UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUPPLEMENT TO OFR 80-198 (LEASE SALE 68)

FOR OCS LEASE SALE 80

OFFSHORE SOUTHERN CALIFORNIA

compiled by

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with

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards.

Contents

SUMMARY

This report is a supplement to OFR 80-198 which was entitled "A summary report of the regional geology, petroleum potential, environmental geology, and operational considerations in the area of proposed Lease Sale 68, offshore southern California." That report summarized and detailed the regional geologic framework, petroleum geology, environmental hazards, and technological considerations pertinent to the OCS Lease Sale 68 area. Following the distribution of OFR 80-198, the geologic framework and oil and gas potential of part of the southern California borderland south of latitude 32°N along the maritime boundary region with Mexico was summarized in OFR 81-264 (Powers, 1981).

This supplement is a compilation of new data and significant new findings pertinent to proposed OCS Lease Sale 80 since OFR 80-198 (Vedder and others, 1980) was prepared in support of OCS Lease Sale 68. The proposed OCS Lease Sale 80 area encompasses the entire California Continental Borderland north of the May 4, 1978, United States-Mexico provisional treaty line and a small part of the borderland south of that line. It is bordered on the northeast by the three-mile limit of the State of California OCS, on the southeast by the United States-Mexico provisional treaty line, on the south and west by the planning area boundary line for Lease Sale 80 as defined by the Bureau of Land Management in January, 1982 (Fig. 1), and on the north by latitude 34.50°N (Fig. 2). Under consideration are approximately 91,400 km^2 (35,300 mi^2) of the borderland north and 570 km^2 (220 mi^2) south of the provisional treaty line, exclusive of lands within the three-mile limit of the mainland and island platforms. The area includes both leased and unleased tracts in water depths ranging from 100 m (330 ft.) to greater than 4,000 m (13,000 ft.) and

