United States Department of the Interior
BUREAU OF OCEAN ENERGY MANAGEMENT
Pacific OCS Region
770 Paseo Camarillo, 2nd Floor
Camarillo, CA 93010-6064

Memorandum

MAY - 2 2013

To: Regional Supervisor, Office of Strategic Resources

From: Regional Supervisor, Office of Environment

Subject: Findings Summary for the Environmental Assessment for Revisions to the Platform Hidalgo Development and Production Plan to Include Development of the Western Half of the Northwest Quarter of Lease OCS-P 0450

Please see the attached Findings Summary which states that based on the analysis presented in the attached Environmental Assessment (EA), no new or supplemental environmental impact statement is necessary, and no further NEPA analysis is required for the proposed project.

In the *Accompanying Information Volume* submitted as part of the application by Plains Exploration and Production Company (PXP), a number of specific actions were proposed in order to avoid or minimize potential environmental impacts. In the course of completing the attached EA, we identified several additional specific measures. We recommend that the following actions are identified as conditions of approval in your response to PXP's application:

1. PXP shall ensure thorough consultation with the Santa Barbara County Air Pollution Control District so that the proposed project provides emission offsets for the maximum allowable project emissions expected, consistent with that entity's applicable rules and regulations (PXP Environmental Evaluation, p. 87);
2. PXP will take the following measures when murrelets are present in the project area (PXP Environmental Evaluation, p. 77)
    a. Minimization of use and wattage of night lighting to the extent feasible while not compromising safety, spill detection capabilities, or platform operations,
    b. Shielding of lights, covering of filaments, and directing lighting downward as much as is feasible,
    c. Requiring that all marine vessels associated with the project also employ measures 2(a) and 2(b), above, and
    d. Developing a comprehensive monitoring program for the waters around the platform for Scripps's and Guadalupe murrelets, Ashy Storm-petrel, and Cassin's auklet.
3. PXP shall consult with the Joint Oil/Fisheries Liaison Office (JOFLO, PXP Biological Evaluation p. 53) in the following circumstances
    a. When marine vessels are used for the project, to ensure use of JOFLO approved traffic corridors, and

b. To resolve disputes over alleged damage to commercial fishing gear arising from the project;

4. All personnel associated with marine support vessel operations should be trained with the Wildlife and Fisheries Training video (Pacific Operators Offshore, LLC, 2009).

If you have any questions on these measures, or need any further information, please do not hesitate to contact me.

Attachment

Findings Summary

In 1984, Minerals Management Service developed the *Point Arguello Field and Gaviota Processing Facility Area Study and Chevron/Texaco Development Plans EIR/EIS* (ADL, 1984). The purpose of this joint State of California/Federal document was to evaluate different construction and development scenarios for developing oil and gas in the Point Arguello Field. The document evaluated the potential impacts of the alternatives on a comprehensive list of physical, biological, and socioeconomic resources. BOEM has tiered this EA to the 1984 document.

Since the finalization of the 1984 EIR/EIS, Platform Hidalgo was installed in 1986, a supplemental EIR was finalized in 1988 to build the Gaviota processing facility and production began from the Point Arguello Field in 1991. Since that time, technology has developed in extended-reach drilling so that new production fields can be accessed by existing platforms. In 2003, a DPP revision was approved to allow the development of the eastern half of Lease OCS-P 0451 (i.e., Rocky Point Field), not originally considered by the Platform Hidalgo DPP. Plains Exploration and Production Company (PXP) proposes to develop and produce commercial quantities of oil and gas from Platform Hidalgo, located on the Federal OCS, by drilling two wells into the Electra Field located in the northwest quarter of Federal Lease OCS-P 0450. The proposed development of the Electra Field will add production of oil and gas to the existing Point Arguello Unit facilities and production operations. The purpose of this EA is to evaluate effects of the proposed project and determine whether (1) the proposed project is a substantial change from the actions evaluated in the original 1984 EIR/EIS relevant to environmental concerns; or whether, (2) there are significant new circumstances or information relevant to environmental concerns and bearing on the actions described in the original 1984 EIR/EIS or its impacts (40 C.F.R. §1502.9(c)).

Current baseline operations are defined as the No Action Alternative, which are described in Chapter 2. Chapter 3 evaluates effects of the proposal relative to current operations/no action alternative.

The proposal to drill in a new oil field is not a substantial change from the actions evaluated in the 1984 EIR/EIS to produce oil and gas elsewhere in the same lease. The size and location of the proposed project, and the scope of the incremental environmental impacts resulting from the proposed project, are roughly equivalent to those described in the 1984 EIR/EIS.

The discussions in Chapter 3 focus on new circumstances or information not previously disclosed in the 1984 EIR/EIS. The new circumstances or information relevant to environmental resources identified in this analysis include:

- Greenhouse gases;
- Lighting effects on marine birds;
- Essential Fish Habitat (EFH); and
- Environmental Justice

Impacts to these resources, while not considered in the 1984 EIR/EIS, do not represent significant, new circumstances or information relevant to the environment and bearing on the proposed action, primarily because the incremental impacts are temporary in nature and negligible as compared to the current baseline operations on Platform Hidalgo. GHG emission

increases from the proposed drilling activities are less than the local regulatory body's preliminary established thresholds. Increase in lighting associated with the project is one-eighth the total wattage that currently exists on Platform Hidalgo, and have multiple measures planned to minimize the potential for impacts to sensitive seabird species. The requirements for both EFH and Environmental Justice came into being after the 1984 EIR/EIS was completed. However, neither of these resources is expected to be significantly impacted by the proposed project.

The remaining effects identified in this EA are considered additional details, or clarifications of, effects that were previously disclosed in the 1984 EIR/EIS. These effects include:

- Changes (listing and delisting) of Federally endangered species;
- Decrease in commercial fishing activities;
- Changes in air quality regulatory transfer of jurisdiction; and
- Changes to specially designated areas.

Therefore, based on the analysis presented in this EA, no new or supplemental environmental impact statement is necessary, and no further NEPA analysis is required for the proposed project.

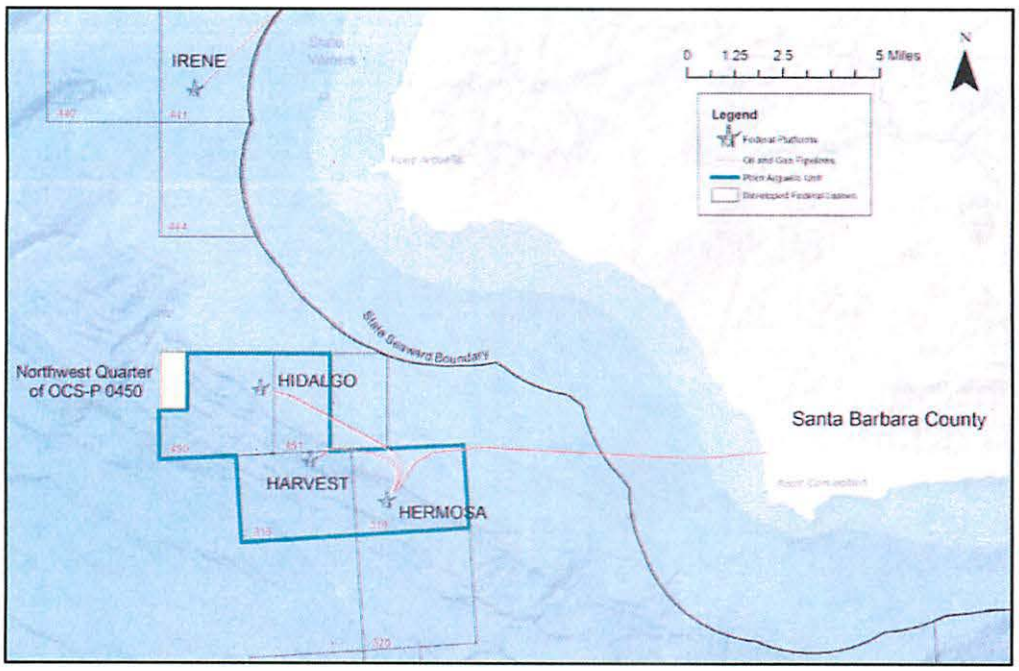
Rick Yarde
Regional Supervisor
Office of Environment

2 May 13
Date

Environmental Assessment

Revisions to the Platform Hidalgo Development and Production Plan to Include Development of the Western Half of the Northwest Quarter of Lease OCS-P 0450

May 1, 2013



Unites States Department of Interior
Bureau of Ocean Energy Management
Pacific OCS Region
770 Paseo Camarillo
Camarillo, California 93010

Environmental Assessment

May 1, 2013

Project: Revisions to the Platform Hidalgo Development and Production Plan to Include Development of the Western Half of the Northwest Quarter of Lease OCS-P 0450

Operator: Plains Exploration and Production Company

Area: Southern Santa Maria Basin

Prepared by: Environmental Analysis Section, Pacific OCS Region

Related Environmental Documents

Please also see cited literature.

U.S. Department of Interior, Minerals Management Service. 2003. OCS Environmental Assessment: Revisions to the Point Arguello Field Development and Production Plans to include development of the eastern half of Lease OCS-P 0451. June 19, 2003.

Arthur D. Little Inc. 1984. Point Arguello Field and Gaviota Processing Facility Area Study and Chevron/Texaco Development Plans EIR/EIS. Prepared for the County of Santa Barbara, U.S. Minerals Management Service, California State Lands Commission, California Coastal Commission, and California Secretary of Environmental Affairs. Prepared by Arthur D. Little, Santa Barbara, CA.

U.S. Department of the Interior, Bureau of Land Management. 1980. Final Environmental Impact Statement for Proposed 1981 Outer Continental Shelf Oil and Gas Lease Sale Offshore Central and Northern California, OCS Lease Sale No. 53. Bureau of Land Management, Pacific OCS Region, LosAngeles, CA.

Table of Contents

1.0 INTRODUCTION 1

1.1 The Proposed Action 1
1.2 Purpose and Need for the Proposed Action 1
1.3 Consultations and Decisions to be Made by BOEM and Other Agencies 1
1.4 Background Information and Description of Existing Facilities 3
1.5 Description of the Proposed Project 7
1.6 Time Frame for Production of Point Arguello Facilities 9
1.7 Alternatives to the Proposed Project 10
1.8 Environmental Resources and Impacts Considered 10
1.9 Cumulative Impacts 12

2.0 DESCRIPTION OF AFFECTED ENVIRONMENT 15

2.1 Physical Environment 15
2.1.1 Air Quality 15
2.1.2 Water Quality (Formerly Marine Water Resource) 15
2.2 Biological Resources 17
2.2.1 Intertidal Communities 17
2.2.2 Benthic Communities 19
2.2.3 Fishes and Essential Fish Habitat (Formerly Nekton Communities) 20
2.2.4 Marine Dependent Birds 22
2.2.5 Marine Mammals 26
2.2.6 Marine Turtles 26
2.2.7 Special Areas (Formerly Important Locations for Marine Biota) 27
2.3 Socioeconomic Resources 28
2.3.1 Commercial Fishing 28
2.3.2 Environmental Justice 29

3.0 IMPACTS AND CUMULATIVE ANALYSES 31

3.1 Physical Resources 31
3.1.1 Oil Spill Risk Analysis 31
3.1.2 Air Quality 35
3.1.3 Water Quality 39
3.2 Biological Resources 40
3.2.1 Intertidal Communities 40
3.2.2 Benthic Communities 43
3.2.3 Fishes and Essential Fish Habitat 45
3.2.4 Marine Dependent Birds 47
3.2.5 Marine Mammals 51
3.2.6 Marine Turtles 53
3.2.7 Special Areas 54
3.3 Socioeconomic Resources 55
3.3.1 Commercial Fishing 55
3.3.2 Environmental Justice 56

5.0 LIST OF PREPARERS 59

4.0 LITERATURE CITED 61

Appendix A: Oil Spill Modeling Trajectories

List of Tables

Table Name	Page No.
Table 1-1. General Data for the Point Arguello Platforms (PXP, 2012).	5
Table 1-2. Current Produced Water Discharge Parameters (PXP, 2012).	6
Table 1-3. Historical and Proposed Volumes of Drilling Fluid and Drill Cuttings Discharges from Point Arguello Platforms	8
Table 1-4. Physical and biological resources that were discussed in the 1984 EIR/EIS that will not be discussed further because no new circumstances have arisen and the potential new impacts to the resource are minimal.	11
Table 1-5. Socioeconomic resources that were discussed in the 1984 EIR/EIS that will not be discussed further because no new circumstances have arisen and the potential impacts to the resource are minimal.	11
Table 2-1. Key Water Quality Parameters for the Southern California Bight.	16
Table 2-2. Threatened or Endangered Fish Species	21
Table 2-3. Special-Status Marine and Coastal Birds Within or Near the Project Area.	24
Table 2-4. State and Federal protected areas near the Platform Hidalgo proposed project.	28
Table 2-5. Percentage (%) of minority populations and low-income populations in the potential area of effect and relevant counties.	30
Table 3-1. Crude, diesel, or other hydrocarbon spills recorded in the Pacific OCS Region, 1963 through 2011 (volumes in barrels).	32
Table 3-2. Estimated Means and Spill Occurrence Probabilities Pacific OCS Region Analyses using only Pacific OCS Spill Data from 1964 to 2011. Anticipated Production for only Point Arguello Field Production is 0.012 Billion Barrels (PXP, 2012).	33
Table 3-3. Estimated Means and Spill Occurrence Probabilities Pacific OCS Region Analyses using only Pacific OCS Spill Data from 1964 to 2011. Anticipated Production for only Electra Field is 0.0035 Billion Barrels (PXP, 2012).	33
Table 3-4. Estimated Means and Spill Occurrence Probabilities Pacific OCS Region Analyses using only Pacific OCS Spill Data from 1964 to 2011. Anticipated Production for Point Arguello and Electra Fields is 0.0155 Billion Barrels (PXP, 2012).	33
Table 3-5. Comparison of air quality issues between Platform Hidalgo proposed DPP Revision and Point Arguello 1984 EIR/EIS	37

List of Figures

Figure Name **Page No.**

Figure 1-1. The proposed project area, including Platform Hidalgo and other Federal Platforms, in relation to shore and to the proposed drilling sites in the northwestern quarter of Lease OCS-P 0450.....4

Figure 2-1. State and Federal protected areas near the Platform Hidalgo proposed project.....33

1.0 Introduction

1.1 The Proposed Action

Plains Exploration and Production Company (PXP) proposes to develop and produce commercial quantities of oil and gas from Platform Hidalgo, located on the Federal Outer Continental Shelf (OCS), by drilling two wells into the Electra Field located in the northwest quarter of Federal Lease OCS-P 0450. The proposed development of the Electra Field will add production of oil and gas to the existing Point Arguello Unit facilities and production operations. As operator, PXP has submitted a revision to the Platform Hidalgo Development and Production Plan (DPP) to develop the Electra Field within their existing lease. The final version was received on October 12, 2012 and deemed complete by BOEM on November 11, 2012. Information from *Revisions to the Platform Hidalgo Development and Production Plan to Include Development of the Western Half NW/4 of Lease OCS-P 0450* (PXP, 2012) was received with an accompanying information volume and multiple attachments, which had an in-depth environmental evaluation. This Environmental Assessment (EA) uses material directly from these documents.

1.2 Purpose and Need for the Proposed Action

The Bureau of Ocean Energy Management (BOEM) is required to ensure that the OCS is leased in a safe and environmentally sound manner. Revisions to the Platform Hidalgo DPP include development and production of oil and gas from the western half of the northwestern quarter (NW/4) of Federal Lease OCS-P 0450.

In 1984, BOEM (then Minerals Management Service (MMS)) developed the *Point Arguello Field and Gaviota Processing Facility Area Study and Chevron/Texaco Development Plans EIR/EIS* (ADL, 1984). The purpose of this joint State of California Environmental Impact Report (EIR) and Federal Environmental Impact Statement (EIS) was to evaluate different construction and development scenarios for developing oil and gas in the Point Arguello Field. The purpose of this EA is therefore to evaluate effects of the proposed project and determine whether a supplemental or new EIS is required, or whether the original 1984 EIR/EIS is sufficient. Specifically, this EA is intended to evaluate whether: (1) the proposed project is a substantial change from the actions evaluated in the original 1984 EIR/EIS relevant to environmental concerns; or whether, (2) there are significant new circumstances or information relevant to environmental concerns and bearing on the actions described in the original 1984 EIR/EIS or its impacts (40 C.F.R. §1502.9(c)).

This document tiers from the 1984 EIR/EIS and subsequent documents described in Section 1.4. Tiering incorporates by reference all the analysis conducted in the tiered documents, allowing for a more focused analysis of the important elements of the proposal without repeating information and analysis conducted in the 1984 EIR/EIS.

1.3 Consultations and Decisions to be Made by BOEM and Other Agencies

Bureau of Ocean Energy Management (BOEM): The BOEM must decide whether the DPP revisions are technically and environmentally sound. The BOEM can approve, deny, or direct the operator to modify its proposed BOEM revisions. The existing Platform Hidalgo DPP was first approved in 1984 and last revised and approved by then MMS in 2003.

Bureau of Safety and Environmental Enforcement's (BSEE): A now separate agency whose authorities were previously part of the MMS. The BOEM requested that BSEE conduct a

technical review of the revised DPP to determine if the outlined worst-case discharge scenarios conform to PXP's approved oil spill response plan in accordance with the October 3, 2011, BOEM-BSEE Memorandum of Agreement for Plans and Permits. BOEM also requested that BSEE participate in the compliance review of the revised DPP.

Fish and Wildlife Service (FWS): Pursuant to Section 7 of the Endangered Species Act (ESA), MMS formally consulted with FWS when offshore oil and gas development and production of the Point Arguello Field was proposed in 1984 (FWS, 1984) and again when drilling from existing Point Arguello facilities (including Platform Hidalgo) was extended to the Rocky Point Field (FWS, 2001). In both cases, FWS concluded that the proposed and existing offshore oil and gas development and production activities were not likely to jeopardize the continued existence of any endangered species under their jurisdiction. BOEM is now working with FWS to update species information and combine all past FWS biological opinions for the Southern California Planning Area into one programmatic document, with the understanding that operations that are and will be conducted on the OCS will continue until the programmatic consultation is completed. The development and production of the Electra Field (and similar actions that may be proposed in the future) will be included in the FWS programmatic biological opinion. No additional consultation is required at this time.

National Marine Fisheries Service (NMFS): Pursuant to Section 7 of the ESA, MMS formally consulted with NMFS when offshore oil and gas development and production of the Point Arguello Field was proposed in 1984 (NMFS, 1984). The resulting biological opinion concluded that the proposed offshore oil and gas development and production activities would not likely jeopardize the continued existence of any endangered species under their jurisdiction. Informal consultation with NMFS was conducted when drilling from existing Point Arguello Facilities (including Platform Hidalgo) was extended to the Rocky Point Field in 2003. BOEM is now working with NMFS to update species information and combine all past NMFS biological opinions for the Southern California Planning Area into one programmatic document, with the understanding that operations that are and will be conducted on the OCS will continue until the programmatic consultation is completed. The development and production of the Electra Field (and similar actions that may be proposed in the future) will be included in the NMFS programmatic biological opinion. No additional consultation is required at this time.

Federal agencies are also required by the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq) as amended by the Sustainable Fisheries Act on October 11, 1996, to consult with the Secretary of Commerce on any actions that may adversely affect essential fish habitat (EFH). No EFH consultation was conducted during the initial development of the Point Arguello Unit because EFH consultations were not required until 1996. EFH assessments on BOEM actions in the Pacific OCS Region after 1996 were conducted on a case-by-case basis. Activities described in this EA are being considered under the programmatic EFH assessment "Ongoing Oil and Gas Development and Production Activities in the Southern California Planning Area" currently being prepared for the NMFS, with the understanding that operations that are and will be conducted on the OCS will continue until the programmatic consultation is completed. The development and production of the Electra Field (and similar actions that may be proposed in the future) will be included in the EFH programmatic document.

Santa Barbara County Air Pollution Control District (SBCAPCD): The SBCAPCD will need to verify that no new permits will be required by ensuring that the emission increases projected for

the Platform Hidalgo drilling project are within the Point Arguello allowable permitted emission limits and have been fully offset and mitigated per SBCAPCD rules and regulations.

California Coastal Commission (CCC): The CCC must decide if the Consistency Certification analysis submitted by PXP is consistent with California's Coastal Zone Management Plan. The CCC decided that this project was consistent and no further review was necessary in a letter from the CCC to BOEM and PXP received on March 12, 2013.

1.4 Background Information and Description of Existing Facilities

Development of the Point Arguello Unit

The Point Arguello Unit is located 28 miles west of Santa Barbara and 15 miles east of Point Conception (Figure 1-1; Table 1-1). The initial development of the Point Arguello Field, including construction and use of Platform Hidalgo and the onshore Gaviota Processing Facility, was assessed in ADL (1984). Development for this area was initially planned to take place over ten years and was represented by five additional, hypothetical platforms tied to existing pipeline systems and processing facilities. The original analysis considered impacts using a 30-year time horizon for each platform. Another assumption for analyzing the area plan was that total production was to remain within the designed peak capacity of 200,000 barrels per day (bbls/day) of dry oil and 120 million standard cubic feet per day (MMscf/d) of natural gas (ADL, 1984). Platforms Harvest and Hermosa were installed in 1985 and Platform Hidalgo was installed in 1986 with the landfall of the pipelines at Point Conception. A supplemental EIR was finalized in 1988 to build the Gaviota processing facility and production began from the Point Arguello Field in 1991. BSEE data shows that the average daily production rate peaked in August 1993 at roughly 81,000 bbls/day and 34.6 MMscf/d of gas and by August 1998, production from the Point Arguello Field fell to approximately 23,000 bbls/day of oil and 12.7 MMscf/d of gas. As of August 30, 1998 the annual (i.e. Jan 1, 1998 through December 31, 1998) production from Point Arguello was approximately 9 million barrels (MMbbls) of oil and 4.9 billion standard cubic feet (Bcf) of natural gas In 2003, a DPP revision was approved to allow the development of the eastern half of Lease OCS-P 0451 (MMS, 2003). Five wells were drilled from Platform Hermosa and three from Platform Hidalgo to extract oil and gas from a small portion of the Rocky Point Field.

Existing Point Arguello Unit Production and Facilities

Annual oil production from the Point Arguello Field (BSEE data as of December 31, 2012) is approximately 1.5 MMbbls, which is roughly equivalent to the average daily production rate of approximately 4,126 bbls/day. Likewise, 2012 annual gas production is approximately 2.8 Bcf and translates to an average daily rate of approximately 7.7 MMscf/d. Twenty-eight wells have been drilled to-date with a maximum of 15 wells producing in a given month. Currently, the only drilling that is occurring on all three platforms is for well work-overs and sidetracks. A major portion of the produced gas is sweetened and then either used as fuel in the offshore turbines, as lift gas, or sent ashore (approximately 1.15 MMscfd) via the PANGL pipeline as sales gas. The sales gas is used in the Gaviota Plant turbines to generate electricity and steam to heat the crude oil stream to shipping specifications. The electricity is used by the facility, with any surplus sold to the grid. Produced gas that is not used as fuel or for sales is dehydrated and injected back into the reservoir at either Platform Harvest or Hidalgo with some gas injection taking place at Hermosa. Sweetened gas indicates that the fuel and sales gas is processed through an amine system to remove the hydrogen sulfide (H_2S). The H_2S removed from the fuel gas is injected back

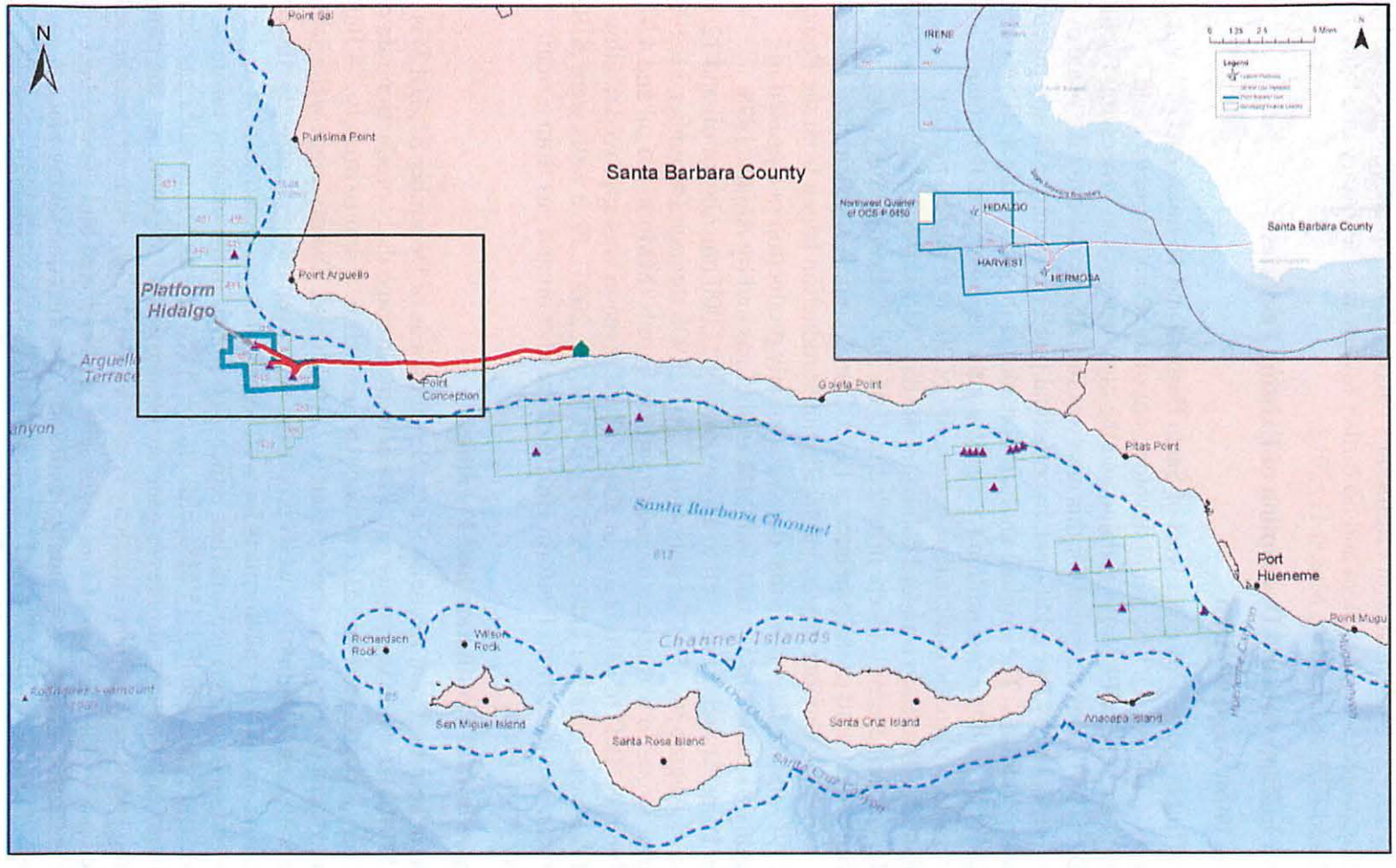


Figure 1-1. The proposed project area, including Platform Hidalgo and other Federal Platforms, in relation to shore and to the proposed drilling sites in the northwestern quarter of Lease OCS-P 0450.

Table 1-1. General Data for the Point Arguello Platforms (PXP, 2012).

Platform/Location	Harvest	Hermosa	Hidalgo
Water Depth at Platform in feet (ft)	675	603	430
Platform location	Lambert Zone 6 (ft) X=664,622 Y=866,189	Lambert Zone 6 (ft) X=674,783 Y=860,793	UTM 10 (m) X=710,975 Y=3,819,245
Well Slots	50	48	56
Number of Well Slots Used for Point Arguello Field and Rocky Point Development	18	17	21
Projected Number of Well Slots Needed for the western half NW/4 of Lease OCS-P 0450 Development	0	0	2
Projected Future Well Slots for Point Arguello and Rocky Point	6	6	6
Well Slots Available for Future Development	25	25	27
OCS Lease	P 0315	P 0316	P 0450

into formation via a separate acid gas injection system or into the gas that is sent to Platforms Harvest or Hidalgo for injection.

The Point Arguello project facilities include the following:

- Platforms Hidalgo, Harvest and Hermosa offshore oil and gas drilling and production platforms located on Leases OCS-P 0315, 0316 and 0450, respectively;
- The Gaviota Facility is located in the City of Gaviota;
- Pipelines connect Platforms Hidalgo and Harvest to Hermosa. Pipelines in one corridor connect Platform Hermosa with the Gaviota Facility. The pipelines reach landfall at Point Conception and travel onshore to the Gaviota Facility. A sales gas pipeline from the Gaviota facility connects to the All America Pipeline. H_2S gas is sent to and from all platforms and re-injected into formations;
- Gas turbine generators generate electrical power for each platform; and
- All three platforms dispose of produced water.

Employees (including contract employees) are housed on the platform and transported by helicopter. Helicopter flights originate from the Santa Maria or Lompoc airports, and supply boat trips originate from Port Hueneme. Equipment and other supplies are brought to the platform by supply boat. There is usually one supply boat trip scheduled per week.

