. Boat traffic through kelp beds impacts the kelp community through the breakage of kelp fronds, introduction of pollutants such as diesel, noise that scatters associated fish, and potential injury to visiting sea otters. Impacts range from low to moderate, depending on the number of boating activities in or adjacent to defined kelp beds. This impact is especially pronounced near piers and harbors where boat traffic is heaviest.

Nearshore Construction Activities. Nearshore construction activities such as construction of pipelines, sewage outfall lines, or thermal discharge pipes impact kelp beds by displacing kelp plants, increasing local turbidity, temporarily displacing resident animals and altering the habitat over a localized area. These are generally localized, low impacts, lasting a few weeks to a few months. Reestablishment of kelp may take longer if the impact occurs during a period of dieback from warm oceanic waters.

INCREMENTAL IMPACTS OF THE 36 UNDEVELOPED LEASES (2002-2030).

Potential sources of impact from the 36 undeveloped leases include pipeline construction in the nearshore area, boat traffic and oil spills.

Installation of the central pipeline through the surf zone in the Santa Maria Basin to support Purisma Point Unit and Point Sal Unit production would be expected to cause low impacts to nearshore resources as no kelp beds along that part of the coastline.

The nearshore crossing for the Gato Canyon pipelines would be expected to cause impacts similar or less than the construction of the Santa Ynez pipelines through this same crossing. Kelp and other macroalgae characterize the nearshore biota along the pipeline corridor. Surficial kelp is founded on both rocky and sedimentary bottom in water depths from –20 to –30 feet (Exxon, 1991). Dominant understory algal plants include the sea palm (Pterogophora) and a flowering plant, (Zostera cf Asiatica).

Based on previous experience, a trenched crossing would be expected to take 1-2 months to move from the subtidal area to the intertidal. Conduits have already been installed in the nearshore area in the Gato Canyon area, put in place to lessen future impacts through the same area. Less disruption is likely to kelp resources than in the previous pipeline installation for any future pipeline in the Gato Canyon area, a low impact. Current technology for shoreline crossings, being used commonly by fiber optic cable companies, entails a drilled crossing started a half mile or more offshore and drilled through the surf zone to an onshore location 1,000 feet onshore. This technology would further reduce disruption to resources in the kelp beds as well as in the surf zone. Drilled crossings also take less time to complete, roughly half that of a conventional trenching activity. Impacts from nearshore construction to kelp resources are expected to be low.

Crewboats and supply boats servicing offshore facilities use designated vessel traffic corridors, which, among other things, mitigate impacts to kelp bed habitat. Impacts from OCS related boat traffic are expected to be low for this reason.

Kelp beds produce a natural oil that largely prevents oil from adhering to their fronds (BLM, 1982). Kelp forests, while in the area of oil from the 1969 blowout, were largely unaffected. It is not anticipated that oil spills will significantly impact kelp beds themselves, though their inhabitants (sea otters, for example) could be adversely affected (refer to the Marine Mammal and Fish Resources sections in this document).

Summary and Conclusion (2002-2030): Kelp resources are the most heavily impacted by the synergistic affect El Nino warm water conditions play in the role between kelp, sea urchins, and commercial fishing. Fishing practices reducing urchin predators and resulting in high increases in urchin predation on kelp, along with the dieback conditions caused by warm water, have a high impact on the kelp bed health. Other activities such as harvesting, discharges and boat traffic provide ongoing low levels of impact. Nearshore construction activities create localized disturbances. The incremental impact of offshore OCS development including potential development of the 36 undeveloped leases is low and results primarily from localized disturbances in the surf zone during pipeline construction activities.

6.2.6 CUMULATIVE FISH RESOURCES IMPACTS (2002-2030)

This section examines:

- the cumulative impacts to marine fish resources without the development of the 36 leases in the period 2002 to 2030;
- the additional cumulative impacts to marine fish resources from development of the 36 leases in the period 2002 to 2030.

Refer to Section 5.2.6 for a discussion of effects from the proposed action for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in Section 5.2.6.

There are no scheduled or anticipated oil and gas lease sales in Federal waters of the Pacific OCS or in State waters. Thus, no additional production platforms are expected to be installed on the Pacific OCS after the development of the current active leases and the 36 undeveloped leases.

Cumulative Impacts Without Development of the 36 Undeveloped Leases (2002-2030):

The production from existing platforms on the Pacific OCS and in State waters is expected to continue through 2025. Table 5.1.2.2-1 shows the number of new wells expected to be drilled by field from existing platforms. Discharge volumes are expected to be at or below the levels identified in table 4.0.1-8. The major impact agents are those discussed in section 5.2.6.2. Impacts to fish resources and EFH from future activities other than decommissioning are expected to be low and will not add significantly to the overall impacts on fish resources of the SCB. Accidental oil spills present an ongoing source of potential impacts to fish resources. The cumulative risk of oil spills arises from multiple sources, including offshore oil and gas activities in Federal and State waters and both Alaskan and foreign-import tankering. Tankering represents the greatest risk of an oil spill in the SCB.

Decommissioning. The oil and gas extraction activities on the existing Pacific Region OCS units currently under development will continue through 2025. Over the next 30 years all existing oil and gas platforms in Federal and State waters are expected to be removed. Between 2010 and 2025, MMS predicts that platforms will be decommissioned in groups of 3-9 based on age, size, geographic location, and heavy lift vessel (HLV) capability.

Section 5.2.6.2 discusses the potential cumulative impacts to marine fish resources from offshore facility decommissioning activities, including the removal of wells, platforms, and associated pipelines. Table 4.0.1-6 presents estimated removal dates for existing oil and gas structures offshore southern California. It is expected that no OCS platforms in the Santa Barbara Channel or Santa Maria Basin will be removed before 2012, and a few may be in place as late as 2030 (or 2035, in the case of Platform Irene if the Tranquillon Ridge development occurs).

As discussed in section 5.2.6.1.2 (Mitigation FR1), implementation of mitigation similar to that employed for platform removal in the Gulf of Mexico would mitigate to the maximum extent feasible damage to habitat and any marine fish injury or mortality that would occur as a result of the use of explosives in decommissioning operations. Likely impacts to marine fish resources would include mortality to fish species (especially those with air bladders) occurring in the immediate vicinity of the structure. In addition to these effects, decommissioning activities would result in loss of the artificial habitat to fish resources, and potential damage to natural habitat in the immediate area. The principal potential impacts to natural habitat would be similar to those expected to occur as the result of construction activities, and are described in section 5.2.6.1.

Effluent discharges. Table 5.1.2.2-1 shows anticipated future wells for the existing State and Federal platforms. Effluent discharges are regulated by EPA under the General NPDES permit. The permitted discharges are based on water quality criteria determined outside the 100 m radius mixing zone beyond each platform's discharge pipe. However, the discharge pipes are located directly beneath the platforms where up to 39 species Federally managed in the Pacific Groundfish Fishery Management Plan have been documented. Several of the species are in decline due to various factors. EPA has amended the General NPDES permit to require the platform operators to evaluate the direct lethal, sublethal, and bioaccumulattive effects of produced water on fish species occupying the mixing zone. The platform operators will also be required to model dilution and dispersion plumes form the point of discharge. If these permit requirements indicate substantial adverse effects to fish species, the platform operators will develop appropriate mitigation measures to protect them.

Oil Spills. Section 5.0 discusses the cumulative oil spill risk for the project area. Table 5.1-1 presents the estimated mean number of spills of various sizes and the probability of their occurrence as a result of the described activities. The probability of one or more spills 200 bbl or less in size occurring from existing and proposed offshore oil and gas activities during the period 2002-2030 is 73.9 percent (table 5.1-1). The probability that one or more spills in the 2,000-bbl range will occur from these activities is 59.1 percent (table 5.1-1). The risk of a major tanker spill (22,800-bbl) during this period is estimated to be 90.5 percent (table 5.1-1).

Impacts to marine fish resources from any oil spills occurring during this period would be similar to those described in section 5.2.6.2 for the 200- and 2,000-bbl spills assumed to occur as a result of offshore oil and gas activities and for the assumed 22,800-bbl tanker spill.

Accidental oil spills present an ongoing source of potential impacts to fish resources. The cumulative risk of oil spills arises from multiple sources, including offshore oil and gas activities in Federal and State waters and both Alaskan and foreign-import tankering. Tankering represents the greatest risk of an oil spill in the SCB. This risk is tempered by recently implemented or proposed mitigation (such as the rerouting of tankers farther offshore along the central California coast) and, as discussed in section 5.0, by modern oil spill response capabilities. The mean spill size derived from the U.S. Coast Guard database for accidents in U.S. waters is 22,000 bbl. A spill this size could contact up to 161 km of coastline. Fish resources and EFH would likely experience low impacts from a spill this size. The water quality from the Point Conception area north and offshore the Channel Islands remains good. This area is very productive and is important habitat for many marine fish species. A large oil spill would impact the water quality of this habitat. Although only minimal adverse impacts to fish populations and their prey species would be likely from such an event, EFH in the Southern California Bight is stressed due to overfishing, and degraded water quality in estuaries south of Point Conception. Degradation of the water quality north of Point Conception due to an oil spill would cause further stress to EFH. The impacts to water quality from an open ocean spill would be short-term and not expected to last more than several days.

The potential for an oil spill occurring from continued oil and gas activities at the existing platforms on the Pacific OCS and State tidelands represents an insignificant incremental increase to the overall cumulative oil spill risk for fish resources.

Other Activities. As discussed in section 5.2.6.2, marine fish resources of the SCB are impacted by several fishing and non-fishing sources including dredging and discharge of dredged material, water intake structures, aquaculture, wastewater discharge, oil and hazardous waste spills, coastal development, agricultural runoff, commercial marine resource harvesting, and commercial and recreational fishing. It is difficult to predict whether resource management efforts will be successful in decreasing the level of impacts from these sources. However, it is likely that efforts will continue and that future mitigation such as fisheries closures, and habitat protection and avoidance efforts and strict pollutant discharge requirements will be legislated or mandated by regulatory agencies.

INCREMENTAL IMPACTS OF DEVELOPMENT OF THE 36 UNDEVELOPED LEASES (2002-2030):

The proposed delineation wells on the 4 units will likely lead to the development of the remaining 36 undeveloped leases on the Pacific OCS. Potential sources of impacts to fish resources and EFH would come from emplacement and decommissioning of up to 5 platforms and associated activities, effluent discharges, new pipelines, and oil spills.

OCS platform emplacement and removal. Three platforms would be needed to recover reserves in the northern SMB including Lion Rock, Purisima Point, Point Sal, and Santa Maria Units. One platform would be needed to develop the Bonito Unit, and another would be needed to develop the Gato Canyon Unit. On a long-term local basis, anchor scars and damage to the bottom could persist, thus altering the habitat quality for species associated with hard bottom substrate. The platforms would also become home to species associated with hard bottom substrate which could adversely effect native habitat and species composition of the area. Species associated with soft bottom that were in the area before the platform would likely be adversely impacted by platform emplacement. Mussel mounds would likely develop beneath the platform structures, further altering the natural habitat of the area. The impacts of removal were discussed earlier in this section.

The emplacement and removal of 5 new platforms on the Pacific OCS would have low to moderate regional impacts on fish stocks and EFH.

Effluent discharges. The hypothetical development scenario anticipates that three platforms with 60 well slots each would be placed in the northern Santa Maria Basin area. One platform with 36 well slots would be placed on the Bonito Unit, and one platform with 28 well slots would be placed on the Gato Canyon Unit. Each of the three platforms anticipated on the northern Santa Maria Basin would discharge approximately 650,000 bbl of drilling muds and 150,000 bbl of drilling cuttings from 50 – 55 wells over the life of the platforms. The hypothetical platform on the Bonito Unit would discharge approximately 342,000 bbl of drilling muds and 82,000 bbl of cuttings from 27 wells. The Gato Canyon platform would discharge 193,000 bbl of drilling muds and 68,000 bbl of cuttings from 24 wells over its anticipated lifetime.

Though drilling muds are nontoxic to slightly toxic to fish (Neff, 1987), the physical effects of increased sedimentation can bury hard bottom habitat and food organisms in the local area. Becausew the direct and indirect effects of drilling muds and cuttings on fish resources and their food supplies and habitat are localized, the cumulative effects from discharges of drilling muds and cuttings on fish resources

and EFH are low.

Produced water from the northern and southern platforms on the northern Santa Maria Basin would be discharged from the central platform. Produced water from the Bonito Unit platform would be discharged at platform Irene. No impacts to fish resources or EFH are expected from discharged produced water outside the 100 m mixing zone around the discharge point. As described previously, the fish species located within the 100 m mixing zone of the produced water discharge point may experience sublethal impacts. These impacts would not be expected to add to the cumulative effects on fish resources in the SCB.

Pipelines and power cables. The anticipated platforms in the northern SMB would require approximately 100 mi of pipeline and 80 mi of power cable. The Bonito Unit platform would require 14 mi of pipeline and 19 mi of power cable. The Gato Canyon Unit platform would require 16 mi of pipeline and 11 mi of power cable. Potential impacts to fish resource habitat including hard bottom and kelp beds could result due to anchoring activities by the lay barge, and laying the pipeline through habitat areas. Pre-activity site surveys, active monitoring of the project, and post-activity surveys would help mitigate the impacts. Medium impacts to fish resources and EFH could occur if contact and damage to significant habitat areas is unavoidable. Offsite mitigation and restoration of kelp beds and hard bottom would be required.

Oil spills. If all 36 leases are developed, under the most likely development scenario the probability of one or more spills 200 bbl or less in size occurring from these activities is 98.8 percent (section 5.0, table 5.1-1). The probability that one or more spills in the 2,000-bbl range will occur from these activities under the most likely development scenario is 53.9 percent.

Impacts to fish resources and EFH from any oil spills occurring as a result of the development of the 36 undeveloped leases would be similar to those described above for the 200- and 2,000-bbl spills assumed to occur as a result of offshore oil and gas activities and for the assumed 22,800-bbl tanker spill.

SUMMARY AND CONCLUSION (2002-2030):

Several fish stocks in the SCB are depressed. Unfortunately, it is difficult to apportion the reasons for a fishery's demise among overfishing, habitat degradation, pollution, and natural variability of the population. However, as fishery managers gather more detailed knowledge about fish life histories, including potential linkages between fish recruitment and long-term changes in ocean climate, they will be better able to prevent the overexploitation and resulting population crashes of one fish species after another. Many of these fish stocks have been monitored for less than the span of one of their generations. It may take decades of monitoring to fully ascertain the long-term feasibility of current fishery restrictions, proposed marine protected areas, and other fishery management options. The 1996 amendments to the Magnusen-Stevens Act addresses sustainable fisheries and sets guidelines for protecting marine fish resources and habitat from fishing related and non-fishing related activities.

Some routine offshore oil and gas activities, including construction and drilling, would likely be heaviest during the years 2007-2012; much of this activity would be related to the development of the 36 undeveloped leases. Construction activities would occur in the Santa Maria Basin and, to a lesser extent, the western Santa Barbara Channel. Decommissioning of existing offshore oil and gas facilities will begin in the eastern Channel about 2012 and shift westward over a period of years. Thus, there will be periods of potentially habitat altering activities occurring in different parts of the project area at various times. Throughout these periods, routine activities such as production, routine maintenance, and vessel and helicopter support traffic will continue.

Overall, the impacts to fish resources in the project area from offshore oil and gas activities, primarily construction and decommissioning, will increase over present levels. However, the areas covered by these activities will be small relative to the available marine fish habitat, and the disturbance will be localized. Cumulative impacts to fish resources and EFH from all the routine oil and gas activities assumed to take place between 2002 and 2030, including those associated with the development of the 36 undeveloped leases, are expected to be moderate.

Accidental oil spills present an ongoing source of potential impacts to fish resources. The cumulative risk of oil spills arises from multiple sources, including offshore oil and gas activities in Federal and State waters and both Alaskan and foreign-import tankering. The greatest oil spill risk to fish resources and EFH in the project area results from tankering operations. This risk is tempered by recently implemented or proposed mitigation (such as the rerouting of tankers farther offshore along the central California coast) and, as discussed in section 5.0, by modern oil spill response capabilities. Impacts to fish resources and EFH from the oil spills assumed to occur in the project area during the period 2002-2030 could range from low to moderate, depending on location, season, volume, and a number of other factors.

Without development of the 36 undeveloped leases, the probabilities that one or more oil spills will occur during the period 2002-2030 from existing OCS oil and gas activities are 94.9 percent for a spill of 200 bbl or less and 41.2 percent for a spill of 2,000 bbl. The probability that an oil spill will occur as a result

of the development of the 36 undeveloped leases are 98.8 percent (200 bbl or less) and 53.9 percent (2,000 bbl). Thus, the potential for an oil spill occurring from development of the 36 undeveloped leases represents a measurable incremental increase to the overall cumulative oil spill risk for fish resources and EFH of the SCB.

6.2.7 CUMULATIVE MARINE AND COASTAL BIRD IMPACTS (2002-2030)

For the 2002-2030 time period, this analysis considers the cumulative impacts to marine and coastal birds from: 1) existing and future Federal and State offshore oil activity, 2) crude oil imports by tanker, 3) other anthropogenic (military activities, recreation, commercial fishing) and non-anthropogenic (e.g., El Ni–o events) impact sources, and 4) proposed and potential development of 36 currently undeveloped OCS leases.

Refer to section 5.2.7 for a discussion of effects from the Proposed Action for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the analysis in section 5.2.7.

Cumulative Impacts Without Development of the 36 undeveloped leases (2002-2030): Cumulative impacts related to offshore oil and gas activities that may have long-term (e.g., months or years) effects on marine and coastal birds are oil spills, disturbance from helicopter flights, and platform decommissioning. These impacts have occurred (in the case of past and present operations and past oil spills) or may occur (in the case of proposed projects, potential oil spills, and platform decommissioning) from existing Federal and State projects and proposed State projects (e.g., Tranquillon Ridge) whether or not the 36 undeveloped leases are developed. Other activities associated with oil and gas development, including exploration activities, platform installation and operation, pipeline construction, and vessel traffic, have, at most, very short-term (e.g., a few minutes to a few weeks), biologically unimportant (e.g., movement out of the path of an approaching vessel) effects on birds and do not contribute to cumulative impacts.

Accidental OCS Oil Spills. Historically, birds in the project area have been affected by OCS-related oil spills (see section 4.6.5). Based on the discussion of oil spill risks in section 5.1.3, the most likely scenario for existing Federal and State offshore oil production and projects proposed by the State is that one or more oil spills in the 50-1,000-bbl range would occur from offshore oil and gas activities over the period 2002-2030, and that such a spill would most likely be 200 bbl or less in volume. The maximum reasonably foreseeable oil spill volume from future offshore oil and gas activities is 2,000 bbl, assumed for purposes of analysis to be a pipeline spill.

Spilled oil may affect birds in several ways: 1) direct contact with floating or beached oil; 2) toxic reactions; 3) damage to bird habitat; and 4) damage to food organisms. Oil-related mortality is highly dependent on the life histories of the bird species involved. Birds that spend much of their time feeding or resting on the surface of the water are more vulnerable to oil spills (King and Sanger, 1979). Direct contact with even small amounts of oil can be fatal, depending on the species involved. Studies by Dr. Michael Fry (Nero and Associates, 1987) have found that exposure to as little as 3 ml of oil (which amounts to just less than a teaspoon) spread evenly on the wings and breast of Cassin's auklets caused severely matted plumage and was a lethal dose. The principal cause of mortality from oil contact in birds is from feather matting, which destroys the insulating properties of the feathers (Erasmus et al., 1981) and leads to death from hypothermia. Oiling can also result in a loss of buoyancy, which inhibits a bird's ability to rest or sleep on the water (Hawkes, 1961), and can diminish swimming and flying ability (Clark, 1984). Also, an oiled bird's natural tendency is to preen itself in an attempt to remove oil from the plumage. The acute toxicity of such ingested oil (crude or refined) depends on many factors, including the amount of weathering and amount of oil ingested. Birds that receive lethal doses succumb to a host of physiologic dysfunctions (e.g., inflammation of the digestive tract, liver dysfunction, kidney failure, lipid pneumonia and dehydration) (Hartung and Hunt, 1966). Oil that is ingested as a result of preening or eating contaminated prey can cause abnormalities in reproductive physiology, including adverse effects on egg production (Ainley et al., 1981; Holmes, 1984; Nero and Associates, 1987). In addition, the transfer of oil from adults to eggs can result in reduced hatchability, increased incidence of deformities, and reduced growth rates in young (Patten and Patten, 1977; Stickel and Dieter, 1979). Growth reduction may also be the indirect result of an oiled parent's inability to deliver sufficient food to nestlings (Trivelpiece et al., 1984).

Cleanup efforts to remove spilled oil may have impacts of their own. Oil spill response and cleanup activities may involve intrusion into sensitive areas. Human presence while booming off an area, cleaning oil off beaches, or attempting to capture oiled wildlife for rehabilitation near seabird colonies may cause flushing from nests or temporary abandonment. Additionally, many seabirds react to disturbance by leaving their roosts or nests to go sit on the water somewhere nearby. In other words, disturbance of the colony may have the effect of flushing the birds into oiled water. This potential should be evaluated on a case-by-case basis in the event of a spill, prior to a decision to approach a roost or breeding colony.

The level of impact on birds from an oil spill depends on a variety of factors, including the type, rate, and volume of oil spilled and the weather and oceanographic conditions at the time of the spill. These parameters would determine the quantity of oil that is dispersed into the water column; the degree of weathering, evaporation, and dispersion of the oil before it contacts a shoreline; the actual amount, concentration, and composition of the oil at the time of shoreline or habitat contact; and a measure of the toxicity of the oil. As discussed previously, the marine and coastal bird community in southern California is also complex, with the number of species, the abundance of each species, and their activity (e.g., nesting, migrating, or wintering) in the project area varying with location and time of year. There are also varying degrees of vulnerability to the effects of an oil spill, with seabirds generally being the most sensitive.

Although there is not a high degree of correlation between the size of a spill and the number of birds affected, a 200-bbl spill will generally have far less impact than one of several thousand barrels. However, a spill in the range of 200 bbl would likely result in the loss of at least some seabirds and a few shorebirds, if it were to contact land (e.g., the 163-bbl Torch pipeline spill off Vandenberg AFB, resulted in the loss of seabirds and shorebirds). Because of weathering, dispersion, and cleanup efforts, the effects of a 200-bbl spill would most likely be limited to the general vicinity of the source of the spill. If the spill remains well offshore and does not contact the mainland or islands, the birds that would most likely be affected would include shearwaters, fulmars, phaloropes, gulls, common murres and other alcids. If the spill approaches the mainland coast, especially if it occurs during the winter months when many nearshore species are in the project area, the birds that would most likely be affected include loons, western grebes, California brown pelicans, cormorants, and surf scoters. If contact with the shore occurs, some shorebirds might also become oiled or displaced to other areas; cleanup efforts could exacerbate impacts on shorebirds. It is estimated that a 200-bbl spill could contact from about 1 km (95% probability) to 19 km (5% probability) of coastline (see section 5.1.3). The shorebirds that might be affected include black-bellied plovers, whimbrels, marbled godwits, willets, black turnstones, and sanderlings. Waterfowl and marshbirds could also be affected if oil contacts a wetland (e.g., Carpinteria Marsh or Mugu Lagoon), where these birds occur. Probably the most serious effects would result if a 200-bbl spill were to occur in close proximity to and/or contact one of the Channel Islands during the breeding season, which could result in both the loss of nesting adults and disruption in nesting activities. Cleanup efforts near or on the islands could exacerbate the impact of a spill on nesting seabirds, which are especially sensitive to disturbance. Because of the actions of weathering, dispersion, and cleanup efforts, for a 200-bbl spill to contact one of the islands, it would most likely have to originate from one of the platforms (Grace, Gilda, Gail, or Gina) or associated pipelines at the eastern end of the Santa Barbara Channel. A 200-bbl spill from this area could contact Anacapa Island or the east end of Santa Cruz Island, both of which are within the Channel Islands National Marine Sanctuary and National Park. The breeding birds that could be affected in these areas include: ashy storm-petrels, California brown pelicans (see section 5.4.7), double-crested and Brandt's cormorants, black oystercatchers, western gulls, pigeon guillemots, and cassin's auklets.

By its very size, the impacts of a 2,000-bbl spill on birds would likely be much greater than that of a 200-bbl spill, depending on the timing, location, and movements of each spill. Such a large spill is likely to affect a much larger area than a 200-bbl spill, and could, therefore, contact a larger number of birds. It is estimated that a 2,000-bbl spill could contact from about 3 km (95% probability) to 53 km (5% probability) of coastline (see section 5.1.3). Unlike the smaller, 200-bbl spill, which would probably only contact Anacapa Island and part of Santa Cruz Island (see above), a 2,000-bbl spill is more likely to contact any one of the northern Channel Islands, including the extensive seabird colonies on San Miguel Island, which is also located within the Channel Islands National Marine Sanctuary and National Park. A 2,000-bbl spill is also more likely to contact a wetland or possibly even more than one.

Overall, the impacts on marine and coastal birds of potential oil spills from existing Federal, State, and State-proposed oil and gas operations is expected to be low. However, impacts would increase to moderate if a 2,000-bbl spill contacts seabird nesting colonies on the Channel Islands.

Helicopter Traffic. Another potential source of impacts from existing and proposed Federal and State offshore oil operations is helicopters. The level of helicopter traffic related to offshore oil and gas activities in the project area is described in section 5.1.2. Routinely, 8-10 helicopter trips occur offshore each day, including those contracted by MMS. Helicopter flights related to offshore oil may originate from three locations, depending on the purpose and destination of the flights: the Camarillo Airport in Ventura County, and the Santa Barbara and Santa Maria Airports in Santa Barbara County. See section 5.4.5.1.1, for a discussion of the potential effects of helicopters on birds. Probably the most sensitive birds are the nesting seabirds, especially those that nest on cliffs and offshore rocks. The few seabirds that nest along the mainland coast are the only ones that are likely to be exposed to OCS-related helicopter traffic, as air traffic over the

Channel Islands National Marine Sanctuary and the Channel Islands National Park, where most of the breeding seabirds in southern California occur, is restricted to altitudes greater than 1,000 feet. The seabirds that nest along the mainland coast and the helicopter flight patterns in this area are described in section 5.4.5.1.1. Several international and numerous smaller airports occur along the southern California coast along with several military airports, and air traffic is a constant daily or even hourly occurrence. Birds have probably become habituated to air traffic at least to some extent in the project area. Overall, no impacts to marine and coastal birds are expected from helicopter traffic resulting from existing Federal offshore oil operations.

