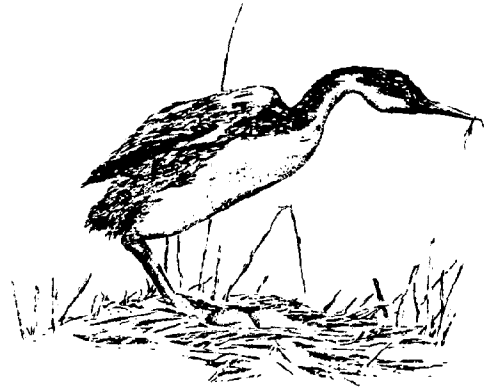


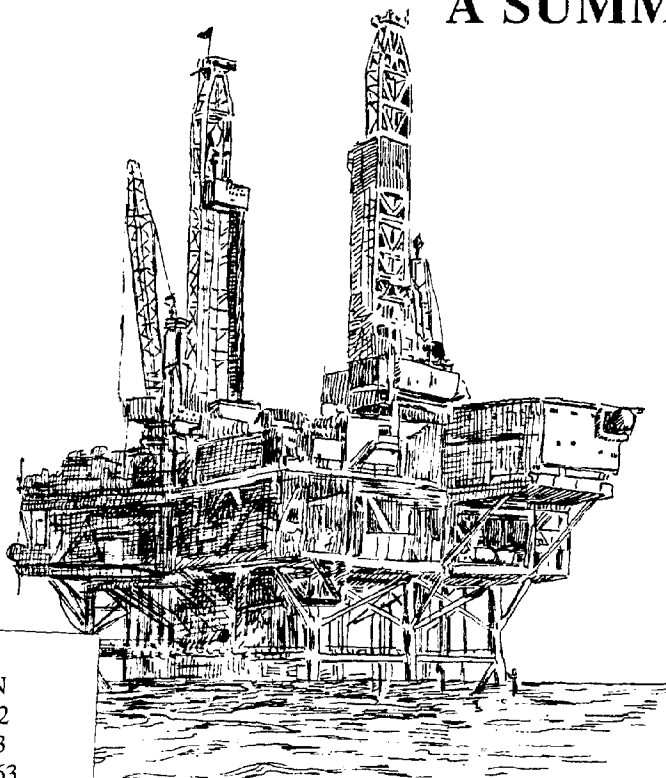
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INFORMATION CENTER



Oil and Gas Activities Affecting California's Coastal Zone:

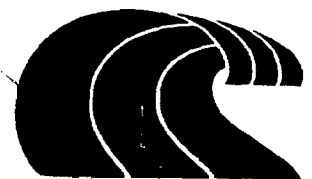
A SUMMARY REPORT

DECEMBER 1988



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CALIFORNIA COASTAL COMMISSION



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OIL AND GAS ACTIVITIES
AFFECTING CALIFORNIA'S COASTAL ZONE

SUMMARY REPORT

CALIFORNIA COASTAL COMMISSION
December 1988

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SUMMARY OF STATISTICS

o Leasing in Pacific OCS and State Tidelands - December 1988

Total OCS Tracts Offered -----	1,691
Total OCS Tracts Leased -----	369
Active OCS leases -----	135
OCS Tracts Reviewed by Coastal Commission -----	1,220
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State Tidelands Platforms -----	1

o Development/Production Platforms in Pacific OCS -
December 1988

Existing -----	21
Approved/Under Construction -----	5
Proposed -----	1
Hypothetical -----	10

o Development/Production Platforms in State Tidelands
December 1988

Existing ----- 8 Platforms 6 Man-made Islands	
Approved/Under Construction -----	0
Proposed -----	5
Hypothetical -----	16

o <u>Pacific OCS and State Tidelands Oil Production</u>		
Pacific OCS 1987 production -----	31,100,000 bbl	
State Tidelands 1987 production -----	30,300,000 bbl	
1999 OCS Peak Production for Santa Barbara Channel/Santa Maria Basin -----	247,600 bbl/d	
o <u>Revenues from Pacific OCS and State Lands</u>		
Pacific OCS from 1963 to 1987 -----	\$5,400,314,000	
Onshore And Offshore State Lands from 1929 to 1987 -----	\$4,917,993,255	
o <u>Existing And Approved Marine Terminals for Crude/Petroleum Product Transportation in California</u> -----		
		70
o <u>Pacific OCS and State Tidelands Pipeline Systems</u>		
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Miles of Pipeline approved/under construction in Pacific OCS -----	101.5	
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INTRODUCTION

California is a major U.S. oil and gas producer. California ranks fourth in overall oil production and second in OCS production among the oil producing states. The California Coastal Commission and numerous other federal, state, and local agencies are involved in planning and regulating oil and gas development along the California Coast.

This Summary Report provides available current statistical information on onshore and offshore California oil and gas activities. It is intended to be used as a background document for Coastal Commissioners, interested public, and other public agencies in their planning and regulation of ongoing energy development.

Commission staff will update and revise the report on a regular basis. Proposed revisions and changes will be solicited from interested parties and public agencies.

The report focuses on oil and gas development in the Pacific Outer Continental Shelf (OCS), State tidelands, and onshore coastal locations. These areas are all within the review authority of the California Coastal Commission by virtue of the California Coastal Act of 1976 and the Federal Coastal Zone Management Act of 1972.

This document is divided into fourteen topical areas which cover leasing activities; offshore and onshore oil and gas exploration and development; oil production and revenue figures; onshore and offshore support facilities; processing facilities; oil and gas sanctuaries; and the major concerns and requirements of the Coastal Commission under its review authority.

Section One gives an overview of the regulation of California oil and gas resources. Section Two provides background information on tract leasing in the Pacific OCS and State Tidelands. It includes the history and process of OCS and State leasing, as well as the present number of active leases off California. Section Three discusses onshore and offshore oil and gas exploration, development, and production activities. It provides an historical summary of exploration and development plans reviewed by the Commission, as well as the number of existing, approved, proposed, and projected hypothetical platforms in the OCS and State Tidelands. Section Four outlines present and projected oil and gas production in California. Revenue figures on OCS and State tidelands development are provided in Section Five. Sections Six, Seven, and Eight focus on oil and gas facilities including existing, approved, and proposed marine terminals, pipeline systems, and separation/treatment facilities. The refinery process and the number of operating refineries in California are discussed in Section Nine. The number and location of crew and supply bases in California are addressed in Section Ten. Section Eleven discusses oil and gas sanctuaries which prohibit oil and gas development in California. Section Twelve, Thirteen, and Fourteen outline the Coastal Commission major concerns with oil and gas development, major conditions required by the Commission's review authority, and positive benefits resulting from Commission review of these activities.

A glossary of terms is provided in Section Fifteen. It lists numerous definitions for terms used in the text of this report in order to further the reader's understanding of oil and gas terminology.

I. REGULATION OF CALIFORNIA'S OIL AND GAS RESOURCES

Energy development beyond the state three-mile limit on the Outer Continental Shelf (OCS) is regulated by the federal Department of Interior (DOI) Minerals Management Service (MMS) through the Outer Continental Shelf Lands Act (OCSLA) as amended and reviewed by the California Coastal Commission (CCC) through the consistency process established by the Federal Coastal Zone Management Act (CZMA).

Under the California Coastal Act of 1976, the Coastal Commission exercises direct coastal permit authority over energy development within the three-mile state tidelands area and onshore to the coastal zone boundary. Where local government has a certified Local Coastal Program (LCP), the local government assumes this permit authority in the onshore areas of the coastal zone subject to the Coastal Commission's review of appeals.

Other state and federal agencies also have review authority over energy development. These agencies, include but are not limited to, the Minerals Management Service (MMS); the State Lands Commission (SLC); the Division of Oil and Gas (DOG); the Department of Fish and Game (DFG); the Regional Water Quality Control Boards (RWQCBs); the Air Pollution Control Districts (APCDs); the Environmental Protection Agency (EPA); the U.S. Coast Guard; and the U.S. Army Corps of Engineers.

II. TRACT LEASING IN OCS AND STATE TIDELANDS

OCS Leasing - Five-Year Leasing Programs

The first step involved in developing offshore oil and gas resources is carrying out a leasing program and sale. The OCSLA requires the Secretary of the Department of Interior (DOI) to develop a five-year schedule for leasing areas or tracts in the OCS for oil and gas exploration and development. At the Call for Information stage, the DOI requests information from industry, government agencies, and the public on offshore areas that either should or should not be considered for lease. The oil industry submits information on areas which it believes may contain oil and gas, and the State and other parties submit nominations and information within areas where oil and gas development would pose problems. The DOI then selects blocks for further study and consideration for sale, prepares an Environmental Impact Statement (EIS) on those tracts, and holds public hearings on the EIS. After public comment, a final EIS is written and the Secretary of the Interior decides which tracts will be offered for sale. Since 1963, there have been nine lease sales and one re-offering sale in the Pacific OCS offshore California, and one lease sale offshore Oregon and Washington. As of 1988, there are still 114 active OCS leases off the California Coast (see Figures 1-4 and Appendix 1). Table 1 provides a summary of California OCS lease sale activity.

In addition to the formal comment process mandated by Congress under the OCSLA, the State of California formerly took the position that offshore oil and gas lease sales required a consistency review by the Coastal Commission under the provisions of the CZMA. However, in January 1984, in the Secretary of the Interior et al. v. California et al the U.S. Supreme Court held that a lease sale does not require a consistency determination because the sale of OCS oil and gas leases is not an activity "directly affecting" the coastal zone within the meaning of Section 307 (c) (1) of the CZMA. Thus, the state's participation is limited to Section 19 of the federal OCSLA, under which the Governor may submit recommendations on the lease sale. The Coastal Commission has submitted recommendations to DOI on the most recent Lease Sale to be held (Lease Sale 80 in southern California) and has submitted comments on proposed Lease Sales 91 (Northern California), 95 (Southern California), and 119 (Central California).

Concern over oil development impacts on sensitive coastal areas led Congress to impose a moratorium from 1982 to 1985 restricting leasing in key areas. The moratorium covered the four northern basins, waters offshore Santa Monica Bay, and waters offshore Newport Beach to San Diego. The Coastal Commission supported the moratorium in a formal resolution to Congressional leaders.

DOI has adopted a new Five-Year Lease Program for the period covering mid-1987 through mid-1992 which includes leasing areas off most of the California coast. (see Figures 9a, 9b and 9c) On April 10, 1986 and reaffirmed on February 24, 1987, the Commission recommended that DOI not carry out the Five-Year lease program due to unacceptable impacts on coastal resources, the lack of an overall energy policy which precludes rational planning for such lease sales, and the absence of an adequate EIS. The program is outlined on page 5.

Table 1

Summary of California OCS Lease Sale Activity
December 1988

<u>Lease Sale</u>	<u>Sale Date</u>	<u>Tracts Offered</u>	<u>Tracts Offered with CCC Objection*</u>	<u>Tracts Leased</u>	<u>Tracts Leased with CCC Objection*</u>	<u>Active Leases</u>
P1**	05/14/63	129		57		0
P3**	12/15/66	1		1		0
P4**	02/06/68	110		71		24
35**	12/11/75	231		56		1
48	06/29/79	148	0	54	0	10
53	05/28/81	111	29	60	19	39
68	06/11/82	140	24	29	0	15
RS-2	08/05/82	27	0	10	0	2
73	11/30/83	137	137	8	8	4
80	10/17/84	657	61 (plus deferral of all tracts in the S.B. Channel)	23	17	19
91	Pending					
95	Pending					
119	Pending					
<u>Totals</u>	<u>1,691</u>	<u>251</u>	<u>369</u>	<u>44</u>	<u>114***</u>	

* - Based on the Supreme Court case (Secretary of Int. vs. California et al.), the Commission has made only recommendations on Lease Sales 80 and 91.

** These are Lease Sales which occurred either before the establishment of the Coastal Commission in 1972 or the approval of federal consistency jurisdiction in 1978.

*** - See Appendix 1 for list of undeveloped California OCS active leases.

(Sources: MMS, Pacific Summary Report 1987; California Coastal Commission files; and California Coastal Commission April 1986 staff reports on Call for Information for Lease Sale 91 and the DOI Proposed Five-Year Lease Program.)

1. Planning Areas: The Pacific OCS previously had two Planning Areas. In the Final Five Year Program the DOI reconfigured these into three Planning Areas:

Northern California -	California/Oregon border to Mendocino/Sonoma County border
Central California -	Mendocino/Sonoma County border to Monterey/San Luis Obispo County border
Southern California -	Monterey/San Luis Obispo County border to California/Mexico border

2. Lease Sales: 5 OCS lease sales are proposed for the California Planning Areas:

	<u>Planning Area</u>	<u>Call for Information Issued</u>	<u>Lease Sale to be Held</u>
91	Northern Calif.	Feb 1986	Oct 1989
95	Southern Calif.	July 1987	April 1990
119	Central Calif.	Nov 1988	March 1991
128	Northern Calif.	Jan 1990	Feb 1992
138	Southern Calif.	May 1990	June 1992

Lease sale dates are based on the DOI Final Program. The date for Lease Sale 91 had been delayed to August 1989 pending review by the Bush administration. Both the House and Senate have passed amendments to the DOI's budget extending Lease Sale 91 to October 1989. The final size and location of each lease sale will be determined through a two-year planning process that begins with the Call for Information and Nominations and ends with the lease sale.

3. Subarea Deferrals: DOI proposes to defer nine areas from any leasing during the new Five-Year Program: (Figures 9a, 9b and 9c indicate specific locations)

Northern California Areas of Special Biological Significance (ASBS)
Pt. Reyes Wilderness
Pt. Reyes - Farallon Islands National Marine Sanctuary
Offshore San Francisco Bay
Offshore Monterey Bay
Offshore Big Sur
Santa Barbara Ecological Preserve & Buffer Zone
Channel Islands National Marine Sanctuary
San Nicolas Basin
Buffers around San Clemente and Catalina Islands

OCS Lease Sale 91 - Northern California

On February 13, 1986, the Department of Interior issued the Call for Information and Nominations for Lease Sale 91 (see Figure 10a). Lease Sale 91 is included in the Final Five-Year Oil and Gas Leasing Program for 1987-1992. Proposed Sale 91 includes an area from 12 miles south of Point Arena, north about 75 miles to Point Delgada offshore Mendocino County, and an area offshore the City of Eureka and Humboldt County. The Call area covers 229 blocks totaling 1.3 million acres. On April 10, 1986 the Coastal Commission recommended to DOI that no areas be leased under Lease Sale 91 due to unacceptable impacts on coastal resources, the lack of an overall energy policy which precludes rational planning for such lease sales, and the absence of an adequate EIS. The Draft EIS document was released December 1987 for public review and comment. Hearings on the document were held in Eureka on February 1, 1988 and in Fort Bragg on February 3, 1988. The hearings were well attended, with over 2,000 people at the hearing in Fort Bragg. The overwhelming majority of testimony pointed to deficiencies in the document and expressed opposition to the Lease Sale which has now been delayed until October 1989. The Commission staff submitted comments on the Draft EIS to the Department of the Interior which identified numerous deficiencies in the document.

OCS Lease Sale 95 - Southern California

On July 9, 1987, the DOI issued a Call for Information and Notice of Intent (NOI) to prepare an EIS on Lease Sale 95 offshore Southern California (see Figure 10b). It consisted of 1,375 blocks located from 3 to 130 miles offshore San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, and San Diego Counties.

The Coastal Commission staff commented to DOI that proposed Lease Sale 95 would pose unacceptable risks of oil spills, visual and air quality degradation, marine resource impacts, commercial fishing conflicts, and continued impacts on the state's vital tourism industries.

On November 17, 1988, the DOI issued a supplemental Call for Information for Lease Sale 95 to add 17 blocks to the sale totaling 76,735 acres offshore Camp Pendleton and the cities of Oceanside, Carlsbad, and San Clemente in San Diego County. (see Figure 10c). On December 14, 1988, the Commission adopted comments opposing the proposed action because of the reasons stated above, and the fact that the Supplemental Call is not authorized under the existing Five Year Program.

OCS Lease Sale 119 - Central California

On November 10, 1988, the Department of the Interior submitted a Call for Information for the offshore oil and gas Lease Sale 119 (see Figure 10d). This call covers 1.7 million acres, from 3 to 45 miles offshore, affecting Mendocino, Sonoma, Marin, San Francisco, San Mateo, Santa Cruz, and Monterey counties. The Commission is on record objecting to leasing in this region of the Outer Continental Shelf in its March 31, 1981 comments on Lease Sale 53, and in its April 10, 1986 comments on the Five Year Oil and Gas Leasing Program. On December 14, 1988, the Commission adopted comments opposing

Lease Sale 119, stating that the sale poses unacceptable risks of oil spills; visual, recreational, and air quality degradation; marine resource impacts; commercial fishing conflicts; and continued impacts to the state's vital tourism industries. Further, the lack of an overall comprehensive policy for energy supply for this nation precludes rational planning for such lease sales. The Commission went on to find that the EIS for the Five Year Program does not adequately identify or discuss the impacts of these proposed sales.

State Tidelands Leasing

The area off California from the mean high tide line seaward to the three-nautical mile boundary is under the jurisdiction of the State of California as a result of Public Law 31, the Submerged Lands Act (SLA), passed by Congress in 1953. The State Lands Commission (SLC) has title to all tidelands and submerged lands with the exception of certain government land. Since 1938 the SLC has issued state leases for offshore oil and gas leasing by competitive bid and collected royalties for oil and gas production in state waters. The last state offshore lease sale was held in 1968. Another sale that was scheduled to be held in November 1983, offering eight parcels from Point Arguello to Point Conception, is not currently being proposed by the State Lands Commission. As of 1988, there are 50 active leases in California State Tidelands. (see Figures 5-8) Table 2 lists each lease number with the respective operator and issue date.

Table 2

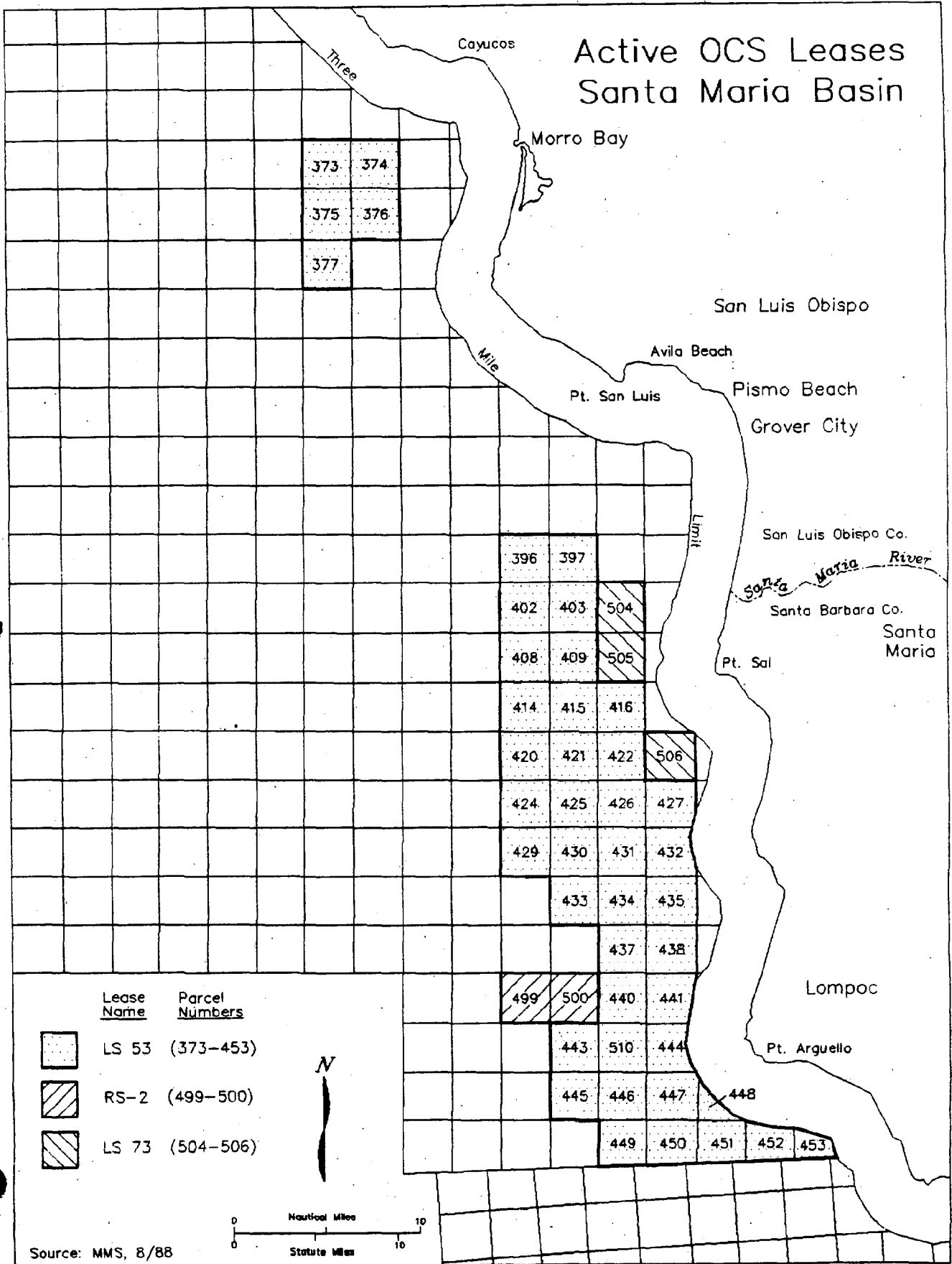
Summary of California State Tidelands Leasing Activity

December 1988

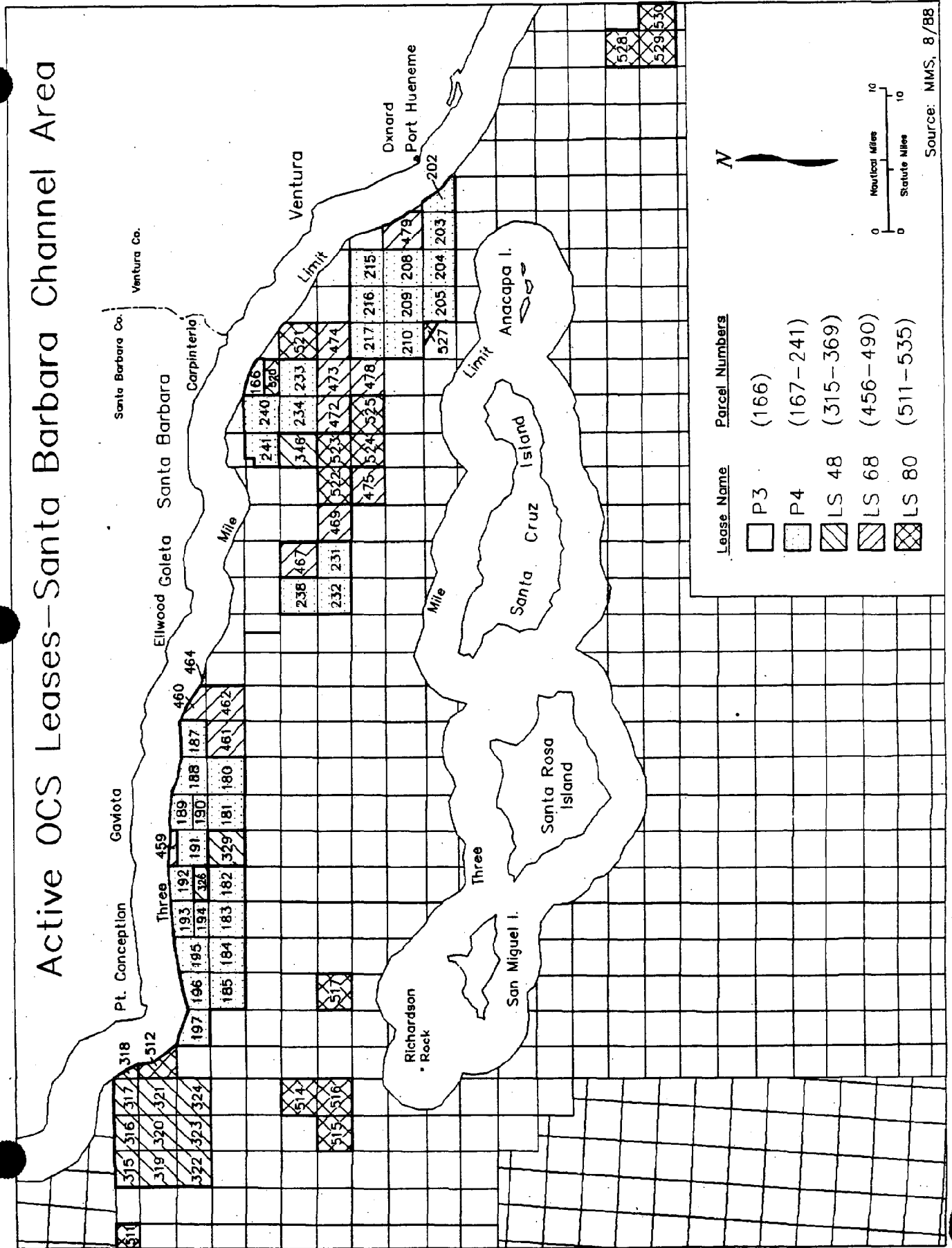
Tracts Leased - 50

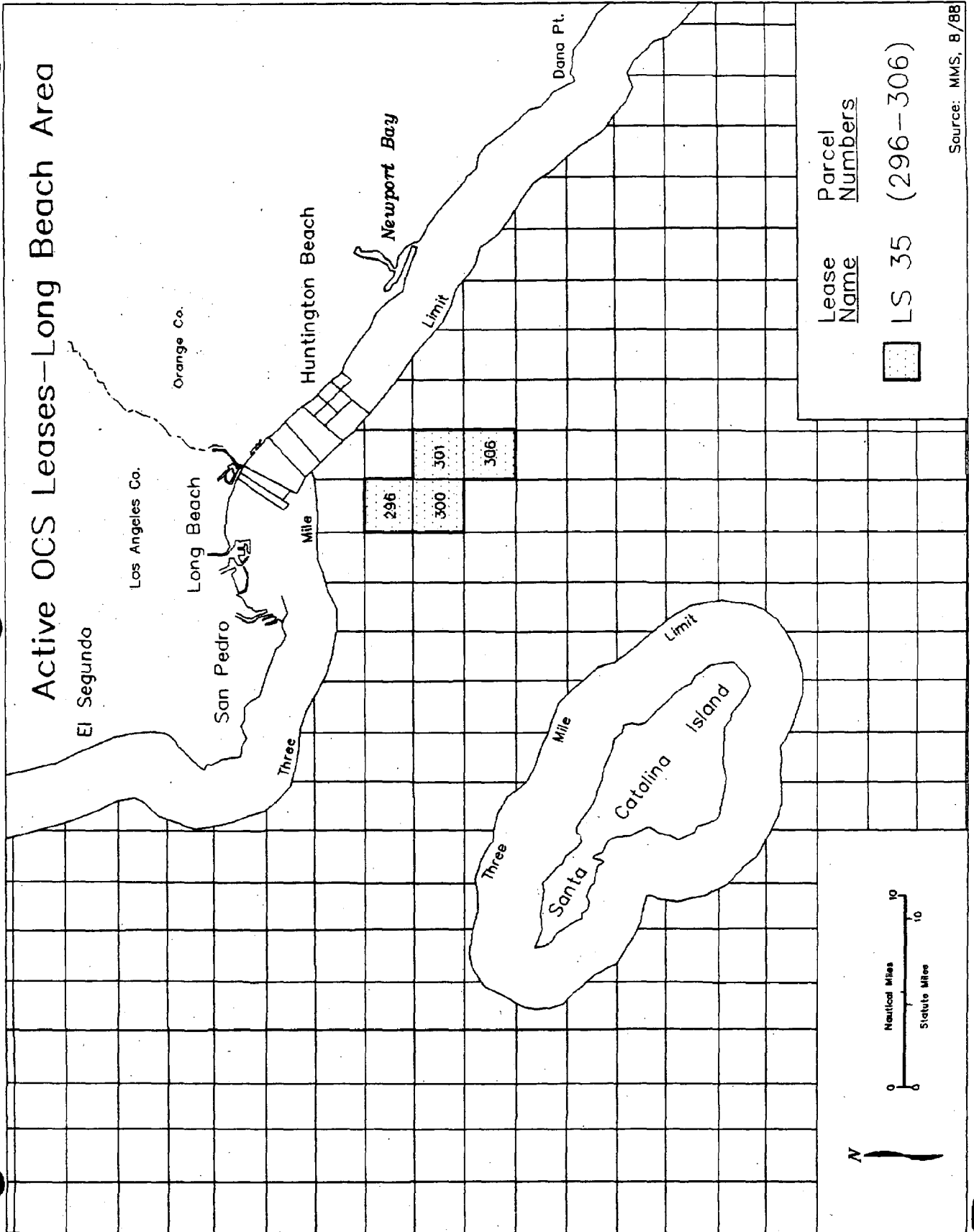
<u>Lease Parcel Numbers</u>	<u>Operator</u>	<u>Commission Issue Date</u>
91	SWEPI	5/21/43
129	ARCO	1/27/44
145	Energy Dev. Cal.	7/3/44
163	SWEPI	11/15/44
186	Exxon	9/24/45
208	ARCO	1/18/46
308	ARCO	3/4/47
309	ARCO	3/4/47
392	SWEPI	9/26/38
410	Bush	4/17/29
421	ARCO	10/22/29
425	SWEPI	1/10/50

<u>Lease Parcel Numbers</u>	<u>Operator</u>	<u>Commission Issue Date</u>
426	SWEPI	2/10/50
427	Mobil	5/19/30
429	Bush	4/21/31
1466	Bush	8/29/55
1824	Chevron	1/10/57
2199	Chevron	7/21/59
2206	Texaco	7/25/68
2725	Texaco	5/4/61
2726	ARCO	5/4/61
2793	ARCO	10/26/61
2879	UNOCAL	4/22/62
2894	Chevron	6/28/62
2920	SWEPI	8/28/62
2933	Phillips	10/25/63
2955	Phillips	10/20/62
2991	UNOCAL	2/28/63
3004	UNOCAL	4/25/63
3033	UNOCAL	7/25/63
3095	Chevron	10/30/64
3120	ARCO	4/8/65
3133	Exxon	5/28/64
3150	Chevron	7/28/64
3184	Chevron	9/29/64
3242	ARCO	4/24/64
3314	SWEPI	7/2/65
3403	Chevron	11/18/65
3413	UNOCAL	12/1/65
3455 (Tract 2)	City of Long Beach	3/11/66