The produced water that is generated from the Point Arguello Platforms are treated and discharged to the ocean in accordance with the existing platforms' National Pollutant Discharge Elimination System (NPDES) General Permit. Any produced water that does not meet the NPDES permit discharge limits is injected back into the reservoir. Table 1-2 provides the various produced water discharge parameters for each of the platforms.

Table 1-2. Current Produced Water Discharge Parameters (PXP, 2012).

Platform	Flow Rate (bbls/day)	Effluent Salinity (psu)	Process Temperature (^{0}C)	Exit Temperature (^{0}C)	Pipe/Pile Diameter (inches)	Pipe/Pile Depth (feet)	Water Depth (feet)
Harvest	75,000	27	85	83.0	10" to 204' 8" to 438' 6" to 647'[1]	647[1]	675
Hermosa	72,000	27	85	82.8	10" to 159' 8" to 375'	375	603
Hidalgo	10,000	29	85	81.6	10" to 100' 8" to 218'	214	430

1. New multiport diffuser to be installed.

Platform Hidalgo

Platform Hidalgo is a three-deck structure that consists of a production/wellhead deck, a drilling deck, and a main deck. The height of the production/wellhead deck above Mean Low Low Water (MLLW) is 62 feet. The main deck is 95 feet above MLLW. The total overall height of the structure, including the drilling rig is approximately 260 feet above MLLW and a depth of 430 feet. Currently the drilling that occurs on Platform Hidalgo is for well workovers and sidetracks. The producing wells are arranged in rows, with short flowlines connecting each well to the manifold system. Each well is equipped with a "Christmas tree" valve stack. The manifold system allows production to be switched between production and test separators. A portion of the produced gas is used for gas lift on the production wells. All wells are equipped with down-hole surface controlled subsurface safety valves. These subsurface valves are hydraulically controlled from the platform. The wells are manifolded so the wells can be isolated for individual testing through one of three test separators.

During normal operations all the wells are 'pooled' into 3-phase production separator trains, which separate the produced oil, gas and free water. A cleanup separator is provided for the initial unloading of wells to remove mud and water until the well is flowing sufficiently to be diverted into the normal production separators. The oil undergoes a primary dehydration process on Platform Hidalgo and is then sent to Platform Hermosa via pipeline where it is undergoes additional dehydration and stabilization. The produced gas is dehydrated on the platform and used for gas lift purposes or shipped to Platform Hermosa, where it is comingled with the Platform Hermosa gas and then sent to Platform Harvest for injection back into the reservoir. Additional gas from Platforms Hermosa and Harvest can also be routed to Platform Hidalgo for injection into the Light Pool reservoir using the intra-platform gas pipelines and existing compressors. A portion of the produced gas is used for fuel in the offshore turbines, which provide the platform's electrical power and heat needs. The gas used as fuel is processed through

an amine system to remove the hydrogen sulfide (H_2S). The H_2S removed from the fuel gas is injected back into the gas that is injected back into the reservoir.

The electrical power requirements for Platform Hidalgo are met using two 2,800 kilowatt (kW) and one 3,100 kW gas-turbine generators. There is also one 2,800 kW stand-by turbine generator that is currently limited by SBCAPCD permit to operate 550 hours per year (PXP, 2012). The turbines have diesel alternate fuel capability but are primarily run on produced gas. Utility and instrument air is provided at 125 and 100 pounds per square inch (psi) psi, respectively. Two air compressors that are electrically driven provide the utility and instrument air. Two salt water systems are used for fire suppression, wash-down, process cooling, desalination, and other routine operations. The fire suppression system is designed for 2,500 gallons per minute (gpm) and is a diesel-driven system. An additional system supplies 3,000 gpm for other platform requirements (PXP, 2012). This system's pumps are electrically driven.

1.5 Description of the Proposed Project

The proposed project is to develop the oil and gas reserves from the northwestern quarter of Lease OCS-P 0450 (Figure 1-1). The eastern half of Lease OCS-P 0450 is already being developed as part of the Point Arguello Unit. PXP is the operator of the Point Arguello Unit and the western half of Lease OCS-P 0450 and is proposing to drill two development wells from Platform Hidalgo. PXP has identified the approximate bottom-hole locations of the two wells accessible from the northwestern quarter of Lease OCS-P 0450, which will be used to develop a portion of the Electra Field. All of the wells will be directionally drilled using existing well slots, equipment and facilities Platform Hidalgo. No new pipelines will need to be built and existing intra-platform pipelines and the pipelines from Platform Hermosa to the Gaviota Facility will be used. No construction of new onshore facilities is proposed. The entire project, from mobilization of drilling equipment to demobilization is expected to take approximately eight months and to begin in the second quarter of 2013.

Production from the Electra Field is expected to peak in 2014 recover between 5 and 7 million barrels of oil (PXP, 2012). It is expected that production from the Electra Field will last approximately six to ten years and be completed within the remaining production time of the currently operating Point Arguello Unit. The development wells for the western half of OCS-P 0450 would serve to increase the risk associated with oil spill volumes on Platform Hidalgo between 1.4 and 4.4 percent from the current baseline (Section 3.1.1) and only during the first few years when the wells are flowing under natural pressure. Once the wells are placed on artificial lift the increased spill volume would be eliminated. Produced oil will be 'pooled' into 3-phase production separator trains, which separate the produced oil, gas and free water. After leaving the production separators, the oil will be dehydrated, stabilized, metered and shipped to Platform Hermosa via an intra-platform pipeline. At Platform Hermosa, all the oil production from the Electra Field will be combined with existing production from Point Arguello Unit and transported to the Gaviota Facility in the existing PAPCO oil pipeline. Gas from the Electra Field will be combined with existing production from Point Arguello Unit gas on the production platforms. As is currently done, the combined gas will be sweetened for platform use or sale to shore via the existing PANGL pipeline. Increased production on Platform Hidalgo is expected to increase the peak produced water discharge rate from 10,000 to 16,500 bbls/day.

Drilling two extended-reach wells on the northwest quarter of Lease OCS-P 0450 will involve additional crew and equipment at Platform Hidalgo. Minor modifications of Platform Hidalgo

may also be required. Drilling of the wells is expected to last approximately five months. The drill rig that will be used will be similar in size to drill rigs that have been used on the Point Arguello Platforms in the past. PXP is proposing to drill both wells using water based drilling fluid. All water based drill cuttings and drilling fluid will be discharged (Table 1-3) into the ocean in accordance with the current approved NPDES permit as long as they contain concentrations below Environmental Protection Agency (EPA) approved limits. The total amount of expected discharged muds and cuttings exceeds the total allowable discharge for one year under the NPDES General Permit CAG280000. Under the current permit, PXP is precluded from discharging the entire predicted volume within one year.

Table 1-3. Historical and Proposed Volumes of Drilling Fluid and Drill Cuttings Discharges from Point Arguello Platforms.

Platform	Historical (1986 to 1989)[1]			1993 to 2006[2]			Proposed Project[3]		
	No. Wells	Drilling Fluid (bbl)	Cuttings (bbl)	No. Wells	Drilling Fluid (bbl)	Cuttings (bbl)	No. Wells	Drilling Fluid (bbl)	Cuttings (bbl)
Harvest	19	102,780	NA	9	43,365	4,918	0	0	0
Hermosa	13	102,990	19,590	14	59,390	3,091	0	0	0
Hidalgo	7	50,090	14,430	10	65,368	10,956	2	27,611	11,209
Total	39	255,860	34,020[4]	33	168,123	18,965	2	27,611	11,209

1. *Modified from PXP, 2012 and from Steinhauer, Imamura, Barminski, Neff; Oil and Gas Journal, May 4 1992.*
2. *From preliminary MMS in-house data reports to EPA. Includes discharges from existing well workovers.*
3. *Based on data provided in PXP, 2012.*
4. *The total for cutting does not include the wells drilled from Platform Harvest.*

Drilling will require an additional crew of approximately 33 people and last approximately six months (PXP, 2012). Specialty personnel and other specialty contractors will be on-site as their services are needed. Drilling personnel will be transported via helicopter from the Santa Maria Airport, which is the current departure point for personnel working offshore at the Point Arguello Field. They will be transported using the existing regularly scheduled helicopter trips. The drilling rig, heavy drilling equipment, rig supplies and bulk drilling mud and cement materials will be shipped to the platform via approximately 56 supply boat trips from Port Hueneme (PXP, 2012, Attachment D). It is estimated that between 30 and 60 days will be required for mobilization and demobilization of the rig and associated equipment to and from the shore base facility at Port Hueneme. During drilling rig installation and removal, the supply boat will make approximately 40 round trips from Port Hueneme to Platform Hidalgo. Each round trip will take approximately one to two days. After the drilling rig is installed, boat traffic to and from the Platform is projected to consist of one round trip per week in addition to the weekly trip that currently occurs for the Point Arguello Platform operations. On return trips, the supply boat will transport any waste material generated from onboard activities requiring onshore disposal. Approximately 120 additional truck round trips are proposed for this project. Twenty truck roundtrips for drill rig delivery and removal, 80 for delivering drilling supplies, and twenty

roundtrips may be needed during the drilling period to carry disposal materials away from the supply boat (PXP, 2012).

PXP may need to add oil dehydration and stabilization capacity on Platform Hidalgo before pumping the oil to Platform Hermosa (PXP, 2012). Subject to BSEE's approval (including a structural analysis), implementation of oil stabilization on Platform Hidalgo would require:

- The installation of a vessel approximately 55 feet tall by 42 inches in diameter (tapering to 20 inches in diameter at 36 feet of elevation) and a re-boiler vessel which is 15 feet long by 27 inches in diameter;
- Installation of the wing deck extensions (18 x 20 feet) to hold the vessels; and
- Instrumentation changes, piping modifications and 200 feet of new piping.

Installation of the oil stabilization equipment would be conducted utilizing permitted scheduled boat and helicopter trips. Installation of the vessel on Platform Hidalgo would be done in conjunction with routine maintenance that is required on the platforms and other installations proposed as part of this project. During tie-ins, the platforms may be shut-in for a brief period of time to allow for safe working conditions as needed. The platform may need to be shutdown depending on the particular work involved. After shutdown, affected process areas may need to be blown down, purged with nitrogen and then isolated for hot work or bolt-up. During shutdown, the platform generators are required to run on diesel because fuel gas processing systems are also shut-in; however, such will be done in compliance with existing air permits for the platform.

1.6 Time Frame for Production of Point Arguello Facilities

Past documents have stated different ranges for the expected duration of offshore drilling and production of the Point Arguello Unit. The first analysis in 1984 assumed 30-years of production (ADL, 1984) for each platform once construction was complete, which is the year 2016. In 2003, the estimated production of the Rocky Point Field was included (MMS, 2003), which had an estimated production time of between eight and ten years and the last well completing its production in the end of 2013. This assessment also reiterated that the Point Arguello Unit would become uneconomic in approximately 2016.

These statements are helpful for bounding scope of analysis but are not a part of lease stipulations or other mechanisms within BOEM's authority to regulate the duration of oil and gas production for the Point Arguello Unit, or any other facility, lease or unit on the OCS. A Federal lease is in effect as long as oil and gas are produced from the lease in paying quantities or approved drilling or well reworking operations are conducted (30 CFR 566.37). Based on historical global oil and gas development, at some time point it will be economically unfeasible to operate facilities and decommissioning will occur. Technological advances and the demand for oil have made it economical for companies to continue to produce oil and gas offshore off southern California beyond the time frame originally considered when the facilities were first constructed. Based on projections of the amount of recoverable oil and current demand, Electra Field production will remain economical for six to ten more years (2019 to 2023), if drilling is completed in 2013. The proposed DPP revisions (PXP, 2012) indicate that production of the Electra Field will last approximately six years and will be completed within the remaining production time of the currently operating Point Arguello Platforms. It is expected that development of the Electra Field will not produce oil and gas in sufficient volumes to extend the overall production period for the Point Arguello Unit.

1.7 Alternatives to the Proposed Project

The only project alternative discussed in this EA is the No Action alternative. No other alternatives were considered in this analysis because no other alternatives were identified that met the purpose and need of the proposed action (Section 1.2).

The adoption of the No Action alternative would avoid all the potential adverse environmental impacts resulting from the proposed project. Thus, potential incremental impacts arising from the proposed project to air quality, marine water quality, intertidal communities, benthic communities, fishes, marine and coastal birds, marine mammals, marine turtles, specially designated areas, commercial fishing and environmental justice topics discussed in this EA (Chapters 2 and 3) would not occur. The adoption of the No Action alternative would preclude recovery of oil and gas resources and result in a loss of conservation of hydrocarbon resources. Operations on Platform Hidalgo would continue to recover oil and gas resources from the Point Arguello Unit until the economic life declines (Section 1.6).

1.8 Environmental Resources and Impacts Considered

BOEM evaluated physical, biological and socioeconomic resources in the area to specifically determine if there has been a *substantial change* or there are *new circumstances* relevant to the actions described in the 1984 EIR/EIS and therefore necessitate a supplemental EIS. The purpose of building facilities offshore is to drill and produce oil; meaning that the action discussed in this EA (drilling wells) is in a new field but is not a substantial change from the actions evaluated in Therefore, the remaining discussion focuses on new information or new circumstances for resources in the area that may be affected by the proposed project. There are several resources that were well described in the 1984 EIR/EIS and for which no new circumstances have arisen since 1984. In addition to having a sufficient and relevant discussion, potential impacts from the proposed project would not change from what was discussed in the 1984 document. This is particularly true for the risk of an oil spill. Many resources have the potential to be affected by the increased likelihood and size of an offshore oil spill for the years where there is positive pressure on the two new wells as compared with current operation. Based on the analysis present in Section 3.1.1, Oil Spill Risk, and PXP (2012, Oil Risk Attachment), severity of impact would not change from what was originally discussed in the 1984 EIR/EIS. Another example of a potential impacting agent from the proposed project is transportation. The proposed project is expected to produce approximately 56 additional supply boat roundtrips and 120 truck trips for 16 weeks of drilling (PXP, 2012). Those increases are extremely small in the context current boat and truck traffic for the area and what was discussed in the 1984 EIR/EIS. Therefore, BOEM would conclude that boat and truck traffic from this project will have an inconsequential effect on tourism, transportation, and recreation resources in the area and does not warrant further analysis.

The 1984 EIR/EIS discussed many resources and their potential effects from both the production of oil and gas and the original construction of Point Arguello Unit facilities. Tables 1-4 and 1-5 below list all resources considered in the original 1984 EIR/EIS that will not be discussed further because no new circumstances have arisen and the potential impacts to the resource are minimal. In addition, impacts to these resources on the proposed project would not change from what was originally discussed. While development of the western half of OCS-P 0450 would slightly increase the probability of an offshore oil spill, given the low level of probability and the

temporary extent, the impacts to resources would not change from what exists today for the Point Arguello Platforms and Pipelines.

Table 1-4. Physical and biological resources that were discussed in the 1984 EIR/EIS that will not be discussed further because no new circumstances have arisen and the potential new impacts to the resource are minimal.

Resource	Description of Potential Impact
Geology Resources	Geologic impacts for the 1984 EIR/EIS were associated with the construction of the platforms, pipelines, and Gaviota Facility. There would be no geologic impacts associated with development of the Electra Field since no new offshore or onshore infrastructure will be needed.
Onshore Water Resources	Impacts for the 1984 EIR/EIS were associated with the construction of the pipelines and Gaviota Facility, and the potential for impacts due to an oil spill from the pipelines or at the Gaviota Facility. No onshore impacts are considered in the proposed development of the Electra Field since no new onshore infrastructure will be needed.
Marine Biology, Plankton Communities	Installation of the new wells will slightly increase the potential for an oil spill during drilling of the wells and throughout production. The current understanding of plankton and impacts caused from oil would not change from what was discussed in the 1984 EIR/EIS. There would be no new impacts.
Marine Biology, Kelp and Subtidal Communities	The main impacts for the 1984 EIR/EIS were associated aspects not related to the proposed project, such as: construction of a marine terminal, mainland outfalls and associated vessel transportation through a particular kelp bed near to the facility. The potential for impacts due to an increased potential for an oil spill during drilling of the wells and throughout production would not change from what was discussed in the 1984 EIR/EIS. There would be no new impacts.
Terrestrial and Freshwater Biology	See Intertidal Communities for impacts from a marine-based oil spill to wetlands or coastal lagoons. No other onshore impacts were considered. See Onshore Water Resources, above, for more details.

Table 1-5. Socioeconomic resources that were discussed in the 1984 EIR/EIS that will not be discussed further because no new circumstances have arisen and the potential impacts to the resource are minimal.

Resource	Description of Potential Impact
Cultural and Historic Resources	Impacts for the 1984 EIR/EIS were associated with the construction of the pipelines and the Gaviota Facility and the potential for impacts due to an offshore oil spill. As there will be no seafloor disturbance, there is no potential to affect historic properties and cultural resources on the seafloor. Installation of the new wells will slightly increase the potential for an oil spill, compared to the current baseline, and could impact cultural resources on San Miguel Island and Point Conception areas. These resources have not changed and there would be no new

	impacts from what was discussed in the 1984 EIR/EIS.
Aesthetic Resources	There has been no substantial change in visual resources relevant to crew helicopter trips between onshore airports and Platform Hidalgo or vessel traffic between onshore staging areas and Platform Hidalgo; therefore these activities will have an inconsequential effect on aesthetics in the area. Compared to the current baseline, installation of the new wells will slightly increase the potential for an oil spill and impacts on the aesthetic environment of the shoreline. These resources have not changed and there would be no new impacts from what was discussed in the 1984 EIR/EIS.
Other Uses, Transportation, Recreation, Coast Land Use and Ownership	Transportation proposed for this project includes 120 total additional truck round trips to and from Port Hueneme associated with drilling rig delivery/removal and the movement of drilling supplies and waste material, and 56 total additional supply boat round trips to Platform Hidalgo from Port Hueneme. These additional trips are few in the context current truck and vessel traffic for the area and therefore will have an inconsequential effect on transportation in the area. The additional truck and vessel trips will have an inconsequential effect on recreation in the project area. Compared to the current baseline, installation of the new wells will slightly increase the potential for an oil spill and impacts on the public use areas where an oil spill might make landfall. There would be no new impacts on recreation from an oil spill making landfall from what was discussed in the 1984 EIR/EIS. The development of the western half of OCS-P 0450 would not change any of the current operations at the Gaviota Facility. Therefore, the project would not have any new land use impacts.
Socioeconomic Resources, Tourism	Commercial Fishing and Environmental Justice resources are discussed in Section 2.3. Most socioeconomic impacts for the 1984 EIR/EIS were associated with the construction of the pipelines and Gaviota Facility. Development of the western half of OCS-P 0450 will not have any socioeconomic impacts on Port Hueneme and the surrounding community. No new support infrastructure will be needed and only 36 additional workers will be needed during the drilling phase. An oil spill making landfall could potentially impact tourism in the area. There would be no new impacts on tourism from an oil spill making landfall from what was discussed in the 1984 EIR/EIS. Given the very low level of activity and short duration of the project, the incremental impacts associated with development of the western half of OCS-P 0450 will not be considered.

1.9 Cumulative Impacts

The focus of the cumulative discussion for this document, as with direct effects from the project, is framed in the context of the 1984 EIR/EIS and subsequent documents. These documents were reviewed for each resource with the question, "Were cumulative impacts to resources fully considered or are there new circumstances or information relevant to the proposed project?" Reasonably foreseeable new activities in the vicinity and time-frame of the proposed action are addressed for individual resources as a part of Section Three, Impacts.

The 1984 EIR/EIS cumulative discussion focused on future oil and gas activity's cumulative impacts for a larger regional development than what is presently built (ADL, 1984). A central scenario discussed in the 1984 EIR/EIS included an additional four to eight platforms to the north, at the same latitude and round the point to the east as Platform Hidalgo. The associated risk of an oil spill was assessed for the region and the 1984 EIR/EIS discussed significant cumulative impacts to many biological resources including birds and rocky coast habitats. Air quality and commercial fishing were listed as significant cumulative impacts discussed in the context of a larger build-out of oil and gas OCS activities. Population growth and traffic were considered in relation to the OCS oil and gas industry. This information was updated in a draft EIS by MMS (2001).

Other actions, beyond oil and gas production, potentially may incrementally contribute to the cumulative effects on resources affected by the proposed action. These activities were more fully addressed in the EA for drilling into the Electra Field (MMS, 2003) and the 2001 draft EIS (MMS, 2001). For example, Platform Arguello is near to a shipping lane and vessels traveling through the area contribute to increased air emissions. The 2001 draft EIS, concluded that the cumulative air quality impact of marine shipping and tinkering will continue to be the most significant contributor to cumulative air quality in the OCS. The 2003 EA updated and discussed vessel and shipping traffic as a source of cumulative impacts to the area.

2.0 Description of Affected Environment

2.1 Physical Environment

2.1.1 Air Quality

The PXP proposed Platform Hidalgo drilling project is located in the OCS, offshore of Santa Barbara County within the South Central Coast Air Basin. The climate, meteorology, air quality and air quality trends of the Santa Barbara County area have been described in detail in several planning and environmental documents and are best summarized by Santa Barbara County Air Pollution Control District (SBCAPCD) in the Santa Barbara County 2010 Clean Air Plan (SBCAPCD, 2010).

The Federal attainment status of Santa Barbara County is found in 40 CFR 81.305. Currently, Santa Barbara County is in attainment of all the National Ambient Air Quality Standards, including the Federal 8-hour O_3 standard. The status of the new 1-hour O_3 standard is currently pending. Santa Barbara County is considered nonattainment for the California 1-hour and 8-hour O_3 and 24-hour PM_{10} air quality standards.

Section 328 of the 1990 Clean Air Act Amendments (CAAA) transferred authority for air quality on the OCS to the EPA. On September 4, 1992, the EPA Administrator promulgated requirements (40 CFR Part 55) to control air pollution from OCS sources to attain and maintain federal and state air quality standards. The promulgated regulations require OCS sources to comply with applicable onshore air quality rules in the corresponding onshore area. EPA delegated authority to the SBCAPCD on November 5, 1993 to implement and enforce the requirements of 40 CFR Part 55. The full transfer of authority to SBCAPCD to regulate OCS air emissions pursuant to 40 CFR Part 55 transpired on September 4, 1994. Platform Hidalgo is located offshore of Santa Barbara County and is currently permitted by and within the jurisdiction of the SBCAPCD.

Greenhouse gases (GHGs) are defined as any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, but are not limited to, water vapor, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). These greenhouse gases lead to the trapping and buildup of heat in the atmosphere near the earth's surface, commonly known as the Greenhouse Effect. The primary source of GHG in the United States is energy-use related activities, which include fuel combustion, as well as energy production, transmission, storage and distribution. These energy-related activities generated 85 percent of the total U.S. emissions on a carbon equivalent basis in 1998 and 86 percent in 2004. Fossil fuel combustion represents the vast majority of the energy related GHG emissions, with CO_2 being the primary GHG (EPA, 2006).

2.1.2 Water Quality (Formerly Marine Water Resource)

The California Current flows southeastward off the central California Coast bringing subarctic water into the Southern California Bight (SCB). The Southern California Countercurrent brings water north within the SCB and the northern flow is blocked by the northern Channel Islands where the water then travels west and merges with the California current, thus creating a counterclockwise-rotating gyre within the SCB. The California Undercurrent brings warmer water from the south into the SCB and flows underneath both the California Current and the Southern California Countercurrent (Daily et. al., 1993). The seasonal patterns in the California Current system drive the oceanography within the SCB (Hickey et al., 2003).

Cold, upwelled waters dominate the south central California coast, Point Arguello and Point Conception (Harms and Winant, 1998). The circulation in the Santa Barbara Channel can be described as Upwelling, Cyclonic and Relaxation (Harms and Winant, 1998). Upwelling consists of alongshore currents moving south, while the Cyclonic pattern is a singular cell cyclonic gyre in the western and central Santa Barbara Channel. The Relaxation state is a northern alongshore current that comes from the eastern entrance of the Santa Barbara Channel, travels to Point Conception and is common when upwelling-favorable winds have subsided. Upwelling dominates in the spring, while all three oceanographic regimes are found in the summer and fall (Harms and Winant, 1998).

Offshore water quality is determined by a number of factors, including natural seawater properties such as transparency and turbidity, oxygen, nutrients and trace metals. The addition of anthropogenic pollutants can change these properties to the extent that the resulting water quality could affect the plankton, fish and other biological entities living in marine waters. The table below (Table 2-1) describes the water quality characteristics of the SCB.

Table 2-1. Key Water Quality Parameters for the Southern California Bight.

Parameter	Characteristics
Temperature	At surface ranges from 14.5 °C in December-April to 19 °C in July-September (Daily et. al., 1993)
Salinity	33.4-33.6 parts per thousand (Daily et. al., 1993)
Dissolved oxygen	5.5-6 milliliter of oxygen per liter of water (ml/L) at the surface, decreasing with depth to 2 ml/L at 200 meters; below 350 meters, as low as 1 ml/L; upwelling can bring this oxygen-poor water to the surface waters, especially from April to July (Lynn et. al., 1982; Daily et. al., 1993; Hickey, 1993)
pH	Range from about 7.869 to 8.266 at Point Conception (Hofmann et. al., 2011).
Nutrients	Important for primary production; include nitrogen, phosphorus, and silicon; Depleted near the surface but increasing with depth (SCCWRP, 1973; Eganhouse and Venkatesan, 1993).
Surface light transmittance	Visual transparency along the coast for all seasons varies from less than 6 meters to more than 15 meters (SCCWRP, 1973).
Trace Metals	The levels of metals in the waters of the southern California bight are within ranges reported for seawater in various areas around the world (SCCWRP, 1973).
Organics	May enter the marine environment from municipal and industrial wastewater discharges, runoff, natural oil seeps, and offshore oil and gas operations.

Sources of Pollution

The Santa Ynez and Santa Maria Rivers are 15 and 35 miles, respectively, north of Point Arguello Unit. Pollutants 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. During winter, high runoff periods associated with storm and rain conditions followed by upwelling-favorable winds have driven these river plumes south past Point Conception and to the vicinity of San Miguel Island. Thus, the Point Arguello Unit area

water quality is occasionally affected by these river plumes (Hickey and Kachel, unpubl.). These rivers are typical for southern California in that they flow intermittently during the dry summer and fall months and more strongly during the winter months when rain falls into the watershed and courses down to the sea, carrying sediment and pollutants into the ocean.

During the dry months, a variety of pollutants enter the mostly dry stream beds. The first strong storm of the winter season flushes those pollutants into the ocean. Known as "first flush" the highest levels for pollution would occur during this time. The large pollutant loadings and pathogens from these river systems surpass the loadings for most constituents from municipal wastewater discharges (Warwick et al., 2007). Pollutants that could be associated with these river plumes include metals (e.g., zinc, copper, lead, nickel, and cadmium), polyaromatic hydrocarbons, and enterococcal bacteria (e.g., *E. coli*).

The rainy season accounts for more than 95 percent of the total annual runoff to the SCB (Schiff et al., 2000). Stormwater plumes are correlated with the size of storm events. Even small amounts of precipitation can cause a plume to develop and plumes can vary greatly in size depending on the amount of precipitation (Nezlin and Digiacomo, 2005; Warwick et al., 2007). Immediately during and after storms, plumes tend to emerge from the river mouth and turn to the left, contrary to the Coriolis influence (Warwick et al., 2007). Strong northerly or northwesterly winds push the plumes south, usually remaining within 10 kilometers (km, or 6 miles) of the coast (Warwick et al., 2007). When these strong, post-storm winds relax, the river plumes move further from the coast and can travel as much as 24 km (15 miles) from shore and thus into the waters surrounding Platform Hidalgo (Nezlin and DiGiacomo, 2005).

The paradox of these plumes is that the higher the flow, the greater the dilution. Additionally, the only time the plumes would reach the vicinity of the Point Arguello Unit would be during times of high flow. Thus, pollutants carried by these plumes would be well diluted by the time they reach the project area.

2.2 Biological Resources

The proposed project is located offshore of the Point Arguello and Point Conception region (Figure 1-1), near the Santa Maria Basin and Santa Lucia Bank. To the north is Point San Luis and to the southeast lie the San Miguel and Santa Rosa Islands, and Santa Cruz Islands. Diverse marine benthic habitats exist in this region, and include low and high relief rock outcrops, mud, silt, and sand sediments, canyons, basins, banks, kelp forests and sea grass beds. In part due to the natural topography of the coastline in the project area, strong winds characterize the region (Dorman and Winant, 2000). These winds enable vigorous upwelling, which in turn greatly enhances local productivity.

The following subsections include a variety of habitats and organisms. Shoreline habitats are discussed as three principle types within Intertidal Communities: rocky headlands/shelves, sandy beaches and wetland habitats that are connected to open ocean waters. Invertebrates living in or on the ocean floor in deeper water are considered separately in Benthic Communities. Fishes and Essential Fish Habitat are discussed next with Marine Dependent Birds, Marine Mammals, Marine Turtles and Special Areas Sections following.

