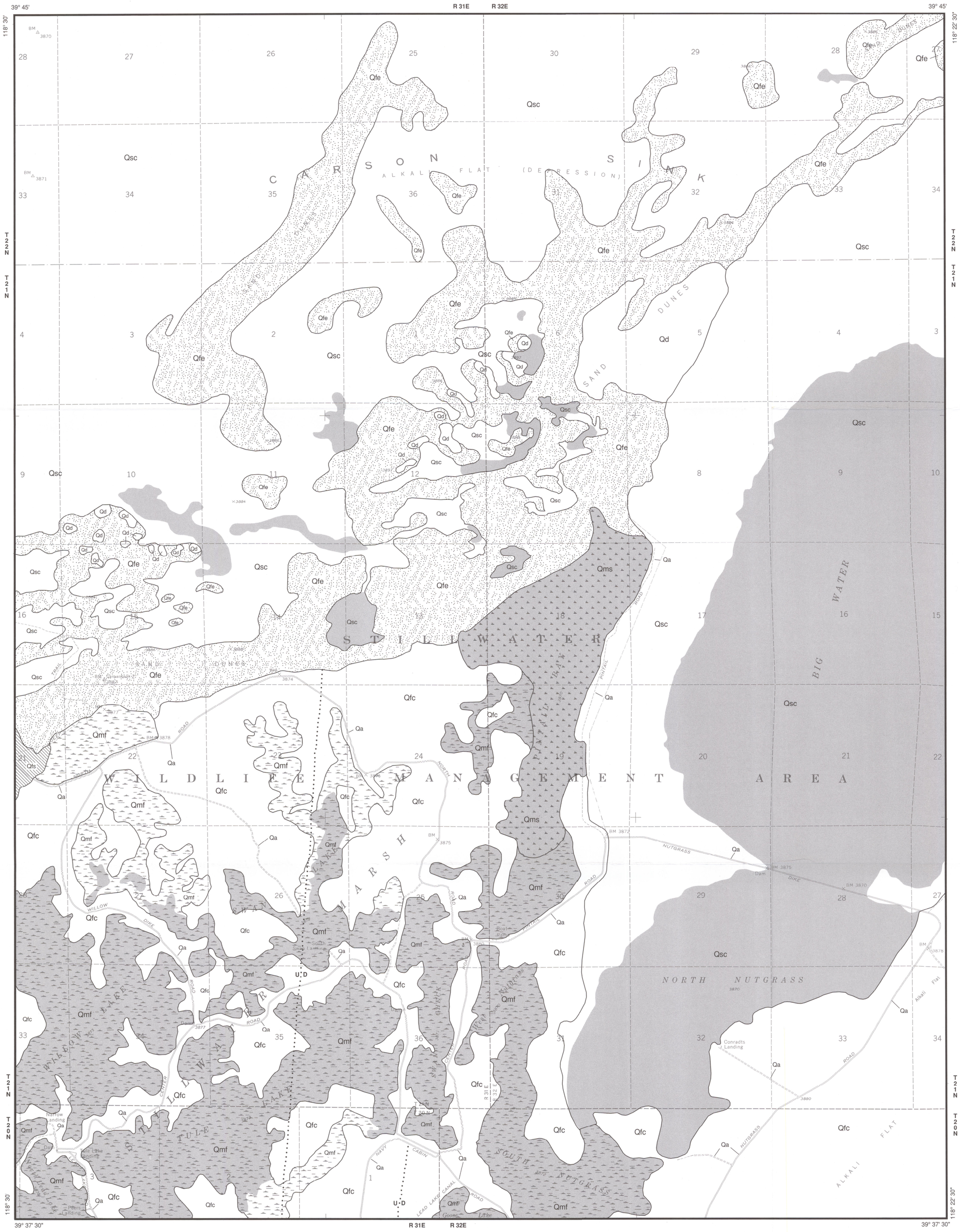

GEOLOGIC MAP OF THE PINTAIL BAY QUADRANGLE, NEVADA

Susan G. Oleson-Elliott

1994

The Pintail Bay Quadrangle

The Pintail Bay 7.5' Quadrangle encompasses the Stillwater Marsh and part of the Carson Sink, in which both the Carson and Humboldt Rivers end. It is situated in the southern Carson Desert, a northeasterly trending basin about 70 miles long and 8 to 30 miles wide.

History. The Carson Desert is part of the lakebed of Lake Lahontan, a Pleistocene lake that, at times, occupied more than 8,500 square miles of western Nevada. The lake underwent numerous cycles of expansion and recession in response to regional climatic changes, coinciding with Sierra Nevada Pleistocene glacial fluctuations. Lake Lahontan reworked the sediments brought in by the Carson and Humboldt Rivers, resulting in complex interbedded and interfingered fluvial, lacustrine, deltaic, and eolian deposits. During intermittent dry periods, large quantities of eolian sand from neighboring areas were deposited. The latest expansion and recession of Lake Lahontan took place near the end of the Pleistocene and was followed by an interval in which the Carson Desert was completely dry. Since then the Carson Desert has been characterized by a series of many oscillating shallow lakes. Pyramid Lake and Walker Lake are the largest remnant water bodies of Lake Lahontan. The Carson River has changed course several times, draining mostly southeastward toward the Carson Lake area and occasionally eastward toward the Stillwater Marsh or northward toward the Carson Sink.