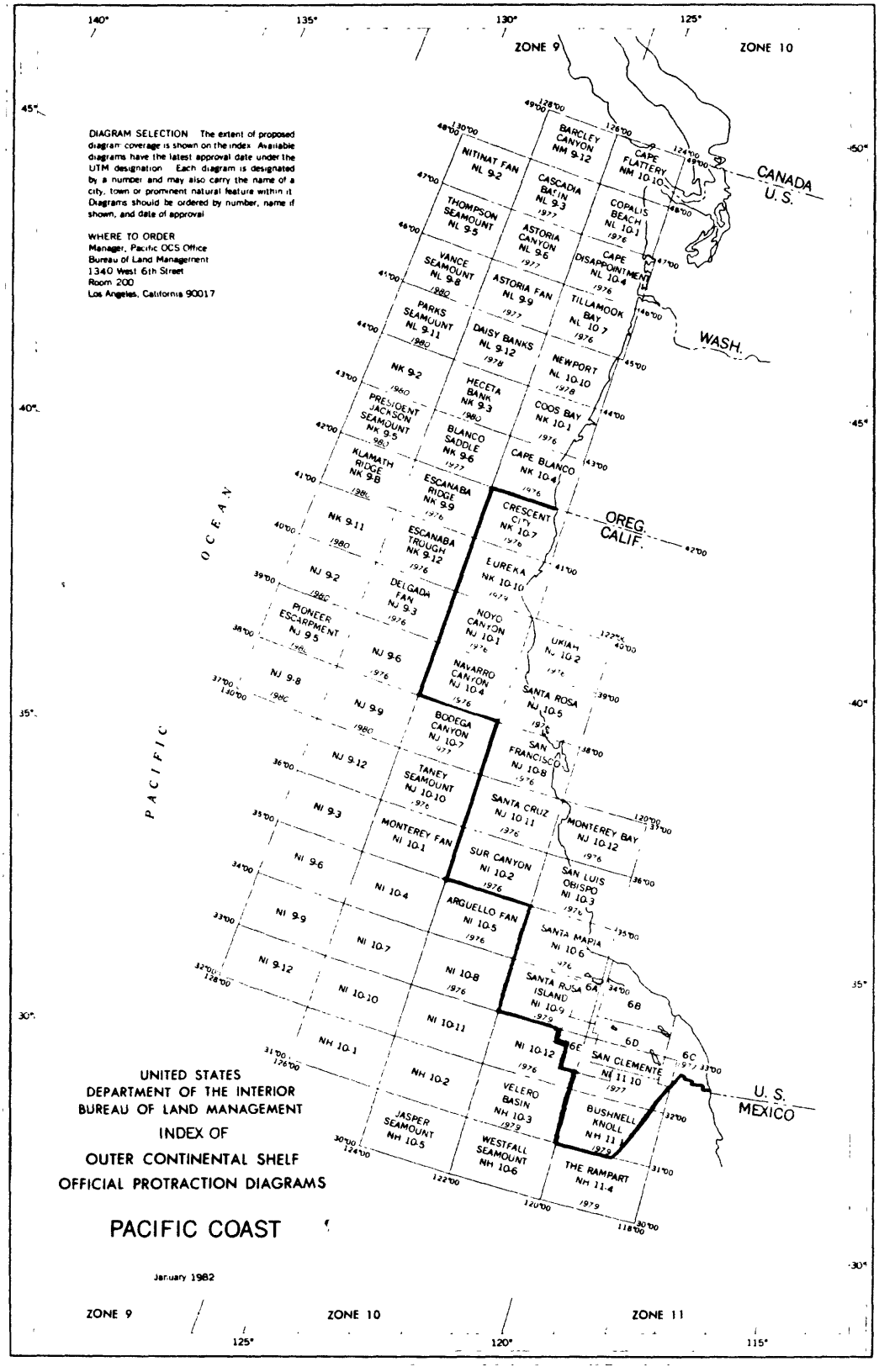


Figure 1. Index map showing planning area boundary for offshore California as of January, 1982.

is adjacent to the highly productive coastal basins of southern California. An index map showing physiographic features and simplified bathymetry of the region of proposed OCS Lease Sale 80 is shown is Figure 2. Target resource areas within the planning area, and tracklines for U.S. Geological Survey geophysical and rock sampling cruises since 1972 are shown in Figures 3-5.

Factors, such as thickness, burial depth and hydrocarbon content, that have contributed to petroleum generation in the onshore basins are less favorable in parts of the offshore region. Nevertheless, regional geologic and geophysical mapping together with data from stratigraphic test wells and bottom samples suggest that source beds, reservoir rocks and traps are present beneath the borderland. Strata of Miocene age are widespread within the area of proposed OCS Lease Sale 80 and contain fair to excellent potential source rocks. Eocene and early Miocene sandstone beds in a Cortes bank test well (Paul and others, 1976) and late Miocene and Pliocene rocks in a Point Conception test well (Cook, 1979) have porosities that are within the range of good reservoir rocks. Late middle Miocene through Pliocene sandy turbidites of reservoir quality possibly occur in some outer borderland basins.

Recently acquired multichannel seismic-reflection profiles on the California Continental Borderland south of latitude 32.50°N show that three little known basins are underlain by sedimentary rocks that may be 5,000 m or more thick. These three basins are West Cortes, East Cortes and Velero basins (Fig. 2), all of which are in water depths greater than 1,250 m. Comparable basins in the relatively well explored northern part of the borderland are San Nicolas and Santa Cruz basins, where Upper Cretaceous to Holocene sedimentary sequences are estimated to be 4,500 to 6,000 m thick. In the Velero Basin, the largest of the southern group of basins, pinchouts in the Tertiary section