2.2.1 Intertidal Communities

Approximately half of the shoreline from Point Conception north to Point San Luis is rocky, forming either broad benches or cliffs (Dugan et al., 1998a). Boulder and cobble beaches are

patchily distributed within this same area (Dames and Moore, 1983). The five northern Channel Islands possess about 176 miles (323 km) of coastline, the majority of which is rocky shore (Channel Islands National Park, 2006).

California rocky intertidal areas are characterized by diverse assemblages of algae, invertebrates, and fish (Ricketts et al., 1985) that are typically restricted to certain elevations along the shoreline. Channel Islands are recognized as having a separate biogeography from mainland areas (Blanchette et al., 2008). Rocky intertidal resources have been the subject of numerous research efforts in this region (Ambrose, 1995; Raimondi et al., 1999; Miner et al., 2005) and conspicuous intertidal organisms have been actively monitored along the mainland and Channel Islands since 1991 (www.MARINe.gov). Organisms such as mussels, abalone, barnacles, algae, limpets, surf grass, and the now endangered black abalone (*Haliotis cracherodii)* were chosen because they form habitat and food for many other species. Once commonly found in large numbers in the rocky intertidal zone (Murray and Littler, 1979; Ambrose, 1995), black abalone at the sites monitored north of Point Conception are estimated at two to five percent of levels identified in 1991 (Miner et al., 2006). This decline is largely the result of a "Withering Syndrome", a fatal infection that is facilitated by warm water (Raimondi et al., 2002); partially explaining the changes that have been seen in the 1990's during El Niño conditions. The likelihood of the recovery of this species is limited (Miner et al., 2006) due to recruitment failure and reduced quality of habitat suitable for settling young.

North of Point Conception, sandy beaches are typically found in the lee of each point due to local depositional patterns and both dune-backed and bluff-backed beaches are evenly represented (Dugan et al., 1998b). A large sand dune area comprises 12 miles (19 km) of shoreline from south of Pismo Beach to north of Purisima Point. Beaches are dynamic systems that change with wind and waves; generally sand is eroded in the winter and redeposited in the summer resulting in annual changes in beach slope and width (CDFG, 2005). Invertebrate communities living in these habitats have high immigration and emigration rates, which contributes to the high level of temporal and spatial patchiness in density that often reported (Thompson et al., 1993). Within a beach, crustaceans and molluscs tend to be more common on steeper, coarser and dryer upper intertidal zone. Annelids and crustaceans have been found to dominate along supratidal to intertidal areas in northern Santa Barbara County (Straughan, 1982). Polychaetes and nemerteans are the dominant invertebrates in the lower intertidal where slope is not as steep and the sand usually finer and wetter (Wenner, 1988; McLachlan and Hesp, 1984; Straughan, 1982). The sand crab (*Emerita analoga)* is often the most abundant intertidal organism and Straughan (1982) found they sometimes comprised over 99 percent of the individuals on a given beach. The large sand crab, *Blepharipoda occidentalis*, and the Pismo clam, *Tivela stultorum* can be found lower on the shore. *Tivela* was once more abundant in the intertidal and its decline was likely the result of overharvesting and predation.

Coastal wetlands, including freshwater, transitional (estuarine) and saltwater habitats, are found near the mouths of the Santa Ynez and Santa Maria Rivers and San Antonio Creek. The Santa Ynez River contains by far the largest watershed, which supplies the estuary with expanses of marsh, channels and mud flat with an 11 acre (4 hectare) salt flat to the north (Ambrose, 1995). Several smaller individual perennial or intermittent streams occur between larger drainages and include Shuman Creek, Cañada Honda Creek and Jalama Creek (Ambrose, 1995). All of the above wetlands have limited tidal flushing because they become seasonally closed off at the mouth by natural sand berms. The coastlines of the Channel Islands are composed predominantly

of beaches and headlands, have fewer streams, and no large coastal wetlands in comparison to the mainland. Wetlands are protected by the 1976 California Coastal Act and locally by the 1979 Santa Barbara County Conservation Element (as amended in 1994) and the 1982 Coastal Plan because of their ecological importance, sensitivity, and limited areal extent. The flora and fauna of these coastal wetlands are unique with several endemic species present. Estuarine plant assemblages include endangered species, such as the La Graciosa thistle (*Cirsium loncholepis*) at the Santa Maria River, and many non-native species present at every site (Ambrose, 1995). Bird diversity is highest in the fall with several protected species using in particular the Santa Ynez River area for nesting, breeding, and feeding. Coastal wetland habitats generally are used by several Federally-listed endangered bird and fish species (Section 2.2.3 and 2.2.4).

2.2.2 Benthic Communities

Deep Benthic Assemblages – Soft Substrate: The project area is located in the southern Santa Maria Basin, at the boundary separating the Oregonian and Californian Provinces. Therefore, the composition of the infauna shows affinities with each province (Hyland et al., 1990). The majority of species (67 percent) occurring in the project area have northern faunal affinities (Oregonian Province), 27 percent exhibit primarily southern affinities (Californian Province), and 31 percent (Hyland et al., 1990) are endemic to the region.

In a comprehensive three-year benthic infauna study conducted offshore Point Conception (CaMP Phase II), Hyland et al. (1991) reported over 886 species representing 15 phyla. The 10 most abundant species reported for a transect located just north of the Point Arguello (Hyland et al., 1991; PXP, 2012) found amphipods (34 percent) and polychaete worms (31 percent) the most dominant taxa, followed by gastropods (10 percent) and bivalves (8 percent). Together these four classes accounted for 83 percent of all taxa. Hyland et al. (1991) revealed patterns of decreasing infaunal abundances and diversity with increased water depth. Similar patterns have also been reported by Fauchald and Jones (1978), SAIC (1986) and regional monitoring outside this area (Ranasinghe et al., 2012).

Deep-Benthic Assemblages – Hard Substrate: Hard substrate habitats in the project area near Platforms Hidalgo, Harvest, and Hermosa are rare. Generally, they are discontinuous patches of exposed rock separated by mud and fine sands (Steinhauer et al., 1994; SAIC and MEC, 1995). Several qualitative surveys of hard substrate communities in this region of the Santa Maria Basin were conducted in the 1980s (Nekton, 1981; Dames and Moore, 1982; and SAIC, 1986). During the comprehensive MMS-sponsored California Offshore Monitoring Program (CaMP), nine rocky reefs were quantitatively surveyed from 1986 to 1995 with the goal to determine the cumulative effects of offshore drilling and production activities on the hard substrate communities. Impacts to hard substrate communities, especially epifauna, were of particular interest, because of the greater sensitivity of many of these species to increased particulate flux, the importance of their trophic role, and the general rarity of these communities in the area.

From CaMP, Hardin et al. (1994) reported 263 taxa from low-relief (<0.5 meters) and 222 taxa from high-relief (>1.0 meters) structures. The ten most dominant species (mean percent cover), are provided in PXP (2012). No one taxon dominates in percent cover on the hard substrate in the project area. The 15 most abundant taxa in low-relief habitats totaled about 19 percent cover, and the 15 most abundant taxa in high-relief habitat total about 27 percent cover (Hardin et al., 1994). Despite the lack of dominance by any one taxon, of the 22 taxa comprising the 15 most

abundant species, 10 were anthozoans. Anthozoans were followed by poriferans, ophiuroids, polychaetes, and urochordates.

Two surveys of hard substrate habitats in the northern Santa Maria Basin off the coast of the Point San Luis-Montana de Oro area were conducted in 1999 to characterize submarine cable corridors. The more extensive of the two surveys was conducted by Marine Research Specialists (personal communication) and twenty-two transects were photo-surveyed at water depths ranging from 35 to 125 meters. Relief height ranged from 0.5 to more than 35 meters. Generally, the species in the survey area bear similarities to those found near Platform Hidalgo in the CaMP. However, there are substantial differences in both the dominant species and epifaunal percent cover. Anthozoans remained the most common taxa from the surveys, however, the percent cover increased for particular species such as cup corals (*Balanophyllia elegans* and *Paracyathus stearnsii*), anenomes (*Corynactis California* and *Epizoanthus* sp.) and the purple encrusting hydrocoral (*Stylantheca porphyra*). At higher relief locations, these species (especially *Corynactis*) formed solid carpets that extend for hundreds of meters. California hydrocoral *(Stylaster californicus)* occurred in water depths of less than 45 meters.

2.2.3 Fishes and Essential Fish Habitat (Formerly Nekton Communities)

At least 554 species of California marine fishes inhabit or visit California waters (Miller and Lea, 1972). This high species richness is probably due to the complex bathymetry, convergence of several water masses, and changeable environmental conditions found within the region (Dailey et al., 1993). The Point Conception area is a recognized biogeographic transition zone between the Oregonian Province (cool-temperate species) to the north and the Californian or San Diegan Province (warm-temperate species) to the south (Horn and Allen, 1978).

The open-water domain or pelagic zone is the largest habitat on earth and home to about 40 percent of the fish species observed off California (Cross and Allen, 1993). Oceanographers often further subdivide this habitat into categories based on depth and other physical characteristics. Pearcy and Laurs (1966) delineate the following for deep-sea fishes: (1) epipelagic, the surface wind-mixed layer, about 0 to 150 meters; (2) mesopelagic, within the permanent thermocline, about 150 to 500 meters; and (3) bathypelagic, in the dysphotic depths, below approximately 500 meters. Common or noteworthy fishes that inhabit the epipelagic zone in southern California waters include albacore, basking shark, blue shark, California barracuda, Chinook salmon, jack mackerel, shortfin mako, northern anchovy, ocean sunfish, Pacific bluefin tuna, Pacific bonito, Pacific herring, Pacific mackerel, Pacific bonito, Pacific sardine, Pacific saury, Pacific whiting, pelagic juvenile rockfishes (*Sebastes* spp.), steelhead trout, striped marlin, yellowtail jack, swordfish, thresher shark and white shark. In addition to these species, the epipelagic zone hosts the eggs and larvae of most marine fishes (Cross and Allen, 1993). Fish assemblages often overlap between the mesopelagic and bathypelagic zones, and offshore southern California, the common species that inhabit these zones include bent-tooth bristlemouth, California smooth-tongue, Mexican lampfish, northern lampfish and showy bristlemouth (DeWitt, 1972; Cailliet and Ebeling, 1990).

Benthic fish habitats can be categorized according to depth and substrate type. Soft sediment fishes characterizing the shelf include English sole, stripetail rockfish, queenfish, white croaker, California halibut, Pacific sanddab, speckled sanddab and a variety of surfperches (Love et al., 1996, Allen et al., 2007). Not surprisingly, rockfishes (Genus *Sebastes*) are associated with all rock outcrops on the continental shelf and slope (Love et al., 2002; 2009). At shallower rock

outcrops, surfperches, wrasses, greenlings, seabasses and damselfish become common (Schroeder et al., 2000; Stephens et al., 2006; Love and Schroeder, 2007).

In 1996, the Magnuson-Stevens Fishery Conservation and Management Act (MSA; 16 U.S.C. 1801 et seq.) was amended by the Sustainable Fisheries Act on October 11, 1996, to require consultation on essential fish habitat (EFH) for Federally-managed species. The MSA describes EFH as: "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." EFH pertains to habitat "required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem." A healthy ecosystem is defined as: an "ecosystem where ecologically productive capacity is maintained, diversity of the flora and fauna is preserved, and the ecosystem retains the ability to regulate itself. Such an ecosystem should be similar to comparable, undisturbed ecosystems with regard to standing crop, productivity, nutrient dynamics, trophic structure, species richness, stability, resilience, contamination levels, and the frequency of diseased organisms." The Pacific Fishery Management Council (PFMC) has identified EFH for the fishes it manages under four Fishery Management Plans (FMPs): (1) Coastal Pelagics FMP; (2) Pacific Salmon FMP; (3) Pacific Groundfish FMP; and (4) Highly Migratory Species FMP. Many of the species managed by the PFMC, in particular rockfishes, can be found within the project area sometime during their life cycle (Love et al., 2003).

In 1997, the southern steelhead was listed as an endangered species in southern California and threatened in south-central California and critical habitat for the species was designated in 2005. In addition, the tidewater goby was listed as threatened in 2001. Both species could be located in areas potentially affected by the project. In 2006, the southern distinct population segment of the North American green sturgeon was listed as threatened and its critical habitat was designated in 2009. This species is uncommon in the project area, and the green sturgeon critical habitat lies far north of the project area and so is not likely to be affected by the proposed project.

Table 2-2. Threatened or Endangered Fish Species.

Common Name	Scientific Name	Status
Green Sturgeon	*Acipenser medirostris*	Federally Threatened
Tidewater goby	*Eucyclogobius newberryi*	Federally Endangered
Southern steelhead	*Oncorhynchus mykiss*	Federally Endangered

The endangered tidewater goby (*Eucyclogobius newberryi*) is found in shallow coastal lagoons, stream mouths, and shallow areas of bays in low salinity waters from Del Norte County south to San Diego County (Lafferty et al., 1999a). Tidewater goby larvae lack a marine phase, and adult gobies are restricted to low salinity environments and cannot live offshore in marine habitats for very long. However, Lafferty et al., (1999b) postulate that connectivity among the isolated wetland goby populations probably occurs via episodic marine dispersal of adults during severe storm events.

The endangered southern California steelhead Evolutionarily Significant Unit (ESU) occupies coastal watersheds from the Santa Maria River (which defines the boundary between San Luis Obispo and Santa Barbara Counties) to the southern extent of its range, which may include the project area. Being anadromous fish, young steelhead remain in fresh water anywhere from less than one year to three years, and then migrate to the sea where they quickly move offshore and begin an epipelagic existence (principally less than 10 meters, or 33 feet, water depth) for one to

four years before returning to their natal stream to spawn (Light et al., 1989, Burgner et al., 1992).

The threatened green sturgeon (*Acipenser medirostris*) inhabits fresh water during early life history stages, and then switches to nearshore coastal marine waters, bays, and estuaries at later stages (Moyle, 2002; Erickson and Hightower, 2007; Erickson and Webb, 2007). Although there is one unusual record of a green sturgeon catch recorded near Bahía de San Quintin in Baja California, Mexico, during a cold water year (Rosales-Casián and Almeda-Jáuregui, 2009), the population center of this fish is considered to lie northward of the project area. The most southerly spawning habitat for green sturgeon is the Sacramento River, and the critical habitat for the Southern distinct population segment lays hundreds of kilometers north of the project area, near Monterey Bay (Biological Review Team, 2005).

2.2.4 Marine Dependent Birds

The marine and coastal bird population off southern California is both diverse and complex, being composed of as many as 195 species (Baird, 1993). This community of birds has been described in detail in previous studies and environmental documents (e.g., Sowls et al., 1980; Briggs et al., 1981; 1987; Hunt et al., 1981; Carter et al., 1992; Baird, 1993; Mason et al., 2007). Of the many different types of birds that occur in this area, two groups are generally the most sensitive to the potential impacts of OCS development: seabirds (e.g., ducks, loons, grebes, shearwaters, storm-petrels, cormorants, gulls, terns and alcids) and shorebirds (e.g., plovers and sandpipers). While some of these breed in the area, others may spend their non-breeding or "wintering" period there or may simply pass through during migration.

Seabirds: Seabirds can be divided into four major groups based on habitat use, behavior, and/or phylogenetic relationships: nearshore, pelagic, breeding species, and non-breeding gulls and terns.

1. Nearshore species generally occupy relatively shallow waters close to shore. While in southern California, these species spend almost their entire time on the water surface and are particularly vulnerable to oil spills. In the proposed project area, the most common nearshore species are Red-throated, Pacific and Common Loons (*Gavia stellata*, *G. pacifica*, and *G. immer*); Western and Clark's Grebes (*Aechmophorus occidentalis* and *A. clarkii*); and Surf Scoters (*Melanitta perspicillata*). In southern California, nearshore species occur in highest numbers during the winter months; relatively few remain during the summer.
2. Pelagic species generally occupy deeper waters than nearshore species and may be found far from shore. These species spend much of their time on the water surface or diving for food and are very vulnerable to oil spills. In the proposed project area, the most common offshore species are Sooty, Black-vented and Pink-footed Shearwaters (*Puffinus griseus*, *P. opisthomelas*, and *P. creatopus*); Northern Fulmars (*Fulmarus glacialis*), Red and Red-necked Phalaropes (*Phalaropus fulicarius* and *P. lobatus*); Pomarine and Parasitic Jaegers (*Stercorarius pomarinus* and *S. parasiticus*); Common Murres (*Uria aalge*); and Rhinoceros Auklets (*Cerorhinca monocerata*). Although the period of highest density varies from species to species, with the exception of the Common Murre and Rhinoceros Auklet, none of these pelagic birds breeds in southern California.

3. Breeding species in the vicinity of the proposed project area nest mainly on the Channel Islands, although a few also nest on the mainland. The most common local breeding species are Leach's, Ashy, and Black Storm-Petrels (*Oceanodroma leucorhoa, O. homochroa,* and *O. melania*); Brown Pelicans (*Pelecanus occidentalis*); Brandt's, Pelagic and Double-crested Cormorants (*Phalacrocorax penicillatus, P. pelagicus* and *P. auritus*); Western Gulls (*Larus occidentalis*); California Least Terns (*Sterna antillarum browni*); and several alcids, including Pigeon Guillemots (*Cepphus columba*), Cassin's Auklets (*Ptychoramphus aleuticus*) and Scripps's Murrelets (*Synthliboramphus scrippsi*). From 1989-1991, the total breeding seabird population on the Channel Islands was estimated at over 100,000 birds (Carter et al., 1992). Location, numbers of nests and at-sea densities vary greatly from species to species.
4. Many gulls and terns (excluding the Western Gull and California Least Tern, which are local breeders), although an important component of southern California avifauna, do not readily fit into any of the above categories. Some are coastal in nature (e.g., Ring-billed gull, *Larus delawarensis*), while others remain far offshore (e.g., Arctic Tern, *Sterna paradisaea*). In the proposed project area, the most common non-breeding gulls and terns are California, Ring-billed, Heermann's, and Bonaparte's Gulls (*Larus californicus, L. delawarensis, L.heermanni* and *L. Philadelphia*) and Forster's, Caspian and Elegant terns (*Sterna forsteri, S. caspia* and *S. elegans*). Based on information in the MMS CDAS (Bonnell and Ford, 2001), densities of non-breeding gulls and terns in the proposed project area range from 0-360.8 birds/km^2 (mean = 7.2).

Shorebirds: In addition to seabirds, there are a number of shorebirds that occupy coastal habitats in the vicinity of the proposed project. More than 40 shorebird species have been recorded in southern California (Garrett and Dunn, 1981; Lehman, 1994); however, only about 24 species occur regularly in the area. Almost all locally occurring shorebirds migrate to southern California from northern breeding areas; very few shorebirds breed in this area. Although the majority of shorebirds occupy coastal wetlands, including estuaries, lagoons, and salt and freshwater marshes, they also utilize other coastal habitats, including sandy beaches, rocky shores, and open ocean. Common shorebird species in southern California and the proposed project area include Black-bellied Plovers (*Pluvialis squatarola*), Willets (*Tringa semipalmata*), Whimbrels (*Numenius phaeopus*), Marbled Godwits (*Limosa fedoa*), Black Turnstones (*Arenaria melanocephala*), Sanderlings (*Calidris alba*), Western and Least Sandpipers (*Calidris mauri* and *C. minutilla*), Dunlins (*Calidris alpina*), and Short-billed and Long-billed Dowitchers (*Limnodromus griseus* and *L. scolopaceus*). Locally breeding shorebirds are limited to Black Oystercatchers (*Haematopus bachmani*), Black-necked Stilts (*Himantopus mexicanus*), American Avocets (*Recurvirostra americana*), Killdeer (*Charadrius melodus*), and the Federally threatened Western Snowy Plover (*Charadrius nivosus nivosus*), which nests and winters on sandy beaches in central and southern California. Because of their migratory nature and the fact that few breed in southern California, shorebirds are most abundant in this area from fall through spring; comparatively few shorebirds remain in southern California during the summer months (McCrary and Pierson, 2002).

Several bird species that have the potential to occur within the project area have been afforded protected status by the state and/or federal governments due to declining populations and/or habitats. In addition, all native birds within the area are protected by the Migratory Bird Treaty Act of 1918 (MBTA), which is enforced by the Fish and Wildlife Service (FWS). Special-status

marine bird species found within the vicinity of the proposed activities are listed below in Table 2-3.

Table 2-3. Special-Status Marine and Coastal Birds Within or Near the Project Area.

Common Name	Scientific Name	Federal Status	State Status
Brant	*Branta bernicla*		SSC
Black-footed Albatross	*Phoebastria nigripes*	BCC	
Short-tailed Albatross	*Phoebastria albatrus*	E	SSC
Hawaiian Petrel	*Pterodroma sandwichensis*	E	
Pink-footed Shearwater	*Puffinus creatopus*	BCC	
Black-vented Shearwater	*Puffinus opisthomelas*	BCC	
Ashy Storm-Petrel	*Oceanodroma homochroa*	BCC	SSC
Black Storm-Petrel	*Oceanodroma melania*		SSC
Brown Pelican	*Pelecanus occidentalis*	DE	DE
Double-crested Cormorant	*Phalacrocorax auritus*		TW
Light-footed Clapper Rail	*Rallus longirostris levipes*	E	E
Western Snowy Plover	*Charadrius nivosus nivosus*	T	SSC
California Gull	*Larus californicus*		TW
California Least Tern	*Sternula antillarum browni*	E	E
Elegant Tern	*Thalasseus elegans*		TW
Marbled Murrelet	*Brachyramphus marmoratus*	T	E
Scripps's Murrelet	*Synthliboramphus scrippsi*	C, BCC	T
Cassin's Auklet	*Ptychoramphus aleuticus*	BCC	SSC
Rhinoceros Auklet	*Cerorhinca monocerata*		TW
Tufted Puffin	*Fratercula cirrhata*		SSC

Status: *E – Endangered T – Threatened*
DE – Delisted (formerly Endangered) C – Candidate
BCC – Bird of Conservation Concern SSC – Species of Special Concern
TW – Taxa to Watch

In the past thirty years, the status and distribution of some Federally-listed bird species has changed in the vicinity of the proposed project:

Brown Pelican and Peregrine Falcon: Both species have been removed from the list of threatened and endangered species (delisted) by the FWS and the State of California. The Brown Pelican was delisted by the state on June 3, 2009, and by the FWS on December 17, 2009. The Peregrine Falcon was delisted by the FWS on August 25, 1999, and by the state on November 4, 2009. As the lead Federal agency, BOEM is no longer required to consult with the FWS on these species.

Western Snowy Plover: The Pacific coast population of this subspecies was Federally-listed as threatened on April 5, 1993. It is also a California species of special concern. A large proportion of the breeding population occurs between Morro Bay and Point Mugu (*c.* 48 percent of west coast population). Wintering birds also occur in this area and on the Channel Islands with sandy beaches (SMI, SRI, SZI, and SNI). This taxa is susceptible to oiling of sandy beaches.

Short-tailed Albatross: This species was Federally-listed as endangered on June 2, 1970. It is also a California species of special concern. The species breeds only on a few Japanese volcanic islands, with occasional individuals on Midway (one nest currently). Historically, they dispersed to waters off the Pacific coast from Alaska to Baja California Sur and were common there until

the turn of the nineteenth century. They were driven close to extinction by the end of the nineteenth century due to plume hunting and exploitation for food. Their population reached a low of approximately 20 birds in 1953 and none were seen along the California coast from 1900-1977. Since that time, the breeding population off Japan has been slowly recovering to a currently estimated 3,500 birds. There have been 37 records off California since 1977 with 33 records between 1998 and 2011. This trend should continue to increase sightings off the California coast and certainly more individuals have occurred in the region than are cited here as those numbers are limited by observer effort at sea. Eight of the 37 records were in the vicinity of the area that could be affected by the proposed project; however, their occurrence in the area is a rare event.

Hawaiian Petrel: This species was Federally-listed as endangered on March 11, 1967. The species breeds on islands in the Hawaiian chain and it is a casual visitor well offshore from April-early September. The first of California's 41 accepted records occurred in May 1992. There are four records in the vicinity of the project area; however, all were 24-125 miles offshore. Hawaiian Petrels with satellite transmitters have been tracked making regular foraging excursions to areas off northern California (where they are now seen almost regularly from boats off Fort Bragg in the summer), but there does not appear to be a regular pattern of occurrence off central and southern California. Therefore, it is not expected to occur with any regularity in the project vicinity.

Marbled Murrelet: This species is Federally-listed as threatened and state listed as endangered in California. The species occurs in Alaska, British Columbia, Washington, Oregon, and California. The population of the species that nests from Washington to the Santa Cruz Mountains in central California, was Federally-listed as threatened on September 28, 1992 and state listed as endangered on March 12, 1992.

While the species does not nest in the vicinity of the project area, individuals from the population nesting in the Santa Cruz Mountains (and perhaps from more northerly populations) do disperse to the coast and offshore waters of San Luis Obispo and Santa Barbara Counties. Marantz (1986) characterized them as a rare transient and winter visitant offshore, but possibly regular in late summer in San Luis Obispo County. Lehman (1994) described the species as a very rare late-summer, fall, and winter visitor along the Santa Barbara County Coast, but somewhat regular in late summer in the Point Sal/north Vandenberg Air Force Base area. A recent study indicates that the San Luis Obispo coast extending south to Point Sal in Santa Barbara County is an important wintering area for the species in central California (Peery et al., 2008). Mortality due to oil pollution is one of the major threats to Marbled Murrelet populations. An accidental discharge from Platform Hidalgo could impact Marbled Murrelets in nearshore areas along the San Luis Obispo and northern Santa Barbara Counties if the spill trajectory moves north and east from the platform.

In addition to Federally-listed species, there are two other rare, special-status seabirds that are currently being evaluated for federal listing; the Scripps's Murrelet and Ashy Storm-Petrel. Both of these species have restricted ranges with a substantial portion of their breeding populations occurring on the Channel Islands. They forage and disperse widely at sea and have known at-sea concentrations in the vicinity of the proposed project.

2.2.5 Marine Mammals

As stated in PXP's environmental evaluation (2012), approximately 40 marine mammal species are known or have the potential to occur off south-central California (Dohl et al., 1981; Dohl et al., 1983; Bonnell and Dailey, 1993; and Takekawa, 2004). These can be broadly categorized as migrants that pass through the area on their way to calving or feeding grounds, seasonal visitors that remain for a few weeks to feed on a particular food source, or residents of the area.

The project area represents a region of overlap where populations of marine mammals having different biogeographic affinities (boreal and subtropical) intermingle. For example, boreal species, such as Dall's porpoises (*Phocoenoides dalli)*, harbor porpoises (*Phoecoena phoecoena*), and the northern fur seals (*Callorhinus ursinus)* inhabit the cooler waters of the North Pacific. For them, the project area represents the southern extent of their range. These species are typically found in areas of coastal upwelling and in the coolest waters of the California Current. They are usually observed in the project area from winter through early summer. Conversely, in late summer and autumn, marine mammals typically found in warmer, subtropical waters to the south may be encountered in the project area. Examples of these species include bottlenose dolphins, Guadalupe fur seals, and pilot whales. Other species, such as the southern sea otter (*Enhydra lutris nereis*), are endemic to coastal southern and central California and occur in the project area year-round. Several species are largely restricted to the waters of the California Current and occur in high numbers off of southern and central California. These species include the California sea lion, northern elephant seal, and during its migration, the California gray whale (Dohl et al., 1983).

Lists and more detailed descriptions of cetaceans (whales and dolphins), pinnipeds (seals and sea lions) and fissipeds (sea otters) found in the vicinity of Platform Hidalgo are included in the environmental evaluation provided by PXP (2012) and hereby incorporated by reference.

2.2.6 Marine Turtles

As stated in PXP's environmental evaluation (2012), although sea turtles are not common to the project area, four species are known to occur in the region: the green sea turtle (*Chelonia mydas)*, the Olive ridley sea turtle (*Lepidochelys olivacea)*, the leatherback sea turtle, (*Dermochelys coriacea)*, and the loggerhead sea turtle (*Caretta caretta)* (Hubbs, 1977; Smith and Houck, 1983). All four species that occur off the California coast are listed as endangered under the Endangered Species Act.

According to the California Marine Mammal Stranding Network Database (NMFS, 1997) over the past eleven years (2001-2011) a total of only three sea turtle strandings were reported on Santa Barbara County Beaches (NMFS 2012). Two of the strandings were identifiable as olive ridley turtles. In contrast, during the period spanning 1982-1995 a total of 14 sea turtles strandings were reported on Santa Barbara County beaches. Of these strandings, nine were leatherbacks, three were loggerheads and two were green turtles (NMFS, 1997). Within the entire southern California region, however, green turtles make up the bulk (61 percent) of reported strandings.

Leatherback sea turtles have the widest distribution of all sea turtles and are the most abundant sea turtle encountered off the central California coast. Although they nest exclusively on beaches in tropical and subtropical latitudes, leatherbacks are known to forage at latitudes as high as 71° N and 47° S (Frair et al., 1972; MMS, 1996). Approximately 150 to 170 leatherbacks appear

annually in deeper waters over the continental shelf of the California coast between Point Conception and Point Arena. These animals travel from their nesting beaches in Indonesia and arrive coincident with the development of seasonal aggregations of jellyfish, a key prey item (Shenker, 1984; Suchman and Brodeur, 2005; Benson et al., 2011; Graham, 2009). NMFS (2012) revised critical habitat for this species to include large portions of the U.S. west coast in recognition of this important foraging habitat.

