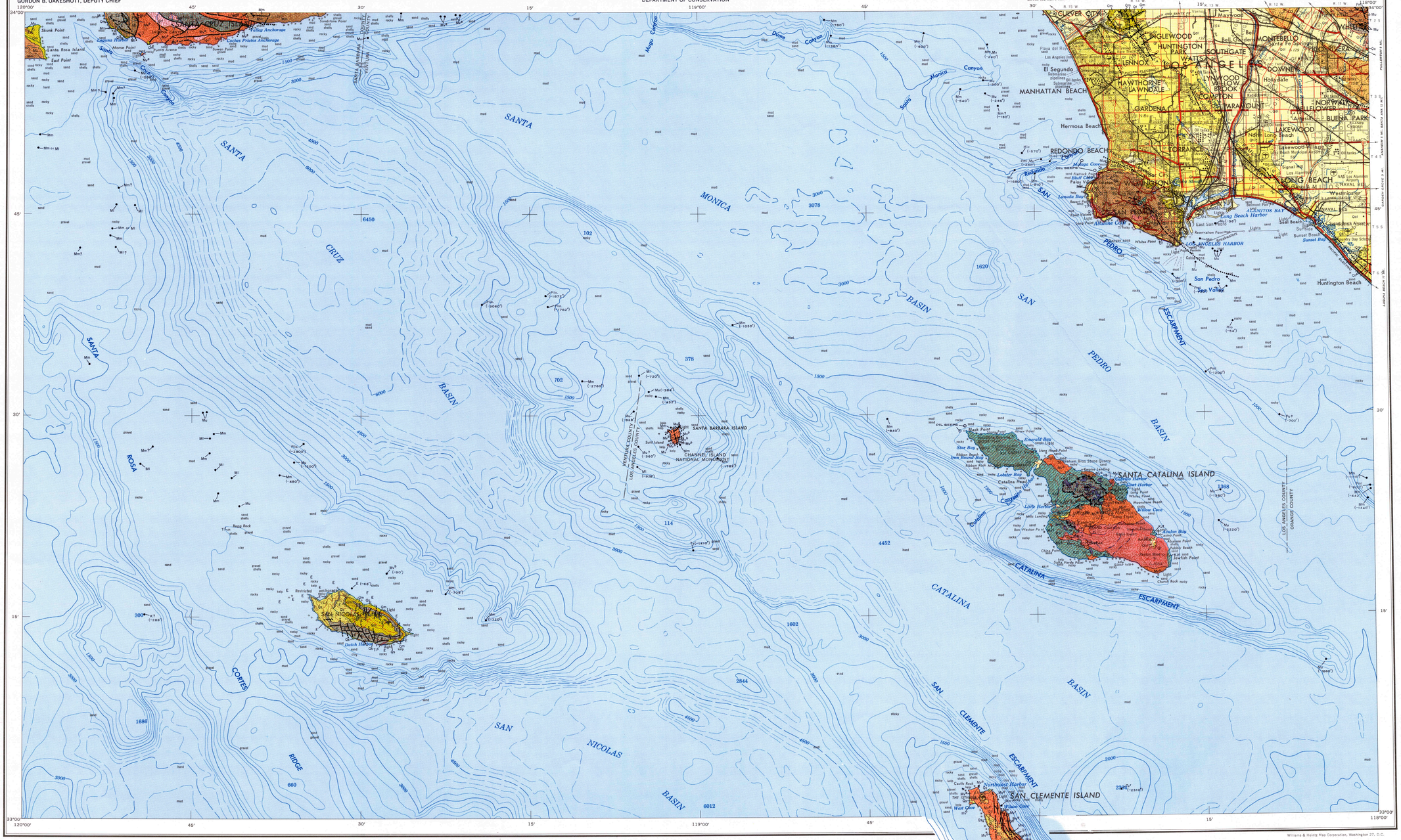
DIVISION OF MINES AND GEOLOGY
IAN CAMPBELL, CHIEF
GORDON B. OAKESHOTT, DEPUTY CHIEF

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF CONSERVATION

GEOLOGIC MAP OF CALIFORNIA
LONG BEACH SHEET



TOPOGRAPHIC BASE MAP

Prepared by the Army Map Service (KC8M), Corps of Engineers, U. S. Army, Washington, D. C. Compiled in 1957 from: United States Quadrangles, 1:24,000, 1:25,000, U. S. Geological Survey and Corps of Engineers, 1943-1951; USC & GS Charts 5144, 5115, 5120, 1955; 5142, 1954; 5113, 5111, 1952; 5114, 1951; 5110, 1948. Planimetric detail revised by photoplanimetric methods. Control by USC&GS, USGS, Los Angeles City and County, and Fairchild Aerial Surveys Inc. Map field checked 1957.

