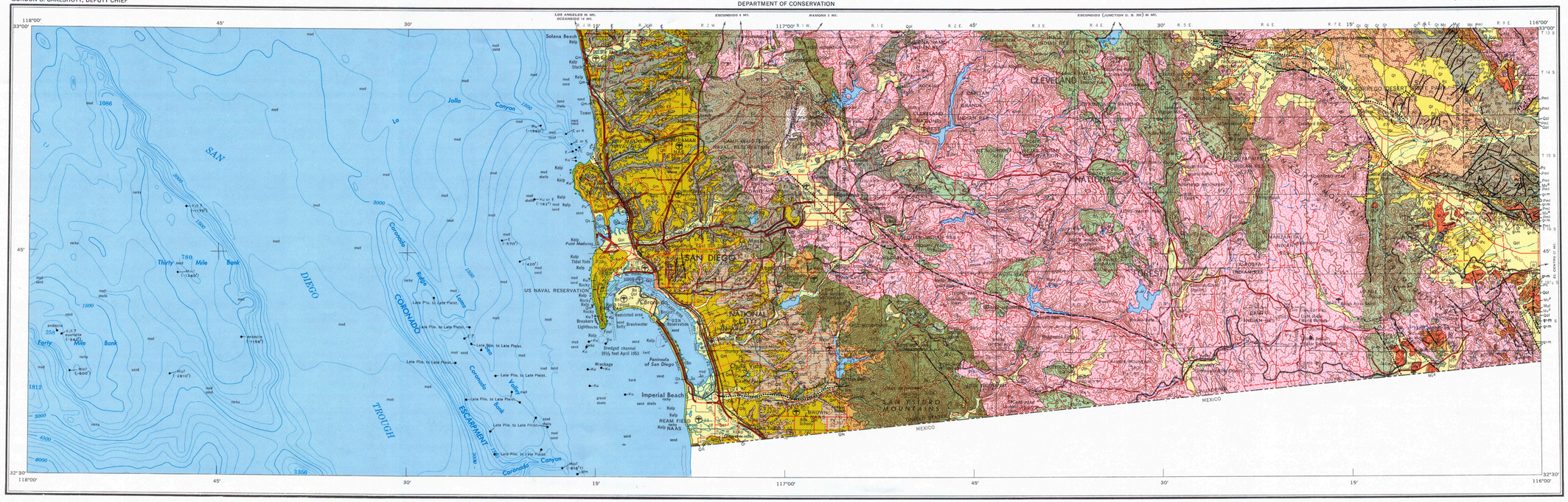
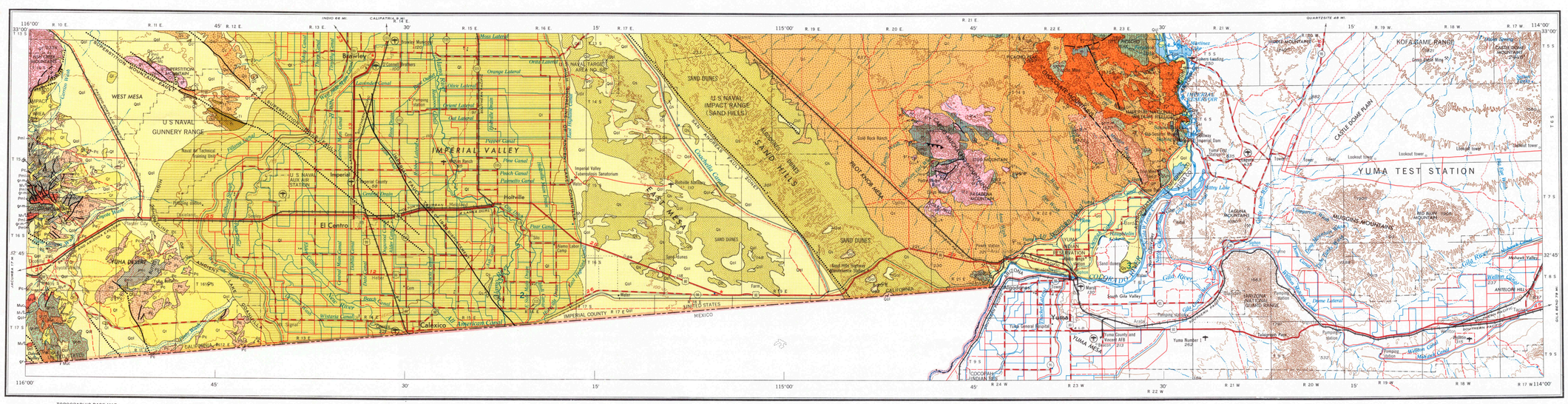
DIVISION OF MINES AND GEOLOGY
IAN CAMPBELL, CHIEF
GORDON B. OAKESHOTT, DEPUTY CHIEF