2.2.7 Special Areas (Formerly Important Locations for Marine Biota)

Special Areas are legally defined areas (known as marine protected areas, sanctuaries, etc.) that are regulated by state or federal governments with the primary intent of protecting marine resources. Essential Fish Habitat is discussed separately in Section 2.2.4. Special status animals, meaning threatened or endangered species, are discussed in their individual resource sections.

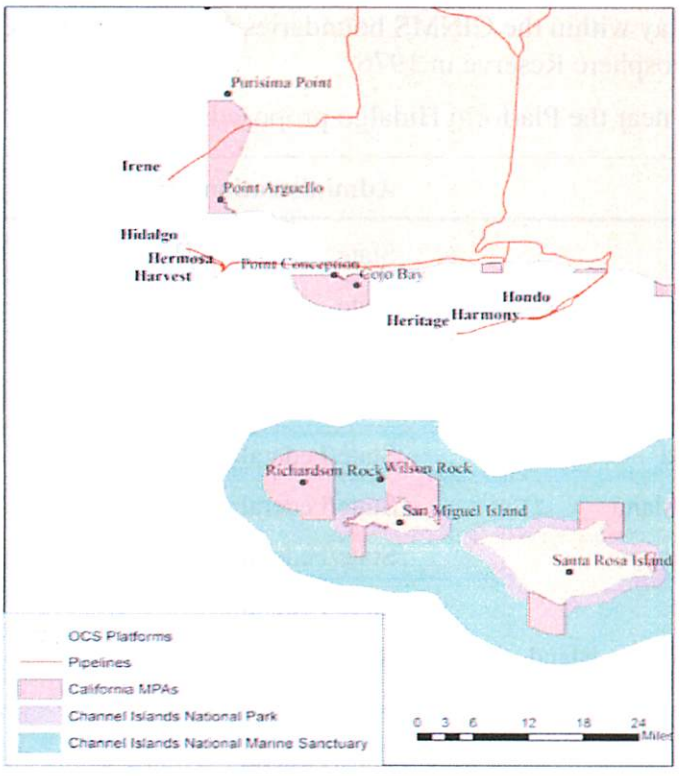


Figure 2-1. State and Federal protected areas near the Platform Hidalgo proposed project.

Special areas are created and managed differently by distinct agencies. Protected areas within the Platform Hidalgo proposed project area (Figure 2-1) that are legally defined and controlled by the State of California include Marine Protected Areas and Areas of Special Biological Significance (Table 2-4). Marine Protected Areas (MPAs) are managed by the California Department of Fish and Wildlife to protect marine life and habitats, marine ecosystems, and marine natural heritage, as well as improve recreational, educational, and study opportunities provided by marine ecosystems. MPAs include State marine reserves, State marine parks, and State marine conservation areas that confer different levels of restrictions on recreational and commercial fishing (CDFG, 2008a; http://www.dfg.ca.gov/mlpa/). Vandenberg State Marine Reserve is the closest MPA to Platform Hidalgo, approximately four miles to the northeast. Areas of Special Biological Significance (ASBS) were designated by the State Water Resources Control Board in 1974 and 1975, and are monitored periodically through a joint interagency agreement with the California Department of Fish and Wildlife. The purpose of the ASBS designation is to eliminate the risk of damage to valuable intertidal and shallow subtidal habitats by prohibiting the discharge of wastes into, or within the vicinity of, these special biological communities. Since 1983, the California Ocean Plan (SWRCB, 2009) has prohibited both point and nonpoint discharges into ASBS.

Located 22 miles south of the project area, the Channel Islands National Marine Sanctuary (CINMS) is a biologically sensitive area, defined and protected by the Federal government. Another important Federally-protected area is the Monterey Bay National Marine Sanctuary

(MBNMS) which is located just over 75 miles north of Platform Hidalgo. The CINMS was created in 1980 to preserve the area's unique and strategically situated ecosystems (intertidal, subtidal, benthic, and pelagic), to encourage scientific research and to enhance public awareness of sanctuary resources. Areas of upwelling within the CINMS support high levels of productivity, diverse biota on the bottom (including an area of purple coral, *Allopora californica*) and within the water column. The CINMS contains extensive kelp beds, fish, and shellfish highly valued by commercial and sport fishermen, and an unusual combination of several cold water/warm water transition zone species. The CINMS covers the coastal waters of the five northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz, Anacapa and Santa Barbara) and overlaps or encompasses the boundaries of several other Federal and State protected areas. The terrestrial resources of these five Channel Islands are protected by the Channel Islands National Park, which was created in 1980. The Channel Islands National Park also encompasses the marine environment within one mile (1.6 km) of shore, where it overlaps with CINMS. Multiple State marine protected areas and two ASBS lay within the CINMS boundaries (Figure 2-1, Table 2-4). This region was also designated as a Biosphere Reserve in 1976.

Table 2-4. State and Federal protected areas near the Platform Hidalgo proposed project.

Designation	Administration
Vandenberg State Marine Reserve, Mainland	State
Point Conception State Marine Reserve, Mainland	State
Richardson Rock Marine Reserve, San Miguel Island	State/Federal
Judith Rock Marine Reserve, San Miguel Island	State/Federal
Harris Point Marine Reserve, San Miguel Island	State/Federal
Carrington Point Marine Reserve, Santa Rosa Island	State/Federal
Skunk Point Marine Reserve, Santa Rosa Island	State/Federal
South Point Marine Reserve, Santa Rosa Island	State/Federal
Painted Cave Marine Conservation Area, Santa Cruz Island	State/Federal
Gull Island Marine Reserve, Santa Cruz Island	State/Federal
Scorpion Marine Reserve, Santa Cruz Island	State/Federal
San Miguel, Santa Rosa, and Santa Cruz Islands ASBS[1]	State
Channel Islands National Marine Sanctuary	Federal
Channel Islands National Park	Federal

[1] *Area of Special Biological Significance*

2.3 Socioeconomic Resources

2.3.1 Commercial Fishing

The proposed project is located offshore of the Point Arguello and Point Conception region, near the Santa Maria Basin and Santa Lucia Bank. Diverse marine benthic habitats exist in the project area, and include low and high relief rock outcrops, mud, silt, and sand sediments, canyons, basins, banks, kelp forests and sea grass beds. In part due to the natural topography of the

coastline in the project area, strong winds characterize the region (Dorman and Winant, 2000). These winds enable vigorous upwelling, which in turn greatly enhances local productivity.

The project area forms a biogeographic transition zone between the Oregonian Province (cool-temperate species) to the north and the Californian or San Diegan Province (warm-temperate species) to the south (Horn and Allen, 1978). As such, the project area contains a diverse assemblage of finfish, shellfish, and other invertebrates, many of which are commercially exploited (CDFG, 2007; 2008b; 2009; 2010; 2011). Offshore, gear used to harvest these species include trawl, hook-and-line, longline, handline, stick gear, troll, hand rake, purse seine, drum seine, trap, and drift and set gill nets (CDFG, 2005). Onshore, Guadalupe Beach and Surf Beach support a small, hook-and-line (surfcasting) fishery for barred surfperch.

Inclement weather conditions prevail in the project area. Strong winds, rough waves and foggy conditions often make the project area hazardous for marine vessels, and it is the location for a number of well-known maritime disasters. Being relatively isolated from ports and piers, and having few coastal access points, the project area is one of the more inaccessible regions along the California Coast (CDFG, 2005). Together, these hazardous and isolated conditions contribute to the low fish harvest rates found in the project region. Scholtz et al. (2006) conducted interviews with commercial fishermen to determine the relative importance of fishing grounds along the central California Coast from Pidgeon Point to Point Conception, and documented that the project area was of low importance compared to other areas. Stephens et al. (2006) reviewed National Marine Fisheries Service triennial trawl data for the Point Conception area (just south of Point Arguello) and found that there was little evidence of long-term declines for most deeper shelf and slope fish species, which suggests that the area is only lightly fished.

In the last few decades, commercial fisheries in California have undergone dramatic changes. The number of commercial fishing licenses has declined nearly 70 percent, from approximately 20,400 in 1980 to 6,300 in 2004. In the same time frame, the number of registered commercial fishing vessels has declined by 64 percent, from approximately 9,200 to 3,300 (CDFG, 2005). It is reasonable to assume that these State-wide trends in commercial fishing reflect trends in the project area as well. The decline in commercial fishing activity results from a number of factors, including increasingly restrictive fishery management regulations that reduce fishing effort and bycatch of sensitive species (CDFG, 2005), as well as a system of spatial closures that restrict most forms of fishing. A moratorium currently prohibits the commercial harvest of abalone, and regular commercial kelp harvest is now longer active in the project region. An expansion of fishing activity to levels seen in the 1980s is therefore unlikely to occur in the future because of these restrictive regulations.

2.3.2 Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898 to address environmental justice in minority populations and low-income populations (59 Fed. Reg. 32, 1994). Under this Executive Order, each Federal agency shall identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. On August 17, 1994, the Department of Interior (DOI) established an environmental justice policy based on the Executive Order. Subsequently, the DOI Office of Environmental Policy and Compliance issued Environmental Compliance Memorandum No. ECM95-3 (DOI, 1995) to all DOI bureaus and offices directing them to incorporate environmental justice into all environmental documents by specifically

analyzing and evaluating the impacts of any proposed projects, actions or decisions on minority and low-income populations and communities, as well as the equity of the distribution of the benefits and risks of those decisions.

To conduct environmental justice analyses, BOEM follows the guidance issued by The Council on Environmental Quality (CEQ, 1997) titled *Environmental Justice Guidance Under the National Environmental Policy Act.* Per CEQ, the potential for adverse effects on minorities occurs when the minority population percentage of the affected area is greater than 50 percent, or where the minority population percentage of the affected area is meaningfully greater than the minority population percentage of the general area or other appropriate unit of geographic analysis. Low-income populations are identified with annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. To identify minority and low-income populations in the potential area of effect (the coastal area from which project operations would be staged), demographic information was obtained from the U.S. Census Bureau.

The primary onshore areas affected by the proposed project are the City of Port Hueneme (the primary staging area for the project) and the communities surrounding the Santa Maria Airport (where drilling personnel will be transported via helicopter to Platform Hidalgo). Table 2-5 shows the relevant demographic information for the cities of Oxnard and Santa Maria. The Hispanic/Latino population is greater than 50 percent in both cities. There are populations whose income is below the poverty level in Port Hueneme and Santa Maria, though the population percentage is not meaningfully greater than that of the Ventura County and Santa Barbara County, respectively. As minority populations and low-income populations were identified in the potential area of effect, the proposed project has the potential for adverse environmental justice effects as defined by CEQ.

Table 2-5. Percentage (%) of minority populations and low-income populations in the potential area of effect and relevant counties.

	City of Port Hueneme	Ventura County	City of Santa Maria	Santa Barbara County
Minority race population	46.4%	29.1%	21.4%	23.6%
Hispanic/Latino origin	51.3%	39.7%	70.1%	41.9%
Percentage of people in poverty	15.1%	9.9%	16.8%	14.2%

Minority race populations are comprised of individuals who defined their race category as Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, some other race, or two or more races according to Census definitions. Some other race and two or more races categories were included to capture minority persons who defined themselves in those categories. According to Census data, individuals of Hispanic/Latino origins may belong to any race. Therefore, persons of Hispanic/Latino origins are summarized separately from minority persons.
Source: U.S. Census Bureau, 2007-2011 American Community Survey 5-Year Estimates (http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml)

3.0 Impacts and Cumulative Analyses

3.1 Physical Resources

3.1.1 Oil Spill Risk Analysis

The potential for oil spills is discussed in three sub-headings of the oil spill risk assessment, trajectory, and response.

Oil Spill Risk Assessment

In the course of normal, day-to-day platform operations, accidental discharges of hydrocarbons may occur. Such accidents are typically limited to discharges of quantities of less than one barrel (bbl) of crude oil. Table 3-1 lists the hydrocarbon spills that occurred in the Pacific OCS Region from 1963 through 2011. During that period, 1,370 oil spills were recorded. The total volume of oil spilled in the Pacific OCS Region is dominated by the 1969 Santa Barbara Spill. Since 1969, spills have ranged in size from less than one bbl to 164 bbls, for a total of 884 bbls and an average oil spill size of 0.65 bbls. As shown in Table 3-1, four percent of the total recorded spills between 1970 and 2011 (48 of 1368) were greater than one bbl spilling 792 bbls of oil into the ocean. For comparison, natural oil seeps at Coal Oil Point in the Santa Barbara Channel discharge approximately 100 bbls of oil per day (Farwell et. al, 2009).

Of the 48 oil spills greater than one bbl in the Pacific OCS Region (1970 – 2011), only five measured 50 bbls or more in volume (Table 3-1); the largest of these was the 164 bbl Platform Irene pipeline spill in September 1997. The average oil spill size in the Pacific OCS Region for oil spills in the 50 to less than 1,000 bbl range is 103 bbls and the average oil spill size for oil spills in the 1 – 50 bbl range is 6.4 bbls. The overall average oil spill size for the Pacific OCS Region from 1970 to 2011 was 0.65 bbls. If the 1969 oil spill is included (1963 – 2011) the average oil spill size is 60 bbl. In comparison, for overall OCS petroleum spills from 1996 to 2010, the average spill size between 50 to 999 bbl is 186 bbl (Anderson et al., 2012). Given these data and the experience in the Pacific OCS Region over the last 40 years, BOEM estimated the most likely spill volume for spills in the 50 – 999 range to be less than 200 bbl.

BOEM estimated the number of oil spills and the probability of one or more spills that could occur as a result of ongoing activities in the Point Arguello Unit and with the addition of production from the Electra Field in the 50 to less than 1000 bbls size range (Tables 3-2, 3-3 and 3-4). Oil spill rates were calculated using data from the Pacific OCS Region (1963 – 2011) and the estimated total production volume (PXP, 2012, Attachment G) for existing production (Table 3-2), proposed Electra Field production (Table 3-3), and combined existing and proposed production (Table 3-4). Oil spill probability estimates are conservative given the long established drilling program in the Pacific OCS Region and the fact that there are no new platforms being installed, no floating platforms being used to drill, the increased safety measures in place and the Pacific OCS Region's oil spill history. Note that during the most recent 15 years of oil spill reporting, there was improved reporting of oil spills and improved drilling and safety technology.

Oil production with addition of the Electra Field is still well within what was analyzed in in the 1984 EIR/EIS. The 1984 EIR/EIS estimated 300 to 500 million bbl of oil produced over the project lifetime. PXP calculates that they will likely recover between 5 and 7 million bbl of oil from the Electra Field. The 1984 EIR/EIS indicated that 144,000 bbl of oil can be expected to be spilled over a 30-year project lifetime (ADL, 1984, Appendix H). To date, the oil spill volumes have not approached this prediction.

Table 3-1. Crude, diesel, or other hydrocarbon spills recorded in the Pacific OCS Region, 1963 through 2011 (volumes in barrels).

CRUDE, DIESEL OR OTHER HYDROCARBON SPILLS
VOLUMES IN BARRELS
PACIFIC OCS REGION

	Less than or equal to 1 BBL		Greater than 1 BBL and less than 50		Equal to or More than 50 BBLS		Total		Cumulative Since 1969
YEAR	NO.	VOLUME	NO.	VOLUME	NO.	VOLUME	NO.	VOLUME	VOLUME
1963	0	0.00	0	0.0	0	0.0	0	0.00	
1964	0	0.00	0	0.0	0	0.0	0	0.00	
1965	0	0.00	0	0.0	0	0.0	0	0.00	
1966	0	0.00	0	0.0	0	0.0	0	0.00	
1967	0	0.00	0	0.0	0	0.0	0	0.00	
1968	0	0.00	0	0.0	0	0.0	0	0.00	
1969	0	0.00	0	0.0	2	80900.0	2	80,900.00	
1970	0	0.00	0	0.0	0	0.0	0	0.00	0.0
1971	0	0.00	0	0.0	0	0.0	0	0.00	0.0
1972	0	0.00	0	0.0	0	0.0	0	0.00	0.0
1973	0	0.00	0	0.0	0	0.0	0	0.00	0.0
1974	0	0.00	0	0.0	0	0.0	0	0.00	0.0
1975	1	0.10	0	0.0	0	0.0	1	0.10	0.1
1976	3	1.10	1	2.0	0	0.0	4	3.10	3.2
1977	11	2.20	1	4.0	0	0.0	12	6.20	9.4
1978	4	1.20	0	0.0	0	0.0	4	1.20	10.6
1979	5	1.70	1	2.0	0	0.0	6	3.70	14.3
1980	11	4.90	2	7.0	0	0.0	13	11.90	26.2
1981	21	6.00	10	75.0	0	0.0	31	81.00	107.2
1982	24	3.20	1	3.0	0	0.0	25	6.20	113.4
1983	56	7.70	3	6.0	0	0.0	59	13.70	127.1
1984	65	4.70	3	36.0	0	0.0	68	40.70	167.8
1985	55	9.30	3	9.0	0	0.0	58	18.30	186.1
1986	39	5.50	3	12.0	0	0.0	42	17.50	203.6
1987	67	7.50	2	11.0	0	0.0	69	18.50	222.1
1988	47	3.70	1	2.0	0	0.0	48	5.70	227.8
1989	69	4.10	3	8.3	0	0.0	72	12.43	240.2
1990*[1]	43	2.70	0	0.0	1	101.0	44	103.70	343.9
1991*[2]	51	2.80	1	13.0	1	50.0	53	65.80	409.7
1992	39	1.20	0	0.0	0	0.0	39	1.20	410.9
1993	32	0.76	0	0.0	0	0.0	32	0.76	411.7
1994*[3]	18	0.40	2	33.0	1	50.0	21	83.40	495.1
1995	25	0.90	1	1.4	0	0.0	26	2.33	497.4
1996*[4]	39	0.90	1	5.0	1	150.0	41	155.90	653.3
1997*[5]	20	1.50	0	0.0	1	164.0	21	165.50	818.8
1998	29	1.00	0	0.0	0	0.0	29	1.00	819.8
1999	26	1.35	1	10.0	0	0.0	27	11.35	831.2
2000	36	1.00	0	0.0	0	0.0	36	1.00	832.2
2001	48	1.70	0	0.0	0	0.0	48	1.70	833.9
2002	55	1.30	1	9.0	0	0.0	56	10.30	844.2
2003	56	1.37	0	0.0	0	0.0	56	1.37	845.5
2004	36	1.00	0	0.0	0	0.0	36	1.00	846.5
2005	46	2.60	0	0.0	0	0.0	46	2.60	849.1
2006	46	2.00	0	0.0	0	0.0	46	1.99	851.1
2007	45	1.19	1	1.2	0	0.0	46	2.40	853.5
2008	45	1.20	1	27.0	0	0.0	46	28.20	881.7
2009	36	1.10	0	0.0	0	0.0	36	1.10	882.8
2010*[6]	33	0.63	0	0.0	0	0.0	33	0.63	883.5
2011	38	0.02	0	0.0	0	0.0	38	0.02	883.5
TOTALS	1320	91.5	43	277.0	7	81,415.0	1370	81,783.477	883.5

*[1] Mineral oil mud released due to incorrectly positioned standpipe and closed valves
*[4] Equipment failure and error allowing emulsion to flow through flare boom
*[5] Pipeline break in the flange metal in state waters due to weldling flaws
*[6] Since January 2010 spills recorded in TIMS in .01 gallons

Table 3-2. Estimated Means and Spill Occurrence Probabilities Pacific OCS Region Analyses using only Pacific OCS Spill Data from 1964 to 2011. Anticipated Production for only Point Arguello Field Production is 0.012 Billion Barrels (PXP, 2012).

POCS Spill data (1964 – 2010)	Spill Rate (2012)	Estimated Mean Number of spills	Probability of one or more spills (%)
Spills ≥ 50 to < 1,000 (bbls)			
Platforms & Pipelines	**3.94**	**0.05**	**4.6**

Table 3-3. Estimated Means and Spill Occurrence Probabilities Pacific OCS Region Analyses using only Pacific OCS Spill Data from 1964 to 2011. Anticipated Production for only Electra Field is 0.0035 Billion Barrels (PXP, 2012).

POCS Spill data (1964 – 2010)	Spill Rate (2012)	Estimated Mean Number of spills	Probability of one or more spills (%)
Spills ≥ 50 to < 1,000 (bbls)			
Platforms & Pipelines	**3.94**	**0.01**	**1.4**

Table 3-4. Estimated Means and Spill Occurrence Probabilities Pacific OCS Region Analyses using only Pacific OCS Spill Data from 1964 to 2011. Anticipated Production for Point Arguello and Electra Fields is 0.0155 Billion Barrels (PXP, 2012).

POCS Spill data (1964 – 2010)	Spill Rate (2012)	Estimated Mean Number of spills	Probability of one or more spills (%)
Spills ≥ 50 to < 1,000 (bbls)			
Platforms & Pipelines	**3.94**	**0.06**	**5.9**

Formulae used in the Oil Spill Occurrence and Probability Calculations:

Spill rate λ = number of spills per Billions of barrels (Bbbl)
Estimated Mean Number of Spills = spill rate λ x volume handled t (Bbbl) = λ t
Probability [n spills over future exposure t] = $[(\lambda t)^n e^{-\lambda t}] / n!$
Probability of Zero Spills = $[(\lambda t)^0 e^{-\lambda t}] / 0! = [1 \times e^{-\lambda t}] / 1 = e^{-\lambda t} = 1 / e^{\lambda t}$
Probability of One or More Spills = 1- Probability [zero spills] = $1 - 1 / e^{\lambda t}$
Source: Anderson et al., 2012

Summary of Oil Spill Risk Assessment

In summary, the most likely oil spill volume is estimated to be less than 200 bbls, the addition of the Electra Field production adds a 1.4 percent probability of one or more spills for a total of 5.9 percent for overall production, and the total oil production is well within what was analyzed in the 1984 EIR/EIS.

Fate of Oil

In the event of an accidental oil spill, a slick forms and part of the slick begins evaporating while the action of breaking waves is forming oil droplets that are dispersed into the water column. Depending on the weight of the oil spilled and the environmental conditions (i.e., wave height) at the time of a spill, the 1984 EIR/EIS estimated that six to 60 percent of oil during an oil spill would sink and affect water quality in the vicinity of the spill. An oil spill may decrease dissolved oxygen concentrations and increase turbidity in the water column.

Oil in the Electra Field is heavy (American Petroleum Institute (API) gravity of 13 – 20). Heavy oil (API gravity < 22) has a negligible evaporation rate and solubility in water. Some of the oil will likely sink in a relatively short period of time. This is supported by a recent study of natural oil seeps at Coal Oil Point in the Santa Barbara Channel that range in depth from six to 67 meters offshore of Goleta, CA (Leifer et al., 2006) and are assumed to release 100 bbls/day (Farwell et al., 2009). The distribution of heavy oil (API gravity <17) in a surface slick in the Santa Barbara Channel is primarily influenced by surface currents and falls out of the slick over a period of 0.4 to 5 days. Current oil spill response plans include the possible application of dispersants that, if effective, would drive more oil into the water column. However, the oil produced from the Electra Field is poorly suited for dispersant use because of its low gravity.

Oil Spill Trajectory Analysis

In the 1984 EIR/EIS a Monte Carlo simulation computer model was run by Arthur D. Little to predict the trajectory of oil from several locations for proposed production platforms in the Point Arguello Field. Historical wind and current distributions were estimated and used to predict surface wind and currents that would drive an oil slick speed and direction (ADL, 1984 Appendix O, Appendum D). Principle outputs focused on the probability of oil making contact for a section of shoreline from the Santa Ynez River to Santa Barbara including San Miguel, Santa Rosa and Santa Cruz Islands (northern Channel Islands). Separate simulations were carried out for environmentally sensitive areas (e.g., Sea Otter Range) outside of this section of shoreline. Impact probabilities were estimated for each segment using the trajectory models and separate analyses were performed for summer, winter, spring and fall to accommodate seasonal variations in wind and current distributions.

In 2012, BOEM reviewed the results from two oil spill models for the trajectory of an oil spill from Platform Hidalgo shown in Appendix A.

The Oil Spill Risk Assessment (OSRA) model calculates numerous trajectories from pre-designated launch points by varying the wind over a static, seasonally-averaged ocean current field and applying a deep ocean 3.5 percent wind rule to project the movement of oil over the surface layer of the water. Shoreline segments are partitioned using Geological Survey Quadrangle maps, and probabilities of oil spill landfall for each shoreline segment are calculated.

The National Oceanic and Atmospheric Administration (NOAA) developed the General NOAA Operational Modeling Environment (GNOME) model to simulate oil movement due to winds, currents, tides and spreading. The model used was specifically created for the Santa Barbara Channel/southern Santa Maria Basin and accounts for the specific gravity of the spilled oil. Outputs include a quantification of oil lost to evaporation/dispersion, oil stranded on shore and oil that continues to float on the surface. Oil may also flow off the map used for the program with its eventual fate not accounted for in the model.

The trajectories predicted for oil spills launched near Platform Hidalgo in the 1984 EIR/EIS are similar to those predicted using current oil spill models in 2012. All models predicted oil to land around Point Arguello and San Miguel Island. The 1984 model and GNOME models also predict land fall around Point Conception, Santa Rosa Island and Santa Cruz Island. The 2012 GNOME model predicts oil traveling further north up the coast to Point Sal and toward San Luis Obispo Bay.

Oil Spill Response

Response to an oil spill is more regulated and largely improved as compared to the 1984 EIR/EIS. The Oil Pollution Act of 1990 amended the Clean Water Act to establish requirements for oil spill response planning for federal agencies, states and industry. It also required an update of the National Contingency Plan and establishes Regional Response Teams and Plans. BSEE regulations at 30 CFR Part 254 require that each OCS facility have a comprehensive Oil Spill Response Plan. Response plans consist of an emergency response action plan and supporting information that includes an equipment inventory, contractual agreements with subcontractors and oil spill response cooperatives, a worst-case discharge scenario, a dispersant use plan, an in-situ burning plan and details on training and drills. The Coast Guard is the lead response agency for oil spills in coastal waters.

3.1.2 Air Quality

Impacts

The primary discussion of air quality impacts associated with the Point Arguello Unit development projects comes from the Point Arguello 1984 EIR/EIS (ADL, 1984) and the Rocky Point Field drilling 2003 EA (MMS, 2003). In addition, various Authority to Construct (ATC) permits and Permits to Operate (PTO) have been issued by the SBCAPCD regarding the development of the Point Arguello Unit including modifications and operations on Platform Hidalgo. In support of their revised Platform Hidalgo DPP, PXP provided an Environmental Evaluation (PXP, 2012) containing an analysis of the potential air quality impacts associated with the proposed drilling of two wells from Platform Hidalgo into Lease OCS-P 0450. PXP (2012) has proposed to further reduce and minimize impacts to air quality by consulting with the SBCAPCD and ensuring that the proposed project provides emission offsets for the maximum allowable project emissions expected and is in full compliance with all SBCAPCD Rules and Regulations.

The impacts expected with the proposed drilling of two wells will be emissions from diesel equipment for drilling the proposed new wells, an increase of one supply boat trip per week during drilling and fugitive emissions associated with the additional production wells. Peak annual emissions are expected to occur during drilling operations and are expected to last approximately five months (Section 1.5). The emission increases projected for the Platform Hidalgo drilling project are within the Point Arguello allowable permitted emission limits and have been fully offset and mitigated per SBCAPCD rules and regulations. Thus, no new air permits will be required from SBCAPCD.

GHG emissions will result from the combustion sources on the platforms (turbines, diesel engines), combustion of diesel fuel on the crew and supply vessels and from fugitive emissions associated with the production wells. The Platform Hidalgo baseline emissions for 2011 as reported to EPA under the GHG Mandatory Reporting Regulation are 34,025 tonnes per year (tpy) of carbon dioxide equivalents (CO_2e). The projected increase from the drilling of the two wells is estimated at 9,123 tonnes with the new baseline emissions estimated to be 43,148 tpy and within the maximum permitted emissions of the facility. An additional 63 tpy is estimated from fugitive emissions with the operation of the wells which is also within the facility potential to emit. The SBCAPCD has established preliminary GHG thresholds of 10,000 metric tonnes of CO_2e per year. The GHG emissions expected from the drilling of the two wells are less than SBCAPCD GHG threshold and are considered less than significant.

