DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

Prepared in cooperation with the

NEVADA BUREAU OF MINES AND GEOLOGY

OPEN-FILE REPORT
81-1155

Base from U.S. Geological Survey, 1956

CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 20-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

APPROXIMATE MEAN DECLINATION, 1958

QUADRANGLE LOCATION

Surficial Geology by J. C. Dohrenwend, 1979-1980.

TRENCH CANYON QUADRANGLE

DESCRIPTION OF MAP UNITS

af ARTIFICIAL FILL--Tailings from the Bodie mining district

Qlh HISTORIC LACUSTRINE DEPOSITS--Beach and lake bottom deposits of Mono Lake below a prominent, nearly continuous strandline at approximately 6,430 ft elevation. Prominent recessional strandlines of medium sand to sandy silt. According to Hardy (1942), the level of Mono Lake was approximately 6,375 ft in the 1850's, and rose to a high at 6,428 ft in 1919. Lake level has since declined to a present elevation of approximately 6,370 ft. Because of the lake's continuing retreat, lacustrine deposits are now exposed subaerially approximately 2.0 km south and east of the November 1958 shoreline shown on this map

Qes EOLIAN SAND--Well sorted to moderately well sorted medium to fine sand and silt. Occurs extensively throughout the quadrangle as thin sand sheets and veneers over other surficial deposits and bedrock. Derived from lacustrine deposits of Mono Lake and Pleistocene Lake Russell and from the air-fall tuffs of Mono Craters southwest of the quadrangle. Symbols for units veneered by eolian sand shown in parentheses

Qsd SAND DUNE DEPOSITS--Well-sorted medium to fine sand. Derived from lacustrine deposits of Mono Lake and Pleistocene Lake Russell and from the air-fall tuffs of Mono Craters. Commonly at least partly stabilized by sparse to moderately dense stands of sagebrush and bitterbush. Occurs throughout the quadrangle, but by far the largest dunefield in the region covers an irregular area of the quadrangle approximately 8 km wide and 15 km long along the northeast shore of Mono Lake. This dune field is dominated by mobilized beach ridges of Pleistocene Lake Russell. Symbols for units covered by sand dune deposits are shown in parentheses

Qea EOLIAN AND ALUVIAL DEPOSITS, UNDIFFERENTIATED--Predominantly air-fall tuff reworked by both eolian and fluvial processes. Occurs in several small fault bounded depressions in the southeast corner of the quadrangle and on Cedar Hill in the north-central part of the quadrangle

Qpa PLAYA DEPOSITS--Brownish- to grayish-white clay, silt, and fine sand with associated evaporite salt. Occasionally flooded. Limited to Larkin Lake at the southwest end of Alkali Valley

Qbf BASIN-FILL DEPOSITS--Undifferentiated eolian, lacustrine, and distal alluvial fan deposits. Concentrated along the margins of Mono and Alkali Valleys. Typically occurs as uneven, patchy veneers on bedrock. The eolian deposits are dominated by air-fall tuffs from Mono Craters. Symbols for units veneered by basin-fill deposits are shown in parentheses

Qls LANDSLIDE DEPOSITS--Chaotic masses of unsorted angular boulder- to clay-size debris and megabreccia. Includes some talus and colluvium where these materials overlap or are intermixed with landslide debris. Forms hummocky to chaotic terrain in steeply sloping upland areas. Large landslides in the quadrangle occur in late Tertiary andesite and andesite porphyry. The largest of these landslides is a rotational slump-debris flow complex (approximately 4 km^2 in area) on the north flank of Brawley Peaks and straddling the north boundary of the quadrangle

Qf_3 YOUNG ALLUVIAL FAN DEPOSITS--Poorly sorted deposits of boulders, cobbles, gravel, sand, and silt. Clast size generally decreases and sorting generally improves downfan toward distal margins. Includes some fine-grained basin-fill deposits where distal fan limits are gradational and poorly defined. Fan surfaces are undissected to slightly dissected with few, if any, well-defined drainage channels. Constructional surfaces are generally unweathered with very weak, if any, soil profile development. Drainage is distributary, radiating from the fan apex. Concentrated along the margins of Mono Valley

Qf_{3-2} YOUNG AND INTERMEDIATE ALLUVIAL FAN DEPOSITS, UNDIFFERENTIATED--Mapped in areas where young and intermediate age fan surfaces are too complexly interrelated to be mapped separately. Also included in the unit are fans for which more precise age relations could not be determined. Forms valley fills in upland valleys and basins

Qf_2 INTERMEDIATE ALLUVIAL FAN DEPOSITS--Lithologically and texturally similar to young alluvial fan deposits. Contacts between intermediate and young alluvial fan deposits are commonly gradational and poorly defined. Intermediate alluvial fan surfaces are slightly to moderately dissected with numerous well-defined drainage channels. Drainage is predominantly distributary, but some drainage channels head on fan surfaces. Relief due to dissection is generally less than 5 m. Constructional surfaces are slightly to moderately weathered. Largely covered by a veneer of eolian and lacustrine deposits. Limited to an elongate northeast-trending upper piedmont surface in the northwest part of the quadrangle