Active OCS Leases—Santa Barbara Channel Area

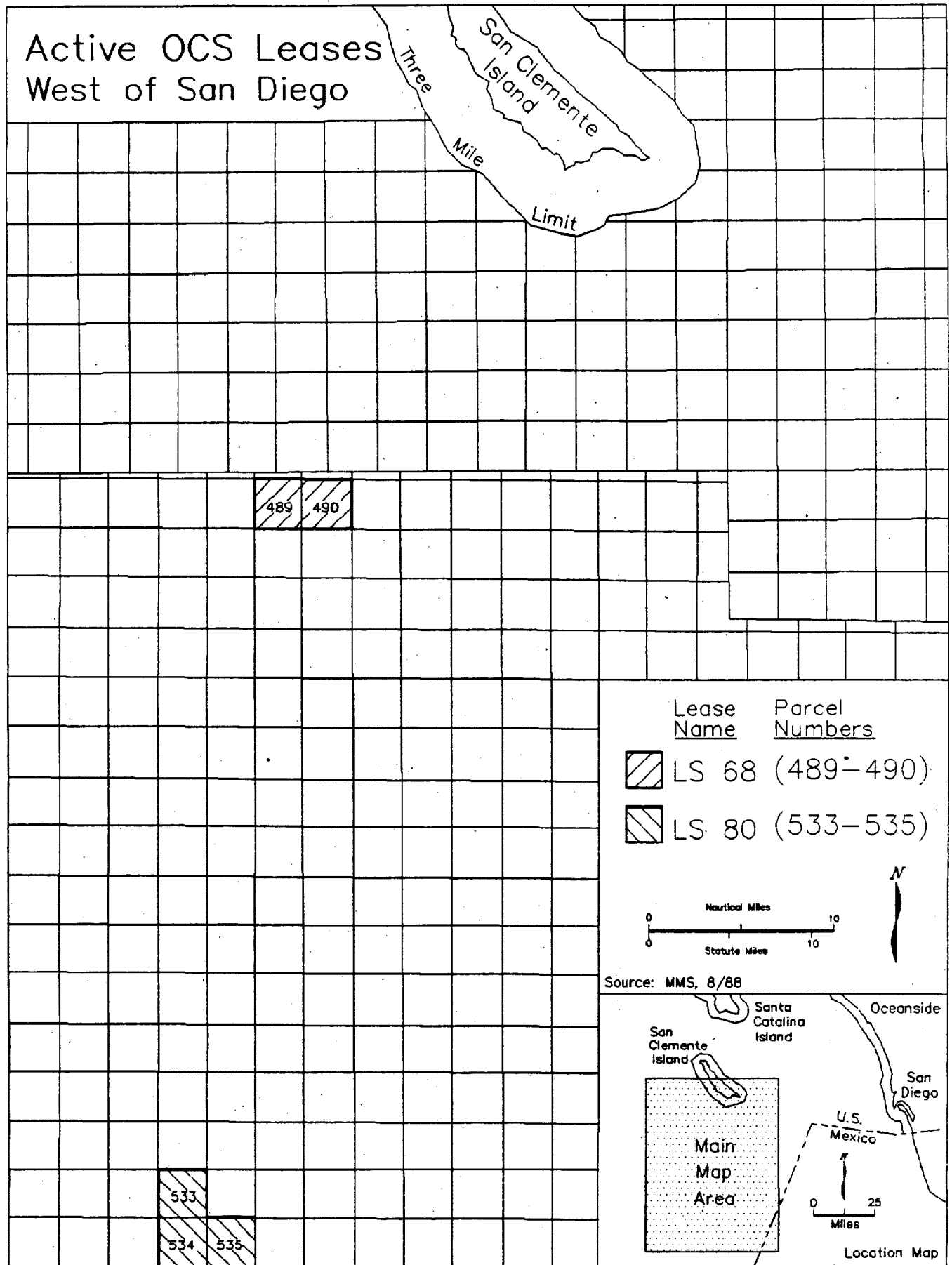




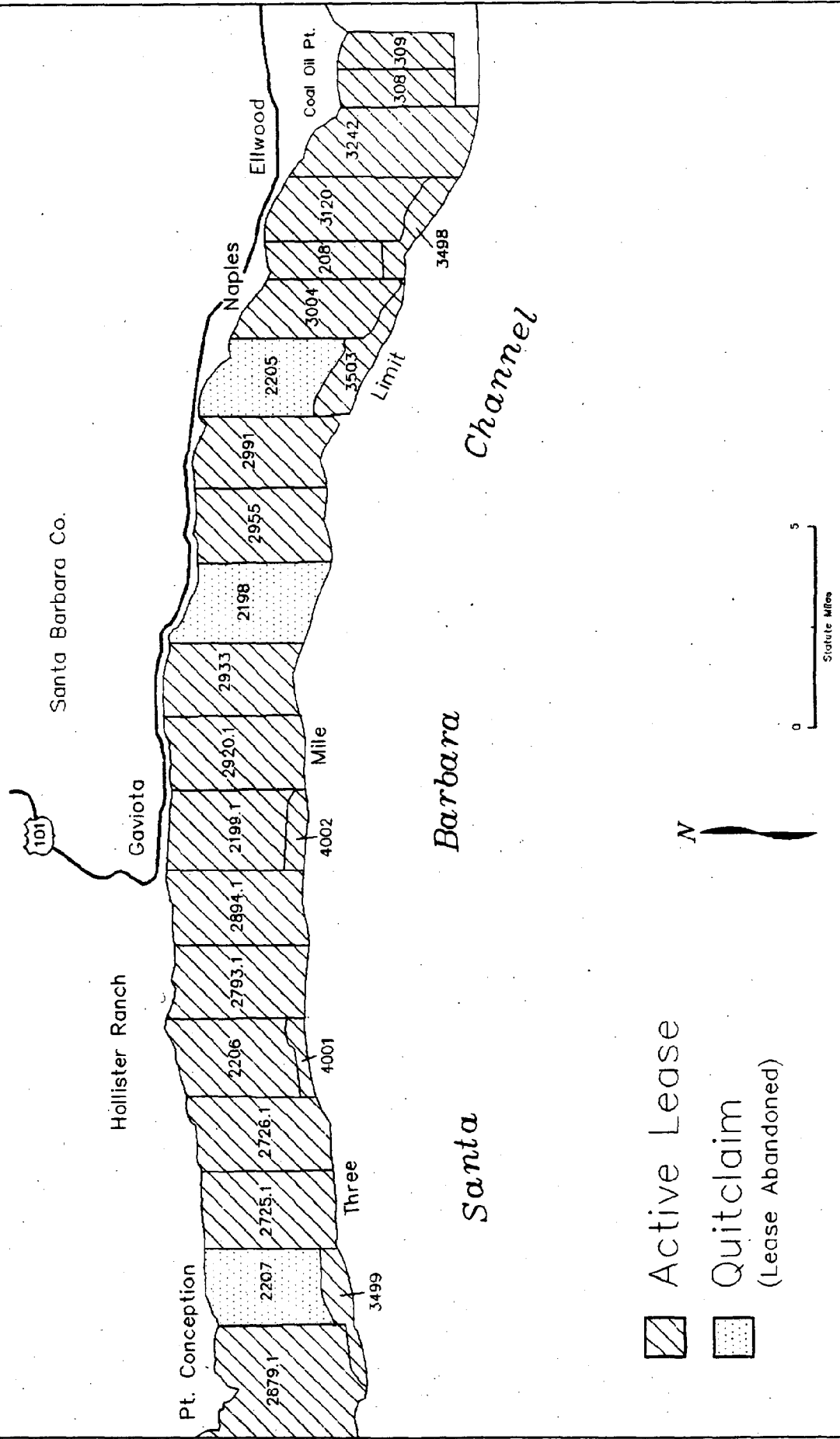
Source: MMS, 8/88

Figure 3

Active OCS Leases West of San Diego

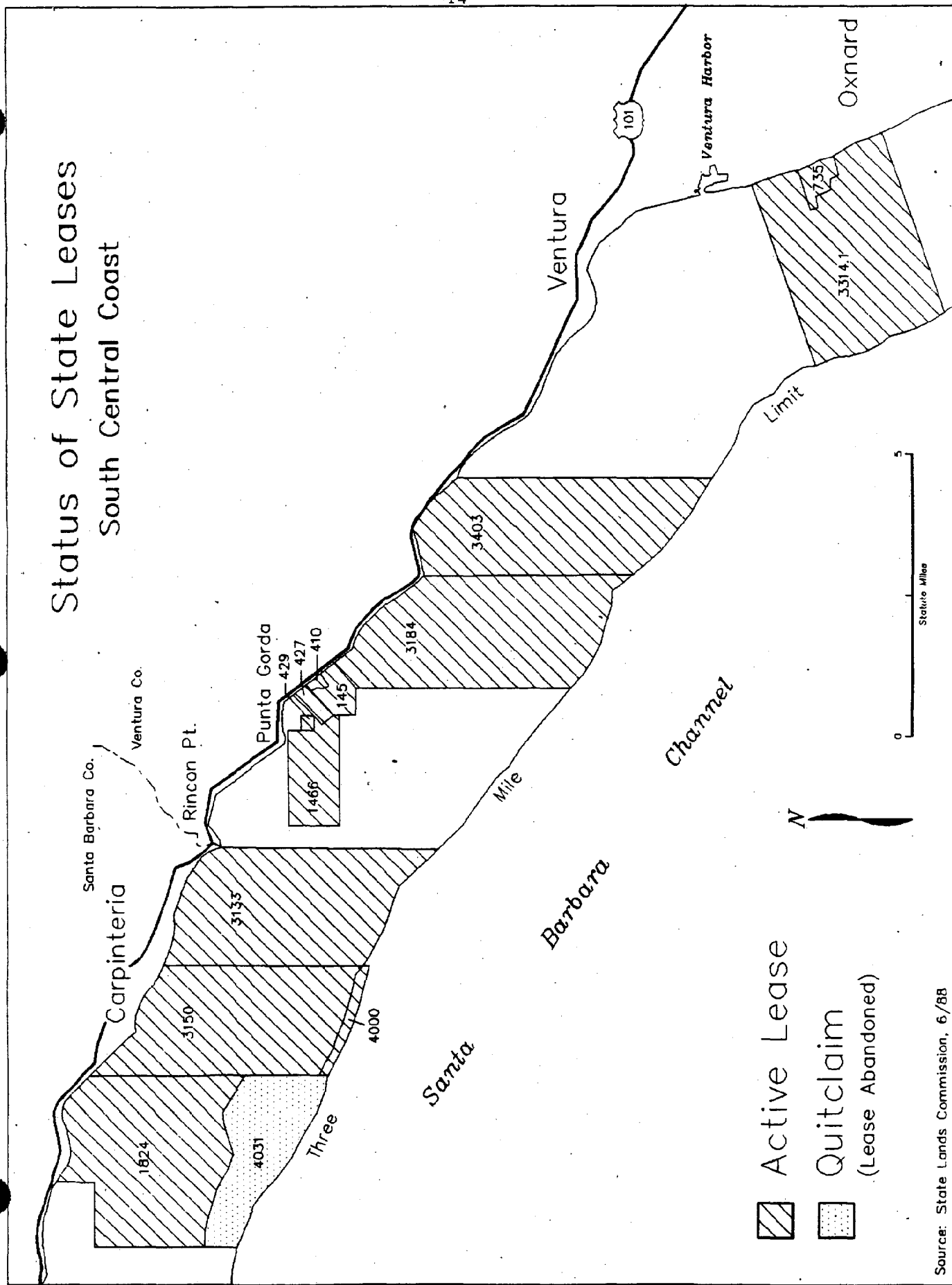


Status of State Leases South Central Coast



Source: State Lands Commission, 6/88

Status of State Leases South Central Coast



Source: State Lands Commission, 6/88

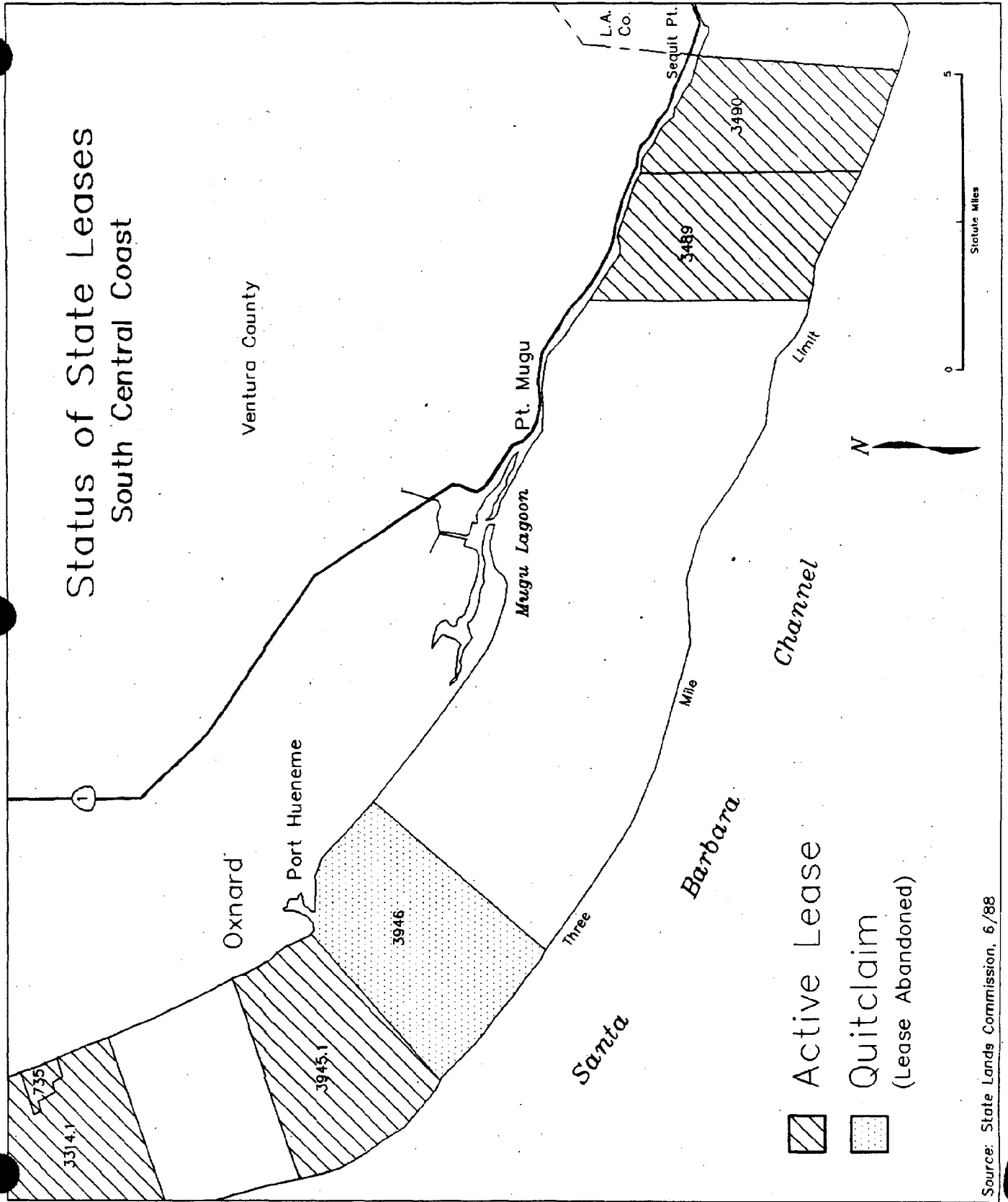
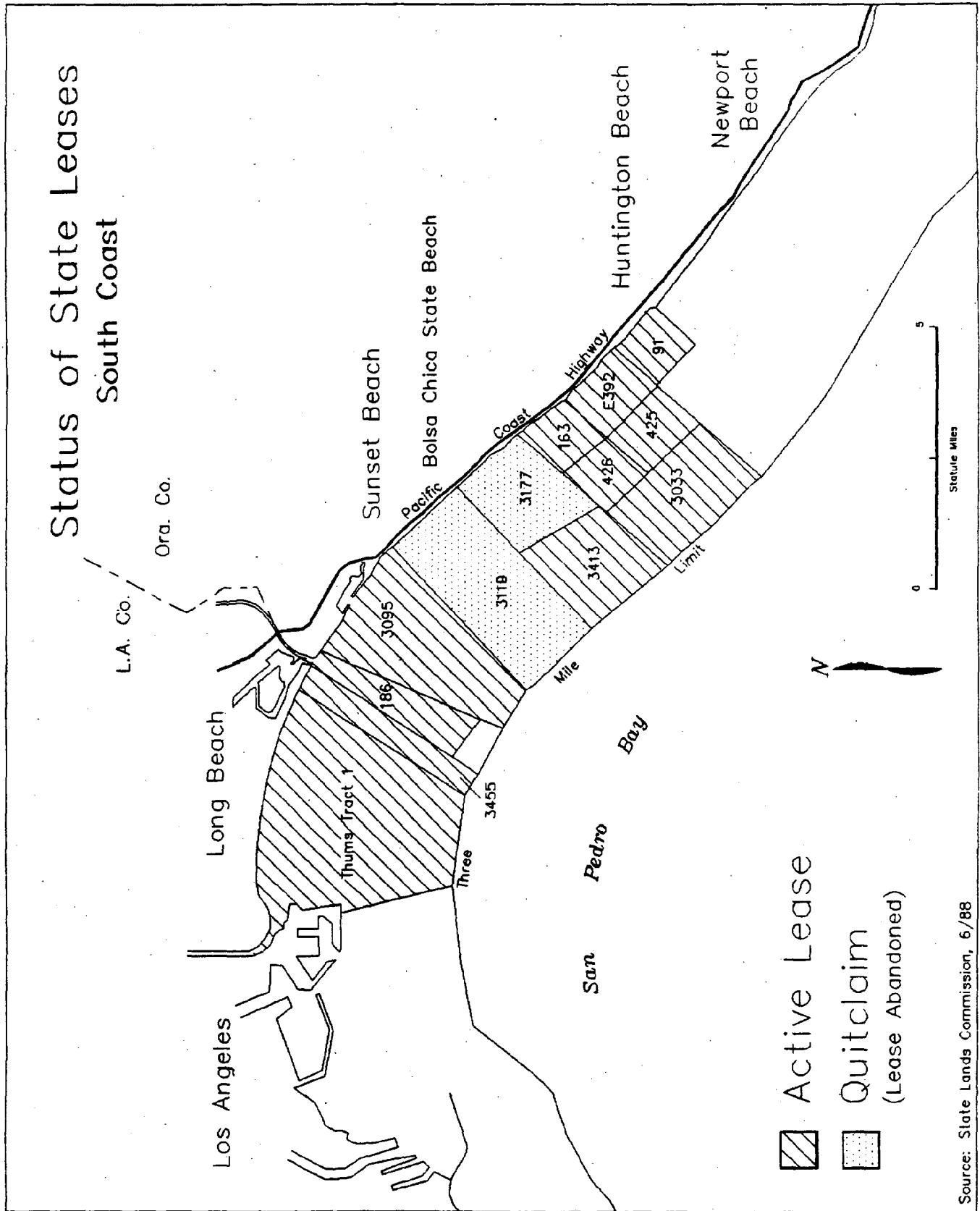


Figure 7



Source: State Lands Commission, 6/88

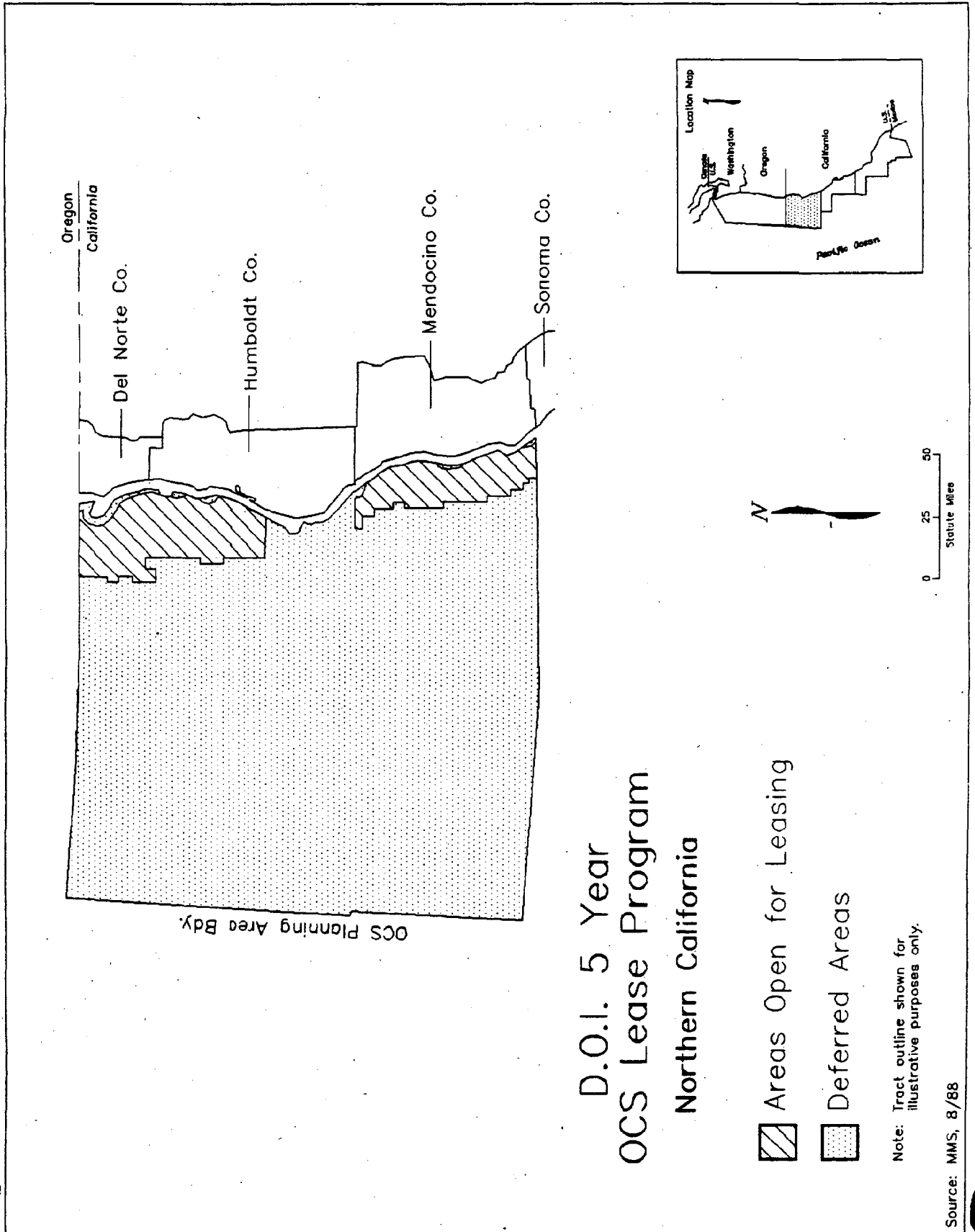


Figure 9a

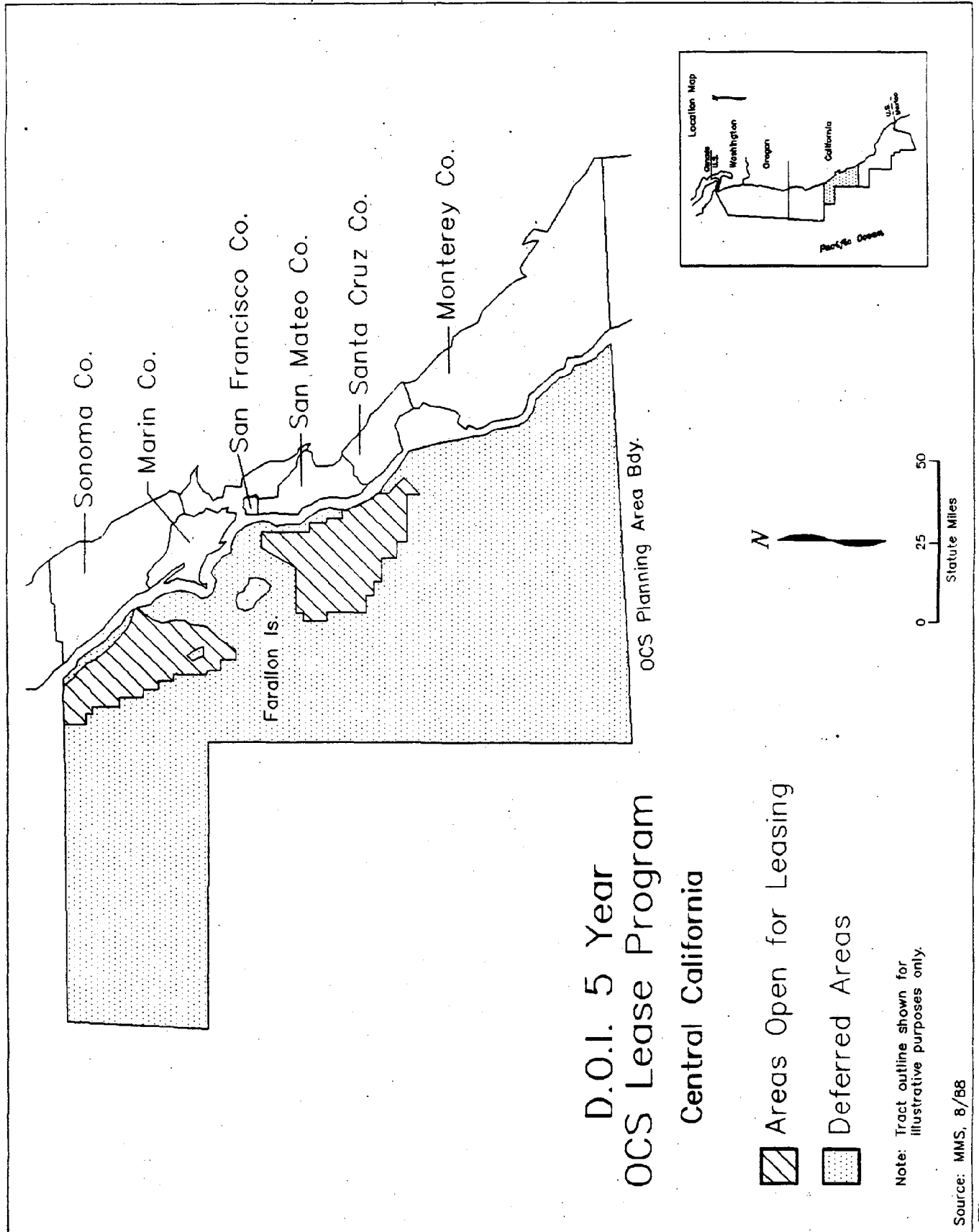


Figure 9b

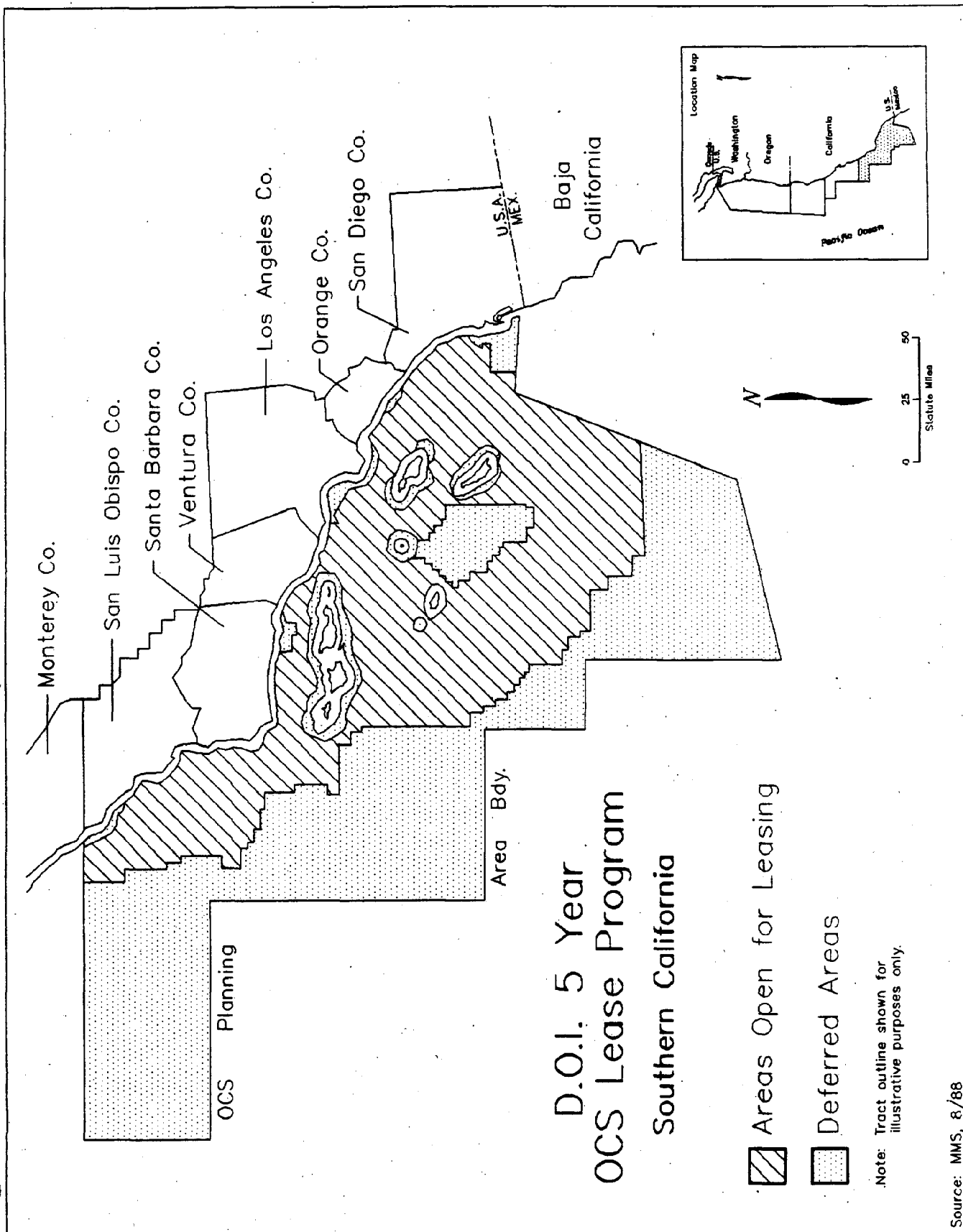
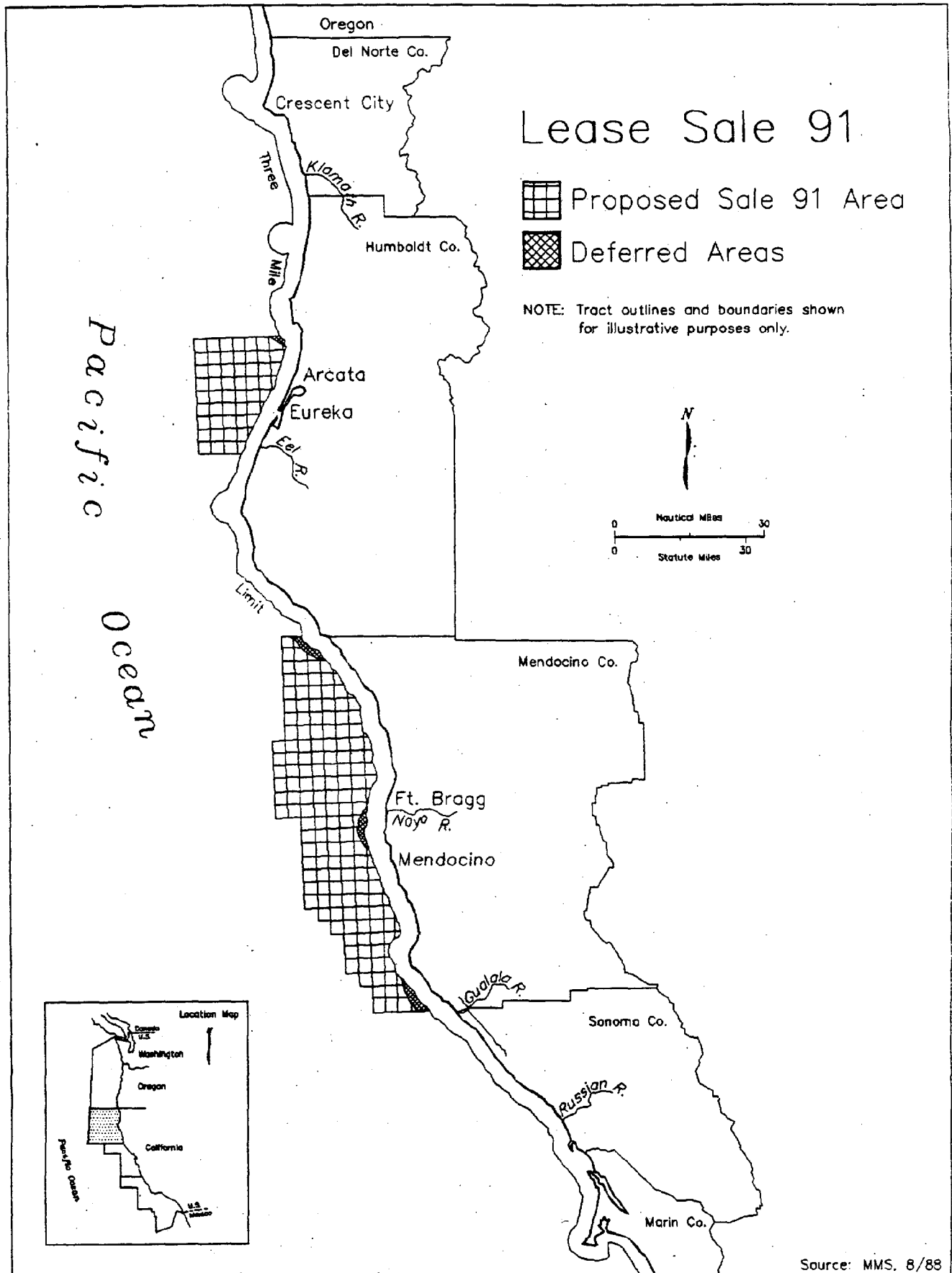
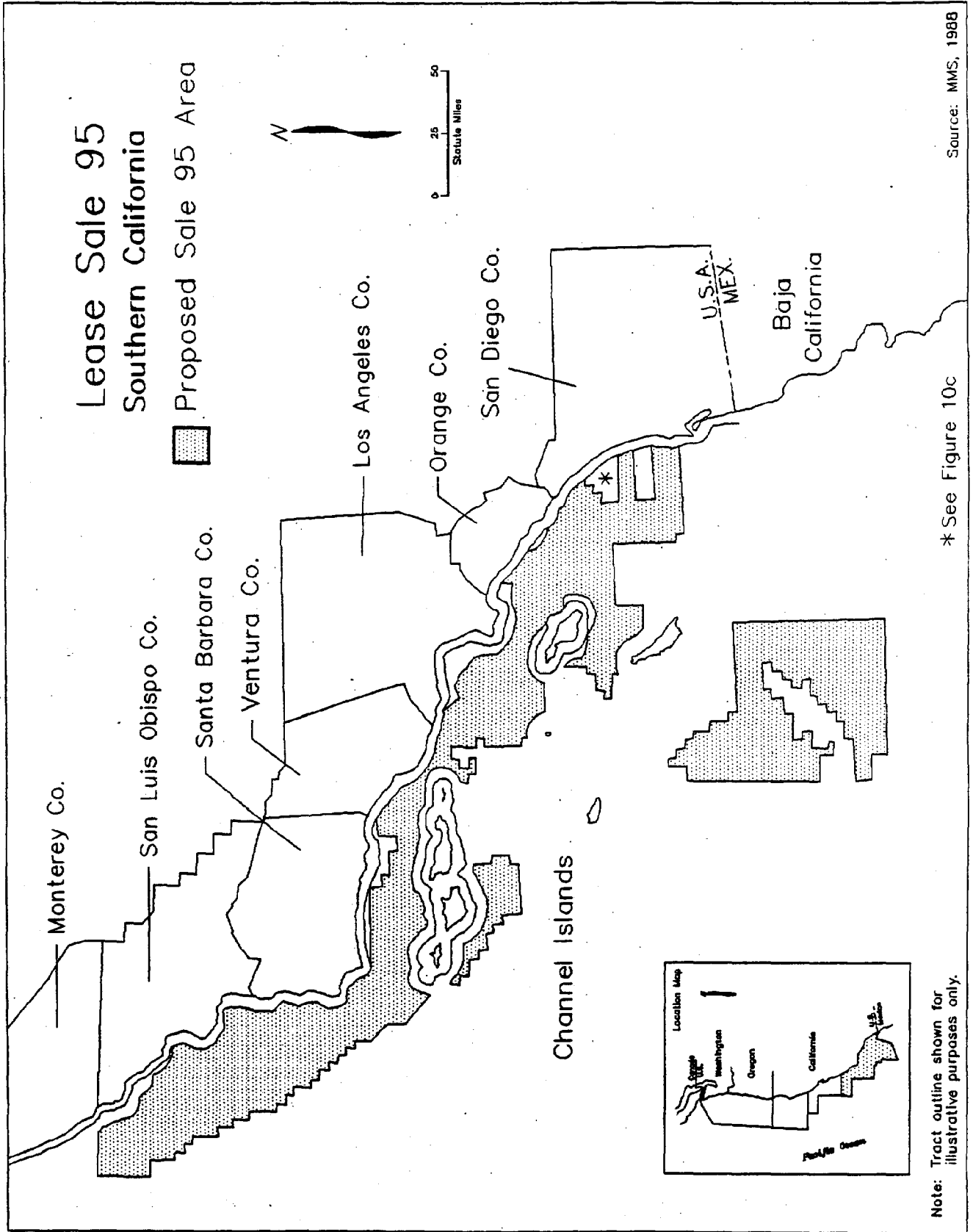
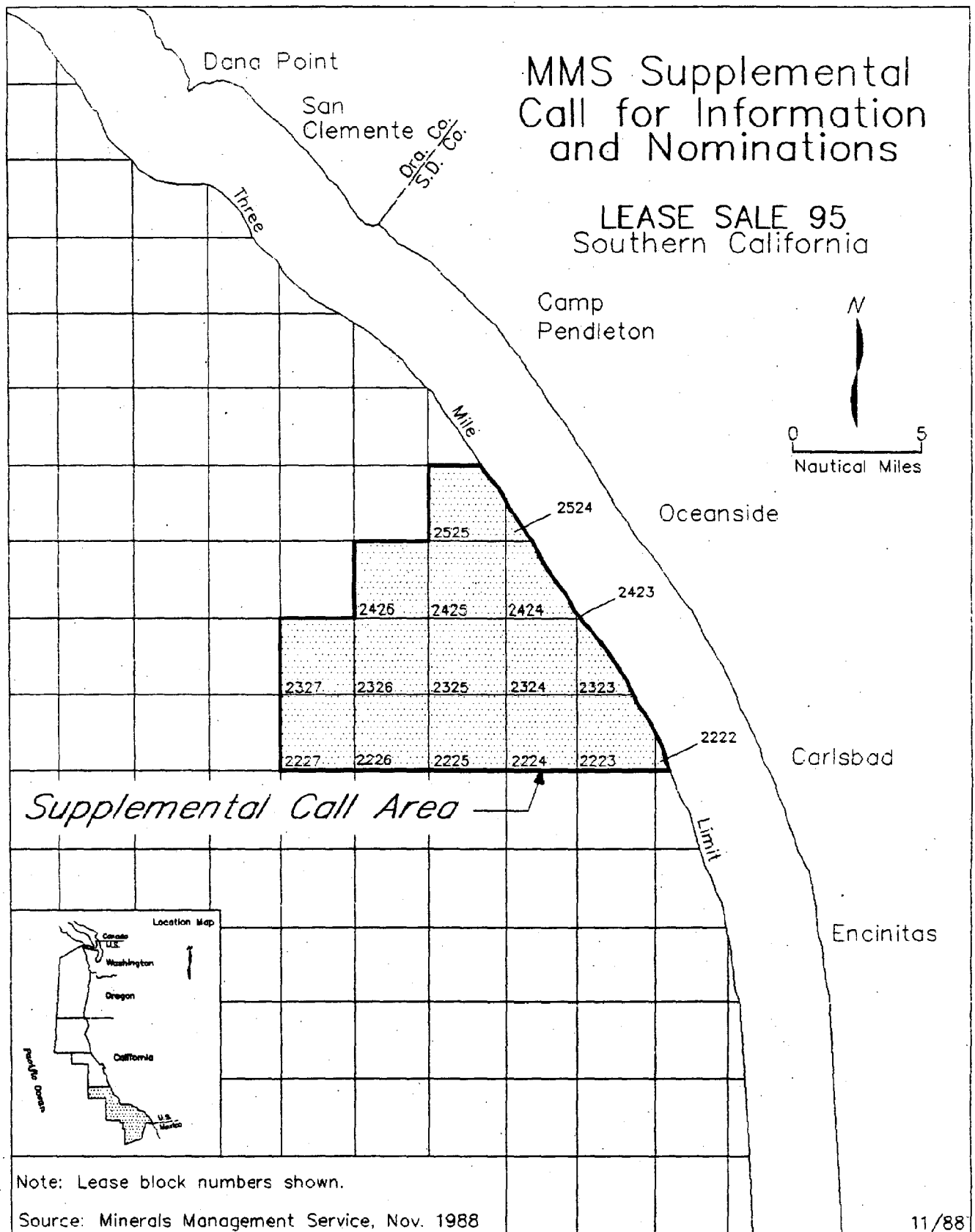
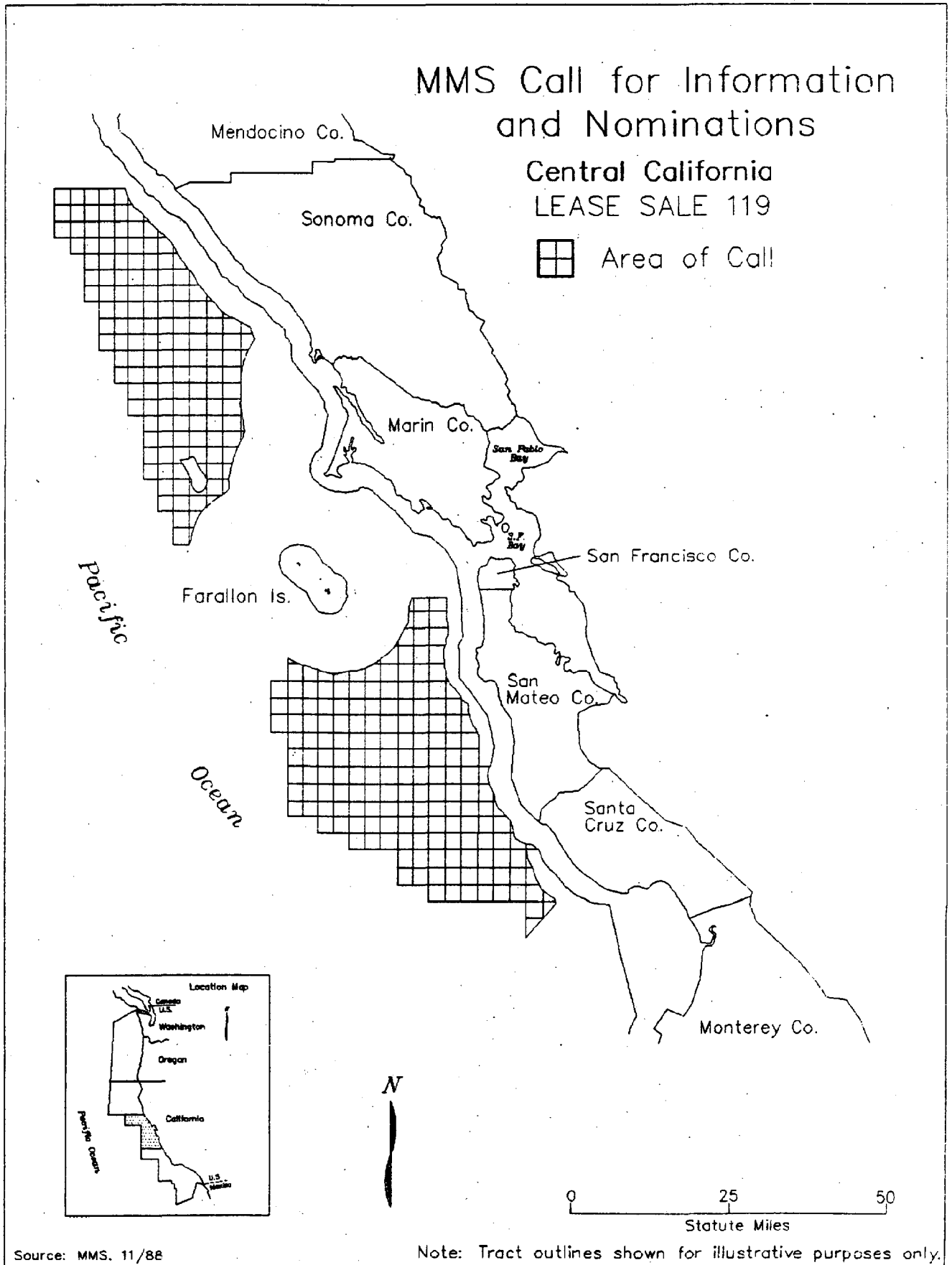


Figure 9c









III. PACIFIC OCS AND STATE OFFSHORE EXPLORATION/DEVELOPMENT PLANS

Once a company has leased an offshore parcel in the OCS or state tidelands, it is required under lease provisions to proceed with exploration (single or multiple wells) and development plans within a two to ten year period. An exploration plan outlines the timing and activities of an exploratory rig in a specific state tidelands or OCS location. A development plan outlines all proposed development and production activities in a specific state tidelands or OCS location. It generally includes a proposed offshore oil production platform, pipelines, and associated onshore facilities such as processing plants, transportation pipelines, and storage tanks.

In the case of OCS plans, the lessee or operator must generally submit the exploration plan to the Minerals Management Service (MMS) before the end of the second year of a Five-Year lease or within the time specified in a 10-Year lease. As stated in Section II, the MMS along with other federal agencies, has regulatory authority beyond the State three-mile limit. However, since 1978 when the Coastal Commission's Coastal Management program was certified as consistent with the federal Coastal Zone Management Act, the Commission has also had consistency review authority over Plans of Exploration (POEs) and Development and Production Plans (DPPs) in the OCS as well as any associated facilities in the state tidelands and onshore (i.e., pipelines, processing facilities, storage tanks) with respect to those activities directly affecting land and water uses of the coastal zone.

A permit from MMS cannot be granted for a plan without Coastal Commission concurrence that the project is consistent with its federally approved coastal management program. Concurrence can be presumed if the Commission does not act within six months of receiving a plan from MMS. If the Commission objects, it must give detailed reasons why it objects and how the project could be altered to be consistent with its coastal management program. Failure of a company to submit information which the Coastal Commission determines necessary for a complete and proper consistency review is also grounds for an objection to an OCS plan. The Secretary of Commerce can override an objection if necessary in the interest of national security or the proposed project is found to be consistent with the objectives or purposes of the Coastal Zone Management Act of 1972.

Under the Coastal Act of 1976, the Commission exercises direct coastal permit authority over plans of exploration and development which are within the three-mile offshore state waters boundary and onshore to the coastal zone boundary. Where local government has a certified Local Coastal Program (LCP), the local government assumes this permit authority in the onshore areas of the coastal zone, subject to the Commission's review of appeals in certain geographic areas and for certain types of development. Local coastal permits on all major energy projects are appealable to the Commission.

Plans of Exploration (POEs) or Development and Production Plans (DPPs) for state tidelands must also be reviewed and approved by the State Lands Commission. In addition, in State Tidelands the Division of Oil and Gas (DOG) issues permits to drill. DOG establishes engineering standards, and inspects operations of all wells drilled both offshore and onshore. Other agencies

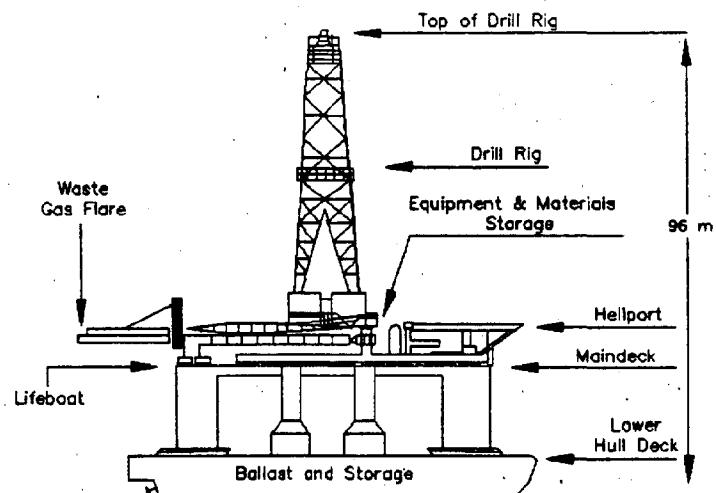
that have some responsibilities and control of exploration and development activities in state waters include the Department of Fish and Game, the Regional Water Quality Control Boards, and the Air Pollution Control Districts.

With the approval of an OCS or state exploration plan by all required agencies, the company can proceed with exploratory drilling at the proposed well location(s). Drill ships, semi-submersibles, and jack-up rigs are generally used for exploratory drilling off California (see Figure 11). Exploratory programs may propose the drilling of single or multiple wells. The average length of time for an exploratory operation is three months, which includes active drilling, evaluation and abandonment, and moving off the site.