Comparison to the Point Arguello 1984 EIR/EIS

Incremental air quality impacts and the potential cumulative effects expected from the proposed Point Arguello Unit were initially analyzed in the 1984 EIR/EIS. The primary impact analyzed in the 1984 EIR/EIS were nitric oxide and nitrogen dioxide (NOx) and reactive organic compound (ROC) emissions from platform operations, the Lompoc Oil and Gas Plant and support activities could contribute to violations of the O_3 standard. A comparative review was conducted of the projected drilling of two wells into the Electra Field on Lease OCS-P 0450 to the original 1984 EIR/EIS (Section 1.2). Two areas of change were identified: 1. A change in regulatory jurisdiction since 1984; and, 2. The 1984 EIR/EIS provided no evaluation of GHG emissions. A significant regulatory change from the Minerals Management Service (MMS) to the EPA and subsequently the SBCAPCD for the air quality regulation of Pacific Region OCS facilities occurred following the 1984 EIR/EIS. The second change relates to the lack of quantification and evaluation of GHG emissions in the original 1984 EIR/EIS.

Regulatory: Section 328 of the 1990 Clean Air Act Amendments (CAAA) transferred authority for air quality on the OCS to the EPA, as discussed in Section 2.1.1. On September 4, 1992, the EPA Administrator promulgated requirements (40 CFR Part 55) to control air pollution from OCS sources to attain and maintain Federal and State air quality standards and to comply with CAAA provisions for the Prevention of Significant Deterioration. The promulgated regulations require OCS sources to comply with applicable onshore air quality rules in the corresponding onshore area. This legislative change effectively transferred the regulatory air quality authority for Platform Hidalgo to the EPA/SBCAPCD from the MMS. Prior to the full transfer in 1994 to SBCAPCD to regulate OCS air emissions, the SBCAPCD was heavily involved in the 1984 EIR/EIS air quality analyses, mitigations and ultimate air permitting approved for the entire Point Arguello Project including Platform Hidalgo. As such, the Point Arguello Unit facilities are all currently permitted, controlled and in full compliance with SBCAPCD rules and regulations. Platform Hidalgo currently has a Part70/Title V permit (PTO 9105) issued by the SBCAPCD. Thus, the change in regulatory authority from the MMS to the EPA/SBCAPCD since the original 1984 Point Arguello project proposal is considered to not be a significant departure requiring a new analysis and evaluation.

Greenhouse Gases (GHG): Emissions of greenhouse gases (GHG) were not required or evaluated as part of the original Point Arguello 1984 EIR/EIS. The most recent PXP submission did provide GHG estimates and methodology for use in this review (PXP, 2012). The PXP submission presents the source of the GHG emissions to be predominately from fuel combustion in the turbines providing power generation to the platform and the crane engines. Recent regulatory revisions by the EPA (Part 70 Tailoring Rule) now require EPA Part 70 permits to quantify GHG emissions. The Platform Hidalgo PTO is currently being renewed to list the GHG emissions to be in compliance with the new EPA regulations.

Based on existing permitted fuel use for Platform Hidalgo, the maximum GHG potential to emit emissions are estimated at 69,892 tpy of CO_2e. Baseline emissions for 2011 reported under EPA's GHG Mandatory Reporting Regulation are 34,025 tonnes. The total proposed project GHG emissions are estimated at 9,123 tonnes which is below the below SBCAPCD preliminary established threshold of 10,000 tonnes. The new baseline GHG emissions are now estimated to be 43,148 tpy with the addition of the proposed project.

Table 3-5. Comparison of air quality issues between Platform Hidalgo proposed DPP Revision and Point Arguello 1984 EIR/EIS.

Impact/Issue	Platform Hidalgo DPP Project	Point Arguello 1984 EIR/EIS	Substantial Changes from Point Arguello 1984 EIR/EIS
Photochemical and Criteria Pollutants	Analyzed and currently under SBCAPCD permit (PTO 9105).	Analyzed and mitigated. Facilities permitted and in full compliance with SBCAPCD Rules and Regulations per 40 CFR part 55.	No
Regulatory	EPA/SBCAPCD maintains regulatory air quality authority for the Point Arguello Unit facilities.	The Minerals Management Service (MMS) had regulatory jurisdiction and authority for POCS oil and gas facilities.	No
Greenhouse Gases (GHG)	GHG emission estimates and methodology from activities associated with the Platform Hidalgo project and were included in the PXP DPP submission.	Not required to be quantified or analyzed.	No. GHG emissions have been quantified and assessed per EPA rules and regulations. GHG emission increases from the proposed drilling activities are below SBCAPCD preliminary established thresholds.

Cumulative Analysis: Potential sources of cumulative air quality impacts in the project area, which overlap both spatially and temporally, include emissions from on-going and proposed oil and gas activities in Federal and State waters and offshore shipping and tankering operations. 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 which exist or are pending or approved in the western Santa Barbara Channel and northern Santa Barbara County.

Federal and State oil and gas activities considered in this analysis include the drilling of new wells within existing leases from existing Pacific OCS platforms, exploration well abandonment, and future decommissioning. Future oil and gas activity's cumulative impacts regarding emissions were analyzed in the 1984 EIR/EIS for a larger regional build-out than what is presently built (Section 1.9). Currently, no proposals are anticipated for either exploration well abandonment or decommissioning of platforms during the next several years. Any drilling emission volumes greater than 25 tons per year will require a PTO from SBCAPCD and will be in accordance with Best Available Control Technology (BACT) and emission offset provisions to ensure a net air quality benefit. The existing energy-related projects considered in Federal and State waters include air emissions from Platform Irene, and the Point Arguello Unit Platforms Harvest, Hermosa, and Hidalgo. The existing platforms identified within the vicinity of the proposed project are within the jurisdiction of the SBCAPCD and have current PTOs. The emission sources from those facilities have been controlled and fully offset and are in full compliance with SBCAPCD Rules and Regulations. Thus, the additional incremental emissions

levels expected with the proposed project have been offset and are not expected to have a cumulative air quality impact with existing controlled and fully offset Federal oil and gas activities.

The other emission sources considered in this analysis are shipping and tankering operations. Emissions due to non-oil related projects were not expected to be significant in the 1984 EIR/EIS because they considered localized residential development or light industrial research and development facilities. Shipping operations in the project area were considered and analyzed as important additional source of emissions to the region in subsequent documents (MMS, 2001; 2003). The 2000 emission inventory for Santa Barbara County estimates that NO_X emissions from OCS ships and commercial boats account for approximately 40 tons per day of NO_X, or about 43 percent of the total NO_X inventory. Maritime shipping on the OCS also accounts for approximately three tons of particulate matter per day. Emissions from ocean-going marine vessels traversing the Santa Barbara Channel as of August 1, 2012 are required to comply with low sulfur fuel standards imposed both by the state of California Ocean-Going Vessel regulation and the North American Emission Control Area requirements within 24 nautical miles of the California coast. As emissions from the proposed project are within allowable permitted levels that have been fully offset per SBCAPCD Rules and Regulations, it is expected that the cumulative air quality impact of marine shipping and tankering will not change with the proposed project. The cumulative impacts for most criteria pollutants will not be markedly different than what was originally predicted and analyzed in previous document (ADL, 1984; MMS, 2001; 2003).

Cumulative impacts from GHG emissions were not considered in 1984. The U.S. GHG emissions for all energy related activities in 2004 were 6,430 million tons (5,835 teragrams (Tg)) of CO_2e and 11.3 million tons (10.3 Tg) of methane. The California GHG inventory for oil and gas extraction activities in 2004 for CO_2e was 14.5 million tons (13.2 Tg). This GHG inventory includes the current operations of Point Arguello Unit. The use of the fossil fuel produced from the proposed Platform Hidalgo drilling project would generate GHGs, but would not result in any overall change to the U.S. GHG inventory or be a significant cumulative impact to regional air quality. Further, emission increases associated with the proposed project for all criteria pollutants will be fully offset and permitted by SBCAPCD and are not expected to contribute significantly to the potential impact to regional air quality that may be expected from existing offshore oil and gas activities, marine shipping and tankering and GHG emissions.

Conclusions

Increased emissions from the proposed drilling operations at Platform Hidalgo are within allowable emission levels currently permitted by the SBCAPCD and have been fully offset in accordance with SBCAPCD Rules and Regulations. Thus, the potential for violations of the ambient air standards from the proposed Platform Hidalgo drilling project are considered to be negligible, through existing emission offset agreements and the implementation of the existing permit requirements in place for Point Arguello Unit.

Projected emission increases due to drilling operations and supply boat trips are well within the activities and emission limits previously analyzed and mitigated in the Point Arguello 1984 EIR/EIS. The cumulative impacts for most criteria pollutants will not be markedly different than what was originally analyzed in previous document.

The full air quality regulatory transfer in jurisdiction from the MMS to EPA/SBCAPCD occurred in 1994 and has resulted in fully permitted, controlled and mitigated Point Arguello facilities. In addition, information provided by PXP regarding the quantification and assessment of GHG emissions resulting from the proposed project demonstrate that proposed activities will be less than preliminary GHG thresholds established by the SBCAPCD. Thus, neither the regulatory changes in jurisdiction from MMS to EPA/SBCAPCD, nor the recent requirements to quantify the GHG emission potential of Title V permitted projects have been determined to be substantive environmental changes compared to that analyzed in the 1984 EIR/EIS.

3.1.3 Water Quality

Impacts

Drilling muds, cuttings (Table 1-3) and produced waters discharged (Table 1-2) from Platform Hidalgo could potentially affect water quality are the primary potential negative impacting agents associated with routine operations of the proposed project (Section 1.5). In the event of an accidental oil spill, a slick forms and part of the slick begins evaporating while the action of breaking waves is forming oil droplets that are dispersed into the water column. Depending on the weight of the oil spilled and the environmental conditions (i.e., wave height) at the time of a spill, the 1984 EIR/EIS estimated that six to 60 percent of oil during an oil spill would sink and affect water quality in the vicinity of the spill. An oil spill may decrease dissolved oxygen concentrations and increase turbidity in the water column.

Comparison to the Point Arguello 1984 EIR/EIS

Effects from increases in produced water, muds and cutting discharges are well within what was analyzed in the Point Arguello 1984 EIR/EIS. Produced water is currently being discharged from Platform Hidalgo at a rate of 10,000 bbl/day and the proposed project would provide a maximum 16,500 bbls/day of produced water discharges. The 1984 EIR/EIS analyzed that 18,000 bbls/day of produced water would be discharged from the platform. Thus the produced water discharges from the Electra Field proposed project along with existing produced water discharges are well within what was analyzed. Regarding drilling muds and cuttings discharges, the only change from the original document is that the two wells will be drilled later that originally proposed. Originally, it was presumed that all the wells would be drilled in the first five years (1985-1990) of the Point Arguello Field development. However, only 21 of Platform Hidalgo's 56 well slots have been drilled to date (Table 1-1). The Electra Field development proposes to drill up to two additional wells and it is anticipated that an additional six wells will be drilled with existing Point Arguello and Rocky Point production for a total of 29 wells. The total volume and spatial impact from these discharges were considered in the original document. The calculations in the Point Arguello EIR/EIS, therefore, included the amount of muds and cuttings to be discharged from the two proposed wells for the Electra Field (Table 1-3). This project is within that which was analyzed in 1984.

The 1984 EIR/EIS document stated that any spill over 1,000 barrels would likely cause Class I locally to regionally significant impacts to water quality. The conclusions for oil spill impacts to water quality are the same today for existing operations and with the addition of the Electra Field as they were in the 1984 EIR/EIS. The incremental increase in the risk of an oil spill during the life of the Electra Field project falls within what was analyzed in the 1984 EIR/EIS and therefore the discussion of impacts to water quality from a spill remains relevant.

Cumulative Analysis: Possible sources of cumulative impacts to water quality in the project area include activities occurring on existing federal platforms and nonpoint pollution from intermittent river runoff. The 1984 EIR/EIS was considering a larger regional build-out of oil and gas activities than what is presently built (Section 1.9) and considered several potentially significant cumulative impacts to water quality coming from oil and gas operations, including: the discharge of drilling fluids containing biocides or chromium; the discharge of potentially toxic inorganics in produced water (e.g.ammonia, hydrogen sulfide); the accumulation of pollutants in sediments; and oil release-related impacts. With the exception of oil releases, impacts from these sources would be restricted to the areas generally within 100-1000 meters of the point of discharge and contribute to the long-term accumulation of pollutants in sediments. Further, the cumulative effects of oil and gas development and production have been reanalyzed and updated in subsequent MMS environmental documents (1992; 1995; 1996; 2001). The risk of an oil spill during the life of the Electra Field proposed project falls within what was analyzed in the 1984 EIR/EIS and therefore the discussion of cumulative impacts to water quality from a spill remains relevant.

Routine platform operations include discharging drilling fluids and produced water. Intermittent river runoff is the only action that could overlap temporally or spatially with the water quality-associated aspects of the Electra Field Project. As discussed in Section 2.1.2, these high runoff periods are associated with winter storm conditions followed by upwelling-favorable winds which can drive the Santa Ynez and Santa Maria River plumes south past Point Conception. Thus, water quality near Platform Hidalgo could be occasionally affected by these river plumes. However, the greatest dilution and dispersion of any pollutants also occurs during the only time the plumes would reach the vicinity of the Point Arguello Unit, that is, during times of high flow. Thus, pollutants carried by the plume would have little effect and be well diluted, probably to background; by the time any of the plumes reaches the project area. No additive effect with routine discharges would occur.

The cumulative impacts from to regional water quality are not different than what was originally predicted and analyzed in 1984 and subsequent documents (ADL, 1984; MMS, 2001). Cumulative impacts to water quality are not expected from the proposed project when added to other activities in the area.

Conclusions

Impacts from the proposed project will not exceed those that were analyzed in prior environmental documents. Therefore, BOEM believes that the proposed project falls well within the level of impacts considered in the 1984 EIR/EIS for routine and accidental operations and for oil spill impacts to water quality.

3.2 Biological Resources

3.2.1 Intertidal Communities

Impacts

The only impacting factor associated with the proposed project that could impact intertidal communities and shoreline habitats is an accidental oil spill that would be of sufficient size, trajectory and duration to reach the shoreline. The mainland shoreline in the project area is periodically exposed to natural oil seepage and the patchy occurrence of tar-balls from a small accidental spill is unlikely to cause any measurable impact above normal variability in these

areas. However, spills reaching the shore typically are heavily oiled where initial contact is made and surrounding sections are moderately or lightly oiled. If the oil landed in sufficient quantities in tide pools or was stranded in wetlands, impacts from oil could result in mortality and/or sub-lethal changes affecting reproduction, recruitment, or settling for most organisms. Marine birds and marine mammals may also use these habitats and be affected by a spill. These species are discussed in more detail below.

The primary concern would be direct contact with long-lived animals such as sea stars, limpets, abalone, and important communities such as algal assemblages and mussel beds. Mortality of a few black abalones at a location may represent the entire local population. Because spawning is local however, a local impact would not affect the recovery of larger populations present on the Channel Islands and north into Monterey County. In the case of the 1997 Torch pipeline oil spill, at least 163 bbls of oil was spilled 2 miles offshore Surf Beach affecting 17 miles of coastline (Torch Trustee Council, 2007). Statistical analyses performed on four common rocky intertidal species found that no significant changes in species abundance occurred which could be attributed to the Torch spill (Raimondi, 1999). This analysis was not done for the black abalone due to the species' population decline, since such declines tend to overwhelm the data (Raimondi, 1999). At one oiled site, sticky globs of tar were seen on sea stars and covering the respiratory pores of some abalone (Raimondi, 1999). Based on this visual observation, it is believed that some abalone mortality occurred at Point Arguello as a result of the spill. Recovery times for rocky intertidal areas damaged by oil and cleanup vary according to the species present and the intertidal zone that are impacted. Mussel bed assemblages may require up to 10 years for full recovery (Lees et al., 1999; Conway-Cranos et al., 2006).

The impact from oil spills on a sandy beach community depends on the residence time of oil in the area. Oil on a highly depositional beach may be buried quickly, making cleanup difficult and exposure to oil longer. Exposed beaches, on the other hand, may be cleaned quickly by the natural removal and cleansing of sand through wave action. Mortalities have been documented for invertebrates such as bean clams (Gorbics et al., 2000) and sand crabs from two oil spills in southern California. In oiled sections of beach the beach, common sand crabs quickly uptake the toxic components in the oil (Gorbics et al., 2000; Torch/Platform Irene Trustee Council, 2007). This can cause a food chain impact for foraging birds and other animals lasting several months, until the oiled crabs have been replaced with uncontaminated animals. Impacts from an oil spill on a sandy beach can often be compounded by impacts from the cleanup operation itself. The use of heavy machinery to collect soiled sand, for example, can crush intertidal animals such as clams and crabs. Wrack removal is a common practice used as a preventative measure to reduce re-oiling of the sand. However, this practice may also cause wrack to be removed unnecessarily and lengthen or cause impacts to lightly oiled beaches (Dugan et al., 2003).

It is unlikely that an offshore 200 bbls spill could result in volumes of oil on the shoreline sufficient to cause measurable impacts inside a wetland. Most river and creek mouths are naturally closed and open intermittently during the rainy season with an outward flow. The wetland that would most likely be contacted by a spill, should one occur, would be the Santa Ynez River. The 1997 Torch pipeline oil spill released 163 bbls of oil and landfall of the spill centered one mile (0.6 km) north of the Santa Ynez River. A very small amount of oil crossed the berm on a high tide but was not detected until the next day and no impacts to the River were found (MMS, 2001). If an oil spill occurred, oil spill response personnel would boom estuary mouths to prevent oil from entering these sensitive areas. Populations of tidewater gobies are

restricted to shallow and enclosed marsh or lagoon systems where oil can become entrapped if contaminated by oil. Since tidewater gobies are generally also restricted to low-salinity water, few avoidance opportunities are available to this species. Cleanup of fragile marsh habitats may also cause impacts to this species and the habitat in general for several years.

Comparison to the Point Arguello 1984 EIR/EIS

The 1984 EIR/EIS designated rocky headlands and shelves as an area of special significance. Because of their relative rarity and scientific and educational value, rocky intertidal areas were designated as Environmentally Sensitive Habitat Areas by the Santa Barbara County Local Coastal Plan. In an oil spill of greater than 1000 bbls, the 1984 EIR/EIS predicted that this resource would be significantly impacted locally due to smothering and cellular toxicity. Offshore oil spills reaching wetland or sandy beach environments were not specifically addressed in the summary of the 1984 EIR/EIS, however, protection and recognition of wetland areas was well established in the 1984 EIR/EIS and have not substantially changed since that time. The 1984 EIR/EIS recognized that, should a spill occur from a pipeline section onshore, it could also impact wetlands. The pipeline comes to shore near Point Conception and crosses several small creeks. The impacts to wetlands from an onshore spill are discussed in detail in the original 1984 EIR/EIS as regionally and locally significant. The conclusions for oil spill impacts to shoreline areas, as described above, are the same today for existing operations and with the addition of the proposed project as they were in the 1984 EIR/EIS.

Cumulative Analysis: Possible sources of cumulative impacts to intertidal communities in the project area include the risk of an accidental oil spill from existing federal platforms and increasing natural and human pressures on select species. The 1984 EIR/EIS designated rocky shore resource as having the greatest vulnerability from cumulative development of oil in the project area because of the susceptibility and impact from oil spills that make landfall. The cumulative likelihood of spill landfalls around San Miguel, Santa Rosa and Santa Cruz Islands could also increase with levels and locations of development and vessel traffic. There have been changes to rocky headland and shelf intertidal communities since the 1984 EIR/EIS document was written. Most notably is decline of the black abalone (*Haliotis cracherodii*) and subsequent listing as a Federally Endangered Species. Also in this time frame, there have been changes in other conspicuous populations, which may have indirect effects on other species and ecosystem functions. Declines to intertidal sea star populations (*Pisaster ochraceus,* Leighton et al, 1991), the number of species present in mussel beds (Smith, 2006), and the size of owl limpets (Sagarin et al., 2007) have been correlated with disease, trampling and poaching. These changes could exasperate population level effects or decrease chances of successful recovery if impacted from an oil spill.

Conclusions

More is understood about the cumulative threats facing rocky intertidal communities today. Although this knowledge base has increased, the BOEM's understanding about how an oil spill may affect coastal biological resources remains substantially unchanged since 1984. Impacts from the proposed project will not exceed those that were analyzed in prior environmental documents. Therefore, BOEM continues to conclude that, compared to the analysis conducted in the 1984 EIR/EIS, the effects of an oil spill that contacts land will continue to have a significant impact on coastal biological resources.

3.2.2 Benthic Communities

Impacts

Discharges from drilling two wells are the primary potential negative impacting source associated with routine operations of the proposed project to the seafloor. Drilling muds and cuttings discharged from OCS oil and gas facilities could potentially affect invertebrate and fish species directly through exposure in the water to toxic substances, burial, changes to the substrate or exposure to increased water turbidity and elevated metals or chemicals in the water column. Invertebrate communities could affect fish species indirectly though ingestion of prey that have bioaccumulated toxins from the discharges. Fishes are discussed more specifically Section 3.2.3. Increased produced water discharges from the proposed project and an accidental oil spill also could potentially affect benthic communities. The produced water discharge outfall at Platform Hidalgo is over 200 feet (Table 1-2) from the seafloor and not anticipated to reach benthic communities, due primarily to the temperature of the discharge which provides buoyancy and prevents any pollutants from reaching the seafloor. In the event of an accidental oil spill, due to the heavy nature of Electra Field oil (Section 3.1.1), it is likely some will sink to the seafloor in patches and could affect animals in the same manner as described for drilling discharges.

Organisms can be buried by muds and cuttings that are discharged during drilling operations (Battelle, 1991). The heavier rock cuttings are usually transported less than 600 feet (de Margerie, 1989) and decreases in species abundances occur within approximately 300 feet (Jones et al., 2007) beyond the discharge point. Approximately 80 to 90 percent of the particulates are removed by these near-field depositional processes (Neff, 2005). Lightweight drilling mud floccules formed from the remaining suspended particulates can be carried over four miles from the platform before being deposited on the seafloor (Coats, 1994). These depositions can change a soft substrate habitat by increasing organic content, sand percentage and grain size (Peterson et al., 1996). Depositions can also increase water turbidity (Battelle, 1991) and clog feeding structures of some filter feeding organisms. The accumulation of mud and cuttings on the bottom may contain higher concentrations of several metals, particularly inert barium (from drilling mud barite) and sometimes petroleum hydrocarbons, than nearby uncontaminated sediments (Neff, 2005). Thin layers of water-based drilling muds have caused lethal and sublethal effects on infaunal organisms in laboratory studies and were likely caused from the size of cuttings particles (Schaanning et al., 2008) and organic compounds initiating eutrophication (Trannum, 2009)

Thirty-nine development wells were drilled from the Point Arguello Unit Platforms between 1986 and 1989 (Table 1-3). The trajectory computations revealed a general transport of drilling fluid plumes toward the northwest; hence, high particulate flux was observed at Platform Hidalgo. Prevailing currents alone transported the majority of drilling fluids to the northwest of Platform Hidalgo as supported by sediment-trap observations (Coats, 1994). The impacts to hard substrate invertebrates from water-based drilling muds and cuttings discharges were studied in detail during the comprehensive California Monitoring Program (CaMP) from 1986 to 1995. Equal numbers of positive and negative effects were indicated for dominant taxa, and there was no consistent pattern of response for a single taxon over the three habitat types analyzed (deep high and low relief, and shallow low relief). Negative impacts occurred to some hard substrate species within approximately 0.6 miles (1 km) of the discharge source (Diener and Lissner, 1995). Mud depositions traveled 3.7 miles (Battelle, 1991) away from the platform but were minor compared to natural sediment fluctuations in the region (SAIC and MEC, 1995). Sediment

sampling found no elevated concentrations of toxic metals during drilling (Battelle, 1991). Bioassay results were variable but overall suggest that discharges may affect the viability of some hard substrate organisms near to the platform (SAIC and MEC, 1995). The CaMP researchers concluded that any minor biological effects due to the drilling muds were related to physical effects of the increased particle loading and not from chemical toxicity (Battelle, 1991).

Comparison to the Point Arguello 1984 EIR/EIS

Potential oil spill impacts to the seafloor from sinking oil were described in the 1984 EIR/EIS estimating up to 60 percent of the volume could sink. The small and temporary increased risk of an oil spill from the producing the Electra Field is within the scope and context of what was discussed in 1984.

A change from the original document is that the drilling muds and cuttings from the two wells will occur much later than originally proposed. Originally, it was presumed that all the wells would be drilled in the first five years (1985-1990) of the Point Arguello Field. However, only 21 of Platform Hidalgo's 56 well slots have been drilled to date (Table 1-1). The Electra Field development proposed to drill up to two additional wells and it is anticipated that an additional six wells will be drilled into the existing Point Arguello Field and Rocky Point Field for a total of 29 wells. The total volume and spatial impact from these discharges were considered in the original document. The calculations in the Point Arguello 1984 EIR/EIS, therefore, encompass the amount of muds and cuttings to be discharged from the two proposed wells for the Electra Field (Table 1-3), thus, this project is within the scope of the 1984 analysis.

The white abalone (*Haliotis sorenseni*) is the only subtidal species of abalone that is listed as endangered under the ESA (NMFS, 2008). In May 2001, the white abalone became the first marine invertebrate to receive federal protection under the ESA. White abalone is primarily found in water depths greater than 75 feet south of Point Conception and is unlikely to be found within the Point Arguello Unit area.

Cumulative Analysis: Possible sources of cumulative impacts are those that can affect benthic communities 100-1000 meters of Platform Hidalgo. Possible sources examined in previous documents (MMS 2001, MMS 2003) include ongoing and proposed oil and gas activities in Federal and State waters and commercial fishing. The CaMP study described above, monitored cumulative impacts on benthic communities from drilling at all three Point Arguello Platforms over a 10-year period and found no significant impacts (SAIC and MEC, 1995). These results combined impacts on the benthic communities from ongoing commercial fishing activities along with ongoing drilling activities. Commercial fishing has only declined since this time point and there has been no new evidence to contradict MMS's prior conclusion that no significant cumulative impacts to benthic resources are expected.

Conclusions

Overall, the knowledge base has increased from the results of CaMP studies for discharges reaching the sediments from Platform Hidalgo. There is no clear evidence of adverse impacts to hard substrate epibiota as a result of past discharges of drilling mud and drill cuttings. Impacts from the proposed project are not expected to occur, particularly as the total quantities to be discharged are substantially smaller than the historic discharge amounts as well as those analyzed in the 1984 EIR/EIS. Therefore, BOEM believes that effects to benthic habitat by the

proposed project are well within the level of impact that was considered in the original 1984 EIR/EIS.

3.2.3 Fishes and Essential Fish Habitat

Impacts

Effluent discharges are the primary potential negative impacting source associated with routine operations of the proposed project. Drilling muds, cuttings and produced waters discharged from OCS oil and gas facilities could potentially affect fish species directly through exposure in the water to toxic substances, or indirectly though ingestion of prey that have bioaccumulated toxins from the discharges.

The EPA's biological assessment for the proposed re-issuance of its General NPDES Permit for offshore OCS facilities in southern California waters concludes that direct toxicity to listed fish species, 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. Significant impacts from routine OCS discharges generally have not been associated with fish. In the past, a local mariculture operation collected and sold mussels collected from offshore oil and gas production platform legs to local restaurants for over a decade. Various toxin levels have been measured in platform mussels because tons of these organisms were harvested and sold to southern California restaurants for human consumption. A State health official has stated that mussels residing on platforms in the Southern California Bight have "probably the highest quality of shellfish meat sold in California and maybe the entire country" (Haldane, 1994).

SAIC (2000a) concluded that the continued discharge from the platforms offshore California will not adversely affect fish resources outside the mixing zones described as a 330 feet (100 meters) radius from the discharge point. Within the 330 feet (100 meters) radius mixing zone, discharges from oil and gas exploration, development, and production may have localized effects on water quality and resident marine organisms, including fish (SAIC, 2000c). These effects could include decreased growth and reproductive success. These sublethal effects are symptomatic of stress and may be transient and only slightly debilitating. Given the life history and behavioral patterns of southern steelhead, tidewater goby and green sturgeon, it is unlikely that any fish species listed under the Endangered Species Act would ever encounter full-strength discharges from the proposed project. Therefore, the proposed project will have an incremental, if any, increase in potential impacts from discharges to fishes and Essential Fish Habitat (EFH), and the overall impact will not be markedly different than what was originally predicted and analyzed in the 1984 EIR/EIS (ADL, 1984).