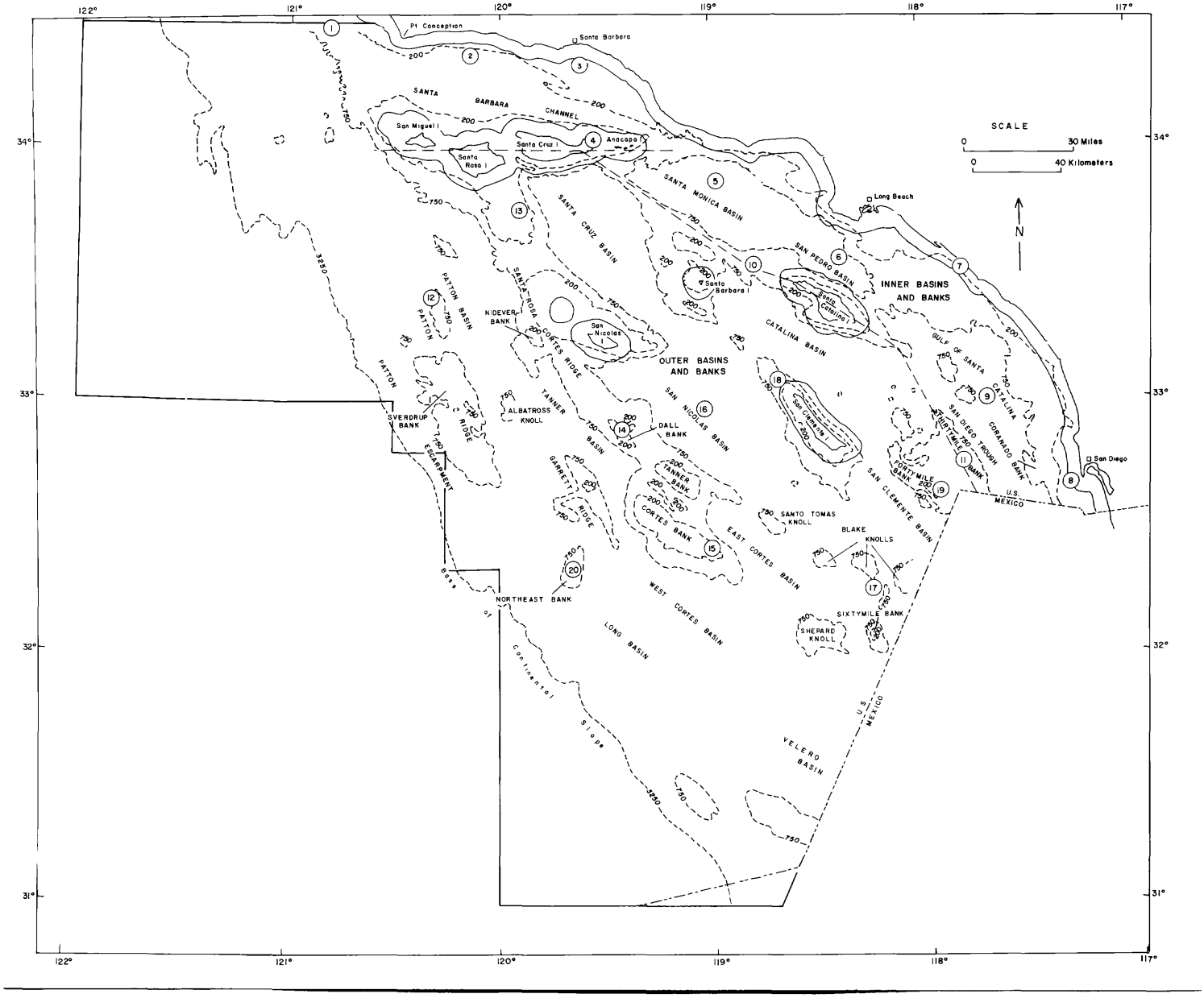


Figure 2. Map of physiographic features and simplified bathymetry in the region of proposed OCS Lease Sale 80. The three-mile limit is shown by a thin solid line along the mainland coast and around the island platforms. The 200 meter and 750 meter isobaths are indicated by short-dashed curved lines. The planning area boundary is depicted by the heavy solid line and the United States-Mexico provisional treaty line. Numbered circles refer to stratigraphic columns presented in OFR 80-198 (Vedder and others, 1980).