If any oil and/or gas discoveries warrant development and the DPP has been approved by all applicable agencies, the company will proceed with development and production. Steel template, pile founded platforms are generally used in oil and gas development and production offshore California except for some man-made islands and gas subsea completions in state tidelands (see Figures 12 & 13). Platforms are fabricated at one or more onshore facilities and towed to their offshore installation site. A development drilling program is designed for each platform to bring the oil and gas discovery into production. Development drilling on the platform usually occurs for 3-10 years. Large platforms are typically equipped with two rigs for drilling wells. After the completion of development wells, the production phase begins in which well fluids are brought to the surface, separated, measured, stored, and piped to shore to be further processed and transported to other oil and gas related facilities.

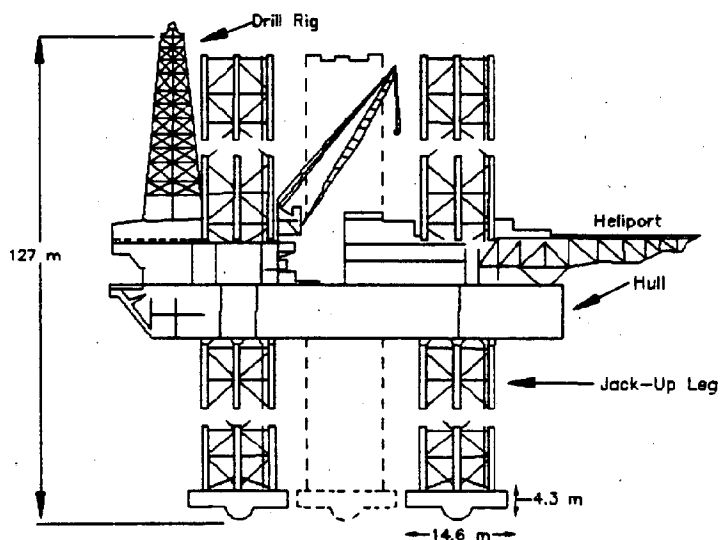
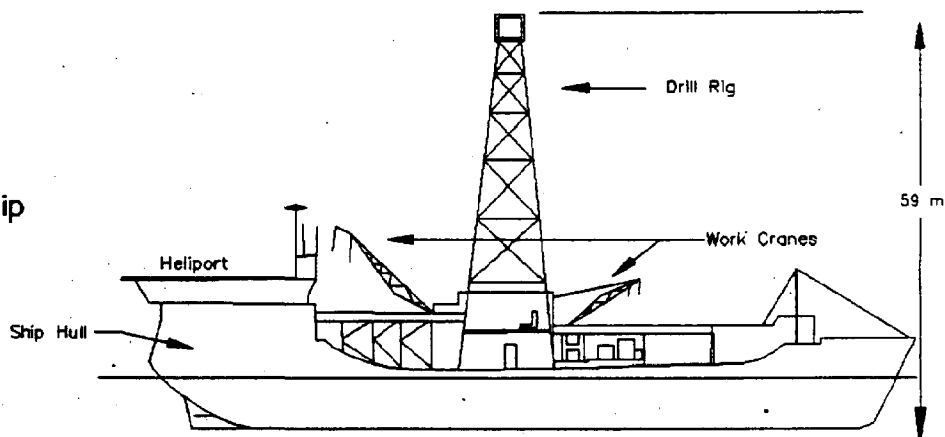
Tables 3-5 show the total number of POEs and DPPs that have been reviewed by the Coastal Commission under its consistency review and coastal permit authority. In addition, Tables 6-11 indicate the number of existing OCS and state platforms, approved platforms under construction, and the number of platforms proposed in the future. Figures 14 through 23 show the location of existing, approved, and proposed federal and state platforms and offshore pipelines.

Types of Exploratory Drilling Rigs



Semisubmersible

Drill Ship

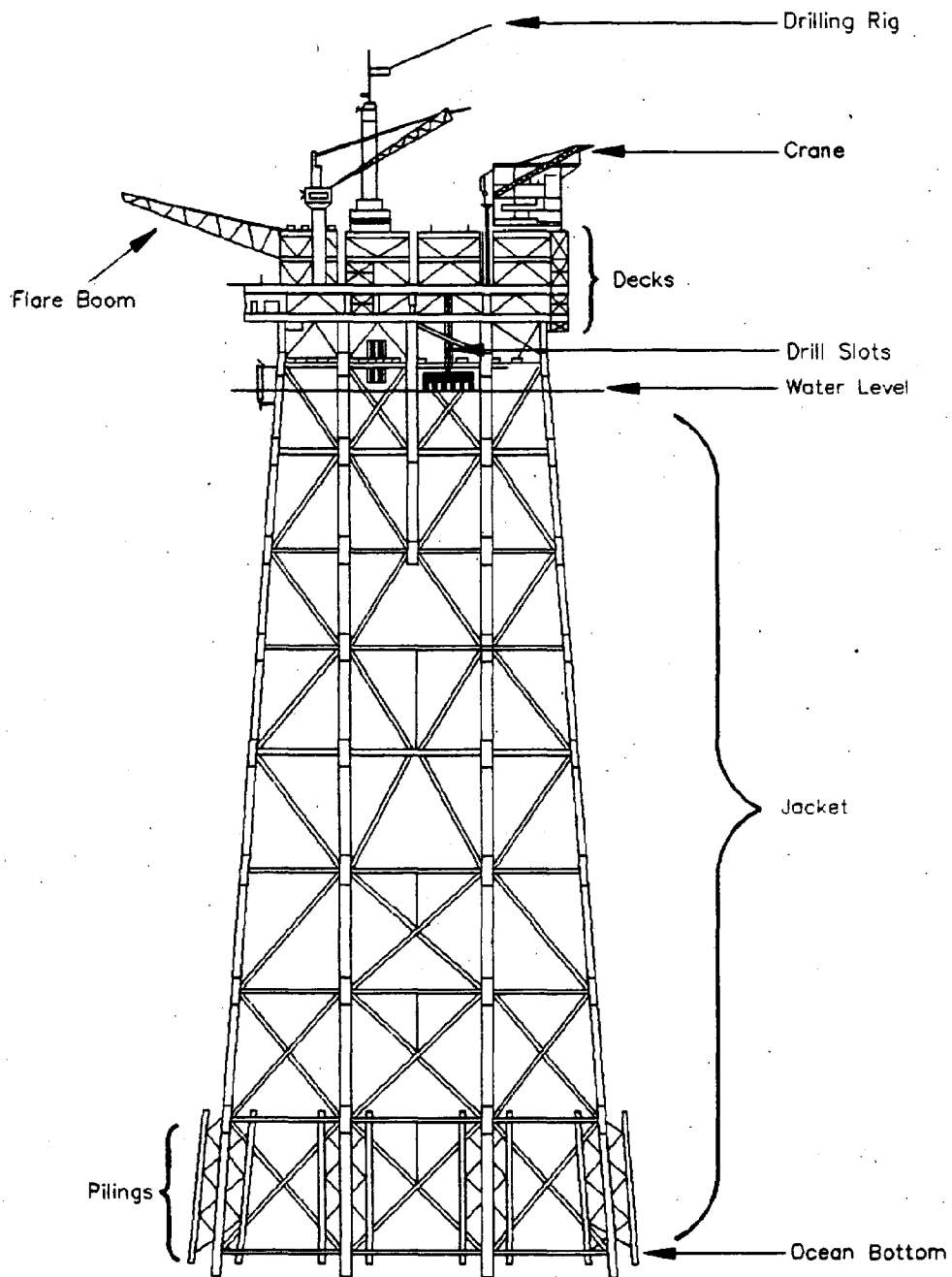


Jack-up Rig

Source: Adapted from Chambers Consultants and Planners

Drawing for illustrative purposes only.

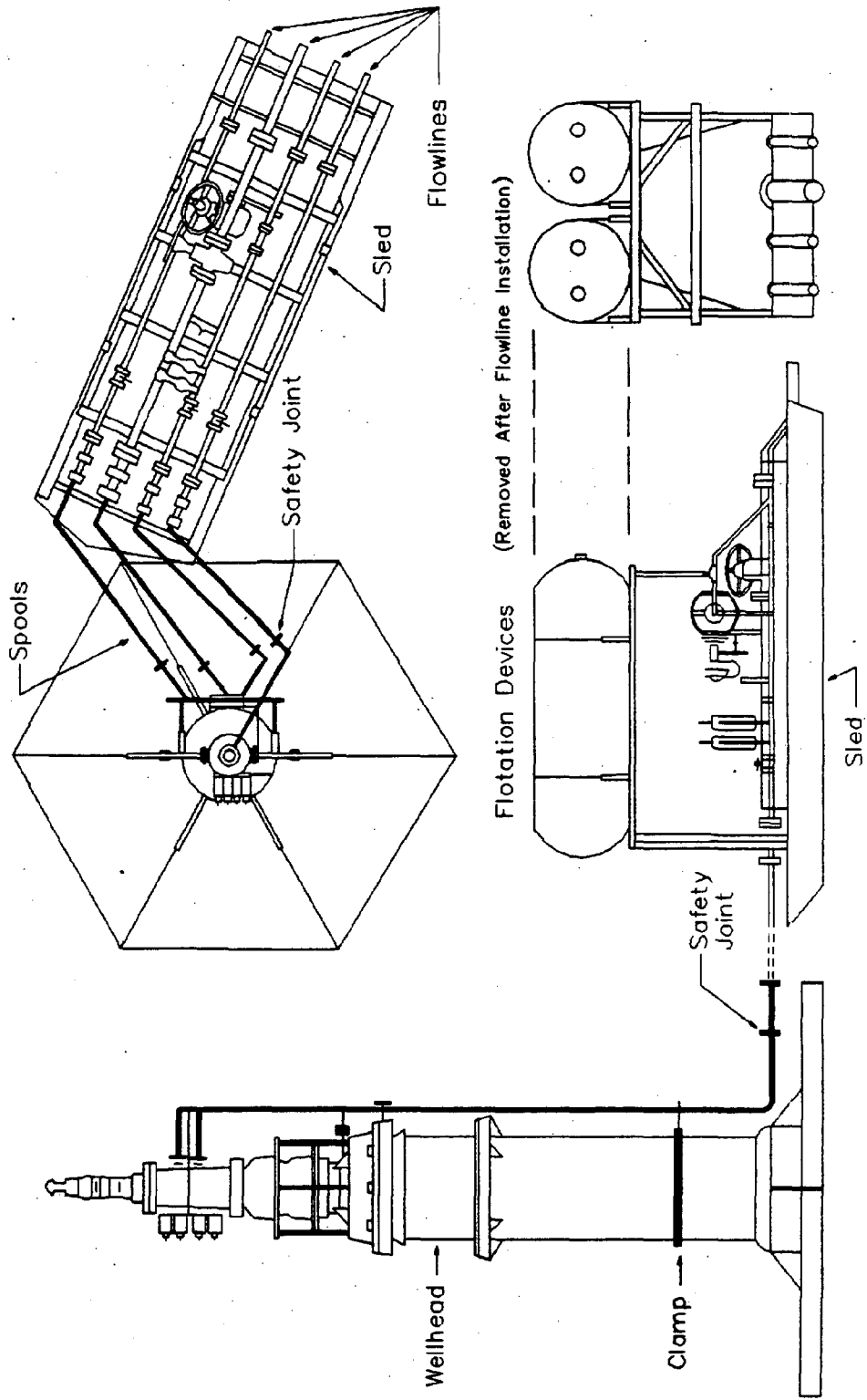
Development and Production Platform



Source: Adapted from A.D. Little

Drawing for illustrative purposes only.

Gas Subsea Completion



Source: Adapted from Shell California Production, Inc.

California Coastal Commission
Earthquake Section

Drawing for illustrative purposes only.

Figure 13

Table 3.

Consistency Certifications of OCS Plans of Exploration (POEs)
through December 1988

Reviewed	120
Concurred with Project Modifications	107
Partial Concurrence*	6
Objected To**	7
Tracts	161
Wells Proposed	520
Wells Concurred With	476

(*Approval/disapproval of certain wells on a POE)

(**Two of these objections were overturned by the Secretary of Commerce on Appeal)

Table 4.

Consistency Certifications of OCS Development and Production Plans (DPPs)
through December 1988

DPPs Reviewed	13 ^a
DPPs Concurred	12 ^b
DPPs with Partial Concurrence	1 (Exxon)
DPPs Objected To*	2 ^c
Tracts	15
Platforms	15
Well Slots	807

a - includes 15 tracts and 15 platforms

b - includes Platforms Gail and Julius

c - includes Platforms Gail and Julius

(*Platform Julius was originally objected to by the Commission in 1985 and later approved in 1987. Platform Gail was installed under a settlement agreed to by Chevron, the Minerals Management Service, and the Commission.)

(Sources: the MMS, the State Lands Commission, the Coastal Commission, and A. D. Little)

Table 5.

State Tidelands Wells and Platforms
Reviewed by the Commission From January 1981 to December 1988

	<u>Proposed</u>	<u>Approved</u>	<u>Denied</u>	<u>Withdrawn</u>
Exploration wells	52	42	2	8
Development wells*	112	112	-	-
Platforms**	1	1	-	-

* Includes existing islands and subsea well completions.

** Platform Esther - approved to replace an existing man-made island.

Table 6.

Summary of Existing, Approved, Proposed and Hypothetical Platforms
in the Pacific OCS and State Tidelands
December 1988

	<u>Pacific OCS</u>	<u>State Tidelands</u>
Existing/Installed	21	8
Manmade Islands	0	6
Approved/Under Construction	5	0
Proposed	<u>1</u>	<u>5*</u>
Sub Total	27	19
Hypothetical thru 2000**	<u>10</u>	<u>16</u>
Total	37	35

* ARCO includes 3 platform complexes each having 2 platforms with a revised DPP for Holly A/B, Heron, and Haven. The two other platforms are Hayley and Hercules.

** Projected hypothetical platforms in the Santa Barbara Channel and Santa Maria Basin through the year 2000.

(Sources: the MMS, the State Lands Commission, the Coastal Commission, and A. D. Little)

Table 7
Existing Platforms on Pacific OCS Active Leases
as of December 1988

Platform	Operator	Lease OCS-P (Lease Sale)	Unit/(Field)	Installation date	Number of well slots	Water depth (ft.)	Required Commission approval
Edith	Chevron	0296/(35)	Beta/(Beta)	1983	72	161	+
Ellen	SWEPI	0300/(35)	Beta/(Beta)	1980	80	265	
Elly ¹	SWEPI	0300/(35)	Beta/(Beta)	1980	--	255	
Eureka	SWEPI	0301/(35)	Beta/(Beta)	1984	60	700	+
Gina	UNOCAL	0202/P4	(Hueneme)	1980	15	95	+
Gilda	UNOCAL	0216/(P4)	Santa Clara/(Santa Clara)	1981	96	205	+
Grace	Chevron	0217/(P4)	Santa Clara/(Santa Clara)	1979	48	318	
Hogan	Phillips	0166/(P4)	(Carpinteria Offshore)	1967	66	154	
Houchin	Phillips	0166/(P4)	(Carpinteria Offshore)	1968	60	163	
Habitat	Texaco	0234/(P4)	Pitas Point/(Pitas Point)	1981	24	290	+
Hermosa	Chevron	0316/(48)	(Point Arguello)	1985	48	603	+
Harvest	Texaco	0315/(48)	(Point Arguello)	1985	50	675	+
Irene	UNOCAL	0441/(53)	Point Pedernales/ (Point Pedernales)	1985	72	242	+

Table 7
(continued)

Platform	Operator	Lease OCS-P (Lease Sale)	Unit/(Field)	Installation date	Number of well slots	Water depth (ft.)	Required Commission approval
Henry	Sun	0240/(P4)	(Carpinteria Offshore)	1979	24	173	
Hillhouse	Sun	0240/(P4)	(Dos Cuadras Offshore)	1969	60	190	
A	UNOCAL	0241/(P4)	(Dos Cuadras Offshore)	1968	57	188	
B	UNOCAL	0241/(P4)	(Dos Cuadras Offshore)	1968	63	190	
C	UNOCAL	0241/(P4)	(Dos Cuadras Offshore)	1977	60	192	
Hondo	Exxon	0188/(P4)	Santa Ynez/(Hondo)	1976	28	842	
Gail	Chevron	0205/(P4)	Santa Clara/(Sockeye)	1987	36	739	+
Hidalgo	Chevron	0450/(S3)	(Point Arguello)	1986	56	430	+

1. Platform Elly is a production platform from which no wells are drilled. Only initial treatment and storage is done on the platform.

- = Not applicable
(Source: MMS, Summary Report, 1987)
MMS Review Comments 4/88

Table 8
Approved/Under Construction Platforms on Pacific OCS Active Leases
as of December 1988

Platform	Operator	Lease OCS-P	Unit/(Field)	Installation date	Number of well slots	Water depth (ft.)	Required Commission approval
Harmony	Exxon	0190/(P4)	Santa Ynez/(Hondo)	1989	60	1,200	+
Heritage	Exxon	0182/(P4)	Santa Ynez/(Pescado)	1989	60	1,075	+
Heather	Exxon	0193/(P4)	Santa Ynez/(Secate)	1997	28	620	+
Julius	SWEPI	0409/(53)	(San Miguel)	1989	70	478	+
Iris (Independence)	UNOCAL	0440/(53)	Point Pedernales/ (Point Pedernales)	1991	60	285	+

(Source: NMS, Summary Report, 1987)
NMS Review Comments, 4/88

Table 9
Proposed Platforms in Pacific OCS Active Leases as of December 1988
(not yet approved)

Platform	Operator	Lease OCS-P	Unit/(Field)	Installation Date	Number of well slots	Water depth (ft.)	Requires Commission Approval
Hacienda	Chevron	0451/(53)	Rocky Point/(Rocky Point)	--	--	--	+

(Source: NMS)

Table 10
Existing State Tidelands Platforms and Artificial Islands as of December 1988

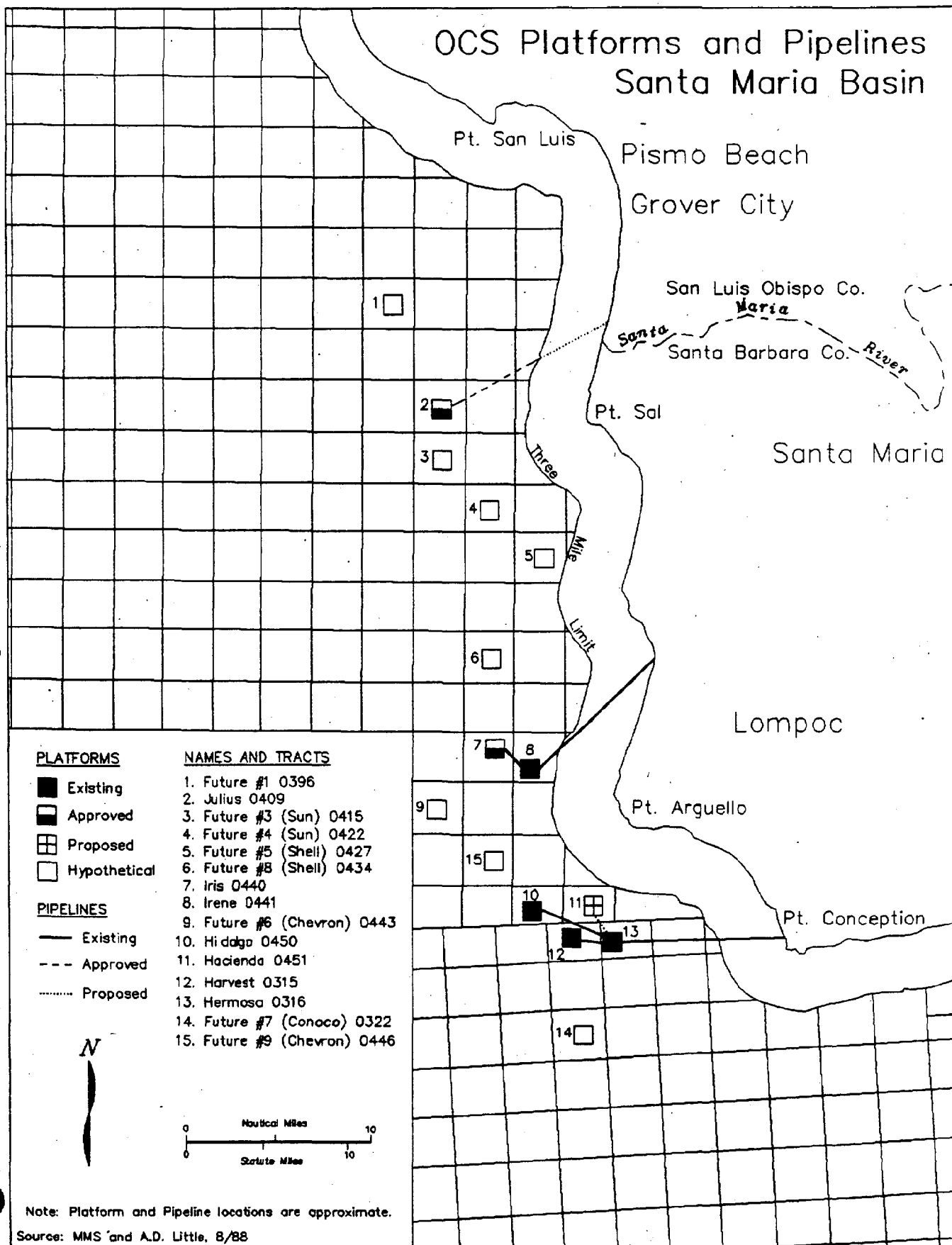
Name	Operator	County	Lease-State PRC	Water Depth +	Well Ports	Date of Installation	Required Commission Approval
<u>Platforms</u>							
Hazel	Chevron	Santa Barbara	PRC 1824.1	100'	25	8/8/57	
Hilda	Chevron	Santa Barbara	PRC 1824.1	106'	24	8/24/60	
Emmy	Aminoil	Orange	PRC 425.1	41'	30	4/12/61	
Eva	UNOCAL	Orange	PRC 3033.1	58'	30	1/30/64	
Hope	Chevron	Santa Barbara	PRC 3150.1	140'	60	9/24/64	
Heidi	Chevron	Santa Barbara	PRC 3150.1	128'	60	5/27/65	
Holly	ARCO	Santa Barbara	PRC 3242.1	211'	30	4/28/66	
Esther	Chevron	Orange	PRC 3095.1	35'	128	5/28/64	+ (modified from an island to a platform)
<u>Artificial Islands</u>							
Belmont	Exxon	Orange	PRC 186.1	42'	70	10/27/48	
Rincon	Norris Oil	Ventura	PRC 1466.1	45'	68	3/11/57	
Grissom					224		
White	City of Long Beach	Los Angeles	Granted tidelands	35' - 40'	176	6/4/64 (enactment of Chapter 138)	
Freeman					181		
Chaffee					261		

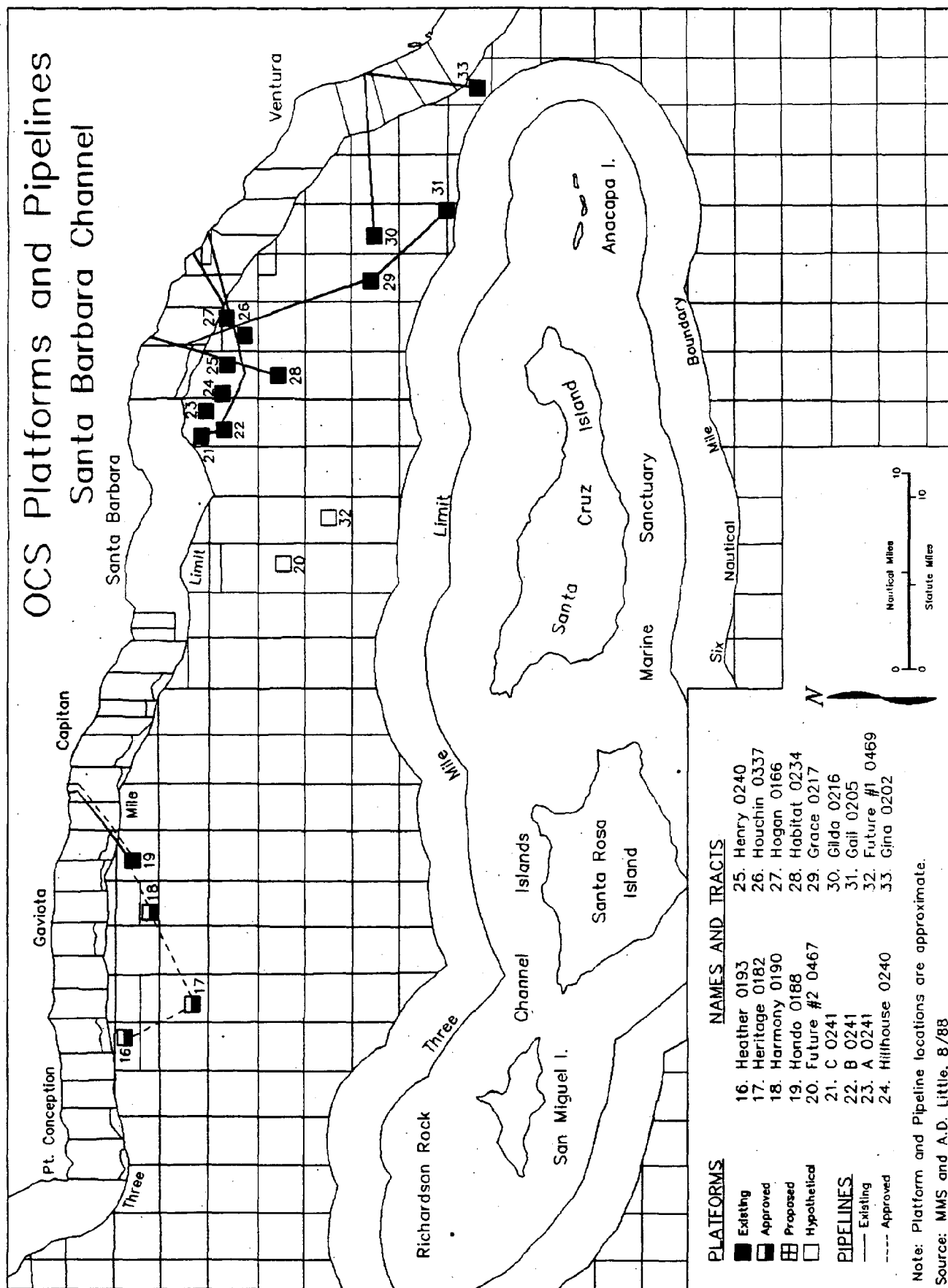
(Source: State Lands Commission)

Table 11
Proposed State Tidelands Platforms
As of December 1988
(not yet approved)

Platform	Operator	County	Lease Served	Water Depth	Well Ports	Requires Coastal Commission approval
Heron	ARCO	Santa Barbara	309	220'	84	+
Haven	ARCO	Santa Barbara	3120	220'	84	+
Holly A & B	ARCO	Santa Barbara	3242	220'	84	+
Hercules	SNEPI	Santa Barbara	2920	237'	55	+
Hayley	UNOCAL	Santa Barbara	2879	295'	48	+

(Source: State Lands Commission)





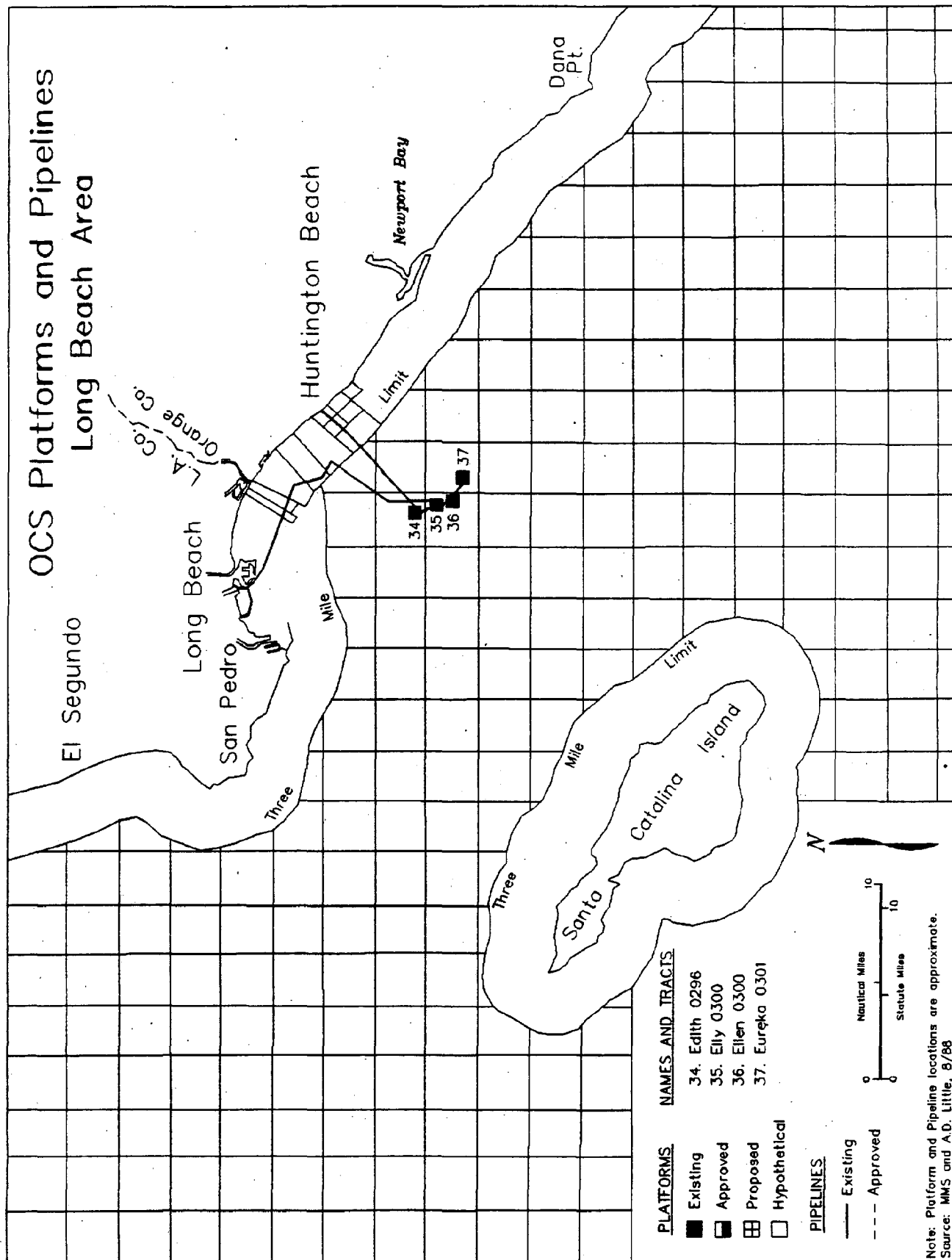


Figure 16

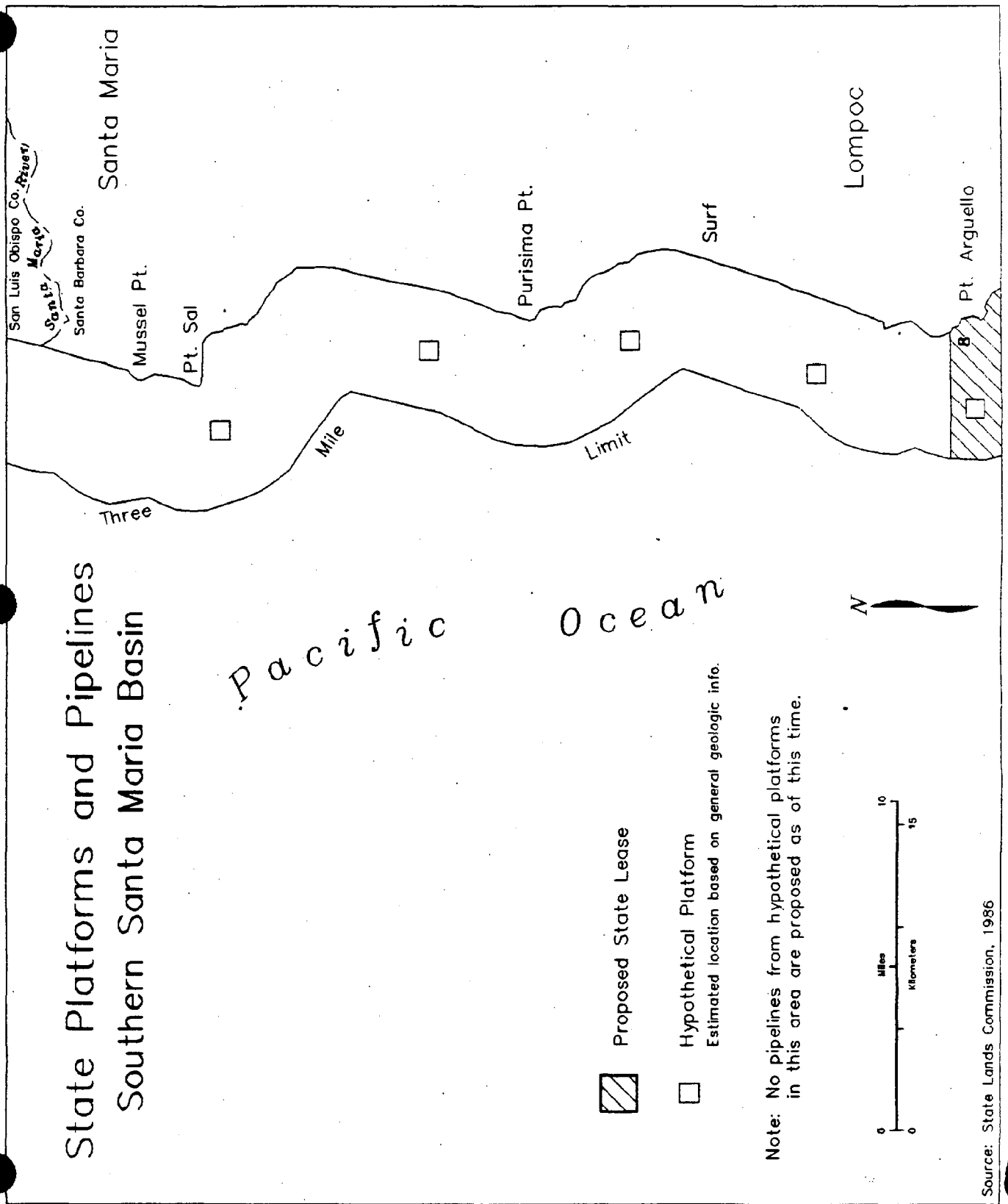
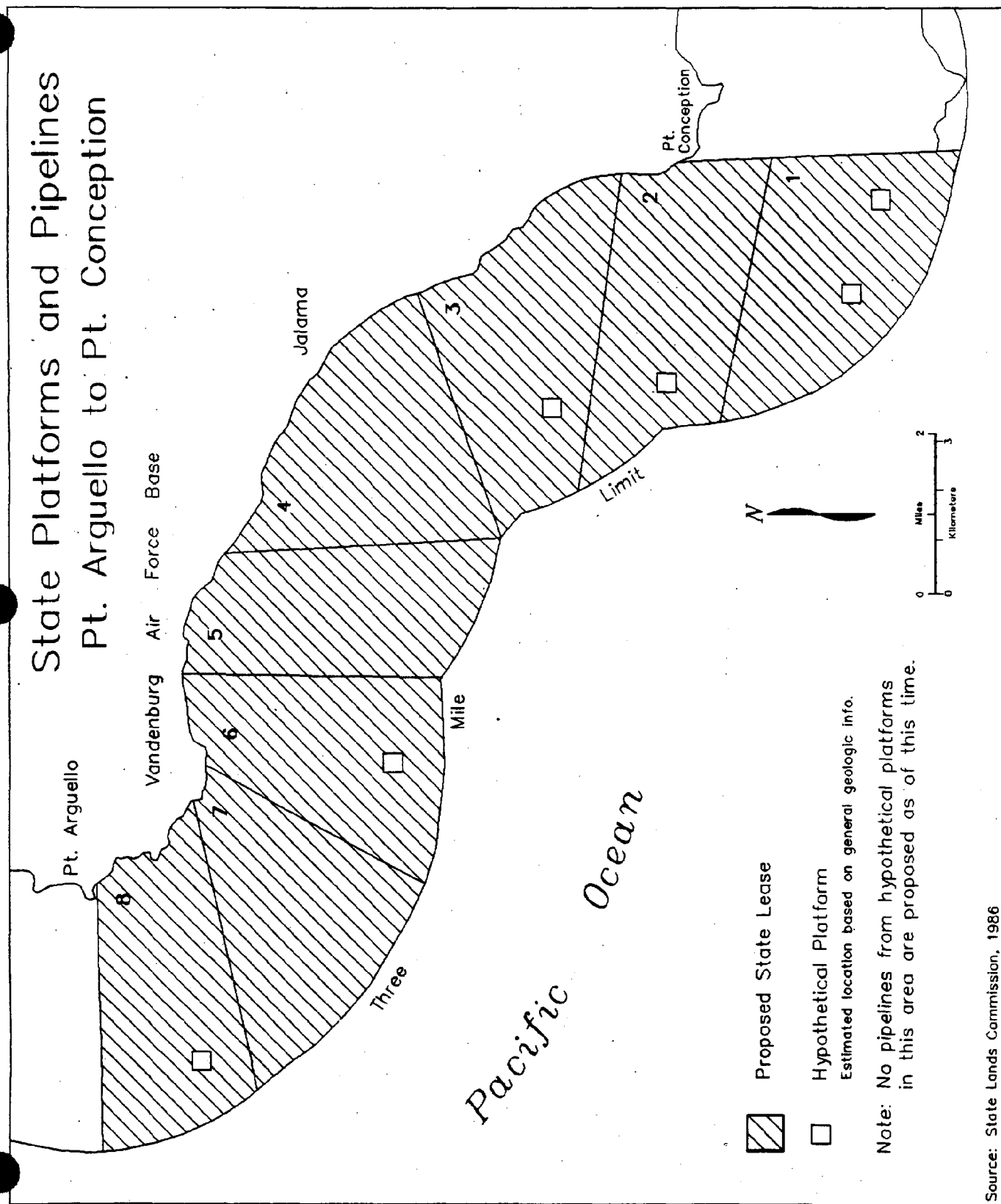
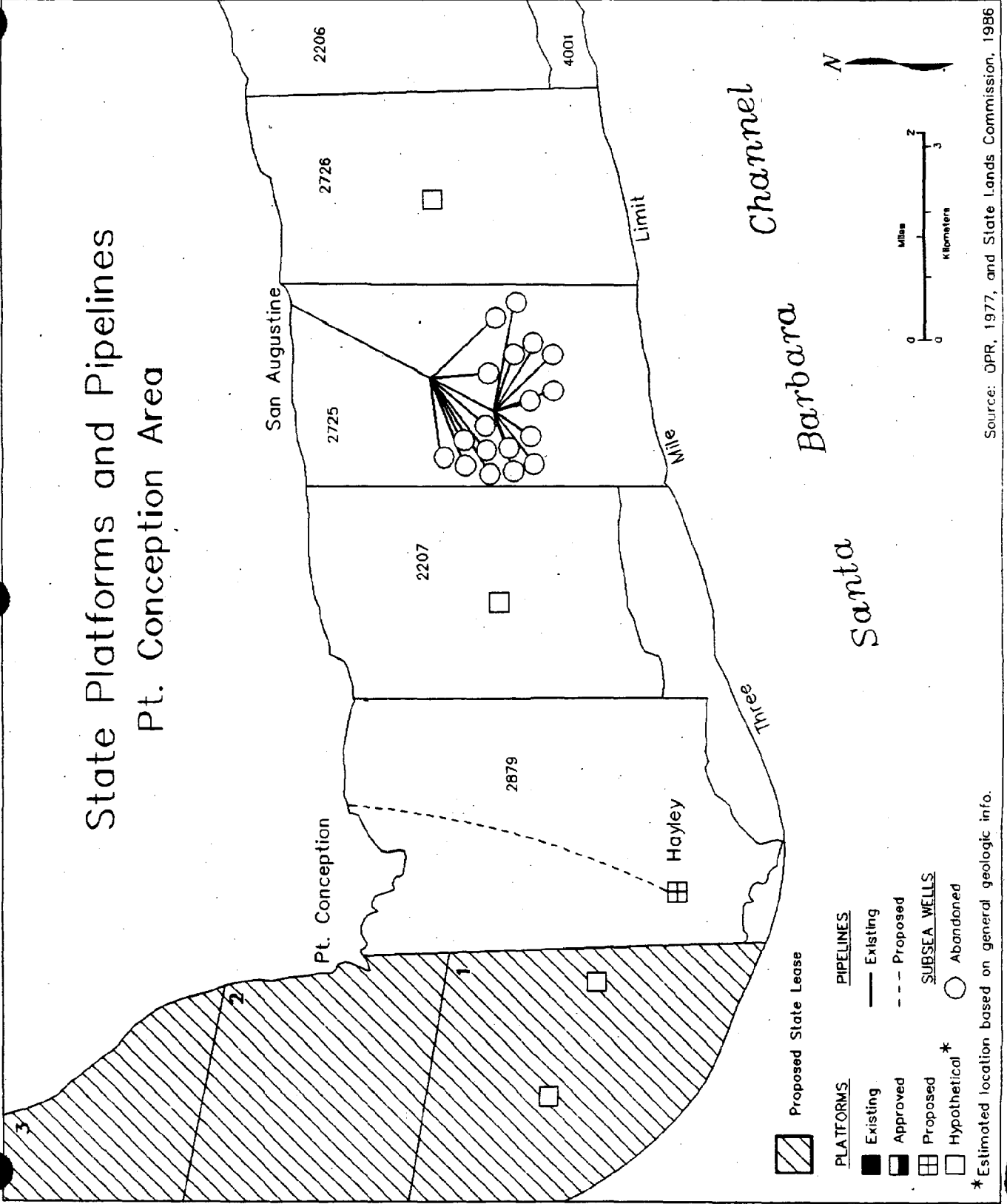