There is a potential risk of an oil spill associated with the proposed project. The impacts of a large open ocean oil spill on fish resources have been described in several studies (GESAMP, 1993; Gorbics et al., 2000; NRC, 1985; Rice et al., 1996; SEEEC, 1998). The results indicate that even with large oil spills, such as the 540,000 bbls *Sea Empress* tanker spill, direct mortality to fishes is minimal. Although many factors contribute to the overall impacts realized from an at-sea oil spill, fishes are generally not adversely impacted at the population level. Given the high energy and high productivity environment of the project region, the characteristic meteorological and oceanographic conditions, and the oil spill preparedness and response capabilities in place, direct measurable effects to fishes and EFH from an oil spill in the project area are unlikely. Any direct mortality to fishes would probably occur over a short time period and only in the egg and

larval stages found in the surface waters in the immediate vicinity of the spill. The greatest impacts could occur when oil contacts the coast or shallow, low energy embayments. In this environment, hydrocarbons can become sequestered in the sediments and persist for years (Dauvin, 1998; Dean and Jewett, 2001). Invertebrates, which are fed upon by fish, can bioaccumulate aliphatic hydrocarbons from the environment. This results in stress and decreased growth of fish that feed on `the contaminated invertebrates and can also cause poor spawning and hatching success of the fish that use this environment. Gorbics et al. (2000) reported that overall mortality of bean clams as a result of the *American Trader* spill (~10,000 bbls of crude oil) in February 1990 was estimated to be 24 percent. Sand crabs showed an increase in the body burden of aliphatic hydrocarbons until June 1990. It can be assumed that the oil from the *American Trader* that stranded along 14 miles (22 km) of coastline near Huntington Beach resulted in a significant increase in the mortality of intertidal invertebrates (Gorbics et al., 2000). After the September 1997, 163 bbls Torch pipeline spill, analysis of sand crab tissues collected from spill-impacted beaches before and after the spill revealed that hydrocarbon levels in the crabs were 7 to 11 times higher after the spill (Torch/Platform Irene Trustee Council, 2007). Bean clams and sand crabs are eaten by a number of nearshore fish species (Love, 1996). Though fish can metabolize hydrocarbons they accumulate, this process requires energy and may lead to an increased vulnerability to disease and decreased growth or reproductive success (NRC, 1985). Since sand crabs were contaminated after the oil spill, one can also assume that other invertebrates such as mysids, amphipods, and polychaetes were also affected.

An accidental oil spill occurring as a result of the proposed project could cause short-term impacts to fishes in the project area if the oil contacted shore. Depending on the oceanographic conditions at the time of the spill, oiling of parts of the intertidal zone along the mainland coast or the northern Channel Islands could occur. Under normal conditions for the area, significant mixing and weathering of the oil would evaporate much of the toxic light-end hydrocarbons into the atmosphere, disperse the oil into the water column, and likely break the slick into smaller patches before the oil reached land. The weathered tar balls would likely cause some mortality to intertidal macrophytes and invertebrates through smothering. Elevated hydrocarbon levels in nearshore invertebrates would be likely, leading to increased stress and potential decreases in growth and reproduction in fish feeding upon the invertebrates. Since fish have the ability to metabolize hydrocarbons (Lee et al., 1972; NRC 1985), these effects are expected to be short-term. The proposed project will generate a small increase in risk of an oil spill, which in turn may affect fishes and EFH, but the overall impact will not be markedly different than what was originally predicted and analyzed in 1984 (ADL, 1984).

Comparison to the Point Arguello 1984 EIR/EIS

A number of regulatory changes have occurred since 1984 that pertain to the fish management and the offshore oil and gas industry. In 1996, the Magnuson-Stevens Fishery Conservation and Management Act (MSA; 16 U.S.C. 1801 et seq.) was amended by the Sustainable Fisheries Act on October 11, 1996, to require consultation on EFH for Federally managed species. In 1997, the southern steelhead was listed as an endangered species in southern California and threatened in south-central California and critical habitat for the species was designated in 2005. In addition, the tidewater goby was listed as threatened in 2001. Both species could be located in areas potentially affected by the project. In 2006, the southern distinct population segment of the North American green sturgeon was listed as threatened and its critical habitat was designated in 2009. This species is uncommon in the project area, and the green sturgeon critical habitat lies far north

of the project area. An additional regulatory change that has occurred since 1984 is the establishment of a network of marine protected areas (MPAs) in central and southern California waters that excludes most forms of fishing (Section 2.2.7). MPAs are considered to be an insurance factor against the negative ecological consequences of catastrophic events, including oil spills (Allison et al., 2003), and may increase the ability of species to recover from localized anthropological impacts.

Changes that have occurred since 1984 include extensive research on fishes and fish habitats within the region, which provides a better index of pre-impact conditions. Improvements in oceanographic information and modeling now allow analysts to increase their precision and accuracy in identifying areas within the region where oil would likely disperse in the event of an accident, and also to improve estimates of coastline vulnerability. Worldwide, research on oil and oil dispersant toxicity and post-spill impact assessments have increased our knowledge of ecological consequences that may be expected from a disastrous oil spill. Better information exists on understanding potential impacts on fishes and their habitats regarding produced water, drill cuttings, noise and artificial reefs.

Cumulative Analysis: Possible sources of cumulative impacts specific to fish resources and EFH are those that degrade water quality and contribute to the overall impact of effluent discharges from routine operations, and activities which increase the risk of accidental oil spills. Sources of cumulative impacts include on-going and proposed oil and gas activities in Federal and State waters, offshore tankering operations, and point and non-point sources of ocean discharges. The cumulative impacts from all these activities will not be markedly different than what was originally predicted and analyzed in 1984 (ADL, 1984).

Conclusions

Overall, the knowledge base of the marine environment in the project area has increased, but the understanding about how effluents and oil spills may affect fishes and essential fish habitat has not altered the applicability of conclusions about potential marine biology impacts from development activities outlined in the original environmental review (ADL, 1984). Impacts from the proposed project will not exceed those that were analyzed in prior environmental documents, and are covered under existing permits. Therefore, BOEM believes that effects to fishes by the proposed project are well within the level of impact that was considered in the original 1984 EIR/EIS.

3.2.4 Marine Dependent Birds

Impacts

Oil Spills: The effects of oil on seabirds have been extensively reviewed (e.g., Bourne, 1976; Fry, 1987; Leighton, 1995; Burger and Fry, 1983). Because of the migratory nature of many bird species in the region, the significance of any impacts from a spill will depend on the habitats affected, the time of year, species present and the numbers of birds in the area at the time of the spill.

The immediate danger of oil to most birds is to clog or mat the fine structure of the feathers that are responsible for maintaining water repellency and heat insulation. Oiled birds are subject to hypothermia, loss of buoyancy, impaired ability to fly and reduction in foraging ability. In addition to coating by oil, birds are also subject to chronic, long-term effects from oil that remains in the environment (Alonso-Alvarez and Ferrer, 2001; Laffon et al., 2006). Small

amounts of oil on a bird's plumage that were transferred to eggs during incubation have been shown to kill developing embryos (Albers, 1978; Szaro et al., 1978). Birds can also accumulate oil in the diet and through preening. Holmes and Cronshaw (1977) and Brown (1982) have reviewed physiological stresses that can result from ingestion. An oil spill that affects important bird habitats (e.g., coastal marshes, intertidal foraging areas), even during periods of low use, may pose long-lasting problems. Birds have been observed to leave an area that has been affected by a spill (Hope et al., 1978; Chapman, 1981; Albers, 1984). Albers (1984) suggests that such movements would cause severe impacts during the breeding season.

The endangered California Least Tern and the threatened Western Snowy Plover are both present in the project area and may suffer mortality in the event of an oil spill. The California Least Tern is highly susceptible to oiling because its feeding behavior includes skimming over the ocean surface for prey and occasional diving.

Should an oil spill reach the tern's coastal habitats, significant mortality could occur. This would also be true for the Western Snowy Plover which forages along shoreline habitats. Both the Western Snowy Plover and the California Least Tern would also be adversely affected if cleanup activities were to occur on nesting or wintering beaches. These subspecies nest in the coastal dunes in northern Santa Barbara County in areas that have been identified by OSRA modeling as locations where the shoreline may be impacted by oil spills from the proposed project. The threatened Marbled Murrelet is also exceedingly vulnerable to oil spills due to it's predominately at-sea existence. However, given the low numbers of Marbled Murrelets observed to occur within the project area and the seasonal nature of their occurrence, Marbled Murrelets would not be expected to suffer significant mortality due to a spill from the proposed project.

Another species that forages in nearshore waters that would be highly susceptible to oil ingestion and fouling in the event of an oil spill from the proposed project is the California Brown Pelican. Although no longer listed as an endangered species, the California Brown Pelican is protected under the MBTA. Effects of oil contamination on the U.S. breeding population of California Brown Pelicans could be significant as this species is sensitive to disturbance, breeding success is highly variable, and the U.S. breeding population is centered at the Channel Islands. Similarly, Scripps's and Guadalupe Murrelets, Cassin's Auklets, and Ashy Storm-Petrels would all likewise be expected to suffer substantial impacts in the event of a spill reaching the Channel Islands. Not only would direct impacts from an oil spill result in mortality to these birds, but cleanup and rehabilitation efforts could be complicated due to the cryptic (e.g., nocturnal, pelagic) nature of these species and the complications inherent in accessing the islands where they nest.

Artificial Lighting: The use of bright lights at the oil platforms or on vessels traveling to the platforms may also negatively impact seabird species. Specifically, artificial lighting can result in disruption of the normal breeding and foraging activities of nocturnal seabirds (e.g., certain species of alcids, storm-petrels and shearwaters) (Burkett et al., 2003; Wolf, 2007) and increase the risk to seabirds from predation and injury and/or mortality from collisions, entanglement and exhaustion.

The attraction to light by some nocturnal feeding seabirds is thought to result from their exploitation of vertically migrating bioluminescent prey and from a predilection to orient to star patterns (Montevecchi, 2006). Regardless of its cause, however, seabirds have been known to circle oil platforms and flares and to fly directly into lights (Wiese et al., 2001, Burkett et al.,

2003). Continuous circling within the illumination of, or around bright, artificial lights by birds is known as light entrapment.

The holding or trapping effect of bright, artificial lighting can deplete the energy reserves of migrating birds, resulting in diminished survival and reproduction. For example, light entrapment may delay migrating birds from reaching breeding or foraging grounds, or leave them too weak to forage or escape predation. Seabirds have been observed to continuously circle platforms until exhausted, whereupon they fall to the ocean or land on the platforms (Montevecchi, 2006; Wolf, 2007). Similarly, light entrapment may negatively affect breeding seabirds by increasing their time away from their nests, leaving the nests vulnerable to predation for longer periods of time, as well as causing parent chick separation of at-sea birds. In addition, time and energy spent circling lights may impede a bird's ability to successfully forage for enough food to feed their young.

Although lights associated with the offshore oil platforms off southern California do appear to attract seabirds, it is not known whether or to what extent such attraction disrupts migration or foraging behavior. Specifically, although the Point Arguello Platforms have been operating for over 20 years, there has been no indication that platform lighting has significantly affected any seabird species. However, during CDFG's 2007 review of a proposal for renewed drilling from nearby Platform Irene, they determined that "...there is potential for impacts to (Scripps's and Guadalupe) Murrelets". In light of this potential, PXP (2012) has described the following measures to be taken when murrelets are present in the area to minimize the potential impacts to these species and gather documentation of lighting impacts, if any. These measures include:

1. Minimization of use and wattage of night lighting to the extent feasible while not compromising safety, spill detection capabilities, or platform operations;
2. Shielding of lights, covering of filaments, and directing lighting downward as much as feasible;
3. Requiring that all vessels associated with the platform also comply with low wattage / shielding / filament-covering measures; and
4. Developing a comprehensive monitoring program for the waters around the platform that includes Scripps's and Guadalupe Murrelets, the Ashy Storm-Petrel and Cassin's Auklet.

Artificial night lighting on Platform Hidalgo could potentially have an adverse effect on individual sea birds and potentially on populations of several sensitive bird species. Specifically the State-threatened Scripps's Murrelet, the Guadalupe Murrelet, Cassin's auklet, and the Ashy Storm-Petrel, a Federal Bird of Conservation Concern and California Species of Special Concern could be impacted by night lighting associated with the proposed project. These species are all known to occur in the vicinity of Platform Hidalgo during both the breeding and non-breeding seasons, and are nocturnal foragers known to be attracted to artificial lighting. Scripps's Murrelets and Ashy Storm-Petrels primarily nest on the northern Channel Islands, and are found within the project area waters year-round. Although Guadalupe Murrelets breed primarily on Guadalupe and San Benito Islands off the Pacific coast of Baja California, they frequent the project area waters during their post-breeding dispersal. Cassin's Auklets have a larger global population and are more widespread, but also have a substantial presence in the project area.

Because the proposed increase in lighting associated with the project is only one-eighth the total wattage that currently exists on the platform, and would only occur during drilling operations,

application of the above measures would minimize the potential for impacts to sensitive seabird species.

Comparison to the Point Arguello 1984 EIR/EIS

The 1984 EIR/EIS stated that oil spills could result in a potentially serious impact to seabirds. Potential impacts described in the document included direct contact with oil and fouling of feathers, sub lethal and lethal toxic effects, ingestion through preening, transfer of oil from adults to chicks and eggs, habitat elimination, and loss of food resources. In addition, the Rocky Point EA (MMS, 2003) also identified disturbance from cleanup efforts to remove spilled oil as a possible effect to birds. Bird mortality during a spill would vary; however, thousands were expected to be killed in a large spill. Bird species listed as endangered were considered in a separate biological opinion prepared by the Fish and Wildlife Service (FWS). Mortality and disturbance of seabirds due to an unlikely major oil spill and cleanup activities was considered locally to regionally significant.

The most significant change since the 1984 EIS is the change in status and distribution of some of the Federally-listed bird species in the vicinity of the proposed project. Oil spills continue to be a significant threat to seabirds worldwide. Several species of birds that could be affected by an oil spill from the Point Arguello Unit have been listed as threatened since 1984 (Western Snowy Plover and Marbled Murrelet), are now known to rarely occur within the area (Short-tailed Albatross and Hawaiian Petrel), or are now considered species of conservation concern (Ashy Storm-Petrel, Scripps's Murrelet and Guadalupe Murrelet).

Our understanding about how an oil spill may affect seabirds is substantially unchanged since 1984. We continue to conclude that the effects of an accidental oil spill on seabirds may be significant.

Cumulative Analysis: Cumulative impacts related to ongoing offshore oil and gas activities that may have long-term effects on marine birds are oil spills, operations-generated noise and night lighting. These impacts have occurred or may occur from existing federal and state projects.

The 1984 EIR/EIS designated this resource as having the greatest effect from cumulative development of oil in the project area because of their susceptibility and impact from oil spills on the sea surface and those that make landfall. The cumulative likelihood of oil landfalls around important seabird breeding areas at San Miguel, Santa Rosa and Santa Cruz Islands could also increase with levels and locations of development and vessel traffic. Seabirds that breed on the Channel Islands and forage close to the breeding sites continue to be at risk of long-term population impacts from a catastrophic oil spill. Breeding seabirds that are primarily restricted to the Channel Islands (California Brown Pelican, Ashy Storm-Petrel, Scripps's Murrelet and Cassin's Auklet) have been identified as being at risk of nest site abandonment or long-term reduction in their breeding populations as the result of a single oil spill event or repeated episodes. Mainland breeding colonies of seabirds at Point Conception, Rocky Point and Point Arguello, and California Least Tern breeding colonies and nesting Western Snowy Plovers between Purisima Point and Point Arguello, have been identified as possibly sustaining heavy mortality and high local losses as a result of a catastrophic spill.

Another possible cumulative effect that was discussed in the 1984 EIR/EIS was the potential for chemical contamination of seabird food supplies by discharges of produced waters, desalination brine, wastewater, and drilling muds as a result of intense exploration and development in the

area. Area-wide discharges on the scale proposed could lead to eventual bioaccumulation of toxicants in seabird food sources and ultimately, seabird tissue. Stress induced by metabolic malfunctions could result in decreased reproductive success and changes in the abundances and types of seabirds in the general region depending on the bioavailability of these pollutants. Such effects were observed for pelicans and cormorants contaminated with pesticide residues from wastewater outfalls in the early 1970s. Current research and observations have not found evidence of these population-level effects from regulated oil and gas discharges in the project area.

The platforms off southern California are far enough from marine bird nesting areas that attenuated noise should not reach levels that could disturb nesting activities. If noise near the platforms reached excessive levels, birds will likely avoid the area and are not likely to suffer harm as a result. While there is a potential for artificial lighting effects as a result of the proposed project, as discussed above the project-specific precautions PXP proposed should ensure that the project does not result in an increase to cumulative impacts.

Because of the temporary and relatively minor nature of drilling two wells from Platform Hidalgo, noise and lighting effects on marine birds are not considered significant new cumulative impacts. The cumulative impacts from current activities will not be markedly different than what was originally predicted and analyzed in 1984 (ADL, 1984).

Conclusions

Overall the knowledge base has increased, but the understanding about how an oil spill may affect marine and coastal birds remains substantially unchanged since 1984. BOEM continues to conclude that the effects of an oil spill on marine dependent-birds may be significant. Impacts from the proposed project will not exceed those that were analyzed in prior environmental documents. Therefore, BOEM believes that effects to marine birds by the proposed project are well within the level of impacts that was considered in the original 1984 EIR/EIS.

3.2.5 Marine Mammals

Impacts

PXP's environmental evaluation (PXP, 2012) considered the potential impacts of oil spills and noise on marine mammals. Temporary increases in vessel traffic and lighting were considered in PXP's screening analysis but adverse effects to marine mammals related to these elements are not likely based on our experience with existing operations.

Effects of Oil: Marine mammals that could be affected by oil spills in the project area include cetaceans, pinnipeds and sea otters. Marine mammals have varying sensitivities to oil contamination depending on their mode of thermoregulation, activity patterns and food items (Geraci and St. Aubin, 1990). Marine mammals unable to avoid contact with oil could suffer from fouling, inhalation or ingestion. Indirect impacts of oil include contamination of food items or reduction of habitat. Detailed reviews of the effects of oil on marine mammals have been provided by Geraci and St. Aubin (1982; 1985; 1990), Englehardt (1983) and the NRC (1985).

Oil spill impacts to sea otters are well documented (Costa and Kooyman, 1982; Siniff, 1982; Davis et al. 1988). After exposure to oil, death usually results from either an increase in metabolic rate or inhalation of volatile vapors (Geraci and Williams, 1990).

Although laboratory studies indicate that oil is highly toxic to pinnipeds resulting in death, large scale mortality has seldom been observed after an oil spill (St. Aubin, 1990). Investigators such as Davis and Anderson (1976) and LeBoeuf (1971) found no difference in the growth and mortality of oiled and unoiled seal pups following exposure to oil. Also, marine mammal deaths could not be linked to the 1969 Santa Barbara Oil Spill (Brownell, 1971; Geraci and Smith, 1977).

It is unlikely that spilled oil will substantially impact cetaceans. Some observations and studies suggest that cetaceans may detect and avoid surfacing in oil slicks or change their respiratory pattern and stay submerged when traveling through oil slicks (Geraci and St. Aubin, 1982).

However, contact with oil can result in fouling of the baleen, toxicity from ingestion, respiratory difficulties, and irritation of the eyes, skin and mucous membranes. Oil does not tend to adhere to and foul cetacean skin as it does with the pelage of sea otters and seals. Studies indicate that the levels of oil fouling by skin contact and ingestion would not reach toxic levels and irritation would likely be temporary (Geraci and St. Aubin, 1982).

Effects of Noise: The literature indicates that while marine mammals hear man-made noises and sounds generated by vessels, there is no indication that they are affected deleteriously by the noise (Richardson et. al., 1995). Because vessel sounds generated from this project are highly localized and short-term in nature, adverse impacts to marine mammals from noise are not expected.

Richardson et al. (1995) cite only a single source of information on the levels of noise produced by platform-based drilling activities. Gales (1982) recorded noise produced by one drilling and three drilling and production platforms offshore California. The noise produced was so weak that they were nearly undetectable even alongside the platform in sea states of Beaufort 3 or better.

Comparison to the Point Arguello 1984 EIR/EIS

When comparing current and past environmental reviews, the types of marine mammals within the vicinity of Platform Hidalgo have not changed since the Point Arguello EIR/ EIS was finalized in 1984 but the population status and distribution has changed for a number of species. Elephant seals have increased in number and a haul out area has been established near Point Conception; the northern fur seal population at San Miguel Island is now designated and managed as a separate stock; blue and humpback whales now congregate in larger numbers (100+) every summer in the Santa Barbara Channel; the southern sea otter population has increased in number and extended its range southward beyond Point Conception; and, the gray whale population has increased to the point that it was removed from the endangered species list in 1994.

Cumulative Analysis: Possible sources of cumulative impacts specific to marine mammal resources are activities which increase the risk of accidental oil spills. Sources of cumulative impacts include on-going and proposed oil and gas activities in Federal and State waters and offshore tankering operations. The cumulative impacts from all these activities will not be markedly different than what was originally predicted and analyzed in 1984 and subsequent documents (ADL, 1984; MMS, 2001; 2003).

Conclusions

The understanding of how an oil spill may affect marine mammals is substantially unchanged since 1984. Impacts from the proposed project to marine mammals will not exceed those that

were analyzed in prior environmental documents. BOEM continues to conclude that mortality and disturbance of marine mammals that may result from an unlikely major oil spill and cleanup activities would be a regionally significant impact that could not be totally mitigated. We also continue to conclude that small oil spills continue to be likely and may have adverse but not significant impact to marine mammals.

Similarly, the potential for noise related impacts to marine mammals was discussed in the 1984 EIR/EIS. Considering the latest information available, we have come to the same conclusion reached in 1984, offshore oil and gas drilling, production, and support activities that produce noise may have an adverse but not significant impact to marine mammals.

Therefore, overall, when compared to the impacts to marine mammals analyzed in the 1984 EIR/EIS, the effects from the proposed project are well within those previously analyzed.

3.2.6 Marine Turtles

Impacts

PXP's environmental evaluation (PXP, 2012) considered the potential impacts of effluent discharges and oil spills on sea turtles. Temporary increases in vessel traffic and lighting were also considered in PXP's screening analysis but adverse effects to sea turtles related to these activities are not likely based on our experience with existing operations.

Discharges: The potential effects of OCS platform discharges on sea turtles include: (1) direct toxicity (acute or sublethal), through exposure in the waters or ingestion of prey that have bioaccumulated pollutants; and (2) a reduction in prey through direct or indirect mortality or habitat alteration caused by the deposition of muds and cuttings (SAIC, 2000a, b). However, there is no toxicity information on the effects of muds and cuttings and produced water discharges on sea turtles.

Comprehensive reviews by the National Academy of Sciences (1983), the Environmental Protection Agency (1985) and Neff (1987) do not address the potential effects of routine OCS discharges on this group of animals (MMS, 1996).

No significant impacts have been associated with sea turtles, in part, because sea turtles are highly mobile and their range far exceeds the extent of a platform discharge plume.

Effects of Oil: Oil spills can adversely affect sea turtles through external contact, blockage of the digestive tract, disruption of salt gland function, asphyxiation and displacement from preferred habitats (Lutz and Lutcavage, 1989; Vargo et al., 1986). Sea turtles may ingest oil during feeding (tar balls may be confused with food) or while attempting to clean oil from flippers. Oil ingestion may result in blockage of the respiratory system or digestive tract (Vargo et al., 1986). Some fractions of ingested oil may also be retained in the animal's tissues, as was detected in turtles collected after the *Ixtoc* spill in the Gulf of Mexico (Hall et al., 1983).

Comparison to the Point Arguello 1984 EIR/EIS

The understanding of how an oil spill may affect sea turtles is substantially unchanged since 1984. The potential impacts to sea turtles in the project area were generally discounted in the original Point Arguello 1984 EIR/EIS because of the relative scarcity of turtles in the region. Although an oil spill could affect a sea turtle, contact with a spill from Platform Hidalgo continues to be unlikely.

Cumulative Analysis: Possible sources of cumulative impacts specific to marine turtle resources are activities which increase the risk of accidental oil spills. Sources of cumulative impacts include on-going and proposed oil and gas activities in Federal and State waters and offshore tankering operations. The cumulative impacts from all these activities will not be markedly different than what was originally predicted and analyzed in 1984 and subsequent documents (ADL, 1984; MMS, 2001; 2003).

Conclusions

When comparing current and past environmental reviews, we found that the types of sea turtles within the vicinity of Platform Hidalgo have not changed since the Point Arguello 1984 EIR/EIS was finalized but our understanding of how sea turtles use habitat in this area has been enhanced. Although an oil spill could affect a sea turtle, contact with a spill from Platform Hidalgo continues to be unlikely. Impacts from the proposed project will not exceed those that were analyzed in prior environmental documents. Therefore, overall, when compared to the impacts to sea turtles analyzed in the 1984 EIR/EIS, the effects from the proposed project are well within those previously analyzed.

3.2.7 Special Areas

Impacts

Special areas have the potential to be effected by a small and temporary increase in the risk of an oil spill over the current baseline production. The impact of an oil spill, as discussed in the 1984 EIR/EIS, is dependent on the trajectory and time of year of the spill. If the spill remains offshore and away from special areas along the mainland and Channel Islands, there will be no measurable impact on the biologically sensitive areas, although marine mammals and/or seabirds inhabiting sensitive areas could be impacted if they foraged in the contaminated waters. Many of the mainland and Channel Island sensitive areas are either pupping grounds for pinnipeds or breeding areas for seabirds, thus the significance of the impact of oil on these areas will be dependent on the time of year the spill occurs. The impacts of an oil spill on specific species at Special Areas are identified in the prior sections: Intertidal Communities, Benthic Communities, Fishes and Essential Fish Habitat, Marine Dependent Birds, Marine Mammals and Marine Turtles.

Comparison to the Point Arguello 1984 EIR/EIS

The 1984 EIR/EIS identified important locations for marine biota. These areas designated by the State of California are of marine biological importance: (1) ecological reserves; (2) marine life refuges; (3) reserves; and (4) area(s) of special biological significance (ASBS). Whiles ASBS remain essentially the same today as in 1984, the Marine Life Protection Act in 1999 directed the State of California to design and manage a network of marine protected areas (MPAs). This process designated areas State-wide and replaced the system of reserves and ecological reserves discussed in the 1984 EIR/EIS. Other areas of special concern under Federal protection include National Marine Sanctuaries and National Park areas, which have not substantially changed in area or mission since the 1984 EIR/EIS. Other biological areas were discussed in the 1984 EIR/EIS as unique biological environments and biologically sensitive areas previously identified by the Bureau of Land Management (1979) and the State of California (ADL, 1984). Several specific sites were identified between Point Conception and Ventura as having special value as pinniped hauling-out areas, avian foraging and avian breeding areas. Only the Point Conception

area is in the proposed project area. Haul out areas and avian foraging and breeding areas are discussed in marine dependent birds and marine mammals sections.

Cumulative Impacts. Possible sources of cumulative impacts specific to special areas are activities which increase the risk of accidental oil spills. Sources of cumulative impacts include on-going and proposed oil and gas activities in Federal and State waters and offshore tankering operations. The cumulative impacts from all these activities will not be markedly different than what was originally predicted and analyzed in 1984 and subsequent documents.

Conclusions

Changes have occurred to specially designated areas. There are currently more areas in State Waters that focus on protecting overfished species and that increase the public's access and awareness of marine-related recreation. Impacts from potential oil spills as a result of the proposed project will not exceed those that were analyzed in prior environmental documents. Therefore, BOEM believes that effects to specially designated areas by the proposed project are well within the level of impact that was considered in the original 1984 EIR/EIS.

3.3 Socioeconomic Resources

3.3.1 Commercial Fishing

The 1984 EIR/EIS developed for the existing facilities expected routine operations to have regionally insignificant adverse impacts on the various commercial fisheries in the area (ADL, 1984). Additional production from the proposed project would occur from the current facilities and will fall within the level of activity originally planned and permitted to occur. Thus, the proposed project will not add to the impacts that were scheduled to occur, were analyzed in prior environmental documents, and are covered under existing permits. Although the proposed project may extend the productive life (Section 1.6) of the Point Arguello facilities beyond what was originally predicted (30 years; ADL, 1984), it is not expected to cause further preclusion or space-use conflicts beyond what presently exists.

Under upset conditions, the proposed development of the Electra Field may generate impacts to commercial fishing activities if a project-related oil spill occurred. The impacts to commercial fisheries would be unequally distributed across sectors. Trap fisheries are more likely to experience equipment loss and damage from clean-up vessels. If the spilled oil reaches local beaches, the barred surfperch fishery could be temporarily excluded during beach clean-up activities. The 1984 EIR/EIS predicted that spills over 1,000 bbls may generate regionally significant impacts to commercial fisheries (ADL, 1984). The activities described within the proposed project represent a small increase to oil spill risk compared to what was analyzed in 1984, but this increase in risk does not change the conclusions of the original analysis.

PXP (2012) has proposed to further reduce and minimize impacts to commercial fishing in the following ways:

- Marine Vessel Traffic Corridors – Marine support vessels shall use approved traffic corridors established by the Joint Oil/Fisheries Liaison Office (JOFLO) during transits to and from local ports, where feasible;
- Conflict Resolution – Disputes over damage to commercial fishing gear resulting from support vessel traffic associated with the proposed project shall be submitted to JOFLO for resolution; and

- Wildlife and Fisheries Training – PXP to show Wildlife and Fisheries Training video (Pacific Operators Offshore, LLC, 2009) to all personnel associated with marine support vessel operations.

Cumulative Analysis: Possible sources of cumulative impacts specific to commercial fishing are those that cause space-use and preclusion conflicts, which contribute to the overall impacts of routine operations, and activities, which increase the risk of accidental oil spills. Sources of cumulative impacts include on-going and proposed oil and gas activities in Federal and State waters, offshore tankering operations, and marine protected area (MPA) closures.