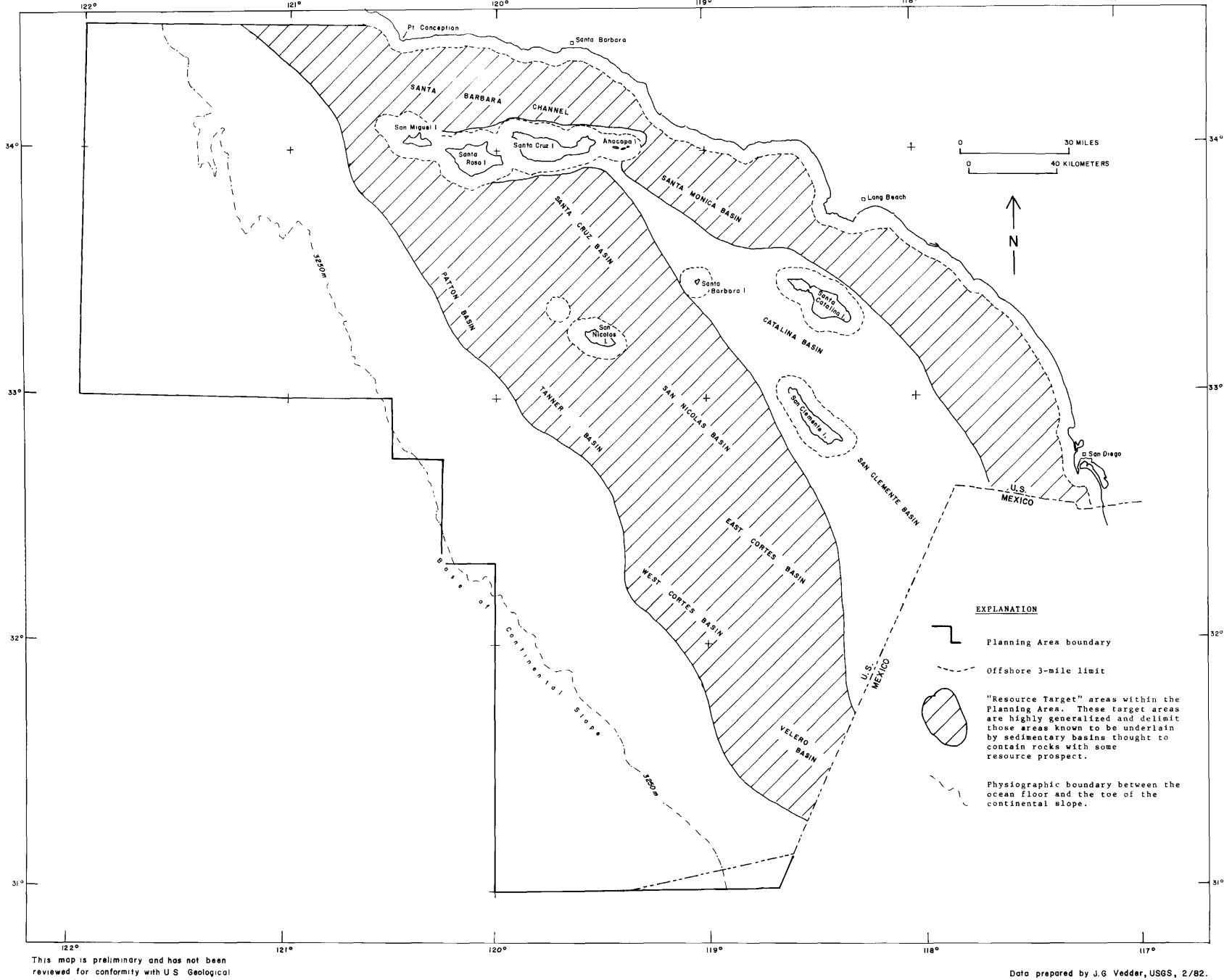


Figure 3. Map of resource target areas within the planning area. The boundary of the planning area is indicated by the heavy solid line and the United States-Mexico provisional treaty line.