Platform Decommissioning. Section 2 discusses the process of delineation well abandonment and the possibility of impacts to marine birds. Section 5.1.2 describes the processes involved in decommissioning offshore facilities. For purposes of analysis, it is assumed that decommissioning would encompass the complete removal of a platform and associated pipelines, with none of the leg structure left in place to form an artificial reef. Platform removal would only have an effect on birds if explosives are used in the process. To date, only one OCS facility in the Pacific Region has been decommissioned by non-explosive means—the Offshore Storage and Treatment (OS&T) vessel that formerly served the Santa Ynez Unit platforms in the Santa Barbara Channel. In addition, six offshore platforms in State waters in the Channel have been removed with the use of explosives—two in 1988 and four in 1996 (table 4.0.1-6). Other OCS platforms may be removed during the period 2002-2030. Table 4.0.1-6 presents estimated removal dates for existing oil and gas structures offshore southern California. It is expected that no OCS platforms in the Santa Barbara Channel or Santa Maria Basin will be removed before 2012, and a few may be in place as late as 2025 (or 2035, in the case of Platform Irene if the Tranquillon Ridge development occurs). Although no impacts to birds have been reported to result from platform removal, under certain circumstances as discussed in section 5.2.7.1, it is possible that birds could be injured or killed as a result of explosives used for platform removal. Although no impacts to marine birds are expected as a result of delineation well abandonment associated with the proposed projects (section 5.2.7.1), a few could be injured or killed with platform decommissioning because of the greater number of explosive charges used; shorebirds, marshbirds, and waterfowl would not be affected.

Impacts from Non-Offshore Oil Sources. Based on the discussion of oil spill risks in section 5.1.3, the mean size for an oil spill from a tanker accident is assumed to be 22,800 bbl. By its very size, a 22,800-bbl spill could have far greater impacts to marine and coastal birds than those from offshore oil operations discussed above, depending on the location, timing, and movement of the various-sized spills. The impacts of this size spill on marine and coastal birds would be far worse than those from offshore oil operations discussed above. It is estimated that a 22,800-bbl spill could contact from about 9 km (95% probability) to 160 km (5% probability) of coastline (see section 5.1.3). However, the possibility of contact with the shore is ameliorated somewhat by the fact that U.S. oil tankers voluntarily maintain a distance of 90 km (50 nm) from the mainland for much of their route. The cleanup process for this size spill would be much more difficult and protracted compared to that for the smaller spills discussed above, especially if a significant proportion of the oil reaches shore. Overall, the impact to marine and coastal birds of a 22,800-bbl, non-OCS tanker spill is expected to range from moderate to high, depending on the timing, location, and movement of the spill.

Other factors that have historically contributed to cumulative impacts on marine and coastal birds include climate and weather events (e.g., El Ni–o events), pollution (e.g., DDT), habitat loss (e.g., conversion of wetland to marinas), introduced predators (e.g., rats), commercial fishing (e.g., gill net mortality) and disturbance (e.g., beach use, hikers, sea kayakers). Overall, the cumulative impacts of these factors on marine and coastal birds range from low to moderate, depending on the species.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): The potential scenario for the exploration and development of the 36 currently undeveloped leases is described in section 5.1. Of the activities and possible accidental events described in section 5.1, oil spills, disturbance from helicopter flights, and platform decommissioning may have long-term (e.g., months or years) effects on marine and coastal birds. Other activities associated with oil and gas development, including exploration activities, platform and pipeline construction, and vessel traffic, have, at most, very short-term (e.g., a few days or weeks), biologically unimportant (e.g., movement out of the path of an approaching vessel) effects on birds and do not contribute to cumulative impacts.

The oil spill risk analysis provided in section 5.1.3 indicates a greater likelihood of both a 200-bbl and a 2,000-bbl oil spill occurring with the development of the 36 undeveloped leases. However, a greater potential for an oil spill to occur does not necessarily indicate a higher level of impact, and the impacts of oil spills to marine and coastal birds that may occur as a result of offshore oil development, including the most likely development scenario for the 36 leases, remains low to moderate as described above for existing Federal and State projects and proposed State projects.

Helicopter traffic is expected to increase as a result of the development of the 36 leases, especially during construction. However, no change is expected in either the airports used for these flights, the flight paths to and from the various airports, and the flight restrictions currently in place (e.g., Vandenberg AFB, Channel Islands National Marine Sanctuary). Therefore, helicopter flights associated with the most likely development scenario for the 36 leases are not expected to contribute to cumulative impacts on marine and coastal birds in the project area.

Summary and Conclusion (2002-2030): The cumulative impacts to marine and coastal birds in the project area from all sources for the period from 2002-2030, including any activities that may occur in the 36 undeveloped leases, range from moderate to high, depending on the species involved and the timing, location, and movement of a 22,800-bbl, non-OCS tanker spill. The likelihood of one or more OCS-related oil spills is greater with the development of the 36 leases, but the cumulative impacts remain moderate to high.

6.2.8 CUMULATIVE MARINE MAMMALS IMPACTS (2002-2030)

This section discusses the cumulative impacts to marine mammals both without and with the development of the 36 leases in the period 2002-2030. Section 5.2.8.2 discusses the major impact agents associated with routine past, present, and foreseeable offshore oil and gas activities, including the proposed activities, that may produce impacts during 2002-2006, the expected duration of the proposed delineation activities. These include noise and disturbance, drilling discharges, and the potential use of explosives in the decommissioning of offshore facilities. Other, non-OCS sources of impacts to marine mammals, both anthropogenic and non-anthropogenic, are also discussed. The significance criteria for the following analyses remain the same as those presented in section 5.2.8.

Cumulative Impacts without Development of the 36 Undeveloped Leases (2002-2030): This section examines the cumulative impacts to threatened and endangered marine mammals without the development of the 36 leases in the period 2002 to 2030. The projects discussed in this section include past, present, and foreseeable actions that may produce impacts during 2002-2030, the period during which development of the 36 undeveloped leases would likely occur (section 6.1). The major impact agents are those discussed in section 5.2.8.2.

Offshore Oil and Gas Activities. Section 5.2.8.2 describes the routine offshore oil and gas activities that may result in cumulative impacts to marine mammals. These include geophysical surveys, construction, drilling and production activities with associated support activities, and the abandonment, or decommissioning, of wells and offshore facilities. As discussed in section 5.2.8.1, the major impact agents expected from these proposed activities are noise and disturbance and drilling discharges. The potential use of explosives in the abandonment of wells and offshore platforms also raises the possibility of lethal impacts to marine mammals.

Geophysical Surveys. As discussed in section 5.2.8.2, no 2-D or 3-D seismic surveys have been proposed for the Pacific OCS or State waters in the near future and none are currently foreseen for the period 2002-2030.

Construction. Section 5.2.8.2 discusses the potential cumulative impacts to marine mammals from construction activities, including the installation of platform jackets and topsides, the laying of pipelines, platform hook-up and commissioning, and the initiation of drilling. Currently, no oil and gas lease sales are scheduled or anticipated in Federal or State waters off California. Therefore, without development of the 36 undeveloped leases, it is assumed no new production platforms or pipelines would be installed during the period 2002-2030.

Development and Production. Section 5.2.8.2 discusses the potential cumulative impacts to marine mammals from offshore development and production activities in the Pacific OCS Region. Table 5.1.2.2-1 in section 5.1.2 shows the number of wells expected to be drilled from existing production platforms. Currently, it is expected that 25 new wells will be drilled from OCS platforms in the Santa Barbara Channel and Santa Maria Basin. Production activities are expected to continue on all existing, active platforms until decommissioning (see section on Offshore Facilities Decommissioning, below). As discussed in section 5.2.8.2, potential impacts to marine mammals from these activities are expected to be restricted to brief avoidance responses within about 100 m (330 ft) of the platform.

Vessel Traffic. Section 5.2.8.2 discusses the potential cumulative impacts to marine mammals from crew and supply boat operations in the Pacific OCS Region. Current levels of support vessel traffic for offshore platforms in both Federal and State waters are presented in table 4.0.1-6. It is assumed that support vessel traffic will continue at levels at or below those presented in table 4.0.1-6 during the period 2002-2030. As discussed in section 5.2.8.2, these levels of support vessel traffic are expected to result in temporary (less than 1-hour), localized disturbances to some marine mammals in the project area, primarily baleen whales. Given that at least one collision between a support vessel and a marine mammal has been recorded during the past 30 years of activities in the

Pacific OCS Region, it is possible that one or two such events may occur during the next two decades.

Aircraft. Section 5.2.8.2 discusses the potential cumulative impacts to marine mammals from helicopter operations in the Pacific OCS Region. Current levels of support helicopter traffic for offshore platforms in both Federal and State waters are presented in table 4.0.1-6. It is assumed that helicopter traffic will continue at levels at or below those presented in table 4.0.1-6 during the period 2002-2030. As discussed in section 5.2.8.2, these levels of helicopter traffic in the project area are expected to result in temporary (less than 1-hour), localized disturbances to some marine mammals.

Offshore Facility Decommissioning. Section 5.2.8.2 discusses the potential cumulative impacts to marine mammals from offshore facility decommissioning activities, including the removal of wells, platforms, and associated pipelines. Table 4.0.1-6 presents estimated removal dates for existing oil and gas structures offshore southern California. It is expected that no OCS platforms in the Santa Barbara Channel or Santa Maria Basin will be removed before 2012, and a few may be in place as late as 2030 (or 2035, in the case of Platform Irene if the Tranquillon Ridge development occurs).

As discussed in section 5.2.8.1.2 (Mitigation MM1), implementation of mitigation similar to that employed for platform removal in the Gulf of Mexico would make it unlikely that any marine mammal injury or mortality would occur as a result of the use of explosives in decommissioning operations. Likely impacts to marine mammals would be limited to minor and temporary (less than 1 hour in duration) disturbance. In addition to these effects, decommissioning activities would result in noise and disturbance to marine mammals during the removal of platform structures and pipelines. The principal potential impacts would be similar to those expected to occur as the result of construction activities, i.e., short-term avoidance reactions at distances of 2 km (1 nm) or less from the operations.

Effluent Discharges. Section 4.0 discusses the treatment and discharge of platform effluents in the Pacific OCS Region. Table 4.0.1-8 presents the volumes of produced water discharged by each of the OCS platforms between 1988 and 1999. During that period, annual totals ranged from about 14 to 34 million bbl. For purposes of analysis, MMS assumes that a platform may discharge up to 8 million bbl of produced water per year. The exception is Platform Harmony in the western Santa Barbara Channel, which discharges from all three platforms in the Santa Ynez Unit after processing at the onshore Las Flores Canyon plant. Discharge volumes from offshore facilities during the period 2002-2030 are expected to be at or below the levels identified in table 4.0.1-8.

Section 5.2.8.1 discusses the potential impacts of effluent discharges from the drilling of the proposed delineation wells on marine mammals. As reported, the EPA biological assessment for the proposed reissuance of its general NPDES permit for offshore OCS facilities in southern California waters concludes that direct toxicity to marine mammals, or their food base, should be minimal (SAIC, 2000a, b). All such discharges are required to meet NPDES water quality criteria, which were established to protect biological resources outside the mixing zone. Therefore, given that effluent discharge volumes are expected to remain at or below current levels, any contact with OCS discharges likely would continue to be extremely limited. No measurable effects to marine mammals in the project area are expected.

Oil Spills. Section 5.1.3 discusses the cumulative oil spill risk for the project area. Tables 5.1.3.1-2 and 5.1.3.1-3 present the estimated mean number of spills of various sizes and the probability of their occurrence as a result of the described activities. The probability of one or more spills 200 bbl or less in size occurring from existing and proposed offshore oil and gas activities during the period 2002-2030 is 99 percent (table 5.1.3.1-2). The probability that one or more spills in the 2,000-bbl range will occur from these activities is 59.1 percent (table 5.1.3.1-3). The risk of a major tanker spill (22,800-bbl) during this period is estimated to be 99 percent (table 5.1.3.1-3).

Impacts to marine mammals from any oil spills occurring during this period would be similar to those described in section 5.2.8.2 for the 200- and 2,000-bbl spills assumed to occur as a result of offshore oil and gas activities and for the assumed 22,800-bbl tanker spill.

Military Activities. It is assumed that military activities in the project area will continue at or near the levels described in section 5.2.8.2 during the period 2002-2030. Thus, the impacts to marine mammals associated with these activities would also be expected to continue. These include periodic disturbance and possible temporary hearing effects for pinnipeds hauled out along the Vandenberg AFB shoreline and on the Channel Islands (particularly San Nicolas Island). Operation of the U.S. Navy's SURTASS LFA sonar system in project area waters potentially could have noise-related impacts on marine mammals.

Commercial Fisheries. As discussed in section 5.2.8.2, incidental take in commercial fishing operations currently is a major source of anthropogenic impacts to marine mammals off California. Whether this level of take will continue is difficult to predict. However, it is likely that additional efforts to reduce take through mitigation, closures, and other legislative actions will occur, and that the incidental take of marine mammals will decline in the coming decades.

Other Anthropogenic Sources of Impacts. Section 5.2.8.2 discusses potential cumulative impacts to marine mammals from other, human-related activities. The incidence of marine mammal mortality, especially of larger whales, due to ship strikes will probably increase as overall vessel traffic off California increases. However, ship-strike mortality along the Pacific coast is not currently considered to be a significant problem at the population level and is not likely to be in the foreseeable future.

It is assumed that whale watching will remain an important local industry in California waters during the period 2002-2030 and that activities will continue at or above current levels. Thus, the potential for impacts to cetaceans described in section 5.2.8.2 will also continue. However, recent recommendations for improving whale-watching regulations (Rugh et al., 1999) may help alleviate these problems.

As discussed in section 5.2.8.2, the effects of pollutants on marine mammals are not well understood, but there is evidence that they may affect reproduction or make individuals more susceptible to other mortality factors, such as disease. Although the levels of certain pollutants, such as DDT, are expected to drop, the overall contamination of the marine environment from industrial, agricultural, and municipal sources is likely to increase during the coming decades. The significance of these pollutant levels to marine mammal populations in the project area is unknown, but concern over the potential effects is growing.

Non-anthropogenic Sources of Impacts. Section 5.2.8.2 discusses potential cumulative impacts to marine mammals in the project area from a number of non-anthropogenic sources, including disease, marine toxins, and climatic events such as El Niño. Each of these phenomena may periodically have significant impacts on marine mammal populations, at least on the local level. However, the likelihood of their occurrence (and the levels of subsequent impacts on marine mammals) during the period 2002-2030 cannot be predicted.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): Development of the 36 undeveloped leases would involve a number of oil and gas activities in addition to those described earlier in this section. As described in section 6.1.3, it is assumed that 4-5 platforms and associated pipelines and cables would be built: 2-3 in the northern Santa Maria Basin leases, 1 in the Bonito Unit, and 1 in the Gato Canyon Unit. The major portion of the offshore construction is expected during the period 2007-2009, beginning with the Gato Canyon Unit, then shifting to the leases located in the Santa Maria Basin. Each platform installation is estimated to take approximately 3-6 months, depending on water depth; pipeline and cable installation are estimated to take about 3 months and 4 months, respectively.

Platform and pipeline installation would involve completion of site investigation programs. These programs would include shallow hazards surveys to obtain data needed to analyze seafloor and subsurface geologic and manmade hazards at the platform sites and along the pipeline routes. A single, small airgun is usually employed as the acoustic source for part of a shallow hazards survey. The potential impacts of seismic survey sound on marine mammals are discussed in section 5.2.8.2.

Impacts on marine mammals in the project area from these activities are expected to be limited to temporary, localized disturbance, as discussed in section 5.2.8.2. If the Gato Canyon construction occurs during winter gray whale migration, as currently projected, some mitigation would probably be required to minimize disturbance and avoid disrupting the species' migration through the project area.

The other routine activities associated with development of the 36 undeveloped leases, including drilling, production, and vessel and helicopter support traffic, are expected to result in temporary (less than 1-hour), localized disturbances to marine mammals, as discussed in section 5.2.8.2, throughout the period 2002-2030. Once production begins, support traffic is expected to remain at levels typical for ongoing offshore oil and gas activities in the Santa Maria Basin (table 4.0.1-6).

Decommissioning of the 4-5 platforms assumed to be built for development of the 36 undeveloped leases would be expected to result in noise and disturbance to marine mammals during the removal of platform structures and pipelines. The principal potential impacts would be similar to those expected to occur as the result of construction activities, i.e., short-term avoidance reactions at distances of 2 km (1 nm) or less from the operations. As discussed in section 5.2.8.1.2 (Mitigation MM1), implementation of mitigation similar to that employed for platform removal in the Gulf of Mexico would make it unlikely that any marine mammal injury or mortality would occur as a result of the use of explosives in decommissioning operations.

Volumes of platform effluents discharged in the course of developing the 36 undeveloped leases are expected to be equivalent to those estimated for existing OCS platforms (section 4.0, table 4.0.1-8). As discussed in previous sections, all platform effluents will be discharged under NPDES permit and will be required to meet NPDES water quality criteria. No measurable effects to marine mammals in the project area are expected from these discharge volumes.

If all 36 leases are developed, under the most likely development scenario the probability of one or more spills 200 bbl or less in size occurring is 98.8 percent (section 5.1.3, table 5.1.3.1-2). The probability that one or more spills in the 2,000-bbl range will

occur from these activities under the most likely development scenario is 53.9 percent (table 5.1.3.1-3).

Impacts to marine mammals from any oil spills occurring as a result of the development of the 36 undeveloped leases would be similar to those described above for the 200- and 2,000-bbl spills assumed to occur as a result of offshore oil and gas activities and for the assumed 22,800-bbl tanker spill.

Summary and Conclusions (2002-2030): Given current trends, it is likely that the populations of most marine mammal species will continue to grow. However, the future status of individual populations is difficult to predict. Impacts to marine mammals from incidental take in commercial fishing operations are likely to decrease. Impacts from other anthropogenic sources, such as ship strikes, marine pollutants, and noise from shipping and military activities, may increase as the human population and related activities continue to grow in the region.

Some routine offshore oil and gas activities, including construction and drilling, would likely be heaviest during the years 2007-2012; much of this activity would be related to the development of the 36 undeveloped leases. Construction activities would occur in the Santa Maria Basin and, to a lesser extent, the western Santa Barbara Channel. Decommissioning of existing offshore oil and gas facilities will begin in the eastern Channel about 2012 and shift westward over a period of years. Thus, there will be periods of noise and disturbance-producing activities occurring in different parts of the project area at various times. Throughout these periods, routine activities such as production and vessel and helicopter support traffic will continue.

Overall, the impacts to marine mammals in the project area from routine offshore oil and gas activities, primarily noise and disturbance, will increase over present levels. However, the areas covered by these activities will be small relative to the available marine mammal habitat, and the periods of disturbance will be localized. Unless several such projects were to overlap in time and space near essential habitat for a particular population (such as the gray whale migration pathway), cumulative impacts to marine mammals would be unlikely. Cumulative impacts to marine mammals from all the routine oil and gas activities assumed to take place between 2002 and 2030, including those associated with the development of the 36 undeveloped leases, are expected to be low.

Impacts to marine mammals from the oil spills assumed to occur in the project area during the period 2002-2030 could range from negligible to high, depending on spill size, location, season, and a number of other factors. Most at risk are pinniped pups. Seasonally, the most sensitive areas are rookeries on the northern Channel Islands (particularly San Miguel Island) and along the mainland coast north of Point Conception.

Without development of the 36 undeveloped leases, the probabilities that one or more oil spills will occur during the period 2002-2030 from existing OCS oil and gas activities are 73.9 percent for a spill of 200 bbl or less and 59.1 percent for a spill of 2,000 bbl. The probability of a 22,800-bbl tanker spill occurring during this period is 90.5 percent. Under the most likely scenario for development of the 36 undeveloped leases, these probabilities are 98.8 percent and 53.9 percent, respectively. Thus, the potential for an oil spill occurring from development of the 36 undeveloped leases represents a measurable incremental increase to the overall cumulative oil spill risk for marine mammals.

6.2.9 CUMULATIVE THREATENED AND ENDANGERED SPECIES IMPACTS (2002-2030)

This section discusses the cumulative impacts to threatened and endangered species both without and with the development of the 36 leases in the period 2002-2030. Section 5.2.9 discusses the potential impacts associated with routine past, present, and foreseeable offshore oil and gas activities, including the proposed activities, that may occur during 2002-2006, the expected duration of the proposed delineation activities. The significance criteria for the following analysis remain the same as those presented in section 5.2.9.

6.2.9.1 CUMULATIVE THREATENED AND ENDANGERED MARINE MAMMALS IMPACTS (2002-2030)

This section discusses the cumulative impacts to threatened and endangered marine mammals in the period 2002-2030. Section 5.2.9.2 discusses the major impact agents associated with routine past, present, and foreseeable offshore oil and gas activities, including the proposed activities, that may produce impacts during 2002-2006, the expected duration of the proposed delineation activities. These include noise and disturbance, drilling discharges, and the potential use of explosives in the decommissioning of offshore facilities. Other, non-OCS sources of impacts to threatened and endangered marine mammals, both anthropogenic and non-anthropogenic, are also discussed.

Cumulative Impacts without Development of the 36 Undeveloped Leases (2002-2030): This section examines the cumulative impacts to threatened and endangered marine mammals without the development of the 36 leases in the period 2002 to 2030. The projects discussed in this section include past, present, and foreseeable actions that may produce impacts during 2002-2030, the period during which development of the 36 undeveloped leases would likely occur (section 6.1). Most of the major impact agents are those discussed in section 5.2.9.2 (and treated briefly below).

Offshore Oil and Gas Activities. Section 5.2.8.2 describes the routine offshore oil and gas activities that may result in cumulative impacts to marine mammals, including threatened and endangered species. These include geophysical surveys, construction, drilling and production activities with associated support activities, and the abandonment, or decommissioning, of wells and offshore facilities. As discussed in section 5.2.8.1, the major impact agents expected from these proposed activities are noise and disturbance and drilling discharges. The potential use of explosives in the abandonment of wells and offshore platforms also raises the possibility of lethal impacts to marine mammals.

Geophysical Surveys. As discussed in section 6.2.8, no 2-D or 3-D seismic surveys have been proposed for the Pacific OCS or State waters in the near future, and none are currently foreseen for the period 2002-2030.

Construction. As discussed in section 6.2.8, it is assumed no new production platforms or pipelines would be installed during the period 2002-2030 without development of the 36 undeveloped leases.

Development and Production. As discussed in section 6.2.8, potential impacts to threatened and endangered marine mammals from offshore development and production activities are expected to be restricted to brief avoidance responses within about 100 m (330 ft) of the platform.

Vessel Traffic. As discussed in section 6.2.8, the levels of support vessel traffic assumed to occur in the project area over the period 2002-2030 are expected to result in temporary (less than 1-hour), localized disturbances to some threatened and endangered marine mammals in the project area, primarily baleen whales. Given that at least one collision between a support vessel and a marine mammal has been recorded during the past 30 years of activities in the Pacific OCS Region, it is possible that one or two such events may occur during the next two decades.

Aircraft. As discussed in section 6.2.8, the levels of helicopter traffic assumed to occur in the project area over the period 2002-2030 are expected to result in temporary (less than 1-hour), localized disturbances to some threatened and endangered marine mammals.

Offshore Facility Decommissioning. Section 5.2.8.2 discusses the potential cumulative impacts to marine mammals from offshore facility decommissioning activities, including the removal of wells, platforms, and associated pipelines. It is expected that no OCS platforms in the Santa Barbara Channel or Santa Maria Basin will be removed before 2012, and a few may be in place as late as 2030 (or 2035, in the case of Platform Irene if the Tranquillon Ridge development occurs).

As discussed in section 5.2.8.1.2, implementation of mitigation similar to that employed for platform removal in the Gulf of Mexico would make it unlikely that any marine mammal injury or mortality would occur as a result of the use of explosives in decommissioning operations. Likely impacts to threatened and endangered marine mammals would be limited to minor and temporary (less than 1 hour in duration) disturbance. In addition to these effects, decommissioning activities would result in noise and disturbance to threatened and endangered marine mammals during the removal of platform structures and pipelines. The principal potential impacts would be similar to those expected to occur as the result of

construction activities, i.e., short-term avoidance reactions at distances of 2 km (1 nm) or less from the operations.

Effluent Discharges. Section 4.0 describes the treatment and discharge of platform effluents in the Pacific OCS Region. Section 5.2.8.1 discusses the potential impacts of effluent discharges from the drilling of the proposed delineation wells on marine mammals. As reported, the EPA biological assessment for the proposed reissuance of its general NPDES permit for offshore OCS facilities in southern California waters concludes that direct toxicity to listed marine mammals, or their food base, should be minimal (SAIC, 2000a, b). All such discharges are required to meet NPDES water quality criteria, which were established to protect biological resources outside the mixing zone. Therefore, given that effluent discharge volumes are expected to remain at or below current levels, any contact with OCS discharges likely would continue to be extremely limited. No measurable effects to threatened and endangered marine mammals in the project area are expected.

Oil Spills. Section 5.1.3 discusses the cumulative oil spill risk for the project area. Tables 5.1.3.1-2 and 5.1.3.1-3 present the estimated mean number of spills of various sizes and the probability of their occurrence as a result of the described activities. The probability of one or more spills 200 bbl or less in size occurring from existing and proposed offshore oil and gas activities during the period 2002-2030 is 99 percent (table 5.1.3.1-2). The probability that one or more spills in the 2,000-bbl range will occur from these activities is 59.1 percent (table 5.1.3.1-3). The risk of a major tanker spill (22,800-bbl) during this period is estimated to be 99 percent (table 5.1.3.1-3).

Impacts to threatened and endangered cetaceans and pinnipeds from any oil spills occurring during this period would be similar to those described in section 5.2.9.2 for the 200- and 2,000-bbl spills assumed to occur as a result of offshore oil and gas activities and for the assumed 22,800-bbl tanker spill.

As discussed in section 5.2.9.2, R.G. Ford Consulting conducted an analysis of the risk of oil spills to the southern sea otter from ongoing and projected production from existing federal OCS facilities during the period 2006-2030 (appendix 5.5). The results, presented as worst-case percentiles, are shown in appendix table 5.5-3.

For ongoing and projected production from existing federal OCS facilities during the period 2006-2030, the model predicts that there is a 1 in 100 chance that 26-27 otters would be contacted. Likewise, for this period the model predicts that there is only a 1 in 1,000 chance that 77 otters would be contacted by an oil spill resulting from existing federal OCS activities, and an extremely slight (1 in 10,000) chance that as many as 110 otters would be contacted. Twenty-seven (27) otters represent about 1 percent of the current estimated southern sea otter population (2,317; section 4.6.7); 77 otters represent about 3 percent. Thus, the model analysis indicates that there is a relatively low probability of sea otter contacts occurring as a result of spill associated with existing federal OCS facilities during this period.

The oil spill risk analysis for the southern sea otter conducted by R.G. Ford Consulting indicates that non-OCS tanker oil spills during the period 2006-2030 would have a 1 in 100 chance of contacting 345 sea otters, a 1 in 1,000 chance of contacting 1,341 sea otters, and a 1 in 10,000 chance of contacting as many as 2,002 otters (appendix 5.5). The first two number represent about 15 and 58 percent, respectively, of the current estimated southern sea otter population (2,317; section 4.6.7). Although an unlikely occurrence, this would be a high impact as defined by the impact level criteria presented in section 5.2.9.

In summary, model runs for oil spills associated with ongoing and projected production from existing federal OCS facilities for the period 2006-2030 indicate that there is a 1-percent chance of contact to 26-27 sea otters within 10 days. If all contacts resulted in mortality (a conservative assumption—see section 5.2.9.2), the impacts to the southern sea otter would be considered medium as defined by the impact level criteria presented in section 5.2.9. As discussed above, non-OCS tanker spills represent by far the greatest risk to sea otters.