Land net prepared by U.S. Geological Survey

Submarine contours adapted from Shepard and Emery Special Paper No. 31, Geol. Soc. America

Corrections and additions to culture by California Division of Mines and Geology, 1962.

SUBMARINE CONTOUR INTERVAL 300 FEET

Local depressions 1500

Limit of danger; Reef
Rocks; Awash; Sunken
Foreshore flat
Intermittent or dry stream
Marsh or swamp

LOCATION MAP FOR LONG BEACH SHEET

Scale 1:250,000

5 0 5 10 15 20 Statute Miles

5 0 5 10 15 20 25 30 Kilometers

CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOURS AT 100 FOOT INTERVALS

GEOLOGIC MAP OF CALIFORNIA

OLAF P. JENKINS EDITION

LONG BEACH SHEET

COMPILATION BY CHARLES W. JENNINGS, 1962

Contact
(Dashed where approximately located, gradational or inferred)

Fault
(Dashed where approximately located; dotted where concealed)

Thrust fault
(Barbs on upper plate; dashed where approximately located, dotted where concealed)

Williams & Heinitz Map Corporation, Washington 27, D.C.

INDEX TO GEOLOGIC MAPPING
(COMPLETE INDEX ON EXPLANATORY DATA SHEET)

1. Bailey, E. H., unpublished.
Dickerson, R. E., 1914.
Smith, W. S. T., 1907.
2. Dibblee, T. W., Jr., unpublished.
3. Emery, K. O., and Shepard, F. P., 1945.
Emery, K. O., 1960.
Fischer, G. A., unpublished.
Grady, J. R., unpublished.
Moore, D. G., 1954.
Rosig, J. M., 1958.
Schott, B., 1960.
Vedder, J. G., 1957.
4. Kennedy, L. E., unpublished.
5. Olmsted, F. H., 1958.
6. Poland, J. F., Piper, A. M., et al., 1956.
7. Poland, J. F., Garrett, A. A., and Sinnott, A., 1959.
Castle, R. O., 1960.
Castle, R. O., 1960.
8. Superior Oil Company, unpublished.
Bowman, C. St. J., 1932.
Hand, W. W., 1931.
9. Vedder, J. G. et al., 1956.
Norris, R. M., unpublished.
10. Woodford, A. O., Schoellhamer, J. E., Vedder, J. G., and Yerkes, R. F., 1954.
Yerkes, R. F., 1962.
Kundert, C. J., 1952.
1. Woodring, W. P., Bramlette, M. N., and Kew, W. S. W., 1946.

EXPLANATION

SEDIMENTARY AND METASEDIMENTARY ROCKS

CENOZOIC

QUATERNARY

Recent

Qs — Dune sand
Qal — Alluvium
Qsc — Stream channel deposits (GREAT VALLEY)
Qf — Fan deposits (GREAT VALLEY)
Qb — Basin deposits (GREAT VALLEY)
Qst — Salt deposits
Ql — Quaternary lake deposits
Qgl — Glacial deposits
Qt — Quaternary nonmarine terrace deposits
Qm — Pleistocene marine and marine terrace deposits

Pleistocene

Qc — Pleistocene nonmarine
QP — Plio-Pleistocene nonmarine

TERTIARY

Pliocene

Pc — Undivided Pliocene nonmarine
Puc — Upper Pliocene nonmarine
Pu — Upper Pliocene marine
Pmnc — Middle and/or lower Pliocene nonmarine
Pm — Middle and/or lower Pliocene marine

Miocene

Mc — Undivided Miocene nonmarine
Muc — Upper Miocene nonmarine
Mu — Upper Miocene marine
Mmnc — Middle Miocene nonmarine
Mm — Middle Miocene marine
Ml — Lower Miocene marine