Figure 17



Source: State Lands Commission, 1986

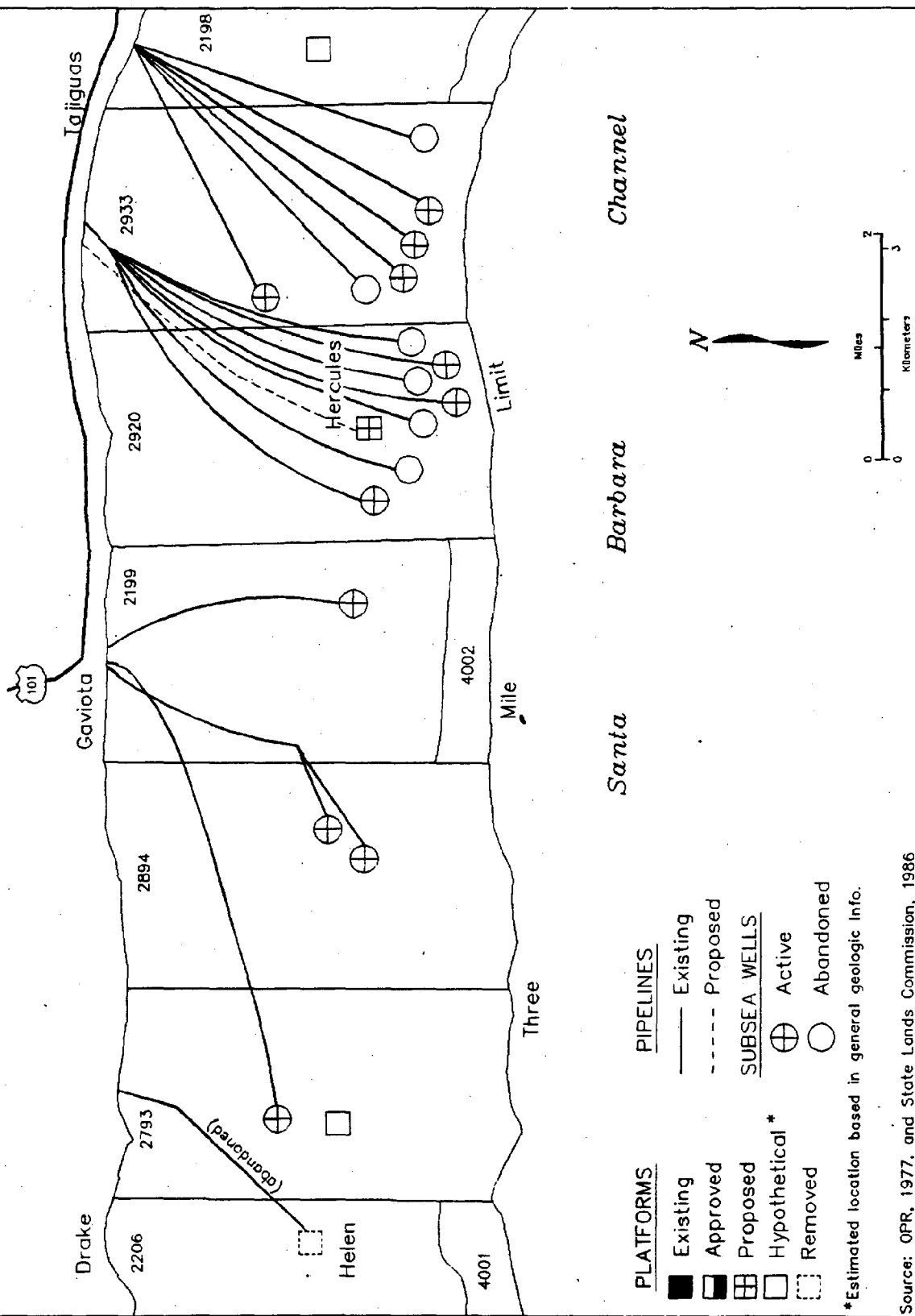
State Platforms and Pipelines Pt. Conception Area



Source: OPR, 1977, and State Lands Commission, 1986

Figure 19

State Platforms and Pipelines Gaviota Area



*Estimated location based in general geologic info.

Source: OPR, 1977, and State Lands Commission, 1986

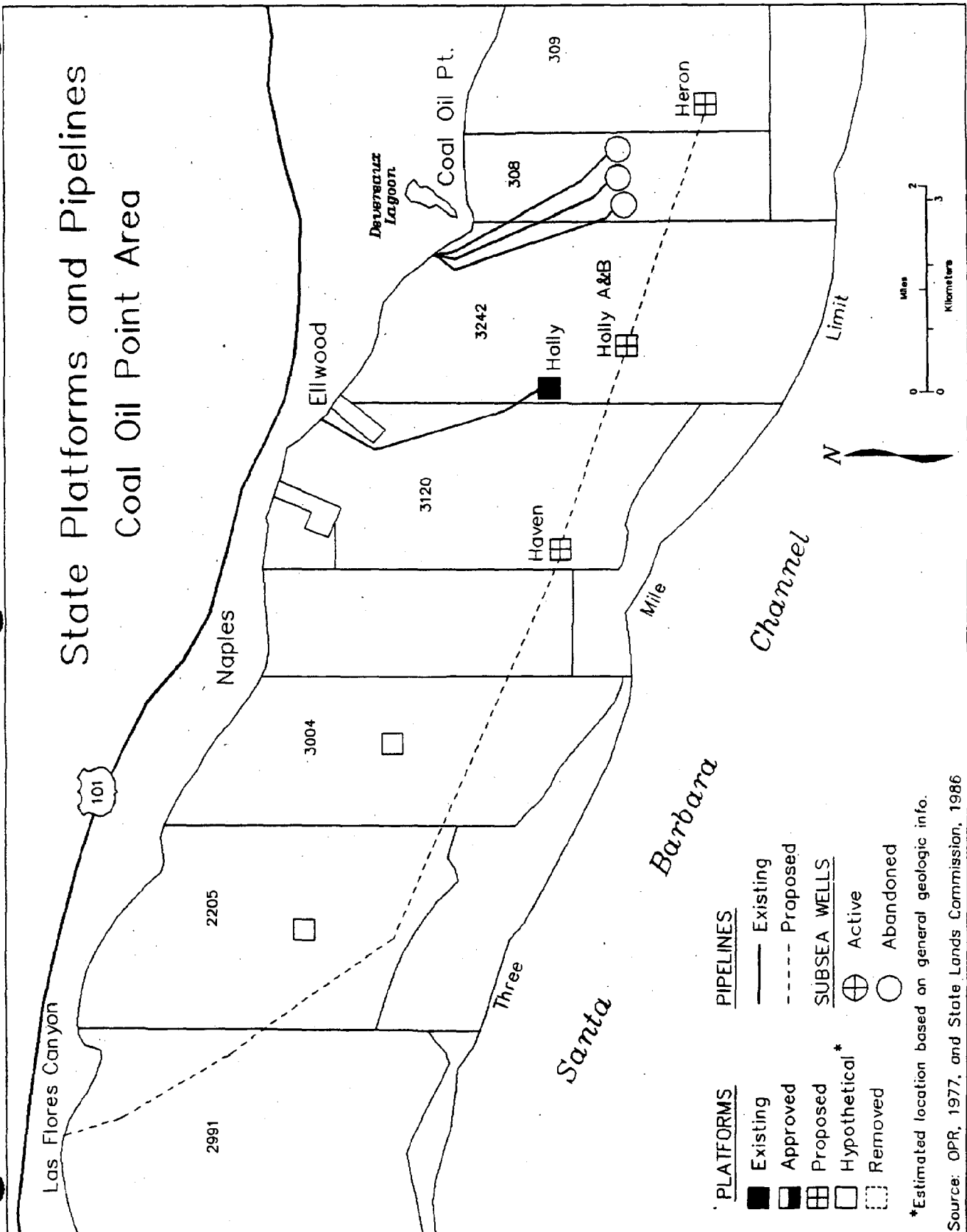


Figure 21

State Platforms and Pipelines Carpinteria Area

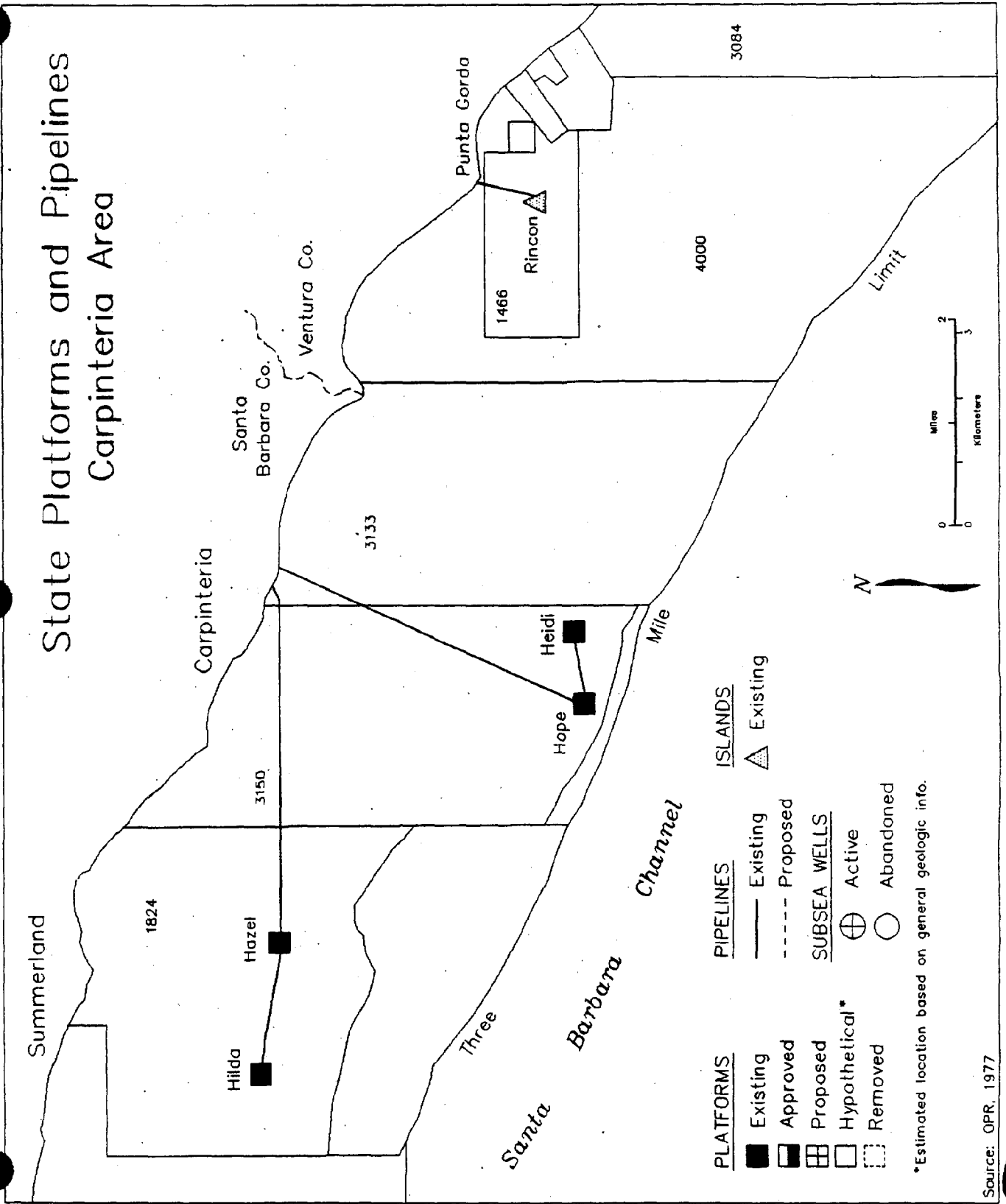
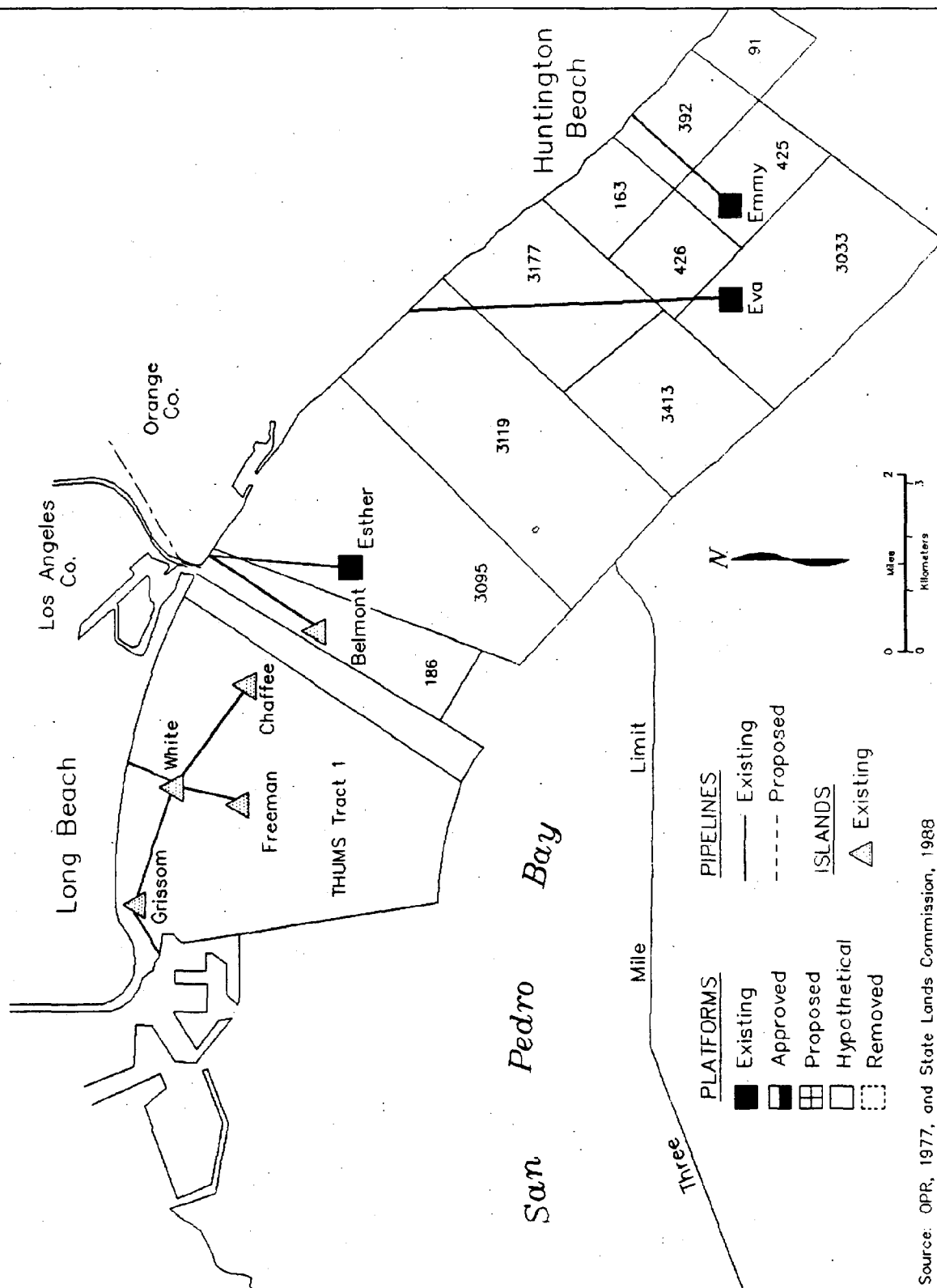


Figure 22

State Platforms and Pipelines Long Beach Area



Source: OPR, 1977, and State Lands Commission, 1988

IV. PACIFIC OCS AND STATE OIL PRODUCTION IN CALIFORNIA

California has been producing onshore and offshore oil since the late 1800's. As of 1987, California ranks fourth among the oil-producing states behind Texas, Alaska, and Louisiana. Total Santa Barbara Channel and Santa Maria Basin OCS Production may peak in 1999 at about 247,600 barrels per day of oil. Tables 12 and 13 indicate: 1) current annual U. S. and California production; 2) projected production; 3) percentage of total U.S. production in California; and 4) percentage of California production from offshore waters. It must be noted that different state agencies have varied figures on production projections with different time scales, different area coverage, and the inclusion of new production and/or current production. According to SLC the differences in the oil production forecast by DOG and SLC for a given field are in both estimated production rates and timing. The difference in production rates are the result of methodology with DOG's analog analysis² as compared with the operator's projections based on production test data from exploratory wells in the specific field. The sequencing of projects under DOG's forecast is again based on analog data, wherein past platform construction, drilling and production schedules were used in timing of the new field developments. State Lands, in contrast, has used the schedules submitted with the respective development plans (A.D. Willard, SLC Memorandum, October 2, 1985).

Table 12

Current California And U.S. Production in 1987 (in barrels)

	<u>1987</u>	<u>% of CA</u> <u>Total</u>	<u>% of US</u> <u>OCS Total</u>	<u>% of US</u> <u>Total</u>
CA Onshore	335,600,000	85%	-	-
CA State Waters	30,300,000	7.63%	-	1.0%
CA OCS	31,100,000	7.83%	8.49%	1.0%
CA Offshore Total	61,400,000	15.46%	-	2.0%
CA Total* Production	397,000,000	-	-	13.0%
US OCS Production	366,141,709	-	-	12.1%
US Total Production	3,034,000,000	-	-	-

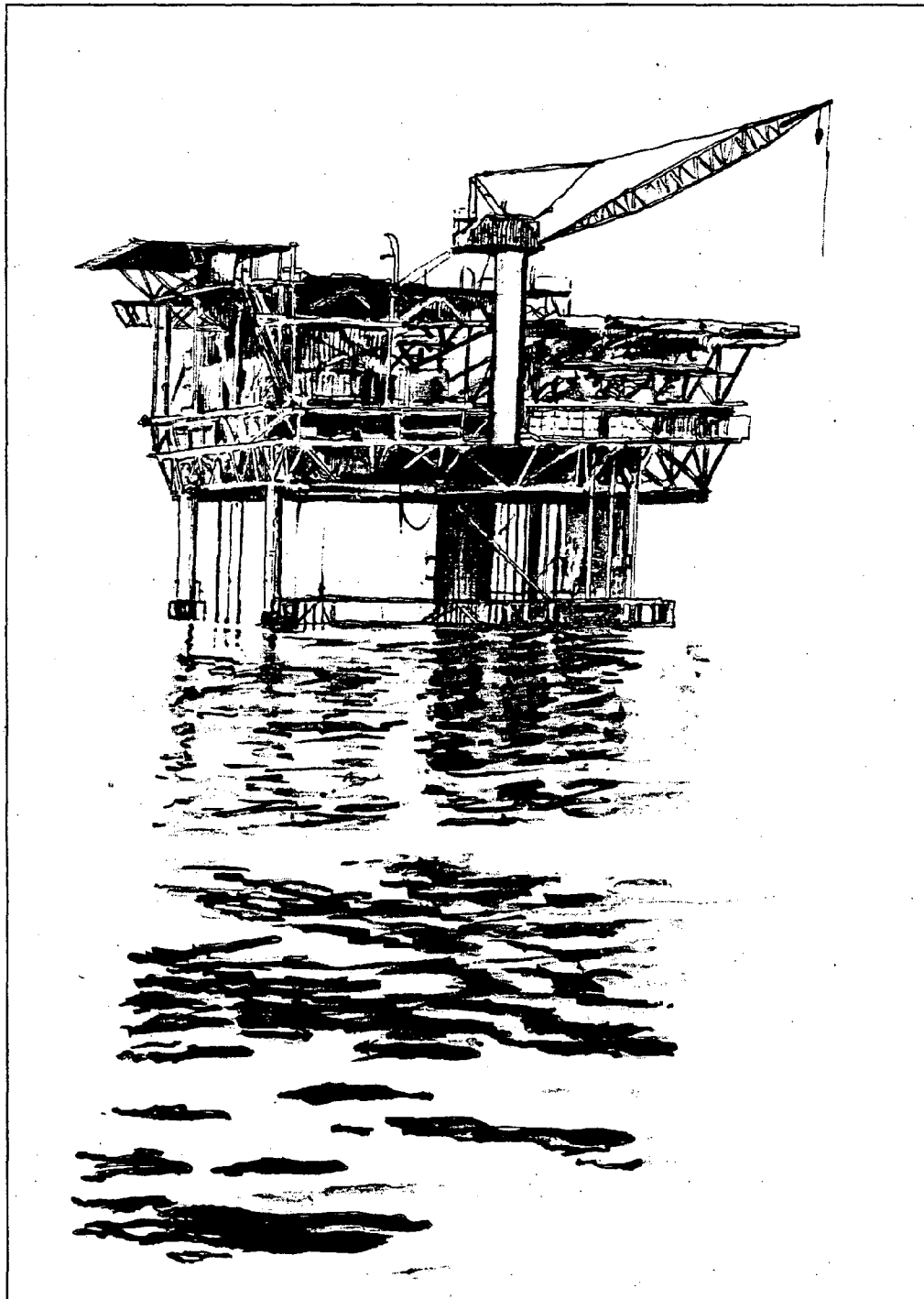
* Total - refers to offshore and onshore oil production

(Sources: DOG and MMS)



SOURCE: CALIFORNIA COASTAL COMMISSION, COASTAL ENERGY DEVELOPMENT, 1981.

Onshore Production Facility



SOURCE: CALIFORNIA COASTAL COMMISSION, COASTAL ENERGY DEVELOPMENT, 1981.

Offshore Production Facility

Table 13

AGENCY PROJECTIONS FOR OIL PRODUCTION IN BARRELS PER DAY

State Onshore And Offshore Production Projections

<u>1990</u>	<u>1995</u>	<u>2000</u>	<u>2005</u>
1,064,000	1,064,000	1,031,000	968,000

(Source: Ca. Energy Commission, Biennial Fuels Report September, 1986)

State Offshore Peak Production For Western Santa Barbara Channel in State Waters

<u>1991</u>	<u>1992</u>	<u>1995</u>	<u>1998</u>	<u>2000</u>	<u>2003</u>
70,000	45,000	63,000	15,000	70,000	45,000

(Source: SLC March 1985 estimates from Goleta to Santa Maria River)

Current and New Production for Onshore and Offshore California

	<u>1987</u>	<u>1992</u>
Onshore And Offshore	1,087,588	1,170,000
State Waters	83,013	65,600
OCS Waters	85,123	229,000

(Source: DOG, July, 1988)

Pacific OCS Current and New Production for Southern California Planning Area

<u>1987</u>	<u>1988</u>	<u>1990</u>	<u>1992</u>	
85,000	104,000	169,600	186,300	
<u>1994</u>	<u>1996</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>
184,000	182,900	224,200	247,600	233,500

(Source: MMS, July 15, 1988)

V. REVENUES FROM OCS AND STATE LEASES

Oil and gas leasing and production in OCS and state tidelands has generated considerable revenue for the federal government and the State of California.

As of 1987, OCS revenues to the federal government from California have totaled over 5 billion dollars. From 1929 to 1987, California tideland revenues have totaled over 4 billion dollars.

Within the OCS, companies acquire rights to develop OCS lease tracts from the federal government in exchange for certain biddable and fixed payments. The OCS Lands Act (OCSLA) of 1953, and Amendments of 1978 and 1985 established a number of leasing systems which have included cash-bonus bidding with fixed royalty rate; cash-bonus bidding with sliding scale royalty rate; cash-bonus bidding with fixed net profit share; royalty-rate bidding; work-commitment bidding; and net profit-share bidding.

Cash bonus payments are lump sum, non-refundable payments made at the time the lease is issued. Royalty payments are based on future production as a percentage of the gross revenue from the tract. Net profit share is contingent on future production with percentage of the net revenue. With work-commitment bidding, the lease is awarded to the company which pledges to undertake the greatest dollar amount of exploration on the lease. The lessee submits the cash value of the bid, or a performance bond for the same amount at the time the lease is issued.

Prior to 1979, cash bonus bidding (fixed or sliding scale royalty rate), was used almost exclusively as the bid variable. The 1978 OCSLA Amendments have required the use of the four other above alternative methods for no less than 20 percent and no more than 60 percent of all leases offered for sale in a five year period. (Mead et al., March 1984) Only cash bonus bidding with fixed royalty bidding systems were used in the two FY 1987 sales. DOI has discontinued the use of the alternative bidding systems (MMS, Oil and Gas Leasing/Production Program, March, 1988).

Revenues generated from OCS development are deposited into the U.S. Treasury General Fund. Some of the OCS lease revenues are credited to the Land and Water Conservation Fund and the Historic Preservation Fund. Current legislation requires that the Land and Water Conservation Fund be credited with \$900 million annually. Transfers to the Historic Preservation Fund have amounted to \$150 million annually since 1980. Under Section 8(g) of the OCSLA Amendments of 1985, the federal government is required to distribute twenty seven percent of the receipts from OCS leasing areas within a three-mile zone adjacent to State Lands. [43 U.S.C. Section 1337(g)]. In April 1986, the U.S. Congress determined that Coastal states would receive 27% of the 8(g) income held in escrow (\$6 billion), with the remaining 73% going to the federal government (MMS, POCS Current Events, April 1987).

Historically, the State Lands Commission has leased parcels in state waters with cash bonus bidding and a fixed or sliding scale royalty. In accordance with Public Resources Code Section 6217, the revenues derived from State Lands leasing are utilized for refunds, State Lands Commission expenditures, specified payments to local governments, California Water Fund; Central Valley Water Project Construction Fund, and public and private higher education.

Table 14 provides the latest detailed revenue figures from OCS and State tidelands oil and gas development.

Table 14

OCS AND STATE TIDELANDS REVENUES

Revenue from U.S. OCS Oil and Gas Operations 1954-1987

Oil and Gas Royalties	\$33,051,164,026
Bonuses	53,397,247,006
Rentals	615,842,712
Other Categories (Minimum royalties, shut-in gas etc.)	73,493,911
	<u>\$87,137,747,655</u>

(Source: MMS, Mineral Revenues: The 1987 Report on Receipts from Federal and Indian Leases, 1988)

Revenues from Pacific OCS Oil and Gas Operations off California 1963-1987

Bonuses	\$3,916,123,323
Minimum Royalties	2,656,765
Rentals	32,908,482
Royalties	<u>1,052,626,135</u>
	<u>\$5,400,314,000</u>

(Source: MMS, June 1988)

Revenues from Onshore and Offshore California State Lands Oil and Gas Operations 1929-1987

Oil and Gas Royalties from State Lands	\$1,224,666,750
Bid Bonuses on Oil Leases from State Lands	189,910,958
Long Beach State Share (Net Profit arrangement)	3,502,793,211
Oil And Gas Royalties from School Lands (onshore)	622,336
	<u>\$4,917,993,255</u>

(Source: State Lands Commission, Historic Revenue Information, Corrections included as of June 30, 1987. Best available figures for historic revenue.)

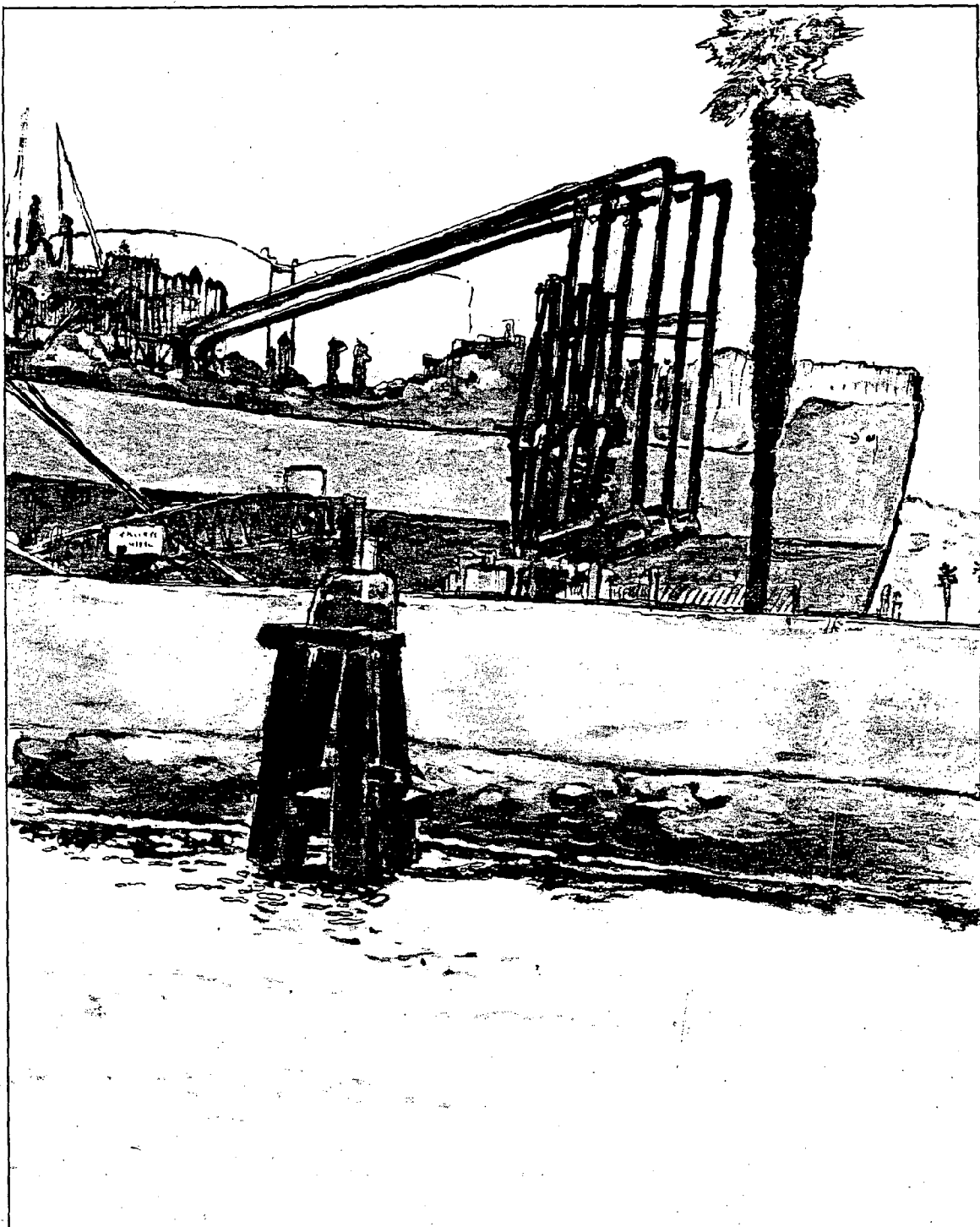
VI. EXISTING AND APPROVED MARINE TERMINALS IN CALIFORNIA

As an alternative to offshore and/or onshore pipelines, marine terminals can be used to load/unload crude oil or other petroleum products for transport by tankers. Terminals generally consist of onshore tank storage farms, offshore mooring stations for the tankers, onshore and offshore pipelines, and tankship fleets.

Marine terminals are used to: 1) load crude oil from production for delivery to refinery centers, 2) unload crude oil for delivery to refineries, and 3) load and unload refined petroleum products. Marine terminals have four basic types of berthing and mooring arrangements: fixed berth, sea island (offshore pier), single buoy, and multiple buoy (see Figures 24 through 28).

The Coastal Commission and Santa Barbara County have encouraged the use of pipeline transportation of oil, instead of using marine terminal facilities, when the environmental impacts of pipelines were determined to be less. In most instances, pipeline transportation results in less risk of oil spills and fewer air quality emissions.

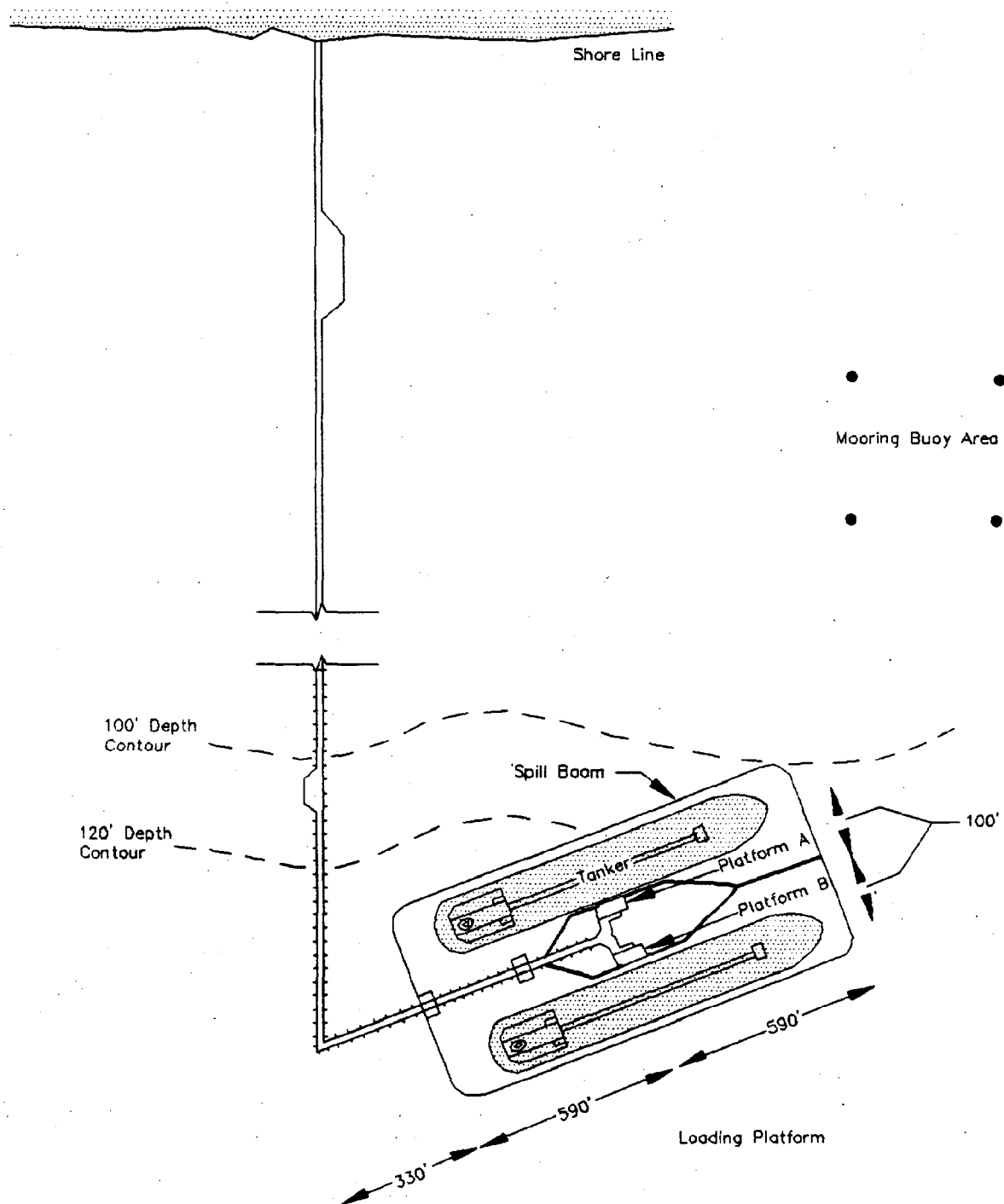
Table 15 indicates the number of existing marine terminals in California, including one in the OCS which also treats and stores crude oil, and marine terminals that have been approved by the Coastal Commission but are not yet under construction (see Figures 29(a) 29(b) for locations).



SOURCE: CALIFORNIA COASTAL COMMISSION, COASTAL ENERGY DEVELOPMENT, 1981.

Marine Terminal Facility

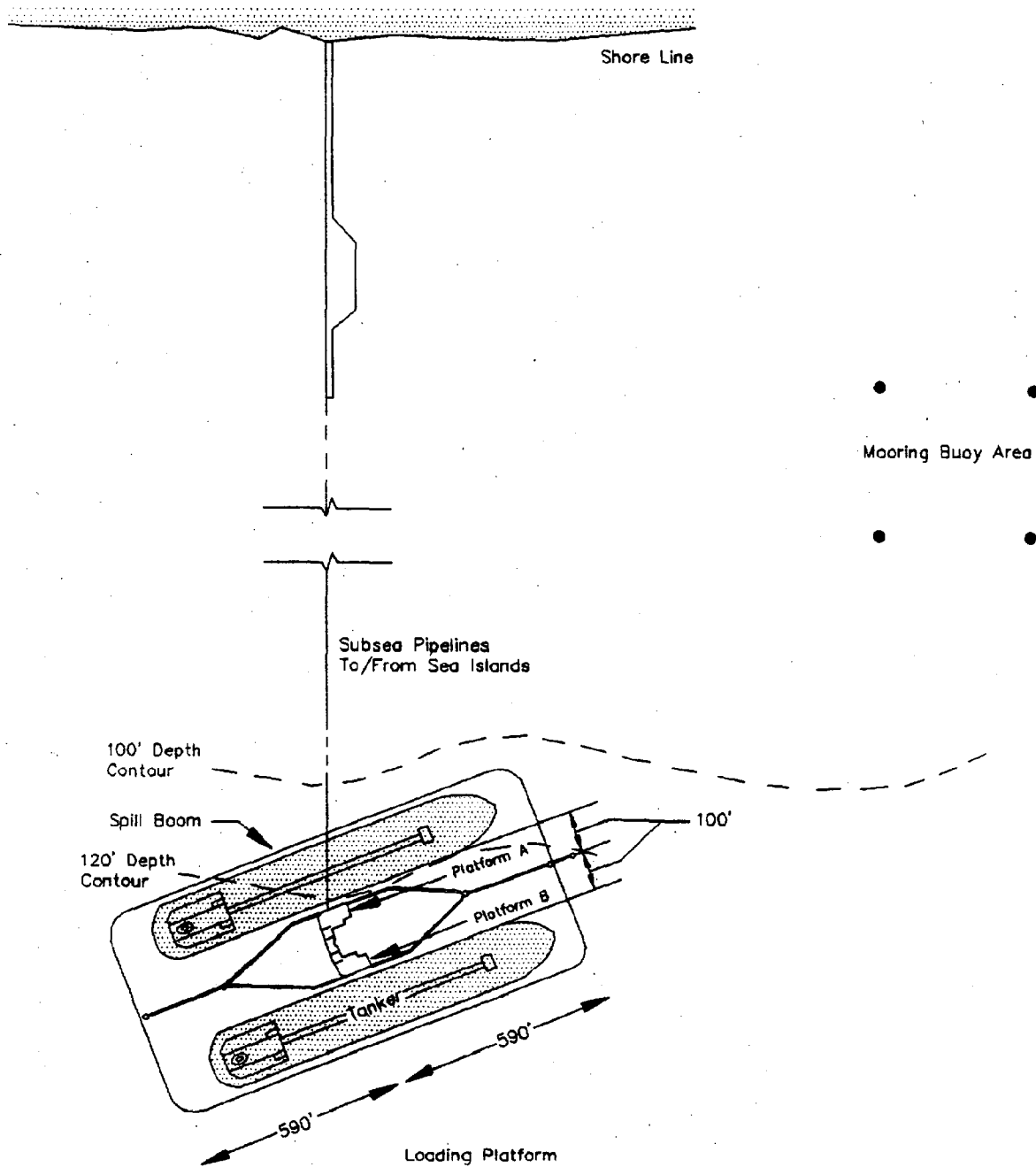
Fixed Pier Tanker Berth



Source: Adapted from ERT

Drawing for illustrative purposes only.