Military Activities. It is assumed that military activities in the project area will continue at or near the levels described in section 5.2.8.2 during the period 2002-2030. Thus, the impacts to marine mammals associated with these activities would also be expected to continue. These include periodic disturbance and possible temporary hearing effects for pinnipeds hauled out along the Vandenberg AFB shoreline and on the Channel Islands (particularly San Nicolas Island). Operation of the U.S. Navy's SURTASS LFA sonar system in project area waters potentially could have noise-related impacts on marine mammals.

Commercial Fisheries. As discussed in section 5.2.9.2, incidental take in commercial fishing operations currently is not a major source of mortality for threatened and endangered cetaceans and pinnipeds off California. Southern sea otter mortality in Monterey Bay gillnet fisheries has become a concern in recent years (Cameron and Forney, 2000; Forney et al., 2001). However, recent fishery closures in this area are likely to reduce this take significantly if made permanent.

Other Anthropogenic Sources of Impacts. Section 5.2.8.2 discusses potential cumulative impacts to marine mammals from other, human-related activities. The incidence of marine mammal mortality, es-

pecially of larger whales, due to ship strikes will probably increase as overall vessel traffic off California increases. However, ship-strike mortality along the Pacific coast is not currently considered to be a significant problem for endangered cetaceans and is not likely to be in the foreseeable future.

It is assumed that whale watching will remain an important local industry in California waters during the period 2002-2030 and that activities will continue at or above current levels. Thus, the potential for impacts to cetaceans, including endangered species, described in section 5.2.8.2 will also continue. However, recent recommendations for improving whale-watching regulations (Rugh et al., 1999) may help alleviate these problems.

As discussed in section 5.2.9.2, the effects of pollutants on threatened and endangered marine mammals are not well understood, but there is evidence that they may affect reproduction or make individuals more susceptible to other mortality factors, such as disease. Although the levels of certain pollutants, such as DDT, are expected to drop, the overall contamination of the marine environment from industrial, agricultural, and municipal sources is likely to increase during the coming decades. The significance of these pollutant levels to threatened and endangered marine mammal populations in the project area is unknown, but concern over the potential effects, particularly to the southern sea otter, is growing.

Non-anthropogenic Sources of Impacts. Section 5.2.9.2 discusses potential cumulative impacts to threatened and endangered marine mammals in the project area from a number of non-anthropogenic sources, including disease and marine toxins. Each of these phenomena may periodically have significant impacts on marine mammal populations, at least at the local level. However, the likelihood of their occurrence (and the levels of subsequent impacts on marine mammals) during the period 2002-2030 cannot be predicted. The relatively high rate of infectious disease in the southern sea otter population is of particular concern.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): Development of the 36 undeveloped leases would involve a number of oil and gas activities in addition to those described earlier in this section. As described in section 6.1, it is assumed that 4-5 platforms and associated pipelines and cables would be built: 2-3 in the northern Santa Maria Basin leases, 1 in the Bonito Unit, and 1 in the Gato Canyon Unit. The major portion of the offshore construction is expected to occur during the period 2007-2009, beginning with the Gato Canyon Unit, then shifting to the leases in the Santa Maria Basin. Each platform installation is estimated to take approximately 3-6 months, depending on water depth; pipeline and cable installation are estimated to take about 3 months and 4 months, respectively.

Platform and pipeline installation would involve completion of site investigation programs. These programs would include shallow hazards surveys to obtain data needed to analyze seafloor and subsurface geologic and manmade hazards at the platform sites and along the pipeline routes. A single, small airgun is usually employed as the acoustic source for part of a shallow hazards survey. The potential impacts of seismic survey sound on marine mammals are discussed in section 5.2.8.2.

Impacts on marine mammals, including threatened and endangered species, in the project area from these activities are expected to be limited to temporary, localized disturbance, as discussed in section 5.2.8.2. The other routine activities associated with development of the 36 undeveloped leases, including drilling, production, and vessel and helicopter support traffic, are expected to result in temporary (less than 1-hour), localized disturbances to threatened and endangered marine mammals, as discussed in section 5.2.8.2, throughout the period 2002-2030. Once production begins, support traffic is expected to remain at levels typical for ongoing offshore oil and gas activities in the Santa Maria Basin (table 4.0.1-6).

Decommissioning of the 4-5 platforms assumed to be built for development of the 36 undeveloped leases would be expected to result in noise and disturbance to threatened and endangered marine mammals during the removal of platform structures and pipelines. The principal potential impacts would be similar to those expected to occur as the result of construction activities, i.e., short-term avoidance reactions at distances of 2 km (1 nm) or less from the operations. As discussed in section 5.2.8.1.2 (Mitigation MM1), implementation of mitigation similar to that employed for platform removal in the Gulf of Mexico would make it unlikely that any marine mammal injury or mortality would occur as a result of the use of explosives in decommissioning operations.

Volumes of platform effluents discharged in the course of developing the 36 undeveloped leases are expected to be equivalent to those estimated for existing OCS platforms (section 4.0, table 4.0.1-8). As discussed in previous sections, all platform effluents will be discharged under NPDES permit and will be required to meet NPDES water quality criteria. No measurable effects to threatened and endangered marine mammals in the project area are expected from these discharge volumes.

If all 36 leases are developed, under the most likely development scenario the probability of one or more spills 200 bbl or less in size occurring is 98.8 percent (section 5.1.3, table 5.1.3.1-2). The probability that one or more spills in the 2,000-bbl range will occur from these activities under the most likely development scenario is 53.9 percent (table 5.1.3.1-3).

Impacts to threatened and endangered marine mammals from any oil spills occurring as a result of the development of the 36 undeveloped leases would be similar to those described above for the 200- and 2,000-bbl spills assumed to occur as a result of offshore oil and gas activities and for the assumed 22,800-bbl tanker spill.

As discussed in section 5.2.9.2, R.G. Ford Consulting also conducted an analysis of the risk of oil spills to the southern sea otter from hypothetical development of the 36 undeveloped leases during the period 2006-2030 (appendix 5.5). The results, presented as worst-case percentiles, are shown in appendix table 5.5-3.

For the period 2006-2030, the model predicts that there is a 1 in 100 chance that 64-65 otters would be contacted by an oil spill resulting from hypothetical development of the 36 undeveloped leases. Likewise, for this period the model predicts that there is only a 1 in 1,000 chance that 199 otters would be contacted, and an extremely slight (1 in 10,000) chance that as many as 383 otters would be contacted. Sixty-five (65) otters represent about 3 percent of the current estimated southern sea otter population (2,317; section 4.6.7); 199 otters represent nearly 9 percent. Thus, the model analysis indicates that there is a relatively low probability of sea otter contacts occurring as a result of spill associated with existing federal OCS facilities during this period.

In summary, model runs for oil spills associated with hypothetical development of the 36 undeveloped leases during the period 2006-2030 indicate that there is a 1-percent chance of contact to 64-65 sea otters within 10 days. If all contacts resulted in mortality (a conservative assumption—see section 5.2.9.2), the impacts to the southern sea otter would be considered moderate as defined by the impact level criteria presented in section 5.2.9.

Summary and Conclusions (2002-2030): While the eastern North Pacific stocks of some endangered whale species, including blue, fin, and humpback whales, appear to be increasing, it is impossible to predict what progress these populations may make toward recovery over the next quarter of a century. Given current trends, the Guadalupe fur seal population is also likely to continue to grow. The future status of other threatened and endangered marine mammals in the region is even less certain. With their tiny population, northern right whales are the North Pacific species most at risk of extinction. Southern sea otters have undergone recent fluctuations in numbers and have suffered impacts from incidental take in commercial fisheries. Impacts from other anthropogenic sources, such as ship strikes and marine pollutants, may increase as the human population and related activities continue to grow in the region.

Some routine offshore oil and gas activities, including construction and drilling, would likely be heaviest during the years 2007-2012; much of this activity would be related to the development of the 36 undeveloped leases. Construction activities would occur in the Santa Maria Basin and, to a lesser extent, the western Santa Barbara Channel. Decommissioning of existing offshore oil and gas facilities will begin in the eastern Channel about 2012 and shift westward over a period of years. Thus, there will be periods of noise and disturbance-producing activities occurring in different parts of the project area at various times. Throughout these periods, routine activities such as production and vessel and helicopter support traffic will continue.

Overall, the impacts to threatened and endangered marine mammals in the project area from routine offshore oil and gas activities, primarily noise and disturbance, will increase over present levels. However, the areas covered by these activities will be small relative to the available marine mammal habitat, and the periods of disturbance will be localized. Cumulative impacts to threatened and endangered marine mammals from all the routine oil and gas activities assumed to take place between 2002 and 2030, including those associated with the development of the 36 undeveloped leases, are expected to be low.

Without development of the 36 undeveloped leases, the probabilities that one or more oil spills will occur during the period 2002-2030 from existing OCS oil and gas activities are 73.9 percent for a spill of 200 bbl or less and 59.1 percent for a spill of 2,000 bbl. Under the most likely scenario for development of the 36 undeveloped leases, these probabilities are 98.8 percent and 53.9 percent, respectively. The probability of a 22,800-bbl tanker spill occurring during this period is 90.5 percent. Thus, the potential for an oil spill occurring from development of the 36 undeveloped leases represents a measurable incremental increase to the overall cumulative oil spill risk for threatened and endangered marine mammals. Expected impacts to threatened and endangered cetaceans and pinnipeds remain negligible to low depending on the species. Oil spills would be expected to result in low to moderate impacts to the southern sea otter during this period. Non-OCS tankers remain by far the greatest source of oil spill risk to sea otters.

6.2.9.2 CUMULATIVE THREATENED AND ENDANGERED BIRD IMPACTS (2002-2030)

For the 2002-2030 time period, this analysis considers the cumulative impacts to threatened and endangered birds from: 1) existing and future Federal and State offshore oil activity, 2) crude oil imports by tanker, 3) other anthropogenic (military activities, recreation, commercial fishing) and non-anthropogenic (e.g., El Ni–o events) impact sources, and 4) proposed and potential development of 36 currently undeveloped OCS leases. Refer to section 5.2.9.3 for a discussion of effects from the Proposed Action for the time period 2002 to 2006.

Cumulative Impacts Without Development of the 36 undeveloped leases (2002-2030): Cumulative impacts related to offshore oil and gas activities that may have measurable, long-term (e.g., months) effects on threatened and endangered birds are oil spills, disturbance from helicopter flights, and platform decommissioning. These impacts have occurred (in the case of past and present operations and past oil spills) or may occur (in the case of proposed projects and potential oil spills) from existing Federal and State projects and proposed State projects (e.g., Tranquillon Ridge) whether or not the 36 undeveloped leases are developed. Pipeline construction could also have an impact if it were to involve nesting or wintering areas. However, no new pipeline landfalls are planned for existing Federal and State projects or for proposed state projects (e.g., Tranquillon Ridge). Other activities associated with oil and gas development, including exploration activities, platform installation and operation, discharges, and vessel traffic, have, at most, very short-term (e.g., a few hours or days), biologically unimportant (e.g., movement out of the path of an approaching vessel) effects on threatened and endangered birds and do not contribute to cumulative impacts.

Accidental Oil Spills. Historically, birds in the project area have been affected by OCS-related oil spills (see section 4.6.7). Based on the discussion of oil spill risks in section 5.1.3, the most likely scenario for existing Federal and State offshore oil production and projects proposed by the State is that one or more oil spills in the 50-1,000-bbl range would occur from offshore oil and gas activities over the period 2002-2030, and that such a spill would most likely be 200 bbl or less in volume. The maximum reasonably foreseeable oil spill volume from future offshore oil and gas activities is 2,000 bbl, assumed for purposes of analysis to be a pipeline spill.

Spilled oil may affect birds in several ways: 1) direct contact with floating or beached oil; 2) toxic reactions; 3) damage to bird habitat; and 4) damage to food organisms. Oil-related mortality is highly dependent on the life histories of the bird species involved. Birds that spend much of their time feeding or resting on the surface of the water are more vulnerable to oil spills (King and Sanger, 1979). See section 5.2.7.2.2, for a discussion of the potential effects of oil spills and cleanup efforts on birds.

The level of impact on birds from an oil spill depends on a variety of factors, including the type, rate, and volume of oil spilled and the weather and oceanographic conditions at the time of the spill. These parameters would determine the quantity of oil that is dispersed into the water column; the degree of weathering, evaporation, and dispersion of the oil before it contacts a shoreline; the actual amount, concentration, and composition of the oil at the time of shoreline or habitat contact; and a measure of the toxicity of the oil. Vulnerability to oil spills also varies from species to species based on abundance, distribution, seasonal occurrence, and habitat.

Although there is not a high degree of correlation between the size of a spill and the number of birds affected, a 200-bbl spill will generally have far less impact than one of several thousand barrels. However, a spill in the range of 200 bbl has the potential for affecting a few of the threatened and endangered species that occur in the project area (e.g., the 163-bbl Torch pipeline spill off Vandenberg AFB contacted California brown pelicans and western snowy plovers). Because of weathering, dispersion, and cleanup efforts, the effects of a 200-bbl spill would most likely be limited to the general vicinity of the source of the spill. If the spill remains offshore and does not contact the mainland or islands, the only threatened and endangered species that could probably be affected is the California brown pelican. If contact with the shore occurs, California least terns, western snowy plovers, and light-footed clapper rails could also be affected. A 200-bbl spill is not expected to reach Santa Catalina Island, and bald eagles would, therefore, not be affected. It is estimated that a 200-bbl spill could contact from about 1 km (95% probability) to 19 km (5% probability) of coastline (see section 5.1.3). Because of the actions of weathering, dispersion, and cleanup efforts, a spill of this size is only likely to contact shore in close proximity to a platform or pipeline. Brown pelicans occur throughout the project area and are especially widespread during the late summer and fall; therefore, at least a few pelicans would probably be oiled regardless of the location of the spill. The greatest threat to pelicans would be from a spill from one of the platforms (Grace, Gilda, Gail, or Gina) or associated pipelines at the eastern end of the Santa Barbara Channel. A 200-bbl spill from this area could contact Anacapa Island, which is the location of the largest pelican colony along the Pacific coast (see section 4.6.7). A spill in close proximity to, or contacting, this island during the breeding season could re-

sult in the loss of adult birds and disrupt nesting activities; cleanup efforts could exacerbate the impact of a spill on nesting pelicans, which are especially sensitive to disturbance.

California least tern colonies in proximity to offshore oil operations are located at Vandenberg Air Force Base, the Santa Clara River mouth, Ormond Beach, and Point Mugu. The number of pairs at most of these locations is generally low (<50) except for Point Mugu, which had 266 pairs in 1998 (Keane, 2000). If a 200-bbl spill were to occur and contact one of these tern colonies during the breeding season, some loss of nesting birds and disruption of nesting activities would be expected; cleanup efforts could exacerbate the impact of a spill on nesting terns, which are especially sensitive to disturbance. Based on weathering, dispersion, cleanup efforts, and the distance between tern colonies, probably no more than one colony would be affected.

Light-footed clapper rails in the project area are restricted to two coastal salt marshes, Carpinteria, and Mugu Lagoon, both of which are close enough to existing and proposed offshore oil developments to be contacted by a 200-bbl oil spill. The number of rails in these areas is not great (see section 4.6.7), with no more than 10-15 at either location. However, the number of rails in California is also very small (<500), and even the small number of birds in the project area are quite important. Based on weathering, dispersion, cleanup efforts and the distance between Carpinteria and Mugu Lagoon (about 11 miles or 18 km), only one of these areas could be contacted by a 200-bbl spill. Also, to have an effect on rails, oil would have to both contact the shore and enter one of the marshes, the latter of which can be prevented in some cases.

Critical nesting habitat for the western snowy plover in the project area in proximity to existing or proposed offshore oil developments is located at Vandenberg Air Force Base and Devereaux Beach in Santa Barbara County and the Santa Clara River mouth, Ormond Beach, and Mugu Lagoon in Ventura County. If a 200-bbl spill were to occur and contact one of these areas during the breeding season, some loss of nesting birds and disruption of nesting activities would be expected; cleanup efforts could exacerbate the impact of a spill on nesting plovers, which are especially sensitive to disturbance. Based on weathering, dispersion, cleanup efforts, and the distance between nesting beaches, probably no more than one area would be affected.

By its very size, the impact of a 2,000-bbl spill on threatened and endangered birds would likely be much greater than that of a 200-bbl spill, depending on the timing, location, and movements of each spill. A 2,000-bbl spill would affect a much larger area than a 200-bbl spill, and could, therefore, contact a larger number of birds. It is estimated that a 2,000-bbl spill could contact from about 3 km (95% probability) to 53 km (5% probability) of coastline (see section 5.1.3). A 2,000-bbl spill could originate from a greater number of locations and still contact Anacapa Island. A 2,000-bbl spill could also contact more than one tern colony, rail marsh, or plover nesting beach. Some oil could also reach Santa Catalina Island and possibly affect the small population of bald eagles that have been reintroduced there. The cleanup process for such a spill would be much more complex and protracted, with potentially greater impacts to threatened and endangered birds.

Overall, the impacts to threatened and endangered birds of potential oil spills from existing Federal, State, and State-proposed oil and gas operations are expected to range from low (if Anacapa Island is not contacted and only one tern colony or plover nesting beach is affected) to moderate (if Anacapa Island is contacted or more than one colony or nesting beach is contacted, or a rail marsh is contacted, or a large amount of oil reaches Santa Catalina Island).

Helicopter Traffic. Another potential source of impacts from existing and proposed Federal and State offshore oil operations is helicopters. The level of helicopter traffic related to offshore oil and gas activities in the project area is described in section 5.1. Routinely, 8-10 helicopter trips occur offshore each day, including those contracted by MMS. Helicopter flights related to offshore oil may originate from three locations depending on the purpose and destination of the flights: the Camarillo Airport in Ventura County, and the Santa Barbara and Santa Maria Airports in Santa Barbara County. See section 5.4.5.1.1, for a discussion of the potential effects of helicopters on birds. Birds are probably the most sensitive to disturbance from helicopter flights during the breeding season. No helicopter fights cross over Anacapa Island or any of the other Channel Islands, and nesting pelicans are, therefore, not affected. Flights from the Camarillo Airport cross the coast at 3-4 locations along the Ventura County coastline (R. Howell, MMS, pers. comm.), all of which are at least 3 km from either a least tern colony or snowy plover nesting beach. Rails in Ventura County are restricted to Mugu Lagoon, which is located entirely within the Naval Air Warfare Center Weapons (NAWCWPNS) Division Point Mugu , where non-military helicopters flights are not allowed. Flights from the Santa Barbara Airport cross the coast at one location (T. Marr, Petroleum Helicopters, Inc., pers. comm.), which is about 5 km from the nearest snowy plover beach (least terns and light-footed clapper rails do not nest in this part of Santa Barbara Co.). See section 5.3.1.1 for a description of helicopter flights from the Santa Maria Airport. Based on the fact that flights over nesting areas will either

not occur or will be at an altitude of 1,000 ft or more, no impacts to threatened and endangered birds from helicopter flights resulting from existing Federal offshore oil operations are expected.

Platform Decommissioning. Section 5.2.9.3 discusses the process of delineation well abandonment and the possibility of impacts to marine birds. Section 5.1 describes the processes involved in decommissioning offshore facilities. For purposes of analysis, it is assumed that decommissioning would encompass the complete removal of a platform and associated pipelines, with none of the leg structure left in place to form an artificial reef. Platform removal would only have an effect on birds if explosives are used in the process. To date, only one OCS facility in the Pacific Region has been decommissioned (by non-explosive means)—the Offshore Storage and Treatment (OS&T) vessel that formerly served the Santa Ynez Unit platforms in the Santa Barbara Channel. In addition, six offshore platforms in State waters in the Channel have been removed with the use of explosives—two in 1988 and four in 1996 (table 4.0.1-6). Other OCS platforms may be removed during the period 2002-2030. Table 4.0.1-6 presents estimated removal dates for existing oil and gas structures offshore southern California. It is expected that no OCS platforms in the Santa Barbara Channel or Santa Maria Basin will be removed before 2012, and a few may be in place as late as 2025 (or 2035, in the case of Platform Irene if the Tranquillon Ridge development occurs). Although no impacts to brown pelicans have been reported to result from platform removal, under certain circumstances as discussed in section 5.2.9.3, it is possible that pelicans could be injured or killed as a result of explosives used for platform removal. Although no impacts to pelicans are expected as a result of delineation well abandonment associated with the proposed projects (section 5.2.9.3), a few could be injured or killed with platform decommissioning because of the greater number of explosive charges used.

Impacts from Non-Offshore Oil Sources. Based on the discussion of oil spill risks in section 5.1.3, the mean size for an oil spill from a tanker accident is assumed to be 22,800 bbl. By its very size, a 22,800-bbl spill could have far greater impacts to threatened and endangered birds than those from offshore oil operations discussed above depending on the location, timing, and movement of the spills. It is estimated that a 22,800-bbl spill could contact from about 9 km (95% probability) to 160 km (5% probability) of coastline (see section 5.1.3). However, the possibility of contact with the shore is ameliorated somewhat by the fact that oil tankers voluntarily maintain a distance of 90 km (50 nm) from the mainland for much of their route. The cleanup process for a spill of this size would be much more difficult and protracted compared to that for the smaller spills discussed above, especially if a significant proportion of the oil reaches shore. Overall, the impact of a 22,800-bbl tanker spill on threatened and endangered birds is expected to range from low to high, depending on the timing, location, and movement of the spill.

Other factors that have historically contributed to cumulative impacts on threatened and endangered birds in the project area include pollution (e.g., DDT), habitat loss (e.g., conversion of wetland to marinas), predation (especially for least terns and light-footed clapper rails), and other forms of disturbance (e.g., beach use). See section 4.6.7.2 for further details on each species. Overall, the cumulative impacts of these factors on threatened and endangered birds in the project area range from low to moderate, depending on the species.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): The potential scenario for the exploration and development of the 36 currently undeveloped leases is described in section 5.1. Of the activities and possible accidental events described in section 5.1, only oil spills and disturbance from helicopter flights may have measurable, long-term (e.g., months) effects on threatened and endangered birds. Pipeline construction could also have an impact if it were to involve nesting or wintering areas. However, the assumed locations of pipeline landfalls that may occur as a result of development of the 36 leases do not coincide with nesting or wintering areas for threatened and endangered birds. Other activities associated with oil and gas development, including exploration activities, platform installation and abandonment, discharges, and vessel traffic, have, at most, very short-term (e.g., a few days), biologically unimportant (e.g., movement out of the path of an approaching vessel) effects on threatened and endangered birds and do not contribute to cumulative impacts.

The oil spill risk analysis provided in section 5.1.3 indicates a greater likelihood of both a 200-bbl and a 2,000-bbl oil spill occurring with the development of the 36 undeveloped leases. However, a greater potential for an oil spill to occur does not necessarily indicate a higher level of impact, and the impacts of oil spills to threatened and endangered birds that may occur as a result of offshore oil development, including the 36 leases, remains low to moderate as described above for existing Federal and State projects and proposed State projects.

Helicopter traffic is expected to increase as a result of the development of the 36 leases, especially during construction. However, no change is expected in either the airports used for these flights, the flight paths to and from the various airports, and the flight restrictions currently in place (e.g., Vandenberg AFB, Channel Islands National Marine Sanctuary). Therefore, helicopter flights associated with the most likely

development scenario for the 36 leases are not expected to contribute to cumulative impacts on threatened and endangered birds in the project area.

Summary and Conclusion: The cumulative impacts to threatened and endangered birds in the project area from all sources for the period from 2002-2030, including any activities and accidental events that may be associated with the development of the 36 undeveloped leases, range from moderate to high, depending on the species involved and the timing, location and movement of the assumed 22,800-bbl tanker spill.

6.2.9.3 CUMULATIVE THREATENED AND ENDANGERED SEA TURTLES IMPACTS (2002-2030)

This section discusses the cumulative impacts to threatened and endangered sea turtles both without and with the development of the 36 leases in the period 2002-2030. Section 5.2.9.6 discusses the major impact agents associated with routine past, present, and foreseeable offshore oil and gas activities, including the proposed activities, that may produce impacts during 2002-2006, the expected duration of the proposed delineation activities. These include noise and disturbance, drilling discharges, and the potential use of explosives in the decommissioning of offshore facilities. Other, non-OCS sources of impacts to sea turtles, both anthropogenic and non-anthropogenic, are also discussed.

Cumulative Impacts without Development of the 36 Undeveloped Leases (2002-2030): This section examines the cumulative impacts to threatened and endangered sea turtles without the development of the 36 leases in the period 2002 to 2030. The projects discussed in this section include past, present, and foreseeable actions that may produce impacts during 2002-2030, the period during which development of the 36 undeveloped leases would likely occur (section 6.1).

Oil and Gas Activities. Section 5.2.9.6 describes the routine offshore oil and gas activities that may result in cumulative impacts to sea turtles. These include geophysical surveys, construction, drilling and production activities with associated support activities, and the abandonment, or decommissioning, of wells and offshore facilities. As discussed in section 5.2.9.6, the major impact agents expected from these proposed activities are noise and disturbance and drilling discharges. The potential use of explosives in the abandonment of wells and offshore platforms also raises the possibility of lethal impacts to sea turtles.

Noise and Disturbance. In general, the routine activities associated with offshore activities in the project area are expected to have little effect on sea turtle populations over the 2002-2030 period. As discussed in section 5.2.9.6, implementation of mitigation similar to that employed for platform removal in the Gulf of Mexico would make it unlikely that any sea turtle injury or mortality would occur as a result of the use of explosives in decommissioning operations. In addition to these effects, decommissioning activities would result in noise and disturbance to sea turtles during the removal of platform structures and pipelines.

Effluent Discharges. Section 4.0 describes the treatment and discharge of platform effluents in the Pacific OCS Region. Section 5.2.9.5 discusses the potential impacts of effluent discharges from the drilling of the proposed delineation wells on sea turtles. Given the low densities of sea turtles in the project area, impacts are expected to be negligible.

Oil Spills. Section 5.1.3 discusses the cumulative oil spill risk for the project area. Tables 5.1.3.1-2 and 5.1.3.1-3 present the estimated mean number of spills of various sizes and the probability of their occurrence as a result of the described activities. The probability of one or more spills 200 bbl or less in size occurring from existing and proposed offshore oil and gas activities during the period 2002-2030 is 99 percent (table 5.1.3.1-2). The probability that one or more spills in the 2,000-bbl range will occur from these activities is 59.1 percent (table 5.1.3.1-3). The risk of a major tanker spill (22,800-bbl) during this period is estimated to be 99 percent (table 5.1.3.1-3).

Impacts to sea turtles from any oil spills occurring during this period would be similar to those described in section 5.2.9.6 for the 200- and 2,000-bbl spills assumed to occur as a result of offshore oil and gas activities and for the assumed 22,800-bbl tanker spill.

Military Activities. It is assumed that military activities in the project area will continue at or near the levels described in section 5.2.8.2 during the period 2002-2030. Thus, the impacts to sea turtles associated with these activities would also expected to be less than significant (U.S. Navy, 2000, 2001).

Commercial Fisheries. As discussed in section 5.2.9.6, incidental take in commercial fishing operations continues to be a serious threat to sea turtles. Many of the fisheries involved operate outside of U.S. jurisdiction, but efforts have begun to monitor, and potentially reduce, the incidental take of sea turtles in the Hawaiian longline fishery (NMFS, 1999).

