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ENVIRONMENTAL IMPACT STATEMENT

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1981 OUTER CONTINENTAL SHELF OIL AND GAS

LEASE SALE OFFSHORE CENTRAL AND NORTHERN CALIFORNIA

OCS SALE NO. 53 VOLUME 2 OF 2

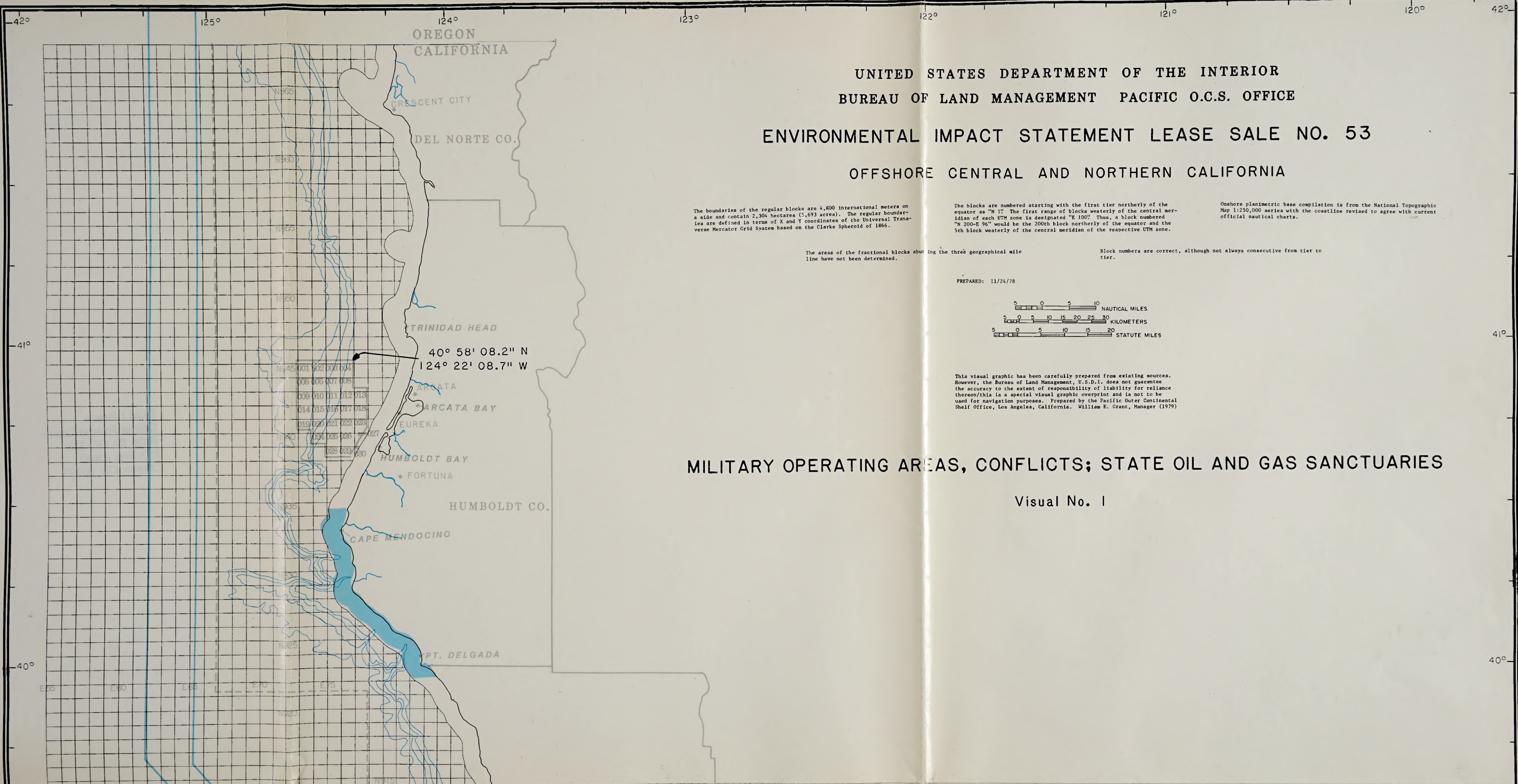
*(14 maps enclosed,
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Errata sheets)*

Prepared by

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UNITED STATES DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT PACIFIC O.C.S. OFFICE
 ENVIRONMENTAL IMPACT STATEMENT LEASE SALE NO. 53
 OFFSHORE CENTRAL AND NORTHERN CALIFORNIA

The boundaries of the regular blocks are 4,800 international meters on a side and contain 2,304 hectares (5,693 acres). The regular boundaries are defined in terms of X and Y coordinates of the Universal Transverse Mercator Grid System based on the Clarke Spheroid of 1866.

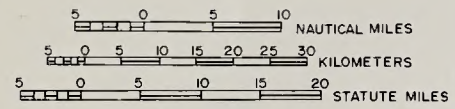
The blocks are numbered starting with the first tier northerly of the equator as "N 1". The first range of blocks westerly of the central meridian of each UTM zone is designated "E 100". Thus, a block numbered "N 200-E 96" would be the 200th block northerly of the equator and the 5th block westerly of the central meridian of the respective UTM zone.

Onshore planimetric base compilation is from the National Topographic Map 1:250,000 series with the coastline revised to agree with current official nautical charts.

The areas of the fractional blocks abutting the three geographical mile line have not been determined.

Block numbers are correct, although not always consecutive from tier to tier.

PREPARED: 11/24/78

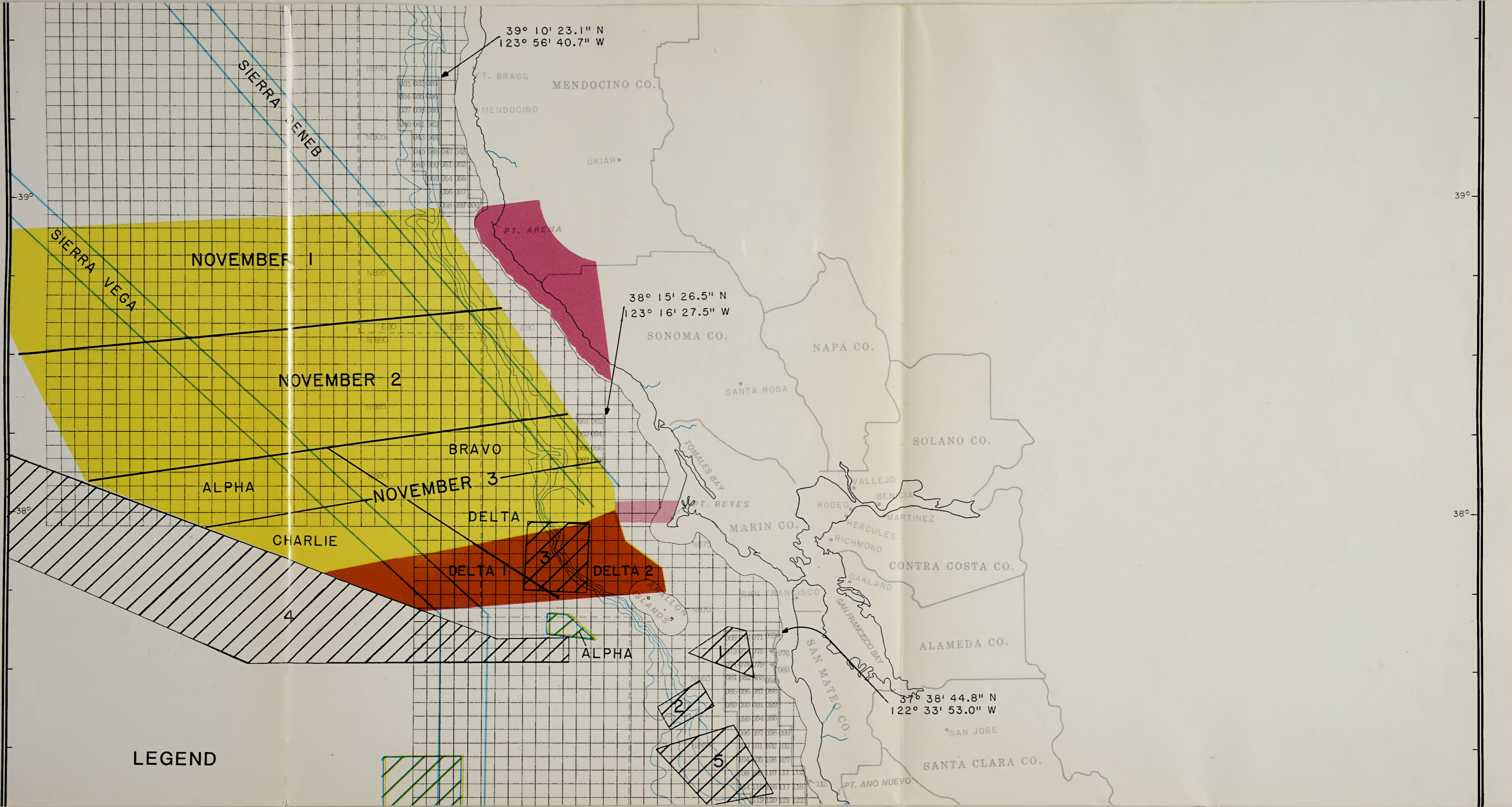







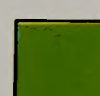
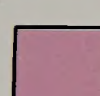
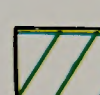


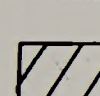
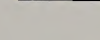

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40° 58' 08.2" N
 124° 22' 08.7" W

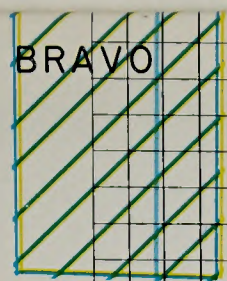
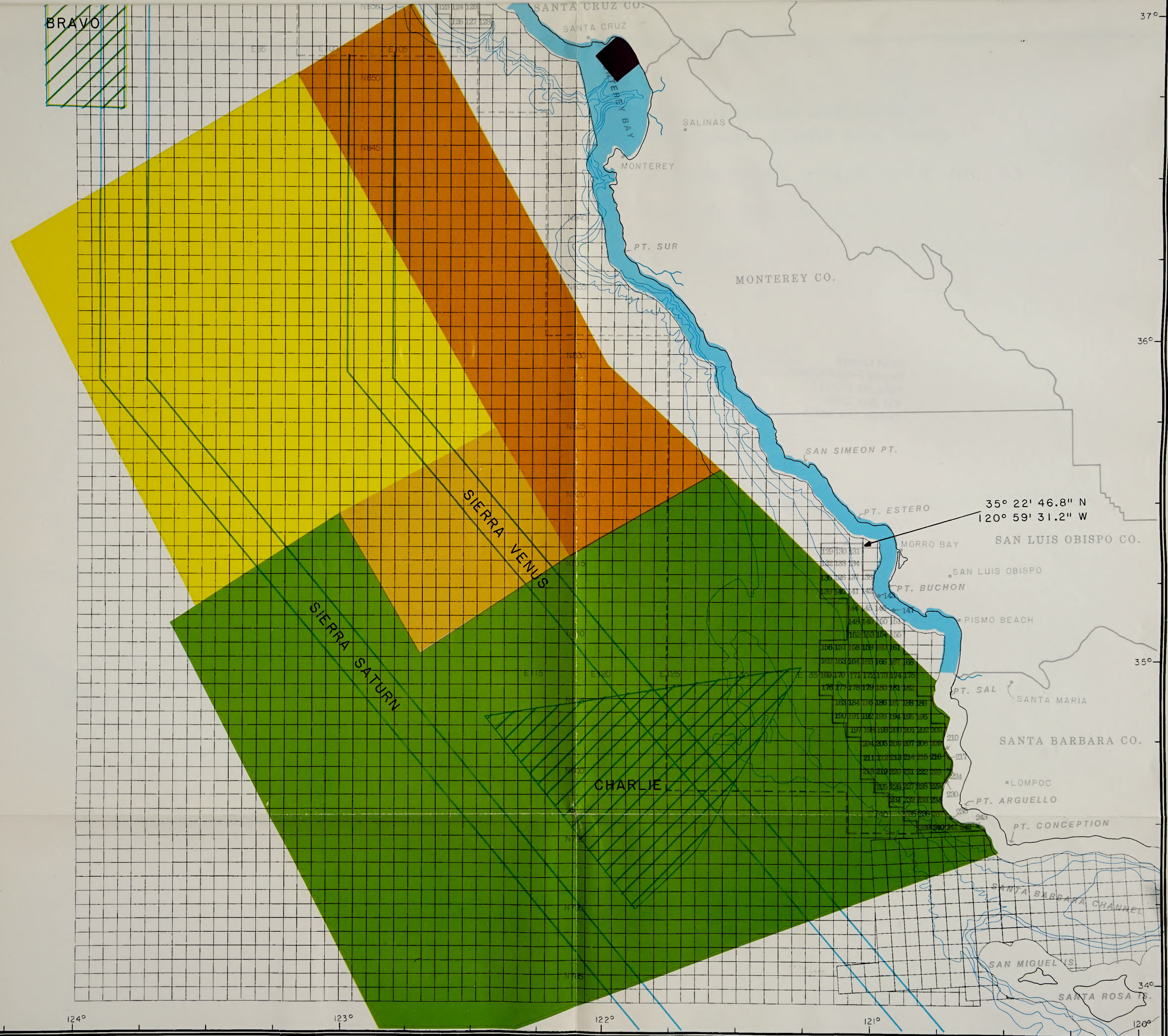
MILITARY OPERATING AREAS, CONFLICTS; STATE OIL AND GAS SANCTUARIES

Visual No. 1



-  W260 Flight Training
-  W281 Flight Training
-  W283 Flight Training
-  W285 Flight Training
-  W513 Flight Training
-  W532 Flight Training
(Missiles,Bombs,ASW)
-  Pt. Reyes Electronic Range
-  Military Dumping Area
-  Monterey Minecraft
Operating Area
-  Anchor Bay MOA/ATCAAA
Flight Training
-  Submarine Diving Area
(Uniform)
-  Submarine Transit Lane
-  State Oil & Gas Sanctuary

BRAVO

35° 22' 46.8" N
120° 59' 31.2" W

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







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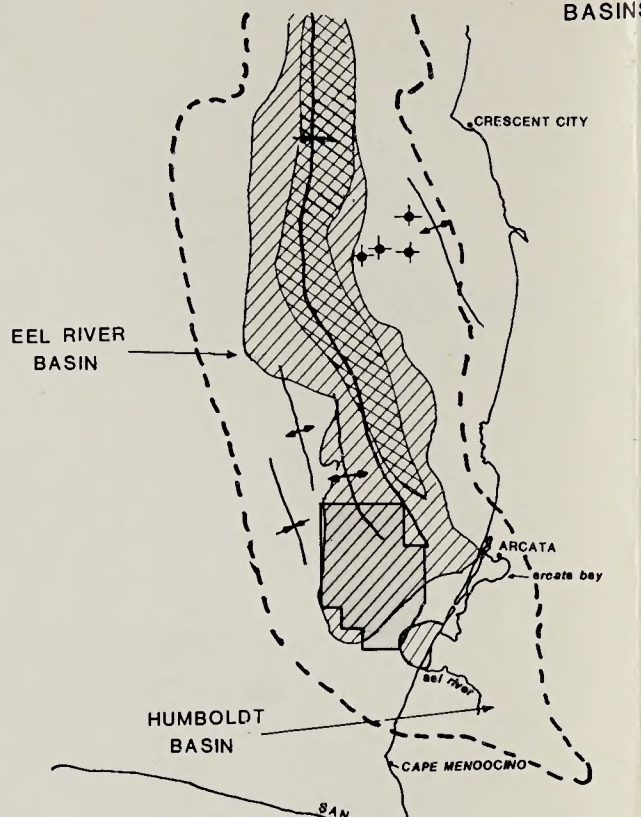
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BASINS OF NORTHERN AND CENTRAL CALIFORNIA

Visual Errata Sheet No. 1

LEGEND

-  Areas With 5,000' To 10,000' Of Neogene Sedimentry
-  Areas With >10,000' Of Neogene Sedimentry
-  Structural Highs
-  Nominated Sale #53 Lease Area
-  Exploratory Wells
-  Basin Limits
-  Major Structural Axis
-  Cross Section



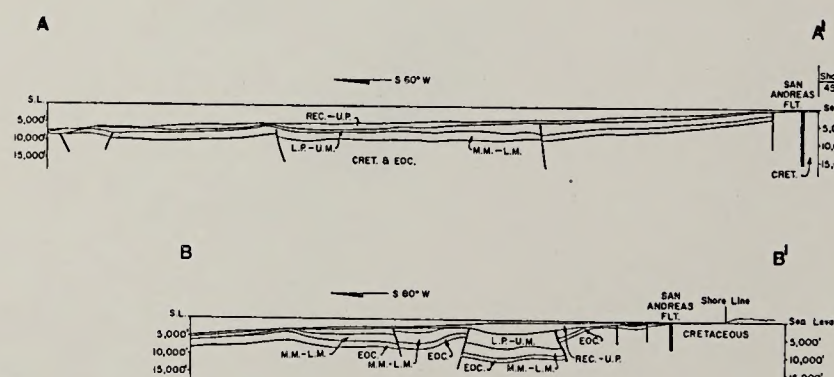
EEL RIVER BASIN STRATIGRAPHIC COLUMN

AGE	FM.	MAX. THICK.	COLUMN	DESC.
QUAT.	REC.	150 m		Nonmarine clay, silt, sand, gravel
TERTIARY	Pliocene	3670 m	WILDCAT GROUP	UNCONF.
			MID.	UNCONF.
			YAGER FM.	Marine mudstone, siltstone, minor f. sandstone. Basal sandstone in east. Massive f. sandstone, nonmarine conglomerate and carbonaceous claystone in upper part.
EOCENE	765 m			UNCONF.
PAL.				Marine shale, indurated mudstone and siltstone. Interbedded with graywacke and conglomerate.
CRET.				?
JUR.				Undiff. graywacke, chert, basalt-greenstone, glaucoophane schist, shale, limestone.

Eel River. Basement rocks in the onshore Eel River Basin are mostly massive graywacke with some chert, basalt-greenstone, shale, limestone and schist assigned to the coastal and central belts of the Franciscan complex of Berkland, et al., (1972) of Late Jurassic to Eocene age (Figure 14). This eugeosynclinal assemblage probably underlies the basin offshore as well. The Yager Formation, Eocene in age (Ewert and Pierce, 1975), is in fault contact with Franciscan basement rocks of the central belt in the lower Eel River area, but depositionally overlies relatively young (upper Cretaceous-Eocene) rocks of the coastal belt a short distance to the southwest (Ogle, 1953; Irwin, 1960). It is at least 765 m (2500 feet) and perhaps as much as 3060 m (10,000 feet) thick, and consists of dense, well-indurated mudstone, siltstone, and shale, with lesser graywacke and conglomerate containing locally-derived Franciscan detritus (Ogle, 1953).

Regional deformation occurred between Eocene and middle Miocene time, and Neogene strata unconformably overlie Eocene and older rocks in the Eel River basin both onshore and offshore (Ogle, 1953; Hoskins and Griffiths, 1971). The Wildcat Group comprises an essentially conformable sequence of mostly marine late Miocene to Pleistocene strata about 3670 m (12,000 feet) thick (Ogle, 1953). Predominant lithologies are weakly consolidated mudstone, siltstone and claystone, with subordinate amounts of sandstone and conglomerate, and minor lignite and tuff. Units of this group appear to record a northward transgression over basement during late Miocene, followed by alternate deepening and shallowing of the basin, a marine regression during late Pliocene and, finally, by emergence and marginal marine and non-marine deposition in late Pliocene and Pleistocene time. Episodic marginal uplifts are indicated by coarse Franciscan debris and conglomerates of Pliocene mudstone fragments in some units, and by local unconformities within the group (Ogle, 1953). The section coarsens upward, reflecting late Pliocene regression, and eastward, reflecting the presence of a landmass nearby. Similar, predominantly shallow-marine, strata that are approximately correlative with the Wildcat Group are preserved in a graben located about 16 km (10 mi) to the north (Manning and Ogle, 1950), and in the Crescent City area (Back, 1957).

The close of Wildcat deposition was marked by basin margin warping and uplift that continued into Pleistocene time, culminating in basinwide deformation that followed older structural trends (Ogle, 1953). Pleistocene and Holocene clays, sands, silts and gravels unconformably overlie Wildcat strata in onshore parts of the basin. These deposits have an aggregate thickness of about 150 m (500 feet) and were deposited in shallow-marine and coastal plain environments. As in the Wildcat Group, the marine section becomes finer grained northward, suggesting that the basin deepened in that direction.

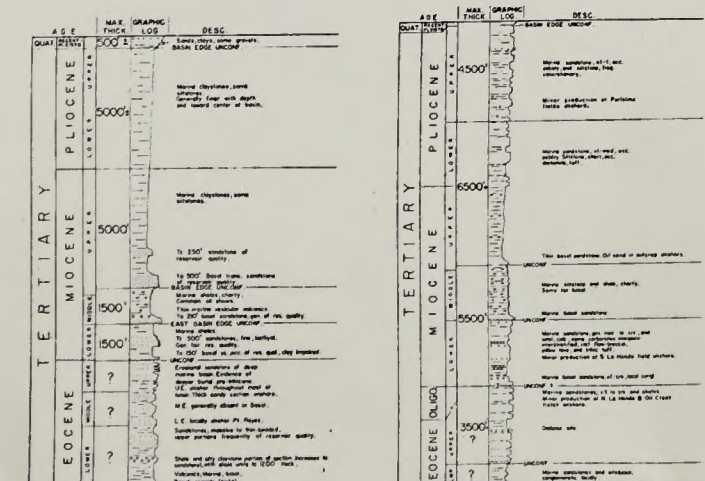


Point Arena Basin. The basin is reported to be underlain partly by pre-Cretaceous (Jurassic?) metasediments (Hoskins and Griffiths, 1971). Thick sections of Cretaceous shallow water marine shale, siltstone and fine-grained sandstones crop out on shore to the south, but they thin abruptly to the north in the basin, probably as the result of pre-Eocene erosion. Eocene sediments also thin abruptly to the north in the basin, and are also truncated by an erosional unconformity below lower Miocene strata. Onshore to the south there is a thick section of lower to upper Eocene sandstone and shale, suggesting that if a comparable section existed on the shelf, it was largely removed by the late Paleogene-early Neogene erosion. Lower Miocene deep water marine shales containing a thick but discontinuous basal sandstone rest on the unconformity, recording a transgression and subsequent deep marine deposition. As in the basins to the south, the following middle Miocene is represented by cherty shale. A lower upper Miocene basal marine sandstone rests unconformably on older sediments near Point Arena, but over most of the basin there appears to have been no break between middle and upper Miocene sedimentation. Upper Miocene marine siltstones and claystones grade upward into upper Pliocene marine sandstones, which in turn are truncated by an unconformity at the base of the coarser Pleistocene section.

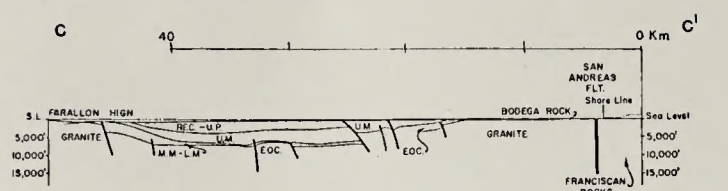
POINT ARENA "BASIN" STRATIGRAPHIC COLUMN

AGE	FM.	MAX. THICK.	COLUMN	DESC.
QUAT.	REC.	1800'		Marine sands and gravels, minor clay, terrace deposits
TERTIARY	Pliocene	2200'	UPPER	UNCONF.
			MIDDLE	Marine sandstones, thin bedded, fine grained, many of minor quality. On south offshore Pt. Arena.
			LOWER	Marine siltstones and claystones. Grain size generally finer with depth and distance from shore.
TERTIARY	Miocene	5000'	UPPER	Occ. of shales. Basal marine sandstone, eroded, thin.
			MIDDLE	BASIN EDGE UNCONF.
TERTIARY	Miocene	1100'	LOWER	Marine shale, cherty. Common of shales. Marine sandstones, thin bedded, fine grained, light.
			LOWER	Marine shales, some of shales. Marine sandstones, some of good reservoir quality, to 100' thick. Basal marine sandstone, eroded, light, to 200' thick.
EOCENE		1800'		Essential remnants of this, deep to shallow marine, sediments, which show evidence of erosion during pre-Miocene. US through LE section onshore west of San Francisco bay south of Pt. Arena 20,000 to 30,000' thick.
EOCENE		?		Primarily sandstones with minor siltstones and conglomerates, some claystones. Volcanic, none, local.
CRET.		?		Erosional remnants of this, deep to shallow marine, sediments, primarily shales and fine sandstones, some

Bodega Basin. The Bodega Basin overlies the granite Salinian basement rock. Cretaceous granite rocks have been recovered for the eastern and western sides of the basin as well as from the bottom of two exploratory wells in the basin just south and southwest of Point Reyes. Interpretations of magnetic and gravity data across the Gulf of the Farallones are also consistent with a presumed granitic basement (Griscom, 1966; Cooper, 1971). Cretaceous marine sandstones with minor amounts of fine-grained sediment, and containing basic volcanics and sills (see stratigraphic section B) are probably limited to scattered remnants in the southern part of the basin, and are thought to be absent to the north. Lower Eocene sediments are absent near Point Reyes but they increase in thickness to the north where lower Eocene rocks lie in sedimentary contact on the granite basement. Middle Eocene sedimentary rocks may occur locally in the northern part of the basin, but are not known in the south. Neogene strata record reported periods of uplift and erosion followed by periods of marine sedimentation. Lower Miocene rocks rest upon an erosional unconformity, and grade vertically from shallow-marine basal sandstones to deeper-marine shales and sandstones. The middle-Miocene sequence is similar, with shallow-marine basal sandstone resting on an erosional unconformity, and grading upward to finer grained rocks containing cherty shale. As previously noted, uplift and erosion of the Farallon-Pigeon Point High occurred in early late Miocene time. Subsidence of the Bodega Basin to the northeast was followed by deposition of as much as 3000 m of Neogene marine clays and silts and some sands of late Miocene and Pliocene age.