Stillwater Marsh is a series of interconnecting small lakes, ponds, and intervening marshlands. This region of the Great Basin is one of eight areas in the Western Hemisphere Shorebird Reserve Network, providing a critical migratorial resting and nesting area for many waterfowl species. In 1948, Stillwater Marsh was transferred to federal control and became the Stillwater Wildlife Management Area (SWMA).

Historical evidence indicates that a relatively permanent marsh containing up to 55,000 acres of wetlands has existed in the Stillwater area for the last 4,000 years. In 1984-1985, water levels in the Carson Sink rose to the highest level in this century following several years of record snowfall and associated runoff from the Sierra Nevada. Floodwater inundated the Carson Sink and Stillwater Marsh covering about 212,000 acres.

Presently only 3,000 to 4,000 acres of wetlands remain, in part due to the ongoing drought affecting the eastern Sierra Nevada since 1986. Reduction of wetlands through evaporation and increased water use efficiency in the Lahonton Valley in addition to poor water-quality drainwater has led to a substantial increase in the concentration of dissolved solids causing adverse effects on wildlife in the SWMA. (Oleson and Carr, 1990).

Tectonics. The 1954 Dixie Valley-Fairview Peak and Fallon-Stillwater earthquakes indicate that basin-and-range faulting is still active in the area. The Fallon-Stillwater earthquakes of July 6 and August 23, 1954 were caused by movement along a fault situated on the eastern border of Rainbow Mountain (15 miles east of Fallon). The fault extends northward to the southern rim of the Carson Sink. A large geothermal anomaly, covering 25 square miles, coincides with the extension of the Rainbow Mountain fault.

Methods. This geologic map is based on fieldwork, computer-enhanced Landsat TM imagery dated April 1988, and black-and-white aerial photographs (1990). Water boundaries reflect 1988 levels. Morrison's (1964) stratigraphic names were used whenever possible.

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Qa **Artificial fill** 1 to 3 m above the natural land surface and 9 m wide covered with roadbed material and used for roads and water control. Contacts not shown.

Qd **Active dunes** Transverse and barchan dunes composed of fine-grained, subrounded sand, small shell fragments, grayish brown (10YR 5/2)[1]. Dunes range from 1 to 10 m high.

Qmf, Qms **Marsh Qmf:** underlain by shallow-lake silty clay (Qfc) with local organic debris and carbonate stringers, granular structure. Shells on surface common. Grayish brown (2.5Y 5/2) to black (2.5Y 2/2). **Qms:** underlain by silty clay to clay (Qsc) with local organic debris. Olive gray (5Y 5/2) grading to light olive gray (5Y 6/2) at depth.

Qfe, Qfs, Qfc **Fallon Formation** (<5 ka) **Qfe:** mainly fine-grained, subrounded sand, some silt, small shell fragments, grayish brown (10YR 5/2), cross-bedded locally. Sand drifts range from a few centimeters high with dunes over 10 m high near the south edge of the Carson Sink. Longitudinal dunes trending N75-80°E and parabolic dunes are found locally. **Qfs:** shallow-lake fine-grained sandy silt deposits with minor amounts of clay. Well sorted, very dark grayish brown (10YR 3/2), 0.5 to 3 m thick, carbonaceous. **Qfc:** shallow-lake silt- and clay-rich deposits with minor amounts of fine sand, 0.5 to more than 3 m thick, massive structure, carbonaceous. Commonly dark grayish brown (2.5Y 4/2) grading to light olive brown (2.5Y 5/4), well sorted, locally hummocky and gypsiferous. Locally white evaporitic crusts of soil efflorescence origin.

Qsc **Sehoo Formation** (35-9 ka) Deep-lake sediments consisting of silty clay to clay deposited during late Lake Lahontan time. Thickness varies from 2 to 6 m. Carbonaceous and distinctly laminated. Characteristically olive gray (5Y 5/2) grading to light olive gray (5Y 6/2) at depth; greenish tint is more apparent when moist and assists in distinguishing the Sehoo Formation from the Fallon Formation. The Sehoo Formation, covering much of the nearly planar Carson Sink, remains exposed due to constant deflation of younger sediments.

[1] Soil colors determined on moist soil using the Munsell Soil Color system of notation and nomenclature (Munsell Soil Color Charts, 1975 edition).

Contact, approximate

U D **Fault,** now obliterated but inferred from ground ruptures reported by Slemmons (1956) and Tocher (1956). **U,** upthrown side; **D,** downthrown side.

Areas inundated in April 1988, mapped from Landsat TM imagery.

Scale 1:24,000

0 0.5 1 kilometer

0 0.5 1 mile

0 1000 2000 3000 4000 5000 feet

CONTOUR INTERVAL 5 FEET

Base map: U.S. Geological Survey
Pintail Bay 7.5' Quadrangle, 1969

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