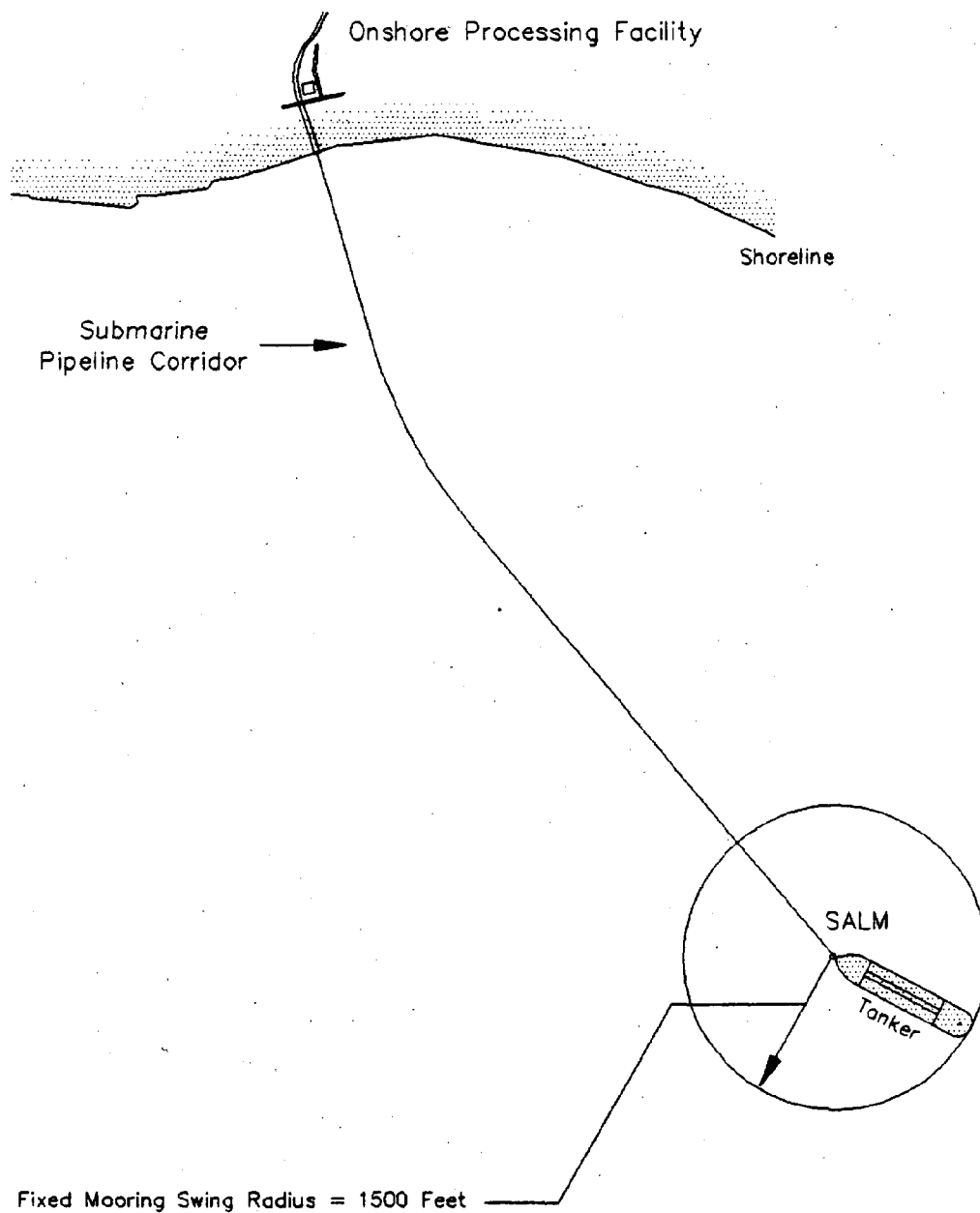
Sea Island Tanker Berth



Source: Adapted from ERT

Drawing for illustrative purposes only.

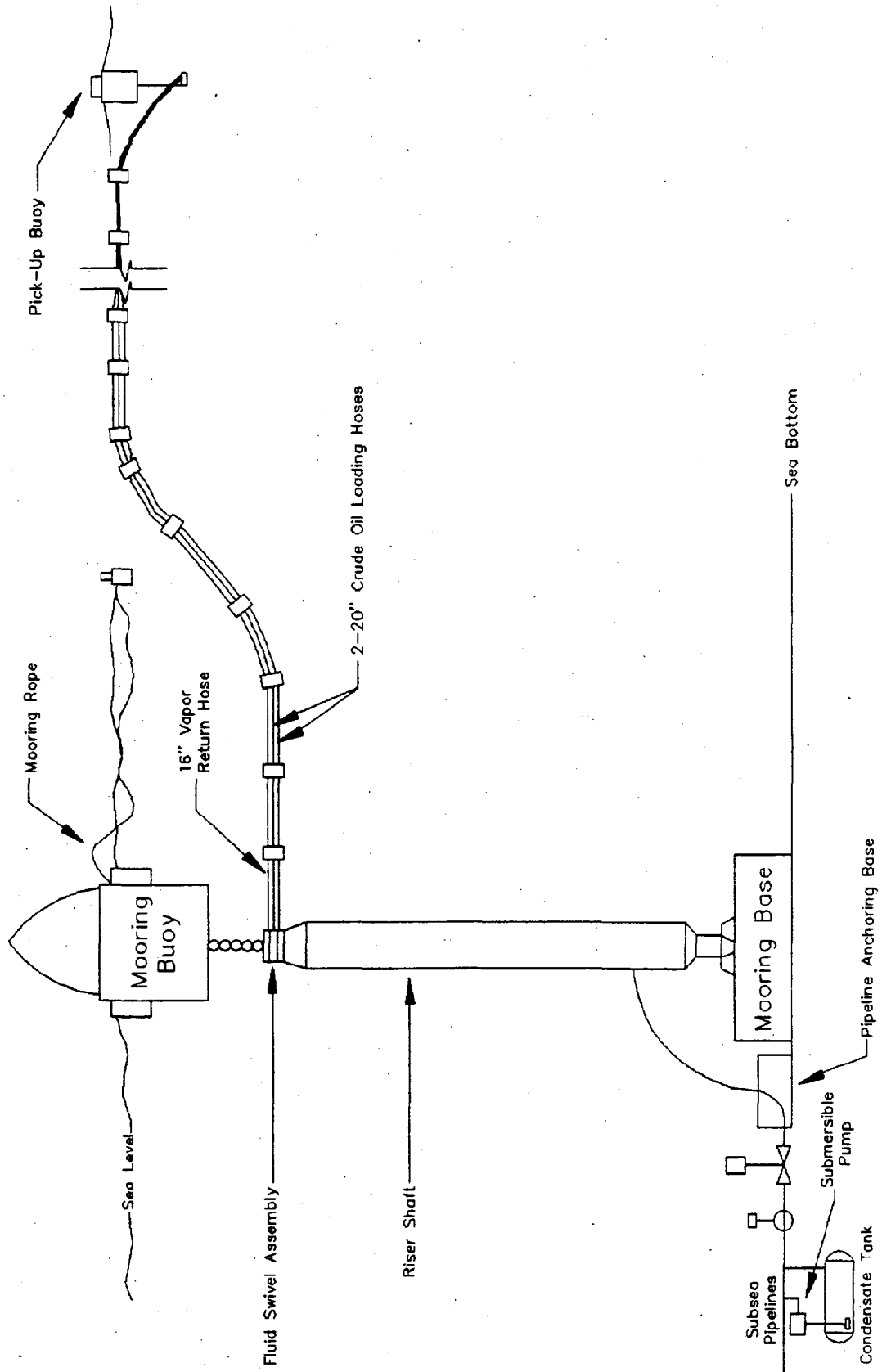
Single Buoy or Anchor Leg Mooring (SALM)



Source: Adapted from ERT

Drawing for illustrative purposes only.

Elevation View Of Single Anchor Leg Mooring (SALM)

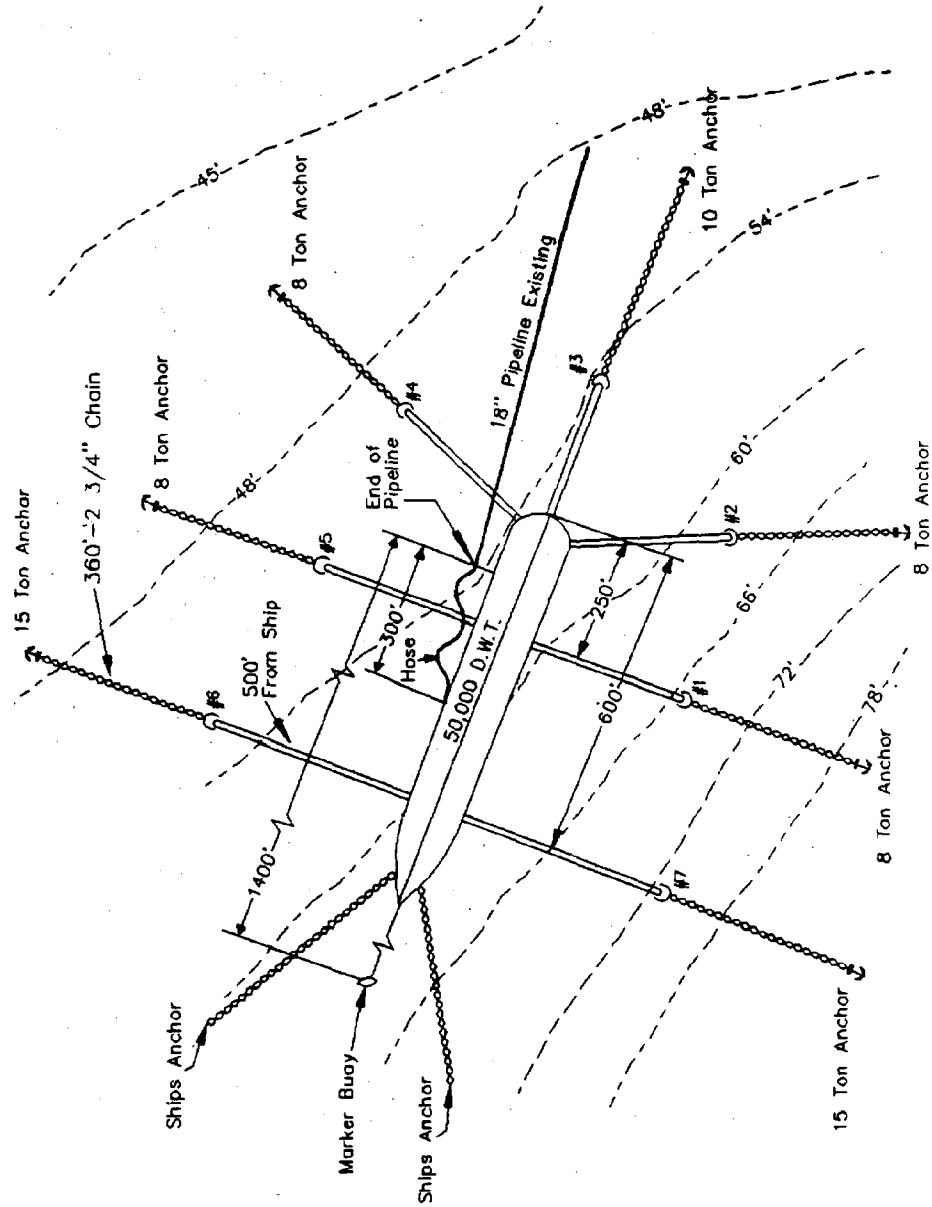


Source: Adapted from ERT

Drawing for illustrative purposes only.

Figure 27

Multiple Buoy Mooring



Source: PG&E

California Coastal Commission
Cartography Section

Drawing for illustrative purposes only.

Figure 28

Table 15

Existing And Approved Marine Terminals for Crude and Petroleum
Product Transportation as of December 1988

Northern California

<u>County</u>	<u>Location</u>	<u>Terminal Operator</u>	<u>Function/Status</u>
Humboldt	1. Port of Humboldt Bay	UNOCAL	Product ¹
	2. Port of Humboldt Bay	Oregon Coast Towing Co.	Product ¹
	3. Port of Humboldt Bay	R.A.Knapp (Chevron owned)	Product ¹
	4. Port of Humboldt Bay	Crown-Simpson Pulp Co.	Product ¹
Contra Costa	5. City of Richmond	Chevron Long Wharf	Unloading crude and load product
	6. Davis Point/Rodeo	UNOCAL	Unloading crude and load product
	7. Selby	Wickland Oil	Unloading product
	8. City of Martinez	Shell	Unloading crude and load product
	9. City of Martinez area	Landsea, Tosco Terminals	Unloading crude
	10. Point Molate	U.S. Navy	Product ¹
	11. Point San Pablo	U.S. Navy	Product ¹
	12. Point Richmond	Petrol Mark	Product ¹
	13. Richmond Harbor Channel	UNOCAL	Product ¹
	14. Richmond Harbor Channel	ARCO	Product ¹

<u>County</u>	<u>Location</u>	<u>Terminal Operator</u>	<u>Function/Status</u>
	15. Richmond Harbor Channel	Texaco	Product ¹
	16. Richmond Harbor Channel	Castrol	Product ¹
	17. Richmond Harbor Channel	Time Oil	Product ¹
	18. Point Orient	Chevron	Product ¹
Solano	19. Benicia Port Terminals	Benicia Terminal (Exxon Refinery)	Unloading Crude
	20. Benicia Port Terminals	Huntway Refinery	Unloading product
San Francisco	21. Pier 70	PG&E	Unload product for Potrero Power Plant
San Mateo	22. Port of Redwood City	Pilot Oil	Product ¹
<u>Southern California</u>			
Monterey	1. Moss Landing	PG&E	Multi-point mooring for loading product oil with onshore storage facilities
San Luis Obispo	2. Estero Bay	Chevron	Loading Crude
	3. Estero Bay	Texaco	Loading Product
	4. Estero Bay	U.S. Navy	Unloading Product
	5. City of Morro Bay	PG&E	Unloading product
	6. Port San Luis	UNOCAL	Loading crude

<u>County</u>	<u>Location</u>	<u>Terminal Operator</u>	<u>Function/Status</u>
Santa Barbara	7. Cojo Bay (Pt. Conception)	UNOCAL	Loading crude
	8. Gaviota	Texaco (constructed as interim terminal)	Loading crude
	9. Ellwood	ARCO	Loading crude
	10. Carpinteria	Chevron	Loading crude and unloading product but not since 1983 and 1985 respectively
	11. El Capitan	Exxon	Not operating
	12. Las Flores	Exxon	Approved but not yet constructed consolidated marine terminal w/SALM offshore for loading 140,000 B/d
	13. Las Flores/ El Capitan OS&T	Exxon	Treatment/storage/ SALM for transporting processed crude
Ventura	14. Ventura River	Texaco (Formerly Getty)	Loading OCS and other crude and product
	15. Ventura	UNOCAL	Loading OCS and other crude
	16. Mandalay Beach	Southern Cal Edison	Unloading product Unloading fuel oil
	17. Port Hueneme	Port of Hueneme So. Ca. Edison Ormond Beach Power Plant	Unloading fuel oil at Wharf 1 (but not since 1982)

<u>County</u>	<u>Location</u>	<u>Terminal Operator</u>	<u>Function/Status</u>
Los Angeles	18. El Segundo	Chevron (4 terminals)	Unloading crude loading product
	19. Port of LA	U.S. Navy	Loading and unloading petroleum products
	20. Port of LA	UNOCAL	Unloading crude oil
	21. Port of LA	GATX Terminals Corp.	Unloading petro- chemical and petro- leum products
	22. Port of LA	Pennzoil	Unloading lube oil
	23. Port of LA	Chevron	Loading and unloading bunker fuel, diesel and lube oil
	24. Port of LA	GATX Terminals Corp.	Loading and unloading petroleum products
	25. Port of LA	BP No. America Trading	Loading and unloading diesel fuel oils
	26. Port of LA	Western Fuel	Loading and unloading crude oil, diesel oil, fuel oils and ethyl alcohol
	27. Port of LA	Petrolane, Inc.	Unloading LPG
	28. Port of LA	UNOCAL	Loading and un- loading petroleum products
	29. Port of LA	LA Terminals	Unloading chemicals
	30. Port of LA	Chevron Chemical	Unloading lube oils

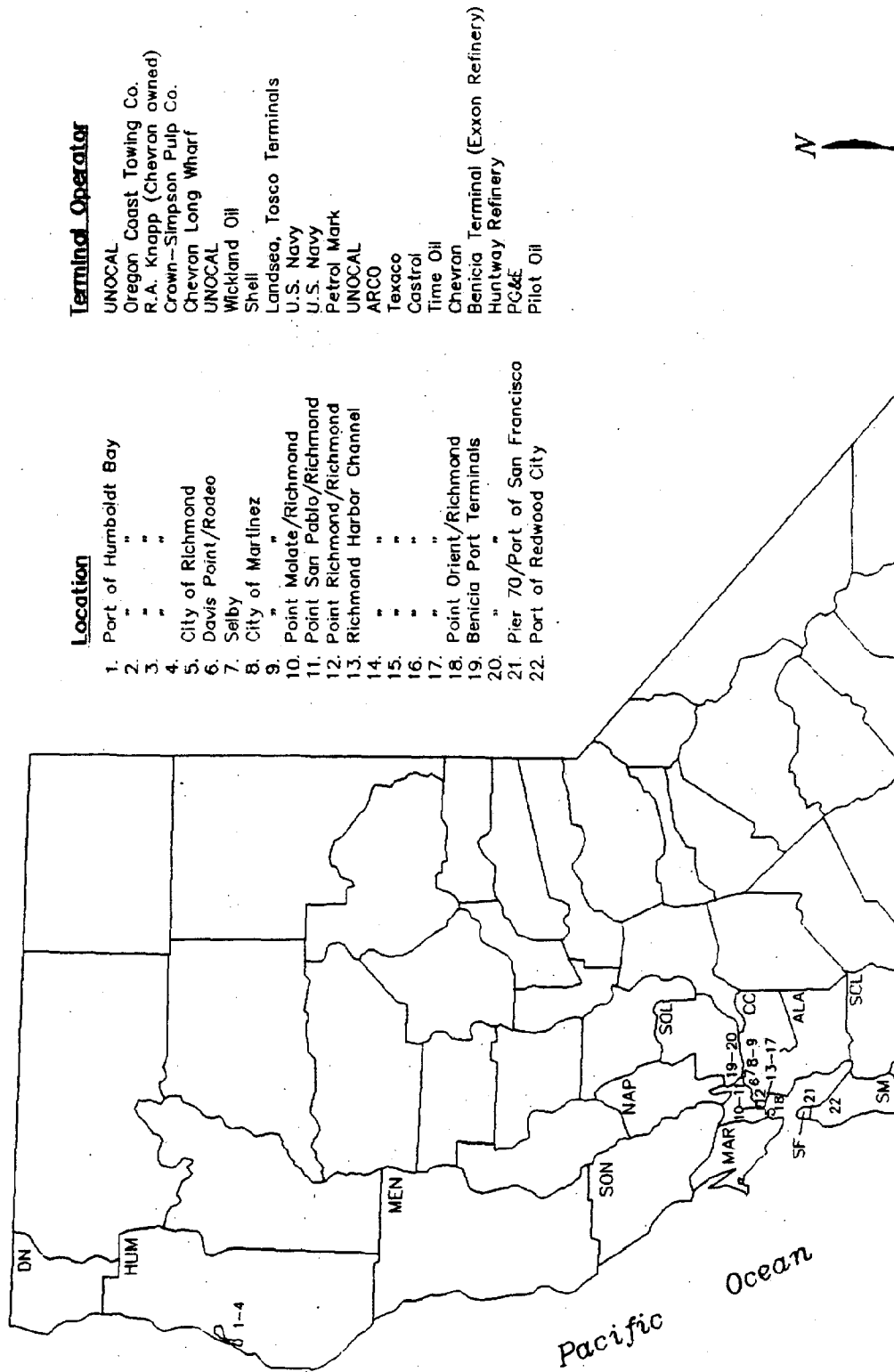
<u>County</u>	<u>Location</u>	<u>Terminal Operator</u>	<u>Function/Status</u>
	31. Port of LA	Golden Eagle Refining Inc.	Unloading crude oil, loading diesel and fuel oils
	32. Port of LA	Champlin Petroleum	Unloading crude oil and petroleum products, loading diesel and fuel oils
	33. Port of LA	Shell Oil Co.	Loading and unloading petroleum products
	34. Port of LA	GATX Terminals Corp.	Unloading crude oil, diesel and fuel oils, loading diesel and fuel oils
	35. Port of LA	City of LA Dept. of Water & Power	Unloading fuel oil
	36. Port of LA	Wilmington Liquid Bulk Terminal	Unloading crude oil, petroleum and petrochemical products, loading diesel and fuel oils
	37. Port of LA	Refiners Marketing	Unloading petro-chemicals
	38. Port of LA	Mobil Oil	Unloading crude loading and unloading petroleum products
	39. Port of LA	Pacific Texas Pipeline Co. (PACTEX)	Approved but not yet constructed, unloading crude for pipeline transportation to Texas
	40. Port of Long Beach	Exxon	Unloading petroleum products and fuel oil, loading bunker fuel

<u>County</u>	<u>Location</u>	<u>Terminal Operator</u>	<u>Function/Status</u>
	41. Port of Long Beach	Four Corners	Unloading crude oil
	42. Port of Long Beach	Texaco	Unloading crude oil, loading/unloading petroleum products, and loading bunker fuel
	43. Port of Long Beach	ARCO	Loading/Unloading petroleum products and loading bunker fuel loading/unloading crude oil
	44. Port of Long Beach	C. Brewer Terminals	Unloading petroleum products
	45. Port of Long Beach	Long Beach Terminal Co.	Unloading/loading petroleum products
Orange	46. Huntington Beach	So. Ca. Edison	Loading fuel oil
	47. Huntington Beach	Gulf Oil	Loading/Unloading Crude oil
San Diego	48. Encina	San Diego Gas & Electric	Unloading fuel oil and petroleum products

1 =loading and unloading refined petroleum products (i.e diesel fuel, lubricating oil, fuel oil, propane)

(Source: MMS, Pacific Summary Report 1987, Mr. Phil Kern, formerly with San Francisco Bay Conservation And Development Commission and now with Port San Francisco, Mr. Gene Serex of the Port of Richmond, Mr. Sid Robinson of Port of Los Angeles, and Ms. Geraldine Knatz of Port of Long Beach.)

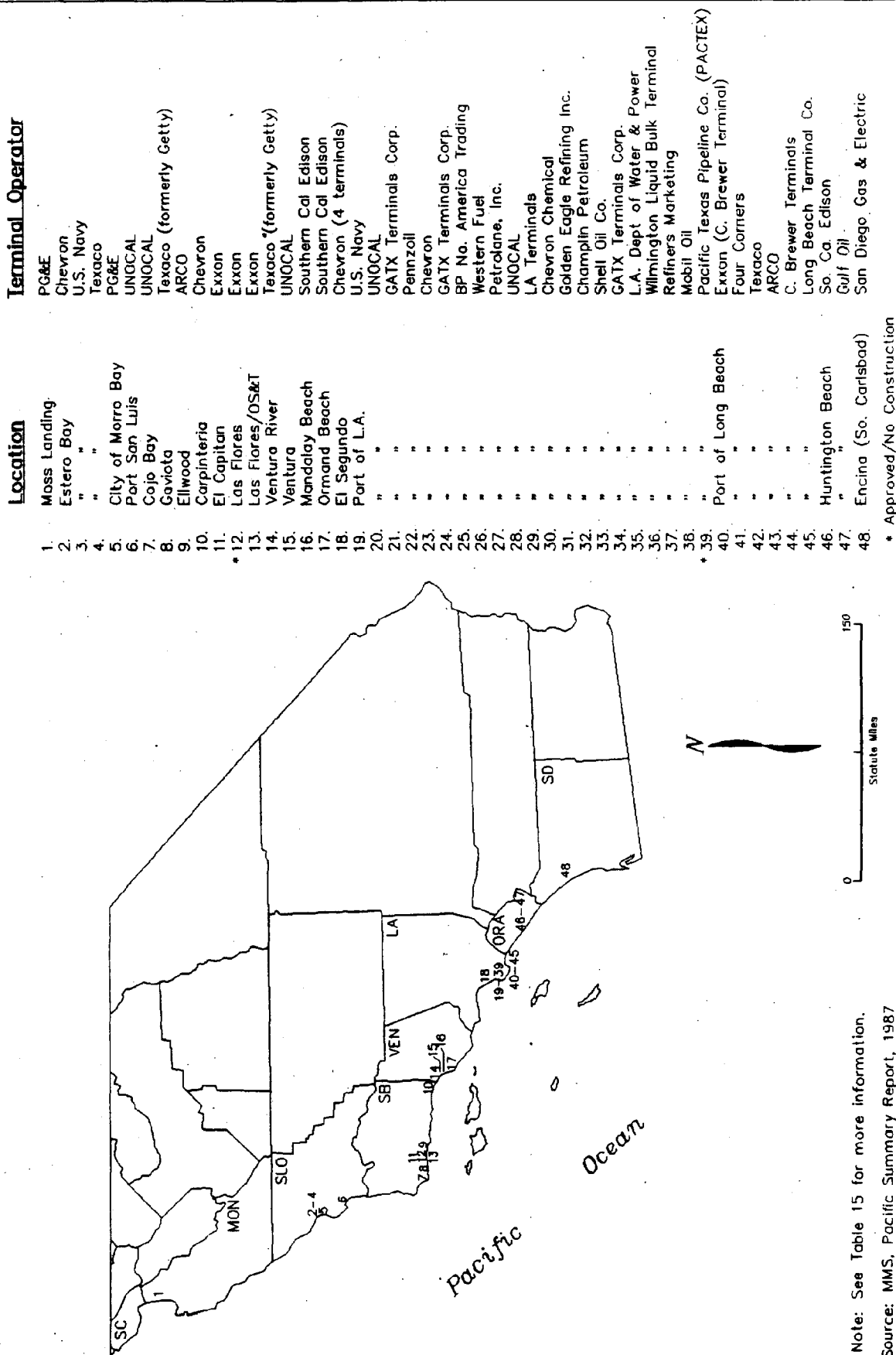
Marine Terminals Northern California



Note: See Table 15 for more information.

Source: MMS, Pacific Summary Report, 1987

Marine Terminals Southern California



Note: See Table 15 for more information.
Source: MMS, Pacific Summary Report, 1987

VII. OCS AND STATE PIPELINE SYSTEMS

Pipelines are an important means for transporting oil and gas. They are used to transport oil and gas from an offshore platform or onshore production site to an onshore processing and storage facility. After treatment, pipelines are then used to transport oil and gas to a refinery. If tankers transport the oil after onshore processing, then pipelines are used to carry the oil back offshore.

Subsea pipelines from platforms to shore are generally constructed by pipelay or pipe-pull techniques (see Figure 30). In pipelay, pipe sections are welded on a lay barge vessel and installed on the ocean bottom. With pipe-pull, pipes are welded together onshore or on a floating barge and pulled into position by a tugboat, winch, or barge.

Onshore pipelines are usually buried in trenches (see Figure 31). If technically feasible, pipelines can be constructed by subsurface horizontal drilling of pipeline routes which are known as directionally drilled crossings. A hole is drilled in a horizontal direction of sufficient size to place a conduit casing through which a pipeline "bundle" would be pulled. This method can be used to reduce blasting and trenching impacts.

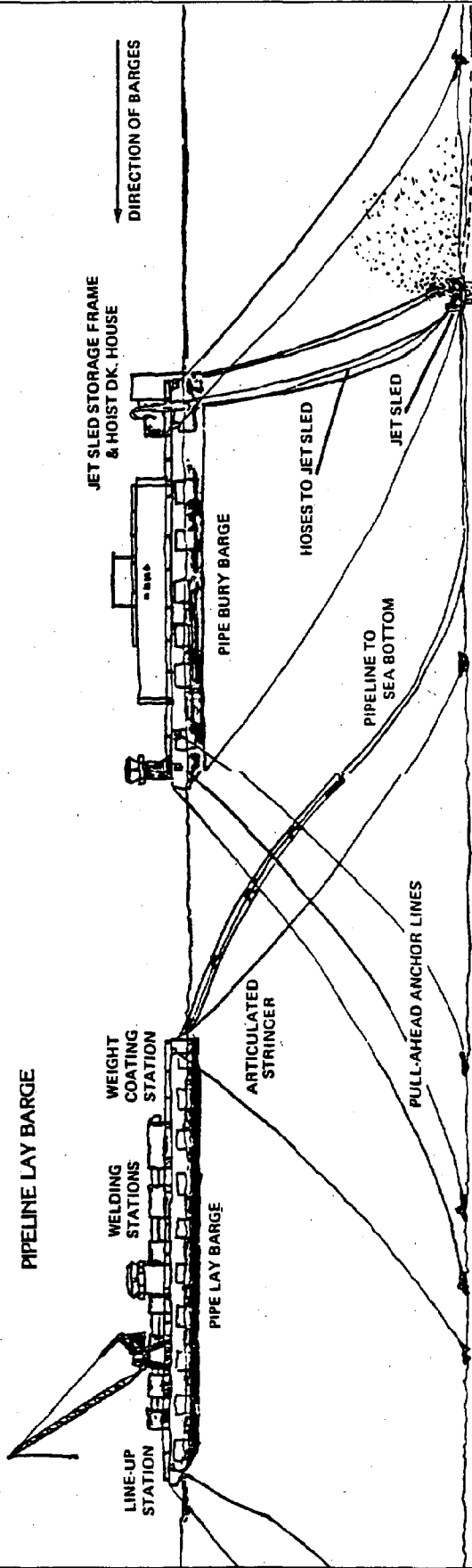
Every pipeline has a maximum throughput and pipeline capacity which is a function of diameter, design capacity (pressure), length, oil viscosity and ancillary facilities. Ultimately, pipeline capacity is a function of the characteristics of the crude. If peak production rates are expected to increase, it may be more economical to build a second parallel line rather than to attempt at the outset a design which would accommodate a later increase in the number of pumps and heaters. However, there would be increased environmental impacts from constructing additional lines in the future.

Pipelines can be privately owned or common carriers. A common carrier pipeline can be used by more than one producer. The tariff rates for interstate oil and gas pipelines are regulated by the Federal Energy Regulatory Commission (FERC), or if intrastate, by the State Public Utilities Commission (PUC). However, most of the onshore crude oil pipelines in California are privately owned and operated by integrated companies that maintain control of oil until it is sold as a refined product. These "industry common carrier" lines have equal access, but the facility is not regulated by the Public Utilities Commission. Since tariffs for privately owned crude oil pipelines are not regulated, the pipeline company can set its own price for transporting crude (OCS Project Task Force/OPR, Offshore Oil and Gas Development, Vol.1, 1977).

Intrastate natural gas pipelines are regulated by the State Public Utilities Commission. Several natural gas companies serve the southern California coastline from Point Conception to San Diego. There are natural gas transmission and trunk lines operated by the various gas companies within five miles of any landfall for offshore production between Point Conception and the Mexican border (OCS Project Task Force, 1977).

There are many existing, proposed, and approved pipelines to serve the OCS area. Some are from platform to platform and some from platform to shore. As of June 1988, there are 164 miles of pipeline installed on the Pacific OCS

Offshore Pipeline Construction

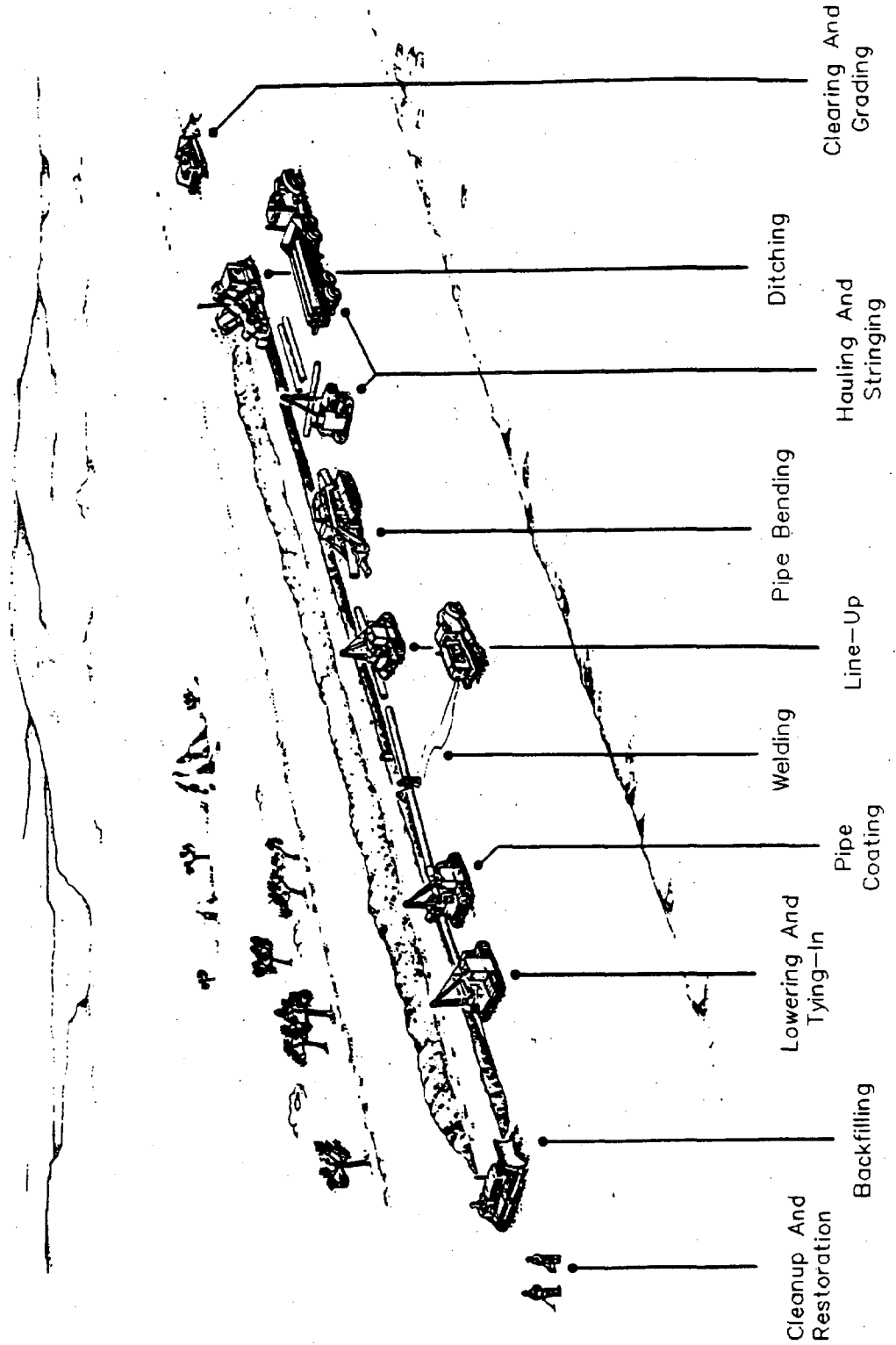


Source: California Coastal Commission, Coastal Energy Development, 1981

Drawing for illustrative purposes only.

Figure 30

Onshore Pipeline Construction Spread



Source: Adapted from ERT

Drawing for illustrative purposes only.

Figure 31

(MMS, 4/88). There are approximately 101.5 total miles of pipeline (including offshore and to shore) approved and/or under construction (approved project descriptions) and 6 proposed miles of pipeline (EIR/project descriptions).

In state waters, there are existing and proposed pipelines from platforms, islands, and subsea well completions. No pipeline mileage figures are readily available for the existing pipelines, but approximately 43.8 new miles of pipeline are now being proposed (Hercules, Haley, and Heron, Haven, & Holly A & B).

There are existing onshore pipeline systems distributing crude oil to California's three refinery centers. This crude oil transportation system is comprised of six major pipeline corridors:

1. the lower San Joaquin Valley to Los Angeles Basin;
2. the San Joaquin Valley to the San Francisco Bay region;
3. the Ventura area to the Los Angeles Basin;
4. a highly integrated and complex network (over 1,000 separate pipelines) in the L.A. Basin moving local production and crude delivered from the San Joaquin Valley, Ventura, Los Angeles and Long Beach Harbors to various refineries in the basin;
5. the central California coast (Estero Bay and Avila Beach) to the San Joaquin Valley, permitting shipment to or from the coast and to the Bay region from Estero Bay; and,
6. the Four Corners Pipeline, the only designated common carrier line in California, linking the Los Angeles Basin with the Four Corners area of the Southwest United States.

At each producing area there are numerous gathering lines connected to the main trunklines.

In addition, there are approved onshore pipelines under construction as well as pipelines proposed in San Luis Obispo and Santa Barbara Counties, and to Texas to carry OCS production. Based on these developments, there would be a total of 3,180 additional pipeline miles including lines to Texas.

Tables 16-20 show the location and capacity of existing, approved, and proposed OCS offshore pipelines; major onshore pipeline systems; existing, approved, and proposed onshore pipelines carrying OCS production; and existing, approved, and proposed state offshore pipelines. Refer to Figures 14 through 23 for OCS and State offshore existing, approved, and proposed pipeline corridor locations. Figures 32 through 35 show the locations for existing major onshore pipeline systems and existing, approved, and proposed onshore pipelines in San Luis Obispo, Santa Barbara, and Ventura Counties as well as the proposed pipeline route to Texas.

Table 16

Existing, Approved, And Proposed OCS Offshore Pipelines as of December 1988

<u>Platform</u>	<u>Pipeline operator</u>	<u>Unit/ (field)</u>	<u>Landfall</u>	<u>Size and type</u>	<u>Status</u>
Hondo ¹	POPCO	Santa Ynez (Hondo)	Las Flores Canyon	12-in gas	Existing
Hondo to OS&T	Exxon	(Hondo)	_____2	12-in oil 6-in fuel 8-in water	Existing
A to shore	UNOCAL	(Dos Cuadras)	Rincon	12-in oil 12-in gas 6-in water	Existing
B to A	UNOCAL	(Dos Cuadras)	_____2	8-in oil 8-in gas 6-in water	Existing
C to B	UNOCAL	(Dos Cuadras)	_____2	6-in oil 6-in gas 6-in water	Existing
Henry to Hillhouse	Sun	Dos Cuadras/ (Carpinteria Offshore)	_____2	8-in oil 6-in gas 6-in water	Existing
Hillhouse to A	Sun	(Dos Cuadras)	_____2	8-in oil 8-in gas 6-in water	Existing
Houchin to Hogan to shore	Phillips	(Carpinteria Offshore)	La Conchita	10-in oil 12-in gas 10-in gas lift 4-in water	Existing
Habitat	Pacific Inter-State Off-Shore Co.	Pitas Point/ (Pitas Point)	Carpinteria	12-in gas	Existing

1. Oil from Platform Hondo is stored and treated on an offshore storage and treatment vessel, then offloaded onto tankers. Additional platform and pipeline emplacements for the Santa Ynez Unit have been approved.
2. Lines indicate pipeline linking to platform.