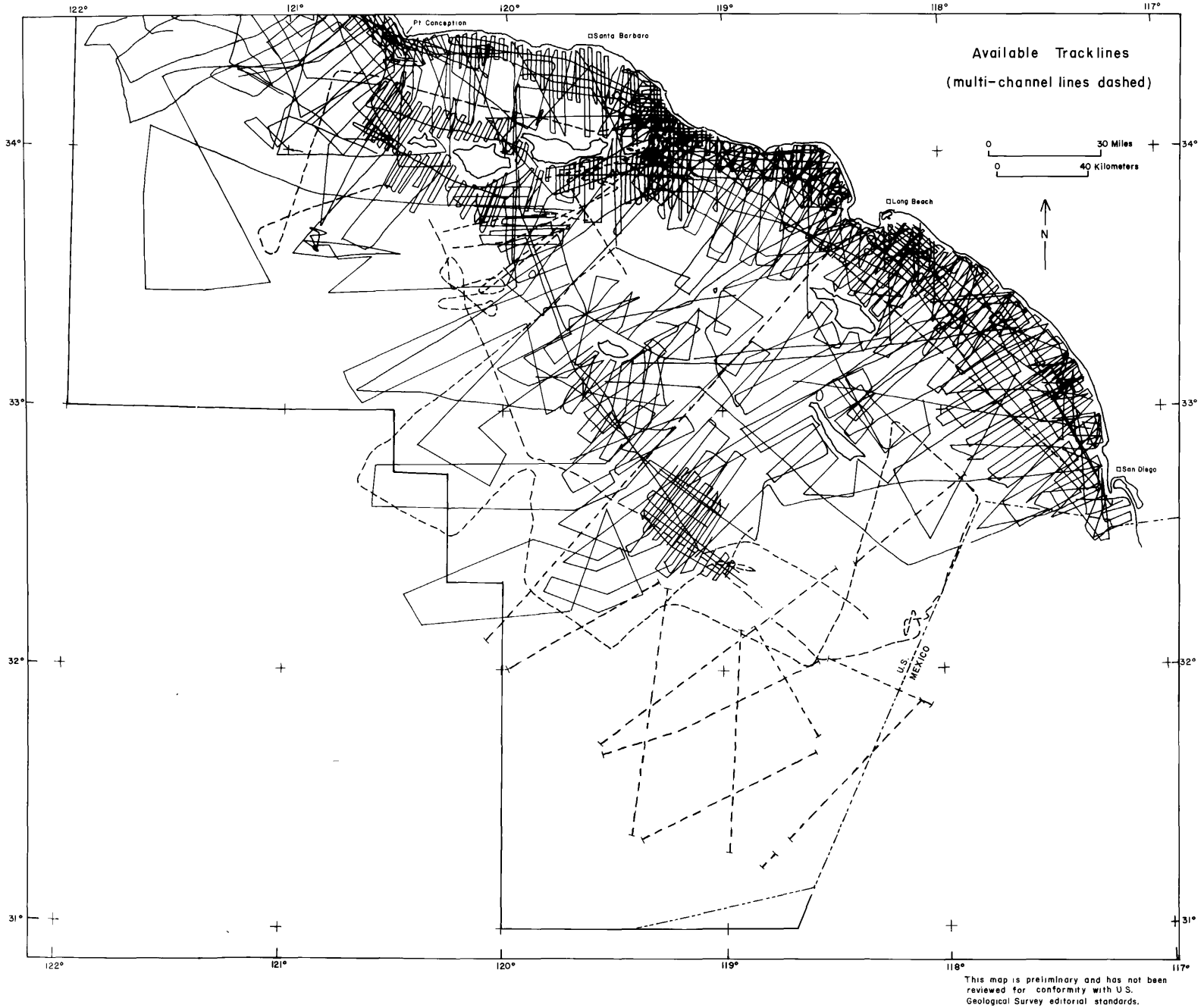


Figure 4. Ship tracklines along which nonproprietary geophysical data have been collected north of latitude 31.2°N. The planning area boundary is depicted by the heavy solid line and the United States-Mexico provisional treaty line.