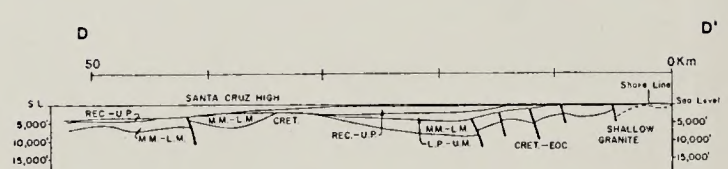
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OUTER SANTA CRUZ BASIN STRATIGRAPHIC COLUMN

AGE	MAX THICK	GRAPHIC LOG	DESC
QUAT	700'		Marine sandstone-water sands, gravels, & clays. BASIN EDGE UNCONF.
TERTIARY	2500'		Marine clays, silts and minor silt sands. Increase in sand content in lower portion. L. P. absent some areas.
			Marine claystones & siltstones, minor sandstones. Marine shallow water basins sandstone (fine-grained, detrital).
			Marine shales, cherty, frequently finely laminated, abundant for.
MIOCENE	1700'		Marine basal sandstone, shallow water, erosive detrital.
			Marine shales with volcanic interbeds.
OLIG.	?		Marine sandstones, found in bottom, shales, on western margin (Pigeon Pt. High).
CRET.	1800'		Marine sandstones, shales and shales, locally brecciated, chloritized. Some shales. Basement unknown.

Outer Santa Cruz Basin. Cretaceous and early Tertiary (Oligocene?) marine sandstone are present locally beneath the basin but their general distribution is not known (Hoakins and Griffiths, 1971). Both the Cretaceous and Oligocene (?) periods of deposition were followed by deformation and erosion. The overlying Neogene units suggested repeated periods of erosion followed by marine sedimentation that reflect the transition from shallow sandy to deep fine-grained deposition. Volcanics (interbedded in marine shales) are limited to the lower Neogene as in the Santa Maria Basin offshore. Cherty shales (Monterey Formation) dominated the deposition until the early late Miocene period of deformation and erosion that accompanied the uplift of the structural high, and the initiation of the present basin. Relatively fine-grained sediment, primarily silt and clay with a minor amount of sand, accumulated in the basin in upper Miocene and Pliocene time.

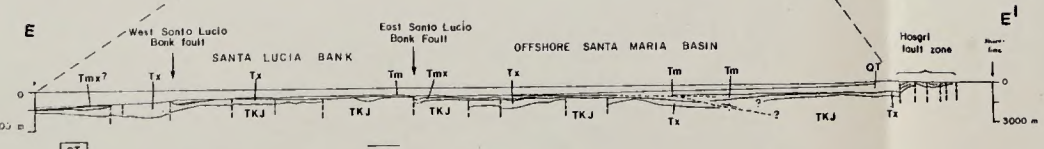


SANTA MARIA BASIN STRATIGRAPHIC COLUMN

AGE	MAX THICK	GRAPHIC LOG	DESC
QUAT	4000'		Marine silts and clays, minor sands. Sand size generally finer with depth and distance from shore.
TERTIARY	3200'		Marine shales and claystones.
			Marine shales and claystones.
MIOCENE	2800'		Marine shales and claystones. Possible corals in basal section.
			Tuffs and flows. Nonmarine sandstones, conglomerates, siltstones. Erosional remnants of volcanic rocks in basal section.
OLIG.	?		Marine shales, siltstones, shales, and sandstones. Erosional remnants of volcanic rocks. Detrital.
CRET.	?		Crystalline igneous rocks, metamorphic rocks, or granite?
JUR.	?		

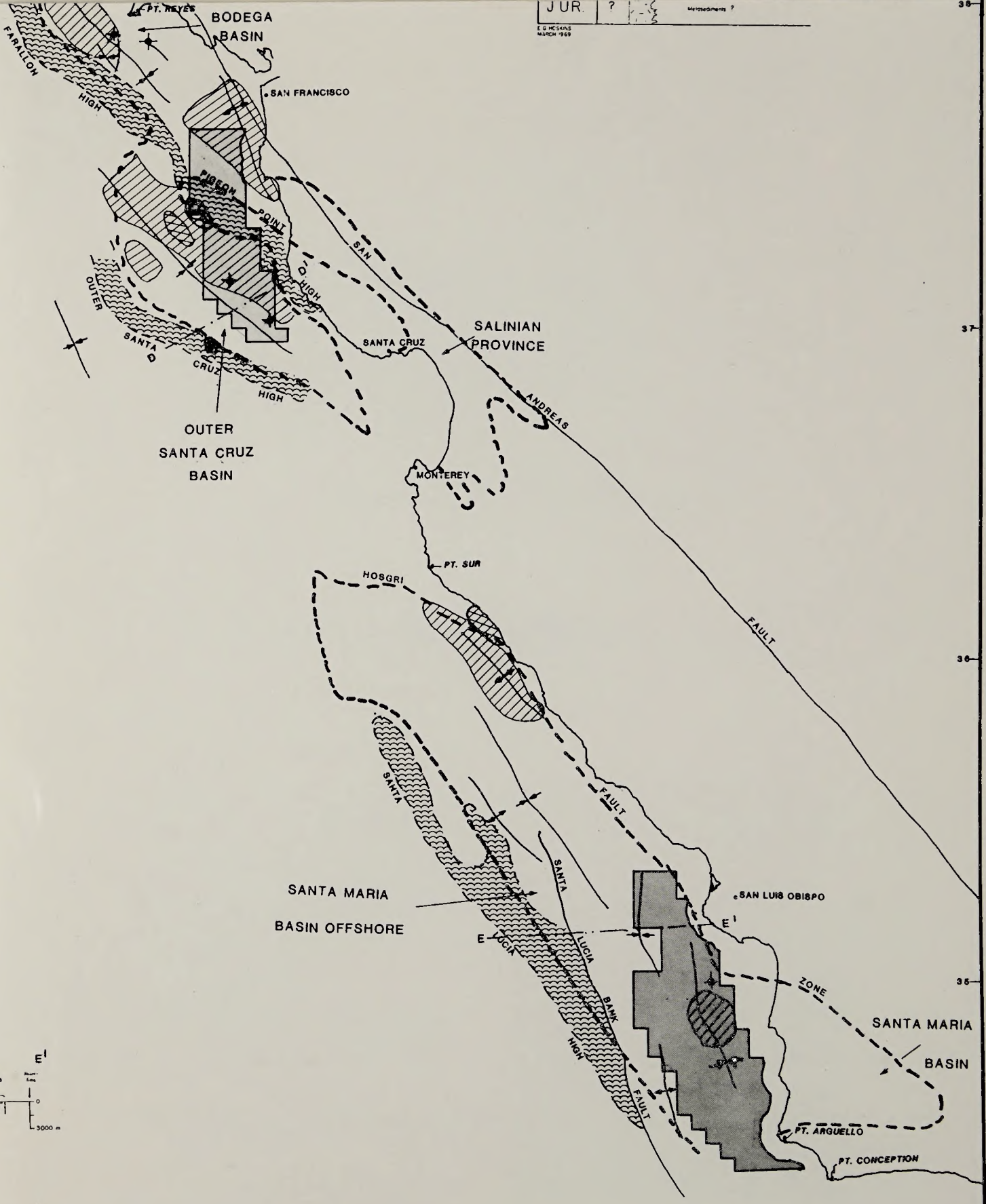
Santa Maria Offshore. Basement rocks exposed along the shore are Franciscan-Knoxville rocks of Jurassic, Cretaceous-early Tertiary (?) age. Similar rocks (metasediments, altered basic igneous rocks) have been dredged from acoustic basement on the Santa Lucia high. The structural style of the basin and granite derived coarse clastics of upper Cretaceous and Eocene age from the Santa Lucia High suggested to Hoakins and Griffith (1971) that basement may be granitic.

X-mac. Lithologies and ages inferred from the nearby single test well in the basin (Husby F-060-1). The lowest Neogene rocks (TK) may be volcaniclastic and contain a few thin flow units. The overlying acoustically thin-bedded, wedge-shaped unit (Tmx) may correlate with a volcanic tuff in the well, and may be equivalent to the onshore Obispo tuff of early and middle Miocene age (Crawford, 1971) Tmx. A well bedded unit (Tm) overlies Tmx. Samples from the Santa Lucia High indicate that these well bedded strata are middle Miocene foraminiferal siliceous shales which may in part be equivalent to the Monterey Formation. The uppermost unit (QT) rests with local unconformity on Tm, and is undivided on the section. It is composed principally of Pliocene and Pleistocene deposits, but it probably includes a minor amount of upper Miocene at its base.

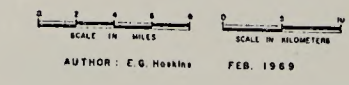


QT Quaternary and upper Pliocene sediments
 Tm Middle Miocene Monterey Fm. type rocks
 Tmx Miocene felsic tuff (and related rocks) (Obispo Tuff equivalent?)
 T Lower Tertiary rocks unspecified offshore. Nearshore are volcaniclastic and thin flows.
 TK Franciscan and/or Cretaceous-Eocene (?) rocks

Contour
 Fault
 All faults, except very low-angle thrusts, are shown vertical. E exaggeration on the seismic profiles. (E) makes faults that dip steeper than about 40° appear vertical on the profiles.



REGIONAL SECTIONS



AUTHOR: E. G. Hoakins FEB. 1969

EXPLANATION
 REC - RECENT
 U.P. - UPPER PLEISTOCENE
 L.P. - LOWER PLEISTOCENE
 U.M. - UPPER MIOCENE
 M.M. - MIDDLE MIOCENE
 L.M. - LOWER MIOCENE
 EOC - EOCENE
 CRET - CRETACEOUS

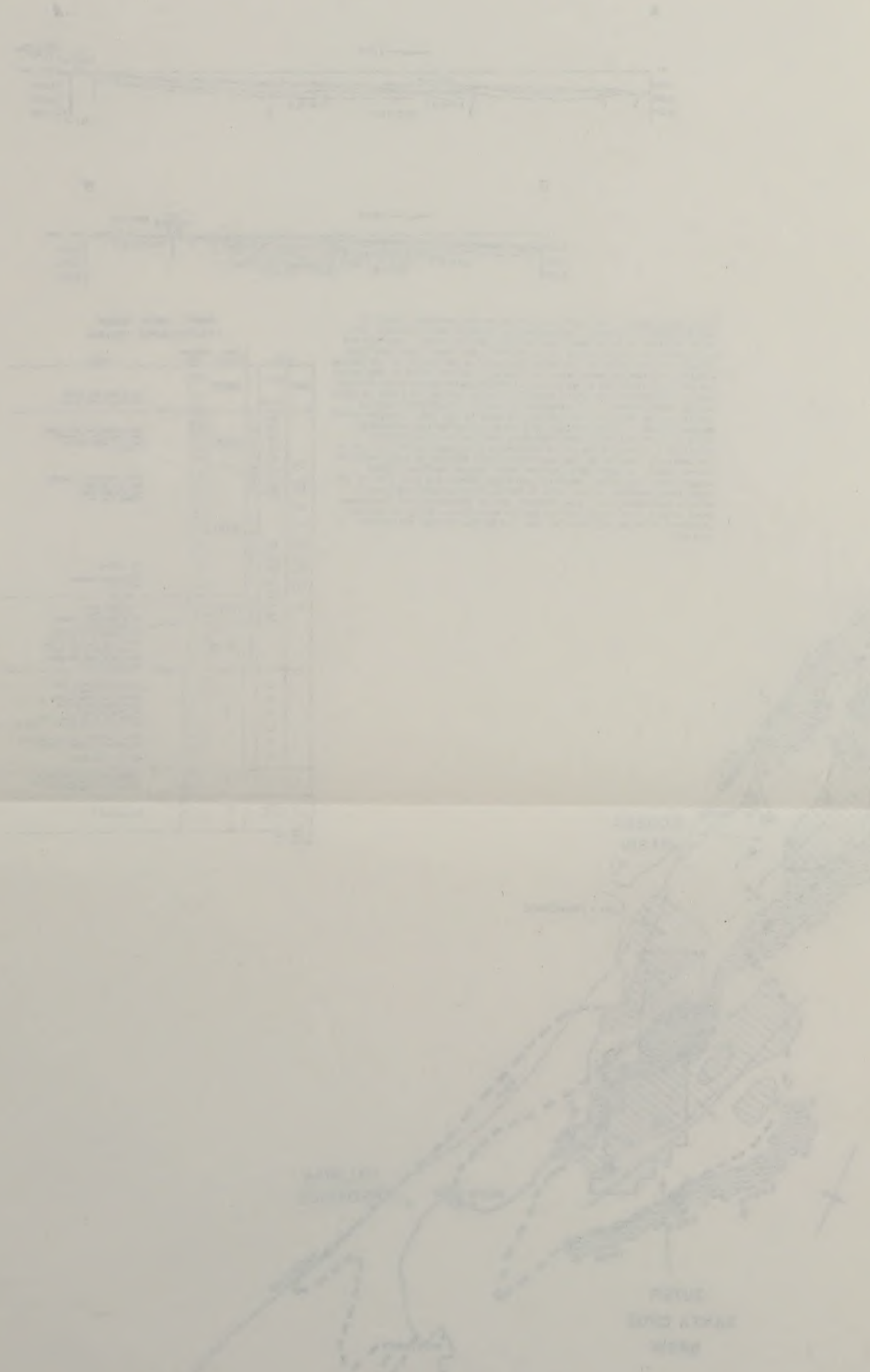
REGION OF NORTHERN AND CENTRAL CALIFORNIA
WEST STATE ROAD NO. 1

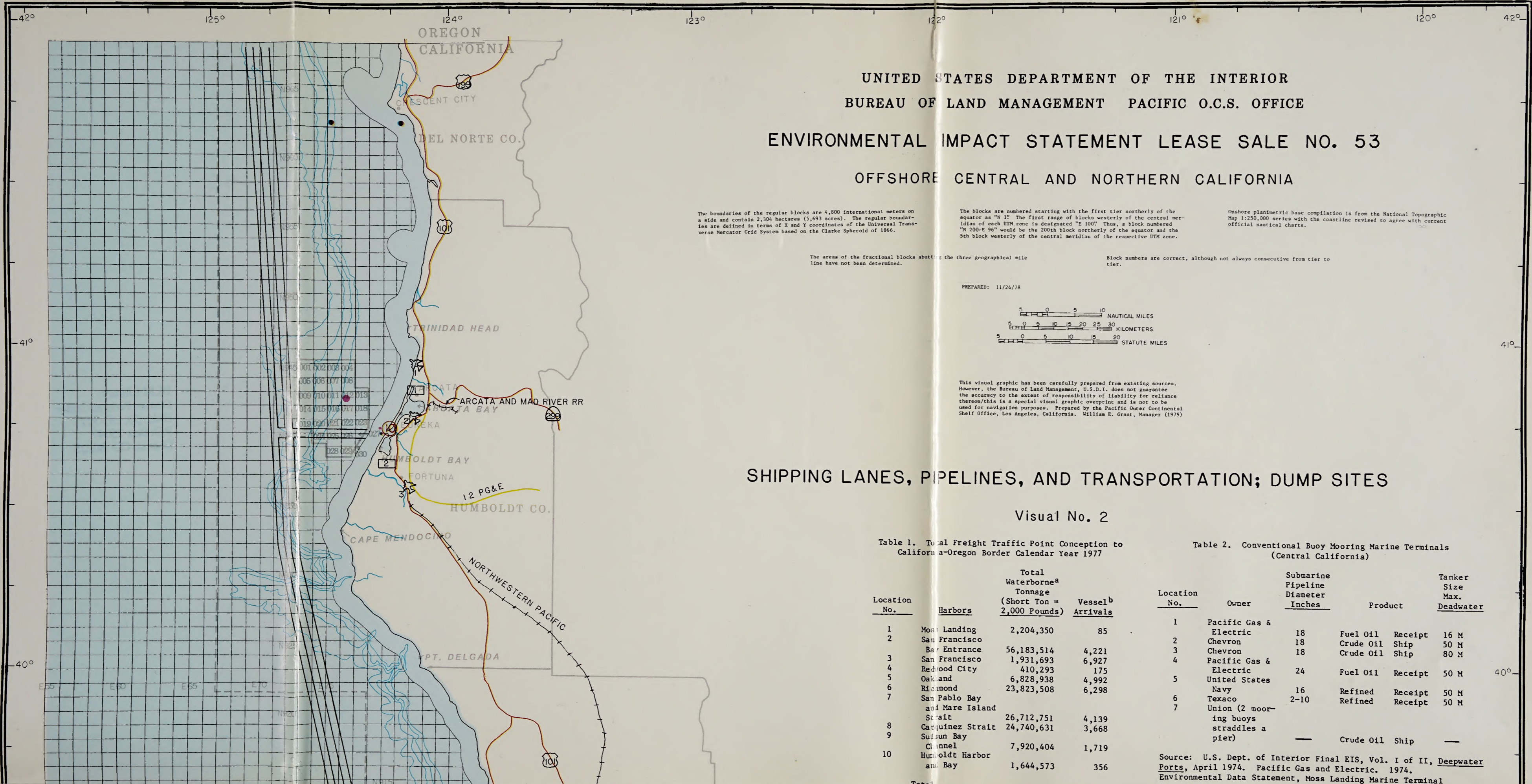
LAND OWNERSHIP

OWNER	ACRES	SECTION
UNITED STATES	100	1
BLM	100	2
PRIVATE	100	3
BLM	100	4
BLM	100	5
BLM	100	6
BLM	100	7
BLM	100	8
BLM	100	9
BLM	100	10
BLM	100	11
BLM	100	12
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BLM	100	18
BLM	100	19
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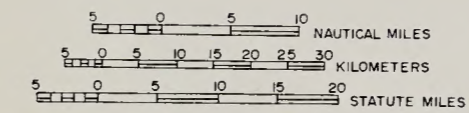
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PREPARED: 11/24/78



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SHIPPING LANES, PIPELINES, AND TRANSPORTATION; DUMP SITES

Visual No. 2

Table 1. Total Freight Traffic Point Conception to California-Oregon Border Calendar Year 1977

Location No.	Harbors	Total Waterborne ^a Tonnage (Short Ton = 2,000 Pounds)	Vessel ^b Arrivals
1	Moss Landing	2,204,350	85
2	San Francisco Bay Entrance	56,183,514	4,221
3	San Francisco	1,931,693	6,927
4	Redwood City	410,293	175
5	Oakland	6,828,938	4,992
6	Richmond	23,823,508	6,298
7	San Pablo Bay and Mare Island Strait	26,712,751	4,139
8	Carpinez Strait	24,740,631	3,668
9	Suisun Bay Channel	7,920,404	1,719
10	Humboldt Harbor and Bay	1,644,573	356

Total

Table 2. Conventional Buoy Mooring Marine Terminals (Central California)

Location No.	Owner	Submarine Pipeline Diameter Inches	Product	Tanker Size Max. Deadwater
1	Pacific Gas & Electric	18	Fuel Oil Receipt	16 M
2	Chevron	18	Crude Oil Ship	50 M
3	Chevron	18	Crude Oil Ship	80 M
4	Pacific Gas & Electric	24	Fuel Oil Receipt	50 M
5	United States Navy	16	Refined Receipt	50 M
6	Texaco	2-10	Refined Receipt	50 M
7	Union (2 mooring buoys straddles a pier)	—	Crude Oil Ship	—

Source: U.S. Dept. of Interior Final EIS, Vol. I of II, Deepwater Ports, April 1974. Pacific Gas and Electric, 1974. Environmental Data Statement, Moss Landing Marine Terminal Expansion.

(excluding S.F. Bay entrance) 96,217,141 28,359

Source: Department of the Army Corps of Engineer, 1977. Waterborne Commerce of the United States, Part 4.

^aIncludes military shipping.
^bExcludes domestic fishing craft, military ships, pleasure boats and through traffic.

NOTE:
 LOCATION NO. FOR REFINERIES SEE TABLE III.B.6-1

Table 3. Public Airports

Location Number	Name	Type
1	Arcata	AC
2	Murray Field	C
3	Rohnerville	GA
4	Mendocino County	C
5	Ukiah Municipal	C
6	Boonville	GA
7	Sonoma County	C
8	Santa Rosa Air Center	GA
9	Petaluma Sky Ranch	GA
10	San Francisco International	AC
11	San Carlos	GA
12	Half Moon Bay	GA
13	San Jose Municipal	AC
14	Santa Cruz Skypark	GA
15	Watsonville Municipal	GA
16	San Luis Obispo County	C
17	Oceano County	GA
18	Santa Maria Public	AC
19	Lompoc	GA

Sources: State of California 1978. Public Use Airport Information, Dept. of Transportation, Division of Aeronautics.

AC Air Carrier
 C Commuter
 GA General Aviation

Table 4. Electric Power Plants

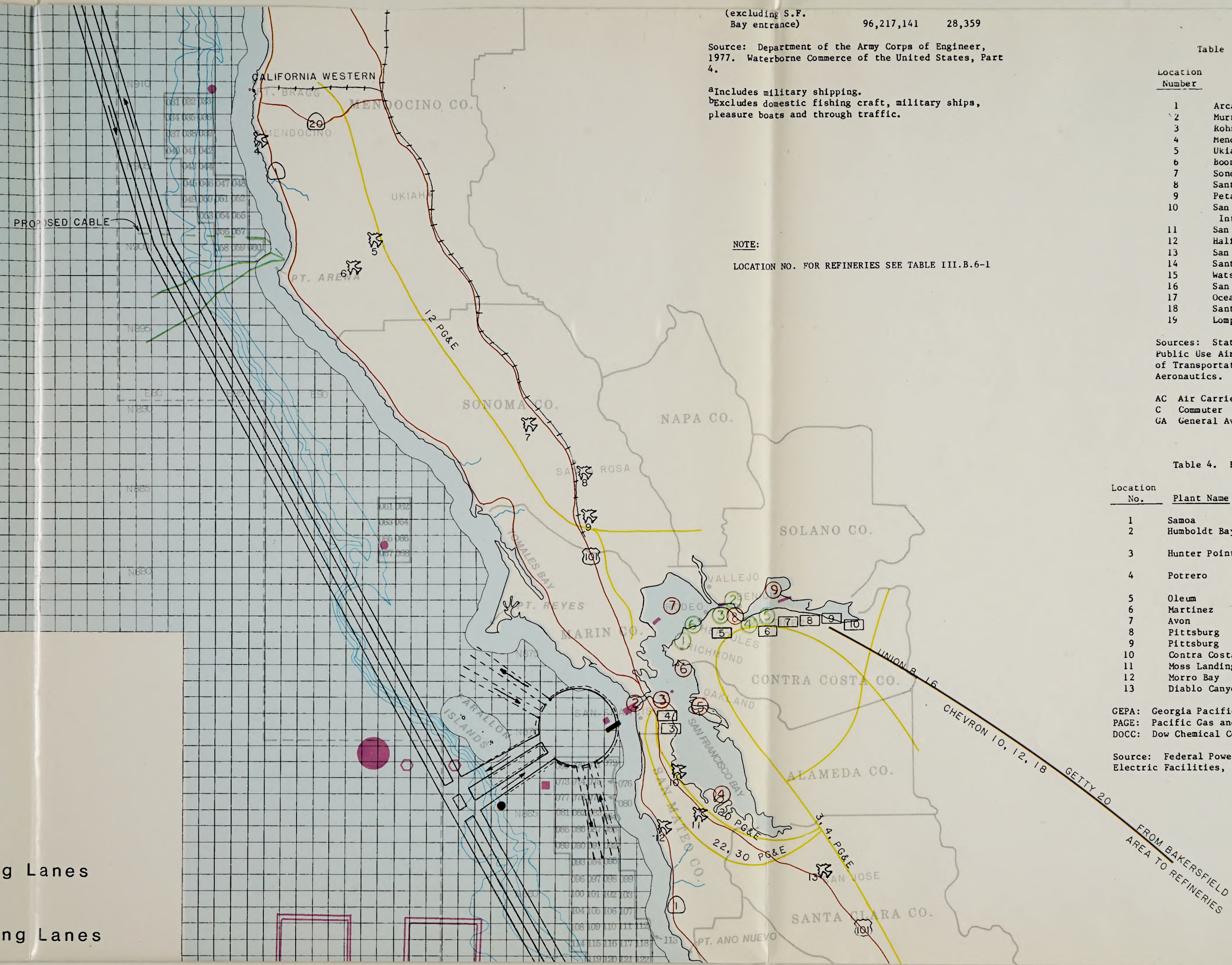
Location No.	Plant Name	Megawatt Capacity	Type	Ownership
1	Samoa	27.5	Steam	GEPA
2	Humboldt Bay	102.4	Steam	PAGE
3	Hunter Point	65.3	Nuclear	PAGE
		366.4	Steam	PAGE
4	Potrero	61.0	Turbine	PAGE
		317.9	Steam	PAGE
5	Oleum	183.0	Turbine	PAGE
		80.0	Steam	PAGE
6	Martinez	40.0	Steam	PAGE
7	Avon	40.0	Steam	PAGE
8	Pittsburg	2,028.9	Steam	PAGE
9	Pittsburg	48.0	Turbine	DOCC
10	Contra Costa	1,253.6	Steam	PAGE
11	Moss Landing	2,152.2	Steam	PAGE
12	Morro Bay	1,056.3	Steam	PAGE
13	Diablo Canyon	2,268.0	Nuclear	PAGE
















GEPA: Georgia Pacific Corp.
 PAGE: Pacific Gas and Electric Co.
 DOCC: Dow Chemical Co.