Other Anthropogenic Sources of Impacts. Section 5.2.9.6 discusses potential cumulative impacts to sea turtles from other, human-related activities. On the species' nesting beaches these include the direct take of adults and eggs, coastal construction and other beach activities, and artificial lighting. At sea, they include the direct take of sea turtles, the entanglement or ingestion of debris, and marine pollutants.

In embayments and other nearshore habitats, construction activities and boat collisions are sources of potential impact, especially for green sea turtles. These activities are likely to continue during the period 2002-2030.

Non-anthropogenic Sources of Impacts. Section 5.2.9.6 discusses potential cumulative impacts to sea turtles in the project area from a number of non-anthropogenic sources, including disease, predation, and natural phenomena. Each of these may periodically have significant impacts on sea turtle populations, at least at the local level. However, the likelihood of their occurrence (and the levels of subsequent impacts on sea turtles) during the period 2002-2030 cannot be predicted.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): Development of the 36 undeveloped leases would involve a number of oil and gas activities in addition to those discussed earlier in this section. These activities are described in section 6.1. Impacts on sea turtles in the project area from these activities are expected to be limited to temporary, localized disturbance to a few individuals, as discussed in section 5.2.9.6.

As discussed in section 5.2.8.1.2 (Mitigation MM1), implementation of mitigation similar to that employed for platform removal in the Gulf of Mexico would make it unlikely that any sea turtle injury or mortality would occur as a result of the use of explosives in decommissioning operations.

Volumes of platform effluents discharged in the course of developing the 36 undeveloped leases are expected to be equivalent to those estimated for existing OCS platforms (section 4.0, table 4.0.1-8). As discussed in previous sections, all platform effluents will be discharged under NPDES permit and will be required to meet NPDES water quality criteria. No measurable effects to sea turtles in the project area are expected from these discharge volumes.

If all 36 leases are developed, under the most likely development scenario the probability of one or more spills 200 bbl or less in size occurring is 98.8 percent (section 5.1.3, table 5.1.3.1-2). The probability that one or more spills in the 2,000-bbl range will occur from these activities under the most likely development scenario is 53.9 percent (table 5.1.3.1-3).

Impacts to sea turtles from any oil spills occurring as a result of the development of the 36 undeveloped leases would be similar to those described above for the 200- and 2,000-bbl spills assumed to occur as a result of offshore oil and gas activities and for the assumed 22,800-bbl tanker spill.

Summary and Conclusions (2002-2030): Although recovery plans have been finalized for all four species of sea turtles found on the U.S. west coast (NMFS and FWS, 1998a-d), the trends of these populations over the next quarter of a century are uncertain. Leatherback sea turtles are the species most commonly sighted at sea in this area, but their Mexican nesting populations are decreasing (NMFS, 1999). The same is true for nesting populations of green turtles in Mexico, although their nesting populations in the Pacific are increasing overall (NMFS, 1999). In contrast, nesting populations of Pacific ridley sea turtles in Mexico and Costa Rica are still quite large and apparently increasing (NMFS, 1999). Loggerhead sea turtles nest in the western Pacific; their population status in most areas is unknown (NMFS, 1999). The primary threats to sea turtles along the west coast are incidental take in commercial fisheries and, to a lesser extent, entanglement in and ingestion of marine debris. Primarily warmwater species, such as the green, ridley, and loggerhead sea turtles, are also subject to boat collisions in nearshore waters and cold stunning during El Niño episodes.

Overall, the impacts to sea turtles in the project area from routine offshore oil and gas activities, primarily noise and disturbance, will increase over present levels. However, the areas covered by these activities will be small relative to the available habitat, and the periods of disturbance will be localized. Cumulative impacts to sea turtles from all the routine oil and gas activities assumed to take place between 2002 and 2030, including those associated with the development of the 36 undeveloped leases, are expected to be negligible.

Accidental oil spills present an ongoing source of potential impacts to sea turtles. The cumulative risk of oil spills arises from multiple sources, including offshore oil and gas activities in Federal and State waters and both Alaskan and foreign-import tankering. The greatest oil spill risk to sea turtles in the project area results from tankering operations. This risk is tempered by recently implemented or proposed mitigation (such as the rerouting of tankers farther offshore along the central California coast) and, as discussed in section 5.1.3, by modern oil spill response capabilities. As was discussed in section 5.2.9.6, impacts to sea turtles from the oil spills assumed to occur in the project area during the period 2002-2030 would be negligible.

6.2.9.4 CUMULATIVE THREATENED AND ENDANGERED AMPHIBIANS IMPACTS (2002-2030)

Cumulative Impacts without Development of the 36 Undeveloped Leases (2002-2030): Section 5.0 describes the projects considered in the cumulative analysis for the proposed delineation activities. Possible sources of cumulative impacts in the project area include on-going and proposed oil and gas activities in Federal and State waters, Alaskan and foreign-import tankering. Cumulative impacts to threatened California red-legged frogs also occur from habitat loss due to urbanization, competition and predation with exotic or invasive species, and other anthropogenic and non-anthropogenic sources.

The projects discussed in this section include past, present, and foreseeable actions that may produce impacts during 2002-2030, the expected duration of the proposed action. Potential cumulative impacts are discussed below.

Offshore Oil and Gas Activities. Past, present and foreseeable oil and gas development activities in the project area have impacts that may affect onshore amphibians. These include onshore construction and the laying of pipelines associated with offshore development. Accidental oil spills may also impact coastal habitat for the California red-legged frog

Onshore Construction. Past construction projects onshore, including pipelines have added to the overall cumulative impacts to California red-legged frogs of southern California. The primary effects have been due to habitat loss and fragmentation. No onshore construction activities are planned for any existing Federal or State offshore oil and gas projects, or for the State Tranquillon Ridge project.

Oil Spills. Section 5.0 discusses the cumulative oil spill risk for the project area, which results from several sources: ongoing and projected oil and gas production from existing OCS facilities in the Santa Barbara Channel and Santa Maria Basin, several proposed development projects on the Federal OCS, ongoing production from one facility in State waters in the Santa Barbara Channel, two likely oil and gas projects in State waters, and the tankering of Alaskan and foreign-import oil through area waters. The most likely oil spill scenario is that one or more oil spills in the 50-1,000-bbl range would occur from offshore oil and gas activities over the period 2002-2030, and that such a spill would be 200 bbl or less in volume. The probability that one or more spills of this size will occur this period is 73.9 percent (table 5.1-1). The maximum reasonably foreseeable oil spill volume from offshore oil and gas activities is 2,000 bbl, assumed for purposes of analysis to be a pipeline spill. The probability of a spill of this size occurring during the period 2002-2030 is 59.1 percent (table 5.1-1). Based on data from tanker spills in U.S. waters, the mean size for a tanker spill is assumed to be 22,800 bbl (with a probability of occurrence of 90.5 percent for this period; table 5.1-1). As discussed in section 5.0, none of the oil produced on the Pacific OCS is transported by tanker. However, the transport of foreign and Alaskan oil along the U.S. west coast does present an oil spill risk.

Oil may affect amphibians through various pathways including direct contact, ingestion of contaminated prey, and lingering sublethal impacts due to oil becoming sequestered in sediments and persisting in some cases for years in low energy environments (NRC 1985). The level of impacts and the persistence of the oil in the environment will depend on the volume of oil that reaches the habitat and the amount of mixing and weathering the oil has undergone before reaching the habitat. An at sea oil spill would not impact breeding or estivation habitat of red-legged frogs which is well upstream of the coast.

Adult red-legged frogs move down to the brackish coastal lagoons formed seasonally behind sand berms that close the mouths of rivers and streams along the south central coast. Storms or tides may breach these natural berms, at which point the frogs move upstream to freshwater. There is some risk that an oil spill might reach the coastal lagoons during a high tide or storm when the sand berms have been breached. Red-legged frogs cannot tolerate salinities in excess of 9ppm and leave the coastal lagoons when seawater breaches the sand berms (pers.com., Norman Scott, USGS-BRD). Though no direct oil contact with frogs is expected, the oil can become sequestered in the sediments and persist until rains flush the sediments from the lagoon. If the sand berms form again and conditions become favorable, some red-legged frogs may return before the contaminated sediments are flushed into the ocean. The level of toxicity would be dependent on the weathering of the oil and the volume of oil that reaches the lagoon.

Data from moored current meters and surface-drifter trajectory observations (section 5.0) indicate that north of Point Conception, a spill would move northward along the mainland coast nearly 30 percent of the time. The OSRA model runs (section 5.0) predict up to a 5% probability that if a spill were to occur between October and March the Pt. Arguello area would be contacted by oil within 3-days from one of the three launch points. The coastal rivers and streams in the Pt. Arguello area support populations of red-legged frogs (pers. com. Norman Scott, USGS-BRD). Tadpoles have been reported in Jalama and Cañada Honda creeks and adult frogs can be found seasonally in the coastal lagoons of the central California coast. Eggs and tadpoles are not found in the coastal lagoons.

If an oil spill did occur, and the sand berms of the coastal lagoons were breached, sublethal impacts to red-legged frogs might occur if the frogs returned before rains flushed the sediments from the lagoons. Oil spill response teams would be expected to boom the mouths of creeks and rivers or enhance the existing berms in the event of a spill thus minimizing the chance of oil reaching the lagoons. An oil spill that contacts the mainland along the central California coast is unlikely to result in red-legged frog mortalities or sub-lethal effects. However habitat destruction could result from clean-up efforts. Proper preparation and execution of the oil spill contingency plan should protect these areas during an oil spill response.

In conclusion, only minor short-term impacts to seasonal habitat of the California red-legged frog would be expected from an oil spill.

Other Activities. Habitat loss and alteration are the primary factors that have negatively affected the California red-legged frog throughout its range. For example, in the Central Valley of California, over 90 percent of historic wetlands have been diked, drained, or filled primarily for agricultural development and secondarily for urban development. Wetland alterations, clearing of vegetation, and water diversions that often accompany agricultural development make aquatic sites unsuitable for California red-legged frogs. Urbanization with its associated roadway, stream channelization, and large reservoir construction projects has significantly altered or eliminated California red-legged frog habitat, with the greatest impact occurring in southern California. The majority of extant localities are isolated and fragmented remnants of larger historical populations.

Loss of habitat and decreases in habitat quality will occur as a result of on-site degradation of the stream environment and/or riparian corridor, or through modification of instream flow. Where streams or wetlands occur in urban areas, the quality of California red-legged frog habitat is degraded by a variety of factors. Among these factors are introduction of exotic predators, elimination of streambank vegetation, collecting, and loss of upland habitat.

Water projects, which accompany urban and agricultural growth, have had a negative effect on California red-legged frogs and their habitat. The construction of large reservoirs, such as Lake Oroville, Whiskeytown Reservoir, Don Pedro Reservoir, Lake Berryessa, San Luis Reservoir, Lake Silverwood, Lake Piru, Pyramid Lake, and Lower Otay Lake, have eliminated California red-legged frog habitat or fragmented remaining aggregations (Jennings et al., 1993).

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2036): The potential scenario for the exploration and development of the 36 currently undeveloped leases is described in section 5.0. Of the activities and possible accidental events described, only oil spills and construction of onshore facilities may have measurable, long-term (e.g., years) effects on threatened amphibians (California red-legged frog). Pipeline construction could also have an impact if it were to occur in California red-legged frog habitat. Other activities associated with oil and gas development, including exploration activities, platform installation and abandonment, discharges, and vessel traffic will not have an impact on threatened and endangered amphibians.

The oil spill risk analysis provided in section 5.0 indicates a greater likelihood of both a 200-bbl (98.8 percent) and a 2,000-bbl (53.9 percent) oil spill occurring with the development of the 36 undeveloped leases. Although a greater potential for an oil spill to occur does not necessarily indicate a higher level of impacts, the potential for an oil spill occurring from deveolpment of of the 36 undeveloped leases represents a measurable incremental increase to the overall oil spill risk for threatened and endangered amphibians.

Summary and Conclusion: While the Fish and Wildlife Service has issued a Draft Recovery Plan (2000) for the California red-legged frog, it is impossible to predict this species' progress toward recovery over the next 30 years. Given current trends, the fragmentation and degradation of California red-legged frog habitat of the south and central coast of California will likely continue due to urbanization and other human-related activities.

Overall, the impacts to California red-legged frogs in the project area from routine offshore oil and gas activities, primarily onshore construction, will increase over present levels only if the 36 undeveloped leases are developed. However, the areas that would be impacted by onshore activities will be small relative to the available frog habitat, and critical areas would likely be avoided. Cumulative impacts to California red-legged frogs from all the routine oil and gas activities assumed to take place between 2002 and 2030, including those associated with the development of the 36 undeveloped leases, are expected to be low.

Without development of the 36 undeveloped leases, the probabilities that one or more oil spills will occur during the period 2002-2030 from existing OCS oil and gas activities are 73.9 percent for a spill of 200 bbl or less and 59.1 percent for a spill of 2,000 bbl. Under the most likely scenario for development of the 36 undeveloped leases, these probabilities are 98.8 percent and 53.9 percent, respectively. The probability of a 22,800-bbl tanker spill occurring during this period is 90.5 percent. Thus, the potential for an oil spill occurring from development of the 36 undeveloped leases represents a measurable incremental increase to the overall cumulative oil spill risk for California red-legged frogs.

6.2.9.5 CUMULATIVE THREATENED AND ENDANGERED FISH IMPACTS (2002-2030)

Cumulative Impacts without Development of the 36 Undeveloped Leases (2002-2030): Section 5.0 describes the projects considered in the cumulative analysis for the proposed delineation activities. Possible sources of cumulative impacts in the project area include on-going and proposed oil and gas activities in Federal and State waters, Alaskan and foreign-import tankering. Cumulative impacts to threatened and endangered fish also occur from habitat loss due to urbanization, competition and predation with exotic or invasive species, and other anthropogenic and non-anthropogenic sources.

The projects discussed in this section include past, present, and foreseeable actions that may produce impacts during 2002-2030, the expected duration of the proposed action. Potential cumulative impacts are discussed below.

Offshore Oil and Gas Activities. Routine past, present and foreseeable oil and gas development activities in the project area are described in section 5.0. These activities have had low impacts on threatened and endangered fish species. No new pipeline or onshore facilities are planned for existing Federal and State projects or the proposed Tranquillon Ridge project. Accidental oil spills may impact coastal habitat for the southern steelhead and tidewater goby.

Oil Spills. Section 5.0 discusses the cumulative oil spill risk for the project area, which results from several sources: ongoing and projected oil and gas production from existing OCS facilities in the Santa Barbara Channel and Santa Maria Basin, several proposed development projects on the Federal OCS, ongoing production from one facility in State waters in the Santa Barbara Channel, two likely oil and gas projects in State waters, and the tankering of Alaskan and foreign-import oil through area waters. The most likely oil spill scenario is that one or more oil spills in the 50-1,000-bbl range would occur from offshore oil and gas activities over the period 2002-2030, and that such a spill would be 200 bbl or less in volume. The probability that one or more spills of this size will occur this period is 73.9 percent (table 5.1-1). The maximum reasonably foreseeable oil spill volume from offshore oil and gas activities is 2,000 bbl, assumed for purposes of analysis to be a pipeline spill. The probability of a spill of this size occurring during the period 2002-2030 is 59.1 percent (table 5.1-1). Based on data from tanker spills in U.S. waters, the mean size for a tanker spill is assumed to be 22,800 bbl (with a probability of occurrence of 90.5 percent for this period; table 5.1-1). As discussed in section 5.0, none of the oil produced on the Pacific OCS is transported by tanker. However, the transport of foreign and Alaskan oil along the U.S. west coast does present an oil spill risk.

A generic discussion of the effects of oil spills on fish is presented in 5.2.6.2. Research shows that hydrocarbons and other constituents of petroleum spills can, in sufficient concentrations, cause adverse impacts to fish and can range from mortality to sublethal effects that inhibit growth, longevity, and reproduction.

Tidewater Goby. Endangered tidewater gobies, which are found in shallow coastal lagoons, stream mouths and shallow areas of bays potentially could be impacted by an oil spill. There is some risk that an oil spill might reach the coastal lagoons during a high tide or storm when the sand berms blocking the stream mouths from the ocean have been breached. Breaches usually occur during the winter and spring months and tidewater gobies often move upstream out of the lagoons during this period. Though direct oil contact with gobies would be unlikely, the oil can become sequestered in the sediments and persist until rains flush the sediments from the lagoon. When the gobies return, short-term sublethal effects would also be expected, since gobies burrow into and feed in the sediment and rely on macrofaunal and intertidal communities for food and shelter from predators. The level of impacts, however, are dependent on the volume of oil that reaches their habitat and the amount of weathering and mixing the oil has undergone before reaching the habitat.

However, tidewater gobies along the south-central California coast are quite resilient and have a great ability to disperse and re-colonize areas from which they were previously eliminated (FWS News Release, June 24, 1999). Thus, oil spills associated with existing offshore oil and gas activities are expected to have only minor impacts on tidewater gobies in the project area.

Steelhead Trout. The critical habitat for endangered steelhead trout includes all river reaches and estuarine areas accessible to listed steelhead in coastal river basins from the Santa Maria Basin to Malibu Creek. In the Point Arguello area, this would include the Santa Ynez River, San Antonio Creek, and the Santa Maria River, and perhaps Jalama and Cañada Honda Creeks. South of Point Arguello this would include the Ventura and Santa Clara Rivers, and Malibu Creek. Only winter steelhead occur along the south-central coast. Winter steelhead enter their home streams from November to April to spawn. Juveniles migrate to sea usually in spring.

If an oil spill contacted shore in the project area during the steelhead trout migration, some mortality and short-term sublethal impacts to steelhead might occur. Oil spill response teams would be expected to boom the mouths of creeks and rivers or enhance the existing berms in the event of a spill thus minimizing

the chance of oil reaching critical habitat. The toxicity and persistence of the oil in the environment would be low due to the weathering and mixing of the oil at sea and the high-energy environment of the south central coast.

If an oil spill were to hit the mainland coast of south or central California, it would likely contact one or two of the above critical habitats during a period when steelhead are entering or leaving the river. Little mortality would be expected from such an occurrence. However, sublethal effects causing stress may lead to increased vulnerability to disease and perhaps reduced reproduction to impacted individuals. Migration could also be disrupted. Oil avoidance reactions are well documented in salmon. Adults and juveniles can detect sublethal levels of hydrocarbons (Rice, 1973; Weber et al., 1981) and have been observed actively avoiding contaminated areas (Patten, 1977; Weber et al., 1981). Also, in the event of a spill, oil spill response teams would identify river and stream mouths at risk of oil contact and would immediately boom or build protective berms at the river and stream mouths, which could further disrupt migration. These effects are expected to be short-term due to the weathering and mixing that would occur to the oil before it reached the shore, and the high-energy environment of the south central California coast that will further minimize the toxicity and persistence of the oil in the environment.

In conclusion, oil spills associated with existing offshore oil and gas activities are expected to have only minor impacts on steelhead trout if the spill contacts critical habitat during a period when steelhead are migrating. Due to the openness of the south central coast and the high-energy environment of the area, a spill will likely break into smaller slicks and some of the oil will disperse into the water column. Thus, concentrated oiling of steelhead habitat would not be expected.

Other Activities. Steelhead from the Southern California ESU have already been extirpated from much of their historical range. There is a strong concern about the widespread degradation, destruction, and blockage of freshwater habitats within the region, and the potential results of continuing habitat destruction and water allocation problems. There is also concern about the genetic effects of widespread stocking of rainbow trout. Total abundance of steelhead in the South-Central Coast ESU is extremely low and declining. Risk factors for this ESU are habitat deterioration due to sedimentation and flooding related to land management practices and potential genetic interaction with hatchery rainbow trout.

The northern population of tidewater goby is found along coastal areas from Del Norte County south to Los Angeles County. It lost some of its habitat over the past 150 years to farming, development, and pollution (Pacific Region USFWS News Release June 24, 1999). Since 1994, the northern population of tidewater gobies has rebounded sharply. Early summer 1999, the Service proposed to delist that population, while maintaining the endangered designation for the southern population.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): The potential scenario for the exploration and development of the 36 currently undeveloped leases is described in section 5.0. Of the activities and possible accidental events described, only oil spills and construction of onshore facilities may have measurable, long-term (e.g., years) effects on threatened and endangered fish (Tidewater goby and Southern steelhead). Pipeline construction could also have an impact if it were to occur across steelhead or goby habitat. Other activities associated with oil and gas development, including exploration activities, platform installation and abandonment, discharges, and vessel traffic will not have an impact on threatened and endangered amphibians.

The oil spill risk analysis provided in section 5.0 indicates a greater likelihood of both a 200-bbl (98.8 percent) and a 2,000-bbl (53.9 percent) oil spill occurring with the development of the 36 undeveloped leases. Although a greater potential for an oil spill to occur does not necessarily indicate a higher level of impacts, the potential for an oil spill occurring from development of the 36 undeveloped leases represents a measurable incremental increase to the overall oil spill risk for threatened and endangered fish.

Summary and Conclusion: The principal threats to the recovery of southern steelhead is habitat degradation due to several sources including dams, agricultural and forest management practices, and urbanization. The species also faces potential genetic interaction with hatchery rainbow. These threats will continue through the next quarter century, although efforts are underway to alleviate the problems.

The northern population of tidewater gobies has lost habitat over the past 150 years due to farming and development, but has recently rebounded sharply. Early summer 1999, the Service proposed to delist that population, while maintaining the endangered designation for the southern population.

Overall, the impacts to tidewater gobies and southern steelhead in the project area from routine offshore oil and gas activities, primarily onshore construction, will increase over present levels only if the 36 undeveloped leases are developed. However, the areas that would be impacted by onshore activities will be small relative to the available habitat, and critical areas would likely be avoided. Cumulative impacts to threatened and endangered fish from all the routine oil and gas activities assumed to take place between 2002 and 2030, including those associated with

the development of the 36 undeveloped leases, are expected to be low.

Without development of the 36 undeveloped leases, the probabilities that one or more oil spills will occur during the period 2002-2030 from existing OCS oil and gas activities are 73.9 percent for a spill of 200 bbl or less and 59.1 percent for a spill of 2,000 bbl. Under the most likely scenario for development of the 36 undeveloped leases, these probabilities are 98.8 percent and 53.9 percent, respectively. The probability of a 22,800-bbl tanker spill occurring during this period is 90.5 percent. Thus, the potential for an oil spill occurring from development of the 36 undeveloped leases represents a measurable incremental increase to the overall cumulative oil spill risk for threatened and endangered fish.

6.2.9.6 CUMULATIVE THREATENED AND ENDANGERED PLANT IMPACTS (2002-2030)

For the 2002-2030 time period, this analysis considers the cumulative impacts to threatened and endangered plants from: 1) existing and future Federal and State offshore oil activity, 2) crude oil imports by tanker, 3) other anthropogenic (military activities, recreation, commercial fishing) impact sources, and 4) proposed and potential development of 36 currently undeveloped OCS leases. Refer to section 5.2.9.11 for a discussion of effects from the Proposed Action for the time period 2002 to 2006.

Cumulative Impacts Without Development of the 36 undeveloped leases (2002-2030): Although no impacts to either the salt marsh bird's beak or California sea-blite from past and present OCS-related oil and gas activities in the Pacific Region have been reported, future oil spills and onshore construction activities have the potential for affecting these plants. No onshore construction activities are planned for any existing Federal or State offshore oil project or the proposed State Tranquillon Ridge project; however, oil spills may occur as a result of these projects whether or not the 36 undeveloped leases are eventually developed.

Accidental OCS Oil Spills. Based on the discussion of oil spill risks in Section 5.1.3, the most likely scenario for existing Federal and State offshore oil production and projects proposed by the State is that one or more oil spills in the 50-1,000-bbl range would occur from offshore oil and gas activities over the period 2002-2030, and that such a spill would most likely be 200 bbl or less in volume. The maximum reasonably foreseeable oil spill volume from future offshore oil and gas activities is 2,000 bbl, assumed for purposes of analysis to be a pipeline spill.

Plant mortality from oil spills can be caused by smothering and toxic reactions to hydrocarbon exposure, especially if oil reaches shore before much of the spill's lighter fractions have evaporated or dissolved. Generally, oiled marsh vegetation dies, but roots and rhizomes survive when oiling is not too severe (Burns and Teal, 1971). Research has shown that recovery to pre-oiling conditions usually occurs within a few growing seasons, depending on the magnitude of exposure (Holt et al., 1975; Lytle, 1975; Delaune, et al., 1979; Alexander and Webb, 1987). The cleanup process, if not conducted with respect to Federal and State regulations, could exacerbate the effects of an oil spill on threatened and endangered plants.

Because of weathering, dispersion, and cleanup efforts, the effects of a 200-bbl spill is only likely to contact shore in close proximity to a platform or pipeline. California sea-blite is restricted to Morro Bay and would not be affected by a 200-bbl oil spill. Populations of salt marsh bird's beak in the general vicinity of offshore oil development occur at the Carpinteria Marsh in Santa Barbara County, and the Ventura County Game Preserve, Ormond Beach, and Mugu Lagoon in Ventura County. Any of these areas could be contacted by a 200-bbl spill, if it originated from a nearby platform or pipeline. For impacts to actually occur, however, oil would have to contact this plant's habitat. The primary habitat of this species is coastal salt marsh, where it occurs in the upper part of the marsh. Salt marshes can frequently be protected from oil contact. However, if an oil spill were to contact this species' habitat, some plants could be lost; the cleanup process would have to be conducted with strict adherence to Federal and State regulations to prevent additional losses. It is estimated that a 200-bbl spill could contact from about 1 km (95% probability) to 19 km (5% probability) of coastline (see Section 5.1.3), and because of weathering, dispersion, and cleanup efforts, probably no more than one area where this plant occurs would be affected.

By its very size, the impact of a 2,000-bbl spill on threatened and endangered plants would likely be much greater than that of a 200-bbl spill, depending on the timing, location, and movements of each spill. Although it is still unlikely that a 2,000-bbl spill could contact Morro Bay, which is about 84 km (52 miles) from the closest offshore oil project, such a spill could originate from a greater number of locations and still contact salt marsh bird's beak habitat. A 2,000-bbl spill could also contact more than one area where this plant occurs. The cleanup process for such a spill would be much more complex and protracted, with potentially greater impacts.

Overall, the impacts to the salt marsh bird's beak from oil spills that may originate from existing Federal, State, and State-proposed oil and gas operations

range from low (if only one area is contacted) to moderate (if several areas are contacted). No impacts to the California sea-blite are expected.

Impacts from Non-Offshore Oil Sources. Based on the discussion of oil spill risks in Section 5.1.3, the mean size for an oil spill from a tanker accident is assumed to be 22,800 bbl. By its very size, the impacts of a 22,800-bbl spill on threatened and endangered plants could be far worse than those from offshore oil operations discussed above, depending on the timing, location, and movements of each spill. It is estimated that a 22,800-bbl spill could contact from about 9 km (95% probability) to 160 km (5% probability) of coastline (see Section 5.1.3), and depending on its location and movements, such a large spill could contact the habitat of both the salt marsh bird's beak and the California sea-blite. The only place where the California sea-blite currently exists is Morro Bay, and if a large amount of oil were to enter the bay and contact this species' habitat, the continued existence of this species could be at risk. However, the possibility of contact with the shore is ameliorated somewhat by the fact that oil tankers voluntarily maintain a distance of 90 km (50 nm) from the mainland for much of their route. If the shoreline is contacted, it might be far more difficult to prevent oil from entering a marsh with this size spill. The cleanup process for a spill of this size would also be much more difficult and protracted compared to that for the smaller spills discussed above, especially if a significant proportion of the oil reaches shore. Overall, the impacts to threatened and endangered plants from a 22,800-bbl, non-OCS tanker spill range from low to high, depending on the location and movement of the spill.