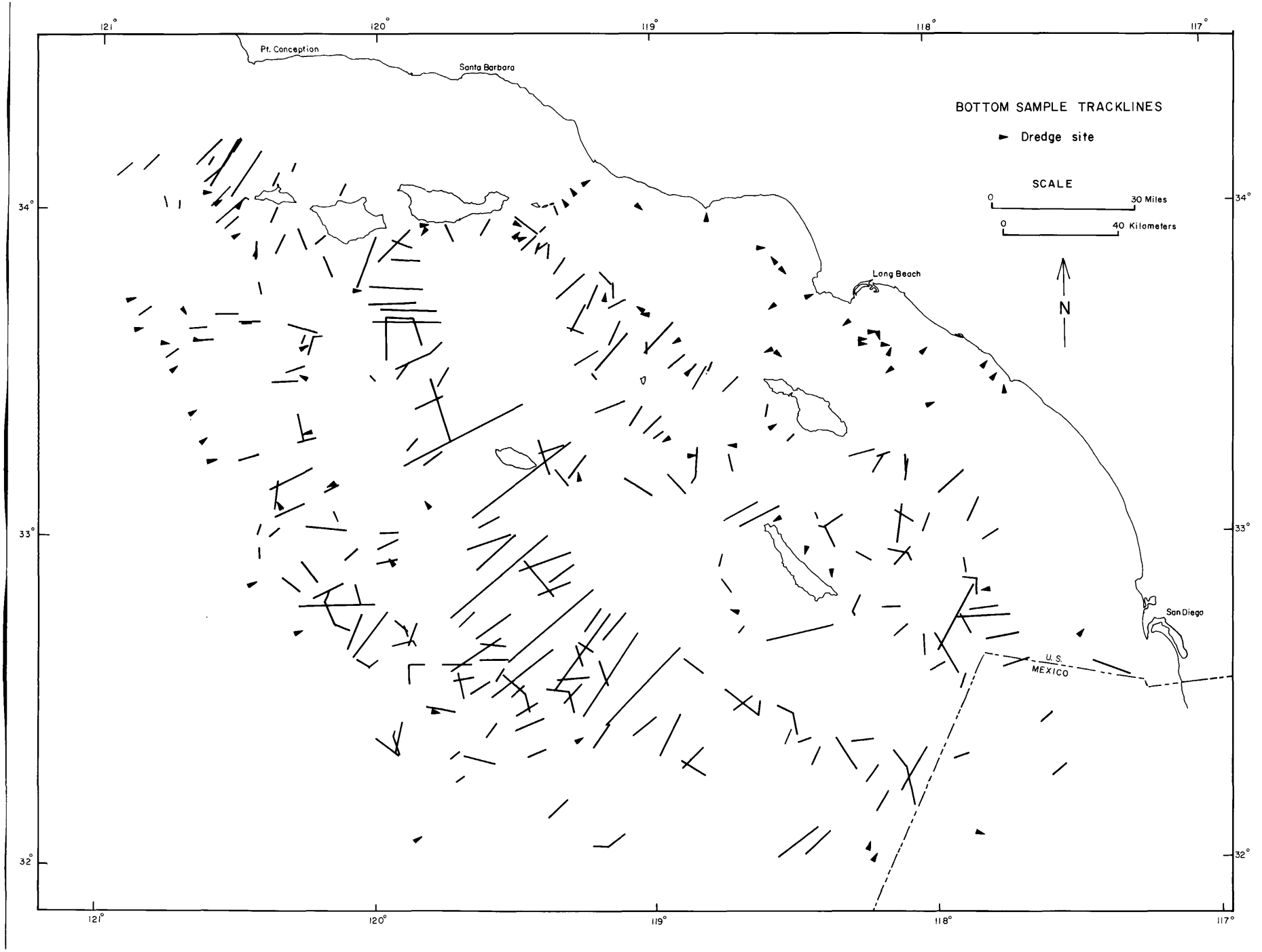


Figure 5. Dredge sites and ship tracklines along which nonproprietary bedrock cores were taken north of latitude 32°N. Sample descriptions are published in references listed in Vedder and others (1980).

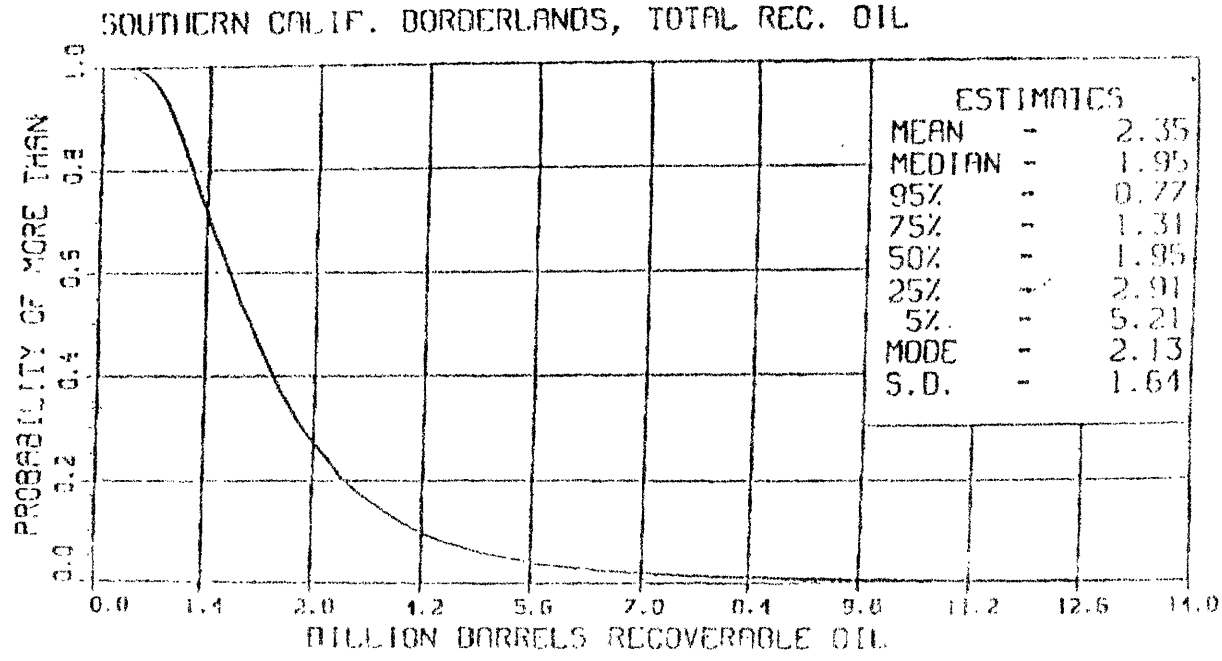
suggest source areas for the sediments on flanking ridges to the southwest and northeast. Along the edges of the Velero Basin, Quaternary faults and folds deform the section, and unconformities separate Eocene (?) from Oligocene (?) strata and Miocene from Pliocene (?) strata. Other prospective targets are fractured Miocene shale beds that may be present in the deeper basins and on the down-flank margins of major uplifts. Additionally, numerous structural and stratigraphic traps, which formed in response to late Cenozoic wrench tectonics, are distributed throughout the borderland.