Qf_{2-1} INTERMEDIATED AND OLD ALLUVIAL FAN DEPOSITS, UNDIFFERENTIATED--Mapped in areas where intermediate and old alluvial fan deposits are too complexly interrelated to be mapped separately. Also included in this unit are fans for which more precise age relations could not be determined. Limited to the north flank of Alkali Valley in the northeast corner of the quadrangle

Qf_1 OLD ALLUVIAL FAN DEPOSITS--Lithologically and texturally similar to intermediate and young alluvial fan deposits. Fan surfaces are dissected by well-developed subparallel drainage that heads on the fan surface. Commonly separated from younger depositional surfaces by abrupt erosional scarps. Constructional fan surfaces are strongly weathered. Limited to one relatively small fan segment on the north flank of Alkali Valley

Ql PLUVIAL LAKE DEPOSITS--Littoral and lake-bottom deposits of Pleistocene Lake Russell. Laminated lacustrine silts intercalated with layers of volcanic ash. Locally overlain by sand and gravel of small alluvial fans and fan-deltas and by beach ridges of medium sand to sandy silt. Lithoid tufa rinds and coatings occur on littoral and alluvial deposits, and lithoid tufa towers associated with fresh-water springs form a prominent landscape element at elevations below 6,700 ft. Characterized by numerous beach ridges and recessional strandlines. Deposited below the Lake Russell high shoreline at approximately 7,200 ft elevation. (The present elevation of the surface of Mono Lake is approximately 6,370 ft.) Significant thicknesses of this unit are largely limited to areas below 7,000 ft elevation. Significant outcrops limited to irregular deflation hollows in the south-central part of the quardangle. Largely covered by sand dunes and sand sheets derived from the lacustrine deposits themselves and from the air-fall tuffs of Mono Craters

Qsp SPRING DEPOSITS--Lithoid tufa towers associated with fresh-water springs: Kirkwood Springs at approximately 6,700 ft elevation north of Mono Lake and Warm Springs between 6,500 and 6,600 ft elevation east of the lake. Deposited at or near lake level by algal activity in areas of fresh water-lake water mixing (Lajoie, 1968)

QTg OLD ALLUVIAL GRAVELS--Boulder- to pebble-size gravel, sandy gravel, and gravelly sand. Gravels are subrounded to subangular. Poorly to moderately sorted. Little or no preserved constructional form. Underlies one low, rounded ridge at the east border of the quadrangle

r BEDROCK--Lake sediments and volcanic rocks of late Tertiary age. The volcanic rocks include basaltic and andesitic lava flows, latitic ignimbrite and andesite porphyry (Gilbert and others, 1968)

Contact

Fault--Dashed where inferred in bedrock, dotted where concealed by Quaternary deposits. Mapped faults are limited to those faults which by stratigraphic evidence can be shown to be Quaternary faults or by geomorphic evidence can be inferred to be Quaternary and (or) late Tertiary faults. Fault traces in Quaternary deposits are mapped as solid lines only where offset of Quaternary deposits can be demonstrated. Fault traces forming contacts between bedrock and Quaternary units are mapped as solid lines only where offset of the Quaternary deposits can be demonstrated or where Quaternary movement is suggested by the morphology of the bedrock scarp. Elsewhere, fault traces in or bounding Quaternary deposits are mapped as dotted lines in the Quaternary deposits. Faults in bedrock are mapped where the morphology of the fault trace suggests Quaternary and (or) late Tertiary movement or where fault traces can be related to faults that offset or bound Quaternary deposits. Fault traces in bedrock are solid where known, dashed where inferred

High shoreline of Pleistocene Lake Russell

REFERENCES

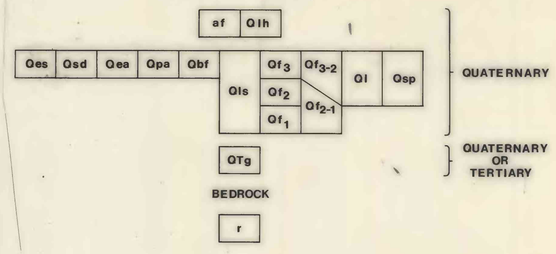
Gilbert, C. M., Christensen, M. N., Al-Rawi, Y. T., and Lajoie, K. R., 1968, Structural and volcanic history of Mono Basin, California-Nevada: Geological Society of America Memoir 116, p. 275-329.

Hardy, S. T., 1942, Lakes, in Meinzer, O. E., ed., Physics of the Earth: IX. Hydrology: New York, McGraw Hill Book Co., p. 220-243.

Lajoie, K. R., 1968, Late Quaternary stratigraphy and geologic history of the Mono basin, California: Berkeley, University of California, Ph. D. thesis.

CORRELATION OF MAP UNITS

SURFICIAL DEPOSITS



RECONNAISSANCE SURFICIAL GEOLOGIC MAP OF THE TRENCH CANYON QUADRANGLE, CALIFORNIA-NEVADA

by

John C. Dohrenwend

1981

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