<u>Platform</u>	<u>Pipeline operator</u>	<u>Unit/ (field)</u>	<u>Landfall</u>	<u>Size and type</u>	<u>Status</u>
Grace to Hope (State waters to shore)	Chevron	Santa Clara/ (Santa Clara)	Carpinteria	2-in oil ³ 10-in gas ³ 10-in oil to shore	Existing
Gilda	UNOCAL	Santa Clara/ (Santa Clara)	Mandalay Beach	12-in oil 10-in gas 6-in water	Existing
Gina	UNOCAL	(Hueneme)	Mandalay Beach	10-in oil and gas 6-in water	Existing
Ellen to Elly	SWEPI	Beta/(Beta)	— ²	14-in oil 4-in gas	Existing
Elly to shore	SWEPI	Beta/(Beta)	Long Beach	16-in oil	Existing
Eureka to Elly	SWEPI	Beta/(Beta)	— ²	12-in oil 6-in gas 10-in water	Existing
Edith to Elly	Chevron	Beta/(Beta)	— ²	6-in oil	Existing
Edith to Eva (State waters to shore)	Chevron	Beta/(Beta)	Huntington Beach	6-in gas	Existing
Gail to Grace	Chevron	Santa Clara/ (Sockeye)	— ²	8-in oil 8-in gas 8-in oil/gas	Existing
Hermosa to shore	Chevron	(Point Arguello)	Point Conception	24-in oil 22-in gas	Existing
Harvest to Hermosa	Texaco	(Point Arguello)	— ²	12-in oil 8-in gas	Existing
Hidalgo to Hermosa	Chevron	(Point Arguello)	— ²	16-in oil 10-in gas	Existing

² Lines indicate pipeline linking to platform. ³Lines from Platform Grace to Platform Hope

<u>Platform</u>	<u>Pipeline operator</u>	<u>Unit/ (field)</u>	<u>Landfall</u>	<u>Size and type</u>	<u>Status</u>
Julius to shore	SWEPI	San Miguel	Guadalupe oil field	20-in oil 10-in water 8-in fuel	Approved (OCS) requires coastal permit in state waters
Irene to shore	UNOCAL	(Point Pedernales)	Vandenberg Air Force Base	20-in oil 8-in gas 8-in water	Existing
Iris to Irene	UNOCAL	(Point Pedernales)	____ ²	10-in oil 6-in gas	Approved/under construction
Heather to Heritage	Exxon	Santa Ynez	____ ²	12-in gas 16-in oil	
Heritage to shore	Exxon	Santa Ynez	Las Flores Canyon	12-in gas	
Heritage to Harmony	Exxon	Santa Ynez	____ ²	20-in oil	Approved/under construction
Harmony to mid-pt. tie-in	Exxon	Santa Ynez	____ ²	14-in gas	
Harmony to shore	Exxon	Santa Ynez	Las Flores Canyon	20-in oil	
Hondo to mid pt. tie-in	Exxon	Santa Ynez	____ ²	12-in oil	
Shore to SALM	Exxon	Santa Ynez	Las Flores Canyon	48-in oil	
Water outfall	Exxon	Santa Ynez	Las Flores Canyon	16-in water	
Hacienda	Chevron	Rocky Point Unit	____ ²	8 or 10-in oil 6 or 8-in gas	Proposed

² Lines indicate pipeline linking to platform.

(Source: MMS, Pacific Summary Report, July 1987 and EIR project Descriptions.)

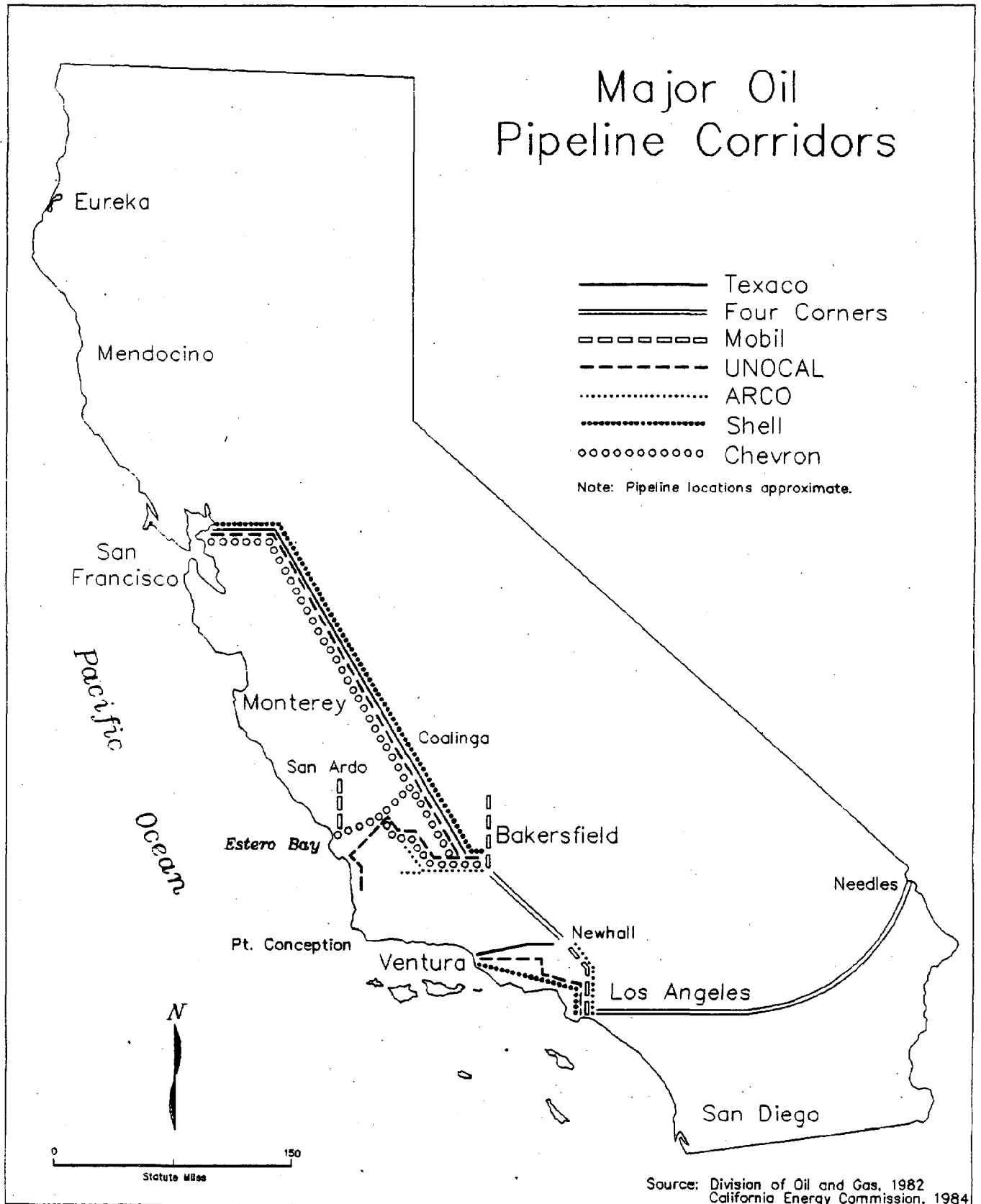
Table 17

Existing Major Onshore Crude Oil Pipeline Systems in California by Capacity and
Throughput as of June 1986

<u>Pipeline Link</u>	<u>Maximum Capacity (mbd)1</u>	<u>Average Throughput (mbd)1</u>	<u>Percent Use 1986</u>
San Joaquin Valley to San Francisco and Estero Bay	514	440	86
San Joaquin Valley to Los Angeles	158	147	93
Ventura County	<u>225</u>	<u>163</u>	<u>72</u>
TOTAL	897	750	

(Source: California Energy Commission, June, 1988)

1. mbd = one thousand barrels per day



Source: Division of Oil and Gas, 1982
California Energy Commission, 1984

Figure 32

Table 18
Existing Onshore Pipelines Carrying OCS Production as of December 1988 in Ventura and Santa Barbara Counties

Pipeline Operator	Owner	Facility	to	Facility	Size and Type	Origin of Oil
Phillips	Ventura Pipeline Company (consortium)	Phillips-La Conchita separation treatment facility	to	Mobil-Rincon storage facility	10-in oil	Carpinteria Offshore Field
Mobil	Ventura Pipeline Company (consortium)	Mobil-Rincon storage facility	to	UNOCAL's and Texaco's marine terminals near Ventura Harbor	22-in oil	Dos Cuadras Field; Carpinteria Offshore Field; Santa Clara Unit
		Connecting line from Mobil 22-in pipeline	to	Texaco 8-in and Shell	12-in oil	10-in pipelines
		Connecting line from Mobil 12-in pipeline	to	Texaco's Willett tank farm	8-in oil	
UNOCAL	UNOCAL	UNOCAL's marine terminal near Ventura Harbor	to	UNOCAL's Santa Paula pump station	8-in oil	Santa Clara Unit
		Santa Paula pump station	to	Torrey Canyon pump station	8-in oil	
		Torrey Canyon pump station	to	Los Angeles Basin	12-in oil	
		Mandalay Beach separation and treatment facility	to	Connecting line to UNOCAL 12-in pipeline	8-in oil	
Shell California	Shell California	Tank terminal in Ventura Avenue oilfield	to	Newhall	10-in oil	Dos Cuadras Field; Carpinteria Offshore Field
Texaco	Texaco	Near Shell's tank terminal in Ventura Avenue oilfield	to	Connecting line to Mobil 10-in pipeline	8-in oil	Santa Clara Unit
Texaco	Texaco	Texaco's Willett Tank Farm	to	Texaco (formerly Getty) Marine Terminal at Ventura River loading OCS and other Crude Oil	2-8 in oil lines	

Table 18
(continued)

<u>Pipeline Operator</u>	<u>Owner</u>	<u>Location</u>	<u>Size and Type</u>	<u>Origin of Oil</u>
ARCO	ARCO	Upper Ojai Valley to Ouyama	Texaco pump station in Fillmore So. Cal. Edison's Mandalay Beach generating station	6-in oil 20-in gas*
Chevron	Chevron	Chevron's Carpinteria separation and treatment plant in Santa Barbara County	Mobil-Rincon plant in Ventura County	10-in oil Santa Clara Unit
PAPCO/PANGL ¹	PAPCO/PANGL ¹	Pt. Conception to	Gaviota Oil & Gas Processing Facility	24-in oil, 20-in gas 250,000 bbl/day, 32 pipeline miles Point Arguello Hermosa Harvest Hidalgo
UNOCAL	UNOCAL	Santa Ynez River mouth to	Lompoc Dehydration Facility to Orcutt Pump Station	20-in oil 10-in gas 10-in water 8-in gas 48.7 pipeline miles Point Pedernales Field (Platform Irene)

* This pipeline is currently transporting gas, but it could be converted to transport crude oil from either Elk Hills to Port Hueneme or from the Ventura-Santa Barbara County area to the Bakersfield area.

(Source: MMS, Pacific Summary Report, September, 1983)
Most current information available in Final Plans and EIR(s)

¹ Point Arguello Pipeline Company and Point Arguello Natural Gas Line Company

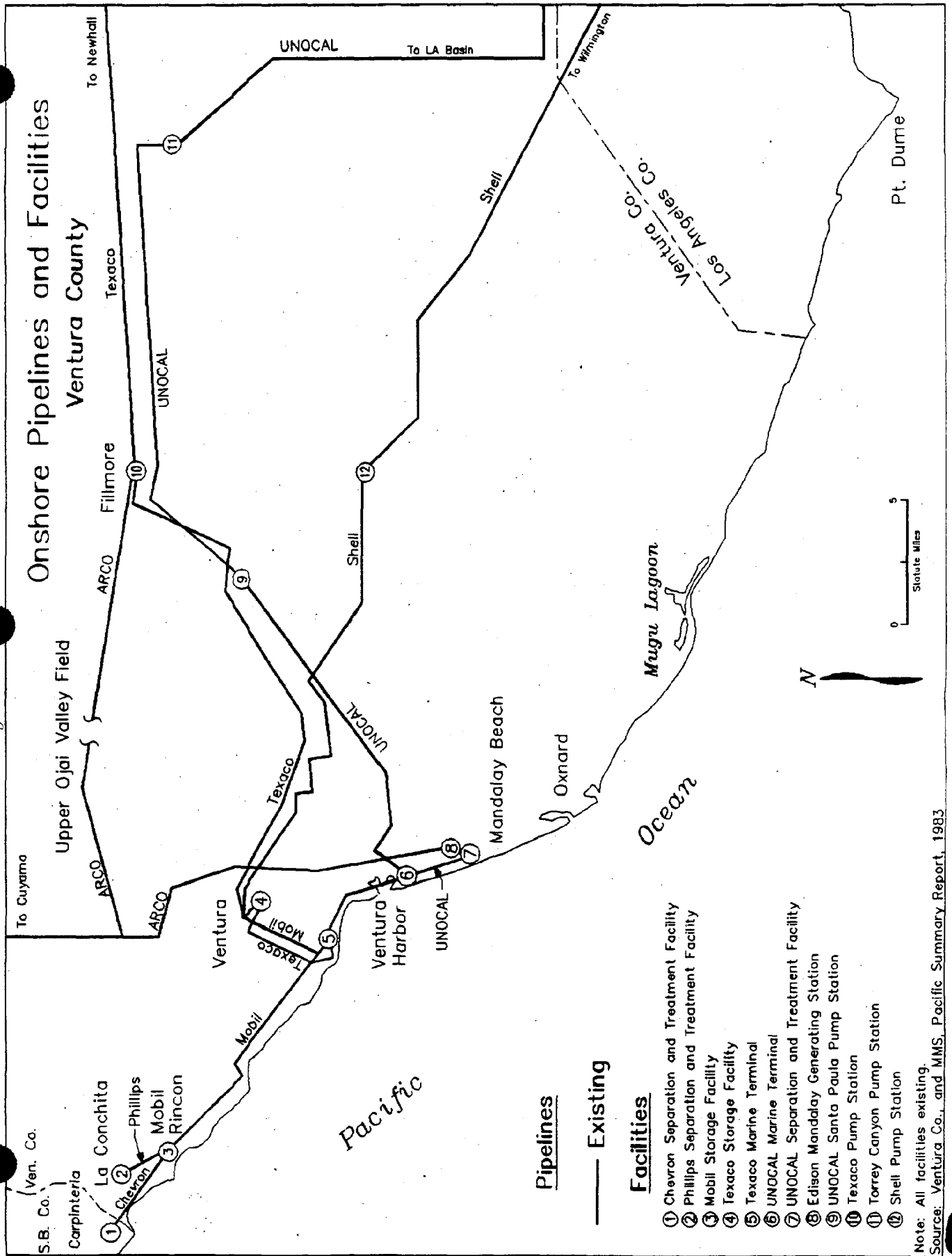


Figure 33

Table 19

Approved/Under Construction and Proposed Onshore Pipeline Systems as of December 1988 in Santa Barbara and San Luis Obispo Counties and to Los Angeles and to Texas

<u>Platform/Pipeline Operator</u>	<u>Location</u>	<u>Size/Type of Line*</u>	<u>Status</u>
Hondo, Heritage, Heather, Harmony/Exxon Santa Ynez Unit	From shore to Las Flores Canyon Facilities	20-in oil, 12-in water 140,000 bbl/day, 11.2 pipe- line miles	Approved/Under Construction
Julius/SWEPI and Celeron/All American	From shore to Guadalupe Dunes to Sisquoc	24-in oil Celeron interconnect, 20-in oil, 10-in water, 8-in fuel, 125,000 bbl/day 44.4 pipeline miles	Proposed
Celeron/All American	Las Flores Canyon to Caviota to Emidio in Kern County to Freeport, Texas	30-in oil, 1,750 pipeline miles, 300,000 bbl/day	Coastal Segment from Las Flores in permit process Majority of line from Caviota has been constructed except portion in Texas which is expected by 1989
Pacific-Texas Pipeline Co.	San Pedro, California to Midland, Texas	42-in oil, 900,000 bbl/day 1,032 pipeline miles	Approved/No Construction
Southern California Pipeline System/consortium of Four Corners Pipeline Co., Chevron Pipeline Co., Texaco USA, and Shell Oil Company	Caviota to Emidio to Los Angeles	30-in oil, 330,000 bbl/day 260 pipeline miles	Approved in Santa Barbara County; under review in all other areas; No construction

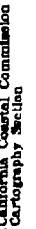
Table 19
(continued)

<u>Platform/Pipeline Operator</u>	<u>Location</u>	<u>Size/Type of Line *</u>	<u>Status</u>
Heron, Haven, Holly A & B/ ARCO	Ellwood to Las Flores Canyon	8-in produced water 8-in vapor, 18-in oil, 13.1 pipeline miles 12-in sweet gas, 12-sour gas, 16-in treated gas, 4 pipe- line miles	Proposed
Hercules/SNEPT (Shell)	Landfall to Canada De La Huerta	14-in oil, 8-in sour gas 10-in sweet gas, 4-in brine, 4-in water 3-in glycol, 8-in produced water, .6 pipeline miles	Proposed
Hayley/UNOCAL	Landfall to PAPCO/PANGEL line or Lompoc dehydration facility	6-in oil, 4-in gas 36 pipeline miles to Lompoc or 2 pipeline miles to PAPCO/PANGEL	Proposed

(Source: WMS, Pacific Summary Report, July 1987, Hermosa, Irene and Exxon Option B Approvals, Julius and Exxon Lompoc Pipeline EIRS)

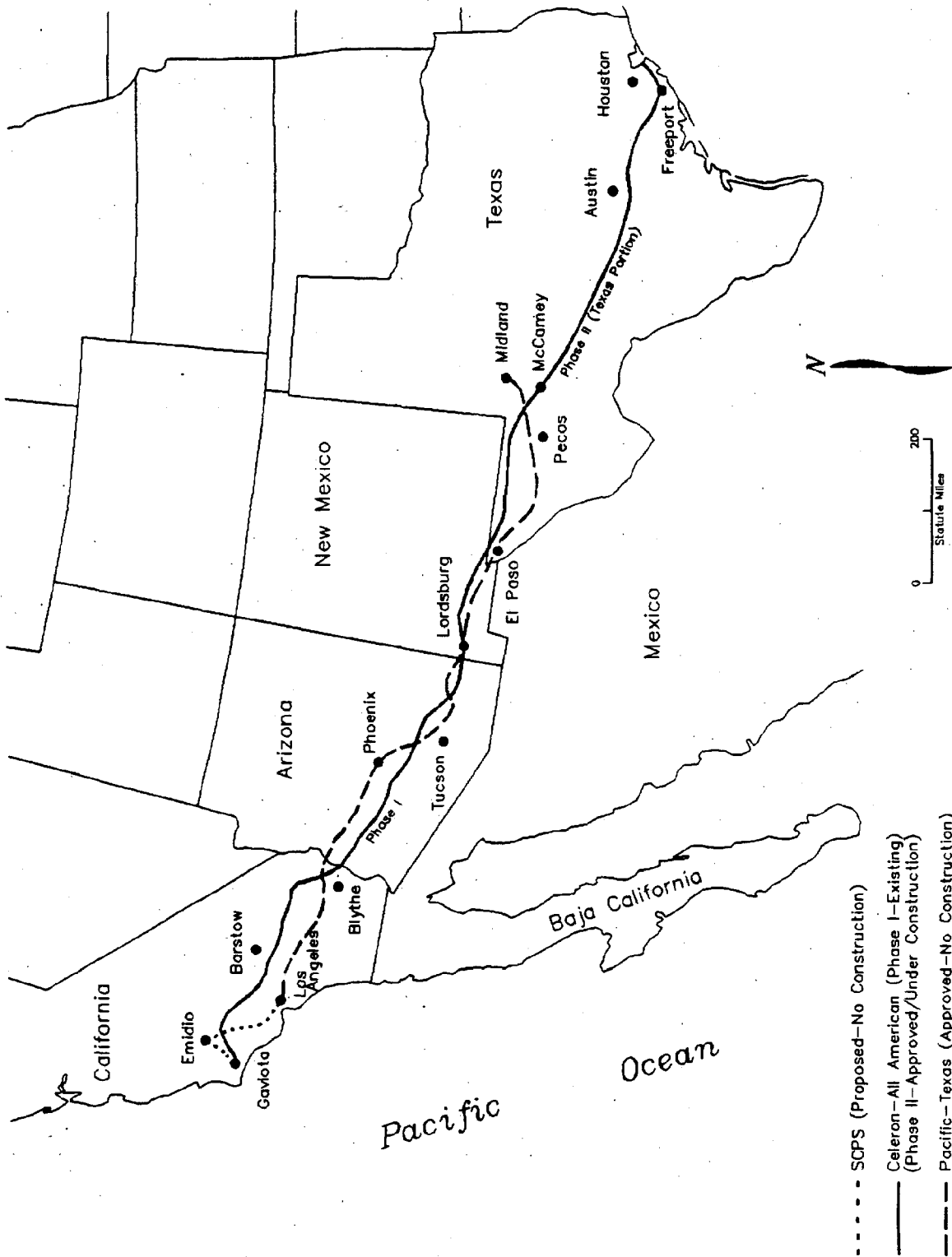
* Design capacity of pipeline and not actual daily throughput.

1 Chevron Pipeline and Point Arguello Pipeline Companies and Point Arguello Natural Gas Line Company



Proposed Routes for Crude Oil Pipelines

California to Texas



Source: MMS, Pacific Summary Report, 1987

Figure 35

Table 20

Existing, Approved/Under Construction, and Proposed State Offshore Pipelines from Platforms/Islands and Subsea Well Completions as of December 1988

Platforms	Platform/Operator	Location-County/Lease	Size/Type	Status
	Hazel/Chevron	Santa Barbara PRC 1824.1	One pipeline corridor	Existing
	Hilda/Chevron	Santa Barbara PRC 1824.1	6-in oil, 6-in gas, 8-in gas with	
	Helen/Texaco	Santa Barbara PRC 2206.1	6-in oil, 8-in gas	Abandoned in place
	Emmy/Phillips	Orange PRC 425.1	14-in oil, 8-in gas	Existing
	Herman/Texaco	Santa Barbara PRC 2725.1	6-in oil	Abandoned in place
	Eva/UNOCAL	Orange PRC 3033.1	8-in gas, 8-in oil	Existing
	Hope/Chevron	Santa Barbara PRC 3150.1	One pipeline corridor	
	Heidi/Chevron	Santa Barbara PRC 3150.1	2-10-in oil with 1-10 in gas	Existing
	Holly/ARCO	Santa Barbara PRC 3242.1	6-in oil, 6-in gas, 4-in gas line	Existing
	Heron, Haven, Holly A&B/ARCO	Coal Oil Point, Santa Barbara , PRC 309, 3120, 3242	12-in gas lines, 10-12-in oil lines	Proposed
	Hercules/SWEPI (Shell)	Shell Molino, Santa Barbara PRC 2920	14-in oil, 8-in sour gas, 10-in sweet gas, 4-in brine, 4-in water 3-in glycol, 8-in produced water	Proposed
	Hayley/UNOCAL	Cojo, Santa Barbara PRC 2879	6-in oil, 4.5-in gas	Proposed
	Esther/Chevron	Orange PRC 3095.1	1-10-in water, 1-4-in water 1-10-in oil, 1-12-in cable line	Existing

1. Platforms have been removed.

Table 20
(continued)

<u>Subsea Well Completions</u>			
<u>Subsea Well Completion Lines</u>	<u>Location-County/Lease</u>	<u>Size/Length</u>	<u>Status</u>
Chevron/ARCO	Caviota, Santa Barbara , PRC. 2793.1, 2894.1, 2199.1	11-3-in oil, 2-4-in gas, 1-4 in gas	Existing
SNEPI(Shell)	Shell Molino, Santa Barbara PRC 2920.1	7-4-in gas lines (3 lines to be abandoned)	Existing
Phillips	Phillips Tajiguas PRC 2933	16-4-in gas lines	Existing
<u>Artificial Islands</u>			
<u>Islands/Operators</u>	<u>Location-County/Lease</u>	<u>Size/Length</u>	<u>Status</u>
Belmont/Exxon	Orange PRC 186.1	--	Existing
Rincon/Norris	Ventura PRC 1466.1	6-in oil, 6-in gas	Existing
Grissom/City of Long Beach		--	Existing
White/City of Long Beach	Los Angeles Granted Tidelands	--	Existing
Freeman/City of Long Beach		--	Existing
Chaffee/City of Long Beach		--	Existing

(Source: OCS Project Task Force/Office of Planning and Research, 1977; Cities Service EIR, December 1985;
ARCO EIR June 1986; and Hayley And Hercules Development Plans)

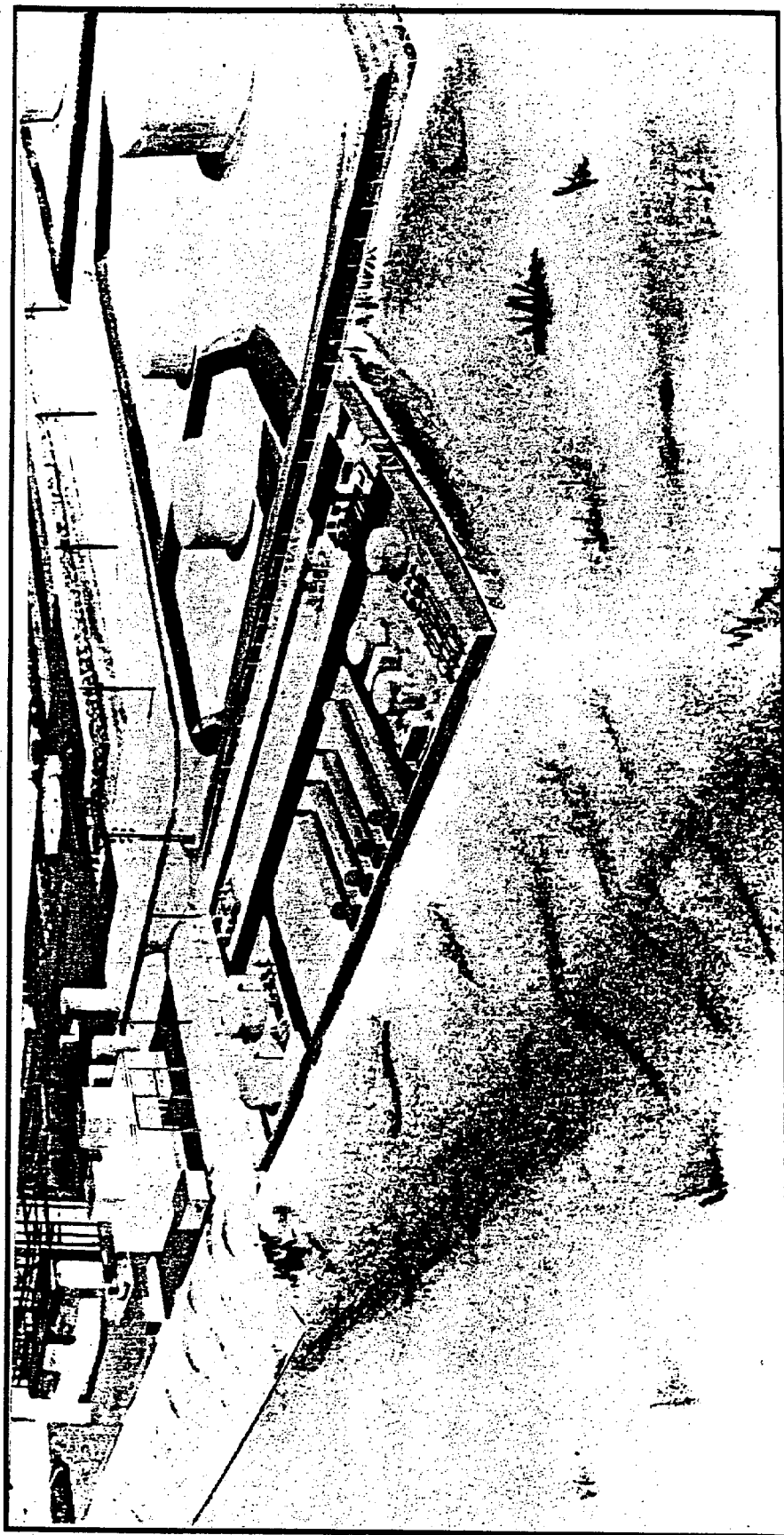
VIII. OIL AND GAS SEPARATION/TREATMENT AND GAS PROCESSING PLANTS

Separation and treatment facilities are designed to remove impurities from a crude oil well stream which consists of oil, natural gas, and formation water (brine water, dissolved solids, and suspended solids). The oil and gas must be separated and the water removed prior to being processed for final disposition. The separation and treatment process may take place totally or in part offshore or onshore.

The equipment used to separate the gas, oil and water components of the well stream is called a separator. Heater treaters and chemicals may be necessary to break down oil/water emulsions into oil and water.

Generally, natural gas is removed from the well stream at the platform and handled separately. If the gas is unassociated (no oil) or if the gas has been separated from oil and most of the water, it is sent to a dehydrator where additional water in the form of vapor is removed. If the gas is sour (high in hydrogen sulfide), it is sent to a gas treatment plant, where the sulfur is removed. The gas then goes to a gas processing plant. If the natural gas is sweet (low in hydrogen sulfide) it goes directly to the gas processing plant. A gas processing plant removes impurities to present standards of the purchasing utility. If economically desirable, the plants may be designed to also recover certain natural gas liquids such as butane, propane, and natural gasoline.

Table 21 shows the existing, approved, and proposed separation and treatment and gas processing facilities with offshore throughput in Santa Barbara, San Luis Obispo, and Ventura Counties. Figure 36 indicates the locations of these facilities with numbers that are cross-referenced to the Table 21.



Separation and Treatment Facility

Table 21

Existing*, Approved/Under Construction, and Proposed Separation and Treatment And/or Gas Processing Facilities in San Luis Obispo, Santa Barbara, and Ventura Counties as of December 1988 (BPD = barrels per day; MMSCFD = million standard cubic feet per day)

Unit/Field (platforms or state wells)	Facility Name and Location	Facility Operator	Permit/Design Capacity	Process/Equipment	Status
San Miguel Field/ (Julius)	1. South Nipoma Mesa Separation and Treatment plant at South Nipoma Mesa, San Luis Obispo County	SWEPI (Shell)	Oil: 40,000 BPD 10,000 BPD water treatment	Oil: Dehydration, H ₂ S removal produced water	Proposed
Santa Maria Oil Fields/ Point Pedernales Field (Irene)	2. Santa Maria Crude Refinery "upgrader" north of City of Guadalupe San Luis Obispo County	UNOCAL	Oil: 44,000 BPD with proposed retrofit of coker plant	Oil: Delayed coker process, gas recovery; H ₂ S absorption sulfur recovery	Existing
Santa Maria oil fields/ Point Pedernales/(Irene)	3. Battles Gas Processing Plant, Santa Maria, Santa Barbara County	UNOCAL	Gas: 30 MMSCFD	Gas: Compression, purification of H ₂ S, and lean oil absorption	Existing
Point Pedernales/(Irene)	4. Lompoc Separation and treatment Facility north of City of Lompoc, Santa Barbara County	UNOCAL	Oil: 36,000 BPD to 42,000 BPD. Produced water: 36,000 BPD	Oil: Dehydration Gas: Remove hydrocarbon condensate	Existing
Point Conception Field/ Coast Guard and State Lease	5. Point Conception Separation and Treatment Plant near Government Point in Santa Barbara County	UNOCAL	Oil: 1000 BPD Gas: .4 MMSCFD	Oil and water separation and water treatment	Existing

Table 21
(continued)

<u>Unit/Field (platforms or state wells)</u>	<u>Facility Name and Location</u>	<u>Facility Operator</u>	<u>Permit/Design Capacity</u>	<u>Process/Equipment</u>	<u>Status</u>
6. Point Arguello Field/ (Hermosa, Hidalgo, Harvest)	Caviota Separation and Treatment/Gas Processing Facility Caviota, Santa Barbara County	Chevron	Oil: 50,000 BPD Gas: 120 MMSCFD	Oil: Dehydration H ₂ S removal, treat produced water. Gas: Remove H ₂ S, NGL's, and LPG's	Existing
7. Alegre Field/State Lease 2793.1	Caviota Separation and Treatment/Gas Processing Plant at Caviota (Texaco Marine terminal property) Santa Barbara County	ARCO	Oil: 350 BPD Gas: .45 MMSCFD	Oil: Separators, 2 storage tanks; Gas: glycol dehydrator, gas lift, sales compressor; no LACT hand gauged	Existing
8. State Lease 2920 (Hercules) and subsea gas well completions from 2199	Molino Separation and Treatment/Gas Processing Plant at Canada de la Huerta, Santa Barbara County	SWEPI (Shell)	Existing: Gas at 34/48 MMSCFD Proposed: Gas expanded to 100 MMSCFD Oil: 30,000 BPD	Existing Gas: Removal of heavier hydrocarbons, dehydration, compression, propane and NGL to sales Proposed Oil and Gas Facility: Dehydration, water cleanup, sour gas sweetening, sulfur recovery.	Existing and proposed modifications and additions under Santa Barbara County Review
9. State Lease 3933 subsea gas wells	Tajiguas Gas Processing Plant at Tajiguas, Santa Barbara County	Phillips	Gas: 30 MMSCFD	Gas: Separation of condensate, compression	Existing
10. Santa Ynez Unit/Hondo (Hondo A)	Offshore Separation and Treatment Facility (OS&T), Offshore Las Flores Canyon in OCS waters	Exxon	Oil: 40,000 BPD	Oil: Dehydration	Existing

Table 21
(continued)

<u>Unit/Field (OCS platforms)</u>	<u>Facility Name and Location</u>	<u>Facility Operator</u>	<u>Permit/Design Capacity</u>	<u>Process/Equipment</u>	<u>Status</u>
11. Santa Vnez Unit/Hondo (Hondo A)	POPCO Separation and Treatment/Gas Processing Facility, Las Flores Canyon, Santa Barbara County	POPCO	Gas: Phase I/ 30 MMSCFD Phase II/60 MMSCFD	Gas: Compression and dehydration; tail gas cleanup	Existing
12. Santa Vnez Unit/Hondo Sacate, and Pescado fields/ (Heather, Harmony, Heritage Hondo A)	Las Flores Separation and Treatment/Gas Processing Facility, Las Flores Canyon, Santa Barbara County	Exxon	Oil: 140,000 BPD Gas: 21 MMSCFD (gas stripping)	Proposed Oil Facility: Dehydration, reduce H ₂ S, water cleanup (brine) sourgas sweetening, compression	Approved/ under construction
13. Ellwood Field/Onshore wells State Lease wells	Dos Pueblos Separation and Treatment Facility at Dos Pueblos, Santa Barbara County	ARCO	Oil: n.a./500-2000 BPD Gas: n.a./ .35-.6 MMSCFD	Oil: Water separation Gas: Separation, compression, sweetening, tank gauge, no LACT	Existing
14a Coal Oil Point/State Leases PRC 3242, 309, 308, 208, and 3120/ (Holly, Heron, Haven, Holly A & B)	Existing: Ellwood Separation and Treatment Facility at Ellwood, Santa Barbara County Proposed: Separation Treatment/Gas Processing Facility at Las Flores Canyon or Ellwood, Santa Barbara County	ARCO	Existing: Gas 20 MMSCFD and Oil 20,000 BPD Proposed: Gas plant at Las Flores 60 MMSCFD, (sour gas) and 90 MMSCFD (Sweetgas) and oil treatment at Las Flores or Ellwood 80,000 BPD w/ additional 3 platforms	Existing: Oil-heater treaters, settling and surge tanks Gas: liquid gas, separators, gas scrubbers, vapor recovery, glycol regeneration, gas compression, LACT Proposed/Gas: Liquid separation, dehydration, CO ₂ reduction, compression, sulphur recovery, tailgas treatment, hydrocarbon removal, NGL and LPG Oil: Additional oil dehydration and treatment equipment-Options of Commingled or segregated	Existing oil and gas processing at Ellwood Proposed gas at Las Flores and expanded oil (80 MBPD) at Ellwood or Las Flores

Table 21
(continued)

<u>Unit/Field (OCS platforms)</u>	<u>Facility Name and Location</u>	<u>Facility Operator</u>	<u>Permit/Design Capacity</u>	<u>Process/Equipment</u>	<u>Status</u>
Santa Clara Unit/Field 15. (Grace) Santa Clara Unit/ Sockeye Field (Gail) Carpin- teria Offshore Field (Hope & Heidi) Summerland Offshore Field (Hilda & Hazel)	Carpinteria Separation and Treatment/Gas Processing Facility at Carpinteria, Santa Barbara County	Chevron	Oil: 30,000 BPD Gas: 23 MMSCFD	Oil: Dehydration, shipping capabilities, water cleanup Gas: Compression, dehydration, LACT Unit	Existing
Carpinteria Offshore 16. Field/(Houchin, Hogan)	La Conchita Separation and Treatment Plant La Conchita, Ventura County	Phillips	Oil: 27,000 BPD Gas: 22 MMSCFD	Oil: Dehydration, shipping, water cleanup. Gas: Compression and dehydration LACT Unit	Existing
Dos Quadras Field/(A,B,C 17. Hillhouse)/Rincon Offshore field (Henry and Rincon Island)	Rincon Separation and Treatment/Gas Processing Facility Rincon, Ventura County	Mobil	Oil: 36,000 BPD Gas: 60 MMSCFD	Oil: Dehydration, shipping, water cleanup. Gas: Compression, carbon dioxide removal, low temp. conditioning, LACT Unit.	Existing
Santa Clara Unit/Field 18. (Gilda) Ruenene Offshore Field (Gina)	Mandalay Beach Separation and Treatment/Gas Processing Facility Mandalay Beach, Ventura County	UNOCAL	Oil: 36,000 BPD Gas: 2 MMSCFD	Oil: Dehydration, shipping, water cleanup. Gas: Compression and dehydration, LACT Unit	Existing

(Source of Data: MMS, Pacific Summary Report, 1987, EIR documents, Santa Barbara County Energy Division Staff; OPR Offshore Oil and Gas Development, Vol II, 1977; County of Santa Barbara, Final EIR for proposed General Plan Amendments Regarding the Consolidation of Onshore Facilities for Processing Offshore Oil and Gas along the County's South Coast, February, 1987.)