Petroleum resources for the proposed OCS Lease Sale 80 area north of the United States-Mexico provisional treaty line and out to a water depth of 2,500 m are estimated in aggregate for the entire area. The estimates represent assessments of undiscovered recoverable oil and gas, and are those quantities considered to be recoverable at existing conditions of economy and technology, assuming additional short-term technologic growth. The undiscovered recoverable oil and gas resources estimated in aggregate at 5% and 95% probibility levels are at least:

	95 percent Probability	5 percent Probability	Statistical Mean
Oil (billions of barrels)	0.77	5.21	2.35
Gas (trillions of cubic feet)	1.49	8.24	3.98

Complete probability distributions for the area are shown in Figure 6.

Seafloor geologic hazards which may affect drilling, production, and pipeline transportation include faults, seismicity, sediment instability, sediment erosion, and hydrocarbon seeps north of latitude 32°N. A preliminary map of seafloor geohazards in Santa Monica Basin is presented in Figure 7. Although no studies have been done south of latitude 32°N within the study area,



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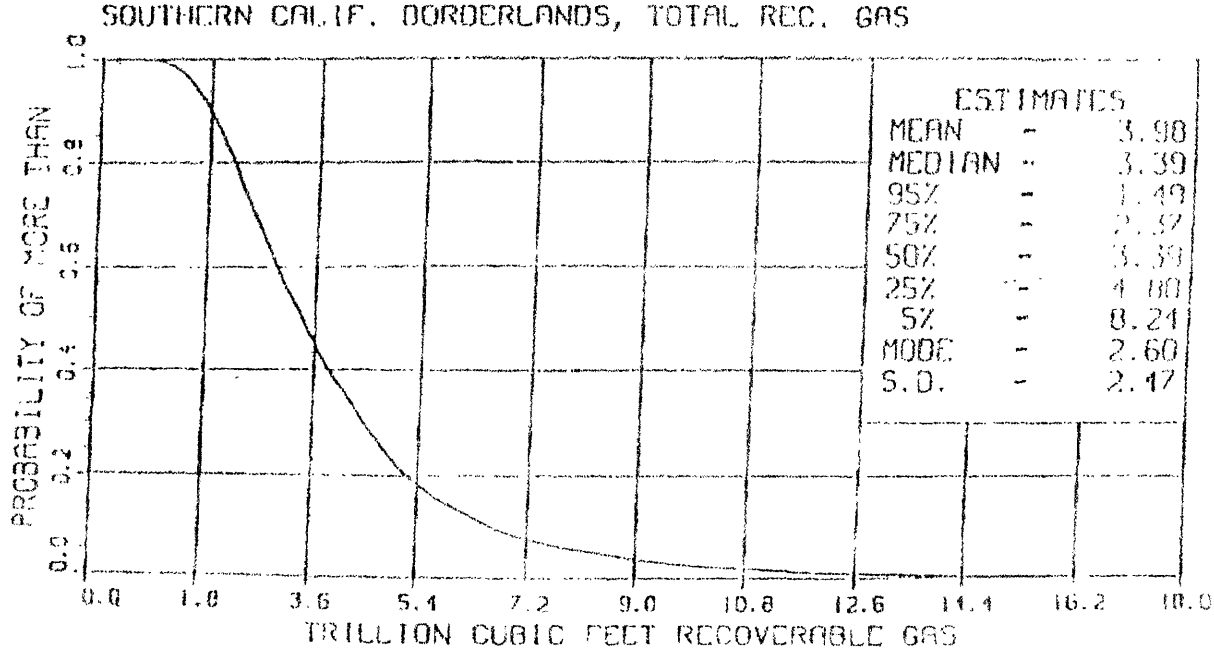

Figure 6. Probability distribution of undiscovered recoverable resources for offshore southern California north of the United States-Mexico provisional treaty line (0 to 2500 m).