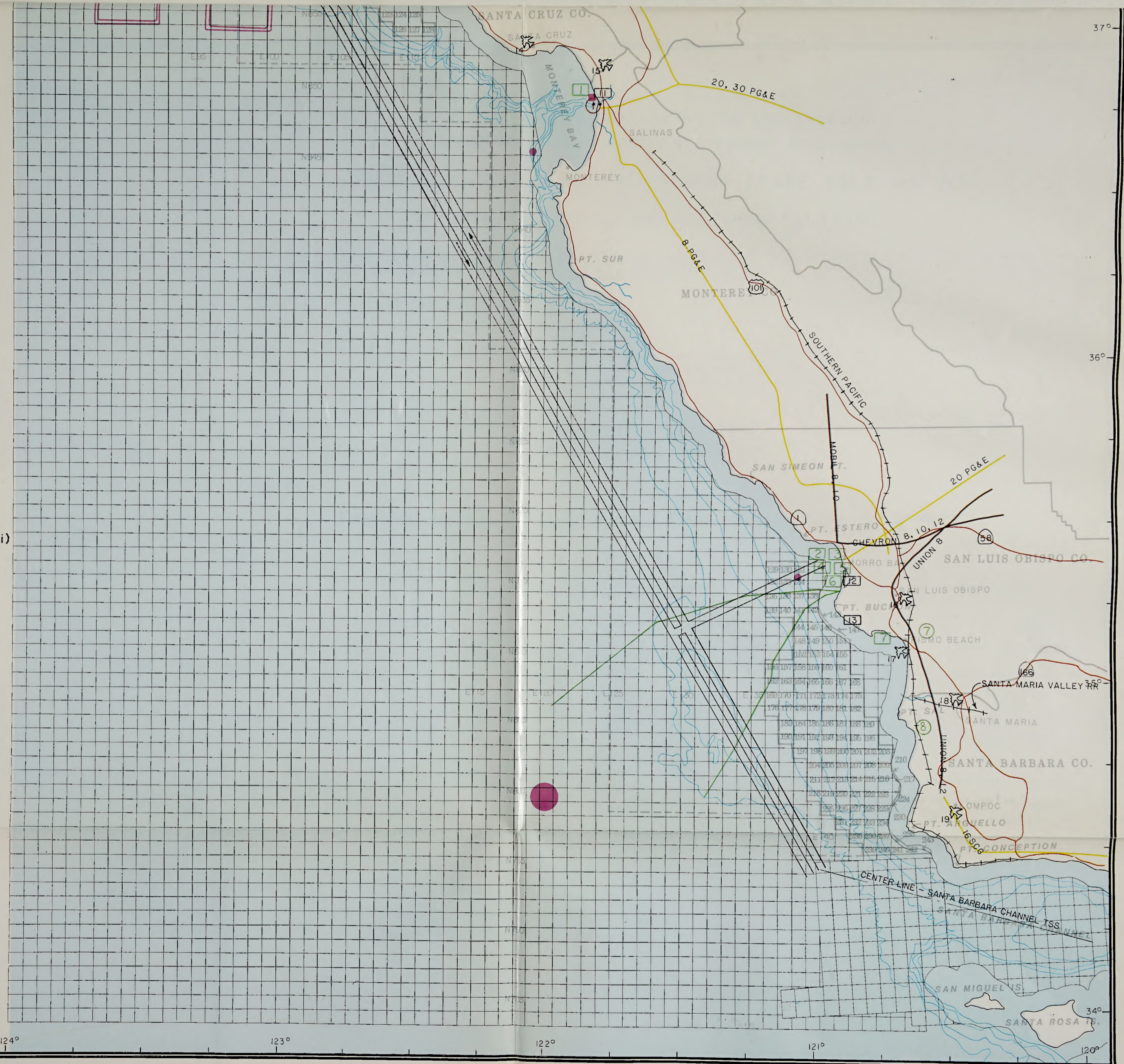
Source: Federal Power Commission. 1977. Principle Electric Facilities, Southwestern Region.

LEGEND

- Existing Shipping Lanes
- ===== Proposed Shipping Lanes



- 37°  Highway
-  Railroad
-  Airport
-  Marine Terminal
-  Harbor
-  Electric Generating Plant
- 36°  Refinery
-  Crude Oil Pipeline
-  Gas Pipeline
-  AT&T Submarine Cable (Cal.-Hawaii)
-  Active Dump Site
-  Historic Dump Site
-  Historic Dump Sites
(Area Covered 220-250 sq. miles)
-  Historic Munitions Dump Site
-  Proposed AT&T Submarine Cable

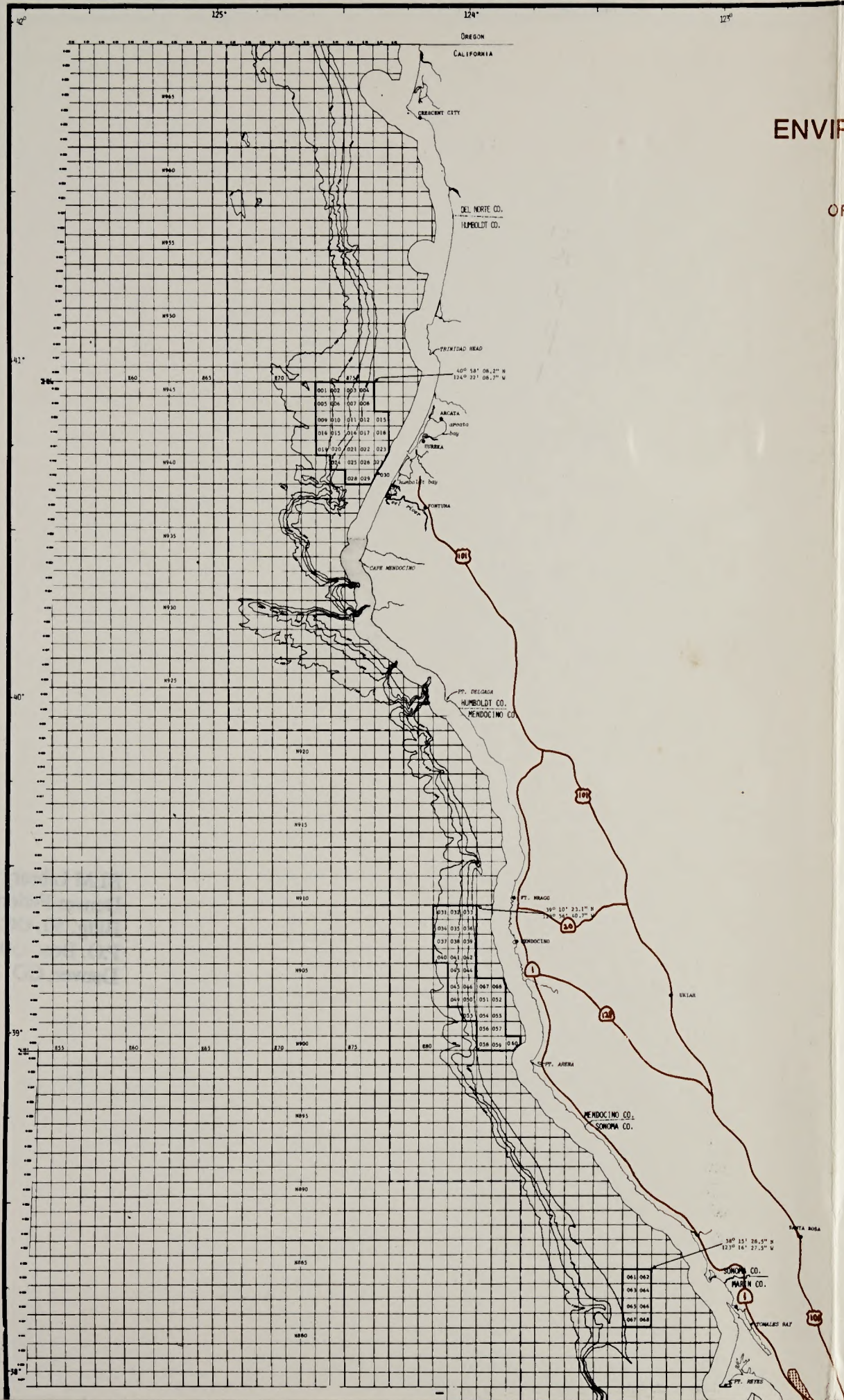


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ENVIRONMENTAL IMPACT STATEMENT

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OFFSHORE CENTRAL AND NORTHERN CALIFORNIA

VISUAL ERRATA SHEET No. 2

TRANSPORTATION

RECREATION

COMMERCIAL FISHERIES

Several Corrections To Visual No. 3 (Commercial Fisheries) Were Noted In The Comments Received On The DEIS. These Corrections Have Been Incorporated In The Text Of The FEIS.

KELP Bell & Ally (1972)

Comments Received On Visual No. 5 (Kelp) Have Been Incorporated In The Text Of The FEIS.

PLANKTON Smith (1971)

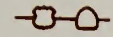
Comments Received On Visual No. 6 (Plankton) Have Been Incorporated In The Text Of The FEIS.

SHORELINE TYPES Dames & Moore (1971)

GEOLOGY

Comments Received On The Geology Visuals Have Been Incorporated In The Text Of The FEIS.

LEGEND



Highway



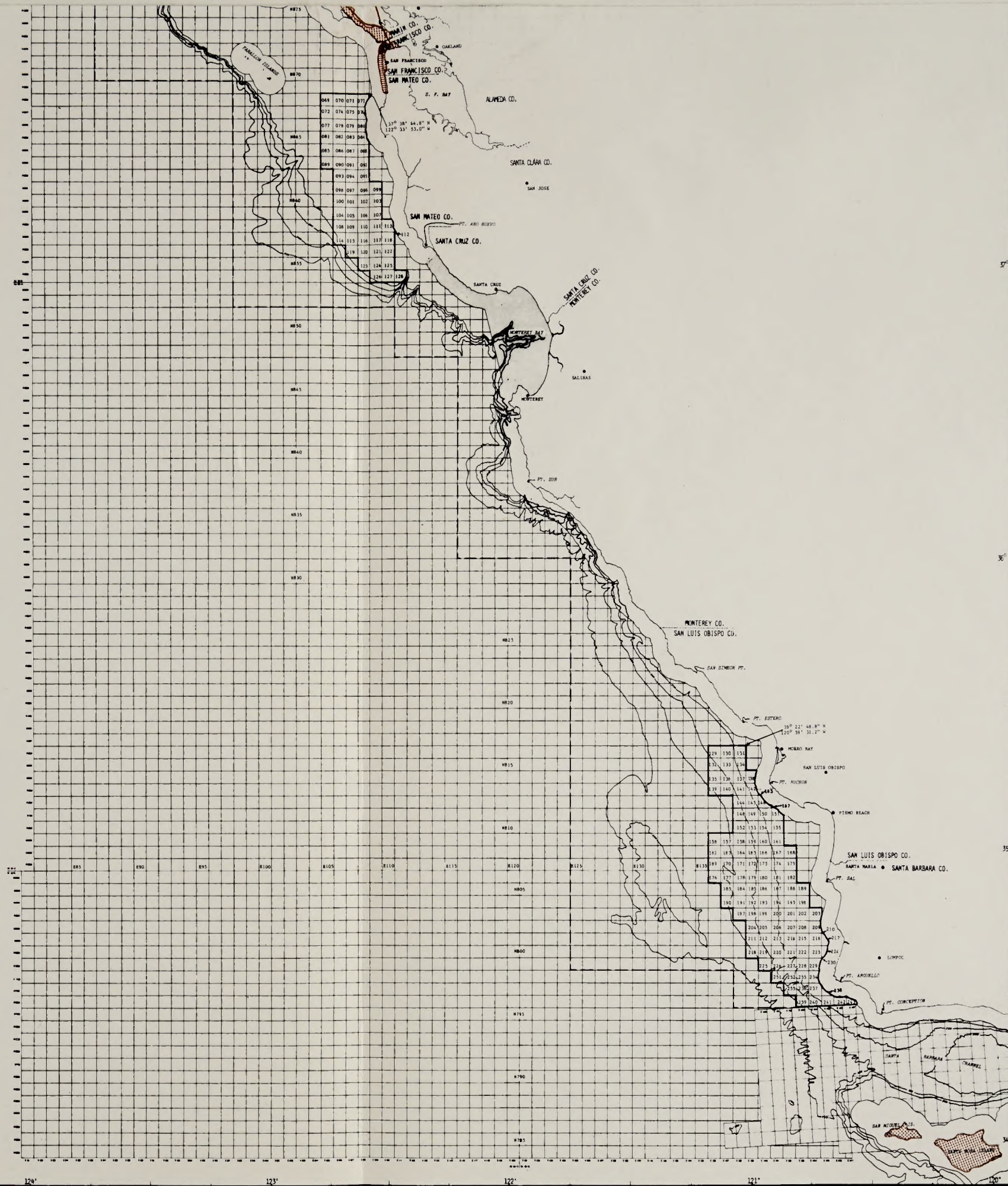
Federal Recreational Areas



Rocky Shore



Sandy Beach



06808551

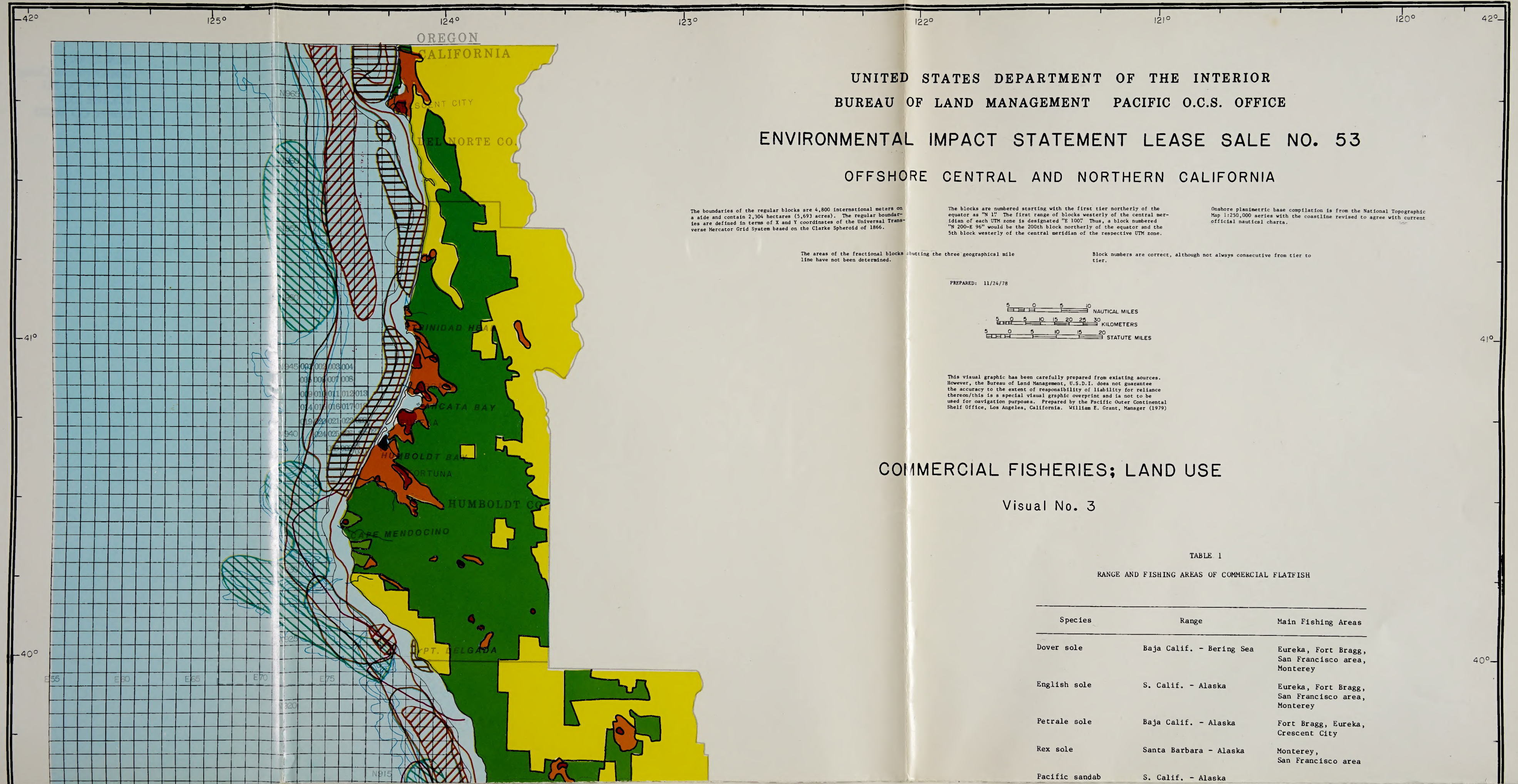
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ENVIRONMENTAL IMPACT STATEMENT

CHAPTER 1 INTRODUCTION
1.1 PROJECT DESCRIPTION
1.2 STUDY AREA
1.3 REGULATORY FRAMEWORK
1.4 PURPOSE AND SCOPE
1.5 ORGANIZATION OF THE STATEMENT

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OFFSHORE CENTRAL AND NORTHERN CALIFORNIA

The boundaries of the regular blocks are 4,800 international meters on a side and contain 2,304 hectares (5,693 acres). The regular boundaries are defined in terms of X and Y coordinates of the Universal Transverse Mercator Grid System based on the Clarke Spheroid of 1866.

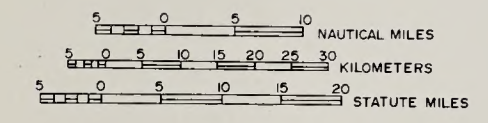
The blocks are numbered starting with the first tier northerly of the equator as "N 1". The first range of blocks westerly of the central meridian of each UTM zone is designated "E 100". Thus, a block numbered "N 200-E 96" would be the 200th block northerly of the equator and the 5th block westerly of the central meridian of the respective UTM zone.

Onshore planimetric base compilation is from the National Topographic Map 1:250,000 series with the coastline revised to agree with current official nautical charts.

The areas of the fractional blocks abutting the three geographical mile line have not been determined.

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PREPARED: 11/24/78



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COMMERCIAL FISHERIES; LAND USE

Visual No. 3

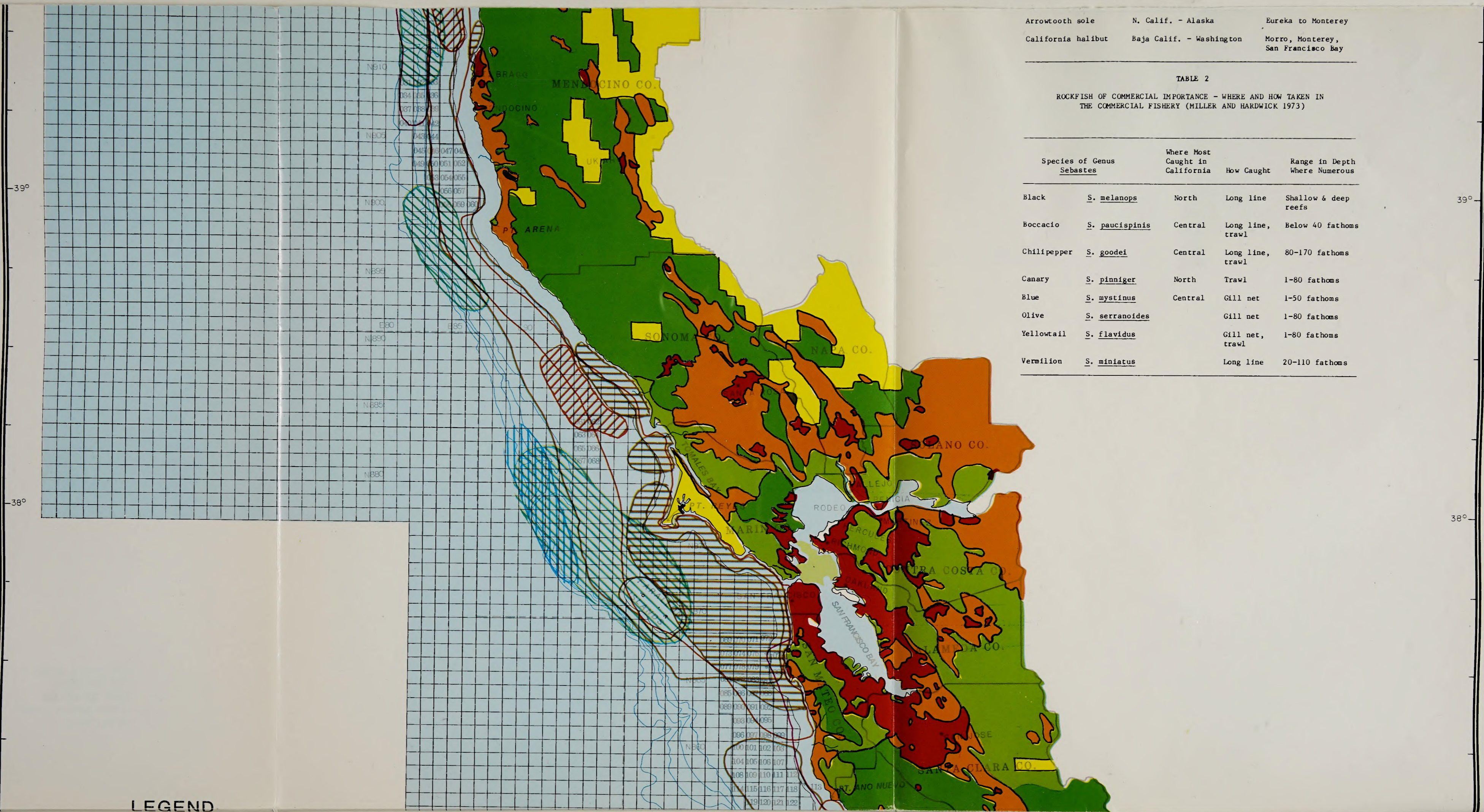
TABLE 1
RANGE AND FISHING AREAS OF COMMERCIAL FLATFISH

Species	Range	Main Fishing Areas
Dover sole	Baja Calif. - Bering Sea	Eureka, Fort Bragg, San Francisco area, Monterey
English sole	S. Calif. - Alaska	Eureka, Fort Bragg, San Francisco area, Monterey
Petrale sole	Baja Calif. - Alaska	Fort Bragg, Eureka, Crescent City
Rex sole	Santa Barbara - Alaska	Monterey, San Francisco area
Pacific sandab	S. Calif. - Alaska	






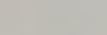
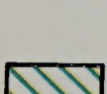
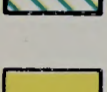
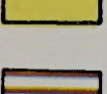
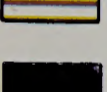
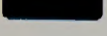

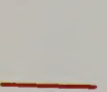

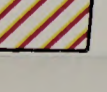
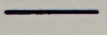
Arrowtooth sole	N. Calif. - Alaska	Eureka to Monterey
California halibut	Baja Calif. - Washington	Morro, Monterey, San Francisco Bay

TABLE 2
ROCKFISH OF COMMERCIAL IMPORTANCE - WHERE AND HOW TAKEN IN THE COMMERCIAL FISHERY (MILLER AND HARDWICK 1973)

Species of Genus	Where Most Caught in California	How Caught	Range in Depth Where Numerous
Black <i>S. melanops</i>	North	Long line	Shallow & deep reefs
Boccacio <i>S. paucispinis</i>	Central	Long line, trawl	Below 40 fathoms
Chilipepper <i>S. goodei</i>	Central	Long line, trawl	80-170 fathoms
Canary <i>S. pinniger</i>	North	Trawl	1-80 fathoms
Blue <i>S. mystinus</i>	Central	Gill net	1-50 fathoms
Olive <i>S. serranoides</i>		Gill net	1-80 fathoms
Yellowtail <i>S. flavidus</i>		Gill net, trawl	1-80 fathoms
Vermilion <i>S. miniatus</i>		Long line	20-110 fathoms