* Presently operating

Separation, Treatment, And Gas Processing Facilities

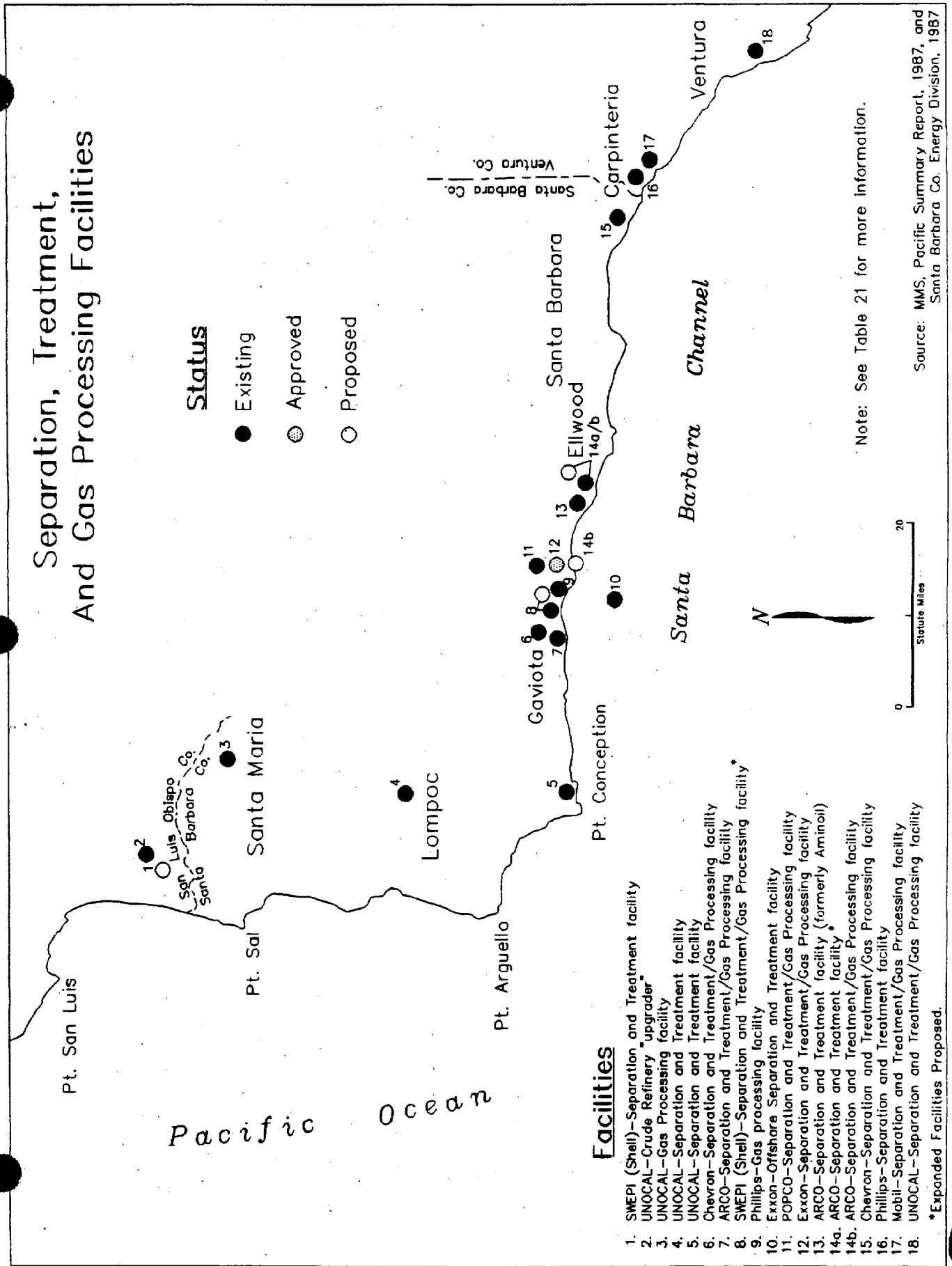
Status

- Existing
- ◐ Approved
- Proposed

Note: See Table 21 for more information.

Source: MMS, Pacific Summary Report, 1987, and
Santa Barbara Co. Energy Division, 1987

Figure 36



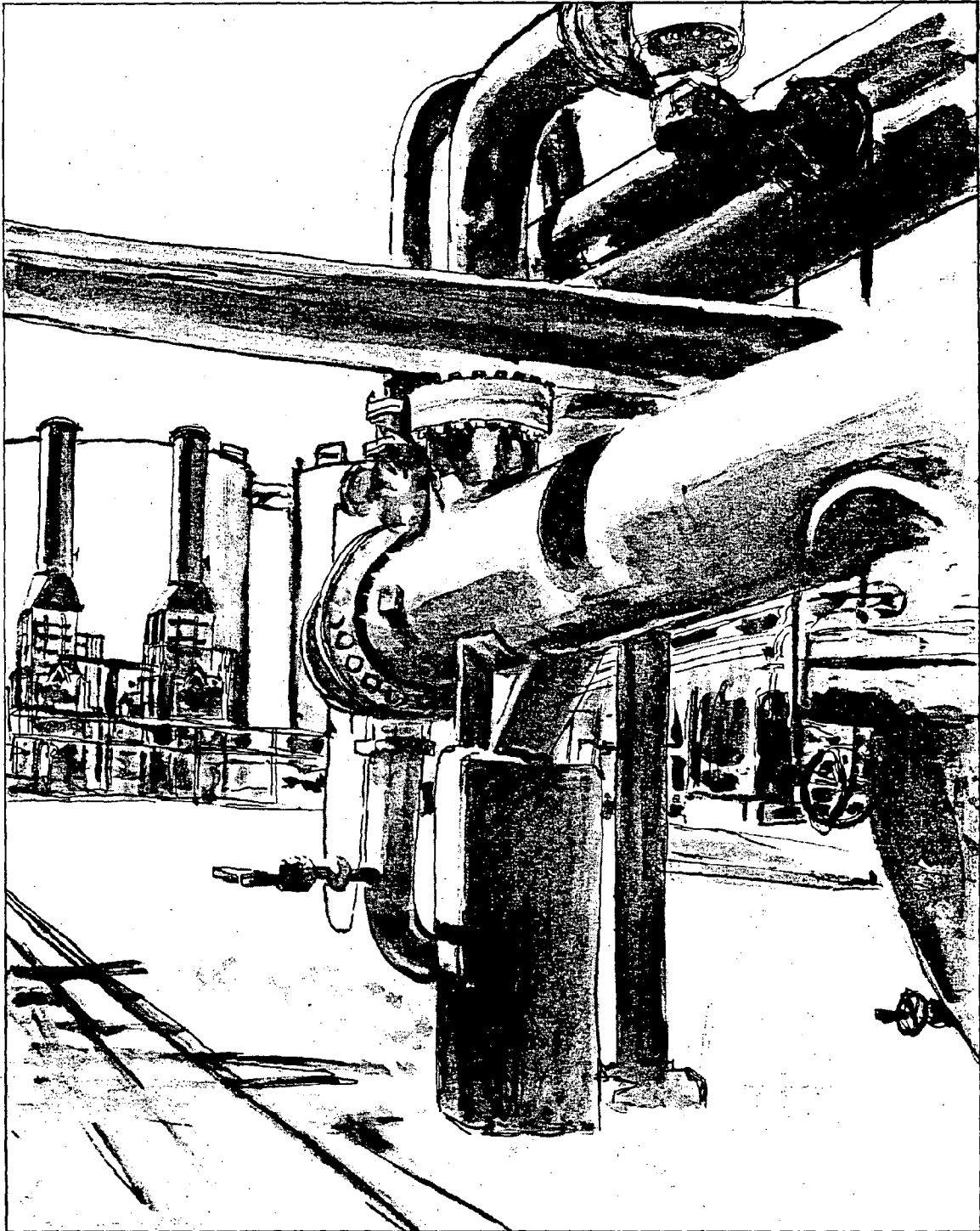
IX. REFINERIES IN CALIFORNIA

After partial processing and treatment, crude oil is transported to refineries by pipeline or tanker and processed into marketable products. Unprocessed petroleum contains hydrocarbon compounds with a range of boiling points, and various amounts of oxygen, sulfur, nitrogen, salt, water, and trace metals. The refinery separates the natural components into marketable products such as diesel fuel, lubricating oil, fuel oil, asphalt, and propane. Major refining processes include: desalting, distillation, cracking, alkylation, polymerization, reforming, and desulfurization (Centaur Associates, Factbook, Oct. 1985).

There are 44 operable refineries on the west coast (California, Oregon, Washington) as of January 1, 1987, comprising approximately 18 percent of the nation's refining capacity. California with 36 refineries ranks second in the number and capacity of refineries nationwide with 16 percent of the national refining capacity. Of the 44 operable refineries on the west coast only 12 process offshore oil from California (MMS, Summary Report, July 1987).

The annual refining survey conducted by the Oil and Gas Journal in 1985, concluded that up to 115,000 barrels per day of OCS crude could be processed in California with minor modifications to refineries and up to 280,000 barrels per day with the addition of residual conversion and desulfurization (Centaur Associates Inc. 1985). The refineries in the Gulf Coast can process the heavier crude with few or no modifications.

Table 22 shows the operating refineries on the West Coast as of 1987. Figures 37(a)(b) shows the locations of the California facilities with numbers that are cross-referenced to Table 22 on page 89.



SOURCE: CALIFORNIA COASTAL COMMISSION, COASTAL ENERGY DEVELOPMENT, 1981.

Refining Facilities

TABLE 22

Pacific Coast Active Refineries And Their Operable Atmospheric Crude Oil Distillation Capacity on January 1, 1987

Company	Location	1987 Crude capacity (bpcd)(1)
CALIFORNIA		
<u>Northern</u>		
Beacon Oil Co.	1. Hanford	17,300
Chevron USA, Inc.	2. Richmond (2,3)	270,000
Exxon Co.	3. Benicia (2,3)	120,500
Huntway Refining Co.	4. Benicia (2)	7,000
Pacific Refining Co.	5. Hercules (2)	55,000
Shell Oil CO.	6. Martinez (2)	135,200
Tosco Corp.	7. Martinez (2,3)	126,000
UNOCAL Corp.	8. Rodeo (3)	70,000
<u>Southern</u>		
ARCO	1. Carson (2)	216,000
Champlin Petroleum, Inc.	2. Wilmington (2)	64,000
Chevron USA, Inc	3. El Segundo (2, 3)	390,000
		*15,000
Conoco. Inc	4. Santa Maria	9,500
Edgington Oil	5. Long Beach (2)	41,600
Fletcher Oil & Refining Co.	6. Carson (2)	29,500
Gibson Oil & Refining	7. Bakersfield	9,600
Golden West Refining Co.	8. Santa Fe Springs (2,3)	40,600
Huntway Refining Co.	9. Wilmington (2)	5,500
Kern Oil & Refining, Inc.	10. Bakersfield	21,400
Lunday Thagard Co.	11. South Gate	8,100
MacMillan Petroleum Co.	12. Signal Hill (2)	14,000
Mobil Oil Corp.	13. Torrance (2,3)	123,000
Newhall Refining	14. Newhall	23,000
Oxnard Refining	15. Oxnard (2)	4,000
Paramount Petroleum Co.	16. Paramount	32,000
		*14,500
	17. Bakersfield	*20,500
Powerine Oil Co.	18. Santa Fe Springs (2)	*33,400
Sabre Refining, Inc.	19. Bakersfield	*10,000
San Joaquin Refining Co., Inc.	20. Bakersfield	10,000
		*14,300
Shell Oil Co.	21. Wilmington (2)	102,000
Sunland Refining Co.	22. Bakersfield	12,000
Texaco Refining & Marketing, Inc	23. Bakersfield	38,000
	24. Wilmington (2,3)	75,000
UNOCAL Corp.	25. Santa Maria (2,3,4,)	41,000
	26. Wilmington (2,3)	108,000

Company	Location	1987 Crude capacity (bpcd)(1)
West Coast Oil CO.	27. Oildale	*5,000
Western Oil Refining, Inc.	28. Long Beach	*19,200
Total		2,430,700
<u>OREGON</u>		
Chevron USA, Inc.	Portland (3)	**0
Total		0
<u>WASHINGTON</u>		
ARCO	Ferndale (2)	163,000
Chevron USA, Inc.	Seattle	**0
Mobil Oil Corp.	Ferndale (2)	77,000
Shell Oil Co.	Anacortes (2)	77,000
Sound Refining, Inc.	Tacoma (2)	*11,900
Texaco Refining and Marketing, Inc.	Anacortes (2)	78,000
U.S. Oil and Refining Co.	Tacoma (2)	32,000
Total		438,900
Pacific Total Crude Capacity		2,869,600
National Total Crude Capacity		15,565,513
Total Number of Operable Pacific Refineries		44
Total Number of Operable National Refineries		219

- (1) bpcd = barrels per calendar day.
 (2) Refineries located in the coastal zone
 (3) Refineries processing California offshore oil.
 (4) Serves as an upgrader with coke as its only saleable product.
 (*) Currently idle, but was active during review period.
 (**) Currently only conducting downstream operations.

(Source: Adapted from MMS, Pacific Summary Report July, 1987.)

Active Refineries Northern California

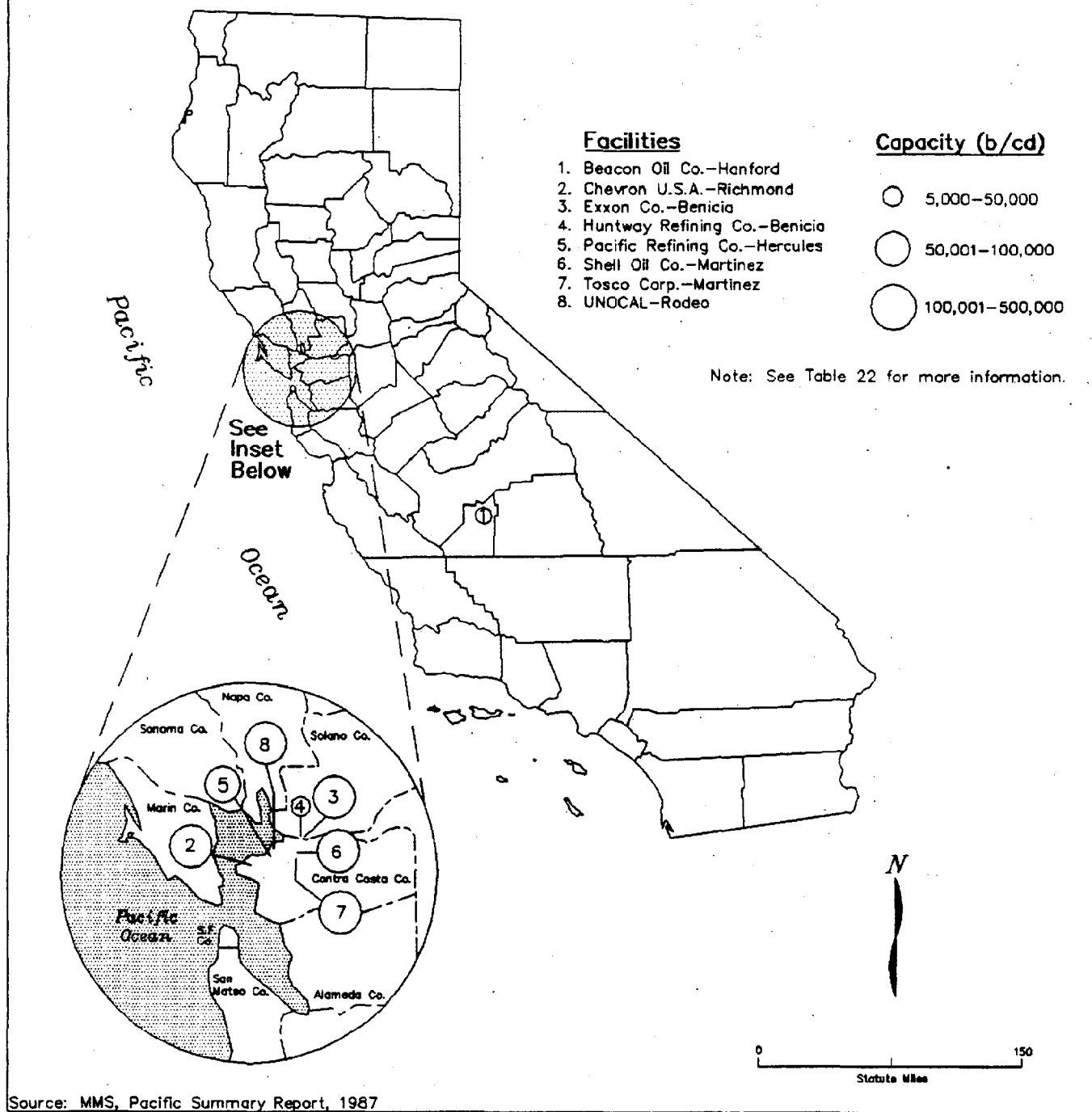


Figure 37a

Active Refineries Southern California

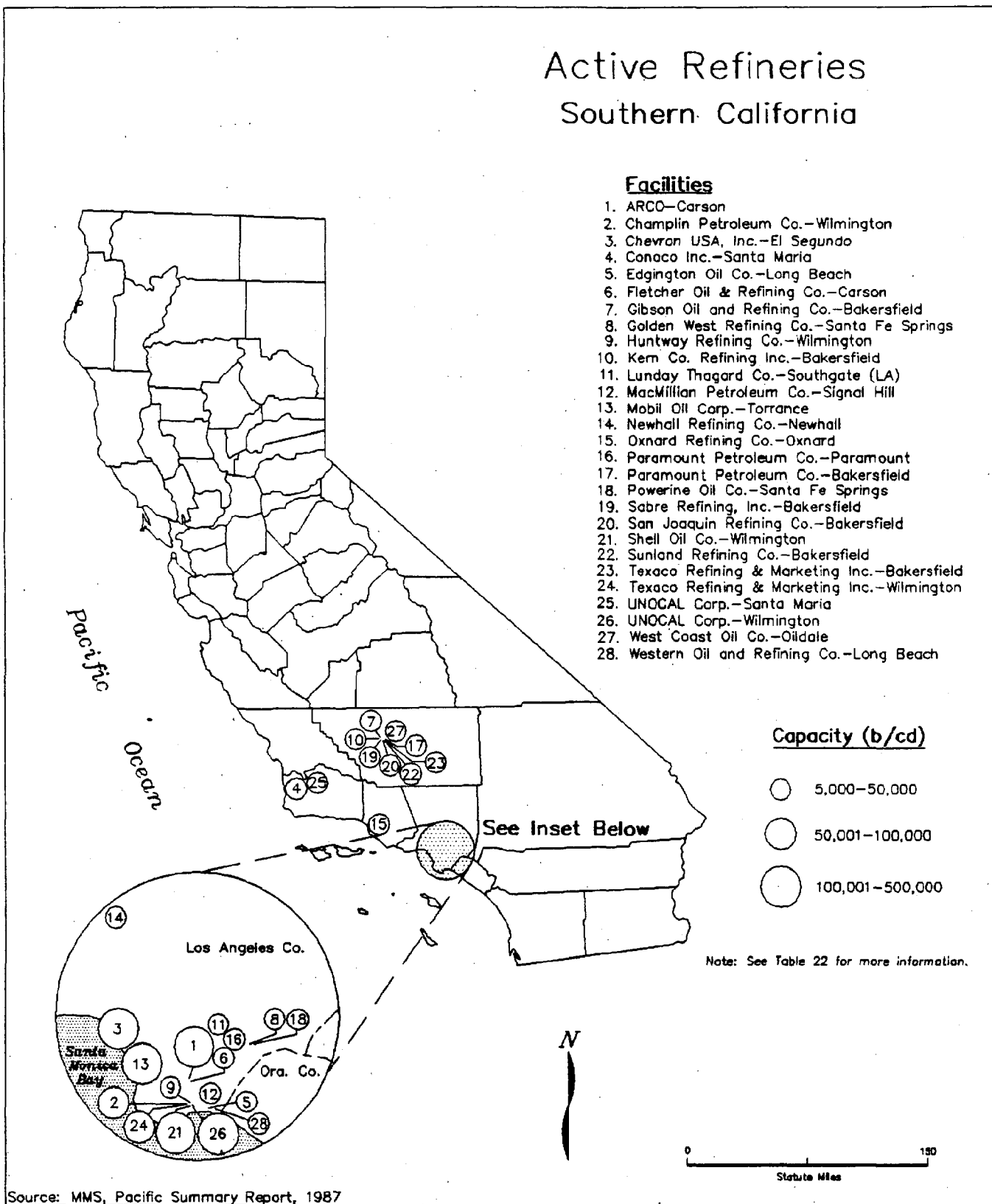
Facilities

1. ARCO—Carson
2. Champlin Petroleum Co.—Wilmington
3. Chevron USA, Inc.—El Segundo
4. Conoco Inc.—Santa Maria
5. Edgington Oil Co.—Long Beach
6. Fletcher Oil & Refining Co.—Carson
7. Gibson Oil and Refining Co.—Bakersfield
8. Golden West Refining Co.—Santa Fe Springs
9. Huntway Refining Co.—Wilmington
10. Kern Co. Refining Inc.—Bakersfield
11. Lunday Thagard Co.—Southgate (LA)
12. MacMillan Petroleum Co.—Signal Hill
13. Mobil Oil Corp.—Torrance
14. Newhall Refining Co.—Newhall
15. Oxnard Refining Co.—Oxnard
16. Paramount Petroleum Co.—Paramount
17. Paramount Petroleum Co.—Bakersfield
18. Powerine Oil Co.—Santa Fe Springs
19. Sabre Refining, Inc.—Bakersfield
20. San Joaquin Refining Co.—Bakersfield
21. Shell Oil Co.—Wilmington
22. Sunland Refining Co.—Bakersfield
23. Texaco Refining & Marketing Inc.—Bakersfield
24. Texaco Refining & Marketing Inc.—Wilmington
25. UNOCAL Corp.—Santa Maria
26. UNOCAL Corp.—Wilmington
27. West Coast Oil Co.—Oildale
28. Western Oil and Refining Co.—Long Beach

Capacity (b/cd)

- 5,000—50,000
- 50,001—100,000
- 100,001—500,000

Note: See Table 22 for more information.



Source: MMS, Pacific Summary Report, 1987

California Coastal Commission
Cartography Section

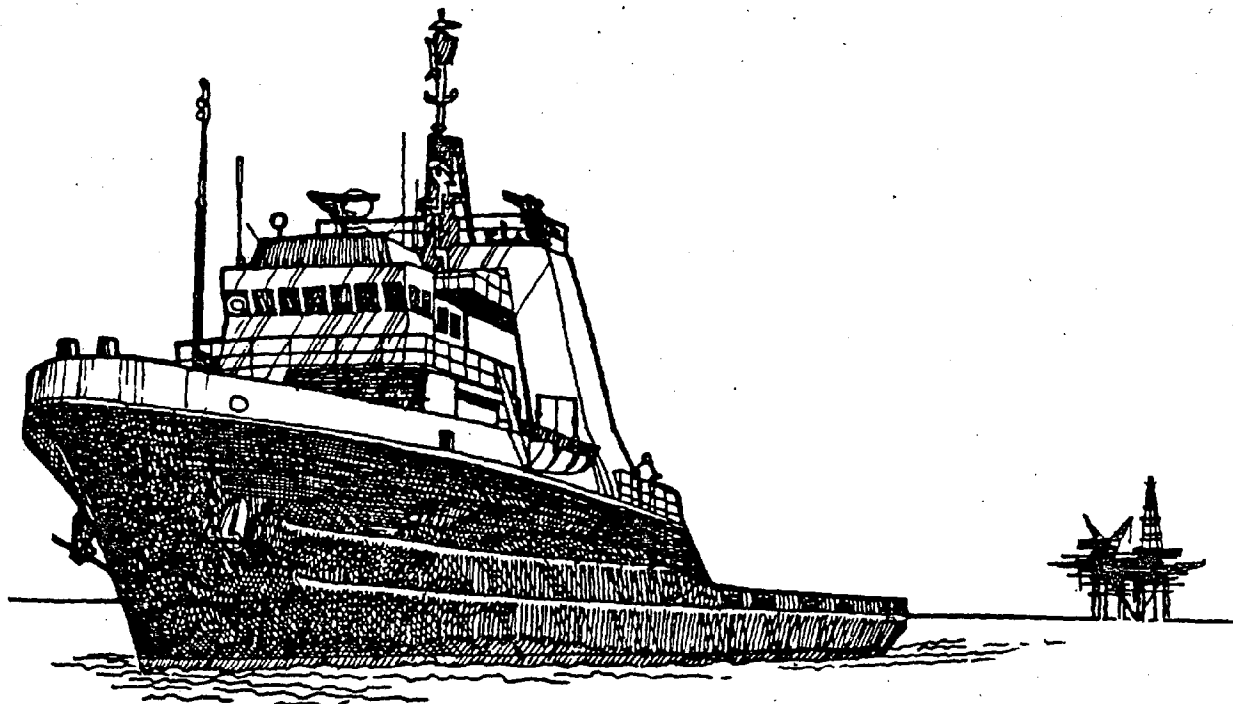
Figure 37b

X. CREW AND SUPPLY BASES IN CALIFORNIA FOR OFFSHORE OIL

Crew and supply bases are necessary support facilities for oil and gas exploration, development, and production. The bases are needed to transport materials, equipment, and personnel from onshore to offshore platforms and exploration rigs either by boat and/or helicopter. The bases generally have a pier or wharf for boat berthage, warehouses, open storage areas, and parking areas.

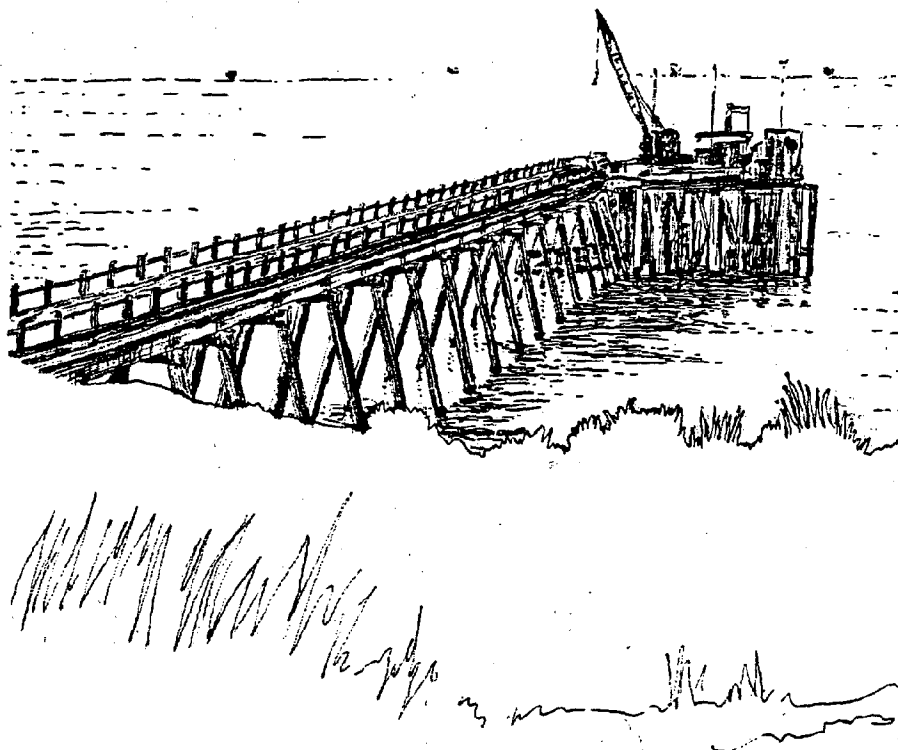
Port Hueneme in Ventura County is presently the major supply base for California OCS activities. The Carpinteria and Ellwood Piers along with Ventura Harbor are used for transferring light supplies and crew. The Gaviota and Goleta piers are also used for light supplies and crew on a temporary emergency basis requiring prior approval from state and local agencies. Oil development offshore Los Angeles and Orange Counties use the Port of Los Angeles and Long Beach for crew and supply bases (Centaur Associates, Factbook, October 1985 and Santa Barbara County staff, 1987).

There have been three proposals for crew and supply bases in Santa Barbara and San Luis Obispo counties. K.T. Enterprises considered applying for a supply base project east of Gaviota on land owned by State Department of Parks and Recreation. A second proposal has been considered on the Morehart property at Naples/Dos Pueblos. Coastal Service Corporation proposed a base at Cojo Bay. The Port of San Luis Harbor District has proposed a multi-use harbor with the inclusion of a supply base at a site approximately 3,000 feet north of the Santa Maria River mouth in San Luis Obispo County. Cojo Bay was the only proposal that was formally submitted to the County. However, the applicant withdrew its permit application to Santa Barbara County in 1986. The locations of these existing and proposed bases are shown on Figure 38.



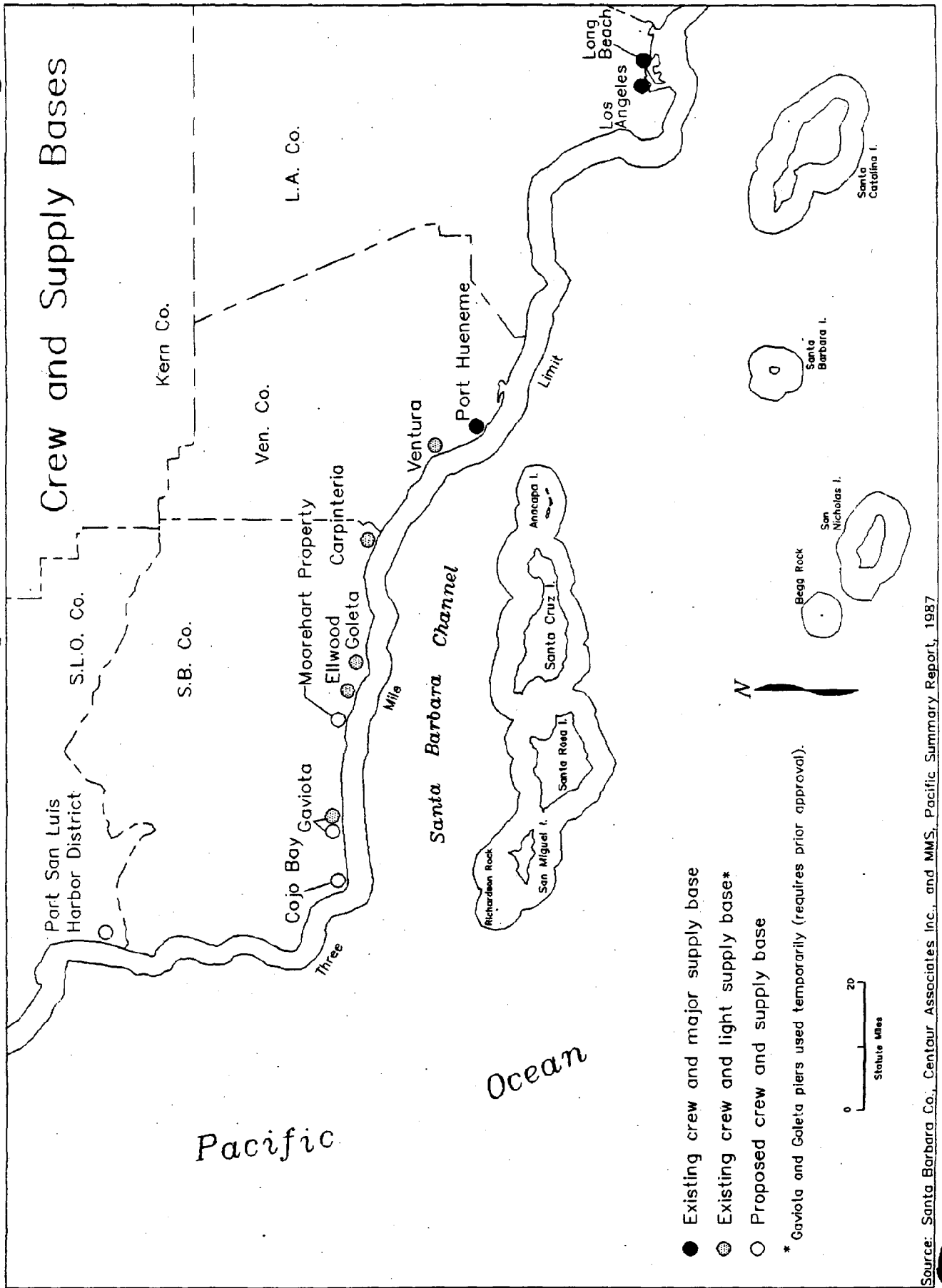
Supply Boat for Offshore Platforms

SOURCE: COASTAL SERVICES CORPORATION



SOURCE: CALIFORNIA COASTAL COMMISSION, COASTAL ENERGY DEVELOPMENT, 1981.

Pier for Offshore Crew and Supply Operations



XI. AREAS OFF LIMITS TO OIL AND GAS DEVELOPMENT IN CALIFORNIA

There are "sanctuary" areas in state and federal waters that are off limits to oil and gas development. A sanctuary area is a specially designated area that is designed to protect marine resources.

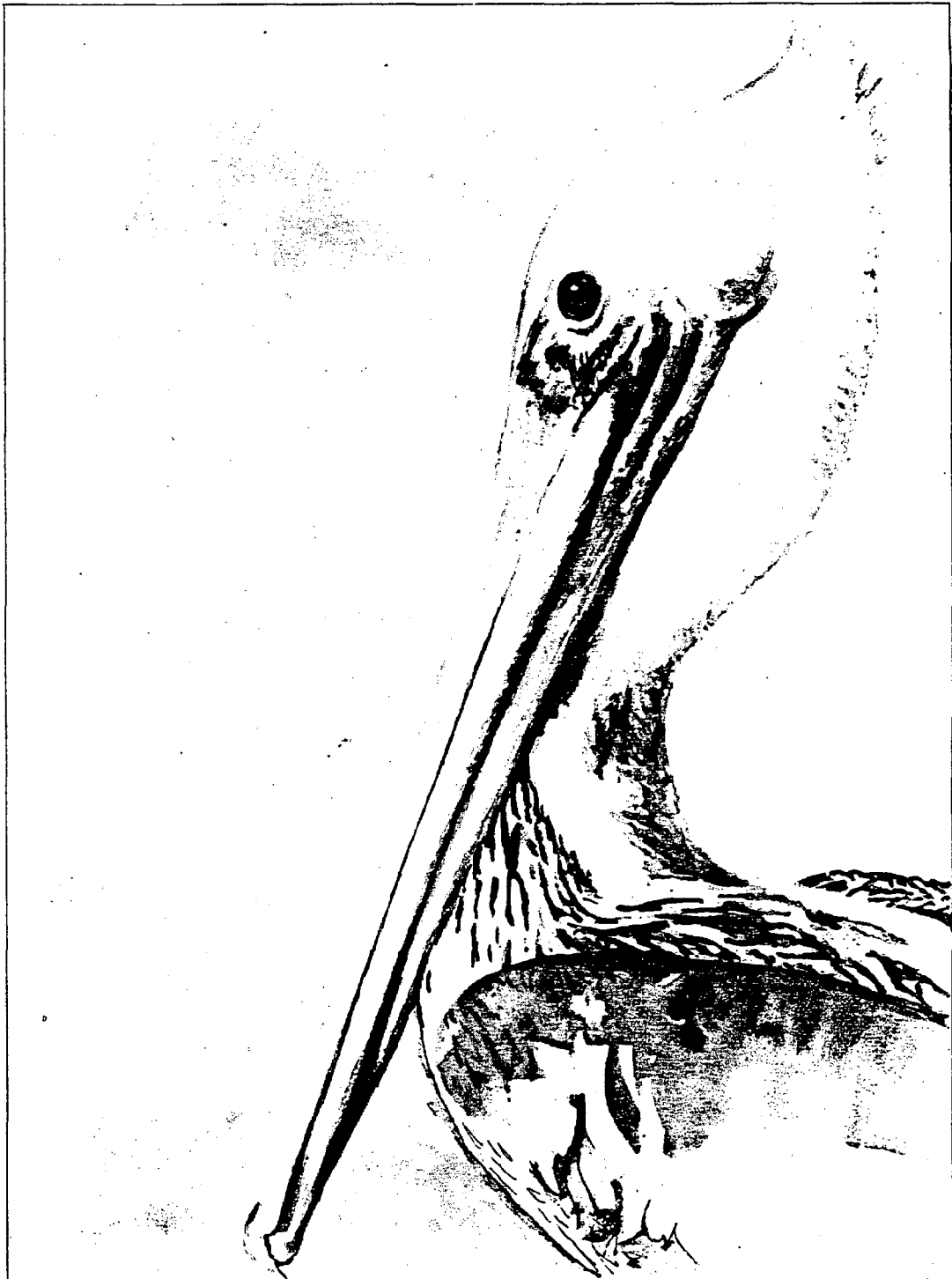
The Marine Protection, Research, and Sanctuaries Act of 1972 authorizes the federal designation of ocean waters as marine sanctuaries to protect or restore their conservation, recreational, ecological, historical or esthetic values. Marine Sanctuaries are created around distinctive marine resources that require protection through management and planning for optimum beneficial use. There is an established list that identifies areas from which candidates for national marine sanctuaries are selected. There are two existing sanctuaries on the West Coast, the Gulf of the Farallones National Marine Sanctuary and the Channel Islands National Marine Sanctuary. New oil and gas leasing and development are prohibited in these sanctuaries.

The California legislature excluded certain state-owned tide and submerged lands from the extraction of oil and gas. These areas include Los Angeles County; portions of Orange County; all of San Diego County; portions of Santa Barbara County; San Clemente and Santa Catalina Islands within three nautical miles; San Luis Obispo County; Monterey County; Santa Cruz County, portions of the Counties of Humboldt and Mendocino; until January 1, 1995, all lands in San Mateo, San Francisco, Marin, Sonoma, Napa, Alameda, Santa Clara, and Del Norte Counties and Solano and Contra Costa Counties except those situated east of the parallel Carquinez Bridges; and Islands of Anacapa, Santa Cruz, Santa Rosa, and San Miguel within three nautical miles (Public Resources Code, Article 4, Div. 6, Section 6871.2).

The above areas can be leased for oil development only if the State Lands Commission determines: 1) that oil or gas deposits are believed to be contained in such lands; 2) that the same are being drained by means of wells upon adjacent lands; and 3) that the leasing of the same for the production of oil and gas will be in the best interests of the state. Areas of Los Angeles County can not be leased even with the above determinations unless such lands are within one nautical mile of the ordinary high water mark and the drilling for oil and gas deposits is to be done by means of slant drilling from an upland site (Public Resources Code, Article 4, Div. 6, Section 6872).

Also, as discussed earlier in Section III, any proposal for oil development in State waters would have to receive approval from the Coastal Commission as well as other state agencies.

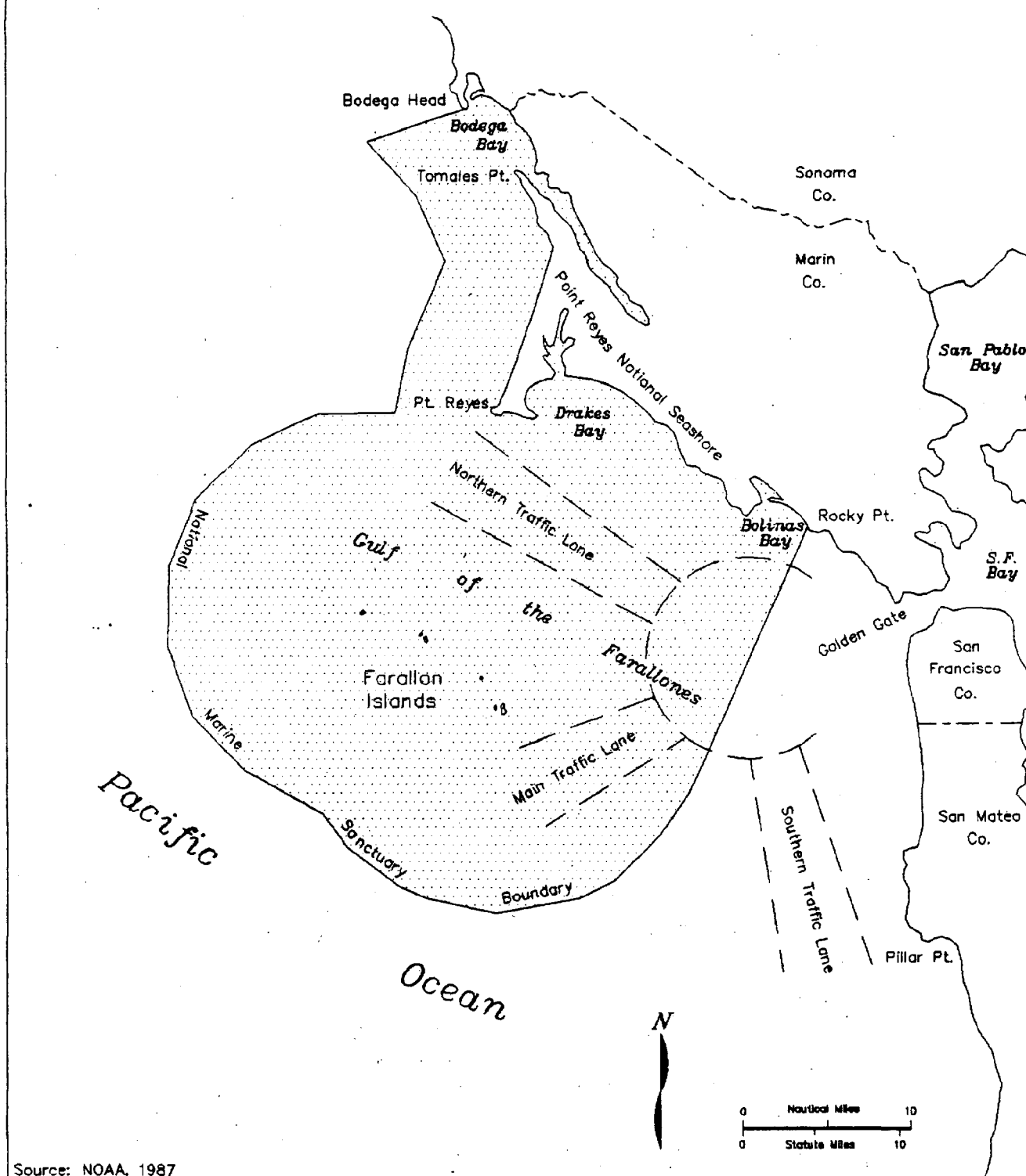
In addition to the legislative areas, the State Lands Commission on October 26, 1988 voted to declare 214 miles of State tide and submerged lands off Mendocino and Humboldt Counties as additional sanctuary zones. No oil and gas leasing or development shall be allowed within these designated areas. Figures 39 through 41 show the existing national and state sanctuaries.