The main reason for the endangered status of both the salt marsh bird's beak and California sea-blite is due to the severe alteration of their already limited salt marsh habitat. California salt marshes have been lost to marina and industrial development, beach recreational facilities, housing development, and other human-related factors. See section 4.6.7.6 for further details on each species. Overall, the cumulative impacts to threatened and endangered plants from habitat loss in the project area range from moderate for the salt marsh bird's beak to high for the California sea-blite.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): The potential scenario for the exploration and development of the 36 currently undeveloped leases is described in Section 5.1. Of the activities and possible accidental events described in Section 5.1, only oil spills and construction of onshore facilities may have measurable, long-term (e.g., years) effects on threatened and endangered plants (salt marsh bird's beak and California sea-blite). Pipeline construction could also have an impact if it were to involve the habitat of either of these two plant species. However, the assumed locations of pipeline landfalls that may occur as a result of development of the 36 leases (see Section 5.1) do not contact their habitats. Other activities associated with oil and gas development, including exploration activities, platform installation and abandonment, discharges, and vessel traffic will not have an impact on threatened and endangered plants.

The oil spill risk analysis provided in Section 5.1.3 indicates a greater likelihood of both a 200-bbl and a 2,000-bbl oil spill occurring with the development of the 36 undeveloped leases. Although a greater potential for an oil spill to occur does not necessarily indicate a higher level of impact, with the development of the 36 leases, an oil spill could occur much closer to Morro Bay than is the case for existing facilities. Therefore, the habitat of the California sea-blite could be contacted, if an oil spill were to occur from one of the northernmost of the 36 leases.

SUMMARY AND CONCLUSION:

The cumulative impacts to threatened and endangered plants in the project area from all sources for the period from 2002-2030, including any activities and accidental events that may be associated with the development of the 36 undeveloped leases, range from moderate to high, depending on the species involved, the size, timing, location and movement of potential oil spills, and continued habitat loss.

6.2.10 CUMULATIVE ESTUARINE AND WETLAND HABITATS IMPACTS (2002-2030)

The cumulative section introduction describes the projects considered in the cumulative analysis. This section examines:

- the cumulative impacts to esturarine and wetland habitats without the development of the 36 leases in the time period from 2002 to 2030;
- the additional cumulative impacts to esturarine and wetland habitats from development of the 36 leases in the time period from 2002 to 2030.

Refer to Section 5.2.10 for a discussion of effects for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in Section 5.2.10.

Cumulative Impacts Without Development of the 36 Undeveloped Leases (2002-2030): Cumulative impacts to wetland resources include sedimentation and contamination due to natural storms

and surface runoff, agricultural practices in the watersheds increasing sediment load and pollutants, physical alteration by commercial and residential development, contamination by offshore and onshore sources of oil and other pollutants.

Natural Storms/surface runoff. Seasonal storm events, and especially the extreme storm events associated with El Nino conditions, can significantly impact wetland habitat through surface runoff. Primary impacts to the wetlands from surface runoff include increased sedimentation, contamination by metals, hydrocarbons and other pollutants, reduced function due to the influx of large amounts of debris, and reduced salinity. Impacts range from low to moderate, depending on the severity of the storm and location in relation to population centers.

Agricultural Practices. More attention has been paid recently to the significance of agricultural practices upstream in the watershed and the ultimate affect on estuarine and wetland resources. Many efforts are aimed at examining water resource uses at a watershed level so that all potential sources of sedimentation and water use which affect downstream resources can be considered. Grading and farming activities substantially increase sediment load in the watershed and reduce the function of the adjoining wetlands. Use of pesticides, herbicides and other chemicals on the farmland affects plants and animals downstream in the estuary. The affects from these practices are felt in the watersheds throughout California.

Commercial and Residential Development. The single most important impact to wetlands in California, especially southern California, is the widespread direct destruction and alteration of habitat through commercial and residential development. Only a small fraction, less than 9%, of the wetland habitat available in 1850 when California became a state, now remains; a reduction from 5% area to .5% area (Southern California Wetland Project website, 2000). Indirectly, this increased development also impacts wetlands through increased population pressure, bringing increased public use, pollution, sewage, roads and parking lots to the already impacted habitat. One of the reasons Point Mugu remains as a wetland habitat is due to the restricted building possible on a military base. The areas along the Central Coast to Point Lobos have been considerably less affected by construction activities than Southern California, though building continues to occur along the coastline in lowland areas adversely affecting wetland resources.

Pollution Events. Sources of pollution include cars which contribute significant amounts of hydrocarbons in surface runoff, leaks from sewage outfalls and facilities, ongoing oil and gas development in Federal and State waters and tanker spills. Most of the original estuarine habitat in Southern California has already been severely altered, much of it possibly beyond repair. In general, while the closed nature of many southern California wetlands affords them protection from introduction of pollution events, pollution events are felt much more strongly in an estuary or wetland than on an adjoining sandy beach because it is a partially closed system. Even smaller pollution events, if they reach or are directly deposited into a wetland, can cause significant long-term impacts due to stagnation, adsorption into the soil and overall lack of flushing.

Marine Vessel Tanker Spills. Tanker spills from foreign flag tankers transiting to Los Angeles harbor continue to be the most likely source (76% chance of one or more spills > 1,000 bbl) of a spill and the largest potential source of an oil spill offshore California (see Oil Spill Risk Section). The mean (average) spill size from a tanker is calculated as 22,800 bbl for the period between 1985-1999. Between 9 km and 161 km of coastline is predicted to be contacted with oil should a spill this size occur.

Should a 22,800 bbl occur from a tanker in an area where shoreline contact occurs, it is likely that more than one wetland habitat would be contacted. While oil spill booms and rapid response would be used to reduce the amount of oil entering a wetland, with the large volume released at one time from a tanker spill, such response measures could be overwhelmed and it is likely that oil would enter one or more wetland areas. If a substantial amount of oil enters a wetland, impacts would be high due to rare nature of the habitat, the potential for irreversible alteration of the habitat, loss of animals and plants that may not be able to repopulate from adjacent areas, and loss of endangered plants, animals and fishes. Once oil contaminates the sediment, a given wetland area may be completely lost. If one of the larger wetlands such as Point Mugu or Morro Bay were oiled, losses to wetland habitat regionally would be very high.

The cleanup response can cause impacts as serious as the oil itself. The most critical cleanup response strategy in preventing long term impacts in a wetland is to prevent oil from reaching the sediment. It has been shown that cleanup methods which require the use of machinery or trampling in the wetland that grind the oil into the sediment can irreversibly damage a wetland (Zengle and Michel, 1996). Insitu burning has been found in heavily oiled areas to successfully remove the oil without introducing the oil into the sediment (Zengle and Michel, 1996). Several strategies have been developed on a worldwide basis to mitigate potentially devastating impacts from tanker spills in wetland areas. These measures would aid recovery of areas, but would not reduce the overall impact to the resource from a tanker spill, a high impact.

Existing OCS Oil and Gas Activities. If you assume that a spill occurs from OCS oil and gas activities, the most likely case is that one or more spills in the 50-1,000 bbl range would occur and that such a spill would be 200 bbl or less in volume. The maximally reasonably foreseeable oil spill volume from offshore oil and gas activities is 2,000 bbl, assumed for purposes of analysis to be a pipeline spill.

In general, impacts to wetland resources from a 200-bbl. spill would be substantially lower than those discussed for a tanker spill. While impacts could be significant if large quantities of oil were to contact a wetland, it is very unlikely that a 200-bbl. offshore oil spill could result in volumes of oil on the shoreline sufficient to cause measurable impacts inside a wetland. Most wetland areas are closed naturally during much of the year, or when open during rainy season, have outward flow. The Platform Irene pipeline spilled 167 bbl of oil 2 miles offshore Vandenburg Air Force Base. The hardest hit beach was Surf, about a mile south of the Santa Ynez River. Because there was an unusually high tide the evening after the spill, a small amount of oil escaped over the natural berm at the Santa Ynez River mouth. Though a very small amount of oil entered the wetland, evidence of sheen or impacts was not discovered the following morning during intensive sampling (K. Wilson, pers. comm.). Because it is unlikely that oil could enter a wetland in sufficient quantities to cause serious impacts, impacts from a 200-bbl spill are estimated to be low.

If oil enters a wetland or estuary, impacts to the resource include irreversible alteration of the habitat, mortality of endangered birds, plants and fish, and loss of plants and animals that may be unable to populate from adjacent areas. For a 2,000 bbl spill, the potential area of contact is larger than that possible for a 200 bbl spill and contact with a wetland is, therefore, greater. A 2,000-bbl spill is predicted to contact between 3 and 53 km of coastline, with a mean value of 12 km. Given the possible extent of coastline, impacts could range from low to high for a 2,000 spill. If the oil does not enter a wetland either because wetland is closed to inward flow or because of oil response measures, impacts to the wetland would be low. If a substantial amount of oil enters a wetland, impacts could be high due to rare nature of the habitat. The most critical mitigation measure is prevention; the requirements to ensure that operators are drilling safely and in a manner that does not produce oil spills is the most important step toward protecting wetlands from spilled oil. MMS records of spills and, lack thereof on the OCS, demonstrate MMS's commitment to prevention.

Should an oil spill occur, concerted efforts would be made by oil response personnel to boom estuary mouths so that oil would not enter these sensitive areas. Regular oil spill drills by Clean Seas focus on strategies for protecting individual wetlands and river mouths. In a wetland area, particularly the larger wetlands with tidal influence, the difficulty is in providing sufficient replicate booms to prevent the oil from entering the wetland, while providing continued water circulation. The strategy for each wetland area has been mapped and practiced for many years and it is expected that this mitigation effort would be highly effective in preventing oil from entering a wetland. This is especially true of the smaller spills (> 200 bbl) because more attention can be focused on an individual wetland. Equipment may less effective or ineffective at night, during heavy fog, or in turbulent/wind driven sea conditions. Weather conditions limiting response are more common north of Point Conception.

Based on local experience, the fact that a majority of the wetlands are not open to the ocean most of the year, and the likelihood that available mitigation would be effective with smaller spills, potential impacts from a 200-bbl spill are expected to be low. Potential impacts from a 2,000-bbl spill range from low to high and depends on whether and how many wetlands are affected.

Onshore Sources of Oil Spills. There are several hundreds of miles of pipelines onshore carrying oil products that, if spilled, could affect esturarine and wetland habitat. These pipelines carry foreign sources of oil from tanker offloading facilities to distribution centers, and domestic sources of oil, gas and oil products from onshore oil fields, processing facilities and refineries to market. Others bring OCS or State crude oil production onshore. The age of the pipeline network in the State of California is of serious concern as many of the oil fields and pipeline systems onshore were laid before current technology and inspection systems. A spill originating onshore, especially from a pipeline break crossing a river or streambed could send oil directly into a wetland. Impacts would be considered high due to damage to habitat and resources. Mitigation on newer pipelines such as the Point Arguello onshore segment or SYU pipeline to Los Flores Canyon include automatic shut down valves at river crossings to reduce the potential impacts to wetlands.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): Refer to the cumulative introduction for a description of the projects being evaluated as part of the 36 Undeveloped Leases.

Pipeline Construction Activities. Wetland resources can be affected through the construction of onshore pipelines, and by oil spill impacts from existing and future platforms. In general, pipeline corridors are specifically chosen to avoid wetland areas and are required to do so through local, State and Federal regulation. Additional mitigation placed on pipeline corridors near streambeds or estuaries include block

valves, ensuring onshore spills can be isolated and limited in volume. Potential areas for these hypothetical platforms and associated pipeline corridors are not located near important estuaries. Mitigation measures required during the placement of the SYU pipeline, whose corridor is coincident with the hypothetical Gato pipeline route, included measures to reduce sedimentation of local streambeds. One of these measures dealt with removal of trees along the route, others with restricting placement of equipment and pipe during construction to minimize disturbance (Santa Barbara County, 1987). These measures were largely successful in reducing impacts to wetland resources; the replanting of trees, however, was not successful in several areas due to drought conditions following pipelaying. It is assumed that should pipelines eventually be proposed to support future offshore facilities, similar measures would be taken to reduce the potential impact on wetland and streambed areas along with additional measures as needed to address any unsuccessful aspects. Additional environmental analysis would be done to evaluate specific impacts of any future project. Given the general location of proposed, impacts to wetlands would be expected to be low from construction activities. Mitigation proposed to address sedimentation and disturbance would further reduce identified impacts.

Oil Spill Impacts. As discussed in the Oil Spill Risk Section, the cumulative oil spill risk for the project area results from several sources; ongoing and projected oil and gas production from existing OCS facilities in the Santa Barbara Channel and Santa Maria Basin, several potential development projects (Rocky Point, Cavern Point, Tranquillion Ridge, and up to five new platforms), ongoing production from one facility in State waters in the Santa Barbara Channel, two likely oil and gas projects in State waters, and the tankering of Alaskan and foreign-import oil through are waters. Tables in this section present the estimated mean number of spills of various sized and the probability of their occurrence as a result of the described activities.

If you assume that a spill occurs from OCS oil and gas activities, the most likely case is that one or more spills in the 50-1,000 bbl range would occur from offshore oil and gas activities over the life of the hypothetical platforms, and that such a spill would be 200 bbl or less in volume. The maximally reasonably foreseeable oil spill volume from future offshore oil and gas activities is 2,000 bbl, assumed for purposes of analysis to be a pipeline spill.

Impacts from a 200-bbl spill and 2,000 bbl are discussed in Section 5.2.10.2.2 above. While the impacts would be the same, the likelihood of occurrence is slightly increased when the 36 undeveloped activities are added in. Refer to the Oil Spill Risk Section for a discussion of risk.

SUMMARY AND CONCLUSION (2002-2030)

Most wetland and estuary habitat in Southern California has been severely altered through commercial and residential development, resulting in less than 9% available habitat. This makes any impact resulting in loss of this rare habitat a high impact. Past, present and possible future cumulative impacts to wetland resources include: surface runoff resulting in sedimentation, and contamination, which are low to moderate impacts, agricultural practices increasing sediment load and introduction of harmful chemicals, producing moderate to high impacts, commercial and residential development resulting in severe reduction of habitat, a high impact, and pollution events such as sewage discharges, a low to moderate impact, risk of tanker spills, a high impact, risk of spills from existing oil and gas activities, a low to high impact, and risk of spill from all future OCS development, a low to high impact. Overall impact from the proposed projects is low; overall risk from existing and future OCS activities ranges from low to high, depending on the extent of oiling, and number of wetlands affected from any one spill event.

6.2.11 CUMULATIVE REFUGES, PRESERVES AND MARINE SANCTUARIES IMPACTS (2002-2030)

Cumulative impacts to these resources for the 2002-2030 time period, including those associated with the proposed and potential development of the 36 currently undeveloped OCS leases, may be found in section 6.2.1 through section 6.2.23, where appropriate. The cumulative impacts to the biological resources of the Channel Islands and Monterey Bay National Marine Sanctuary and the Channel Islands National Park are summarized in table 6.2.11-1.

Refer to section 5.2.1 through section 5.2.23 for a discussion of the impacts of the Proposed Action to these resources for the time period 2002 to 2006.

Table 6.2.11-1. Summary of cumulative impacts for the 2002-2030 time period to the biological resources of Channel Islands and Monterey Bay National Marine Sanctuaries and the Channel Islands National Park.

Resource	Impacts
Rocky and Sandy Beach	Cumulative impacts range from low to high depending on the resource and the source of the impact (e.g., public beach use, sewage, oil spills). See section 6.2.3.
Seafloor Resources	Cumulative impacts range from low to high depending on the resource and the source of the impact (e.g., commercial fishing). See section 6.2.4.
Kelp Beds	Cumulative impacts range from low to high depending on the source of the impact (e.g., harvesting, commerical fishing). See section 6.2.5.
Fish Resources	Cumulative impacts range from low to moderate depending on the source of the impact (e.g., commercial fishing, oil spills). See section 6.2.6.
Marine and Coastal Birds	Cumulative impacts range from moderate to high depending on the resource and the source of the impact (e.g., non-OCS tanker spill). See section 6.2.7.
Marine Mammals	Cumulative impacts range from negligible to high depending on the resource and the source of the impact (e.g., routine offshore oil and gas activities, oil spills). See section 6.2.8.
Threatened and Endangered Species	Cumulative impacts range from negligible to high depending on the species involved and the source of the impact (e.g., routine offshore oil and gas activities, oil spills, habitat loss). See section 6.2.9.
Estuaries and Wetlands	Cumulative impacts range from low to high depending on the resource involved and the source of the impact (e.g., surface runoff, development, oil spills). See section 6.2.10.
Onshore Biological Resources	Cumulative impacts range from low to moderate depending on the resource involved and the source of the impact (e.g., pipeline construction, oil spills, development). See section 6.2.12.

6.2.12 CUMULATIVE ONSHORE BIOLOGICAL RESOURCES IMPACTS (2002-2030)

For the 2002-2030 time period, this analysis considers the cumulative impacts to onshore biological resources from: 1) existing and future Federal and State offshore oil activity, 2) other anthropogenic (military activities, agriculture, urban development) impact sources, and 3) proposed and potential development of 36 currently undeveloped OCS leases.

Refer to section 5.2.12 for a discussion of effects from the Proposed Action for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the analysis in section 5.2.12.

Cumulative Impacts Without Development of the 36 undeveloped leases (2002-2030): Cumulative impacts related to offshore oil and gas activities that may have measurable, long-term (e.g., months or years) effects on onshore biological resources in the potentially affected area include habitat loss associated with construction of pipelines and facilities and accidental oil spills. These impacts have occurred (in the case of past and present operations and past oil spills) or may occur (in the case of proposed projects and potential oil spills) from existing Federal and State projects and proposed State projects (e.g., Tranquillon Ridge) whether or not the 36 undeveloped leases are developed.

Construction Activity. Within the onshore project area, which extends from the Santa Barbara County line at the Santa Maria River in the north to the Santa Ynez River and Point Arguello in the south and inland to the cities of Santa Maria and Lompoc, past construction activities associated with OCS-related oil and gas projects are limited to the construction of the Point Pedernales pipeline and the associated Lompoc Oil and Gas Plant. Impacts of construction include vegetation removal, with associated changes in erosion, sediment deposition, and invasive weeds, and disturbance to wildlife. Within the onshore project area, these activities may have affected an estimated 225-245 acres of vegetation and wildlife habitat (A.D. Little, 1985), the vast majority of which was related to pipeline construction. Most of this area has probably recovered, since revegetation efforts were carried out along the pipeline corridor and natural recovery would have occurred during the approximately15-year period since the pipeline was completed. No new onshore pipelines or facilities are planned for existing Federal and State projects or State-proposed projects.

Accidental OCS Oil Spills. The impacts of oil spills associated with onshore pipelines depends on the location and extent of the pipeline rupture in relation to local topography, habitat, and wildlife abundance. The impact to vegetation and wildlife of an oil leak from a buried pipeline are generally limited in extent due to the limited mobility of oil in soil and the likelihood of detection and repair of the problem before the spread of oil is extensive. The cleanup process, which is another source of impacts, would consist of removal and replacement of contaminated soil and revegetation with native species. Although limited in extent, recovery could take several years, depending on the type of vegetation affected by the spill. Impacts could be more severe, however, if a break occurs at a stream crossing or oil enters a stream or wetland from a nearby spill. Both the areal extent and duration of the impacts could be greater than that for a buried pipeline. Impacts would also be more severe if rare, threatened, or endangered species were involved.

Overall, in the onshore project area, past, present, and future impacts to onshore biological resources of potential oil spills from existing Federal, State, and State-proposed oil and gas operations are expected to be low.

Impacts from Non-Offshore Oil Sources. Other factors that have cumulative impacts to onshore biological resources include: agriculture, urban development, onshore oil and gas activities, road construction, erosion, sedimentation, stream diversion, fire, and pollution (County of Santa Barbara, 2000). Overall, the cumulative impacts of these factors to onshore biological resources range from low to moderate, depending on the level of future urban expansion.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): The following is a brief discussion of the impacts to onshore biological resources that may occur if the 36 undeveloped leases are developed. A comprehensive, detailed environmental analysis, including a Section 7 threatened and endangered species consultation with the Fish and Wildlife Service, will be conducted as development plans are submitted on these leases. A potential scenario for the exploration and development of the 36 undeveloped leases is provided in section 5.1. Of the activities and possible accidental events described in section 5.1, only activities associated with onshore pipeline and facility construction in northern Santa Barbara County and accidental onshore oil spills may have measurable, long-term (e.g., months or years) effects on onshore biological resources.

The scenario for the 36 leases discusses the installation of up to five new platforms. The proposed location for some of these platforms would call for the onshore construction of a 24-inch oil emulsion and a 10-inch gas pipeline and an onshore processing facility in northern Santa Barbara County. Santa Barbara County (2000) has conducted an analysis of potential locations for a pipeline corridor and processing facility within the onshore project area. Although

preliminary, the County's analysis has identified two locations near the town of Casmalia (Casmalia East and Casmalia West), that may avoid many of the biological constraints that are known to occur in the area. For the purposes of this EIS, it is assumed that the Casmalia East site will be the location for the onshore facility. The County has also identified a pipeline corridor for this facility, which may avoid many of the biological constraints that are known to occur in the area (see section 4.6.10). The location of this corridor is described in the County's draft report (County of Santa Barbara, 2000) and in section 5.1. For the purposes of this EIS, it is assumed that the pipeline to the onshore processing facility would be constructed within this corridor. The County estimates the length of this corridor at about 7 miles; therefore, the total area affected by the pipeline would be about 85 acres, based on the 100-ft corridor width estimated for the Point Pedernales Pipeline (A.D. Little, 1985). Based on the 16-acre area estimated for the Lompoc Oil and Gas Plant (A.D. Little, 1985), the development of the 36 leases could affect about 100 acres of land. The level of impact to this area would depend on the types of habitat and wildlife species involved, the presence of rare, threatened, and endangered species, and the effectiveness of mitigation measures, including revegetation efforts.

The Casmalia East site is located within the Casmalia Oil Field (County of Santa Barbara, 2000), and this area may already be disturbed to some degree. Although a survey of the biological resources of this site has not been conducted (County of Santa Barbara, 2000), the County indicates a concern for birds of prey and a riparian corridor to the south of the Casmalia East site. When development plans are submitted requesting approval of onshore construction, a detailed survey of the affected areas, including birds of prey and riparian habitat, would be conducted, from which a comprehensive impact analysis could be carried out. Until such an analysis is carried out, it is assumed that the impacts to onshore biological resources from the development of the 36 leases will be insignificant (low). This is based largely on the results of Santa Barbara County's Draft North County Siting Study (2000), one of the goals of which was to identify areas "that are relatively unconstrained with respect to development of oil and gas facilities serving offshore production."

Summary and Conclusion (2002-2030): The cumulative impacts to onshore biological resources in the project area from all sources for the period from 2002-2030, including any activities and accidental events that may be associated with the development of the 36 undeveloped leases, range from low to moderate, depending on the habitat and species involved, the occurrence of an extensive onshore oil spill, and the level of future urban development.

6.2.13 CUMULATIVE CULTURAL RESOURCES IMPACTS (2002-2030)

This section examines

- the cumulative impacts to cultural resources without the development of the 36 leases in the period 2002 to 2030;
- the additional cumulative impacts to cultural resources from development of the 36 leases in the period 2002 to 2030.
- Native American concerns in the period 2002 to 2030.

Refer to Section 5.2.13 for a discussion of effects for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in Section 5.2.13, as is the discussion of factors that influence cumulative impacts to cultural resources.

Cumulative Impacts Without Development of the 36 Undeveloped Leases (2002 to 2030): Physical disturbance caused by non-OCS development activities will be the source of project and cumulative impacts to submerged sites and upland sites. These sources include installation of seafloor cables, construction of sewage treatment infrastructure, commercial trawl fishing, anchoring, dredging, and unauthorized removal of artifacts by recreational scuba divers. Onshore, cumulative impacts may occur from a full range of construction activities and pilferage. Natural processes, such as shoreline erosion, also contribute to the destruction of cultural resources. Because of stringent monitoring and mitigation of local, state, and Federal agencies for actions that may affect cultural resources, permitted actions are likely to cause little cumulative impact.

For example, a recent California Coastal Commission staff report noted that since 1988 the number of registered archaeological sites in San Luis Obispo County increased from 1,000 to 2,055 sites, most of which fall in the County's coastal zone. The report noted that the greatest source of destruction of archaeological resources came from urbanization and uncontrolled public access. Factors that must be addressed to ensure adequate protection of archaeological resources include adequate identification of resources and avoidance and mitigation to known resources (CCC 2001).

Because of the nature of clean-up operations, oil spill related impacts are not expected offshore. Onshore, archaeological sites could be affected by oil spills from OCS production or non-OCS tankering and associated containment and cleanup activities. Oil spills could alter the chemical composition of archaeological materials and render them useless for carbon-14

dating. Oil-soaked soils would also be difficult to excavate and process. Oil spill containment and cleanup activities could result in extensive impacts to site deposits from the excavation of containment barriers (dams, berms, and trenches) and the mechanized removal of oil-soaked earth.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002 to 2030): As noted above, physical disturbance of the seafloor is the primary cause of direct impacts to offshore archaeological resources. For OCS development, operators are required to either avoid potential sites or conduct further investigations of potential sites to document their true nature and design further mitigation, if necessary. As a result, the greatest potential for impact comes from seafloor disturbance of previously undetected sites by construction of infrastructure (platforms and pipelines). Drilling operations can directly impact prehistoric cultural resources by drilling through buried archaeological deposits. After the infrastructure is installed, potential for seafloor disturbance from OCS operations ceases.

lndirect offshore impacts resulting from introduction of a rig would include permanent disturbance of the magnetic field from the time of construction to an undetermined but lengthy period until decommissioning. These disturbances can prevent identification of previously undetected cultural resources. Magnetic disturbance surrounding a typical platform covers a roughly circular area with a radius of approximately 460 meters. Indirect impacts from the magnetic field of pipelines will be similar in duration to those associated with platforms. The horizontal zone of magnetic disturbance from a typical large pipeline may extend to 160 meters or more on either side of the centerline.

Onshore, the primary cause of direct impacts is the disturbance to sites by earth moving and excavation. Construction-related activities that could directly or indirectly impact cultural resources include removal of vegetation from a ROW corridor, surface and subsurface disturbance in zones of heavy equipment movement, excavating a common pipeline trench for the lines, and backfilling pipeline trenches and cleaning the ROW with heavy equipment.

Indirect impacts to a site result from increased erosion of an site attributable to the original action and use of areas outside of construction corridors for expedient movement of construction equipment, and from unauthorized artifact collection.