LEGEND

-  Urban
-  Agricultural Lands
-  Federal & State Lands
-  Forests (Non Governmental)
-  Grasslands
-  Abalone
-  Albacore Tuna
-  Anchovy or Pacific Herring
-  Crab
-  Oyster
-  Rockfish
-  Salmon Trolling
-  Shrimp
-  Squid
-  Trap Fishing (ie. Sablefish)
-  Trawl Grounds (ie. Flatfish)



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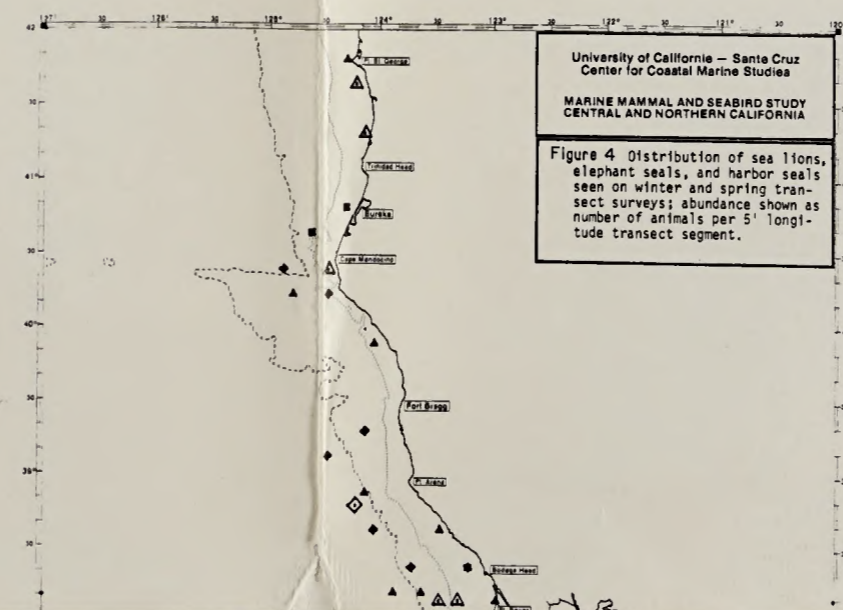
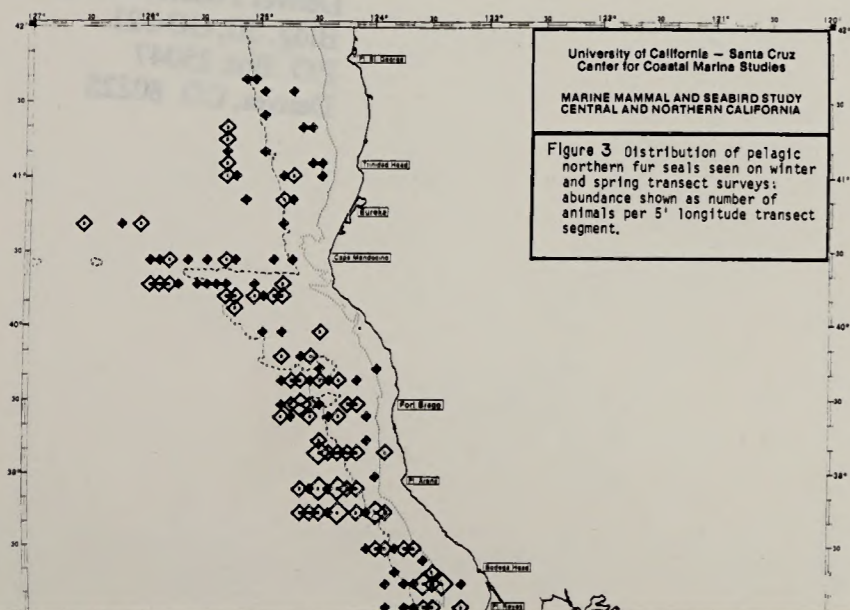
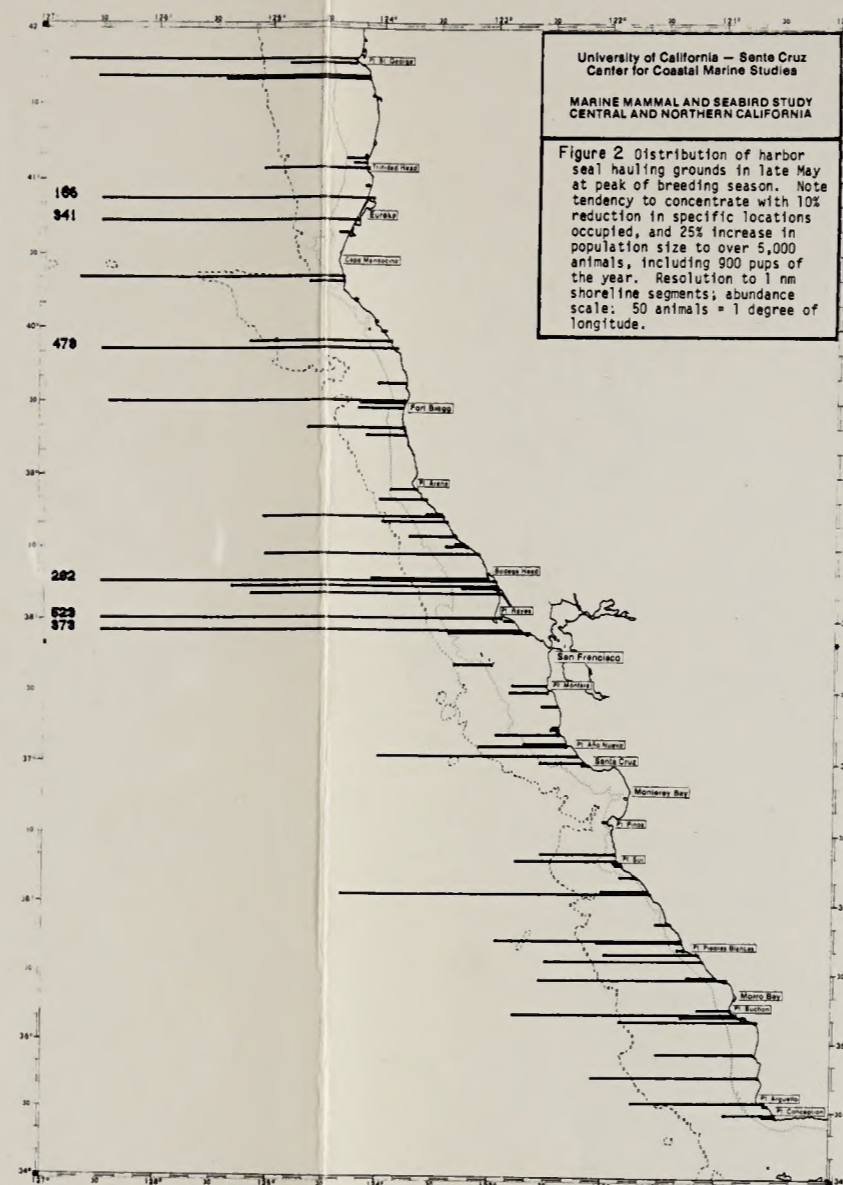
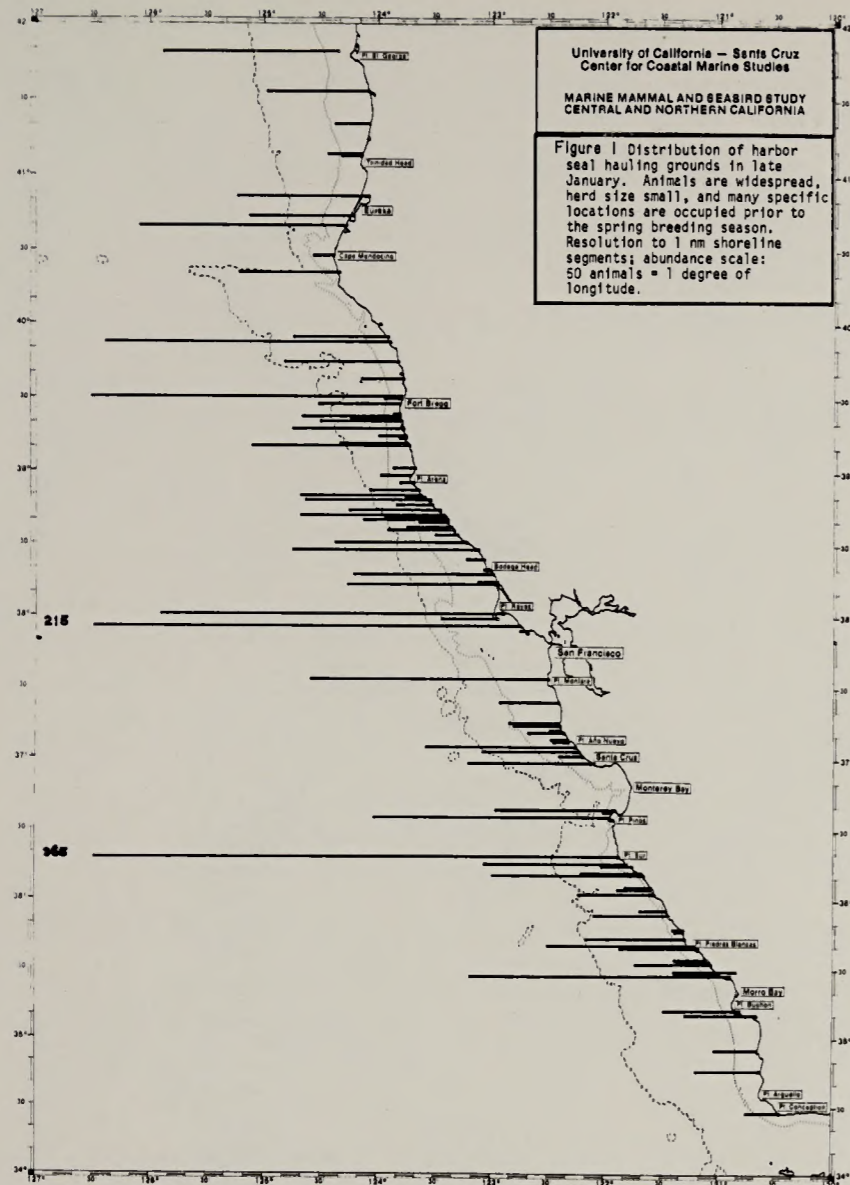
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OFFSHORE CENTRAL AND NORTHERN CALIFORNIA

VISUAL ERRATA SHEET No. 3

MARINE BIRDS AND MAMMALS

Source: Figures 5, 6, & 7, U.S. Fish & Wildlife Service, 1980.



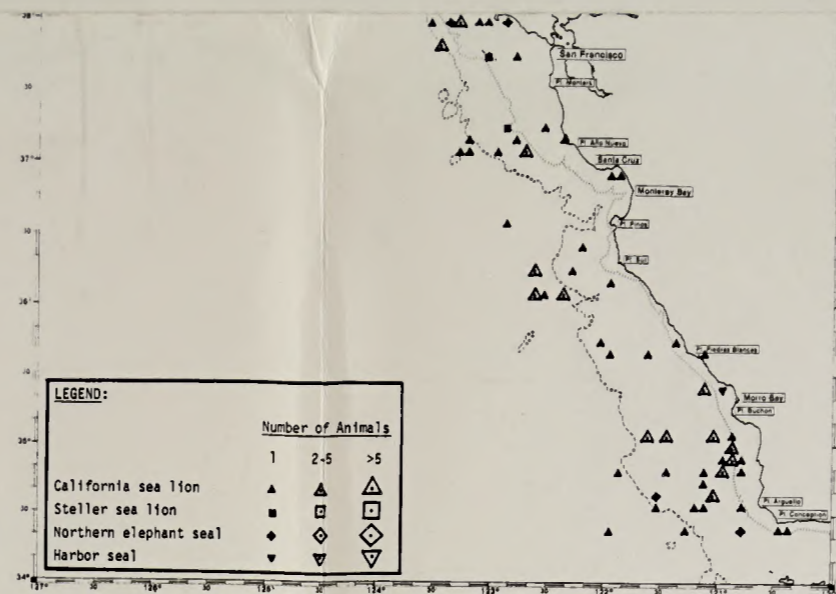
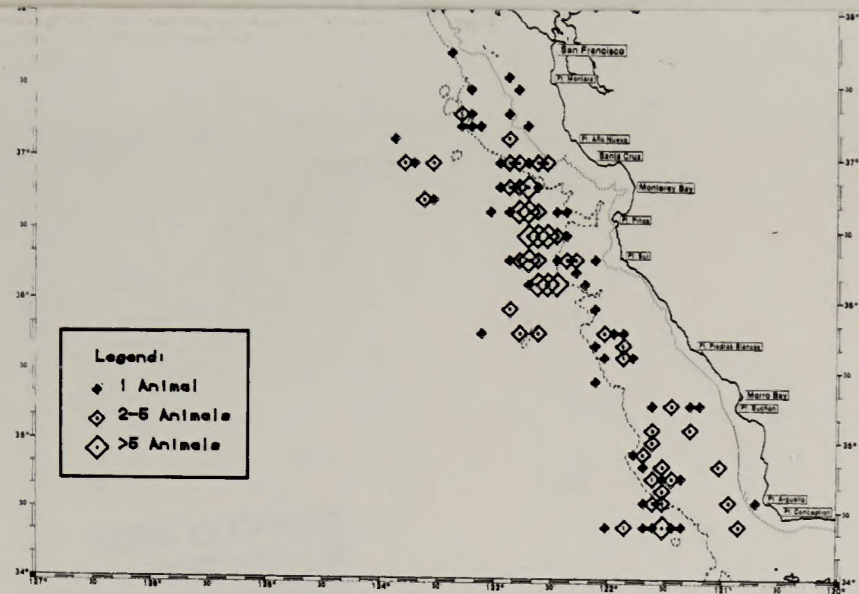


Figure 5 Proportion of breeding seabirds along the California coast. Circle size is directly proportional to number of birds.

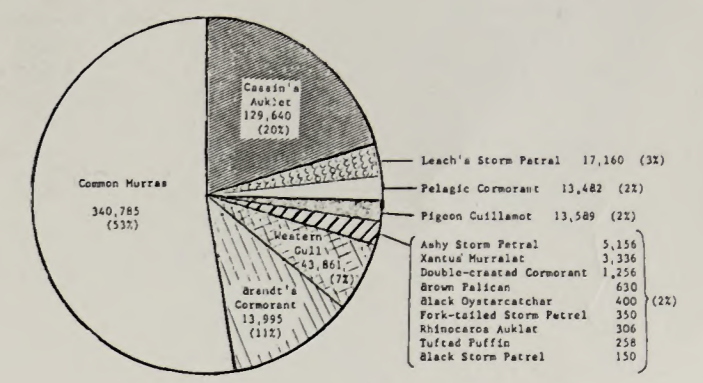


Figure 6 Total estimated populations and percentage of California breeding seabirds.

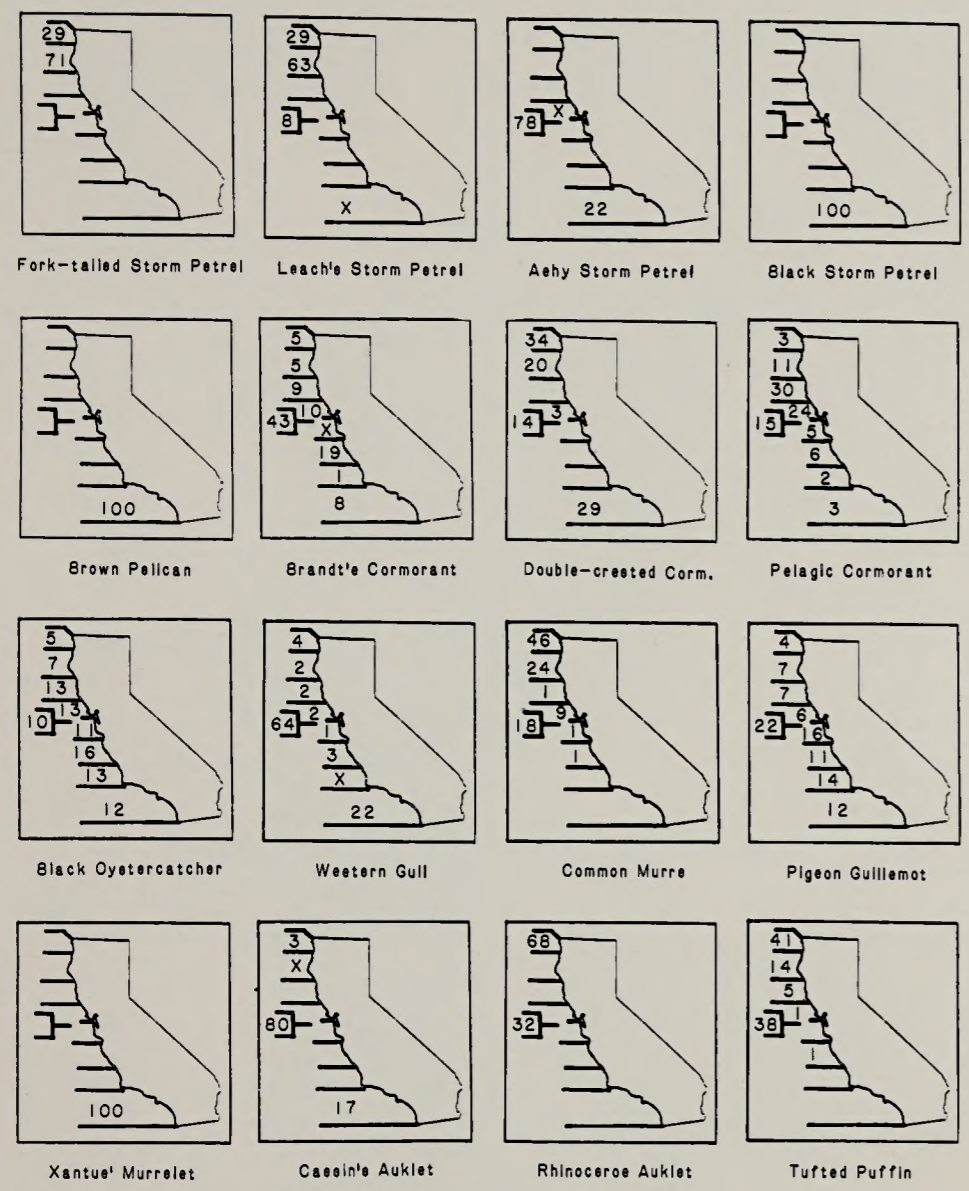
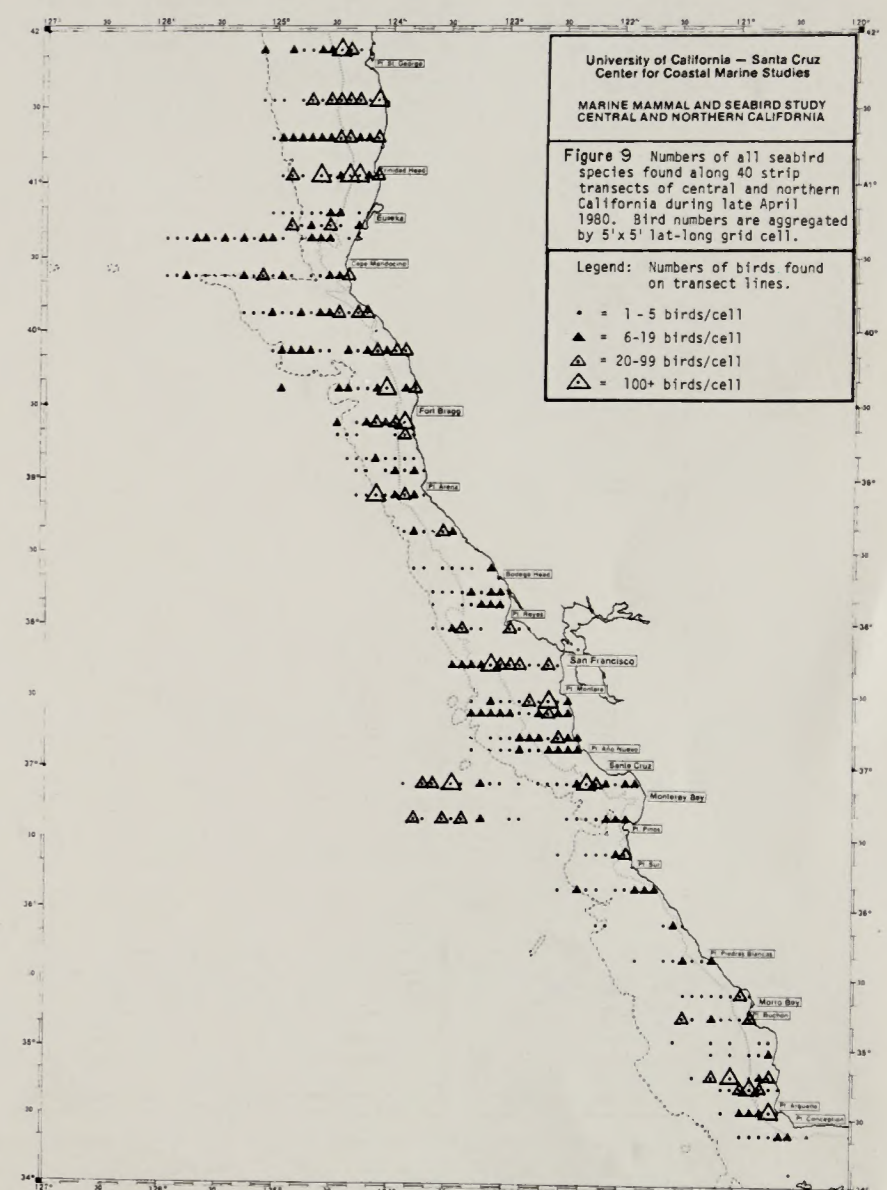
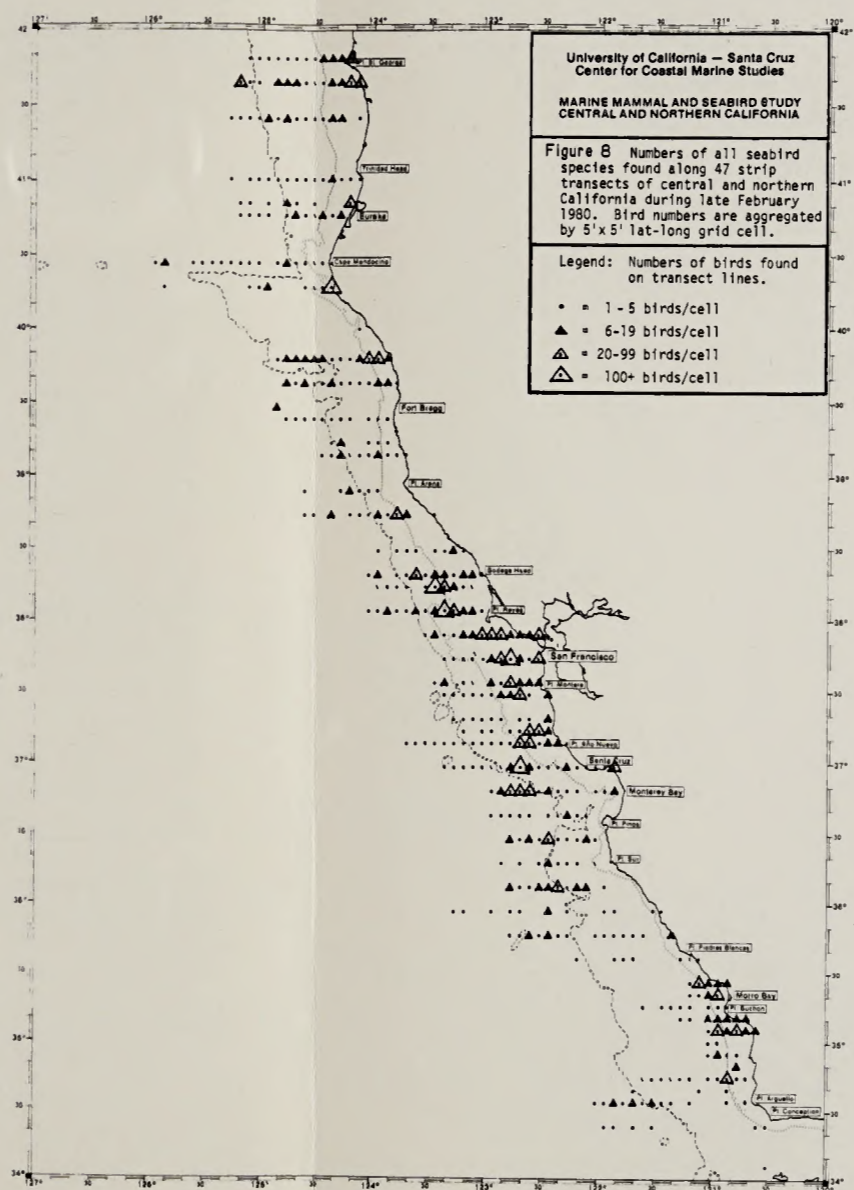


Figure 7 Percentages of California population for nine zones of the California coast by Species.