The cumulative effects of offshore oil and gas development activities can be found in numerous reports and environmental documents (MMS, 1992; 1995; 1996; 2001). Routine operations under the proposed project do not add to preclusion impacts and space-use conflicts to commercial fisheries because the project area is not heavily fished and because it is improbable the project area will see a future increase in fishing activity. Also, because no new offshore facilities or pipelines are proposed, there will be no additional preclusion impacts to commercial fishing that have not already been described, analyzed, and mitigated in the 1984 EIR/EIS (ADL, 1984).

Culver et al. (2007) summarized other factors and activities identified by 86 commercial fishers in the Santa Barbara Channel area that affect their industry. Aside from MPA closures, top-ranking concerns included operating costs, competition from foreign and domestics markets and marine mammal interactions. Oil and gas industry activities were not listed as factors likely to impact the future of local commercial fisheries, and foreseeable activities from the proposed project will not increase the duration, intensity or scope of impacts from these other activities.

Activities from non-oil and gas projects and actions may also impact local commercial fisheries. A number of MPA closures exist in or nearby the project area which limit fishing activity. Due to the light fishing activity and current fishing regulations in the project area, the proposed project will not add significant preclusion impacts to local commercial fishing activities.

Accidental oil spills from offshore tankering operations presents an ongoing risk to commercial fishermen. Oil spill response capabilities reduce this risk. The potential for an oil spill occurring from the proposed project represents an insignificant incremental increase to the overall cumulative oil spill risk in the Santa Barbara Channel and Santa Maria Basin.

Conclusions

Commercial fishing around Point Conception and the northern Channels Islands has substantially declined since 1984 (Section 2.3.1). However, the potential impacts to commercial fishing in the project area as described in the original Point Arguello 1984 EIR/EIS have not changed and impacts from the proposed project will not exceed those that were analyzed in prior environmental documents. BOEM continues to conclude that routine operations have regionally insignificant adverse impacts ongoing operations and are not expected to cause further preclusion or space-use conflicts beyond what presently exists. BOEM also continues to conclude that oil spills have the potential to generate regionally significant impacts to commercial fisheries.

3.3.2 Environmental Justice

Impacts in the cities of Port Hueneme and Santa Maria from transportation of project crew and materials are not expected because the trips needed for the proposed project in addition to those

trips already occurring for Point Arguello field operations will be minimal and temporary. The proposed project will not result in disproportionate impacts to minority or low-income populations or in a substantial disproportionate decrease in the employment and economic base of minority or low-income populations residing in surrounding cities and counties.

The drilling phase is expected to last approximately six months, during which drilling personnel will be transported via helicopter to Platform Hidalgo from Santa Maria Airport using regularly scheduled helicopter trips; no new helicopter trips will be needed for project (Section 1.5). Supply transport will require one additional supply boat round trip per week to Platform Hidalgo from Port Hueneme during the drilling phase, and drilling rig installation and removal will require 40 total additional supply boat round trips. Five additional truck trips per week to and from Port Hueneme will be required to transport drilling supplies and miscellaneous waste, and another five additional truck trips per week will be required during drilling rig installation and removal. No new infrastructure will be needed at Port Hueneme.

There are large Hispanic/Latino populations in the city of Port Hueneme and elsewhere in the area that may be affected by an oil spill making landfall. However, the onshore areas that may be adversely affected should an oil spill resulting from the proposed project make landfall, as predicted by the GNOME model (Section 3.1.1; Appendix A); extend northwest of Point San Luis to Point Conception, the northern shorelines of San Miguel and Santa Rosa Islands, and western Santa Cruz Island. However, the likelihood of an oil spill occurring and reaching the shore is low, and the effects on these resources should landfall occur would be temporary.

Conclusions

The 1984 EIR/EIS did not address environmental justice since the Executive Order was signed in 1994. However, as discussed above, an accidental oil spill would not have a disproportionate impact on minority or low-income populations. Therefore, this new analysis regarding environmental justice does not represent significant new information relevant to the environment.

5.0 List of Preparers

David Panzer	Chief, Environmental Analysis Section
Mark Eckenrode	Air Quality Specialist
Susan Zaleski	Biological Oceanographer
Lisa Gilbane	Marine Biologist
Donna Schroeder	Marine Biologist
David Pereksta	Avian Biologist
Greg Sanders	Wildlife Biologist
Sara Guiltinan	Social Scientist
Chima Ojukwu	Petroleum Engineer

4.0 Literature Cited

Allen, M.J., T. Mikel, D. Cadien, J.E. Kalman, E.T. Jarvis, K.C. Schiff, D.W. Diehl, S.L. Moore, S. Walther, G. Deets, C. Cash, S. Watts, D.J. Pondella II, V. Raco-Rands, C. Thomas, R. Gartman, L. Sabin, W. Power, A.K. Groce, and J.L. Armstrong. 2007. Southern California Bight 2003 Regional Monitoring Program: IV. Demersal Fishes and Megabenthic Invertebrates. Southern California Coastal Water Research Project. Costa Mesa, CA.

Allison, G.W., S.D. Gaines, J. Lubchenco and H.P. Possingham. 2003. Ensuring persistence of marine reserves: catastrophes require adopting an insurance factor. Ecological Applications 13:S8-S24.

Albers, P.H. 1978. The effects of petroleum on different stages of incubation on bird eggs. Bull. Env. Contam. Toxicol. 19:624-630.

Albers, P.H. 1984. Ecological considerations for the use of dispersants in oil spill response: bird habitats, draft guidelines. A report for the ASTM dispersant use guidelines task force. 14 pp.

Alonso-Alvarez, C., and M. Ferrer. 2001. A biochemical study about fasting, subfeeding and recovery processes in yellow-legged gulls. Physiol Biochem Zool 74: 703–13.

Anderson, C.M., Mayes, M. and R. LaBelle. 2012. Update of Occurrence Rates for Offshore Oil Spills. BOEM 2012-069; BSEE 20112-069.

Ambrose, R. 1995. Coastal Wetland Resources of the Santa Barbara County Mainland. Prepared for the County of Santa Barbara.

Arthur D. Little Inc. (ADL). 1984. Point Arguello Field and Gaviota Processing Facility Area Study and Chevron/Texaco Development Plans EIR/EIS and Appendices. Prepared for the County of Santa Barbara, U.S. Minerals Management Service, California State Lands Commission, California Coastal Commission, and California Secretary of Environmental Affairs. Prepared by Arthur D. Little, Santa Barbara CA.

Baird, P.H. 1993. Birds. Pp. 541-603 in: M.D. Dailey, D.J. Reish, and J.W. Anderson (eds.). Ecology of the Southern California Bight: A Synthesis and Interpretation. Berkeley, CA: University of California Press.

Battelle. 1991. California OCS Phase II Monitoring Program. Final Report. Report submitted to the U.S. Department of the Interior, Minerals Management Service under contract No. 14-12-0001-30262. MMS OCS Study 91-0083.

Benson, S.R., T. Eguchi, D. Foley, K.A. Forney, H. Bailey, C. Hitipeuw, B. Samber, R. Tapilatu, V. Rei, P. Ramohia, J. Pita, and P.H. Dutton. 2011. Large-scale movements and high use areas of western Pacific leatherback turtles, *Dermochelys coriacea*. Ecosphere 2:art84.

Biological Review Team. 2005. Green Sturgeon (*Acipenser medirostris*) Status Review Update. Santa Cruz Laboratory, Southwest Fisheries Science Center, NOAA Fisheries.

Blanchette, C.A., C. Melissa Miner, P.T. Raimondi, L. David, K.E.K. Heady, B.R. Broitman (2008). Biogeographical patterns of rocky intertidal communities along the Pacific coast of North America. Journal of Biogeography 35(9): 1593-1607.

Bonnell, M.L., and M.D. Dailey. 1993. Marine mammals. *In*: Ecology of the Southern California Bight: A Synthesis and Interpretation, M.D. Dailey, D.J. Reish, and J.W. Anderson (eds.). Berkeley, CA: University of California Press. pp. 604-681.

Bonnell, M.L., and R.G. Ford. 2001. Marine mammal and seabird computer database analysis system (CDAS). Prepared by Ecological Consulting, Inc., Portland, OR, for the Pacific OCS Region, Minerals Management Service. Contract No. 1435-0 1-97-PO-14206.

Bourne, W.R.P. 1976. Seabirds and pollution. In: R. Johnson (ed.). Marine pollution. Academic Press, New York, NY.

Briggs, K.T., E.W. Chu, D.B. Lewis, W.B. Tyler, R.L. Pitman, and G.L. Hunt, Jr. 1981. Distribution, numbers, and seasonal status of seabirds of the Southern California Bight. Pp. 1-399, Book I, Part 111. Investigators' reports, summary of marine mammal and seabird surveys of the Southern California Bight area, 1975- 1978. Publ. #PB-8 1-248-205, U.S. National Tech. Info Serv., Springfield, VA.

Briggs, K.T., W.B. Tyler, D.B. Lewis, and D.R. Carlson. 1987. Bird communities at sea off California: 1975-1983. Studies in Avian Biology, No. 11. 74 pp.

Brown, R.G.B. 1982. Birds, oil and the Canadian environment. In: J.B. Sprague, J.H. Vandermeulen, and P.G. Wells (eds.). Oil and dispersants in Canadian seas- research appraisal and recommendations. Economic and technical report EPS-3-EC-82-2.

Brownell, R.L., Jr. 1971. Whales, dolphins, and oil pollution. Pp. 255-276 *In*: D. Straughn (ed.), Biological and oceanographical survey of the Santa Barbara Channel oil spill 1969-1970.

Bureau of Land Management. 1979. Final Environmental statement, proposed 1979 outer continental shelf oil and gas lease sale offshore southern California. OCS Sale No. 48. Vol. 1 of 4.

Burger, A.E. and D.M. Fry. 1993. Effects of oil pollution on seabirds in the northeast Pacific. Pages 254-263. In: Vermeer, K., Briggs, K.T., Morgan, K.H. & Siegel-Causey, D., editors. The status, ecology, and conservation of marine birds of the North Pacific. Ottawa, Ontario: Canadian Wildlife Service, Special Publication.

Burgner, R.L., J.T. Light, L. Margolis, T. Okazaki, A. Tautz, and S. Ito. 1992. Distribution and origins of steelhead trout (*Oncorhynchus mykiss*) in offshore waters of the North Pacific Ocean. International North Pacific Fisheries Commission Bulletin 51. 92 pp.

Burkett, E.E., N.A. Rojek, A.E. Henry, M.J. Fluharty, L. Comrack, P.R. Kelly, A.C. Mahaney, and K. M. Fien. 2003. Report to the California Fish and Game Commission: Status review of Xantus' murrelet (*Synthliboramphus hypoleucus*) in California. Calif. Dept. of Fish and Game, Habitat Conservation Planning Branch Status Report 2003-01. 96 pp+appendices.

Cailliet, G.M., and A.W. Ebeling. 1990. The vertical distribution and feeding habits of two common midwater fishes (*Leuroglossus stilbius* and *Stenobrachius leucopsarus*) off Santa Barbara. California. Cooperative Oceanic Fisheries Investigations Report 31:106-123.

California Department of Fish and Game (CDFG) 2005. Regional Profile of the Central Coast Study Region (Pigeon Point to Point Conception California). Prepared for the California Marine Life Protection Act Initiative Central Coast Regional Stakeholder Group. September 19, 2005 (v.3.0). 117 pp. + appendices. http://www.dfg.ca.gov/mlpa/draftdocuments_phase1.asp, referenced December 01, 2012.

CDFG. 2007. Final 2007 California Commercial Landings. http://www.dfg.ca.gov/marine/landings07.asp, referenced January 24, 2013.

CDFG. 2008a. California Marine Life Protection Act: Master Plan for Marine Protected Areas. Approved February 2008. http://www.dfg.ca.gov/mlpa/, referenced January 24, 2013.

California Department of Fish and Game (CDFG). 2008b. Final 2008 California Commercial Landings. http://www.dfg.ca.gov/marine/landings08.asp, referenced January 24, 2013.

California Department of Fish and Game (CDFG). 2009. Final 2009 California Commercial Landings. http://www.dfg.ca.gov/marine/landings09.asp, referenced January 24, 2013.

California Department of Fish and Game (CDFG). 2010. Final 2010 California Commercial Landings. http://www.dfg.ca.gov/marine/landings10.asp, referenced January 24, 2013.

California Department of Fish and Game (CDFG). 2011. Final 2011 California Commercial Landings. http://www.dfg.ca.gov/marine/landings11.asp, referenced January 24, 2013.

California State Water Resources Control Board (SWRCB) 2009. California Ocean Plan: Water Quality Control Plan, Ocean Waters of California. Sacramento, CA. http://www.waterboards.ca.gov/water_issues/programs/ocean/docs/2009_cop_adoptedeffective_usepa.pdf

Carter, H.R., G.J. McChesney, D.L. Jaques, C.S. Strong, M.W. Parker, J.E. Takekawa, D.L. Jory, and D.L. Whitworth. 1992. Breeding populations of seabirds in California, 1989-1991. Vols. 1 and 2. Report to US Department of the Interior, Minerals Management Service, Washington, D.C. Prepared under Inter-agency Agreement 14-12-001-30456.

Channel Islands National Park. 2006. National Park Service, Channel Islands National Park Technical Report CHIS-2005-08: Rocky Intertidal Monitoring 2001 Annual Report.

Chapman, B.R. 1981. Effects of IXTOC-1 oil spill on Texas shorebird populations. In: Proceedings, 1981 oil spill conference; prevention, behavior, control, cleanup. API Publ. No. 4334. 742 pp.

Coats, D.E. Imamura, A.K. Fukuyama, J.R. Skalski, S. Kimura, and J. Steinbeck. 1999. Monitoring of biological recovery of Prince William Sound intertidal sites impacted by the *Exxon Valdez* oil spill. NOAA Tech. Memorandum NOS OR&R 1. NOAA HazMat, Seattle, WA.

Coats, D. 1994. Deposition of drilling particulates off Point Conception, CA. Mar. Env. Rev. 37:95-127.

Costa, D.P. and G.L. Kooyman. 1982. Oxygen consumption, thermoregulation, and the effect of fur oiling and washing on the sea otter, *Enhydra lutris.* Can. J. Zool., 60:2761-2767.

Council on Environmental Quality (CEQ) 1997. Environmental Justice Guidance Under the National Environmental Policy Act. Executive Office of the President (10 December 1997). www.whitehouse.gov/CEQ

Conway-Cranos, T., P.T. Raimondi, R. Ambrose. 2006. Spatial and Temporal Variation in Recruitment to Rocky Shores: Relationship to Recovery Rates of Intertidal Communities. OCS Study MMS 2006-053. Final Study Report. Agreement no.14-35-0001-31063, Santa Barbara CA

Cross, J. N. and L.G. Allen. 1993. Fishes. Pages 459–540. *In*: Dailey, M. D., D. Reish, and J. Anderson (eds.) Ecology of the Southern California Bight: A Synthesis and Interpretation. University of California Press, Berkeley and Los Angeles, California. 926 pp.

Culver, C. S., J.B. Richards, C.M. Pomeroy. 2007. Commercial Fisheries of the Santa Barbara Channel and Associated Infrastructure Needs. California Sea Grant Extension Program, University of California Extension Program, Publication No. T-062, 101 pp.

Dailey, M.D., D. Reish, and J. Anderson. 1993. Ecology of the Southern California Bight: A Synthesis and Interpretation. University of California Press, Berkeley and Los Angeles, California. 926 pp.

Dames and Moore. 1982. Site Specific Marine Biological Survey of Chevron Exploration Leases OCS-P 0446, 0447, 0450, 0451, 0452.

Dauvin, J. C. 1998. The fine sand *Abra alba* community of the Bay of Morlaix twenty years after the *Amoco Cadiz* oil spill. Marine Pollution Bulletin 36:669-676.

Davis, J.E. and S.S. Anderson. 1976. Effects of oil pollution on breeding grey seals. Mar. Poll. Bull. 7:115-118.

Davis, R.W., T.M. Williams, J.A. Thomas, R. Kastelein and L.H. Cornell. 1988. The effects of oil contamination and cleaning on sea otters (*Enhydra lustris*). II. Metabolism, thermoregulation, and behavior. Can. J. Zool. 66:2782-2790.

Dean, T.A., and S.C. Jewett. 2001. Habitat-specific recovery of shallow subtidal communities following the Exxon Valdez oil spill. Ecological Applications 11:1456-1471.

de Margerie, S. 1989. Modeling Drill Cutting Discharges. *In*: Englehart, F.R., Ray, J.P., and A.H. Gillam, eds. Drilling Wastes. Elsevier Applied Science, New York. pp. 627-646.

DeWitt, F. A., Jr. 1972, Bathymetric Distributions of Two Common Deep-Sea Fishes, *Cyclothone acclinidens* and *C. signata*, off Southern California. Copeia 1972:88-96.

Diener, D.R. and A.L. Lissner. 1995. Long-term variability of hard-bottom epifaunal communities: effects from offshore oil and gas production and development. *In:* SAIC and MEC. Appendix D. Monitoring assessment of long-term changes in biological communities in the Santa Maria Basin: Phase III. Final Report OCS Study MMS 95-0049. Submitted to the US Department of the Interior, MMS, Camarillo, CA.

Dohl, T.P., K.S. Norris, R.C. Guess, J.D. Bryant, and M.W. Honig. 1981. Cetacea of the Southern California Bight. Part II of Investigators' reports: Summary of marine mammal and seabird surveys of the Southern California Bight Area, 1975-1978. Prepared for U.S. Department of the Interior, Bureau of Land Management, Pacific OCS Region. NTIS #PB 81-248-189. 414 pp.

Dohl, T.P., R.C. Guess, M.L. Duman, and R.C. Helm. 1983. Cetaceans of central and northern California, 1980-1983: Status, abundance, and distribution. Prepared for U.S. Department of the Interior, Minerals Management Service, Pacific OCS Region. OCS Study MMS 84-0045. 284 pp.

Dorman, C.E., and C.D. Winant. 2000. The marine layer in and around the Santa Barbara Channel. Monthly Weather Review 128:261-282.

Dugan, J.E., D.M. Hubbard, M. McCrary, and M. Pierson. 2003. The response of macrofauna communities and shorebirds to macrophyte wrack subsidies on exposed sandy beaches of southern California. Estuar. Coastl. Shelf Sci. 58S: 133-148.

Dugan, J. E., D. M. Hubbard, and A. M. Wenner. 1998b. A catalog of the sandy beaches of San Luis Obispo and Santa Barbara Counties. Report to Minerals Management Service, Camarillo, CA.

Dugan, J. E., D. M. Hubbard, and A. M. Wenner. 1998a. A physical characterization of the sandy beaches of San Luis Obispo and Santa Barbara Counties. Report to Minerals Management Service, Camarillo, CA.

Eganhouse, R.P. and M.I. Venkatesan. 1993. The Southern California Bight: Background and Setting, *In*: Dailey, M.D., D. Reish, and J. Anderson, eds. 1996. M.D. Dailey, D.J. Reish, and J.W. Anderson (eds.), Chemical Oceanography and Geochemistry, University of California Press, pp. 71 – 189.

Englehardt, F.R. 1983. Petroleum effects on marine mammals. Aquat. Toxicol. 1:175-186.

Environmental Protection Agency (EPA). 1985. Assessment of environmental fates and effects of discharges from offshore oil and gas operations. EPA 440/5-4-85/002. Washington, D.C.

Erickson, D.L. and J.E. Hightower. 2007. Oceanic distribution and behavior of green sturgeon (*Acipenser medirostris*). *In*: Munro, J., J. E. Hightower, K. McKown, K. J. Sulak, A. W. Kahnle and F. Caron, editors. Anadromous sturgeons: habitats, threats, and management. American Fisheries Society Symposium 56: 197-211.

Erickson, D.L. and M.A.H. Webb. 2007. Spawning periodicity, spawning migration, and size at maturity of green sturgeon, *Acipenser medirostris*, in the Rogue River, Oregon. Environmental Biology of Fishes 79: 255-268.

Environmental Protection Agency (EPA). 2006. Inventory of U.S. Greenhouse Gases Emissions and Sinks: 1990 – 2004. April, 2006.

Farwell, C., C.M. Reddy, E. Peacock, R.K. Nelson, L. Washburn, D.L. Valentine (2009). Weathering and the Fallout Plume of Heavy Oil from Strong Petroleum Seeps Near Coal Oil Point, CA. Environmental Science & Technology 43(10): 3542-3548.

Fauchald, K. and G.F. Jones. 1978. Variation in community structure of shelf, slope and basin macrofaunal communities of the Southern California Bight. *In*: Chapter 19, Year II benthic study. Report submitted by Science Applications Inc. to Bureau of Land Management , Pacific OCS Office, Los Angeles, CA under Contract No. AA551-CT6-40.

Federal Register 1994. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations. Federal Register 59:32 (16 February 1994).

Fish and Wildlife Service (FWS). 1984. Memorandum from FWS Regional Director to U.S. Minerals Management Service Director. Formal Section 7 Endangered Species Consultation on Offshore Oil and Gas Development and Production in the Point Arguello Field and the Gaviota Processing Facility, Santa Barbara County, California (1-1-84-F-22). October 31, 1984.

FWS. 2001. Memorandum from FWS Field Supervisor to U.S. Minerals Management Service Regional Director. Biological Opinion on Proposed Oil and Gas Development Activities in the Rocky Point Unit, Point Conception and Point Arguello, California (7300)(1-8-00-F-76). December 21, 2001.

Frair, W., R.G. Ackman, and N. Mrosovsky. 1972. Body temperature of *Dermochelys coriacea*: warm turtle from cold water. Science 177:791-793.

Fry, D.M. 1987. Seabird oil toxicity study. Final report Contract 14-112-0001-29112/SBO 408(a). U S. Department of the Interior, Minerals Management Service. Pacific OCS Region, Los Angeles, California

Gales, R.S. 1982. Effects of noise of offshore oil and gas operations on marine mammals: An introductory assessment. Vols. I and II. Technical Report 844. Prepared for USDOI/MMS. Naval Ocean Systems Center, San Diego, CA.

Garrett, K., and J. Dunn. 1981. Birds of southern California: status and distribution. Los Angeles Audubon Society, Los Angeles, CA. 408 pp.

Geraci, J.R. and T.G. Smith. 1977. Consequences of oil fouling on marine mammals. In: D.C. Malins (ed.). Effects of petroleum on arctic and subarctic marine environments and organisms. Vol. 2, biological effects. Academic Press, New York, NY. 500 pp.

Geraci, J.R. and D.J. St. Aubin. 1982. Study of the effects of oil on cetaceans. Report to the US Department of Interior, Bureau of Land Management. Contract No. AA551-CT9-29.

Geraci, J.R. and D.J. St. Aubin. 1985. Effects of offshore oil and gas development on marine mammals and turtles. *In*: D.F. Boesch and N.N. Rabalais (eds.). The long term effects of offshore oil and gas development: an assessment and a research strategy. National Marine Pollution Program Office, NOAA, Interagency Committee on Ocean Pollution, Research, Development and Monitoring.

Geraci, J.R., and D.J. St. Aubin (eds.). 1990. Sea mammals and oil: confronting the risks. Academic Press, San Diego. 282 pp.

Geraci, J.R., and T.D. Williams. 1990. Physiological and toxicological effects on sea otters. Pp. 211-221 *in*: J.R. Geraci, and D.J. St. Aubin (eds.), Sea mammals and oil: Confronting the risks. Academic Press, Inc., San Diego.

Gorbics, C., P. Kelly, and M. Devany. 2000. Draft Restoration Plan and Environmental Assessment for seabirds injured by the American Trader oil spill. USFWS, Carlsbad, California. 38 pp. + appendices.

Graham, T. 2009. Scyphozoan jellies as prey for leatherback turtles off central California. Master's thesis, San Jose State University, San Jose, CA.

Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP). 1993. Impact of oil and related chemicals on the marine environment. Reports and Studies No. 50. International Maritime Organization, London, 180+ix pp.

Haldane, D. 1984. Offshore harvest shellfish go from oil platforms to dinner plates. The Los Angeles Times, March 5, 1994.

Hall, R.J., A.A. Belisle, and L. Sileo. 1983. Residues of petroleum hydrocarbons in tissues of sea turtles exposed to the *Ixtoc 1* oil spill. Journal of Wildlife Disease 19:105-109.

Hardin, D.D., J.T. Toal, T. Parr, P. Wilde, and K. Dorsey. 1994. Spatial Variation in Hard-Bottom Epifauna in the Santa Maria Basin, California: The Importance of Physical Factors. Marine Environmental Research 37: 165-193.

Harms, S. and C. Winant. 1998. Characteristic patterns of the circulation in the Santa Barbara Channel. Journal of Geophysical Research 103(C2): 3041-3065.

Hicky, B.M. 1993. The Southern California Bight: Background and Setting, *In:* Dailey, M.D., D. Reish, and J. Anderson, eds. 1996. M.D. Dailey, D.J. Reish, and J.W. Anderson (eds.), Physical Oceanography, University of California Press, pp. 19 – 70.

Hickey, B.M., E.L. Dobbins, and S.E. Allen. 2003. Local and remote forcing of currents and temperature in the central southern California bight. Journal of Geophysical Research 108(C3), 3081.

Hofmann GE, Smith JE, Johnson KS, Send U, Levin LA, et al. 2011. High-Frequency Dynamics of Ocean pH: A Multi-Ecosystem Comparison. PLoS ONE 6(12): e28983. doi:10.1371/journal.pone.0028983

Holmes, W.N. and J. Cronshaw. 1977. Biological effects of petroleum on marine birds. *In*: D.C. Malins (ed.). Effects of petroleum on arctic and subarctic marine environments and organisms. Vol. II, biological effects. Academic Press, New York, NY. 500 pp.

Hope, J.P., J.Y. Monnat, D.J. Cadbury, and T.J. Stowe. 1978. Birds oiled during the *Amoco Cadiz* incident: an interim report. Mar. Poll. Bull. 9:307-310.

Horn, M. H., and L.G. Allen. 1978 A distributional analysis of California coastal marine fishes. Journal of Biogeography. 5:23-42.

Hubbs, C.L. 1977. First record of mating of ridley turtles in California with notes on commensals, characters, and systematics. Calif. Fish and Game 63(4):262-267.

Hunt, G.L., Jr., R.L. Pitman, M. Naughton, K. Winnett, A Newman, P.R. Kelly, and K.T. Briggs. 1981. Distribution, status, reproductive ecology, and foraging habits of breeding seabirds. Summary of marine mammal and seabird surveys of the Southern California Bight area, 1975-1978. Publ. #PB-8 1-248-205, U.S. National Tech. Info Serv., Springfield, VA.

Hyland, J., E, Babtiste, J. Campbell, J. Kennedy, R. Kropp, S. Williams. 1991. Macroinfaunal communities of the Santa Maria Basin on the California outer continental shelf and slope. Marine Ecology-Progress Series 78(2): 147-161.

Hyland, J.E. Baptiste, J. Campbell, J. Kennedy, R. Kropp, C. Robinson and S. Williams. 1990. Macroinfaunal infaunal assemblages in the Santa Maria Basin off the coast of southern California. *In*: M. Steinhauer and E. Imamura (eds.). California OCS Phase II Monitoring Program, Year III Annual Report. Prepared for the US Department of the Interior, Minerals Management Service, Camarillo, Ca.

Jones, D.O.B., B.D. Wigham, I.R. Hudson, B.J. Bett. 2007. Anthropogenic disturbance of deep-sea megabenthic assemblages: a study with remotely operated vehicles in the Faroe-Shetland Channel, NE Atlantic. Marine Biology 151 (5):1731-1741.

Lafferty, K.D., C.C. Swift, and R.F. Ambrose. 1999a. Extirpation and recolonization in a metapopulation of an endangered fish, the tidewater goby. Conservation Biology 13:1447-1453.

Lafferty, K.D., C.C. Swift, and R.F. Ambrose. 1999b. Postflood persistence and recolonization of endangered tidewater goby populations. North American Journal of Fisheries Management 19:618-622.

Le Boeuf, B.J. 1971. Oil contamination and elephant seal mortality—a "negative" finding. Pp. 277-286 *In*: D. Straughn (ed.), Biological and oceanographical survey of the Santa Barbara Channel oil spill 1969-1970.

Lee, R.F., R. Sauerheber, and G.H. Dobbs. 1972. Uptake, metabolism and discharge of polycyclic aromatic hydrocarbons by marine fish. Marine Biology 17: 201-208.

Lees, D.C., W.B. Driskell, J.P. Houghton, R.H. Gilmour, A.J. Mearns. 1999. Recovery of Prince William Sound Intertidal Infauna from Exxon Valdez Oiling and Shoreline Treatments 1989-1996; Part II – Species Composition. Paper presented at the Legacy of and Oil Spill – 10 years after the *Exxon Valdez* Conference.

Lehman, P. 1994. The birds of Santa Barbara County, California. Vertebrate Museum, Univ. California, Santa Barbara, CA. 337 pp.

Leighton, B.J., J.D.G. Boom, C. Bouland, E.B. Hartwick and M.J. Smith. 1991. Castration and mortality in *Pisaster ochraceus* parasitized by *Orchitophrya stellarum* (Ciliophora). Diseases of Aquatic Organisms 10: 71-73.