Gato Canyon Unit Development. Development of the Gato Canyon Unit would, at most, result in no impacts, to offshore or onshore archaeological resources. Based on past experience, any potential impact would most likely result from encountering previously undetected sites. Pre-construction analysis should identify any seafloor anomalies that may be potential archaeological resources and allow planned avoidance of those sites. The platform-to-shore pipelines intersect areas containing submerged landforms considered highly sensitive for prehistoric sites. However, since the pipeline will not be buried in this area, no impact will result. Onshore pipeline construction will occur in a previously surveyed and currently utilized pipeline corridor. In the past, the stringent archaeological resources monitoring and mitigation requirements of Santa Barbara County have reduce the likelihood of direct and indirect impact to onshore archaeological resources, even when the sites were previously undetected.

Bonito Unit Development. Offshore development of the Bonito Unit is not expected to result in impacts to archaeological resources. Pre-construction analysis should identify any seafloor anomalies that may be potential archaeological resources and allow planned avoidance of those sites. Prehistoric sites and sensitive submerged landforms are not likely to be present since Platform Bonito and the pipeline to Platform Irene is seaward of the 16,500-year-old shoreline, well before the time of known human occupation of the area. There is no new onshore construction associated with the Bonito Unit development.

Northern Santa Maria Basin. Offshore development in the Northern Santa Maria Basin would, at most, result in negligible impacts to offshore and onshore archaeological resources. Based on past experience, these impacts would most likely result from encountering previously undetected sites. Pre-construction analysis should identify any seafloor anomalies that may be potential archaeological resources and allow planned avoidance of those sites.

Sensitive submerged landforms are present in the offshore area. The landform area located on lease OCS-P-0409, hypothetical location of platform SMB A, is associated with the 18,000-year-old shoreline. The area on lease OCS-P-0431, the hypothetical location of platform SMB C, is seaward of the 16,500-year-old shoreline. Both date to the period well before the time of known human occupation of the area and are not likely to contain prehistoric archaeological resource sites. There are no relict landforms identified on lease OCS-P-0422, the area associated with the hypothetical location of platform SMB C. The hypothetical platform-to-shore pipeline intersect areas containing submerged landforms considered highly sensitive for prehistoric sites. However, since the pipeline will not be buried in this area, no impact is anticipated.

Several vessels have been lost in the area from the Santa Maria River to Purisima Point. Stranding, where the ship runs aground on the coastline or shallow offshore rocks and reefs, is the primary cause of

vessel loss. In addition, the area immediately adjacent to the coastline is considered a sensitive area for locating wrecked vessels. The hypothetical platform-to-shore pipeline traverses this area and has the potential to impact significant shipwreck sites immediately offshore and associated debris onshore if sites are not detected and avoided.

The archaeological site data summarized in table 4.7.4.2-1 reveal that the potential corridor of the pipeline landfall to the processing plant contains several prehistoric and historic sites. In the past, the stringent archaeological resources monitoring and mitigation requirements of Santa Barbara County and VAFB reduced the likelihood of significant direct and indirect impact to onshore archaeological resources, even when the sites were previously undetected.

The extent of the damage to archaeological resources from an oil spill would depend on the area oiled by a spill, the presence of sites in the area, and the nature of cleanup operations. Accident-related impacts are not expected to offshore archaeological resources. Resources located in the intertidal zone, such as portions of wreck sites around the Channel Islands, could be affected. (All islands within the Channel Islands National Park and Channel Islands National marine Sanctuary, are either listed or eligible for listing Archaeological Districts on the National Register of Historic Places.) Onshore, archaeological sites could be affected by oil spills and associated containment and cleanup activities. Along the coastline that could be affected by the three spills analyzed, known sites tend to be concentrated around watersheds in less-developed areas. Oil spill-related impacts, should they occur, could be significant depending on the characteristics of the sites affected and the ability to mitigate those impacts. The larger the spill, the greater the likelihood of impacts. In 1997, Federal departments and agencies entered into a programmatic agreement to ensure that historic properties (that is, cultural resources) are taken into account in their planning for an conduct of the emergency response under the National Oil and Hazardous Substances Pollution Contingency Plan (ACHP, 1997).

Summary and Conclusions (2002 to 2030): Archaeological resources are present in the area. Impacts are not anticipated as a result of the anchoring or exploration drilling from the proposed projects since these operations will avoid potential resource sites. Cumulative impacts are the same with the proposal as they are without the proposal. Significant cumulative impacts to archaeological resources from potential construction of offshore and onshore production facilities are not likely. Oil spill related impacts, should they occur, could be cumulatively significant.

NATIVE AMERICAN CONCERNS

Cumulative impacts discussed below are in addition to those listed above for archaeological resources. Impacts to pre-historic archaeological sites, even those not considered significant, are a particularly acute concern to Native Americans.

Cumulative Impacts Without Development of the 36 Undeveloped Leases: Without development of the leases, the cumulative impacts are the same as described above for the Proposed Action. The impact from existing offshore oil and gas platforms of the traditional cultural property at Point Conception remains as long as the platforms are in the viewshed.

Cumulative Impacts With Development of the 36 Undeveloped Leases:

Bonito Unit Development. Offshore development of the Bonito Unit will place another platform in the viewshed of Point Conception, resulting in the marginal expansion of an already existing low impact from the Point Arguello platforms. This impact will remain as long as an offshore structure is visible from Point Conception.

Northern Santa Maria Basin. A number of concerns expressed by Native Americans regarding the direct and indirect effects of construction will occur as a result of the pipeline and facilities in Shuman Canyon. The traditional use of resources in Shuman Canyon has not been evaluated. However, the impact could be of moderate to high significance if the resources are present and become locally unavailable for a period of time.

Summary and Conclusion (2002 to 2030)

A low level of impact is expected from the placement of Platform Bonito in the Point Conception area. Routine operations are not expected to affect the traditional cultural resource qualities of Point Conception that make it eligible for the National Register. Moderate to high cumulative impacts to archaeological resources from potential construction of offshore and onshore production facilities and offshore spills are possible. Participation by Native Americans in the Santa Barbara County monitoring and mitigation activities have proven very effective in addressing Native American concerns regarding construction impacts, although some disagreements were noted in the past. Potential impacts to traditional resources in Shuman Canyon, if present, could be moderate to high. In past projects, moderate to high impacts have been successfully mitigated by local, State, and Federal regulations and mitigation measures.

6.2.14 CUMULATIVE VISUAL RESOURCES IMPACTS (2002-2030)

The visual impact of offshore production structures and onshore processing facilities has been a major concern of the public since the inception of offshore oil development more than a century ago (Lima1994; MMS 1996). A number of strategies developed to address visual impacts from drilling on state offshore leases including restrictions on where development would be permitted, technology that would be used for development (platforms, subsea completions, slant drilling from upland locations), and the location of onshore facilities. In 1967, to minimize the number of onshore processing plants, Santa Barbara County developed criteria for the siting of consolidated onshore processing facilities. These criteria were eventually crafted into zoning ordinances requiring the use of consolidated facilities for the processing of offshore oil and gas (Lima, 1997).

This section examines the

- factors that affect cumulative impacts to visual resources from offshore oil and gas development;
- cumulative impacts without the development of the 36 leases for the time period from 2002 to 2030;
- additional cumulative impacts from development of the 36 leases for the time period from 2002 to 2030.

Refer to Section 5.2.14 for a discussion of effects for the time period 2002 to 2006 from the Proposed Action.

Factors Affecting Cumulative Impacts to Visual Resources

Locations. The rail line, beaches, and roads noted are highly sensitive travel routes and use areas. Most of the impact occurs from views from these areas.

Platforms. "Platforms" as the term is used in this section refers to OCS production platforms, not the MODU. The size and longevity or OCS production platforms and other infrastructure requires a more sophisticated methodology for examining project-related effects of these structures compared to the MODU. Please refer to the visual resources section of previous offshore development environmental impact statements for a description of this methodology that examines effects using the dimensions of visual character, visual sensitivity, and visual quality.

The impacts of the groups or clusters of platforms, once installed, must be considered together. Although some platforms may be scheduled to be in place later than the other others in the group or cluster, the cumulative difference in impacts caused by a single versus two or more somewhat closely spaced platforms cannot be discerned. Adding an element to the cluster does not change a significant cumulative impact, but alters the area of the area of the impact. As such, the contribution of existing clusters of platforms, such as those in the Santa Barbara Channel, to cumulative visual impacts will not cease until the last platform in the cluster is decommissioned and at least the visible above-water structure is removed.

The primary aspect of platform operation having visual importance is the appearance of the platforms themselves, although the vessel and helicopter traffic for supply and crew transport would be noticeable, as would occasional flaring. Under optimum visibility, platforms and support activity are evident and attract attention. The platforms' prominence may be further enhanced on clear days by their color that may be highly reflective, increasing the platforms' dominance over a significant portion of available ocean views. Because they would be stationary and unlike vessels in configuration, they would probably be seen as incongruous features on the horizon. However, because of the greater-than-180-degree views available from the most beaches in the area, the platforms and their support activities would tend to be seen as co-dominant overall, with attention being drawn equally toward the headlands or other portions of the coast.

Some consideration must be given to the reduced visibility offshore during the summer months. Further, when visibility extends to and beyond the platforms, if haze and fog prevail in the background, the color of the platforms may cause them to blend in during part of the time they are "visible." Because of visual conditions at such times and the overall quality would remain unchanged. The impact under these circumstances would, therefore, be negligible and insignificant.

However, it is on clear days that the scenic aspects of the coast are most apparent and viewing conditions most critical. The visual impact of the platforms on such days is substantial, when it occurs in a highly scenic area and is viewed from a highly sensitive public use area.

Pipelines. Visual impacts associated with onshore pipelines would primarily result from installation. No dominate aspects of normal pipeline operation should be visible. Upon decommissioning, if the pipelines are sealed and left underground soil and vegetation would not be disturbed. If pipelines are removed, vegetation would be destroyed. Pipeline-associated above ground equipment may be installed near the landfall. The small relative size of this equipment suggests that it would not alter the visual quality of the area, and could be screened with appropri-

ate vegetation.

The presence during the construction stage of the project of the workforce, heavy equipment, and staging areas, though attracting attention to the point of dominating certain views, would only present short-term visual impacts. More important are the grading, clearing, trenching and backfilling activities. In most cases, the potential for adverse visual impacts from pipeline construction would be greatest at stream crossings where adjacent slopes and banks are steep and wooded. In such areas direct visual impacts would be due primarily to the destruction of riparian vegetation and disturbance of soil within the right-of-way by the movement of heavy equipment during grading, clearing and trenching. Indirect visual effects in the drainage areas would be expected where subsequent erosion and gullying could occur. Particularly vulnerable are the steep canyon slopes and stream banks.

Onshore Facilities. An onshore oil and gas processing facility is a major industrial facility, often covering several acres with equipment and towers of various heights, cylindrical storage tanks and pumps, pipes and compressors. Those facilities lower than 40 feet could be screened from view by landscaping but the visual impacts of taller structures would be long term. Facilities sited in a manner that does not appreciably change the visual quality or the visual condition of an area often result in negligible or insignificant impacts.

Cumulative Impacts Without Development of the 36 Undeveloped Leases (2002 to 2030): Without development of the undeveloped leases, the cumulative effects of present development will not increase. No other projects have been identified which will result in the permanent emplacement of above-water structures in the seascape for areas already under development. The contribution of existing clusters of platforms, such as those in the Santa Barbara Channel, to cumulative visual impacts will cease when the last platform in the cluster is decommissioned and at least the visible above-water structure is removed. Onshore facilities, when decommissioned, are restored to their pre-development condition.

The visual impact of offshore production structures and onshore processing facilities has been a major concern of the public since the inception of offshore oil development more than a century ago (Lima1994; MMS 1996). A number of strategies developed to address visual impacts from drilling on state offshore leases including restrictions on where development would be permitted, technology that would be used for development (platforms, subsea completions, slant drilling from upland locations), and the location of onshore facilities.

In 1967, to minimize the number of onshore processing plants, Santa Barbara County developed criteria for the siting of consolidated onshore processing facilities. These criteria were eventually crafted into zoning ordinances requiring the use of consolidated facilities for the processing of offshore oil and gas (Lima, 1997).

Platforms are functionally designed and sited to maximize resource recovery. To the extent possible consistent with that objective, operators have been encouraged to maximize well slots per platform to minimize the number of platforms needed to develop a field, orient platforms so as to minimize the profile to populated areas, and select colors that blend in with the environment (Lima 1994). While these strategies minimized visual impacts, significant impacts remained. Each additional development created new project-related impacts and increased the area of cumulative impacts. Strategies developed address residual project-related and cumulative affects to visual resources include siting of facilities, screening of facilities, and payments to dedicated funds to offset the impacts (Science Applications, Inc. 1984, Arthur D. Little 1984, 1985). These strategies have had varying degrees of success. (See, for example, SBC. 1993).

Incremental Impacts from Development of the 36 Undeveloped Leases (2002 to 2030):

The cumulative impact analysis for visual resources is divided into new development from existing facilities, the northern Santa Maria Basin, the Bonito Unit, and the Gato Canyon Unit.

New Activity from Existing Facilities: Foreseeable activity from existing facilities includes:

- Exploratory drilling and possible development of the Cavern Point Unit from Platform Gail.
- Development of the Tranquillion Ridge field from Platform Irene.
- Development of the Rocky Point Unit and Sword Unit from Hildago, Hermosa, and Harvest.

Development from existing facilities does not contribute to the magnitude of cumulative impacts on visual resources. Visual impacts from these platforms occurred with original development. To the extent that activity extends the use of the facility beyond that originally anticipated, the duration of the cumulative impact will be longer.

Northern Santa Maria Basin: The three new platforms in the Northern Santa Maria Basin will be visible, to varying degrees, from adjacent public recreation areas such as the Nipomo Dunes Preserve, Point Sal State Beach, VAFB Fishing Access and Ocean Beach County Park as well as the coastal areas of southern San Luis Obispo County. In addition, at least two of the platforms will be visible from the Southern Pacific Rail Line as it joins the coastal area south of Point Sal. While the existing Platform Irene may be

viewed from portions of this area, the proposed platforms introduce more prominent offshore structures not previously experienced by viewers in this area. Also, the scarcity of public access to this area may tend to concentrate the visual effects.

Though much of the time the visual impact of the offshore platforms more than three nautical miles offshore would be reduced by restricted visibility, the potential impacts at other times, will be intense, be highly controversial, and therefore, be considered significant. The effects, moreover, would be long term, lasting until decommissioning.

The impact of pipeline construction is local and short-term. As such, it is not expected to contribute significantly to cumulative impacts that would be associated with construction activities on Vandenberg AFB.

The cumulative impact to visual resources from the placement of the processing plant near Casmalia, or at another location, is discussed in the North County Facility Siting Study (SBC 2000). Contribution of the project to cumulative impacts will be dependent on several factors including: the visual character of the location selected for the facility; how well the facility can be shielded from public view through terrain or other methods; the effectiveness of the screening methods, and the character of other development in the area.

This analysis assumes the placement of more than one platform in the Northern Santa Maria Basin. According to previous analysis (URS 1986, Arthur D. Little 1985) the placement of any one of the three platforms is necessary and sufficient to create a highly significant visual impact in the area where one currently does not exist. Since other development projects in the area do not result in a visible permanent structure within the seascape, the second platforms creates a significant cumulative impact. Thereafter, additional platforms expand the area of impact of an already existing significant cumulative impact.

Bonito Unit: The Bonito platform will be visible from Ocean Beach County Park and Jalama Beach County Park, but the appearance of the platform will not be the prominent feature because of existing infrastructure, distance from shore, and periods of restricted visibility. From Ocean Beach County Park, he platform will be viewed in a cluster with the existing Platform Irene and Platform Hildago. Similarly, from Jalama County Park the platform will be viewed as the most distant element in the cluster formed by the existing platforms Hermosa, Harvest, and Hildago. Given the grand scale of the scene and the distance at which the platforms would be seen from both parks, the platform would probably be overlooked, contributing little to the cumulative effect. The platform in and of itself, may be viewed from the Southern Pacific Rail Line as an element in the scenic Point Arguello area. As such, its contribution to the cumulative impact of views from rail line is more pronounced and must be considered a significant cumulative impact.

Since the project uses existing pipelines to shore and onshore processing infrastructure, it is not expected to result in a significant contribution to cumulative visual impacts.

The platform-to-shore pipeline will use the existing Platform Irene pipeline, landfall and onshore pipelines. On shore processing of Bonito production will occur at existing facilities. As such, Bonito Unit production will not contribute to the cumulative effects from the onshore processing facility and pipelines.

In summary, addition of the Bonito Unit platform marginally expands the area of an already significant cumulative impact created by Point Arguello and Point Pedernales Unit platforms. The impact is most discernable from the Southern Pacific Rail line as it approaches point Arguello and less so from parks in the area. Bonito Unit production using existing platform-to-onshore pipelines and onshore processing is not expected to make a significant contribution to the cumulative impacts.

Gato Canyon Unit: Platform Gato clusters with existing platforms SYU platforms—Hondo, Heritage, and Harmony, and the Las Flores Canyon consolidated facility. The emplacement of platform Hondo in 1976 introduced an industrial appearance to the largely unmodified seascape and created a significant visual impact. The placement of the OST vessel in 1981 approximately 3.1 nautical miles offshore, and platform Heritage and Harmony in 1993 incrementally added elements to the seascape, with each element increasing the area and magnitude of the cumulative visual impacts. Similarly, decommissioning and removal of the OST in 1994 removed an element and incrementally reduced area of the impact somewhat. The removal of this single element was not sufficient to reduce the significant visual impact to insignificant. The cumulative, significant impact to visual resources is expected remain until all offshore platforms in the area are decommissioned.

Platform Gato will be most prominent in the view from El Capitan State Park, and the adjacent portions of Highway U.S. 101 and the Southern Pacific Railroad line, becoming a dominant, permanent feature. From this location, the platform becomes the most dominant element in the cluster of platforms in the Santa Ynez Unit. As such, the cumulative effect of the platform is to expand eastward the area of the already significant visual effects from the Santa Ynez Unit.

The location-specific conditions would be altered, with the effects being long-term. For part of the year, the Gato platform's distance from shore and fog, which occurs frequently during several months each year,

would partially conceal the platform. Also, due to its distance from shore, the platform will appear to be small relative to the breadth of the panoramic view. However, since only other OCS platforms are within the field of view, the platform would be obvious when Channel haze and fog is at a minimum. Given that the coastal area is a sensitive area (scenic quality is a locally and regionally important resource), such effects would contribute to an already significant impact.

The visual impacts noted are not restricted to El Capitan Beach State Park. Cumulatively, the Refugio Beach and Gaviota Beach State Parks would be similarly affected, except that not all of the platforms are visible from these parks. On the other hand, Gaviota Beach currently has an industrialized appearance, given that a railroad trestle crosses the park and a pier cuts off much of the potential panoramic view. Therefore, the visual impacts of the Gato platform would be minimal for this park. Refugio Beach is similar in quality to El Capitan Beach; the effects there would be similar in significance to those at the latter park.

Throughout the area of cumulative impacts, views of the platforms from U.S. Highway 101 would be transitory; landforms and roadside vegetation obscure ocean views intermittently. The direction of view normally is away from the ocean and along the direction of travel, with attention often being drawn inland to interesting rock formations, canyons, foothills and the mountain crestline. The foregoing statement applies to travel in both the north- and south-bound lanes.

The platform-to-shore pipeline will utilize the existing SYU landfall and pipeline corridor. On shore processing of Gato Canyon production takes place at existing facilities in the Las Flores Canyon consolidated facility. These onshore elements are not generally visible. As such, Gato Canyon production will not contribute to the cumulative effects from the onshore processing facility and pipelines.

In summary, addition of Platform Gato expands the area of an already significant cumulative impact created by the Santa Ynez Unit platforms. The impact is most discernable from parks in the area, less so from highway and rail lines. Pipelines and onshore processing uses existing corridors and facilities and are not expected to make a significant contribution to the cumulative impacts.

Summary and Conclusion (2002 to 2030):

- The only source of project and subsequent cumulative visual impacts for the seascape originates from additional platforms from new offshore development since no other foreseeable activity results in above-water structures.
- New platforms do not increase the already significant cumulative impact to visual resources. It does expand the area where those effects are realized.
- Using existing onshore and offshore facilities in new development does not create new visual impacts but may extend the duration over which those impacts are present.
- Pipeline construction and operation is not expected to significantly increase cumulative impacts.
- The construction of onshore processing facilities in the northern Santa Maria Basin may create significant impacts to onshore visual resources.

6.2.15 CUMULATIVE RECREATION IMPACTS (2002-2030)

Generally, impacts to coastal and beach recreation and associated tourism from offshore development that may result from the following:

1. temporary effects from offshore development activity such as use of campground facilities by construction crews, change in use patterns from the activity, or beach or campground closures due to offshore to onshore pipeline construction.
2. long-term effects from the presence of onshore infrastructure such as processing facilities and offshore oil platforms that may change use patterns.
3. temporary and long-term effects of an oil spill that may change use patterns.

This section examines

- the cumulative impacts to recreation without the development of the 36 leases in the time period from 2002 to 2030;
- the additional cumulative impacts to recreation from development of the 36 leases in the time period from 2002 to 2030.

Refer to Section 5.2.15 for a discussion of effects for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in Section 5.2.15, as is the discussion of factors that influence cumulative impacts to recreation

Cumulative Impacts Without Development of 36 Undeveloped Leases (2002 to 2030): The cumulative impacts described in section 5.2.15 for 2002 to 2006 will continue through 2030. CREF payments are reduced as each OCS project contributing to the cumulative effect is decommissioned. Additional impacts will occur from anticipated population growth in the area.

Incremental Impacts from the Development of the 36 Undeveloped Leases (2002 to 2030):

New Activity from Existing Facilities.

Foreseeable activity from existing facilities includes:

- Delineation drilling and possible development of the Cavern Point Unit from Platform Gail.
- Development of the Tranquillion Ridge field from Platform Irene.
- Development of the Rocky Point Unit and Sword Unit from Hildago, Hermosa, and Harvest.

Development from existing facilities does not appear to contribute to the magnitude of cumulative impacts on recreational resources. Impacts from these platforms occurred with original development. To the extent that activity extends the use of the facility beyond that originally anticipated, the duration of the cumulative impact will be longer. In the case of the cumulative recreational impacts from Platforms Irene, Hildago, Hermosa, and Harvest, these are currently being mitigated by Coastal Resources Enhancement Fund payments to Santa Barbara County.

Existing offshore platforms provide an opportunity for an unique recreational scuba diving experience. However, this opportunity is very limited and currently does not appear to offer a significant increase in the number of locations available to divers.

Northern Santa Maria Basin

The remote locations of the three platforms in the Northern Santa Maria Basin do not appear to interfere with recreational uses of the coastal area. The platform-to-shore pipeline construction will not interfere with on-shore recreation since the pipeline landfall site is within the area restricted to access by the public by VAFB. Pipeline construction activity in the area of Pt. Sal Road could impede access to Point Sal State Park, which is currently closed because of damage to the road from storms. Campground use by project construction workers may impact campground availability during the pipeline construction project. These project impacts will incrementally contribute to cumulative impacts from existing offshore oil and gas projects were found to be significant, especially during the pipeline construction phase. The cumulative impact to recreational resources from the processing plant near Casmalia, or at another location, is not known, but could be locally significant during the construction period.

Bonito Unit.

Because of it's remote location and lack of onshore construction, the Bonito Unit development does not appear to interfere with recreational uses of the coastal area. Still, since cumulative impacts from existing offshore oil and gas projects were found to be significant, Bonito Unit development will incrementally contribute to the cumulative impact.

Gato Canyon

Because of its distance from shore, Gato Canyon Unit is not expected to interfere with recreational use of offshore area. The construction of the platform to shore pipeline may temporarily preclude certain water contact uses in the nearshore area, such as scuba diving, kayaking, and swimming, and beach recreation activities and use of the bike path between Refugio State Park and El Capitan State Park at the pipeline landfall. Campground use by project construction workers may impact campground availability during the pipeline construction project. These project impacts will incrementally contribute to cumulative impacts from existing offshore oil and gas projects were previously found to be significant.

Summary and Conclusion (2002 to 2030):

- The greatest potential for effects to recreation is realized primarily through the use of campground by personnel engaged in onshore construction of onshore facilities, and temporary closures of or reduced access to coastal recreation facilities and activities because of construction activity. Depending on the length of the action and the time of the year, low to high impact could result.
- Once production has commenced, routine operations do not appear to interfere with any location specific recreational activities. However, the projects may contribute to the general, diffused cumulative impact on coastal-dependent and coastal enhanced recreation, aesthetics, and tourism associated with previous offshore oil and gas projects in the area. Previous impacts of this type have been mitigated by CREF payments, which continue over the life of the project.

- The greatest demand for recreational facility use is the projected increase in California's population.
- Cumulative impacts could result from oil spills. These impacts are very location and seasonally specific for small spills of 200 barrels, less so for spills of 2,000 barrels or larger. Impacts could be low to high, local to regional.

6.2.16 CUMULATIVE COMMUNITY CHARACTERISTICS AND TOURISM RESOURCES IMPACTS (2002-2030)

The development of a community's conditions and resources, including its sense of place, develop over a long period of time and is the product of many interaction, of continuity and change. Tourism is one roust indicator of a community's characteristics. At any point in time, a community may be the sum of past, existing, and emerging social, cultural, and economic forces. A community's development is not static; it is the product of continuity and change. This section addresses the impacts of the Proposed Action and cumulative effects from production on Ventura, Santa Barbara, and Ventura County, the areas most proximate to the offshore activity evaluated in this document.

This section examines

- the cumulative impacts to community characteristics and tourism resources without the development of the 36 leases in the time period from 2002 to 2030;
- the additional cumulative impacts to community characteristics and tourism resources from development of the 36 leases in the time period from 2002 to 2030.

Refer to Section 5.2.16 for a discussion of effects for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in Section 5.2.16.

Cumulative Impacts Without Development of the 36 Undeveloped Leases (2002 to 2030): Without the development of the 36 leases, the onshore and offshore petroleum extraction industry will continue its decline across the region culminating in the decommissioning of offshore structures and onshore processing plants. Impacts to community characteristics and tourism resources will come primarily in the form of further decline in public revenues from property taxes and other taxes, revenues, and fees. Furthermore, the conversion of former oil development and processing properties to other uses may require revision to land use planning, regulation, and zoning designation.

Ventura County. For this area, the trend will be part of the general adjustment communities have faced to the gradual decline in the once prevalent petroleum extraction industry and industrial diversification that the communities have addressed since the 1980s. Larger issues of importance to the community's characteristics, such as conversion of agricultural land, urbanization, and population growth will overshadow the decline in petroleum production.

Santa Barbara County. Without development, offshore and onshore petroleum production will continue to decline, offshore structures and the onshore consolidated facilities at Gaviota and Las Flores Canyon near El Capitan will be decommissioned. These consolidated facilities comprise "offshore industrial parks" created to accommodate offshore development while minimizing industrialization of the coast, community-level concern dating back to beginning of offshore development (Lima 1994, 1997). The decommissioning of the sites, which are required to be restored to pre-development conditions, will be part of the large debate on how to protect the so-called Gaviota coast from encroaching development and conversion of the area from agriculture and open range into more intense or dense development. Community effects would be relatively minor. Local government would have to address declines in the property tax base from onshore processing sites. Local government administrative structures may have to be realigned (assuming restructuring of the County's Energy Division) (MMS 1998b). Mitigation payments to the Coastal Resources Enhancement Fund would cease and the projects it funds would have to secure funding from other sources. Operations at VAFB are expected to continue without effects from the decline and demise of OCS activity. Like portions of Ventura County, without development of the 36 leases, North County communities will continue to deal with the trend of general adjustment communities faced to the gradual decline in the once prevalent petroleum extraction industry.