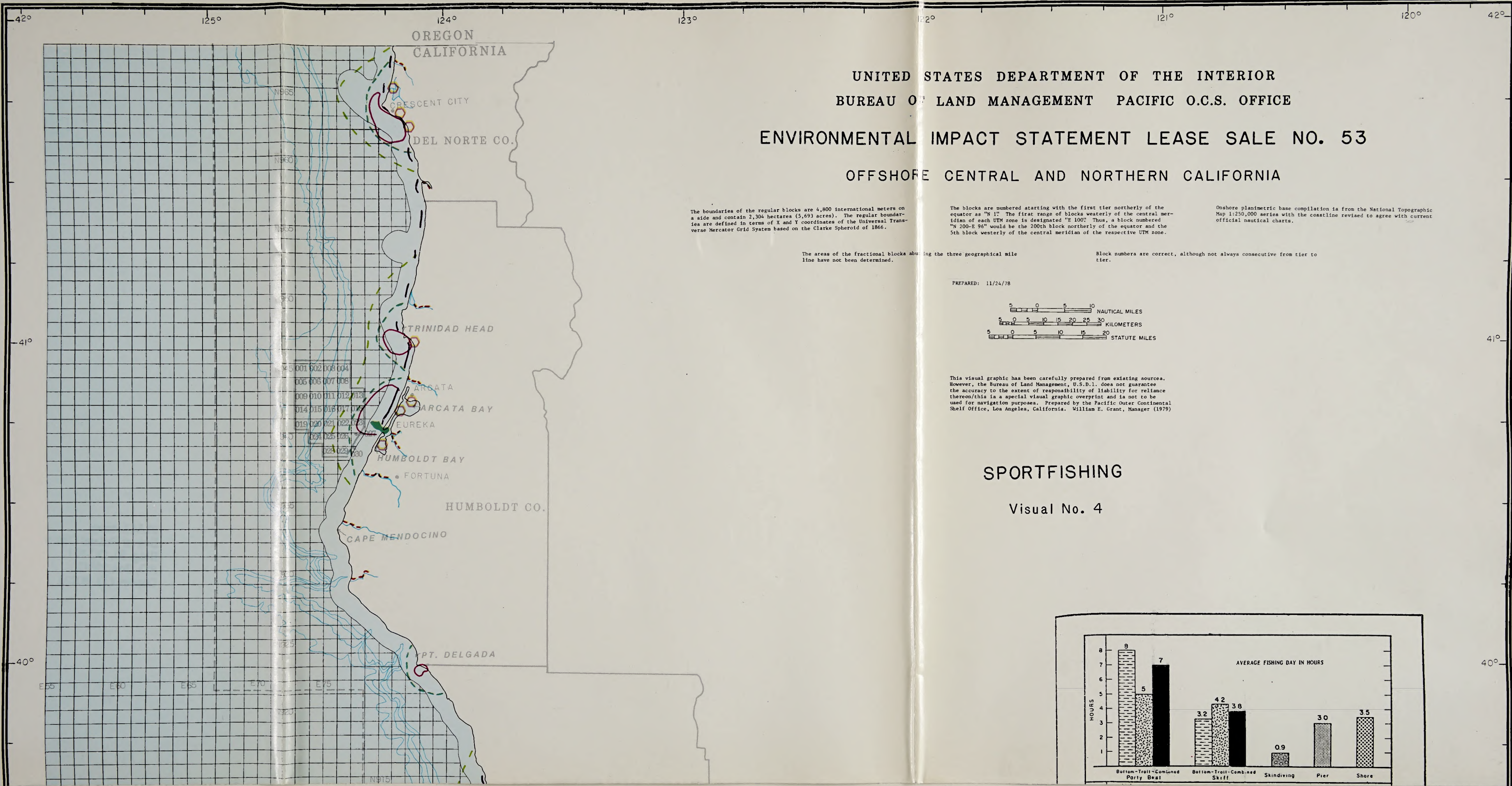


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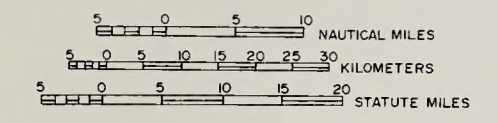
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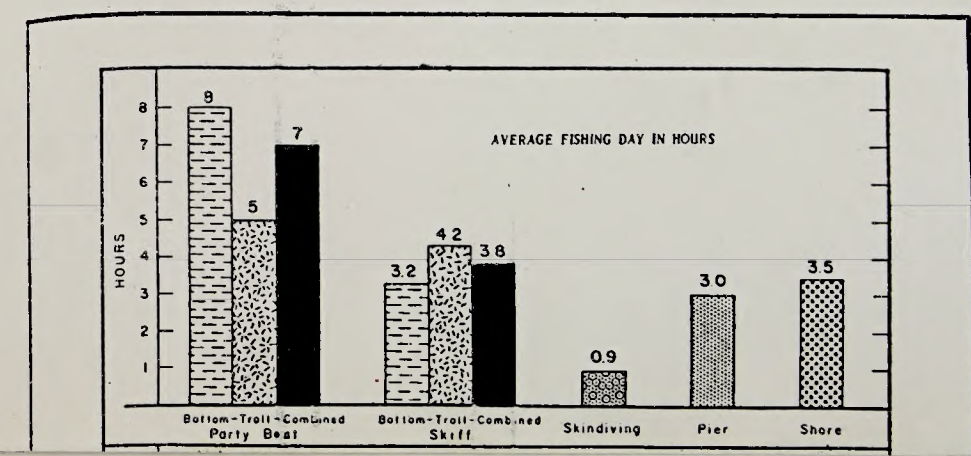
PREPARED: 11/24/78



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SPORTFISHING

Visual No. 4



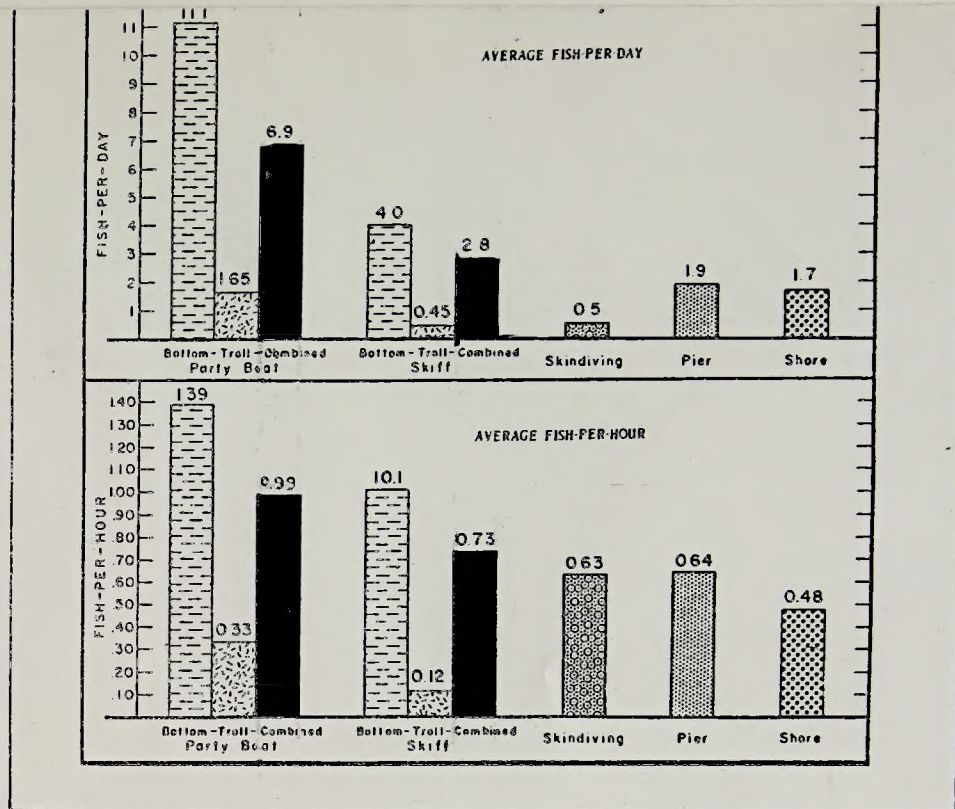
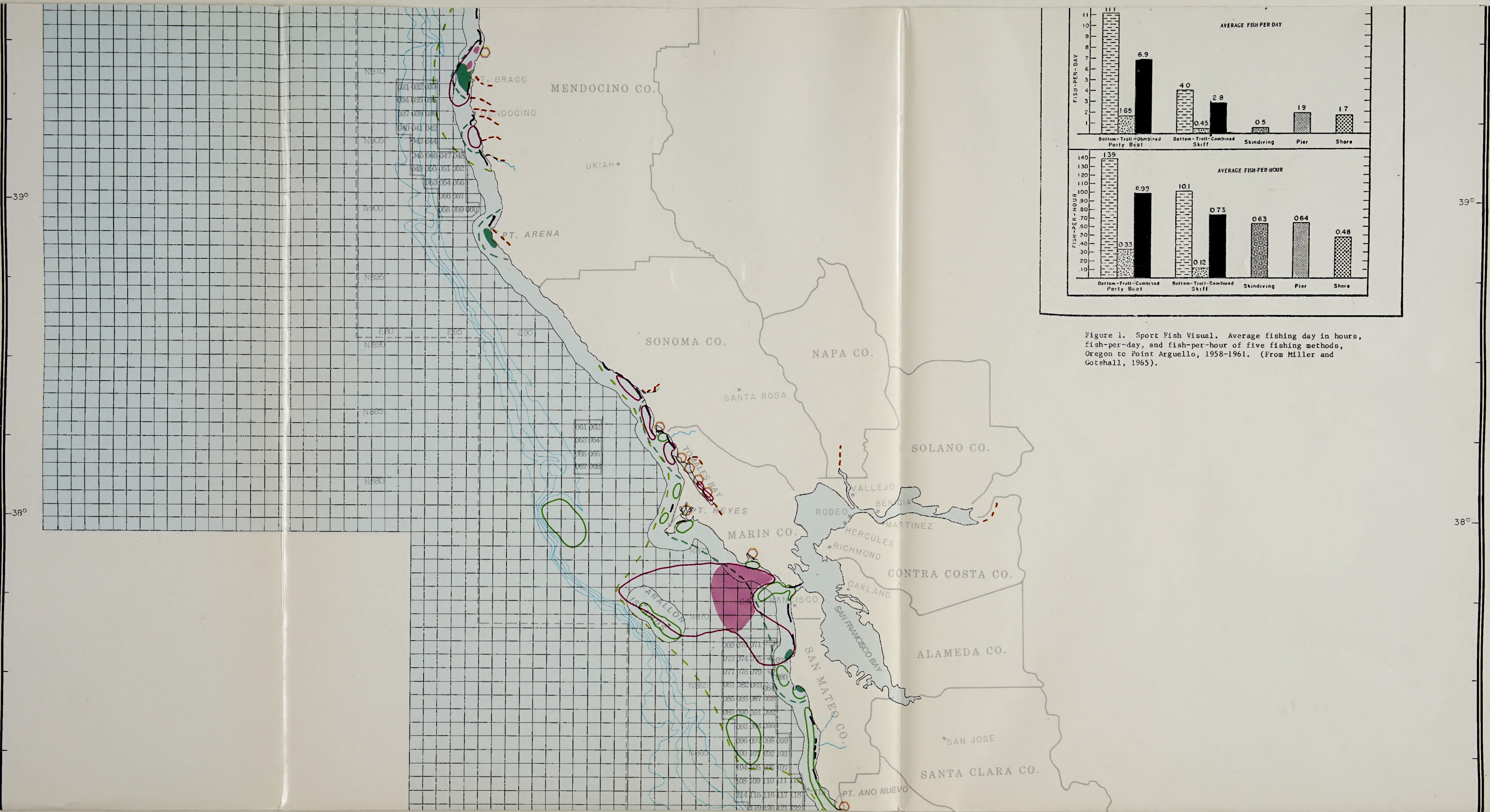









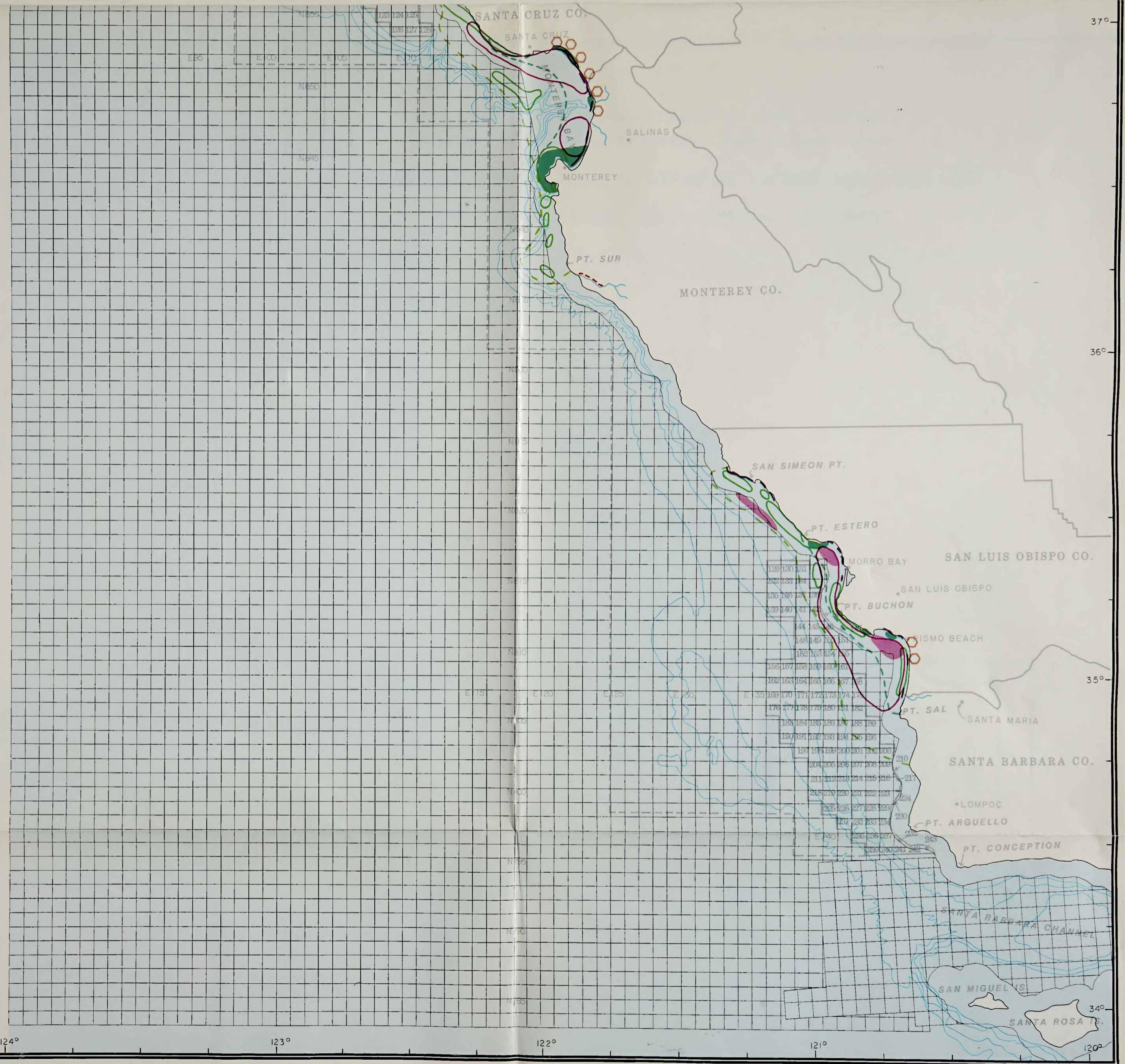


Figure 1. Sport Fish Visual. Average fishing day in hours, fish-per-day, and fish-per-hour of five fishing methods, Oregon to Point Arguello, 1958-1961. (From Miller and Gotshall, 1965).

LEGEND

-  Clam Digging
-  General Salmon Trolling Areas
-  Prime Salmon Fishing Areas
-  Salmon/Steelhead Streams
-  Party Boat Fishing Areas
-  General Party Boat Limits
-  Skiff Fishing Areas
-  General Skiff Limits
-  Shoreline Fishing Areas

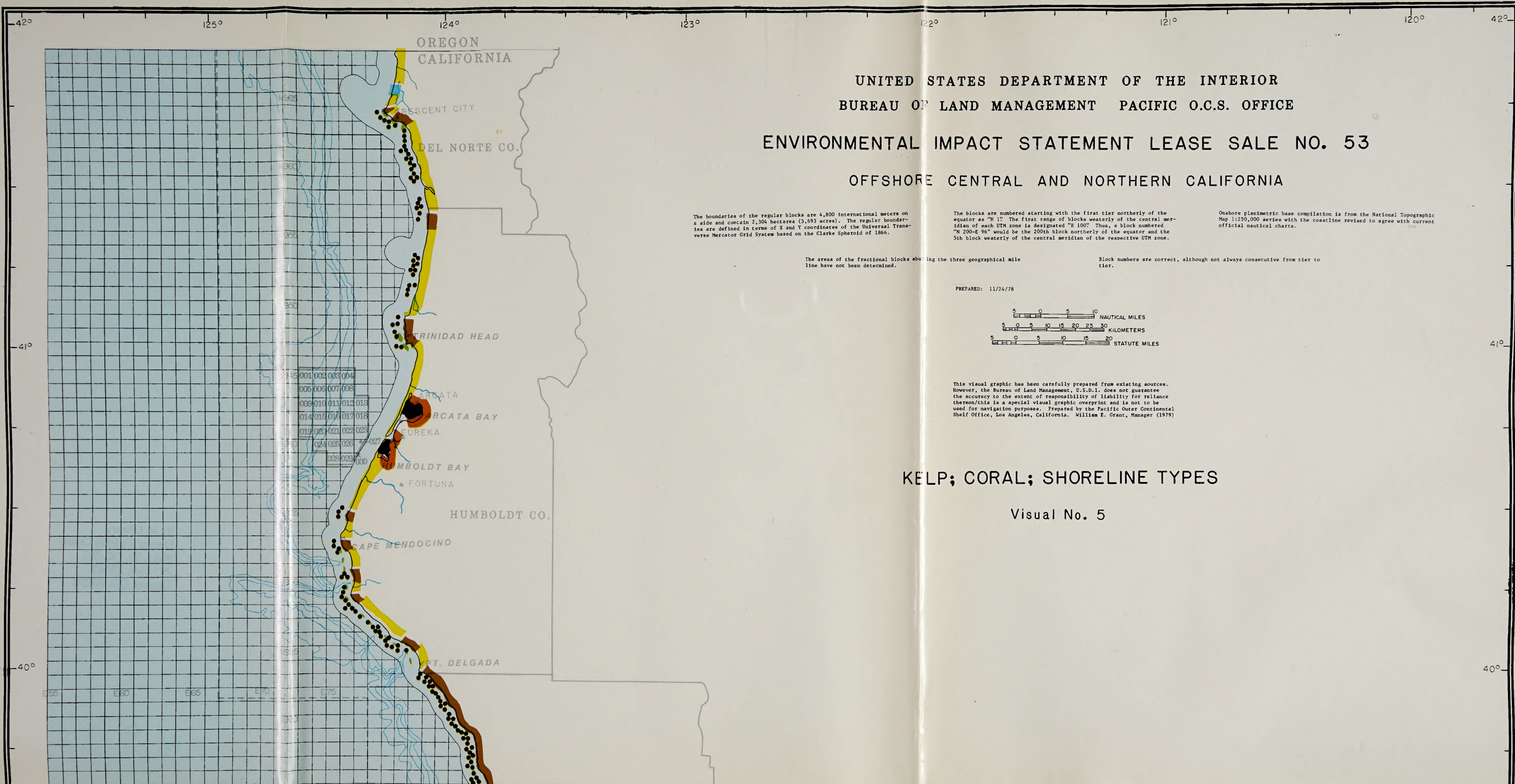


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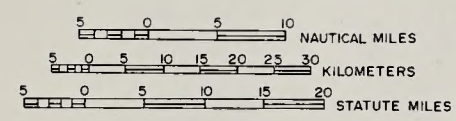
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KELP; CORAL; SHORELINE TYPES

Visual No. 5

39°

38°

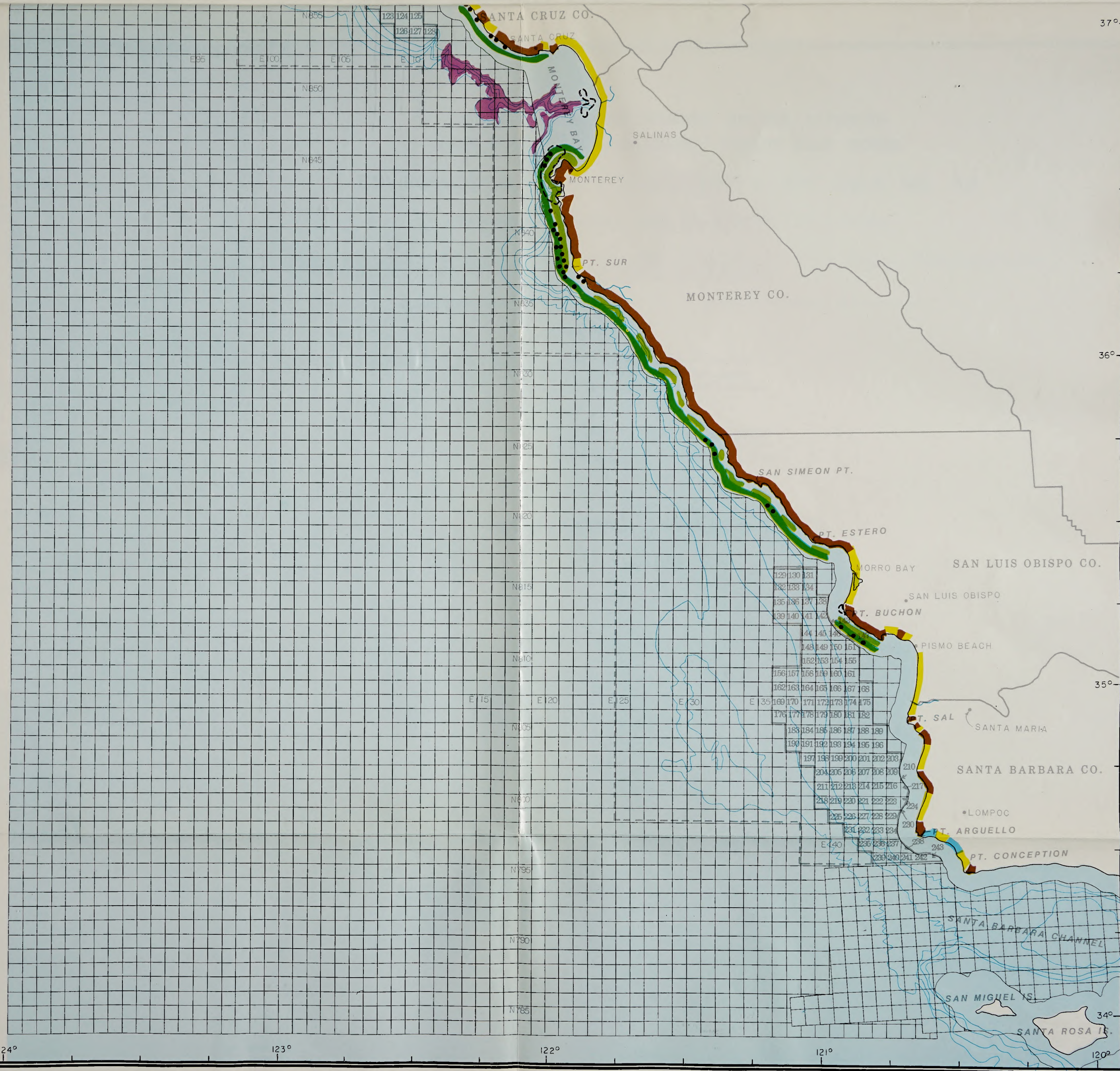
39°

38°



LEGEND

- Macrocystis (Giant Kelp)**
- Nereocystis (Bull Kelp)**
- Allopora Californica (Coral)**
- Paragorgia Arborea (Coral)**
- Boulders**
- Marsh**
- Mud Flats**
- Rocky Shore**
- Sandy Beach**
- Stacks**

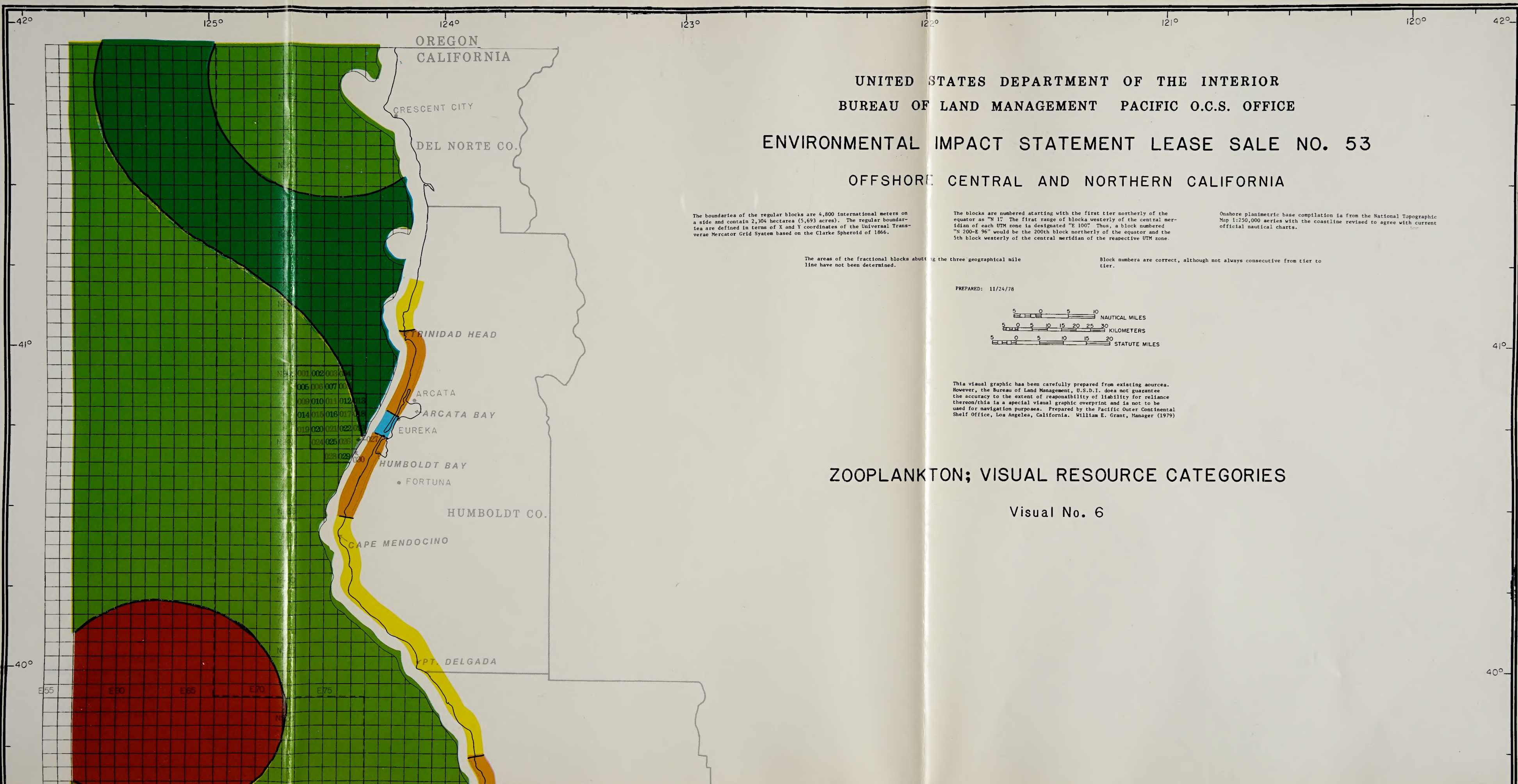


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ARCATA
ARCATA BAY

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HUMBOLDT CO.