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF CONSERVATION

GEOLOGIC MAP OF CALIFORNIA
SAN DIEGO-EL CENTRO SHEET





TOPOGRAPHIC BASE MAP

Prepared within the collaborative program of the Departamento Cartografico Militar of Mexico, Inter American Geodetic Survey and Army Map Service of the United States. Aerial photography 1954-56. Horizontal and vertical control by DCM, IAGS, USC&GS, USGS, CE, USBR, US & Mexico Boundary Commission, City of Los Angeles and Los Angeles County. Photography field annotated 1957 for Mexico portion; United States portion partially field checked 1958. Compiled in 1958 by Army Map Service (ACSI & ACAM), Corps of Engineers, U. S. Army, Washington, D. C. by photogrammetric methods and from: United States Quadrangles 1:25,000; 1:25,000; 1:50,000; 1:62,500 AMS and U. S. Geological Survey 1935-56; Plu USC&GS Charts 5101 and 5107, 1955; USHO Chart 5195, 1955. Planimetric detail in the United States portion partially revised by photo-planimetric methods.

Land net prepared by U. S. Geological Survey, 1957.

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 SAN DIEGO-EL CENTRO 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

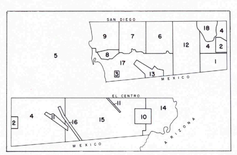
GEOLOGIC MAP OF CALIFORNIA
OLAF P. JENKINS EDITION
SAN DIEGO-EL CENTRO SHEET
COMPILATION BY RUDOLPH G. STRAND, 1962

FOURTH PRINTING 1993

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 & Heintz Map Corporation, Capitol Heights, Md. 20743
INDEX TO GEOLOGIC MAPPING
(COMPLETE INDEX ON EXPLANATORY DATA SHEET)

1. Brooks, B., and Roberts, E., 1954.
2. Christensen, A. G., unpublished.
3. Cleveland, G. B., 1960.
4. Dibblee, T. W., Jr., 1954.
5. Emery, K. O., and Shepard, F. P., 1945.
6. Emery, K. O. et al, 1952.
7. Everhart, D. L., 1951.
8. Gastil, R. G., and Huber, O. L., unpublished.
9. Goldsmith, G., unpublished.
10. Hanna, M. A., 1926.
11. Hershey, P. E., 1942.
12. Kosech, R. L., unpublished.
13. Merriam, R. H., unpublished.
14. Mielenz, P. K., unpublished.
15. Storie, R. E. et al, 1944.
16. Strahler, A. T. et al, 1922.
17. Kocher, A. E. et al, 1923.
18. WCAK F. P., 1941.
17. Weber, F. H., Jr., unpublished.
18. Woodard, G. D., unpublished.

EXPLANATION

SEDIMENTARY AND METASEDIMENTARY ROCKS — IGNEOUS AND META-IGNEOUS ROCKS

CENOZOIC

QUATERNARY — *Recent*

- Qd — Dune sand
- Qal — Alluvium
- Qsc, Qf, Qb — Stream channel deposits; Fan deposits; Basin deposits (GREAT VALLEY)
- Qsd — Salt deposits
- Ql — Quaternary lake deposits
- Qg — Glacial deposits
- Qt — Quaternary nonmarine terrace deposits