San Luis Obispo County. Of the three areas, San Luis Obispo County will be faced with the least impact without development of the 36 leases. Since the County has not experienced offshore development, there will be no adjustments for communities to make as a result of the cessation of the activity in other area of the Pacific OCS. However, communities will continue to address consequences of onshore development. For example, if the characteristics of Avila Beach have indeed changed as a result of the remediation of the tank farm spill, that community will have to determine what characteristics will replace it. Similarly, an emerging issue that could affect community characteristics is the decommission-

ing of the Diablo Canyon nuclear power plant and conversion of that site and the surrounding area. Issues regarding development within the coastal zone, such as development in the San Simeon area, will continue.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002 to 2030):

New Activity from Existing Facilities.

Foreseeable activity from existing facilities includes:

- Exploratory drilling and possible development of the Cavern Point Unit from Platform Gail.
- Development of the Tranquillion Ridge field from Platform Irene.
- Development of the Rocky Point Unit and Sword Unit from Hildago, Hermosa, and Harvest.

Development from existing facilities does not appear to contribute to the magnitude of cumulative impacts on community resources. Impacts from these platforms occurred with original development. To the extent that activity extends the use of the facility beyond that originally anticipated, the duration of the cumulative impact will be longer. In the case of the cumulative tourism impacts from Platforms Irene, Hildago, Hermosa, and Harvest, these are currently being mitigated by Coastal Resources Enhancement Fund payments to Santa Barbara County. In addition, under current California law, the County will realize a substantial portion of the State's royalty Tranquillion Ridge production.

Northern Santa Maria Basin

The remote locations of the three platforms in the Northern Santa Maria Basin represent an extension of offshore platforms into an area that does not currently have such structures. The adjacent onshore area from the coastline to the Casmalia Hills is an area that supports space launch operations at VAFB and onshore production from the Casmalia oil field. The potential onshore processing facility site in a canyon near Casmalia is proximate to a closed toxic substance landfill. The remoteness of the area, placement of the facility inland, and compatibility of the potential development with land use in the area minimizes effects. The development of the northern Santa Maria Basin should not interfere with the plans to develop the area as a commercial spaceport nor interfere with ongoing military operations at VAFB and its role as a social, cultural, and economic influence on surrounding communities. As noted in the recreation and visual resources sections, Northern Santa Maria Basin development project impacts will incrementally contribute to cumulative impacts from existing offshore oil and gas projects were found to be significant. These impacts are mitigated through payments to the Santa Barbara County Coastal Resources Enhancement Fund.

As noted in the visual resources section, the NSMB platforms will be visible from locations in southern San Luis Obispo County. For some, this will induce a locally unwanted land use, albeit one that is distant and beyond the borders of the County. No mechanism exists for San Luis Obispo County to receive proceeds from the Coastal Resources Enhancement Fund. Furthermore, in the past, the County declined to participate in the Socioeconomic Monitoring and Mitigation Program, which resulted in mitigation of impacts in Santa Barbara and Ventura County. However, the adaptability of Ventura and Santa Barbara to offshore development may not be generalized to San Luis Obispo County. As such, the cumulative impacts to these communities from offshore development is negligible to low depending on the degree to which the residents and visitors to the community perceive the distant activity as a disruption and the adjustment that would need to be made.

Bonito Unit.

Because of its remote location and lack of onshore construction, the Bonito Unit development does not appear to have a cumulative effect on community and tourism values.

Gato Canyon Unit

Because of its proximity to existing development, the capacity of Santa Barbara County government to address development issues, and the area's adaptability to the presence of onshore and offshore production, the Gato Canyon Unit does not appear to have a cumulative effect on community and tourism values.

Oil Spills

For the purposes of accidents, researchers suggest that there are three periods of time that need to be evaluated in determining impact (Deacon and Kolstadt 2000).

1. Closure period when the beach is officially closed for clean up.
2. Physically degraded period when the beach is open but the experience is degraded because there is still evidence of pollution.
3. Perceptually degraded period when the beach is physically clean yet the memory of the accident is fresh enough that the quality of the experience may be somewhat degraded.

Applying this framework to cumulative analysis, the third item most relevant for it examines the cumulative impact analysis of people's long-term perception of the community as opposed to a single-project related event or tanker accident. An often-expressed concern is the long-term effects of an oil spill on community character and tourism resources. For example, Avila Beach experienced a small oil spill in 1992 and underwent a major remediation in 2000 as a result of operations from the tank farm. If a third spill imparts a reputation to the area as an oil-polluted area, community and tourism impacts could be quite sizeable. In all likelihood, a 200-barrel spill from production would not be sizeable to produce this effect. However, a much larger spill on the order of 2,000 barrels from a production accident or 22,800 barrels spill from tankers could have that effect, especially for an area for which the effects of spills have been newsworthy and high profile. The effects of this could be more pronounced if an area gains a reputation for a degraded environment from a series of beach closures due to other environmental conditions, such as sewage spills or contaminated non point source pollution.

Summary and Conclusion (2002 to 2030):

- The greatest potential for effects to tourism and community resources comes from introduction of offshore activities in areas that currently are not proximate to development. In this case, proposed operations are far enough removed not to induce effects to community characteristics or tourism resources. Effects would be negligible to low.
- In areas with development, effects will not be of sufficient magnitude to affect community resources or it occurs in areas not proximate to tourism. Effects would be negligible to low.
- Cumulative impacts could result from oil spills. These impacts are very location and specific and would have the most effect for areas that have experience recent, well-publicized incidents of environmental degradation. Effects in this case could be low to high.

6.2.17 CUMULATIVE IMPACTS ON EMPLOYMENT AND POPULATION (2002-2030)

This section examines the cumulative impacts to employment and population without the development of the 36 leases in the period 2002 to 2030 and the additional cumulative impacts to employment and population from development of the 36 leases in the period 2002 to 2030.

Refer to section 5.2.17 for a discussion of effects from the proposed action for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in section 5.2.17.

Cumulative impacts without the 36 Undeveloped Leases (2002-2030): The trend of declining employment in the oil and gas sector is expected to continue through the period. Decommissioning activities may cause a slight increase in certain specialized segments of the sector, but this will probably only slow the decline, not reverse the trend. It is anticipated that overall employment and population will continue to grow in the study area ameliorating any job loss in offshore oil and gas related activities. Assuming labor participation rates remain constant employment and populations are expected to increase by more than 58% between 2000 and 2030.

Incremental impacts with the 36 Undeveloped Leases (2002-2030): Employment and population are expected to increase as result of development of the 36 undeveloped leases. The impact on employment and population are anticipated to be similar to the levels of population and employment increases experienced during the construction of Exxon's Santa Ynez Unit project. At its peak level the Santa Ynez Unit project directly employed approximately 1,200 workers (MMS 2000). Peak employment effects from the Santa Ynez Unit project were estimated to be approximately 3,000 jobs accompanied by peak a population impact of approximately 5,000 people. Tables 6.2.17-1 and 6.2.17-2 show the short term and long term impact for development of the 36 undeveloped leases on employment and population. The most significant distinction between the Santa Ynez Unit and a likely northern Santa Barbara County facility is the location. Since the most likely location for a new facility is removed from the south coast of Santa Barbara and Ventura County the likely areas to be impacted by a new facility are southern San Luis Obispo and northern Santa Barbara Counties. Because of the concentration of the impacts to less densely and urbanized area, the impacts from the development of the 36 undeveloped lease is moderated in the short term and low in the long term.

Summary and Conclusion (2002-2030): Short term impacts of employment and population from development of the 36 undeveloped leases is moderate, however, long-term impacts are low and not significant.

Table 6.2.17-1. Short term change in population, employment, and housing from development of the 36 undeveloped leases.

	San Luis Obispo County	Santa Barbara County	Ventura County	Total Study Area
Direct Employment	420	660	120	1,200
Indirect/Induced Employment	802	935	198	1,935
Population	2,222	2,653	509	5,384
Housing Demand	567	569	101	1237
Percent Change in Demand	0.58%	0.39%	0.04%	0.25%
Housing Percent of Annual Variation in Supply	61.42%	83.19%	4.56%	32.29%
Population Percent of Annual Variation 2000-2020	32.31%	37.69%	4.47%	21.28%

Table 6.2.17-2. Long term change in population, employment, and housing from development of the 36 undeveloped leases.

	San Luis Obispo County	Santa Barbara County	Ventura County	Total Study Area
Direct Employment	25	175	0	200
Indirect/Induced Employment	48	248	0	296
Population	132	704	0	836
Housing Demand	34	151	0	185
Percent Change in Demand	0.03%	0.10%	0.00%	0.04%
Housing Percent of Annual Variation in Supply	3.66%	22.06%	0.00%	4.82%
Population Percent of Annual Variation 2000-2020	1.92%	9.99%	0.00%	3.30%
Population Change as percent of 2020 Total	0.03%	0.13%	0.00%	0.04%

6.2.18 CUMULATIVE IMPACTS ON HOUSING (2002-2030)

This section examines the cumulative impacts on housing without the development of the 36 leases in the period 2002 to 2030 and the additional cumulative impacts to housing from development of the 36 undeveloped leases in the period 2002 to 2030.

Refer to section 5.2.18 for a discussion of effects from the proposed action for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in section 5.2.18.

Cumulative impacts without the 36 Undeveloped Leases (2002-2030): Housing impacts from existing offshore oil and gas development will continue at the present level of 1,561 housing units occupied. This level is approximately 0.32% of the total housing in the tri-county area. Since population in the study area is forecast to increase by more than 58 percent between 2000 and 2030, the share of housing demand associated with offshore oil and gas development will likely decline.

Incremental Impacts of the Development of the 36 Undeveloped Leases (2002-2030): This section examines the cumulative impacts to housing with the development of the 36 leases in the period 2002 to 2030. Housing impacts are not expected from the development of the Cavern Point and Rocky Point Units. The construction of new platforms, pipelines, and a new onshore facility in northern Santa Barbara County will create both short term and long term impacts on housing. The short term impacts on housing are anticipated to be similar to those that occurred with the construction of the Santa Ynez Unit projects the peak impact on housing from the Santa Ynez project was 721 total housing units. Because of the proposed location a new facility in northern Santa Barbara County, it is likely that housing impacts will be distributed in northern Santa Barbara County and southern San Luis Obispo County. A short-term change in housing requirement in San Luis Obispo and Santa Barbara County is anticipated to be 61 percent and 83 percent of the annual variation in housing respectively. The short-term impact on housing demand is high. The long-term impact on housing is low from development of the undeveloped 36 leases.

Summary and Conclusion (2002-2030): Short-term impacts on housing from the development of the 36 undeveloped leases are high. Tables 6.2.17-1. and 6.2.17-2. show short-term and long-term impacts from the development of the 36 undeveloped leases on housing.

6.2.19 CUMULATIVE IMPACTS ON INFRASTRUCTURE (2002-2030)

This section examines the cumulative impacts to community infrastructure without the development of the 36 leases in the period 2002 to 2030 and the additional cumulative impacts to infrastructure from development of the 36 leases in the period 2002 to 2030.

Refer to section 5.2.19 for a discussion of effects from the proposed action for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in section 5.2.19.

Cumulative impacts without the 36 Undeveloped Leases (2002-2030): Crew and supply boats will continue to service the offshore oil and gas industry and existing onshore development will continue at the present levels of activity. No other activities that would impact infrastructure other than expected variation in port operations have been identified.

Incremental Impacts of he Development of the 36 Undeveloped Leases (2002-2030): Development of the Cavern Point and Rocky Point Units is anticipated to cause an increase in the level of Crew and Supply boat trips during drilling activities. The level crew and supplies trips are expected to increase by less than 3% of the total trips. Depending on the quality of crude discovered in the northern Santa Maria Basin trucks could be required to ship product most likely in the form of asphalt from a proposed northern Santa Barbara County processing facility. Depending on the location of a new northern Santa Barbara County facility, roads, highways, and rail lines could be significantly impacted by the new facility. There are forty-one weekly truck trips related to offshore oil and gas activities in the northern Santa Barbara County. In addition to offshore oil and gas related traffic, there are approximately 442 additional weekly truck trips at the junction of Highway 1 and Casmalia Road. The junctions of Highway 1 and Casmalia Road would be impacted by a new facility if the new facility is located at the preferred site identified in the Final North County Siting Study by Santa Barbara County. If truck transport of asphalt is required from the construction of a northern Santa Barbara County processing facility there could be an increase in truck trips related to offshore oil and gas development of more than 1,500 trips or 4,000 percent, the impacts from this change will be high. Table 6.2.19-1 shows the potential increase in truck traffic resulting from a north county processing facility.

Rail transport of asphalt could replace all or part of the transportation from the new processing facility. If rail transport replaced all truck transport of asphalt, truck traffic would be reduced by 1,500 weekly

Table 6.2.19-1. Trucks for northern Santa Barbara County facility with and without rail transport.

	Current Level	North County Facility	Percent Change	Rail Transport all Asphalt	Percent Change
Trucks by Product					
Sulfur	6	14	233.3%	14	233.3%
LPG	35	145	414.3%	145	414.3%
Heavy Product Fraction (Asphalt)	0	1500	N/A	N/A	N/A
Total Product Trucks	41	1659	4046.8%	159	387.8%
Total Trucks Casmalia Road and Hwy 1.	483	1659	343.5%	159	32.9%

trips. Rail transport would increase by approximately one 70-car unit train a day. Since there are no unit trains transporting asphalt from northern Santa Barbara County the impact from the addition of one train a day would be high. The COOGER Study (MMS 1999) discusses transportation of Asphalt from a Northern Santa Barbara County Facility.

In addition to the impacts on infrastructure a new facility in northern Santa Barbara County will also directly impact non-residential land use. A discussion of the impacts on non-residential land use can be found is section 6.2.21.

Summary and Conclusion (2002-2030): Impacts are expected to be low without the development of the undeveloped 36 leases. Depending on the location of a new northern Santa Barbara County oil and gas facility impacts on infrastructure could be high.

6.2.20 CUMULATIVE IMPACTS ON PUBLIC FINANCE AND SERVICES (2002-2030)

This section examines the cumulative impacts to on public finance and services without the development of the 36 leases in the period 2002 to 2030 and the additional cumulative impacts to public finance and services from development of the 36 leases in the period 2002 to 2030.

Refer to section 5.2.20 for a discussion of effects from the proposed action for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in section 5.2.20.

Cumulative impacts without the 36 Undeveloped Leases (2002-2030): The existing demand for public and private services will continue to change in variation with demographic and other factors not related to offshore oil and gas or other identifiable projects. Property taxes in Santa Barbara and Ventura will continue to be enhanced by revenue generated by offshore-related onshore development. As oil and gas projects move from production to decommissioning, valuation of the facilities for property taxes will decline. The fee-for-service arrangement for local agency land use permitting and regulatory activities for offshore oil and gas projects is expected to continue.

Incremental impacts of the Development of the 36 Undeveloped Leases (2002-2030): Development of the Cavern Point and Rocky Point Units are anticipated to have little if any effect on onshore property taxes and demand on services. The construction of new onshore processing facility in northern Santa Barbara County and its related support facilities will likely increase the amount paid into the property tax fund. Additional demand for housing will increase the price of housing and also result in additional property tax revenue. The short-term increase in population and employment will also result in an increase is demand for schools, hospitals and other services. It is likely that the construction of a new onshore facility in northern Santa Barbara County will have impacts on public services similar to those experienced during the construction phase of Exxon's Santa Ynez Unit project including the Las Flores Canyon onshore component. Past practice by Santa Barbara County required participation by offshore oil and gas operators in the Socioeconomic Monitoring and Mitigation Program (SEMP). The impacts from the development of the 36 undeveloped leases may warrant establishing a similar program. Table 6.2.20-1. Shows the percentage distribution of SEMP impact mitigation payments for Santa Barbara and Ventura Counties. Santa Barbara County and entities within Santa Barbara County received payments in excess of $7 million from 1985 to 1995. Ventura county entities received more than $3 million during the same period.

Table 6.2.20-1. Distribution of SEMP impact mitigation payments.

Functional Category/County	Santa Barbara County	Ventura County
Housing	69%	0%
School Facilities	11%	4%
Water Supply and Treatment	10%	8%
Public Services	9%	88%
Campgrounds	1%	0%

SUMMARY AND CONCLUSION (2002-2030):

Short-term impacts on public finance and services from population increases from the development of the 36 leases could be high if a new northern Santa Barbara County processing facility is constructed. These impacts may warrant establishing a mitigation program similar to the Socioeconomic Monitoring and Mitigation Program.

6.2.21 CUMULATIVE IMPACTS ON NON-RESIDENTIAL LAND USE (2002-2030)

This section examines the cumulative impacts to on non-residential land use without the development of the 36 leases in the period 2002 to 2030 and the additional cumulative impacts to non-residential land use from development of the 36 leases in the period 2002 to 2030.

Refer to section 5.2.21 for a discussion of effects from the Proposed Action for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in section 5.2.21.

Cumulative impacts without the 36 Undeveloped Leases (2002-2030): Existing onshore facilities are expected to continue substantially as they are. No changes in the onshore support facilities are expected. Land uses supporting offshore oil and gas will continue as long as oil production is possible. As part of decommissioning, the land use designation of former on-shore processing facilities may change in accordance with local land use plans and practices.

Incremental Impacts of the Development of the 36 Undeveloped Leases (2002-2030): The Cavern Point and Rocky Point Unit developments are not expected to have an impact on non-residential land uses. The development of a new processing facility in northern Santa Barbara County and new pipeline and power cable landfalls and rights-of-ways will have a varying impact depending on the routes selected and the location of the new facility. If new pipelines and power cables can be routed in existing rights-of ways the impact will be low. Since a new processing facility is required in the northern Santa Barbara County the location of the facility will determine if the impacts are moderate or high. If the facility is situated on land already used for oil and gas related activities the impacts on non-residential land use will be moderate. In the “final North County Facility Siting Study” Santa Barbara County identifies the sites described as Casmalia East or Casmalia West as strongly preferred locations for any new onshore facility in support of offshore oil and gas development. The location of a new facility at either location is likely to result in a moderate impact on non-residential land use.

SUMMARY AND CONCLUSION (2002-2030):

Without development of the 36 undeveloped leases, existing facilities will continue to operate under their current land use designations. Development of the 36 undeveloped leases will require a new onshore processing facility, which may result in a moderate impact.

6.2.22 CUMULATIVE COMMERCIAL FISHING AND KELP HARVEST IMPACTS (2002-2030)

This section examines:

- the cumulative impacts to commercial fishing and kelp harvest without the development of the 36 leases in the period 2002 to 2030;
- the additional cumulative impacts to commercial fishing and kelp harvest from development of the 36 leases in the period 2002 to 2030.

Refer to Section 5.2.22.2 for a discussion of effects from the proposed action for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in Section 5.2.22.

There are no scheduled or anticipated oil and gas lease sales in Federal waters of the Pacific OCS or in State waters. Thus, no additional production platforms are expected to be installed on the Pacific OCS after the development of the current active leases and the 36 undeveloped leases.

CUMULATIVE IMPACTS (2002-2030)

Section 5.2.22.2 discusses the major impact agents associated with past, present, and foreseeable offshore oil and gas activities, including the proposed activities, that may produce impacts during 2002-2006, the expected duration of the proposed exploration activities. These include routine on-going and proposed oil and gas activities in Federal and State waters that may cause space-use or preclusion conflicts, and accidental or upset conditions (oil spills or hydrogen sulfide gas releases). Alaskan and foreign-import tankering, dredging and discharge of dredged material, aquaculture, coastal development, agriculture runoff, and commercial and recreational fishing also add to the cumulative impacts on commercial fishing through adverse effects on marine fish resources. These impacts are discussed more thoroughly in section 5.2.6. Other, non-OCS sources of impacts to commercial fishermen, both anthropogenic and non-anthropogenic, are also discussed.

CUMULATIVE IMPACTS WITHOUT DEVELOPMENT OF THE 36 UNDEVELOPED LEASES (2002-2030):

The projects discussed in this section include past, present, and foreseeable actions that may produce impacts during 2002-2030, the period during which development of the 36 undeveloped leases would likely occur (section 5.0). Most of the major impact agents are those discussed in section 5.2.22.2 (and treated briefly below). Potential cumulative impacts are discussed below.

Oil and Gas Activities. Section 5.2.22.2 describes the routine offshore oil and gas activities that may result in cumulative impacts to commercial fishing. These include geophysical surveys, construction, drilling and production activities with associated support activities, and the abandonment, or decommissioning, of wells and offshore facilities. As discussed in section 5.2.22.2, the major impact agents expected from these proposed activities are space-use and preclusion. The potential use of explosives in the abandonment of wells and offshore platforms also raises the possibility of lethal impacts to fish resources. Upset conditions such as oil spills may also impact commercial fishing.

Geophysical Surveys. As discussed in section 5.2.22.2, no seismic surveys have been proposed for the Pacific OCS or State waters in the near future and none are currently foreseen for the period 2002-2025.

Construction. Section 5.2.22.2 discusses the potential cumulative impacts to commercial fishing from construction activities, including the installation of platform jackets and topsides, the laying of pipelines, platform hook-up and commissioning, and the initiation of drilling. Currently, no oil and gas lease sales are scheduled or anticipated in Federal or State waters off California. Therefore, without development of the 36 undeveloped leases, it is assumed no new production platforms or pipelines would be installed during the period 2002-2025.

Development and Production. Section 5.2.22.2 discusses the potential cumulative impacts to commercial fishing from offshore development and production activities in the Pacific OCS Region. Table 5.1.2.2-1 in section 5.1.2 shows the number of wells expected to be drilled from existing production platforms. Currently, it is expected that 25 new wells will be drilled from OCS platforms in the Santa Barbara Channel and Santa Maria Basin. Production activities are expected to continue on all existing, active platforms until decommissioning (see section on Offshore Facilities Decommissioning, below). As discussed in earlier, potential impacts to commercial fishermen from these activities are expected to be restricted to short-term preclusion and space-use conflicts due to vessel traffic and routine maintenance and repairs of platforms and pipeline facilities.

Offshore Facility Decommissioning. Section 5.2.22.2 discusses the potential cumulative impacts to commercial fishermen from offshore facility decommissioning activities, including the removal of wells, platforms, and associated pipelines. Table 4.0.1-6 presents estimated removal dates for existing oil and gas structures offshore southern California. It is expected

that no OCS platforms in the Santa Barbara Channel or Santa Maria Basin will be removed before 2012, and a few may be in place as late as 2025 (or 2035, in the case of Platform Irene if the Tranquillon Ridge development occurs).

The principal potential impacts would be similar to those expected to occur as the result of construction activities, i.e., short-term preclusion and space-use conflicts. Some long-term impacts to commercial trawlers may occur due to anchor scars and debris left on the sea floor. Section 5.2.6.2 analyzes the impacts of explosive removals on fish resources.

Oil Spills. As discussed in section 5.0, the cumulative oil spill risk for the project area results from several sources: ongoing and projected oil and gas production from existing OCS facilities in the Santa Barbara Channel and Santa Maria Basin, several proposed exploration and development projects on the Federal OCS, ongoing production from one facility in State waters in the Santa Barbara Channel, two likely oil and gas projects in State waters, and the tankering of Alaskan and foreign-import oil through area waters. Table 5.1-1 present the estimated mean number of spills of various sizes and the probability of their occurrence as a result of the described activities.

The probability of one or more oil spills in the 50-1,000-bbl range occurring from existing and proposed offshore oil and gas activities over the period 2002-2030 is 73.9 percent (table 5.1-1). The probability that one or more oil spills in the 2,000 bbl range will occur from these activities is 59.1 percent (table 5.1-1). The risk of a major tanker spill in the range of 23,000 bbl during this period is estimated to 90.5 percent (table 5.1-1).

The level of impacts from such spills will depend on many factors, including the type, rate, and volume of oil spilled and the weather and oceanographic conditions at the time of the spill. These parameters would determine the quantity of oil that is dispersed into the water column; the degree of weathering, evaporation, and dispersion of the oil before it contacts a shoreline; the actual amount, concentration, and composition of the oil at the time of shoreline or habitat contact; and a measure of the toxicity of the oil.

The impacts to commercial fishing and fish resources from any oil spills occurring during this period would be similar to those described in sections 5.2.22.2.1 and 5.2.6.2.1 for the 200- and 2000-bbl spills assumed to occur as a result of offshore oil and gas activities, and for the assumed 23,000-bbl tanker spill.

Military Activities. It is assumed that military activities in the project area will continue at or near the levels described in section 5.2.24 during the period 2002-2030. Thus, the impacts to commercial fishing associated with these activities would also be expected to continue.

INCREMENTAL IMPACTS OF DEVELOPMENT OF THE 36 UNDEVELOPED LEASES (2002-2030):

Development of the 36 undeveloped leases would involve a number of oil and gas activities in addition to those described earlier in this section. As described in section 5.0, it is assumed that 4-5 platforms and associated pipelines and cables would be built: 2-3 in the northern Santa Maria Basin leases, 1 in the Bonito Unit, and 1 in the Gato Canyon Unit (figures 6.1.3-1, 6.1.3-2, and 6.1.3-3). The major portion of the offshore construction expected during the period 2007-2009, beginning with the Gato Canyon Unit, then shifting to the leases located in the Santa Maria Basin. Platform installation is estimated to take approximately 3-6 months, depending on water depth; pipeline and cable installation are estimated to take about 3 months and 4 months, respectively.

Impacts on commercial fishing in the project area from these activities are expected to cause low to moderate impacts, as discussed in section 5.2.22.2. The impacts would be mostly due to loss of fishing grounds to platforms and pipelines, which would be onsite for approximately 25 years. In an area such as the Gato Canyon Unit or the southern portion of the Bonito Unit where the drift gillnet fishery is active, moderate impacts would be expected due to the preclusion from a large area upcurrent of the platform. Furthermore, fishing grounds of the Santa Maria Basin have been fragmented by the laying of fiber optic cables making it difficult to sustain a prolonged tow through the fishing grounds. The emplacement of platforms and associated pipelines would further fragment the fishing grounds and could lead to moderate impacts on the commercial trawl fleet of the SMB. The increase in boat traffic to any new platforms on the SMB would likely lead to conflicts with the crab trap fishermen of the area.

The other routine activities associated with development of the 36 undeveloped leases, including drilling, production, and vessel and helicopter support traffic, are expected to result in minor space-use and preclusion conflicts to commercial fishermen, as discussed in section 5.2.22.1, throughout the period 2007-2030. Once production begins, support traffic is expected to remain at levels typical for ongoing offshore oil and gas activities in the Santa Maria Basin (table 4.0.1-6).

Decommissioning of the 4-5 platforms assumed to be built for development of the 36 undeveloped leases would be expected to result in space-use and preclusion conflicts with commercial fishermen during the removal of platform structures and pipelines.

If all 36 leases are developed, under the most likely development scenario the probability of one or more spills 200 bbl or less in size occurring is 98.8 percent (table 5.1-1). The probability that one or more spills in the 2,000-bbl range will occur from these activities under the most likely development scenario is 53.9 percent.