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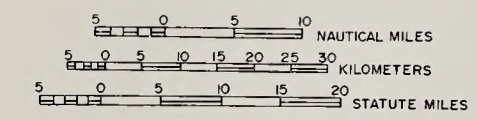
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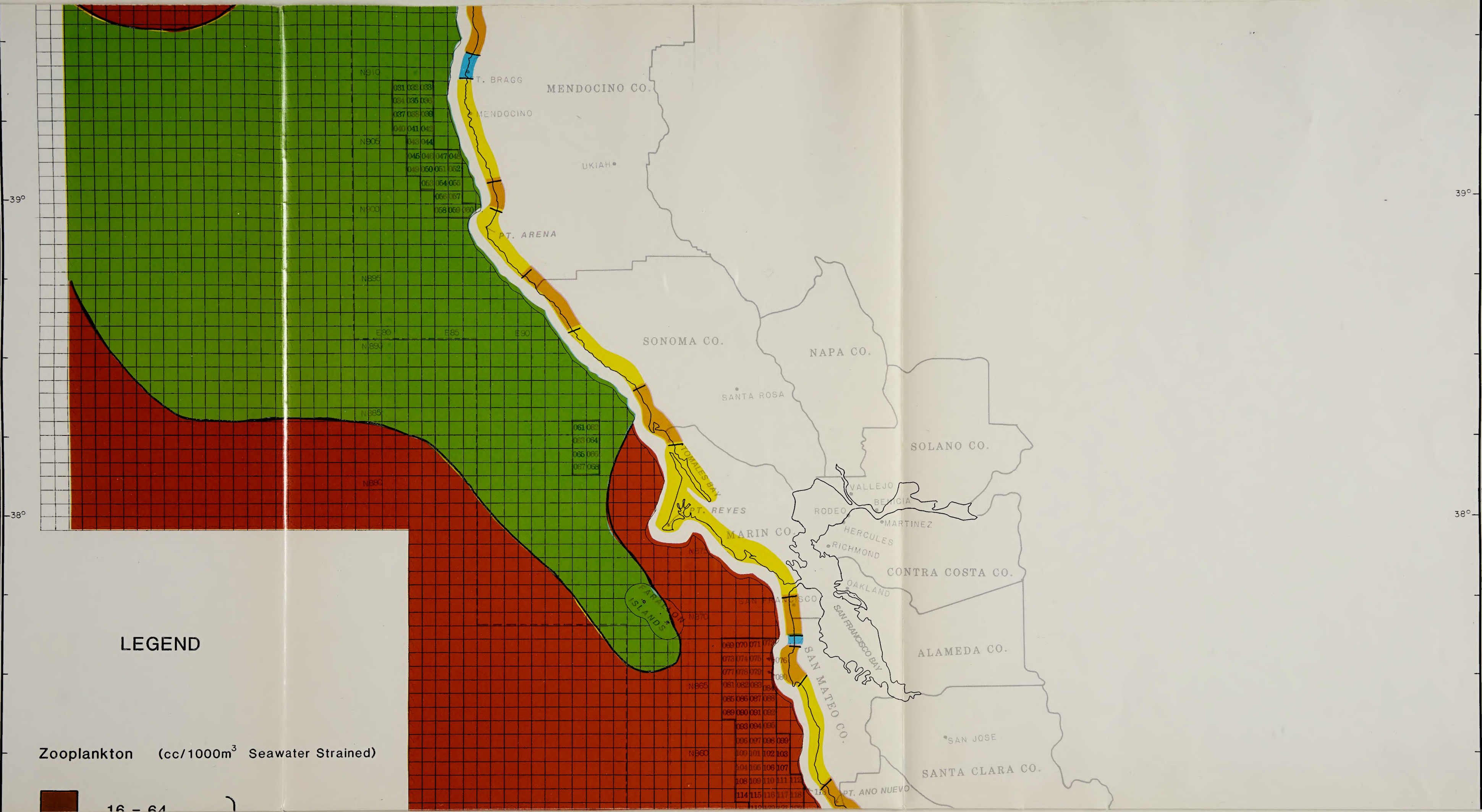
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ZOOPLANKTON; VISUAL RESOURCE CATEGORIES

Visual No. 6



LEGEND

Zooplankton (cc/1000m³ Seawater Strained)

N910
031 032 033
034 035 036
037 038 039
040 041 042
N905
043 044
045 046 047 048
049 050 051 052
063 064 065
066 067
N900
068 069 090

MENDOCINO CO.

SONOMA CO.

NAPA CO.

SOLANO CO.

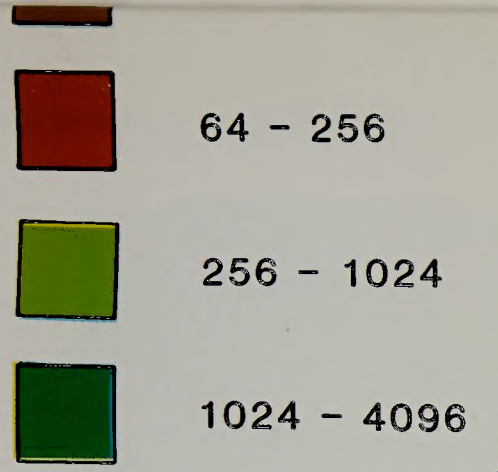
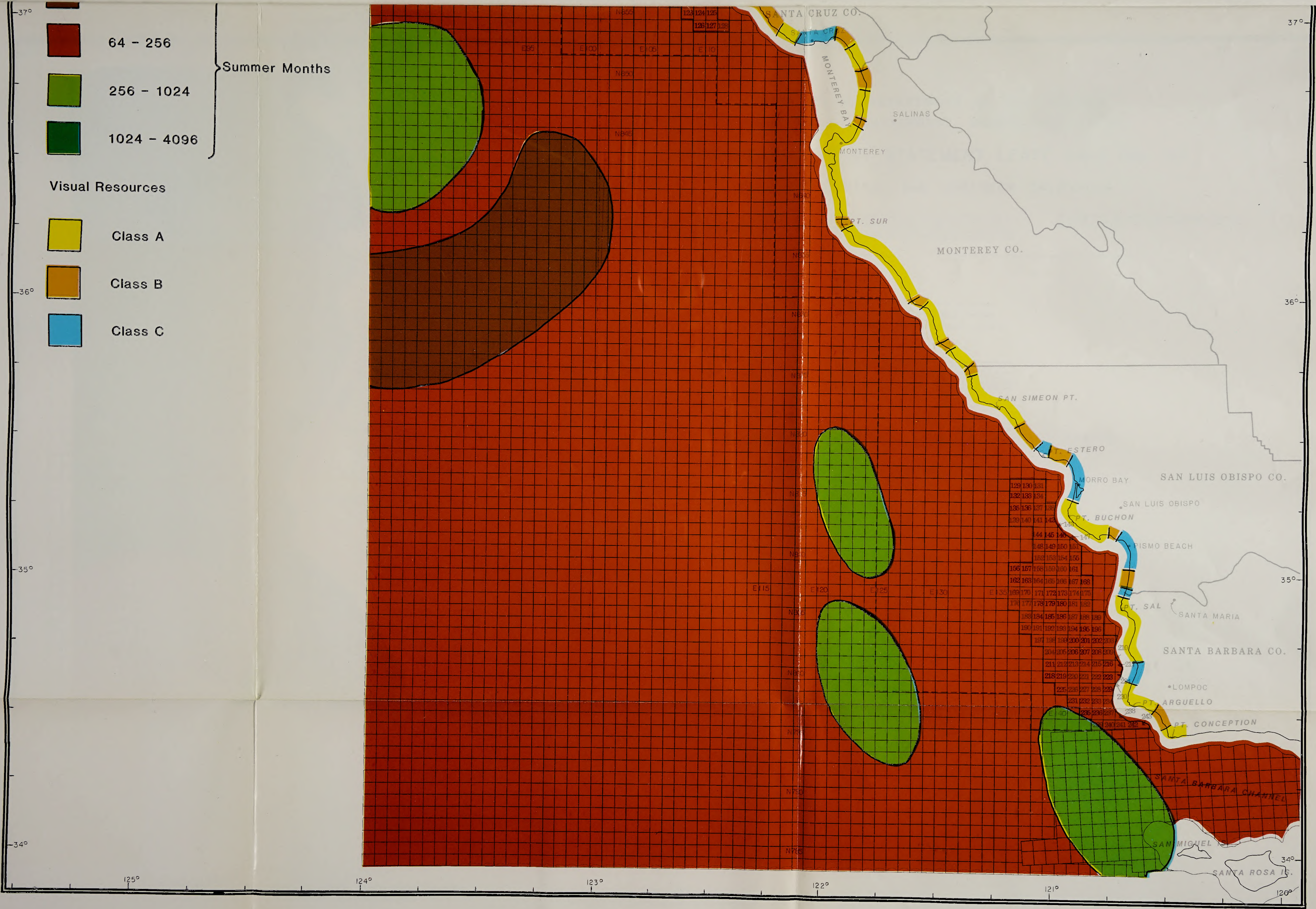
MARIN CO.

CONTRA COSTA CO.

ALAMEDA CO.

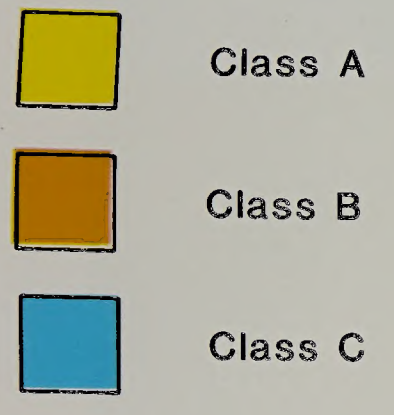
SANTA CLARA CO.

N965
060 070 071 072
073 074 075 076
077 078 079 080
N960
081 082 083 084
085 086 087 088
089 090 091 092
093 094 095
096 097 098 099
N955
100 101 102 103
104 105 106 107
108 109 110 111 112
114 115 116 117 118



Summer Months

Visual Resources



64 - 256

256 - 1024

1024 - 4096

Class A

Class B

Class C

37°
36°
35°
34°

37°
36°
35°
34°

125°

124°

123°

122°

121°

120°

SANTA CRUZ CO.
MONTEREY BAY
MONTEREY
SALINAS
PT. SUR
MONTEREY CO.
SAN SIMEON PT.
ESTERO
MORRO BAY
SAN LUIS OBISPO CO.
SAN LUIS OBISPO
PT. BUCHON
PISMO BEACH
PT. SAL
SANTA MARIA
SANTA BARBARA CO.
*LOMPOC
PT. ARGUELLO
PT. CONCEPTION
SANTA BARBARA CHANNEL
SAN MIGUEL
SANTA ROSA IS.

128	130	131
132	133	134
136	136	137
139	140	141
144	145	146
148	149	150
152	153	154
156	157	158
162	163	164
168	170	171
172	173	174
178	179	180
184	185	186
190	191	192
198	199	200
204	205	206
211	212	213
218	219	220
225	226	227
231	232	233
238	239	240
245	246	247
252	253	254

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 ENVIRONMENTAL IMPACT STATEMENT LEASE SALE NO. 53
 OFFSHORE CENTRAL AND NORTHERN CALIFORNIA

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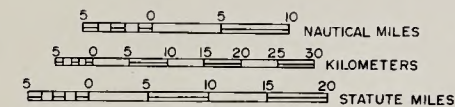
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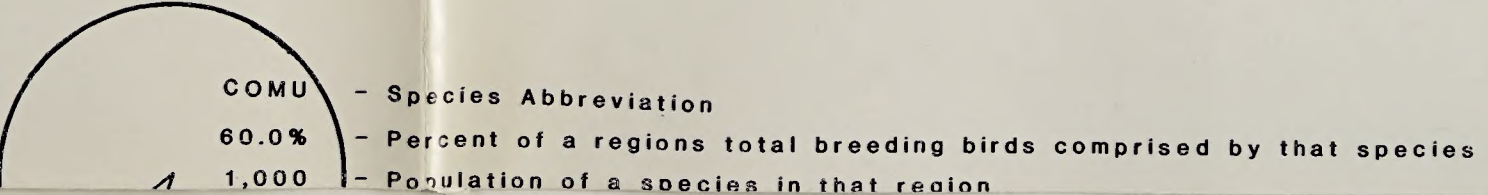
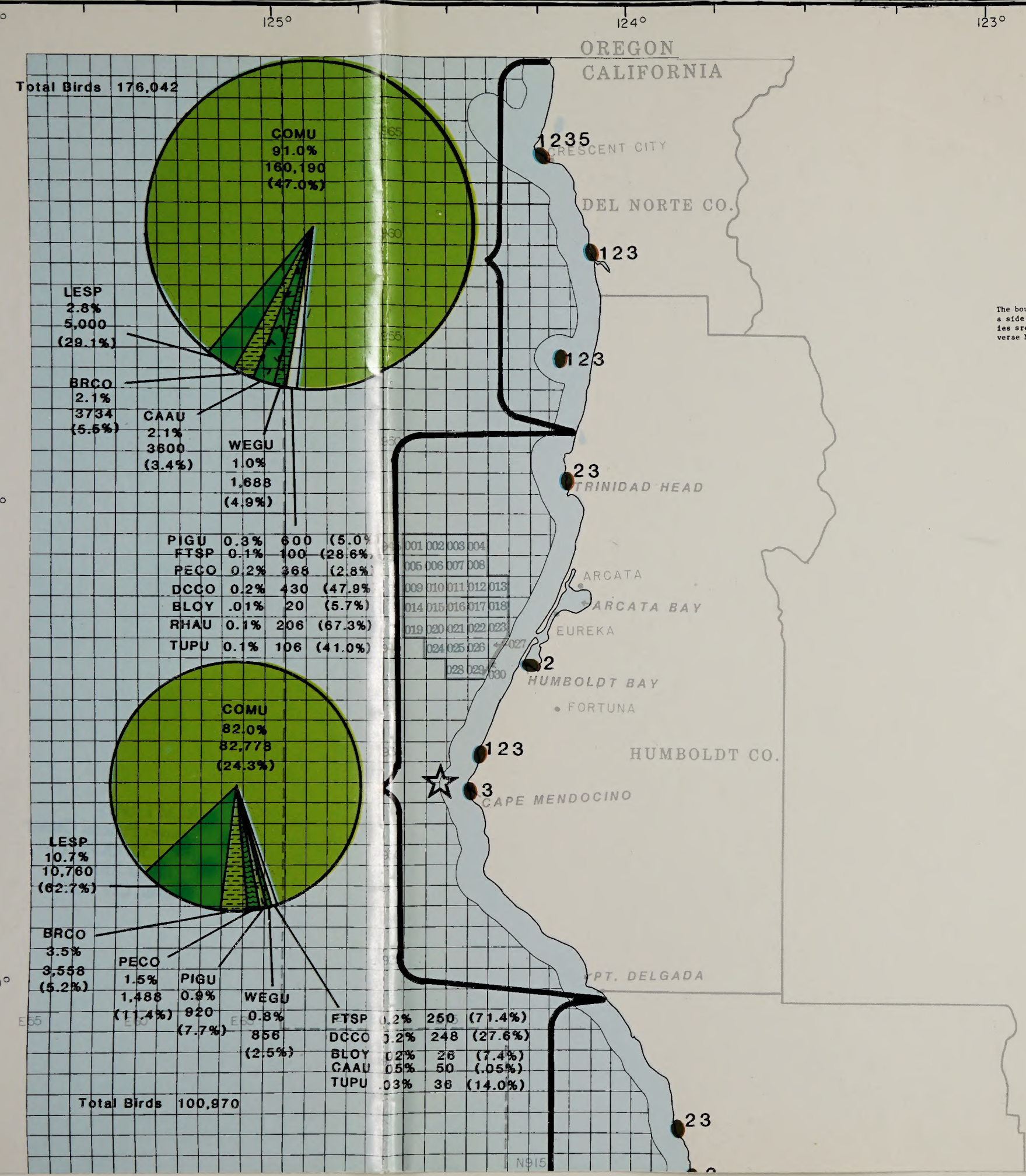
PREPARED: 11/24/78

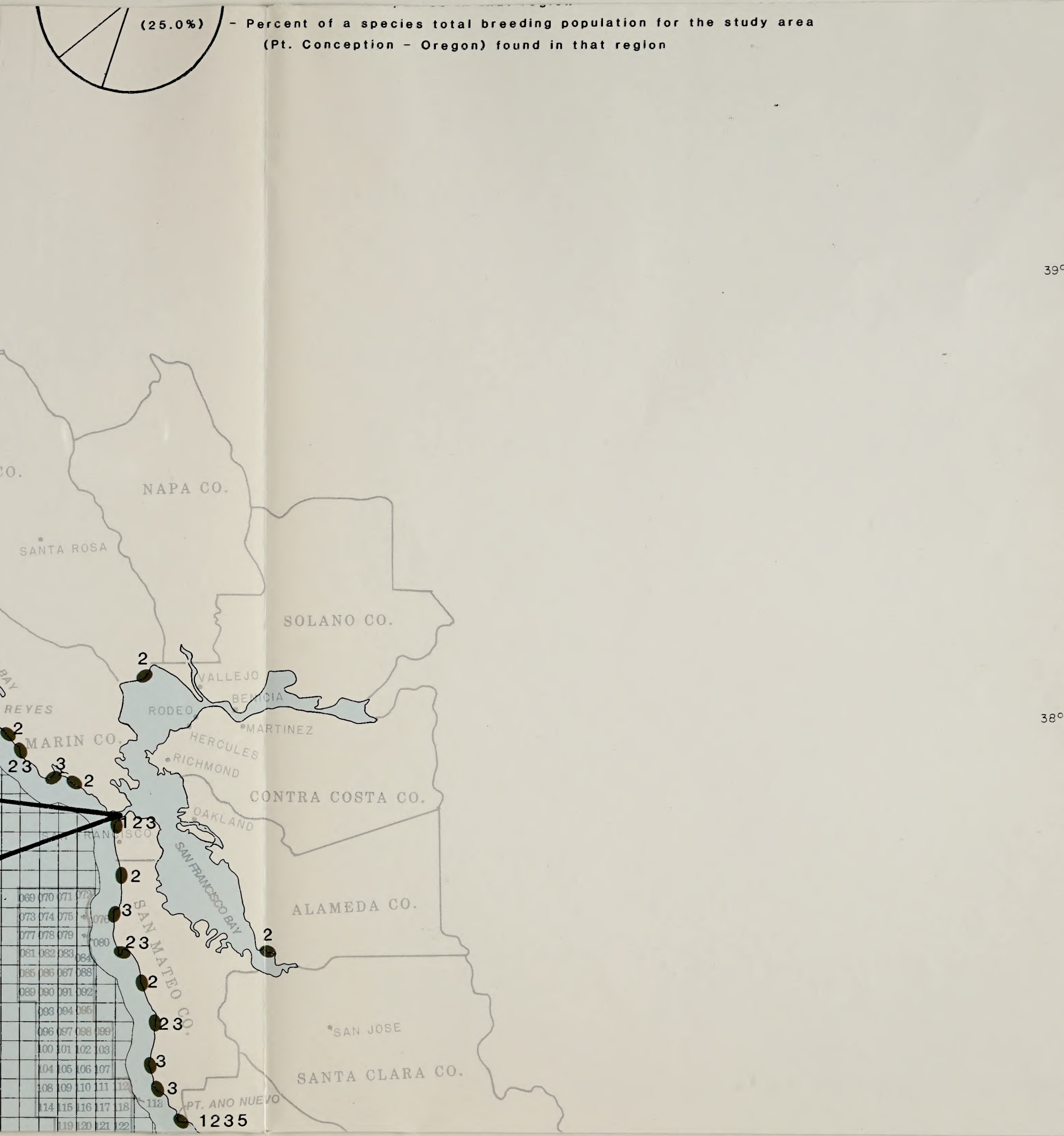
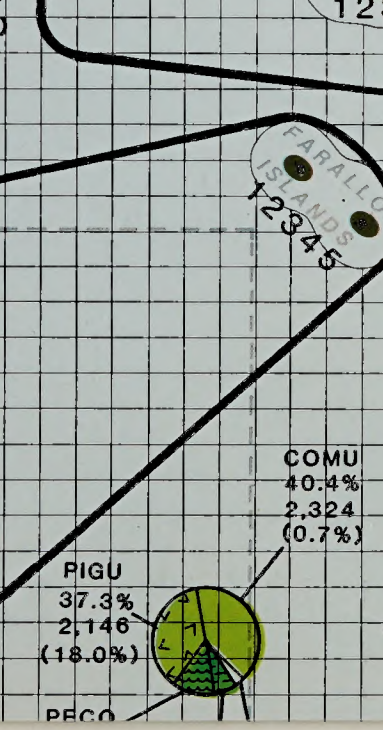
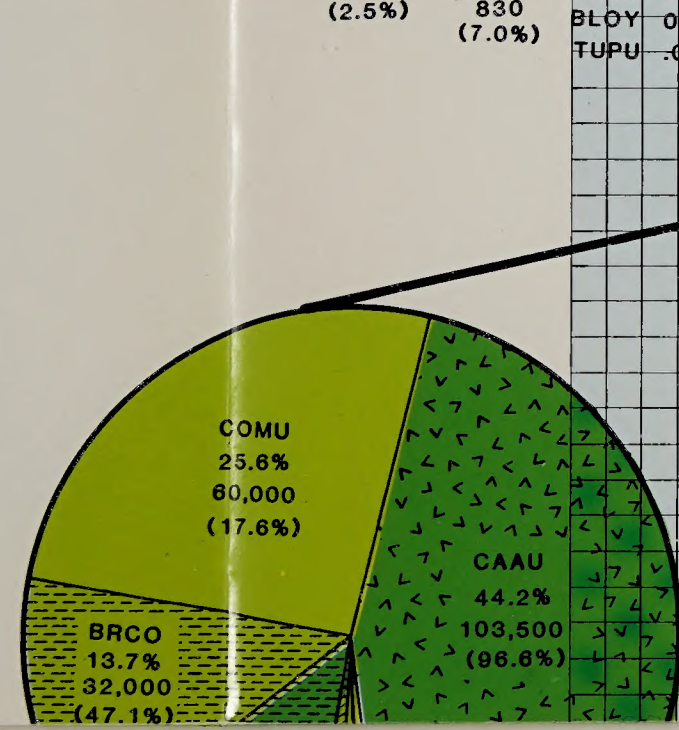
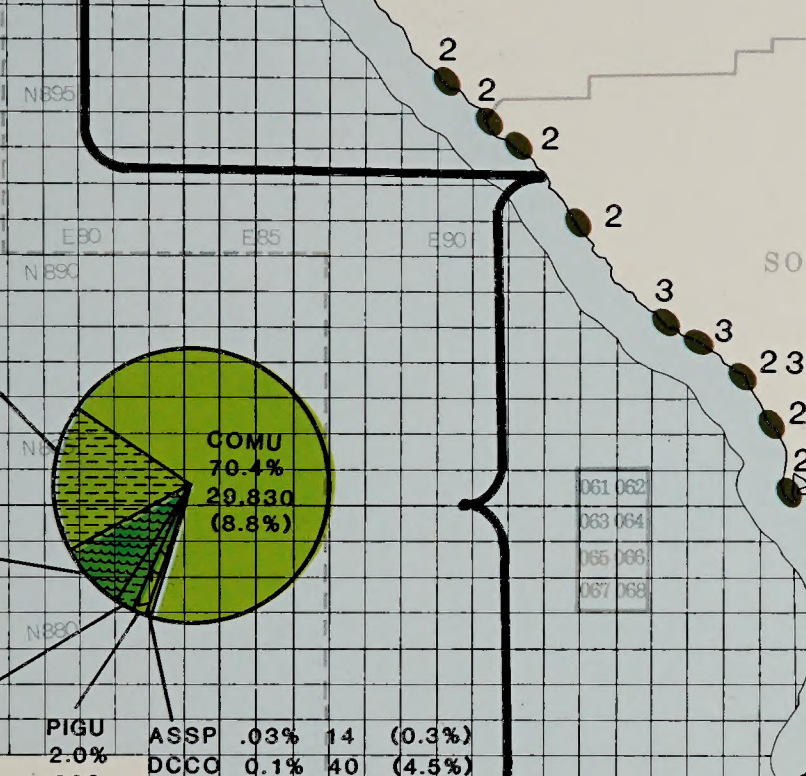
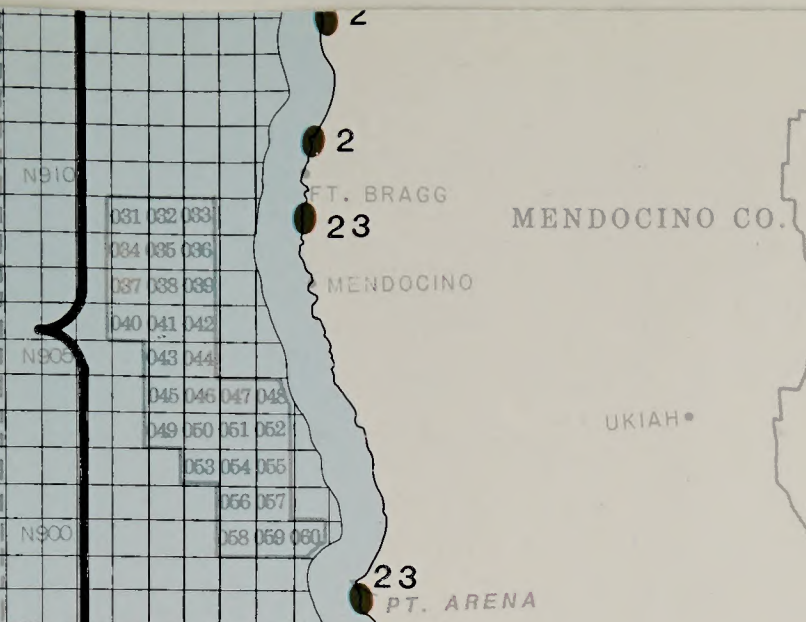
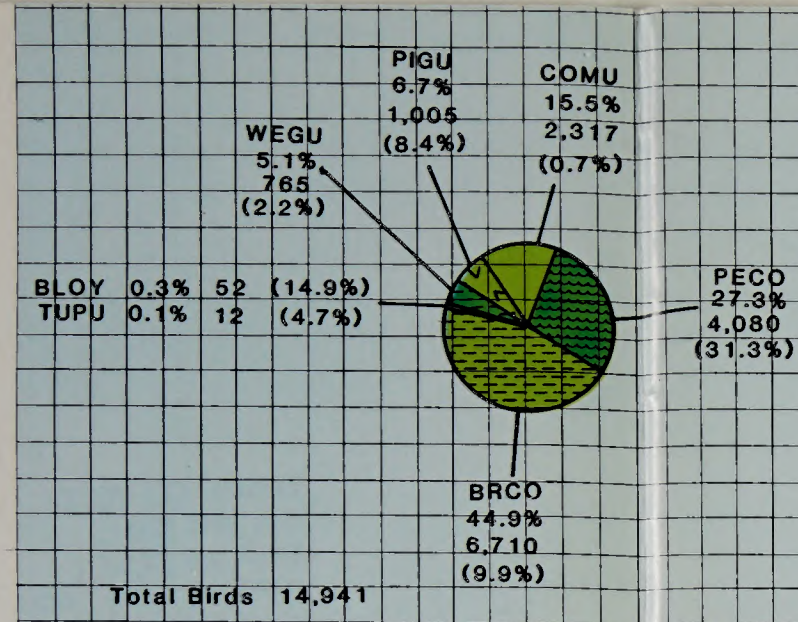