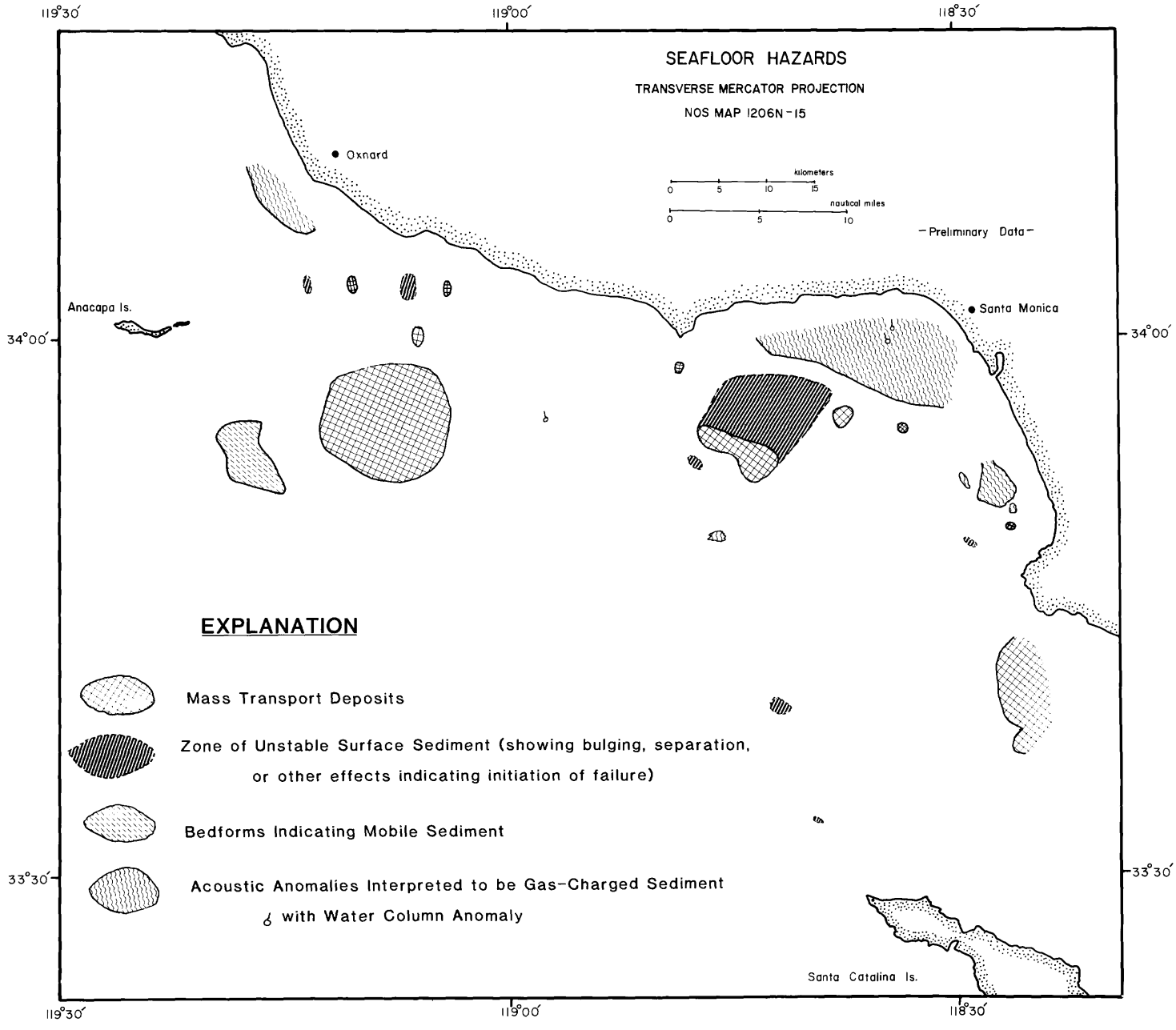

Figure 7. Preliminary seafloor hazards map of Santa Monica Basin.

potential problems presumably are analogous to those identified farther north. Numerous earthquake epicenters and seafloor offsets along some of the major fault zones indicate continuing crustal activity, and many other faults that continue upward to the seafloor must be considered geologically hazardous, as they cut beds of Holocene age. The probability of specific seafloor hazards risk in the assess areas, however cannot be predicted at this time.

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