Impacts to commercial fishing from any oil spills occurring as a result of the development of the 36 undeveloped leases would be similar to those described above for the 200- and 2,000-bbl spills assumed to occur as a result of offshore oil and gas activities and for the assumed 22,800-bbl tanker spill.

SUMMARY AND CONCLUSIONS (2002-2030):

Some routine offshore oil and gas activities, including construction and drilling, would likely be heaviest during the years 2007-2012; much of this activity would be related to the development of the 36 undeveloped leases. Construction activities would occur in the Santa Maria Basin and, to a lesser extent, the western Santa Barbara Channel. Decommissioning of existing offshore oil and gas facilities will begin in the eastern Channel about 2012 and shift westward over a period of years. Thus, there will be periods of intense activity occurring in different parts of the project area at various times. Throughout these periods, routine activities such as production and vessel and helicopter support traffic will continue.

Overall, the impacts to commercial fishing in the project area from routine offshore oil and gas activities, primarily space-use and preclusion, will increase over present levels. However, the areas covered by these activities will be small relative to the available commercial fishing grounds, and the periods of disturbance will be localized. Unless several such projects were to overlap in time and space during peak fishing seasons, cumulative impacts to commercial fishing would be unlikely. However, if 4-5 platforms are placed in the SMB and SBC along with associated pipelines, fishermen, especially trawlers, would experience moderate impacts due to loss of fishing grounds. Increased vessel traffic would lead to conflicts with the trap fishermen of the area. Cumulative impacts to commercial fishing from all the routine oil and gas activities assumed to take place between 2002 and 2030, including those associated with the development of the 36 undeveloped leases, are expected to be moderate.

Accidental oil spills present an ongoing source of potential impacts to commercial fishing. The cumulative risk of oil spills arises from multiple sources, including offshore oil and gas activities in Federal and State waters and both Alaskan and foreign-import tankering. The greatest oil spill risk to the commercial fishing industry in the project area results from tankering operations. This risk is tempered by recently implemented or proposed mitigation (such as the rerouting of tankers farther offshore along the central California coast) and, as discussed in section 5.0, by modern oil spill response capabilities.

Without development of the 36 undeveloped leases, the probabilities that one or more oil spills will occur during the period 2002-2030 from existing OCS oil and gas activities are 94.9 percent for a spill of 200 bbl or less and 41.2 percent for a spill of 2,000 bbl. Under the most likely scenario for development of the 36 undeveloped leases, these probabilities are 98.8 percent and 53.9 percent, respectively. Thus, the potential for an oil spill occurring from development of the 36 undeveloped leases represents a measurable incremental increase to the overall cumulative oil spill risk for the commercial fishing industry.

Impacts to commercial fishing from the oil spills assumed to occur in the project area during the period 2002-2030 could range from low to moderate, depending on location, season, and a number of other factors. The most sensitive areas, from a commercial fishing perspective, would be near a harbor, resulting in closure.

6.2.23 CUMULATIVE MARINE RECREATIONAL FISHING IMPACTS (2002-2030)

This section examines:

- the cumulative impacts to marine recreational fishing without the development of the 36 leases in the period 2002 to 2030;
- the additional cumulative impacts to marine recreational fishing from development of the 36 leases in the period 2002 to 2030.

Refer to Section 5.2.23 for a discussion of effects from the proposed action for the time period 2002 to 2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in Section 5.2.6.

Cumulative Impacts without Development of the 36 Undeveloped Leases: We discussed above the major impact agents associated with routine past, present, and foreseeable offshore oil and gas activities, including the proposed activities, that may produce impacts during 2002-2006, the expected duration of the proposed exploration activities. These include routine on-going and proposed oil and gas activities in Federal and State waters that may cause space-use or preclusion conflicts. Alaskan and foreign-import tankering, oil spills, dredging and discharge of dredged material, aquaculture, coastal development, agriculture runoff, and commercial and recreational fishing also add to the cumulative impacts

on marine recreational fishing through adverse effects on marine fish resources. These impacts are discussed more thoroughly in section 5.2.6. Other, non-OCS sources of impacts to recreational fishermen, both anthropogenic and non-anthropogenic, are also discussed.

The projects discussed in this section include past, present, and foreseeable actions that may produce impacts during 2002-2025, the period during which development of the 36 undeveloped leases would likely occur (section 5.0). Most of the major impact agents are those discussed above (and treated briefly below). Potential cumulative impacts are discussed below.

Offshore Oil and Gas Activities. Section 5.2.23.2 discusses the routine offshore oil and gas activities that may result in cumulative impacts to the marine recreational fishing industry. These include geophysical surveys, construction, drilling and production activities with associated support activities, and the abandonment, or decommissioning, of wells and offshore facilities. As discussed above, the major impact agents expected from these proposed activities are space-use and preclusion. The potential use of explosives in the abandonment of wells and offshore platforms also raises the possibility of lethal impacts to fish resources, discussed in section 5.2.6.

Geophysical Surveys. As discussed above, no seismic surveys have been proposed for the Pacific OCS or State waters in the near future and none are currently foreseen for the period 2002-2030.

Construction. The potential cumulative impacts to commercial fishing from construction activities, including the installation of platform jackets and topsides, the laying of pipelines, platform hook-up and commissioning, and the initiation of drilling were discussed above. Currently, no oil and gas lease sales are scheduled or anticipated in Federal or State waters off California. Therefore, without development of the 36 undeveloped leases, it is assumed no new production platforms or pipelines would be installed during the period 2002-2030.

Development and Production. Table 5.1.2.2-1 in section 5.0 shows the number of wells expected to be drilled from existing production platforms. Currently, it is expected that 25 new wells will be drilled from OCS platforms in the Santa Barbara Channel and Santa Maria Basin. Production activities are expected to continue on all existing, active platforms until decommissioning (see section on Offshore Facilities Decommissioning, below). As discussed above, potential impacts to sport fishermen from these activities are expected to be restricted to short-term preclusion and space-use conflicts due to vessel traffic and routine maintenance and repairs of platforms and pipeline facilities.

Offshore Facility Decommissioning. Table 4.0.1-6 presents estimated removal dates for existing oil and gas structures offshore southern California. It is expected that no OCS platforms in the Santa Barbara Channel or Santa Maria Basin will be removed before 2012, and a few may be in place as late as 2025 (or 2035, in the case of Platform Irene if the Tranquillon Ridge development occurs).

The principal potential impacts would be similar to those expected to occur as the result of construction activities, i.e., short-term preclusion and space-use conflicts. These sites would also be lost as potential fishing areas. Section 5.2.6 analyzes the impacts of explosive removals on fish resources.

Oil Spills. As discussed in section 5.0, the cumulative oil spill risk for the project area results from several sources: ongoing and projected oil and gas production from existing OCS facilities in the Santa Barbara Channel and Santa Maria Basin, several proposed exploration and development projects on the Federal OCS, ongoing production from one facility in State waters in the Santa Barbara Channel, two likely oil and gas projects in State waters, and the tankering of Alaskan and foreign-import oil through area waters. Table 5.1-1 present the estimated mean number of spills of various sizes and the probability of their occurrence as a result of the described activities.

The most likely scenario is that one or more oil spills in the 50-1,000-bbl range would occur from offshore oil and gas activities over the period 2002-2030, and that such a spill would be 200 bbl or less in volume. The probability that one or more spills this size would occur during this period is 73.9 percent (table 5.1-1). The maximum reasonably foreseeable oil spill volume from offshore oil and gas activities is 2,000 bbl, assumed for purposes of analysis to be a pipeline spill. The probability of a spill this size occurring between 2002-2030 is 59.1 percent (table 5.1-1). Based on data from tanker spills in U.S. waters, the mean size for a tanker spill is assumed to be 22,800 bbl (probability of occurrence is 90.5 percent).

Impacts to marine recreational fishing from any oil spills occurring during this period would be similar to those described in section 5.2.23.2 for the 200- and 2,000-bbl oil spills assumed to occur as a result of offshore oil and gas activities and for the assumed 22,800-bbl tanker spill.

Other Activities. Section 5.2.23.2 discusses the potential impacts to marine recreational fishing from other human-related activities. It is assumed that these activities will continue to contribute to the overall impacts on recreational fishing. However, as concern for marine fish resources gains the attention of the public, new legislation and regulations will likely be imposed that could adversely affect the charter boat and rental boat fleets at local harbors. The signifi-

cance of area and fishery closures is difficult to predict, however it seems likely that some charter boat owners will go out of business as a result of fishery closures.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): Development of the 36 undeveloped leases would involve a number of oil and gas activities in addition to those described earlier in this section. As described in section 5.0, it is assumed that 4-5 platforms and associated pipelines and cables would be built: 2-3 in the northern Santa Maria Basin leases, 1 in the Bonito Unit, and 1 in the Gato Canyon Unit (figures 6.1.3-1, 6.1.3-2, and 6.1.3-3). The major portion of the offshore construction expected during the period 2007-2009, beginning with the Gato Canyon Unit, then shifting to the leases located in the Santa Maria Basin. Platform installation is estimated to take approximately 3-6 months, depending on water depth; pipeline and cable installation are estimated to take about 3 months and 4 months, respectively.

Impacts on recreational fishing in the project area from these activities are expected to cause low impacts, as discussed in section 5.2.23.2.

The other routine activities associated with development of the 36 undeveloped leases, including drilling, production, and vessel and helicopter support traffic, are expected to result in minor space-use and preclusion conflicts to recreational fishermen throughout the period 2007-2030. Once production begins, support traffic is expected to remain at levels typical for ongoing offshore oil and gas activities in the Santa Maria Basin (table 4.0.1-6).

If all 36 leases are developed, under the most likely development scenario the probability of one or more spills 200 bbl or less in size occurring is 98.8 percent (section 5.1, table 5.1-1). The probability that one or more spills in the 2,000-bbl range will occur from these activities under the most likely development scenario is 53.9 percent.

Impacts to recreational fishing from any oil spills occurring as a result of the development of the 36 undeveloped leases would be similar to those described above for the 200- and 2,000-bbl spills assumed to occur as a result of offshore oil and gas activities and for the assumed 22,800-bbl tanker spill.

Summary and Conclusion (2002-2030): Some routine offshore oil and gas activities, including construction and drilling, would likely be heaviest during the years 2007-2012; much of this activity would be related to the development of the 36 undeveloped leases. Construction activities would occur in the Santa Maria Basin and, to a lesser extent, the western Santa Barbara Channel. Decommissioning of existing offshore oil and gas facilities will begin in the eastern Channel about 2012 and shift westward over a period of years. Thus, there will be periods of intense activity occurring in different parts of the project area at various times. Throughout these periods, routine activities such as production and vessel and helicopter support traffic will continue.

Overall, the impacts to the recreational fishing industry in the project area from routine offshore oil and gas activities, primarily space-use and preclusion, will amount to a negligible increase over present levels. The areas covered by these activities will be small relative to the available fishing grounds, and the periods of disturbance will be localized. Cumulative impacts to marine recreational fishing from all the routine oil and gas activities assumed to take place between 2002 and 2030, including those associated with the development of the 36 undeveloped leases, are expected to be low.

Accidental oil spills present an ongoing source of potential impacts to the recreational fishing industry. The cumulative risk of oil spills arises from multiple sources, including offshore oil and gas activities in Federal and State waters and both Alaskan and foreign-import tankering. The greatest oil spill risk to the recreational fishing industry in the project area results from tankering operations. This risk is tempered by recently implemented or proposed mitigation (such as the rerouting of tankers farther offshore along the central California coast) and, as discussed in section 5.0, by modern oil spill response capabilities.

Without development of the 36 undeveloped leases, the probabilities that one or more oil spills will occur during the period 2002-2030 from existing OCS oil and gas activities are 73.9 percent for a spill of 200 bbl or less and 59.1 percent for a spill of 2,000 bbl. Under the most likely scenario for development of the 36 undeveloped leases, these probabilities are 98.8 percent and 53.9 percent, respectively. Thus, the potential for an oil spill occurring from development of the 36 undeveloped leases represents a measurable incremental increase to the overall cumulative oil spill risk for the recreational fishing industry.

Impacts to recreational fishing from the oil spills assumed to occur in the project area during the period 2002-2030 could range from low to medium, depending on location, season, and a number of other factors. The most sensitive areas, from a fishing perspective, would be near a harbor, resulting in closure.

6.2.24 CUMULATIVE MILITARY OPERATIONS IMPACTS (2002-2030)

This section examines cumulative impacts to military operations without development of the 36 undeveloped leases in the period 2002-2030, and the additional cumulative impacts to military operations from development of the 36 leases during that period. Refer to section 5.2.24 for a discussion of effects from the Proposed Action for the time period 2002-2006. The significance criteria for the following analysis are the same as the criteria for the time period 2002 to 2006 presented in 5.2.24.

Cumulative Impacts Without Development of the 36 Undeveloped Leases (2002-2030): The following text briefly describes routine and non-routine oil and gas activities that may result in cumulative impacts during the period 2002-2030 without development of the 36 undeveloped leases. The activities include geological and geophysical surveys, exploration drilling, platform construction, development and production, decommissioning, and oil spills. Potential cumulative impacts are also discussed.

Geological and Geophysical Surveys: As discussed in Section 5.2.24.2.1, no seismic surveys have been proposed for existing OCS and State Tidelands leases. Currently, no oil and gas lease sales are scheduled or anticipated on the Pacific OCS or State Tidelands. Therefore, without exploration and development of the 36 undeveloped leases, future geological and geophysical surveys are likely to be limited to periodic side-scan sonar surveys of pipelines and short-duration geo-hazard surveys covering relatively-small geographic areas.

Exploration Drilling: Section 4.0 discusses exploration activities and provides a historical overview of exploration activity on the Pacific OCS. No exploratory wells have been drilled on the Pacific OCS since 1989 and no additional exploration on the developed leases is expected. Therefore, without exploration and development of the 36 undeveloped leases, no further exploration drilling activity is expected over the 2002-2030 period.

Platform Construction: Section 4.0 discusses platform construction activities and provides a historical overview of platform construction on the Pacific OCS and in State waters. Currently, no oil and gas lease sales are scheduled or anticipated on the Pacific OCS or State waters. Therefore, without development of the 36 undeveloped leases, no new production platforms are likely to be installed during the period 2002-2030.

Development and Production: Section 4.0 discusses development and production activities. Currently, about two development wells per month are being drilled from OCS platforms. Therefore, without development of the 36 undeveloped leases, the number of development wells drilled from existing OCS platforms is expected to remain at this level or decrease during the period 2002-2030.

Decommissioning: Section 4.0 describes how oil and gas platforms are decommissioned. Section 4.0 also presents an estimated decommissioning schedule for existing oil and gas structures offshore southern California. Three of the existing platforms (Harvest, Hermosa, Hidalgo) located in Military Warning Area W-532 are projected to be decommissioned between 2015-2020. The fourth platform (Irene) is projected to be decommissioned during 2020-2025 but decommissioning could be delayed to 2030-2035 if development of the Tranquillon Ridge Field by extended reach drilling is successful.

Oil Spills: Section 5.0 describes the cumulative oil spill risk for the project area. Section 5.0 describes the estimated mean number of spills of various sizes and the probability of their occurrence as a result of the described activities. The probability of one or more spills 200 bbl or less in size occurring from existing and proposed offshore oil and gas activities during the period 2002-2030 is 73 percent. The probability that one or more spills in the 2,000-bbl range will occur from these activities is 59.1 percent. The risk of a tanker spill (22,800 bbl) during this period is estimated to be 90.5 percent.

Impacts to military operations from any oil spills occurring during this period would be similar to those described in Sections 5.2.24.2.1 for the 200 bbl and 2,000 bbl spills assumed to occur as a result of offshore oil and gas activities, and for the assumed 22,800 bbl tanker spill.

Incremental Impacts of Development of the 36 Undeveloped Leases (2002-2030): The oil and gas activities likely to have a cumulative impact on military operations during 2002-2030 are MODU drilling activities, platform construction, development and production, decommissioning, and oil spill cleanup operations. The activities create the potential for space-use conflicts with military operations and hazards to personnel. The cumulative impacts of offshore oil and gas activities and oil spills on military operations conducted in Military Warning Area W-532 are discussed below.

Space-Use Conflicts and Hazards to Personnel: Sections 5.2.24.1 and 5.2.24.2 describe oil and gas activities and associated vessel and aircraft traffic in Military Warning Area W-532. The following text briefly describes the temporal relationships of the activities and how the level of aircraft and vessel traffic would likely change over the 2002-2030 period. The incremental impacts resulting from oil spills are also discussed.

Currently, about 8-12 supply boat trips and 150 helicopter trips are made monthly to the four existing OCS platforms (Irene, Harvest, Hermosa, Hidalgo)

located in the Military Warning Area W-532. During MODU drilling operations in 2002-2003, the number of supply boat trips will temporarily increase from 8-12 per month to 20-25 per month. The number of helicopter trips will temporarily increase from its current level of 150 per month to 170-180 per month during the MODU drilling period. Additionally, fluid produced during drill-stem tests for each MODU well will be barged to Long Beach or Port Hueneme at the end of each testing period. A total of 4-10 such trips are estimated to occur during the drilling period.

As was discussed in Section 5.2.24.2, two new development projects have been proposed from existing OCS platforms in Military Warning Area W-532. Arguello Inc. is proposing to drill up to 20 extended reach wells into undeveloped leases in the Rocky Point Unit from Platforms Harvest, Hermosa, and Hidalgo. Nuevo Energy Company is proposing to drill up to 30 extended reach wells into the Tranquillon Ridge (State Tidelands) from Platform Irene. The projects will not create any additional space use conflicts with military operations because drilling will be conducted from existing platforms. Consequently, there will not be any appreciable increase in the existing level of aircraft and vessel traffic to the platforms as a result of the development projects.

If the proposed MODU drilling activity is successful, it is projected that up to five new platforms would be constructed on the OCS between 2007-2008. Four of the platforms would be constructed in the Point Sal, Purisima Point, and Bonito Units, which are located in Military Warning Area W-532. The development scenario also envisions the construction of a new onshore facility in northern Santa Barbara County (Casmailia) to serve the three new platforms in the northern Santa Maria Basin. It is estimated that it will take approximately 3-6 months to install a platform and 3-4 months to install pipelines and power cables. The level of supply boat and helicopter traffic in Military Warning Area W-532 is estimated to increase 25-50 percent above its current level during the peak construction period.

After construction of the platforms is completed, the level of vessel and aircraft traffic in Military Warning Area W-532 is expected to increase 100 percent over its current level as the number of platforms increase from four to eight. This level of activity will continue during the 2008-2015 period when all 8 platforms are expected to be operating. The level of vessel and aircraft activity is expected to return to its current level after Platforms Harvest, Hermosa, Hidalgo, and possibly Irene are decommissioned between 2015-2020. During decommissioning operations, the level of vessel and aircraft traffic in Military Warning Area W-532 is estimated to increase 25-50 percent above its current level during the peak dismantling period. The time required to decommission a platform is estimated to range from 60-90 days. After decommissioning operations have been completed, the level of vessel and aircraft activity would return to its current level and remain at that level until the four new platforms in Military Warning Area W-532 are decommissioned between 2025-2030.

The effect of oil spills on military operations will depend on many factors, including the type, rate, and volume of oil spilled, and the weather and oceanographic conditions at the time of the spill. The probability of one or more spills 200 bbl or less in size occurring from existing and proposed offshore oil and gas activities is 73.9 percent. The probability that one or more spills in the 2,000 bbl-range will occur from these activities is 59.1 percent. The risk of a major tanker spill (22,800 bbl) during this period is estimated to be 90.5 percent.

Impacts to military operations from oil spills occurring during this period would be similar to those described in Section 5.2.24.2.1 for the 200- and 2,000-bbl spills assumed to occur as a result of offshore oil and gas activities and for the assumed 22,800 bbl tanker spill.

Summary and Conclusion (2002-2030): The conclusion in this section applies to all of the units where MODU drilling is proposed. Most of the southern California OCS is used intensively for various military activities, the exception being most of the Santa Barbara Channel. Offshore oil and gas activities have the potential to impact military activities because of space-use conflicts resulting from additional aircraft and vessel traffic, the placement of permanent or semi-permanent drilling and production structures and activities resulting from them, and activities stemming from cleanup efforts of oil spills. As oil and gas activities are expanded in southern California, the potential for additional space use conflicts is created with the military as operations increase in the Point Mugu Sea Range. As a result of the MODU drilling activity, it is estimated that as many as five new platforms would be installed on the Pacific OCS. Four of the platforms would be located in Military Warming Area W-532.

During the more than 15-year operational history of oil and gas platforms in Military Warning Area W-532, no military operations have been delayed, canceled, or relocated due to routine offshore oil and gas activity. In addition, there have been no accidents (vessel/aircraft collisions, deaths, or serious injuries) involving oil and gas activities and military operations in the Point Mugu Sea Use Range since the initiation of exploration and development activities more than 30 years ago. As described earlier in this section, the existing military lease stipulations have been very effective in avoiding conflicts between oil and gas and military operations. The potential cumulative impact

of routine oil and gas activities on military operations is therefore considered low based upon the significance criteria used in this analysis.

For non-routine operations, such as oil spill clean-up activities, oil and gas activities have the potential to disrupt military operations, particularly if spills occur in a Military Warning Area or drift into a Military Warning Area due to wind and current movements. As described in Section 5.2.24.2.1, small spills of 200 barrels or less would have a low impact on military operations. Moderate spills (2,000 bbl), depending on their location and timing, would have a low to moderate impact on military operations. Large tanker spills (22,800 bbl), particularly if they were to occur in the Point Mugu Sea Range, would have a moderate impact on military operations. Overall, the cumulative impact on military operations from all activities is expected to be moderate.

6.3 ENVIRONMENTAL IMPACTS OF THE HIGH CASE SCENARIO

This section describes the potential offshore activities, and disturbances associated with the much more unlikely (high case) estimate of resources that could be developed. This high case assumes that the 3 platforms with 60 well slot size projected for the development in the Santa Maria Basin would remain the same as in the Base Case. It differs in that a slightly larger number of wells are assumed (a total increase of 18 wells) and it assumes that the drilling program, production methods, and well recoveries will all be more successful than expected for the base case. Table 6.3-1 presents a comparison of the resources and the associated disturbances projected for the most likely scenario and the high case scenario for the 36 undeveloped leases.

Although this increase in resources and associated activities could potentially affect the biological, physical, and socioeconomic resources of the cumulative activity area, the increase would be limited to an increase in oil and gas production in the Santa Maria Basin area. No additional platforms or pipelines are assumed. Estimates for the Bonito Unit and Gato Canyon Unit would remain the same as the base case.

The additional resource recovery would slightly increase the risk of an oil spill and there would be an increase in the volume of muds and cuttings. Oil spills and the impacts were already discussed in the base case scenario. The risk would increase slightly but the impacts remain the same for all resources. Increased muds and cuttings would add to the effects described for the base case however they would not change the impact levels projected for the base case.

Table 6.3-1. Comparison of base case and high case hypothetical scenario for the 36 undeveloped leases.

	Base Case	High Case	Increase
Santa Maria North			
Oil Reserves	115 MMbbl	146 MMbbl	**31 MMbbl**
Gas reserves	47 BCF	56.5 BCF	**9.5 BCF**
Oil recovery/well	2.5 MMbbl	2.8 MMbbl	**.3 MMbbl**
Producing wells	45	52	**7**
Peak oil year	year 7	year 7	**nc**
Peak gas year	year 7	year 7	**nc**
Platforms	1	1	**nc**
Well slots	60	60	**nc**
Muds	602,800 BBL	759,000 BBL	**156,200 BBL**
Cuttings	144,600 BBL	182,100 BBL	**37,500 BBL**
Santa Maria Central			
Oil Reserves	118 MMbbl	159 MMbbl	**41 MMbbl**
Gas reserves	24 BCF	32 BCF	**8 BCF**
Oil recovery/well	2.5 MMbbl	3 MMbbl	**.5 MMbbl**
Producing wells	49	53	**4**
Peak oil year	year 8	year 8	**nc**
Peak gas year	year 8	year 8	**nc**
Platforms	1	1	**nc**
Well slots	60	60	**nc**
Muds	650,000 BBL	697,300 BBL	**47,300 BBL**
Cuttings	155,925 BBL	167,300 BBL	**11,375 BBL**
Santa Maria South			
Oil Reserves	90 MMbbl	120 MMbbl	**30 MMbbl**
Gas reserves	18 BCF	24 BCF	**6 BCF**
Oil recovery/well	2.1 MMbbl	2.4 MMbbl	**.3 MMbbl**
Producing wells	46	50	**4**
Peak oil year	year 8	year 8	**nc**
Peak gas year	year 8	year 8	**nc**
Platforms	1	1	**nc**
Well slots	60	60	**nc**
Muds	658,000 BBL	708,600 BBL	**50,600 BBL**
Cuttings	158,000 BBL	170,200 BBL	**12,200 BBL**
Bonito Unit			
Oil Reserves	68 MMbbl	nc	nc
Gas reserves	34 BCF	nc	nc
Oil recovery/well	3.2 MMbbl	nc	nc
Producing wells	21	nc	nc
Peak oil year	year 5	nc	nc
Peak gas year	year 5	nc	nc
Platforms	1	nc	nc
Well slots	36	nc	nc
Muds	342,000 BBL	nc	nc
Cuttings	82,000 BBL	nc	nc
Gato Canyon Unit			
Oil Reserves	77 MMbbl	nc	nc
Gas reserves	46 BCF	nc	nc
Oil recovery/well	4 MMbbl	nc	nc
Producing wells	20	nc	nc
Peak oil year	year 5	nc	nc
Peak gas year	year 5	nc	nc
Platforms	1	nc	nc
Well slots	28	nc	nc
Muds	193,000 BBL	nc	nc
Cuttings	68,000 BBL	nc	nc

Table 6.3-1. Comparison of base case and high case hypothetical scenario for the 36 undeveloped leases (continued).

Rocky Point Unit			
Oil Reserves	39 MMbbl	nc	nc
Gas reserves	11.7 BCF	nc	nc
Oil recovery/well	2.8 MMbbl	nc	nc
Producing wells	14	nc	nc
Peak oil year	year 4	nc	nc
Peak gas year	year 4	nc	nc
Platforms	Existing (Platform Harvest, Hermosa and Hidalgo)	nc	nc
Well slots	NA	nc	nc
Muds	265,000 BBL	nc	nc
Cuttings	62,500 BBL	nc	nc
Cavern Point Unit			
Oil Reserves	22 MMbbl	nc	nc
Gas reserves	20 BCF	nc	nc
Oil recovery/well	2.2 MMbbl	nc	nc
Producing wells	10	nc	nc
Peak oil year	year 3	nc	nc
Peak gas year	year 3	nc	nc
Platforms	Existing (Platform Gail)	nc	nc
Well slots	NA	nc	nc
Muds	38,700 BBL	nc	nc
Cuttings	45,300 BBL	nc	nc
Sword Unit			
Oil Reserves	29 MMbbl	nc	nc
Gas reserves	7.3 BCF	nc	nc
Oil recovery/well	2.9 MMbbl	nc	nc
Producing wells	10	nc	nc
Peak oil year	year 4	nc	nc
Peak gas year	year 4	nc	nc
Platforms	Existing (Platform Hermosa)	nc	nc
Well slots	NA	nc	nc
Muds	213,000 BBL	nc	nc
Cuttings	50,400 BBL	nc	nc