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MARINE BIRDS AND MAMMALS














Visual No. 7








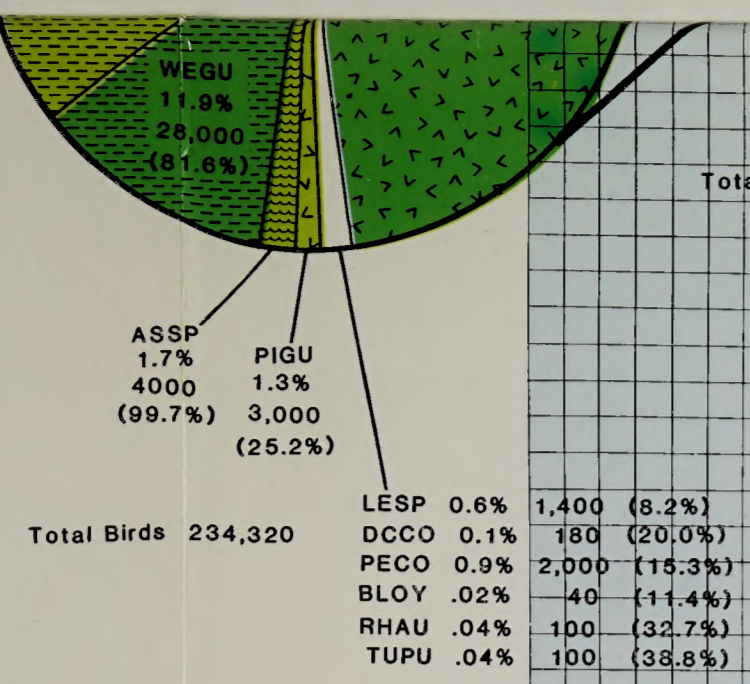
LEGEND

MARINE BIRDS

-  ASSP - Ashy Storm Petrel
-  BLOY - Black Oystercatcher
-  BRCO - Brandt's Cormorant
-  CAAU - Cassin's Auklet
-  COMU - Common Murre
-  DCCO - Double-crested Cormorant
-  FTSP - Fork-tailed Storm Petrel
-  LESP - Leach's Storm Petrel
-  PECO - Pelagic Cormorant
-  PIGU - Pigeon Guillemot
-  RHAU - Rhinoceros Auklet
-  TUPU - Tufted Puffin
-  WEGU - Western Gull

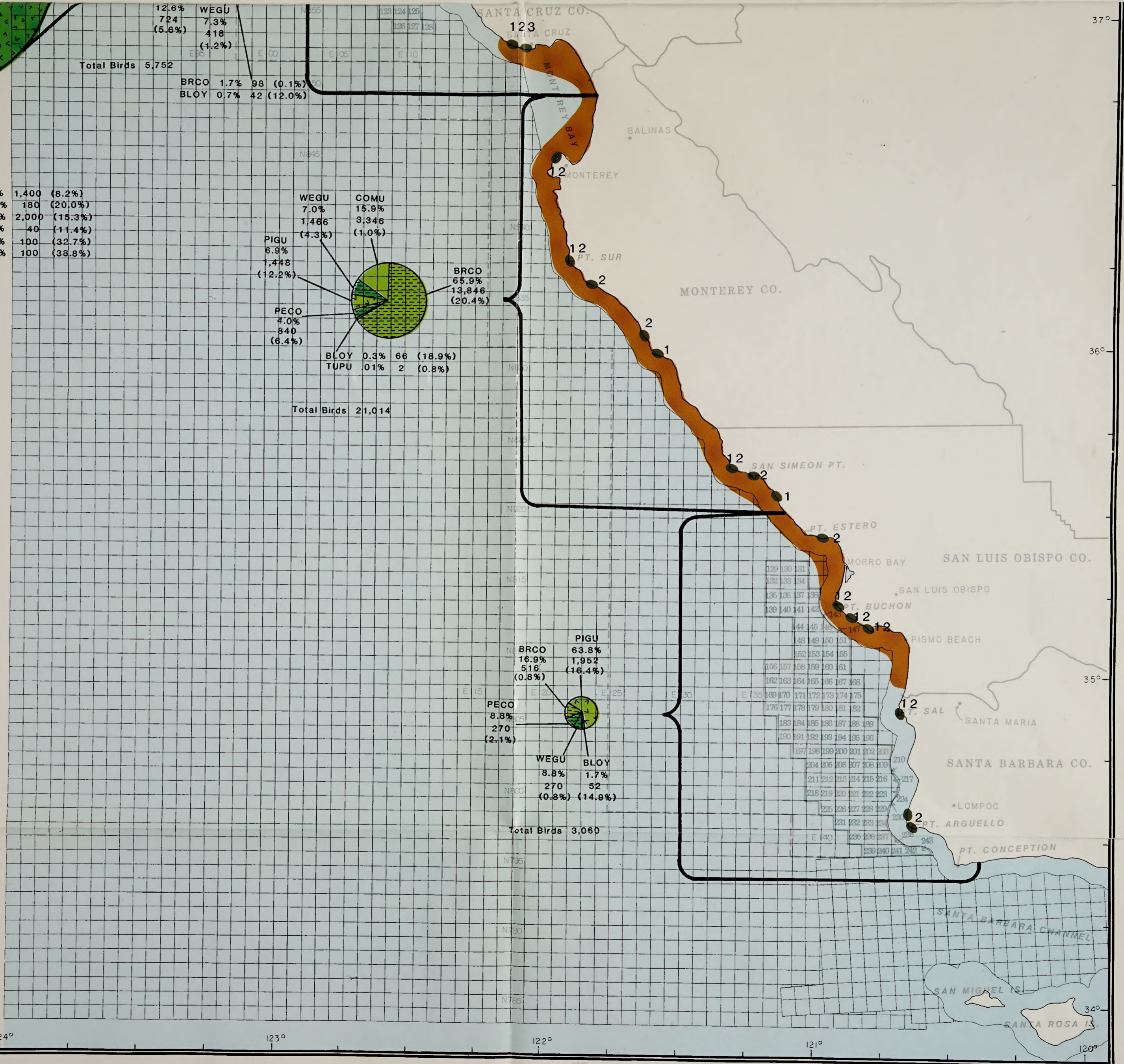
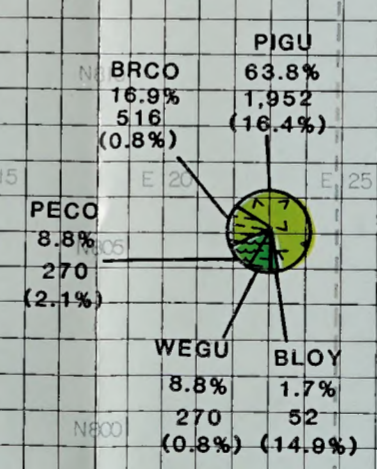
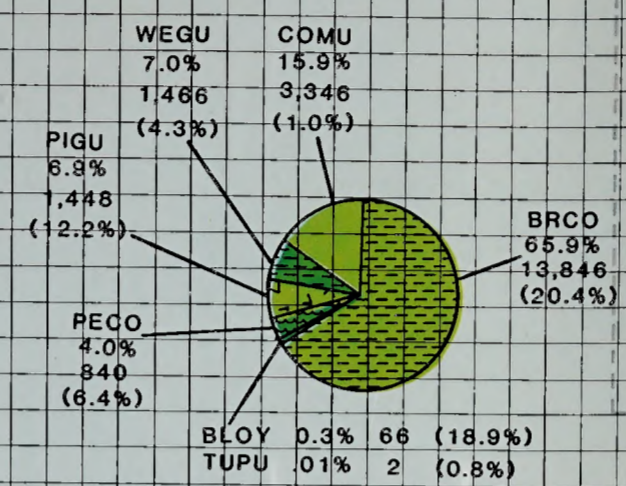
MARINE MAMMALS

-  Sea Otter Range
-  Pinniped Haul-out &/or Breeding Area
- 1 California Sea Lion
- 2 Harbor Seal
- 3 Steller Sea Lion
- 4 Northern Fur Seal
- 5 Northern Elephant Seal
-  Sea Otter Sighting



12.6% WEGU
724 (5.6%)
7.3% 418 (1.2%)
BRCO 1.7% 98 (0.1%)
BLOY 0.7% 42 (12.0%)

Total Birds 5,752



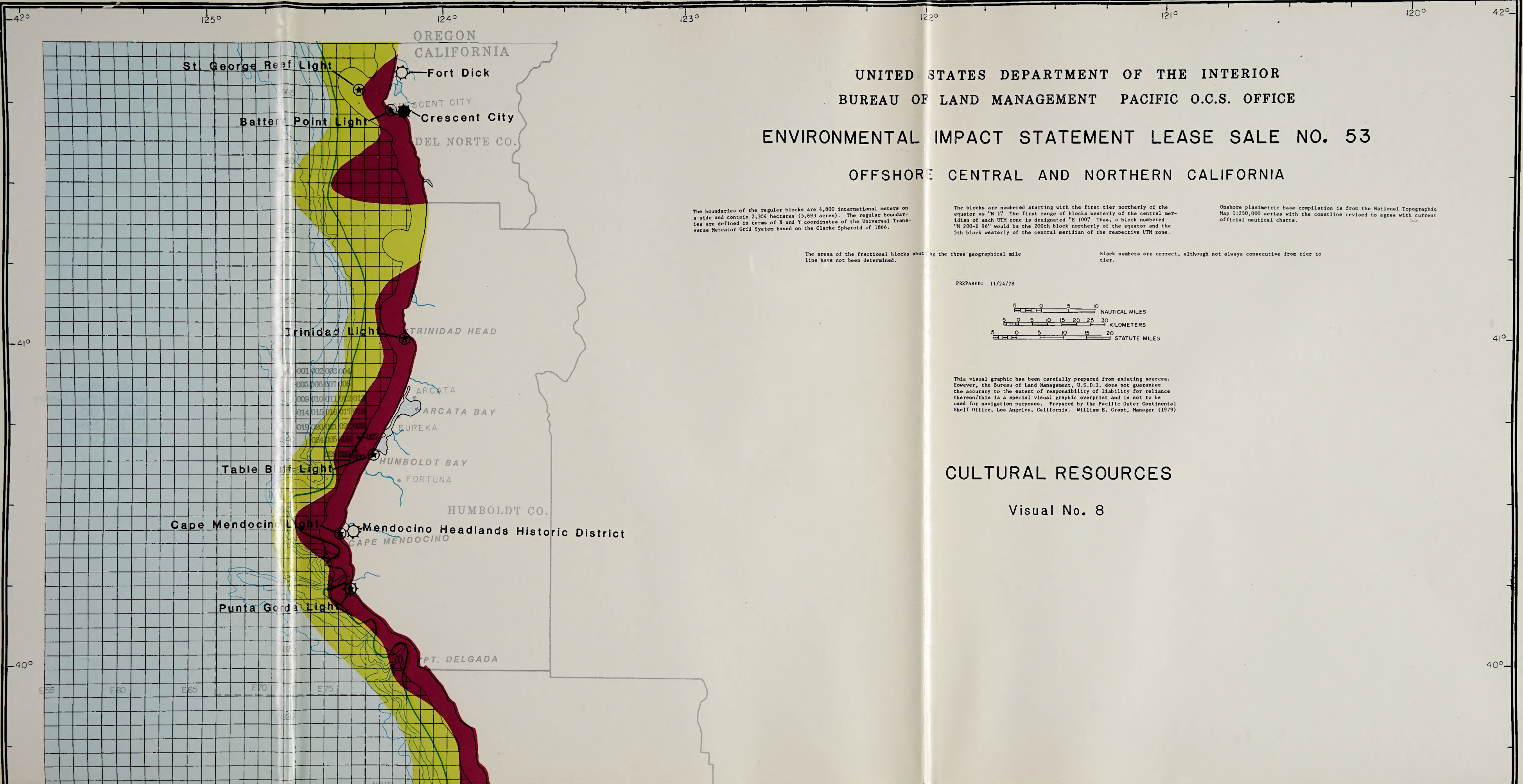
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BUREAU OF LAND MANAGEMENT
RANGING DISTRICT OF DENVER
GENERAL AND SURVEY SECTION
STATEMENT OF WORK
FOR
LAND ACQUISITION
PROJECT
NO. 88-072801

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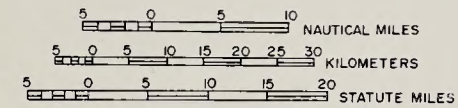
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CULTURAL RESOURCES

Visual No. 8

39°

38°

39°

38°

Point Cabrillo Light

N910
 031 032 033
 034 036 038
 037 038 039
 040 041 042
 N905
 043 044
 045 046 047 048
 049 050 051 052
 053 054 055
 056 057
 N900
 058 059 060

Point Arena Light

N895
 E80 E85 E90
 N890
 N885
 N880

FT. BRAGG
 MENDOCINO
 Mendocino
 UKIAH

PT. ARENA
 Fort Ross
 SONOMA CO.
 Duncan's Landing Site

061 062
 063 064
 065 066
 067 068

Point Reyes Light

Farallon Islands
 Farallon Islands Light

Point Montara Light

N875
 N870
 N865
 N860

Pidgeon Point Light

MENDOCINO CO.
 SONOMA CO.
 NAPA CO.
 SOLANO CO.
 CONTRA COSTA CO.
 ALAMEDA CO.
 SANTA CLARA CO.

SANTA ROSA
 VALLEJO
 BENICIA
 MARTINEZ
 HERCULES
 OAKLAND
 YERBA BUENA
 SAN BRUNO
 BURLINGAME
 HILLSBOROUGH
 MENLO PARK
 SAN JOSE
 PT. ANO NUEVO

TOMALES BAY
 PT. REYES
 East Brother
 Lime Point
 San Rafael
 Alcatraz
 Angel Island

San Francisco
 Fort Point

Half Moon Bay

Schreiber Boathouse And Beach

Point Bonita

San Francisco

San Bruno

Burlingame

Hillsborough

Menlo Park

Half Moon Bay

PT. ANO NUEVO

LEGEND

- Shipwrecks Zone 1
- Shipwrecks Zone 2
- Potentially Sensitive for Aboriginal Remains (Depth 150m. or less)
- ★ Historic Lighthouse
- ★ Historic Lighthouse (National Register Historic Site)
- ★ Historic Lighthouse (California Historic Site)
- ★ Historic Lighthouse (National & California Historic Site)
- ★ National Register Historic Site
- ★ Multiple Historic Sites

Zone 1 : Recorded Shipwrecks Within 10 Nautical Miles

Zone 2 : Cluster of at Least Three(3) Shipwrecks Within 5 Nautical Miles or Single Shipwreck Within 1 Nautical Mile

Prehistoric Sites Omitted For Protection

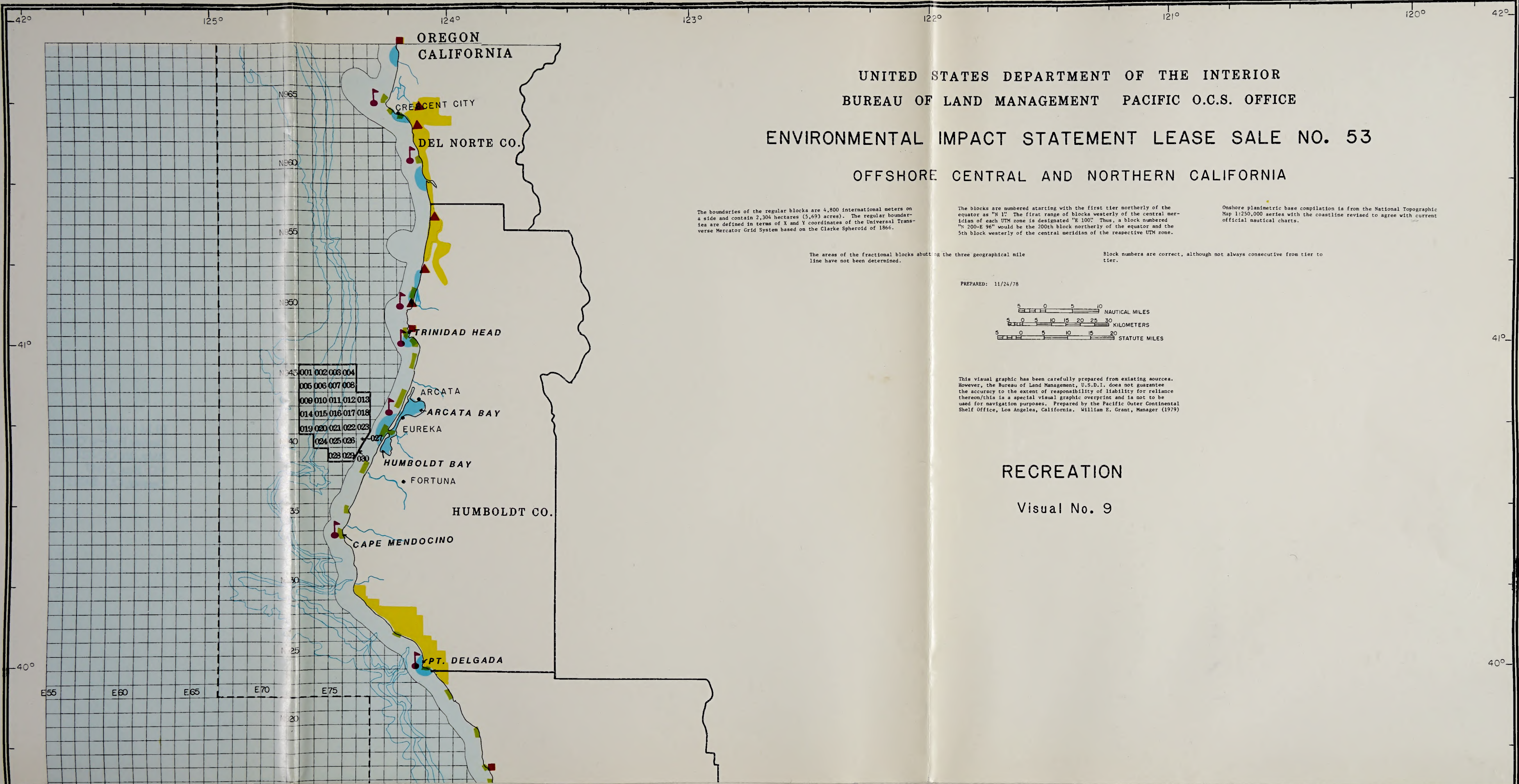


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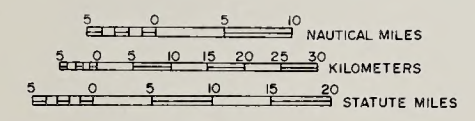
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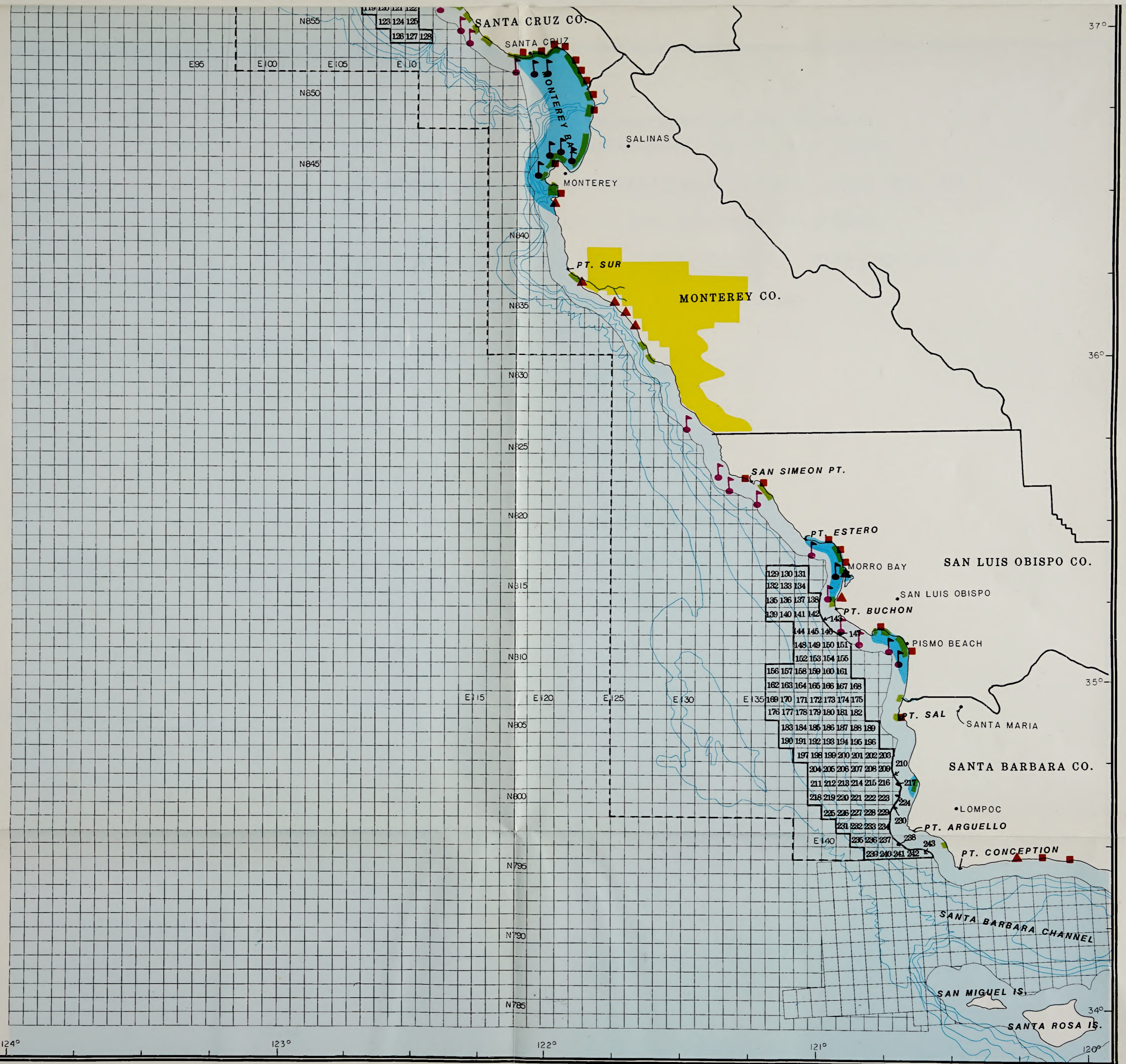
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RECREATION
 Visual No. 9