Pleistocene

- Qm — Pleistocene marine and marine terrace deposits
- Qn — Pleistocene nonmarine
- QP — Plio-Pleistocene nonmarine

TERTIARY — *Pliocene*

- Pc — Undivided Pliocene nonmarine
- Pun — Upper Pliocene nonmarine
- Pu — Upper Pliocene marine
- Pmn — Middle and/or lower Pliocene nonmarine
- Pm — Middle and/or lower Pliocene marine

Miocene

- Mc — Undivided Miocene nonmarine
- Mun — Upper Miocene nonmarine
- Mu — Upper Miocene marine
- Mmn — 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
- Ep — Paleocene marine

Undivided

- QTc — Cenozoic nonmarine
- Tn — Tertiary nonmarine
- Tl — Tertiary lake deposits
- T.m — Tertiary marine

- Qrv — Recent volcanic: Qr_v^r —rhyolite; Qr_v^a —andesite; Qr_v^b —basalt; Qr_v^p —pyroclastic rocks
- Qpv — Pleistocene volcanic: Qp_v^r —rhyolite; Qp_v^a—andesite; Qp_v^b—basalt; Qp_v^p—pyroclastic rocks
- Cinder cones — 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
- Tgr — Tertiary granitic rocks
- Ti — Tertiary intrusive (hypabyssal) rocks: T_i^r—rhyolite; T_i^a —andesite; T_i^b—basalt
- Tv — Tertiary volcanic: T_v^r —rhyolite; T_v^a —andesite; T_v^b —basalt; T_v^p —pyroclastic rocks

MESOZOIC — *CRETACEOUS*

- K — Undivided Cretaceous marine
- Ku — Upper Cretaceous marine
- Kl — Lower Cretaceous marine
- Kv — Knoxville Formation
- KJfv — Franciscan volcanic and metavolcanic rocks
- gr^a — Mesozoic granitic rocks: gr^a granite and adamellite; gr^d granodiorite; gr^t tonalite and diorite

JURASSIC

- Jv — Upper Jurassic marine
- Jm — Middle and/or Lower Jurassic marine
- Jf — Franciscan Formation
- Di — Mesozoic basic intrusive rocks
- Ub — Mesozoic ultrabasic intrusive rocks

TRIASSIC

- Ts — Triassic marine
- JTRv — Jura-Trias metavolcanic rocks

PALEOZOIC — *UNDIVIDED*

- Pzs — Paleozoic marine (ls = limestone or dolomite)
- Pzm — Pre-Cretaceous metamorphic rocks (ls = limestone or dolomite)
- Pzsm — Pre-Cretaceous metasedimentary rocks
- Pzv — Pre-Cretaceous metavolcanic rocks
- pCm — Pre-Cenozoic granitic and metamorphic rocks
- PzV — Paleozoic metavolcanic rocks

PERMIAN

- P — Permian marine
- Pv — Permian metavolcanic rocks

CARBONIFEROUS

- C — Undivided Carboniferous marine
- Cv — Carboniferous metavolcanic rocks
- CP — Pennsylvanian marine
- CM — Mississippian marine

DEVONIAN

- D — Devonian marine
- Dv — Devonian metavolcanic rocks
- Dvd — Devonian and pre-Devonian? metavolcanic rocks

SILURIAN

- S — Silurian marine
- Spz — Pre-Silurian metasedimentary rocks
- pzm — Pre-Silurian metamorphic rocks
- pzv — Pre-Silurian metavolcanic rocks

ORDOVICIAN

- O — Ordovician marine

CAMBRIAN

- Є — Cambrian marine
- Єp — Cambrian – Precambrian marine

PRECAMBRIAN

- pЄ — Undivided Precambrian metamorphic rocks: pЄg = gneiss, pЄs = schist
- pЄgr — Undivided Precambrian granitic rocks
- pЄp — Precambrian igneous and metamorphic rock complex
- pЄs — Later Precambrian sedimentary and metamorphic rocks
- pЄan — Precambrian anorthosite
- pЄpt — Earlier Precambrian metamorphic rocks

HEAVY BORDER ON BOXES INDICATES UNITS THAT APPEAR ON THIS SHEET