SOURCE: CALIFORNIA COASTAL COMMISSION, COASTAL ENERGY DEVELOPMENT, 1981.

California Brown Pelican

Gulf of the Farallones National Marine Sanctuary

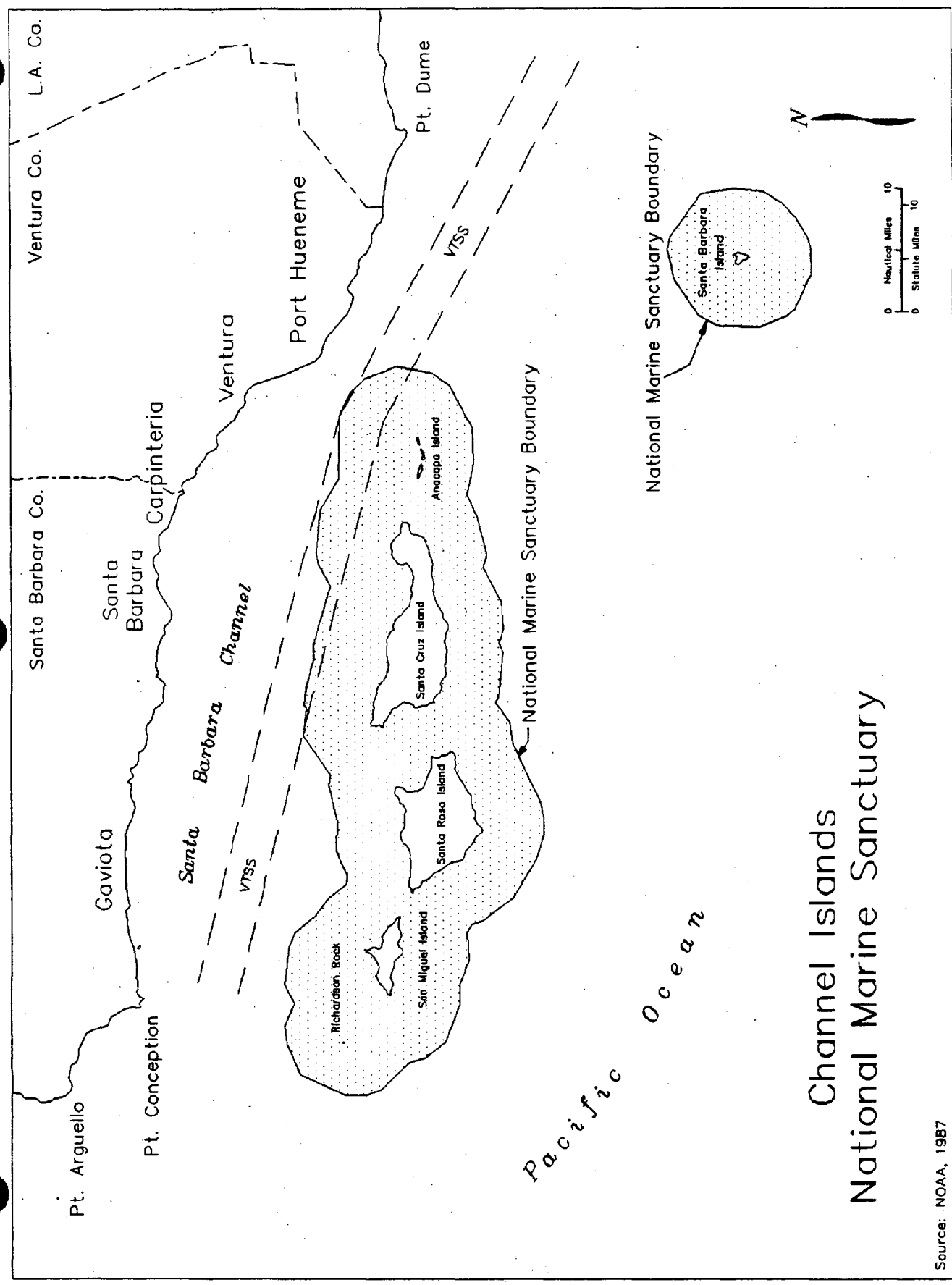


Source: NOAA, 1987

California Coastal Commission
Cartography Section

Figure 39

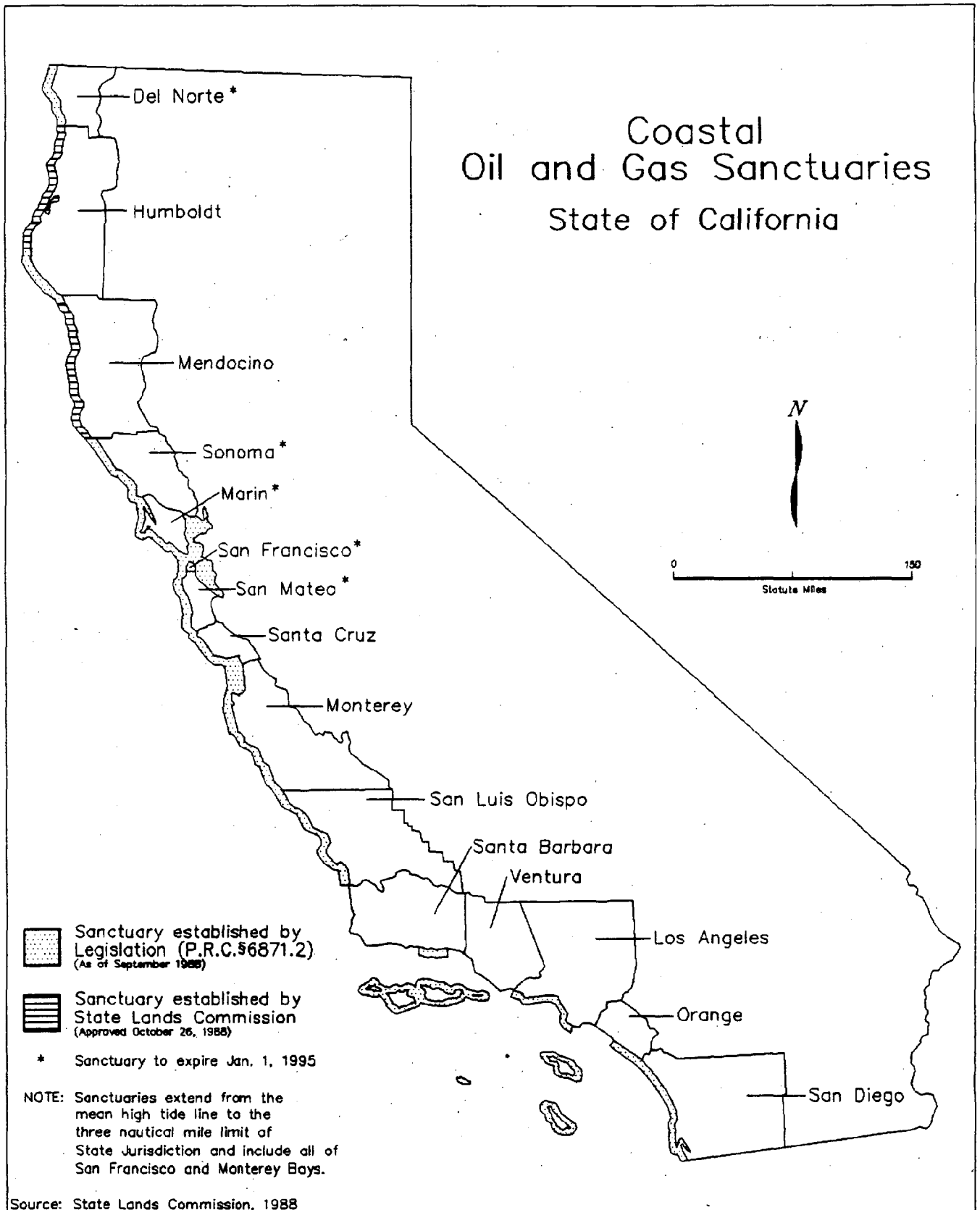
Figure 40



Source: NOAA, 1987

California Coastal Commission
Cartography Section

Channel Islands National Marine Sanctuary



**XII. MAJOR COASTAL ACT ISSUES IDENTIFIED RELATIVE TO OFFSHORE OIL
AND GAS DEVELOPMENT**

The Coastal Act policies that govern energy development deal with proliferation of facilities, oil spillage, vessel traffic safety, safety hazards, visual and scenic quality, air quality, commercial fishing, archaeological resources, biological resources, seismic hazards, geologic hazards, water quality, noise, public access, cumulative impacts, and public welfare.

In its consistency certification and coastal permit review of certain past lease sales and oil and gas projects, the Coastal Commission has identified the following major Coastal Act concerns and issues:

- 1) Size and timing of OCS lease sales and resultant development.
- 2) Need for consolidation of onshore and offshore facilities.
- 3) Risks to offshore navigation from an increased number of platforms, exploratory rigs, and vessel activity.
- 4) Cumulative impacts relative to air quality, commercial fisheries, oil spills, scenic quality, marine resources, vessel traffic safety, and land resources.
- 5) Effects from disposal of drill muds and cuttings, formation waters, and other drilling wastes.
- 6) Transportation of oil by pipeline rather than by tanker to promote consolidation of facilities, reduce risks of oil spills and reduce air quality impacts.
- 7) Protection of wetlands, waterfowl migration, and nesting areas.
- 8) Protection of commercial fishing and environmentally sensitive areas.
- 9) Socioeconomic impacts on local communities.
- 10) Adequacy of oil spill equipment, contingency plans, and training programs.
- 11) Onshore and offshore effects of air emissions from platforms and exploratory rigs and associated development.
- 12) Protection of visual and recreational resources.
- 13) Protection of archaeological resources.
- 14) Protection of marine and estuarine sanctuaries.

XIII. MAJOR CONDITIONS OR PROJECT CHANGES RESULTING FROM THE COASTAL COMMISSION'S REVIEW OF ONSHORE AND OFFSHORE OIL AND GAS DEVELOPMENT

Under its consistency review authority, the Commission has often found that the federal stipulations on lease sales and the OCS orders have not been sufficient to find consistency with Coastal Act policies. In addition, under its coastal permit or appeal authority, the Commission has not always found the applicant's proposal or the local government's conditions of approval adequate to find consistency with Coastal Act policies.

Therefore, the Commission has required additional conditions on coastal permits or changes to projects on consistency reviews to protect coastal resources and thus find consistency with Coastal Act policies. The major mitigations, conditions or changes that have been made by the Coastal Commission in consultation with other several federal, state, and local agencies, are as follows:

- 1) Case by case evaluation of transportation of oil by pipeline rather than by tankers if available and feasible with capacity to market destinations.
- 2) Specific oil spill containment and clean-up equipment to mitigate oil spill impacts.
- 3) Oil spill response training for oil company personnel.
- 4) Installation of wind, wave, and current data equipment for oil spill trajectory analysis that will help predict the direction of oil spills in any given oil development area.
- 5) Provision of the most effective and least toxic oil dispersants to be used to break up oil spills. These chemicals can only be used upon approval of the Environmental Protection Agency.
- 6) Prohibition of the use and offshore disposal of the most toxic components of drill muds to minimize impacts to marine water quality.
- 7) Restrictions on the disposal of drill muds and cuttings to protect sensitive marine environments.
- 8) Well relocations and post-exploration debris surveys to protect commercial fishing areas.
- 9) Installation of automatic radar plotting aids in appropriate areas and radars with guard zones and audible and visual alarms for offshore vessel traffic safety.
- 10) Additional lighting for platforms and drill rigs to prevent vessel traffic collisions.
- 11) Seasonal restrictions on exploration plans to protect migrating marine species and certain commercial fishing operations.

- 12) Injection timing retard (4°) to reduce NO_x emissions.
- 13) Ventilation of vapors to flare system to reduce fugitive hydrocarbon emissions.
- 14) Utilization of hydrogen sulfide (H₂S) scrubber to remove H₂S from gas during well testing.
- 15) Collection of data on fuel consumption and meteorological conditions and submitting it to ARB and APCD for air quality impact analysis.
- 16) Pipeline consolidation plans to minimize onshore and offshore area impacts on kelp beds and other marine and land resources.
- 17) Kelp bed mitigation programs to mitigate pipeline construction impacts.
- 18) Ocean floor debris removal plans to minimize pipeline construction impacts.
- 19) Relocation of pipelines and other oil and gas structures outside of archaeological and environmentally sensitive areas.
- 20) Requirements for oil spill contingency, waste disposal, grading, and fire protection plans to minimize impacts from oil spills, pollution, erosion, and fires to the environment.
- 21) Utilization of supply boat routes and mooring areas adopted by the Santa Barbara Channel Oil Service Vessel Corridor Program Joint Committee to minimize commercial fishing impacts.
- 22) Requirements for public access to coastal beach areas.
- 23) Avoidance of marine construction activities during the whale migration period of December through May.
- 24) Transportation of NGL's by pipeline or rail when it becomes available to the applicant's market destination to avoid road traffic impacts, and public hazard concerns.

XIV. MAJOR RESULTS OF COASTAL COMMISSION REVIEW OF OFFSHORE OIL AND GAS DEVELOPMENT

The Commission's review authority has resulted in major positive benefits that may not have otherwise occurred with oil and gas development. The following is a listing of some of those major positive benefits in which the Commission:

- 1) On a case-by-case basis, established agreements for oil companies to transport oil by pipeline, when these pipelines are available and when their use would clearly reduce environmental impacts.
- 2) Increased oil spill containment and clean-up capabilities including four major oil spill response vessels dedicated to 24-hour response on line in California.
- 5) In the forefront of developing and requiring alternatives to traditional exploratory, construction, and production techniques to minimize impacts on commercial fishing operations.
- 6) Required the submission of improved cumulative impact analysis by oil companies through their project submittals and EIS/R's. As a result, a cumulative impact analysis on commercial fishing has been completed.
- 5) Recommended and received certain improved federal OCS lease sale stipulations. Lease Sale 73 and 80 require improved modeling, analysis, and mitigation measures to decrease impacts on onshore air quality, improved communications between the commercial fishing and oil and gas industries, and additional oil spill equipment, training, and drills.
- 6) Required companies to use chrome-free lignosulfates which reduce toxicity of discharged muds into the marine environment.

XV. GLOSSARY OF TERMS

Active Leases - Areas that have been leased and are still within the federally required time frame for exploration and/or development.

Alkylation - The process of introducing one or more alkyl groups into the structure of hydrocarbons to form high octane fuels.

Analog - A continuous physical variable (such as voltage or rotation) which bears a direct relationship (usually linear) to another variable (such as the motion of the earth because of seismic waves) so that one is proportional to the other. Continuous, as opposed to discrete or digital.

Associated Gas - Free natural gas in immediate contact, but not in solution, with crude oil in the reservoir (see dissolved gas.).

Barrel (BBL) - A barrel of oil equals 42 gallons. The measure stems from the 19th century when oil was carried in wooden 50-gallon barrels that leaked an average of eight gallons during shipment and storage.

Block - A geographical area having a square dimension of approximately 3 miles on a side (9 square miles, 5,760 acres or 2,331 hectares) on the California (Lambert) Plane Coordinate System and 5,693 acres (2,304 hectares) on the Universal Transverse Mercator System (used north of Point Conception and southwest of San Diego). It is used in official MMS protraction diagrams or leasing maps (see Tract).

Bonus - Money paid by the lessee for the execution of an oil and gas lease.

BPD (bpd) - Barrels per day.

Call for Information and Nominations - The Minerals Management Service formally requests nominations for those specific areas where oil companies are interested in leasing and where the state and other parties would have problems with development.

Catenary Anchor-leg Mooring (CALM) - A moored buoy with a fluid swivel top to which a tanker is connected to a mooring line. It is anchored using catenary chain legs. Cargo is transferred through a floating hose connected to the tanker and the buoy fluid swivel. An underbuoy hose connects the floating hose to the subsea pipelines.

Christmas Tree - The assembly of pipes, valves and fittings at the top of the casing which is used to control the flow of oil and gas from a producing well.

Chrome-Free Lignosulfates - An additive to drill muds without chromium. Chromium is a metallic chemical element with a high resistance to corrosion which may be toxic to sensitive life stages of marine organisms.

Coastal Act of 1976 - A law enacted by the California legislature in 1976 which regulates development within the coastal zone from the Oregon border to the border of Mexico. The policies of the Act are aimed at protection and preservation of coastal environmental resources as well as the protection and

promotion of public use and enjoyment of coastal resources. The Coastal Commission established under the Act regulates development in the zone through a coastal permit process until local governments in the zone establish their local coastal programs (LCP's). The Commission retains permit and appeal authority over certain areas and/or over certain types of development.

Coastal Zone Boundary - The specific mapped area of the State of California established by the Coastal Act of 1976 from the Oregon border to the border of the Republic of Mexico which extends seaward to the State's outer limit of jurisdiction including all offshore islands, and extending inland generally 1000 yards from the mean high tide line of the sea. In significant coastal estuarine, habitat, and recreational areas it extends inland to the first major ridgeline paralleling the sea or 5 miles from the near high tide line of the sea, whichever is less, and in developed urban areas the zone generally extends inland less than 1,000 yards.

Coastal Zone Management Act (CZMA) - A federal law enacted in 1972 to "protect, preserve, develop and, where possible, restore, or enhance the resources of the nation's coastal zone," through encouragement and assistance to states and through state participation in decisions affecting the coastal zone. The states establish coastal management programs subject to federal review and approval which outline principles for development and protection. Federal actions must be consistent with State Coastal Management Plans to the maximum extent practicable. Applicants for federal licenses and permits must submit consistency certifications. A 1976 amendment provides that OCS lessees must submit a consistency certification on exploration and development and production plans for State review and concurrence. An objection can be appealed to the Secretary of Commerce.

Condensate - Known sometimes as distillate. Liquid hydrocarbons produced with natural gas that are separated from the gas by cooling and various other means. Condensate generally has an API gravity of 50 to 120 degrees and is water-white, straw, or bluish in color.

Consolidation/Consolidated - Involves requiring offshore and/or onshore operators to minimize the areas used for offshore/onshore operations through multi-use, multi-company facilities.

Cracking - A process carried out in a refinery reactor in which the large molecules in the charge stock are broken up into smaller, lower-boiling, stable hydrocarbon molecules, which leave the vessel as overhead (unfinished cracked gasoline, kerosines, and gas oils). At the same time, certain of the unstable or reactive molecules in the charge stock combine to form tar or coke bottoms. The cracking reaction may be carried out with heat and pressure (thermal cracking) or in the presence of a catalyst (catalytic cracking).

Desalting - In the refining process, removing inorganic salts from crude oil to prevent corrosion of process equipment. Oil is separated from water which contains the salts.

Dispersants - A chemical substance to break up concentrations of toxic fluids used sometimes in oil spill cleanups.

Desulfurization - A process where sulfur compounds such as hydrogen sulfide, mercaptans, sulfides, and disulfides are removed from crude oil

Development - Activities that take place following exploration for, discovery of, and delineation of hydrocarbons in commercially recoverable quantities (including but not limited to geophysical activity, drilling, platform construction, placement, and operation of all directly related onshore support facilities) and that are for the purpose of ultimately producing the hydrocarbons discovered.

Development and Production Plan (DPP) - A plan describing the specific work to be performed on an offshore lease or leases, including all development and production activities that the operator propose(s) to undertake during the time period covered by the plan and all actions to be undertaken up to and including the commencement of sustained production. The plan also includes descriptions of facilities and operations to be used; well locations; current geological and geophysical information; environmental safeguards; safety standards and features; time schedules; and other relevant information. Under 30 CFR 250.34-2, all lease operators are required to formulate and obtain approval of such plans by MMS. Before final approval by MMS, the operator must receive a consistency certification by the California Coastal Commission or an override to a Commission objection by the Secretary of Commerce. If the plan is for development in State Tidelands, then the lease operation must receive approval from the State Lands Commission as well as coastal permit approval from the Coastal Commission.

Distillation - The process of separating hydrocarbons in crude oil into different parts with specified boiling point ranges. It results in such products as raw gasoline, diesel oil, asphalt, and fuel oil.

Drill Cuttings - Chips and small fragments of rock as the result of drilling that are brought to the surface by the flow of the drilling mud as it is circulated.

Drill Muds - A special mixture of clay, water or refined oil, and chemical additives pumped downhole through the drill pipe and drill bit. The mud cools the rapidly rotating bit; lubricates the drill pipe as it turns in the well bore; carries rock cuttings (solid materials removed from drill hole) to the surface; serves as a plaster to prevent the wall of the bore hole from crumbling or collapsing; provides the weight or hydrostatic head to prevent extraneous fluids from entering the well bore; and controls downhole pressures that may be encountered.

Drillship - A self-propelled, self-contained vessel equipped with a derrick amidships for drilling wells in deep water.

Emulsion - Mixture of crude oil and water remaining after free water has dropped out.

Environmental Impact Statement (EIS) - An analysis of the environmental effects of a project required by the federal National Environmental Policy Act of 1969.

Exploration - The process of searching for hydrocarbons. Exploration activities include (1) geophysical surveys where magnetic, gravity, seismic, or other systems are used to detect or infer the geologic conditions conducive to the accumulation of such minerals; and (2) any drilling, except development drilling, whether on or off known geological structures. Exploration also includes the drilling of a well in which a discovery of oil or natural gas in paying quantities is made and the drilling of any additional well after such a discovery that is needed to delineate a reservoir and to enable the lessee to determine whether to proceed with development and production.

Exploratory Rigs - Vessels used for offshore oil and gas exploration. They can be a drill ship which is a self-propelled, self-contained vessel equipped with a derrick amidships for drilling wells in deep water; a jackup rig that is a bargelike, floating platform with legs that can be lowered to the sea bottom to raise the decks above water; or a semisubmersible which is a drilling rig mounted on an offshore bargelike vessel whose hull is submerged by flooding its compartments, leaving the derrick and its equipment above the water line.

Field - An area within which hydrocarbons have been concentrated and trapped in economically producible quantities in one or more structural or stratigraphic related reservoirs.

Fixed Berth - A pier built out into deep water for tankers at a marine terminal.

Flare System - A system to burn gas for the purpose of safe disposal.

Heater-Treater - A vessel in which heat is transferred from a hot fluid to a colder fluid through the walls of pipes which separate the fluids in flow through the vessel.

Hydrocarbon - Any organic compound comprised of carbon and hydrogen; for example, parafins, olefins, members of the acetylene series, alicyclic hydrocarbons, and aromatic hydrocarbons, commonly referred to as petroleum, natural gas, coal, and bitumens.

Hydrogen Sulfide (H₂S) - A poisonous, corrosive compound consisting of hydrogen and sulfur commonly found in coal, oil, or gas which must be removed before formal sale of the product.

Injection Timing Retard - Air pollution control technology which cools engines to reduce nitrogen oxide (NO_x) emissions.

Jack-Up Rig - A mobile drilling platform with extendible legs for support on the ocean floor.

LACT - Lease Automatic Custody Transfer is an automatic system for measuring and monitoring produced oil and gas prior to sale.

Landfall - The location where a pipeline comes out of the water and onto land.

Lay Barge - A barge used to lay underwater pipelines.

Lease - A contract authorizing exploration for and development and production of minerals; the land covered by such a contract.

Lease offering - See lease sale.

Lease sale - The public opening of sealed bids made after competitive submittal for leases granting companies or individuals the right to explore for and develop certain minerals within a defined period of time.

Local Coastal Program (LCP) - Individual county and city coastal programs mandated by the California Coastal Act of 1976, each consisting of a land-use plan and zoning implementation ordinances.

Marine Sanctuary(ies) - Areas protected under the federal Marine Protection, Research and Sanctuaries Act of 1972.

Marine Terminals - A facility that can receive or ship out crude oil or petroleum products. There are pipelines from the terminal mooring to shore, onshore pumping stations and storage tanks. The terminal can be in the form of a fixed pier or berth, an island, a multi-point or a single point mooring.

M B P D - Thousand barrels per day (oil).

M C F D - One thousand cubic feet per day (natural gas).

MMSCF/D - Million standard cubic feet per day.

M M B D - Million barrels per day.

Multiple Buoy Mooring - Three to seven moored buoys for mooring tankers depending on ship size and environmental conditions. The buoys are placed in position off the ship's stern. The ship's anchors are used for forward mooring points. Submerged hoses attached to the subsea pipelines are connected to the tanker once it is moored.

NGL - Natural gas liquids which are gaseous at underground reservoir temperatures and pressures but are recoverable by condensation or absorption.

NO_x Emissions - Compounds of nitrogen and oxygen which may be produced by the burning of fossil fuels. They are harmful to health and a contributor to formation of smogs.

OCS Lands Act (OCSLA) - A federal law enacted in 1953 which gave primary control to the federal government of submerged lands beyond the three-mile limit of the territorial sea. The Act was amended in 1978 to require the Secretary of Interior (DOI) to select the size, timing, and location of lease sales in a manner that balances the potential for oil discovery and adverse impacts on the coastal zone. The Act was amended again in 1986 to require the distribution of a portion of the receipts from the leasing of mineral resources of the OCS to coastal states.

OCS Orders - Orders issued by the Minerals Management Service (MMS) for each OCS area. These orders govern oil and gas lease operations and specify procedures and practices that are required by the MMS during exploration and development and production activities.

Offshore Storage and Treatment Vessel (OS&T) - A converted tanker anchored near a platform and used to remove natural gas, water, and other impurities from crude oil and to store the treated product until it is unloaded by a shuttle vessel. There is one OS&T in federal waters near Platform Hondo off the Gaviota coast, Santa Barbara County.

Oil Spill Contingency Plan - A plan submitted by the oil/gas operator along with or prior to a submission of a plan of exploration or a development/production plan that details provisions for fully defined, specific actions to be taken following discovery and notification of an oil spill. OCS Order No. 7 specifies the requirements of this plan.

Outer Continental Shelf (OCS) - All submerged lands lying seaward of the State tidelands. Jurisdiction and control over these lands was asserted in 1945 by President Truman. The so-called Truman Proclamations were incorporated into domestic law by enactment of Congress in 1953 of the Submerged Lands Act (67 Stat. 29) and the Outer Continental Shelf Lands Act (67 Stat. 462).

Ozone - A major component of photochemical smog.

Plan of Exploration (POE) - A plan based on all available relevant information about a leased area that identifies, to the maximum extent possible, all the potential hydrocarbon accumulations and wells that the operator proposes to drill to evaluate the accumulations within the entire area of the lease(s) covered by the plan. Under 30 CFR 250.34-1, all lease operators are required to formulate and obtain approval of such plans by the Regional Director of MMS before exploration activities can commence. Before final approval by MMS, the operator must receive a consistency certification by the California Coastal Commission or an override to a Commission objection by the Secretary of Commerce. If the plan is for development in State Tidelands, then the lease operator must receive approval from the State Lands Commission as well as a coastal permit approval from the Coastal Commission and any other applicable state, federal and local permits.

Planning Area(s) - Geographical area designated by the Minerals Management Service for potential lease sale offerings.

Platform - A fixed steel or concrete structure from which offshore development wells are drilled and produced/oil/gas/water is processed. It consists of a jacket or welded frame which is positioned almost totally underwater and attached to the ocean floor with piles driven through hollow legs. The deck section where drilling activities occur is welded to the top of the jacket.

Polymerization - The combining of similar light weight hydrocarbon molecules to form a heavier hydrocarbon molecule as propylene and butylene which are mixed to produce a gasoline blending stock.

Processing - A course or method of operations in the production of certain products.

Production - Activities that take place after the successful establishment of means for the removal of hydrocarbons, including such removal, field operations, transfer of hydrocarbons to shore, operation monitoring, maintenance, and workover drilling.

Refinery - A plant for heating crude oil so that it separates into chemical components which are then distilled off as more usable substances as gasoline, kerosene, fuel oil, propane and lubricants.

Reforming - A process in which heat and catalysts are used to rearrange hydrocarbon molecules without changing their composition. Catalytic reforming is used to upgrade low octane naphthas, convert naphtha to liquified petroleum gas, and produce aromatic hydrocarbons, a feedstock for explosives, detergents, plastics, and other petrochemical products.

Scrubber - A device for removing impurities especially from gas. Scrubbers are used to reduce air pollutants.

Sea Island - An offshore pier for tankers consisting of a platform with loading and/or unloading facilities connected to shore by subsea pipelines.

Seismic - Pertaining to, characteristic of, or produced by earthquakes or Earth vibration; having to do with elastic waves in the Earth.

Semi-submersible Rigs - Floating drilling platforms which can be used in deepwater exploration. They may be either self-propelled or require towing. At the drill site, ballast chambers are flooded to pre-determined water depth with a mooring system to keep the vessel on location.

Separation and Treatment Facilities - Facilities that separate oil and/or gas from produced water, remove natural gasolines from gas, and remove sulfur from crude oil or natural gas.

Single Anchor Leg Mooring (SALM) - A semi-rigid anchored mooring used by vessels, primarily tankers, as a system to transfer oil to or from storage tanks or production platforms. The mooring buoy at the sea surface is attached to a mooring base anchored to the sea floor. Tankers are connected to it by mooring lines. Submarine pipelines are connected to the base from where hoses connect to the tanker.

Single Buoy Mooring - A mooring system using one buoy and commonly used for mooring large crude carriers. Two common types are CALM (catenary anchor-leg mooring) and SALM (single anchor leg mooring) (see SALM definition).

Sour Crude - Crude oil containing appreciable amounts of hydrogen sulfide and mercaptans.

Sour Gas - Hydrocarbon gas containing undesirable sulphur compounds, sulphuretted hydrogen and methyl mercaptan.

Stipulations - Conditions of leases under which the federal offshore leases must be developed.

Submerged Lands Act - A federal law enacted in 1953 which gave primary control over the submerged lands of the coastal waters out to three-miles to the states.

Subsea Completion - A production well in which the Christmas tree assembly is located at or near the ocean bottom rather than on a platform. The produced liquids or gases are then transferred from the well head either to a nearby fixed platform or to a shore facility for processing.

Supply Boats - Vessels that ferry people (crew boat), food, water, fuel, and drilling supplies and equipment to a platform or exploratory rig.

Sweet Gas - Hydrocarbon gas free from sulphur compounds.

Treatment Facility - A facility that removes impurities, separates hydrocarbons from water, emulsions, and other impurities, and further separates the liquid and gaseous hydrocarbons.

Tract - An areal unit usually consisting of a single block from an official protraction diagram. Groups of tracts, having sale-specific numbers, were selected and offered for lease prior to implementation of areawide leasing. Through Lease Sale 80, this was an identification number assigned to a block for a particular lease sale. In the future, MMS will not use tract numbers (see Block).

Unitization - A process by which two or more leaseholders allow one company to serve as the operator for exploration, development, and/or production of the affected leases.

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Appendix 1
UNDEVELOPED CALIFORNIA OCS ACTIVE LEASES
AS OF DECEMBER 1988

<u>No.</u>	<u>Active Lease (Undeveloped)</u>	<u>Lease Sale</u>	<u>Principal Lease Holder(s)</u>	<u>Unit Name(s)</u>
1.	P-0181	P4	Exxon	Santa Ynez
2.	P-0182	P4	Chevron Exxon	Santa Ynez
3.	P-0183	P4	Exxon	Santa Ynez
4.	P-0184	P4	Exxon	Santa Ynez
5.	P-0185	P4	Shell	Santa Ynez
6.	P-0187	P4	Exxon	Santa Ynez
7.	P-0189	P4	Chevron Exxon	Santa Ynez
8.	P-0191	P4	Exxon	Santa Ynez
9.	P-0192	P4	Chevron Exxon	Santa Ynez
10.	P-0193	P4	Chevron Exxon	Santa Ynez
11.	P-0194	P4	Chevron Exxon	Santa Ynez
12.	P-0195	P4	Chevron Exxon	Santa Ynez
13.	P-0196	P4	Chevron	Santa Ynez
14.	P-0197	P4	Chevron Exxon	Santa Ynez
15.	P-0203	P4	Union	-----
16.	P-0204	P4	Chevron Exxon	Santa Clara
17.	P-0208	P4	Chevron Exxon	Santa Clara

<u>No.</u>	<u>Active Lease (Undeveloped)</u>	<u>Lease Sale</u>	<u>Principal Lease Holder(s)</u>	<u>Unit Name(s)</u>
18.	P-0209	P4	Chevron Exxon	Santa Clara
19.	P-0210	P4	Chevron	Santa Clara
20.	P-0215	P4	Chevron ARCO	Santa Clara
21.	P-0231	P4	Exxon	Santa Rosa
22.	P-0232	P4	Exxon	Santa Rosa
23.	P-0233	P4	Union Texaco	Pitas Point
24.	P-0238	P4	Exxon	Santa Rosa
25.	P-0306	035	Chevron	Beta
26.	P-0317	048	Phillips Chevron	Rocky Point
27.	P-0318	048	Phillips Chevron	Rocky Point
28.	P-0319	048	Conoco	Sword
29.	P-0320	048	Conoco	Sword
30.	P-0321	048	Mobil	Castle Rock
31.	P-0322	048	Conoco	Sword
32.	P-0323	048	Conoco	Sword
33.	P-0324	048	Phillips Chevron	Castle Rock
34.	P-0326	048	Chevron	Santa Ynez
35.	P-0329	048	Exxon	Santa Ynez
36.	P-0373	053	Maxus	-----
37.	P-0374	053	Phillips	-----

<u>No.</u>	<u>Active Lease (Undeveloped)</u>	<u>Lease Sale</u>	<u>Principal Lease Holder(s)</u>	<u>Unit Name(s)</u>
38.	P-0375	053	Phillips	---
39.	P-0376	053	Phillips	-----
40.	P-0377	053	Phillips	-----
41.	P-0396	053	Chevron Shell	Lion Rock
42.	P-0397	053	Chevron Shell	Lion Rock
43.	P-0402	053	Chevron Shell	Lion Rock
44.	P-0403	053	Chevron Shell	Lion Rock
45.	P-0408	053	Chevron Shell	Lion Rock
46.	P-0414	053	Chevron	Lion Rock
47.	P-0415	053	Chevron	Point Sal
48.	P-0416	053	Shell	Point Sal
49.	P-0420	053	Shell	Santa Maria
50.	P-0421	053	Shell	Point Sal
51.	P-0422	053	Shell	Point Sal
52.	P-0424	053	Shell	Santa Maria
53.	P-0425	053	Shell	Santa Maria
54.	P-0426	053	Chevron	Purisima Point
55.	P-0427	053	Shell	Purisima Point
56.	P-0429	053	Samedan Oil	Santa Maria
57.	P-0430	053	Phillips Elf Aquitaine	Santa Maria
58.	P-0431	053	Shell	Santa Maria
59.	P-0432	053	Shell	Purisima Point
60.	P-0433	053	Samedan Oil	Santa Maria

<u>No.</u>	<u>Active Lease (Undeveloped)</u>	<u>Lease Sale</u>	<u>Principal Lease Holder(s)</u>	<u>Unit Name(s)</u>
61.	P-0434	053	Shell	Santa Maria
62.	P-0435	053	Union Shell	-----
63.	P-0437	053	ARCO	Point Pedernales
64.	P-0438	053	Exxon	Point Pedernales
65.	P-0443	053	Phillips Chevron	Bonito
66.	P-0444	053	ARCO	Point Pedernales
67.	P-0445	053	Phillips Chevron	Bonito
68.	P-0446	053	Phillips Chevron	Bonito
69.	P-0447	053	Phillips Chevron	Rocky Point
70.	P-0448	053	Phillips Chevron	Rocky Point
71.	P-0449	053	Sun	Bonito
72.	P-0451	053	Phillips Chevron	Rocky Point
73.	P-0452	053	Phillips Chevron	Rocky Point
74.	P-0453	053	Phillips Chevron	Rocky Point
75.	P-0459	068	Phillips Chevron	-----
76.	P-0460	068	ARCO	Gato Canyon
77.	P-0461	068	Exxon	Santa Ynez
78.	P-0462	068	Samedan Oil	Gato Canyon
79.	P-0464	068	ARCO	Gato Canyon
80.	P-0467	068	BP Alaska	Santa Rosa

<u>No.</u>	<u>Active Lease (Undeveloped)</u>	<u>Lease Sale</u>	<u>Principal Lease Holder(s)</u>	<u>Unit Name(s)</u>
81.	P-0469	068	ARCO	Smuggler's Cove
82.	P-0472	068	Amber Resources	Anacapa
83.	P-0473	068	Chevron	Anacapa
84.	P-0474	068	Chevron	Anacapa
85.	P-0475	068	ARCO	Smuggler's Cove
86.	P-0478	068	Chevron	Anacapa
87.	P-0479	068	Texaco	-----
88.	P-0489	068	Amoco	-----
89.	P-0490	068	Amoco	-----
90.	P-0499	RS2	Phillips Chevron	Bonito
91.	P-0500	RS2	Phillips Chevron	Bonito
92.	P-0504	073	ARCO	-----
93.	P-0505	073	Chevron	-----
94.	P-0506	073	Exxon	-----
95.	P-0510	073	Chevron	Point Pedernales
96.	P-0511	080	Texaco	-----
97.	P-0512	080	BP Alaska	-----
98.	P-0514	080	Texaco	-----
99.	P-0515	080	Union Texaco	-----
100.	P-0516	080	Texaco	-----
101.	P-0517	080	Texaco BP Alaska	-----
102.	P-0520	080	Conoco	-----

<u>No.</u>	<u>Active Lease (Undeveloped)</u>	<u>Lease Sale</u>	<u>Principal Lease Holder(s)</u>	<u>Unit Name(s)</u>
103.	P-0521	080	Conoco	-----
104.	P-0522	080	Conoco	Smuggler's Cove
105.	P-0523	080	BP Alaska	-----
106.	P-0524	080	BP Alaska	-----
107.	P-0525	080	Chevron	Anacapa
108.	P-0527	080	Chevron	-----
109.	P-0528	080	Exxon	-----
110.	P-0529	080	Exxon	-----
111.	P-0530	080	Exxon	-----
112.	P-0533	080	Chevron	-----
113.	P-0534	080	Chevron	-----
114.	P-0535	080	Chevron	-----