LEGEND

-  Areas of Boating Concentration
-  Diving Areas
-  Surfing Areas
-  Federal Recreational Areas
-  State Beaches
-  State Parks

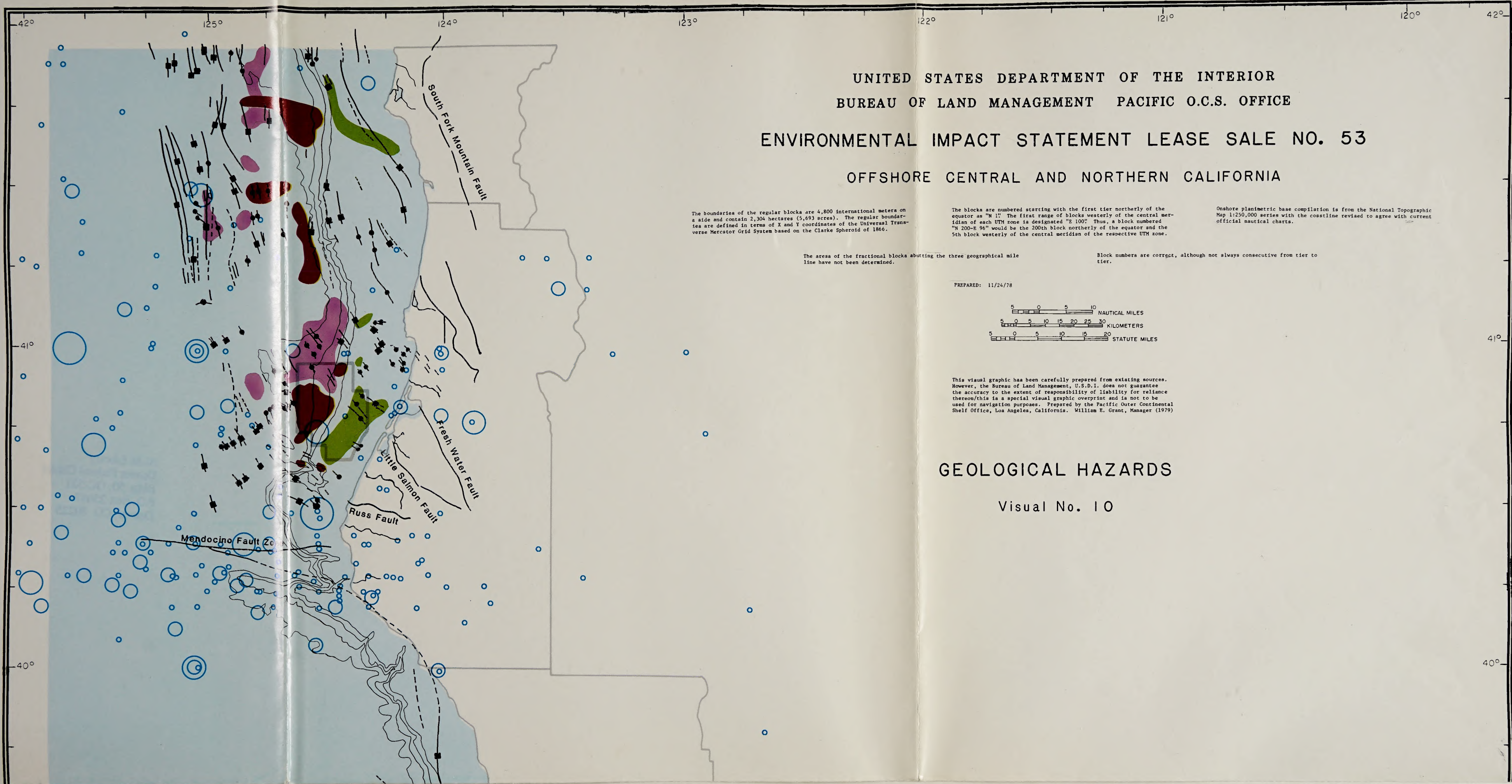


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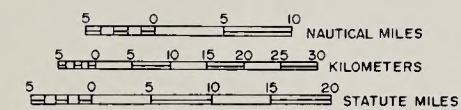
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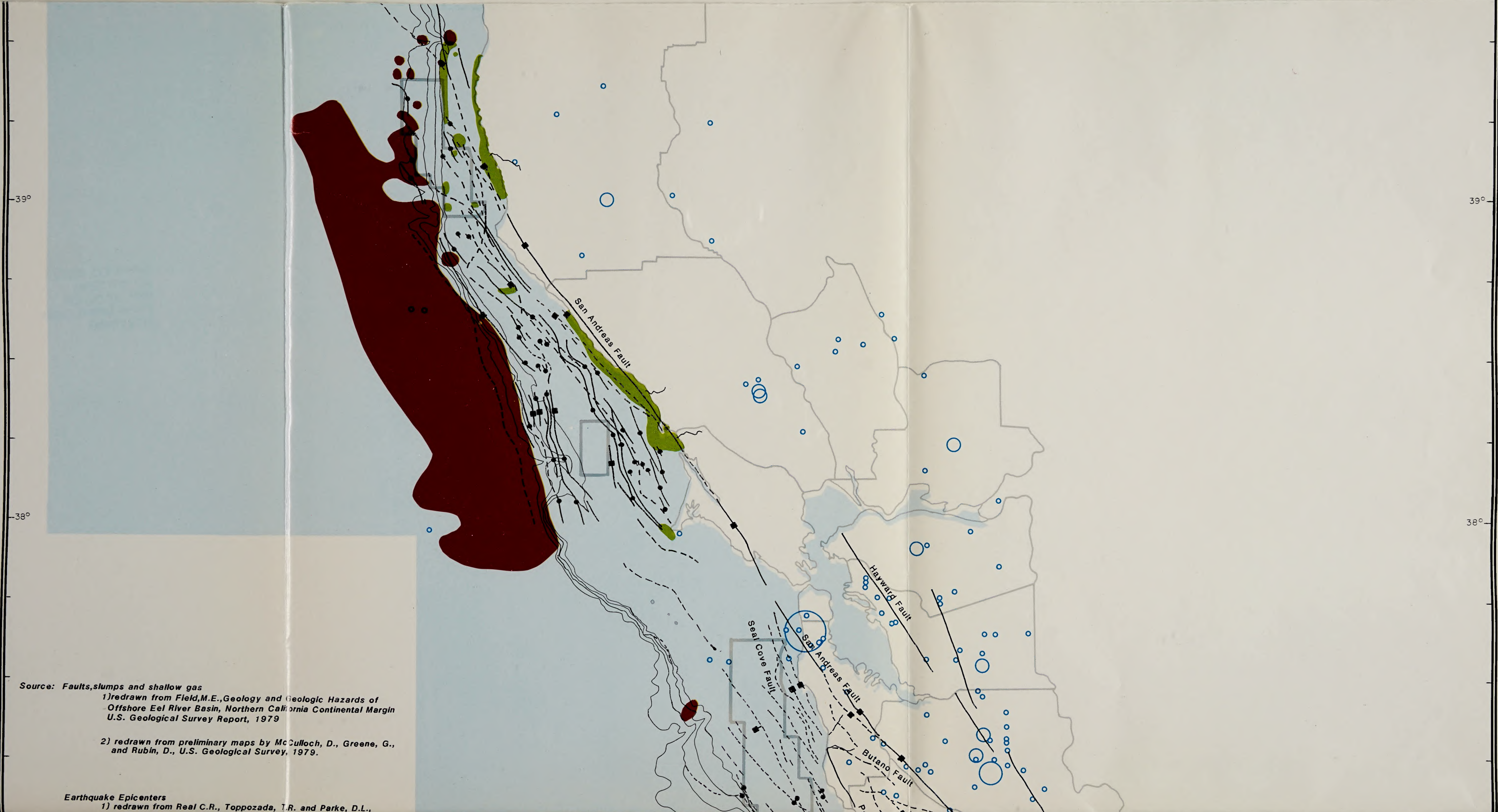
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GEOLOGICAL HAZARDS

Visual No. 10



Source: *Faults, slumps and shallow gas*
1) redrawn from Field, M.E., *Geology and Geologic Hazards of Offshore Eel River Basin, Northern California Continental Margin* U.S. Geological Survey Report, 1979
2) redrawn from preliminary maps by McCulloch, D., Greene, G., and Rubin, D., U.S. Geological Survey, 1979.

Earthquake Epicenters
1) redrawn from Reel C.R., Topozada, T.R. and Parke, D.L.,

LEGEND

---■--- Shallow Faulting (Cuts Pleistocene or Holocene Strata)

---●--- Intermediate Depth Faulting (Pre-Quaternary in Age)

---●--- Deep Older Faulting (Tertiary in Age or Age Cannot be Determined)

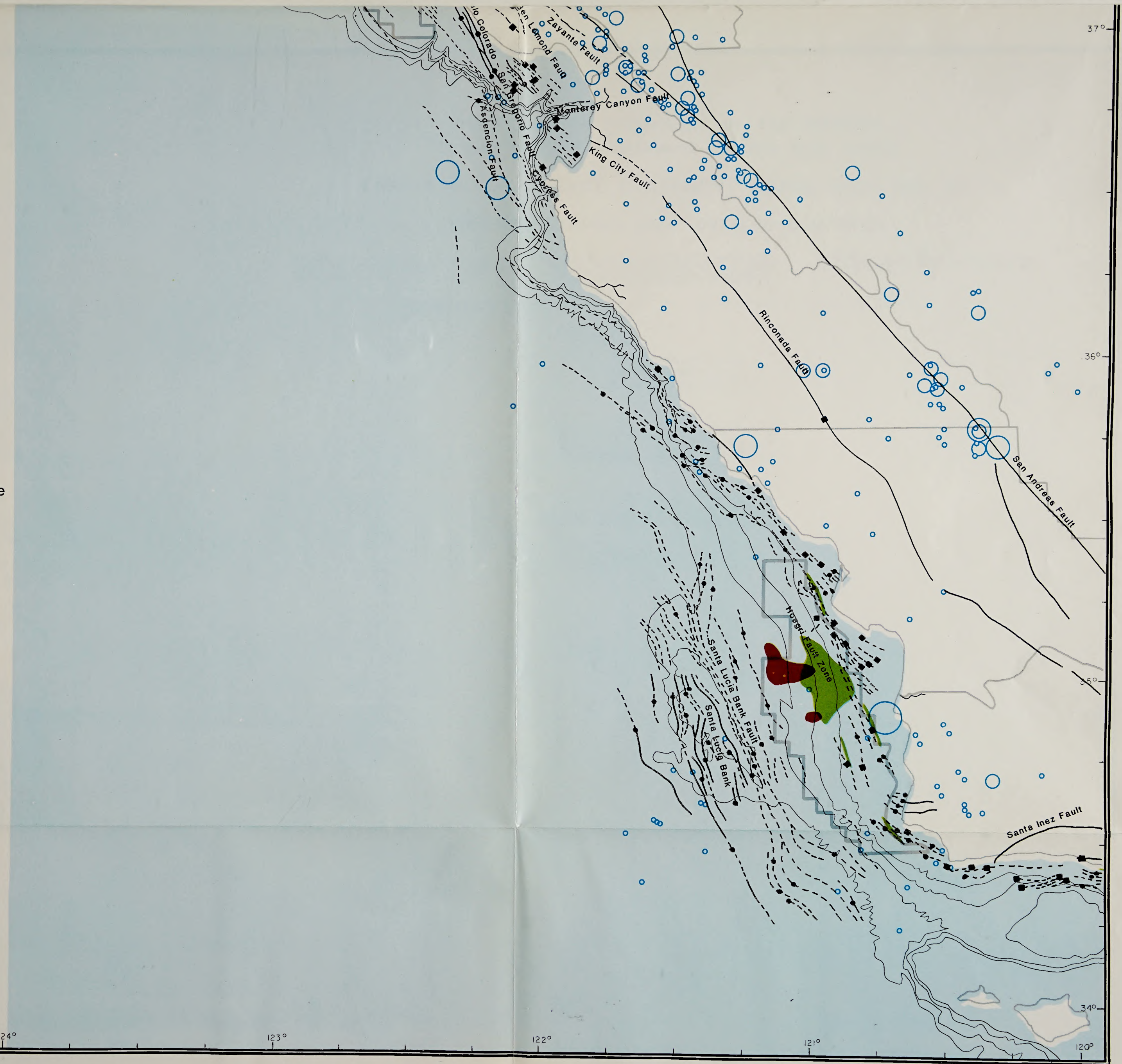
■ Slump

■ Potential Slump

■ Shallow Gas

Earthquake Epicenters of Known Intensity (Richter Scale) 1900-1974

- 4.0 - 4.9
- 5.0 - 5.9
- 6.0 - 6.9
- 7.0 - 7.9
- 8.0 or Greater



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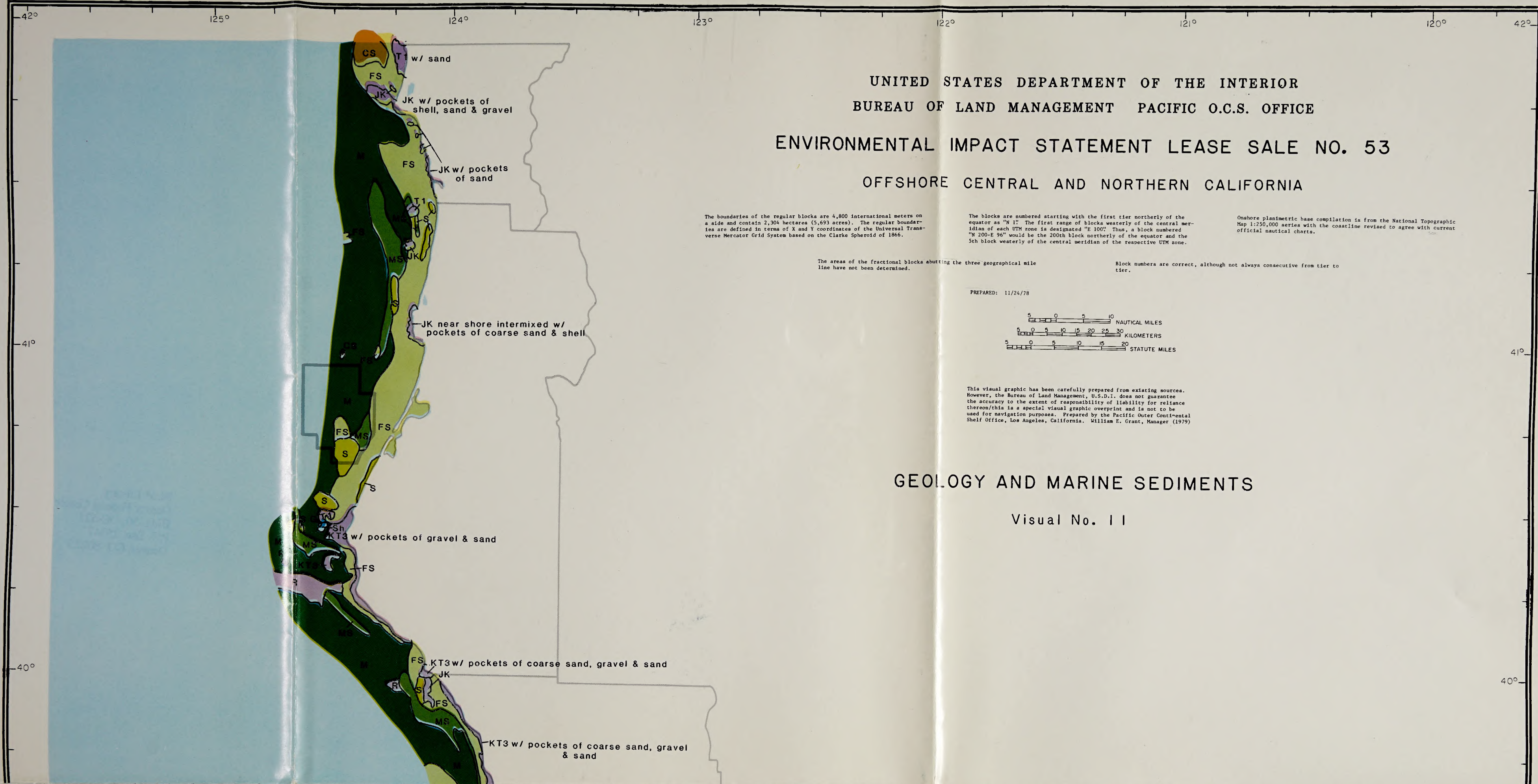
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FOR THE
IMPACT STATEMENT LEASE SALE NO. 10
CENTRAL AND NORTHWEST DISTRICTS

STATEMENT OF WORK

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The boundaries of the regular blocks are 4,800 international meters on a side and contain 2,304 hectares (5,693 acres). The regular boundaries are defined in terms of X and Y coordinates of the Universal Transverse Mercator Grid System based on the Clarke Spheroid of 1866.

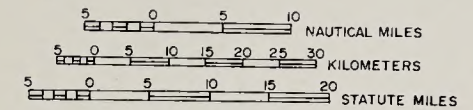
The blocks are numbered starting with the first tier northerly of the equator as "N 1". The first range of blocks westerly of the central meridian of each UTM zone is designated "E 100". Thus, a block numbered "N 200-E 96" would be the 200th block northerly of the equator and the 5th block westerly of the central meridian of the respective UTM zone.

Onshore planimetric base compilation is from the National Topographic Map 1:250,000 series with the coastline revised to agree with current official nautical charts.

The areas of the fractional blocks abutting the three geographical mile line have not been determined.

Block numbers are correct, although not always consecutive from tier to tier.

PREPARED: 11/24/78



This visual graphic has been carefully prepared from existing sources. However, the Bureau of Land Management, U.S.D.I. does not guarantee the accuracy to the extent of responsibility of liability for reliance thereon; this is a special visual graphic overprint and is not to be used for navigation purposes. Prepared by the Pacific Outer Continental Shelf Office, Los Angeles, California. William E. Grant, Manager (1979)

GEOLOGY AND MARINE SEDIMENTS

Visual No. 11

39°

38°

39°

38°

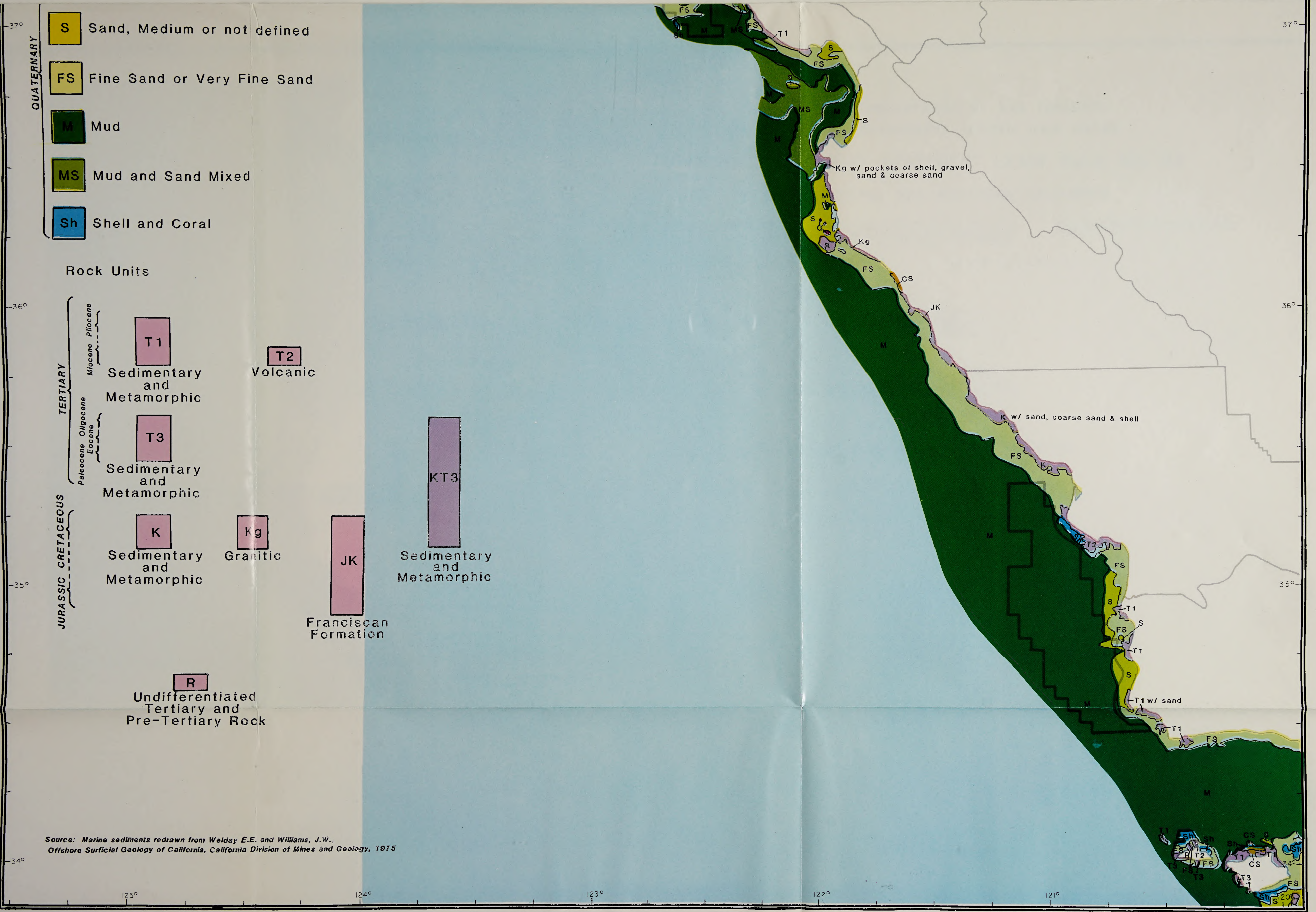
LEGEND

Unconsolidated Sediments

G Gravel

CS Coarse Sand





Kg w/ pockets of shell, gravel, sand & coarse sand

K w/ sand, coarse sand & shell

T1 w/ sand

125° 124° 123° 122° 121°

37° 36° 35° 34°

37° 36° 35° 34°

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