Oligocene

Oc — Oligocene nonmarine
O — Oligocene marine

Eocene

Ec — Eocene nonmarine
E — Eocene marine

Paleocene

Epc — Paleocene nonmarine
Paleocene marine

Undivided

Tc — Cenozoic nonmarine
Tn — Tertiary nonmarine
Tl — Tertiary lake deposits
Tm — Tertiary marine

MESOZOIC

CRETACEOUS

K — Undivided Cretaceous marine
Ku — Upper Cretaceous marine
Lower Cretaceous marine
Kv — Knoxville Formation

JURASSIC

Ju — Upper Jurassic marine
Middle and/or Lower Jurassic marine

TRIASSIC

Ts — Triassic marine

UNDIVIDED

Ls — Pre-Cretaceous metamorphic rocks (ls = limestone or dolomite)
Pz — Pre-Cretaceous metasedimentary rocks
Pz ls — Paleozoic marine (ls = limestone or dolomite)

PALEOZOIC

PERMIAN

P — Permian marine

CARBONIFEROUS

C — Undivided Carboniferous marine
CP — Pennsylvanian marine
CM — Mississippian marine

DEVONIAN

D — Devonian marine

SILURIAN

S — Silurian marine
pSs — Pre-Silurian metasedimentary rocks

ORDOVICIAN

O — Ordovician marine

CAMBRIAN

Є — Cambrian marine
Cambrian—Precambrian marine

PRECAMBRIAN

pЄ — Undivided Precambrian metamorphic rocks
pЄg = gneiss, pЄs = schist
pЄu — Later Precambrian sedimentary and metamorphic rocks
pЄe — Earlier Precambrian metamorphic rocks

IGNEOUS AND META-IGNEOUS ROCKS

Qv — Recent volcanic: Q_v^r—rhyolite; Q_v^a—andesite; Q_v^b—basalt; Q_v^p—pyroclastic rocks
Qpv — Pleistocene volcanic: Q_{pv}^r—rhyolite; Q_{pv}^a—andesite; Q_{pv}^b—basalt; Q_{pv}^p—pyroclastic rocks
Quaternary and/or Pliocene cinder cones
Pv — Pliocene volcanic: P_v^r—rhyolite; P_v^a—andesite; P_v^b—basalt; P_v^p—pyroclastic rocks
Mv — Miocene volcanic: M_v^r—rhyolite; M_v^a—andesite; M_v^b—basalt; M_v^p—pyroclastic rocks
Ov — Oligocene volcanic: O_v^r—rhyolite; O_v^a—andesite; O_v^b—basalt; O_v^p—pyroclastic rocks
Ev — Eocene volcanic: E_v^r—rhyolite; E_v^a—andesite; E_v^b—basalt; E_v^p—pyroclastic rocks
QTv — Cenozoic volcanic: QT_v^r—rhyolite; QT_v^a—andesite; QT_v^b—basalt; QT_v^p—pyroclastic rocks
Tv — Tertiary intrusive (hypabyssal) rocks: T_v^r—rhyolite; T_v^a—andesite; T_v^b—basalt
Tv — Tertiary volcanic: T_v^r—rhyolite; T_v^a—andesite; T_v^b—basalt; T_v^p—pyroclastic rocks

Franciscan Formation

Franciscan volcanic and metavolcanic rocks
Mesozoic granitic rocks: gr^a-granite and adamellite; gr^d-granodiorite; gr^t-tonalite and diorite
Mesozoic basic intrusive rocks
Mesozoic ultrabasic intrusive rocks
Jurs-Trias metavolcanic rocks
Pre-Cretaceous metavolcanic rocks
Pre-Cenozoic granitic and metamorphic rocks
Paleozoic metavolcanic rocks
Permian metavolcanic rocks
Carboniferous metavolcanic rocks
Devonian metavolcanic rocks
Devonian and pre-Devonian and Devonian metavolcanic rocks
pSv — Pre-Silurian metamorphic rocks
pSv — Pre-Silurian metavolcanic rocks
Undivided Precambrian granitic rocks

HEAVY BORDER ON BOXES INDICATES UNITS THAT APPEAR ON THIS SHEET