Leighton. F. A. 1995. The toxicity of petroleum oils to birds: an overview. In: Frink L, Ball-Weir K, Smith C, editors. Wildlife and oil spills. Newark, Delaware: Tri-State Bird Rescue and Research Inc; 1995. p. 10–22.

Light, J.T., C.K. Harris, and R.L. Burgner. 1989. Ocean distribution and migration of steelhead (*Oncorhynchus mykiss*, formerly *Salmo gairdneri*). (Document submitted to the International North Pacific Fisheries Commission.) 50 pp. FRI-UW-8912. Fisheries Research Institute, University of Washington, Seattle.

Love, M.S. 1996. Probably more than you want to know about the fishes of the Pacific Coast. Really Big Press, Santa Barbara, California. 381 pp.

Love, M.S., and D.M. Schroeder. 2007. A characterization of the fish assemblage of deep photic zone rock outcrops in the Anacapa Passage, southern California, 1995 to 2004, with evidence of a regime shift. California Cooperative Oceanic Fisheries Investigations Report 48:165-176.

Love, M.S., D.M. Schroeder, and M.M. Nishimoto. 2003. The Ecological Role of Oil and Gas Production Platforms and Natural Outcrops on Fishes in Southern and Central California: A Synthesis of Information. U.S. Geological Survey, Biological Resources Division, Seattle, Washington, 98104, OCS Study MMS 2003-032.

Love, M.S., J. Stephens, Jr., P. Morris, M. Singer, M. Sandhu, and T. Sciarrotta. 1986. Inshore soft substrata fishes in the Southern California Bight: An overview. California Cooperative Oceanic Fisheries Investigations Report 27:84-106.

Love, M.S., M. Yoklavich, and D.M. Schroeder. 2009. Demersal fish assemblages in the Southern California Bight based on visual surveys in deep water. Environmental Biology of Fishes 84:55-68.

Love, M.S., M. Yoklavich, and L. Thorsteinson. 2002. The Rockfishes of the Northeast Pacific. University of California Press, Berkeley, California. 422 pp.

Lutz, P.L., and M. Lutcavage. 1989. The effects of petroleum on sea turtles: Applicability to Kemp's ridley. Pp. 52-54 *In*: C.W. Caillouet, Jr., and A.M. Landry, Jr. (comp.), Proceedings of the First International Symposium on Kemp's Ridley Sea Turtle Biology, Conservation, and Management. TAMU-SG-89-105.

Lynn, R.J., K.A. Bliss and L.E. Eber, 1982. Vertical and horizontal distributions of seasonal mean temperature, salinity, sigma-t, stability, dynamic height, oxygen, and oxygen saturation in the California Current, 1950-1978. Cal COFI Atlas 30.

Marantz, C. 1986. The Birds of San Luis Obispo, California: Their Status and Distribution. Biological Sciences Department, School of Science and Mathematics, California Polytechnic State University, San Luis Obispo.

Mason, J.W., G.J. McChesney, W.R. McIver, H.R. Carter, J.Y. Takekawa, R.T. Golightly, J.T. Ackerman, D.L. Orthmeyer, W.M. Perry, J.L. Yee, M.O. Pierson, and M.D. McCrary, 2007. At-sea distribution and abundance of seabirds off southern California: a 20-year comparison. Studies in Avian Biology, No. 33. 95 pp.

McCrary, M.D., and M.O. Pierson. 2002. Shorebird abundance and distribution on beaches of Ventura County, California. U.S. Department of the Interior, Minerals Management Service, Pacific OCS Region. OCS Study MMS 2000-010. 73 pp.

McLachlan, A. and P. Hesp. 1984. Faunal response to morphology and water circulation of a sandy beach with cusps. Mar. Ecol. Prog. Ser. 19:133-144.

Miller. D.J., and R. Lea. 1972. Guide to the coastal marine fishes of California. California Department of Fish and Game Fish Bulletin, No. 157. 249 pp.

Miner, M.C.; P.T. Raimondi; R.F. Ambrose; J.M. Engle; S.M Murray. 2005. Monitoring of Rocky Intertidal Resources along the Central and Southern California Mainland. Comprehensive Report (1992-2003) for San Luis Obispo, Santa Barbara, Ventura, Los Angeles, and Orange Counties. OCS Study MMS-2005-071.

Miner, M.C., J.M. Altstatt, P.T. Raimondi, T.E. Minchinton. 2006. Recruitment failure and shifts in community structure following mass mortality limit recovery prospects of black abalone. Marine Ecology Progress Series. Vol 327: 107-117.

Minerals Management Service (MMS). 1992. Proposed comprehensive Outer Continental Shelf natural gas and oil resource management program for 1992-1997. Environmental Impact Statement. MMS 92-0004.

MMS. 1995. Outer Continental Shelf natural gas and oil resource management program: Cumulative Effects, 1987-1991. U.S. Department of the Interior, Minerals Management Service, Herndon, Virginia. MMS 95-0007.

MMS. 1996. Final Environmental Impact Statement, Outer Continental Shelf Oil & Gas Leasing Program: 1997-2002. U.S. Department of the Interior, Minerals Management Service, Herndon, VA.

MMS. 2001. Draft Environmental Impact Statement for Delineation Drilling Activities in Federal Waters Offshore Santa Barbara County, California. U.S. Department of the Interior, Minerals Management Service, Pacific OCS Region, Camarillo, CA. OCS EIS/EA MMS 2001-046

MMS. 2003. OCS Environmental Assessment: Revisions to the Point Arguello Field Development and Production Plans to include development of the eastern half of Lease OCS-P 0451. June 19, 2003.

Montevecchi, W.A. 2006. Influences of artificial light on marine birds. Pp 94-113. *In*: Rich, C. and T. Longcore (eds.) Ecological Consequences of Artificial Night Lighting. Island Press. Washington, D.C.

Moyle, P. B. 2002. Inland fishes of California. University of California Press, Berkeley, CA.

Murray, S. and M. Littler, 1979. Southern California Baseline Study Intertidal, Year III, Final Report Volume II. Published by Science Applications, Inc.

National Academy of Sciences (NAS). 1983. Drilling discharges in the marine environment: Panel on Assessment of Fates and Effects of Drilling Fluids and Cuttings in the Marine Environment. National Academy Press, Washington, D.C.

National Marine Fisheries Service (NMFS). 1997. Sea turtle strandings reported to the California marine mammal stranding network database. US Department of Commerce, NOAA, NMFS, Southwest Region, Long Beach, CA. 18 p.

NMFS. 1984. Letter from NMFS Assistant Administrator to U.S. Minerals Management Service Director. Section 7 Consultation- Biological Opinion: Operations Pertaining to the Development and Production of Oil and Gas Offshore California between Point Arguello and Point Conception. May 31, 1984.

NMFS. 2008. White Abalone Recovery Plan (*Haliotis sorenseni*). National Marine Fisheries Service, Long Beach, CA.

NMFS. 2012. Marine turtle stranding data records for southern California, 1990 to 2011. Southwest regional Office of National Marine Fisheries Service. Unpublished data.

National Research Council (NRC). 1985. Oil in the Sea: Inputs, Fates, and Effects. National Academy Press, Washington, DC. 601+xviii pp.

Neff, J.M. 1987. Biological effects of drilling fluids, drill cuttings, and produced water. Pp. 469-538, *In*: D.F. Boesch and N.N. Rabalais (eds.), Long-term environmental effects of offshore oil and gas development. Elsevier Applied Science, New York, NY.

Neff, J.M. 2005. Composition, environmental fates, and biological effects of water-based drilling muds and cuttings discharged to the marine environment: a synthesis and annotated bibliography. Prepared for Petroleum Environmental Research Forum (PERF) and American Petroleum Institute by Battelle. Pp 73.

Nekton, Inc. 1981. A biological survey of a hard-bottom feature, Santa Maria Basin, CA. Report to ARCO Oil and Gas Company.

Nezlin, N.P. and P.M. DiGiacomo. 2005. Satellite ocean color observations of stormwater runoff plumes along the San Pedro Shelf (southern California) during 1997–2003. Continental Shelf Research 25:1692–1711.

Pacific Operators Offshore, LLC. 2009. Wildlife and Fisheries Training Video.

Pearcy, W.G., and R.M. Laurs. 1966. Vertical migration and distribution of mesopelagic fishes off Oregon. Deep-Sea Research 13:153-165.

Peery, M.Z., L.A. Henkel, B.H. Becker, S.H. Newman, J.T. Harvey, C. Thompson, and S.R. Beissinger. 2008. Effects of rapid flight-feather molt on post-breeding dispersal in a pursuit-diving seabird. Auk 125:113-123

Peterson C.H., M.C. Kinnicutt II, R.H. Green, P. Montagna, D.E. Harper Jr, E.N. Powell, P.F. Roscigno 1996. Ecological consequences of environmental perturbations associated with offshore hydrocarbon production: a perspective on long-term exposures in the Gulf of Mexico. Canadian Journal of Fisheries and Aquatic Sciences 53:2637-2654.

Plains Exploration and Production Company (PXP). 2012. Revisions to the Platform Hidalgo Development and Production Plan to Include Development of the Western Half NW/4 of Lease OCS-P 0450, Report, Accompanying Information Volume, and Attachments. Project http://boem.gov/Oil-and-Gas-Energy-Program/Leasing/Regional-Leasing/Pacific-Region/Arguello-DPP.aspx. Attachment D – Air emissions and traffic data was amended through a letter from PXP to Bureau of Ocean Energy Management, February 15, 2013.

Raimondi P.T., C.M. Wilson, R.F. Ambrose, J.M. Engle, T.E. Minchinton. 2002. Continued declines of black abalone along the coast of California: are mass mortalities related to El Niño events? Mar Ecol Prog Ser Vol. 242: 143–152

Raimondi, P.T. 1999. 1997 Torch oil spill. Pp. 34-41 *In:* Monitoring of rocky intertidal resources along the central and southern California mainland. 3-Year Report for San Luis Obispo, Santa Barbara, and Orange Counties (Fall 1995-Spring 1998)(Raimondi, P.T., R.F. Ambrose, J.M. Engle, S.N. Murray and M. Wilson). OCS Study, MMS 99-0032, U.S. Minerals Management Service, Pacific OCS Region.

Ranasinghe, J.A., K.C. Schiff, C.A. Brantley, L.L. Lovell, D.B. Cadien, T.K. Mikel, R.G. Velarde, S. Holt, S.C. Johnson (2012). Southern California Bight 2008 Regional Monitoring Program: VI. Benthic Macrofauna. Southern California Coastal Water Research Project. Costa Mesa, CA. Technical Report 665.

Rice, S. D., R.B. Spies, D.A. Wolfe, and B.A. Wright, eds. 1996. Proceedings of the Exxon Valdez Oil Spill Symposium, American Fisheries Society Symposium 18. Bethesda, Maryland.

Richardson, W.J., C.R. Greene, Jr., C.I. Malme, and D.H. Thompson. 1995. Marine mammals and noise. Academic Press, Inc., San Diego, CA. 576 pp.

Ricketts, E.F., J. Calvin, et al. (1985). Between Pacific Tides. Stanford University Press.

Rosales-Casián, J., and C. Almeda-Jáuregui. 2009. An unusual occurrence of a green sturgeon, Acipenser medirostris, at El Socorro, Baja California, Mexico. CalCOFI Rep. 50:169-171.

Santa Barbara County Air Pollution Control District (SBCAPCD). 2010. Santa Barbara County Air Pollution Control District 2010 Clean Air Plan. November, 2001.

Sagarin, R.D., R.F. Ambrose, B.J. Becker, J.M. Engle, J. Kido, S.F. Lee, C. M. Miner, S.N. Murray, P.T. Raimondi, D.V. Richards, and C. Roe. 2007. Ecological impacts on the limpet *Lottia gigantea* populations: human pressure over a broad scale on island and mainland intertidal zones. Marine Biology 150:399-413.

Science Applications International Corporation (SAIC). 1986. Assessment of long-term changes in biological communities of the Santa Maria Basin and western Santa Barbara Channel, Phase I. Report No. MMS 86-9912, prepared for US Department of the Interior, Minerals Management Service, Camarillo, Ca.

SAIC. 2000a. Biological assessment for endangered species in outer continental shelf waters of south and central California for consultation with the National Marine Fisheries Service. Submitted to U.S. Environmental Protection Agency Headquarters, Washington, D.C., and Region 9, San Francisco, CA. Reston, VA, and Santa Barbara, CA. EPA Contract No. 68-C4-0034, WA No. IM-5-30. 35 pp.

SAIC. 2000b. Biological assessment for endangered species in outer continental shelf waters of south and central California for consultation with the United States Fish and Wildlife Service. Submitted to U.S. Environmental Protection Agency Headquarters, Washington, D.C., and Region 9, San Francisco, CA. Reston, VA, and Santa Barbara, CA. EPA Contract No. 68-C4-0034, WA No. IM-5-30. 29 pp.

SAIC. 2000c. Essential Fish Habitat assessment for re-issuance of NPDES general permit for oil and gas production platforms off the California coast. Submitted to U.S. Environmental Protection Agency, Region 9, San Francisco, CA. EPA Contract No. 68-C4-0034, WA No. IM-5-30(P).

SAIC and MEC. 1995. Monitoring Assessment of Long-Term Changes in Biological Communities in the Santa Maria Basis: Phase III, Final Report. Report submitted to the U.S. Department of the Interior, Minerals Management Service/National Biological Service, under contgract No. 14-35-0001-30584. MMS OCS Study 95-0049.

Schaanning M.T., H.C. Trannum, S. Øxnevad, J. Carroll, and T. Bakke. 2008. Effects of drill cuttings on biogeochemical fluxes and macrobenthos of marine sediments. Journal of Experimental Marine Biology and Ecology 361, 49–57.

Schiff, K.C., M.J. Allen, E.Y. Zeng and S.M. Bay. 2000. Southern California. Marine Pollution Bulletin 41:76-93.

Scholz, A., C. Steinback, and M. Mertens. 2006. Commercial fishing grounds and their relative importance off the Central Coast of California. Report submitted to the California Marine Life Protection Act Initiative, April 20, 2006.

Schroeder, D.M., A.J. Ammann, J.A. Harding, L.A. MacDonald, W.T. Golden. 2000. Relative habitat value of oil and gas production platforms and natural reefs to shallow water fish assemblages in the Santa Maria Basin and Santa Barbara Channel, California. OCS Study MMS 99-0038. Proceedings of the Fifth California Island Symposium, US Department of the Interior, Minerals Management Service, Pacific OCS Region, Camarillo, CA, and Santa Barbara Natural History Museum, Santa Barbara, CA, 1999.

Sea Empress Environmental Evaluation Committee (SEEEC). 1998. The environmental impact of the Sea Empress oil spill. The Stationery Office, United Kingdom.

Shenker, J.M. 1984. Scyphomedusae in surface waters near the Oregon coast, May-August, 1981. Estuarine Coastal Shelf Science 19:619-632.

Siniff, D.B., T.D. Williams, A.M. Johnson, and D.L. Garshelis. 1982. Experiments on the response of sea otters, *Enhydra lutris*, to oil contamination. Biol. Conserv. 2:261-272.

Smith, J.R., R.F. Ambrose, and P. Fong. 2006. Long-term change in mussel (*Mytilus californianus* Conrad) populations along the wave-exposed coast of southern California. Marine Biology 149:537-545.

Smith, S.A. and W.J. Houck. 1983. Three species of sea turtles collected from northern California. Calif. Fish and Game 70(1):60-62.

Southern California Coastal Water Research Project (SCCWRP). 1973. Technical Report 010.

Sowls, A.L., A.R. Degange, J.W. Nelson, and G.S. Lester. 1980. Catalog of California seabird colonies. U.S. Dept. Interior, Fish and Wildlife Serv. Rpt. FWS/OBS-80-37.

St. Aubin, D.J. 1990. Physiologic and toxic effects on pinnipeds. *In*: J. Geraci and D.J. St. Aubin (eds.). Sea mammals and oil, confronting the risks. Academic Press, New York, NY. 282 pp.

Steinhauer, M., E. Crecelius, W. Steinhauer 1994. Temporal and spatial changes in the concentrations of hydrocarbons and trace metals in the vicinity of an offshore oil-production platform." Marine Environmental Research 37(2): 129-163.

Stephens, J., D. Wendt, D. Wilson-Vandenberg, J. Carroll, R. Nakamura, E. Nakada, S. Rienecke, and J. Wilson. 2006. Rockfish resources of the South Central California Coast: analysis of the resource from partyboat data, 1980-2005. California Cooperative Fisheries Investigations Reports 47:140-155.

Stephens, J.S., Jr., R. Larson and D.J. Pondella, II. 2006. Rocky Reefs and Kelp Beds. Chapter 9 in The Ecology of Marine Fishes: California and Adjacent Waters (ed.s L.G. Allen, D.J. Pondella, II, and M. Horn) pp. 227-252. University of California Press, Los Angeles.

Straughan, D. 1982. Inventory of the Natural Resources of Sandy Beaches In Southern California. Los Angeles: Allan Hancock Foundation. 447 pp.

Suchman, C.L., and R.D. Brodeur. 2005. Abundance and distribution of large medusae in surface waters of the northern California Current. Deep Sea Res II 52:51–72

Szaro, R.C., P.H. Albers, and N.C. Coon. 1978. Petroleum; effects on mallard eggs hatchability. J. Wildl. Manage. 42:404-406.

Takekawa, J.Y., H.R. Carter, D.L. Orthmeyer, R.T. Golightly, J.T. Ackerman, G.J. McChesney, J.W. Mason, J. Adams, W.R. McIver, M.O. Pierson, and C.D. Hamilton. 2004. At-Sea Distribution and Abundance of Seabirds and Marine Mammals in the Southern California Bight: 1999–2003. Unpublished Summary Report, U.S. Geological Survey, Western Ecological Research Center, Vallejo, CA; and Humboldt State University, Department of Wildlife, Arcata, CA 309 pp.

Thompson, B., J.D. Dixon, et al. (1993). Benthic Invertebrates. *In*: Ecology of the Southern California Bight: a synthesis and interpretation. M. Dailey, D. Reish and J. Anderson. Berkeley, Ca, University of California Press: 369-458.

Torch/Platform Irene Trustee Council. 2007. Torch/Platform Irene Oil Spill Final Restoration Plan and Environmental Assessment. Prepared by Prepared by Torch/Platform Irene Trustee Council: United States Fish and Wildlife Service, California Department of Fish and Game, United States Department of Air Force, Vandenberg Air Force Base, California State Lands Commission, With Assistance from Santa Barbara County Planning and Development Department.

Trannum, H.C., H.C. Nilsson, M.T. Schaanning, S. Øxnevad. 2009. Effects of sedimentation from water-based drill cuttings and natural sediment on benthic macrofaunal community structure and ecosystem processes. Journal of Experimental Marine Biology and Ecology 383(2) 111-121.

U.S. Department of Interior (DOI) 1994. Office of Environmental Policy and Compliance, Environmental Compliance Memorandum No. ECM95-3 (30 May 1995).

Vargo, S., P. Lutz, D. Odell, E. Van Fleet, and G. Bossert. 1986. Study of the effect of oil on marine turtles. Final report to Minerals Management Service by Florida Institute of Oceanography. Contract No. 14-12-0001-30063.

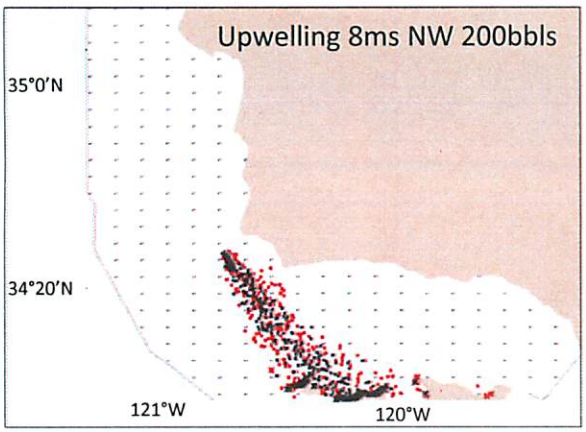
Warrick, J.A., P.M. DiGiacomo, S.B. Weisberg, N.P. Nezlin, M. Mengel, B.H. Jones, J.C. Ohlmann, L. Washburn, E.J. Terrill, and K.L. Farnsworth. 2007. River plume patterns and dynamics within the Southern California Bight. Continental Shelf Research 27:2427–2448.

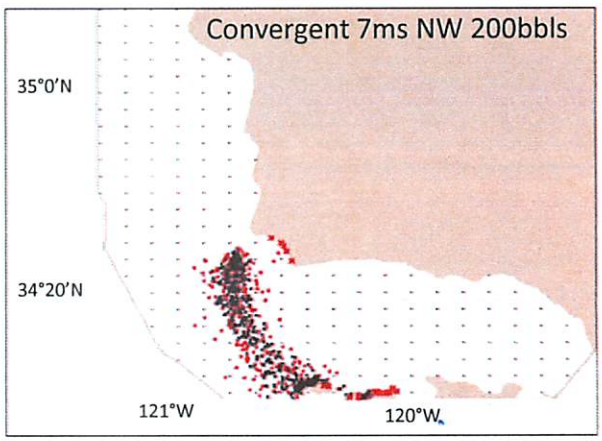
Wenner, A.M. 1988. Crustaceans and other invertebrates as indicators of beach pollution. Chapter 9. *In*: D.F. Soule, and G.S. Kleppel [Eds.]. Marine organisms as indicators. New York: Springer-Verlag. pp. 200-229.

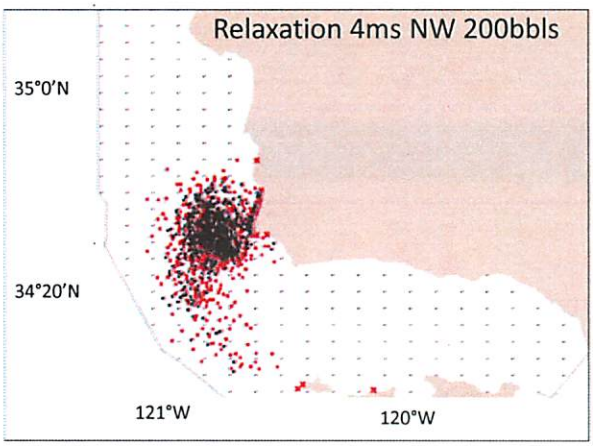
Wiese, F.K., W.A. Montevecchi, G.K. Davoren, F. Huettmann, A.W. Diamond, and J. Linke. 2001. Seabirds at risk around offshore oil platforms in the North-west Atlantic. Marine Pollution Bulletin 42:1285-1290.

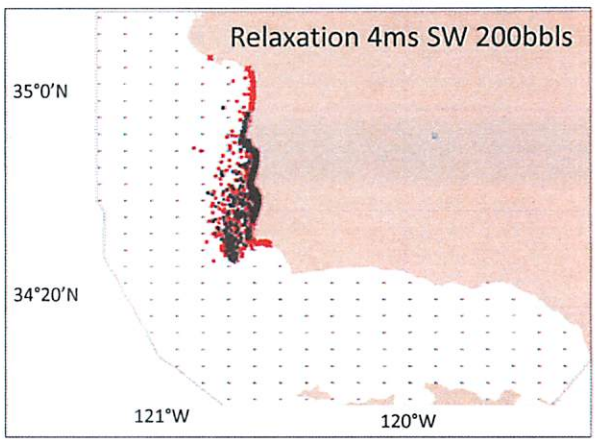
Wolf, S. 2007. University of California, Santa Cruz, personal communication.

Appendix A
Oil Spill Modeling Trajectories









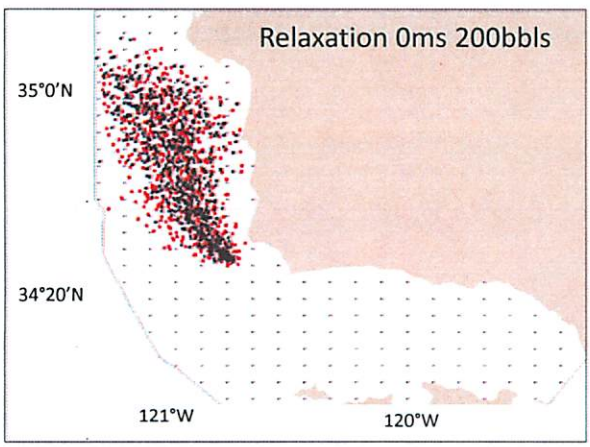
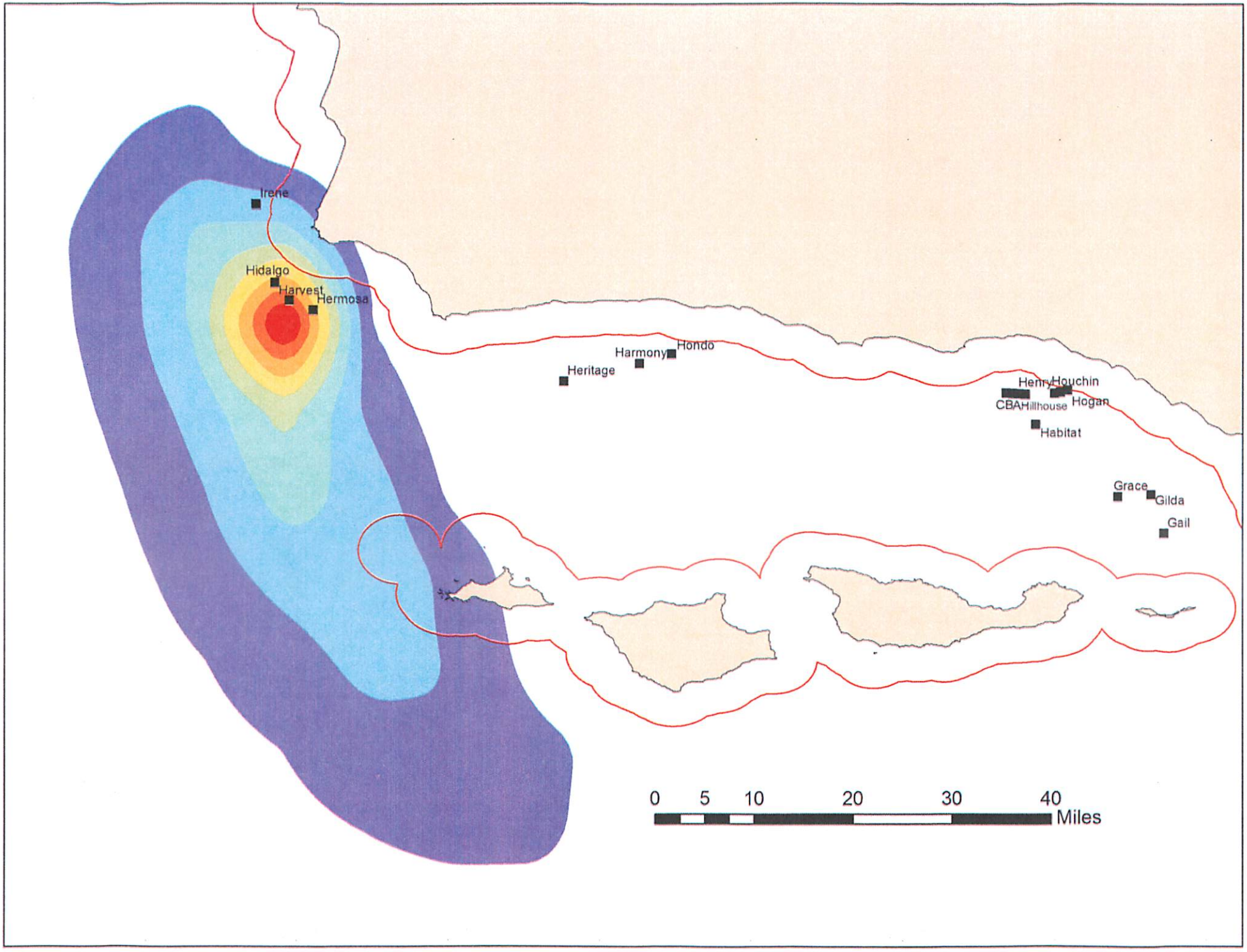


Figure E7.
Platform Hidalgo

Northwest wind: Under upwelling and convergent regimes oil lands on San Miguel Island in 3 days and Santa Rosa Island in 3-4 days. Upwelling carries oil to Santa Cruz Island in 5 days. Convergent ocean currents carry oil to just north of Point Conception in 3 days. The relaxation regime carries oil to Pt. Arguello in 2 days, San Miguel Island in 6 days, Purisima Point in 7 days and Santa Rosa Island in 9 days.

Southwest and neutral wind: In the relaxation regime and neutral wind it take 8 days for oil to land at Pt. Sal. In the relaxation regime with southwest wind, oil lands at Pont Aruguello in 1 day, Purisima Point in two days, Point Sal in 3 days and Pismo Beach in 7 days.


Irene
Hidalgo
Harvest
Hermosa
Harmony
Hondo
Heritage
Henry
Houchin
CBA
Hillhouse
Hogan
Habitat
Grace
Gilda
Gail
0
5
10
20
30
40
Miles