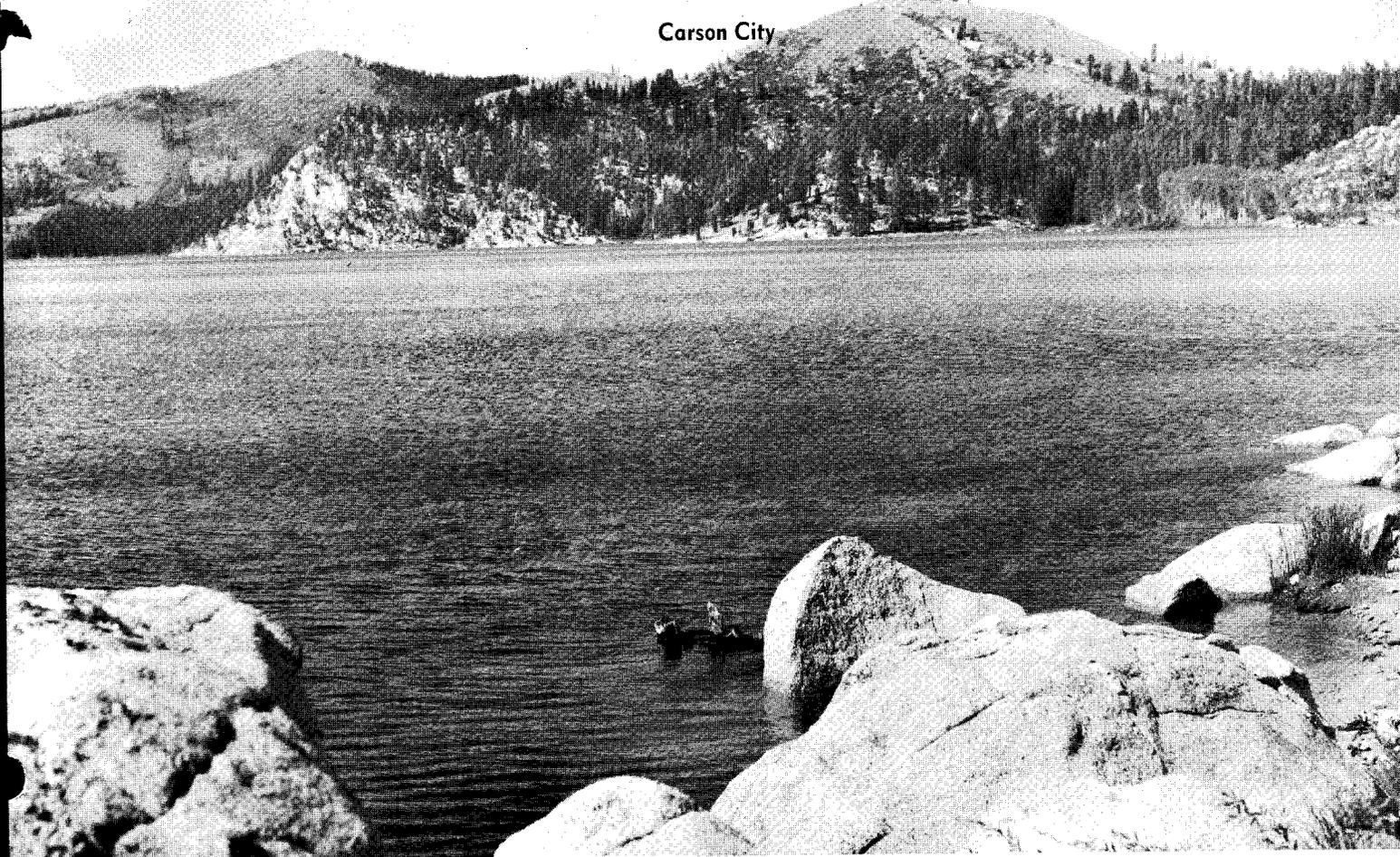


STATE OF NEVADA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES

Carson City



View of Marlette Lake

WATER RESOURCES—INFORMATION SERIES
REPORT 14

**BATHYMETRIC RECONNAISSANCE OF MARLETTE AND SPOONER LAKES,
WASHOE COUNTY AND CARSON CITY, NEVADA**

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Prepared cooperatively by the U.S. Geological Survey
and the Nevada Division of Water Resources

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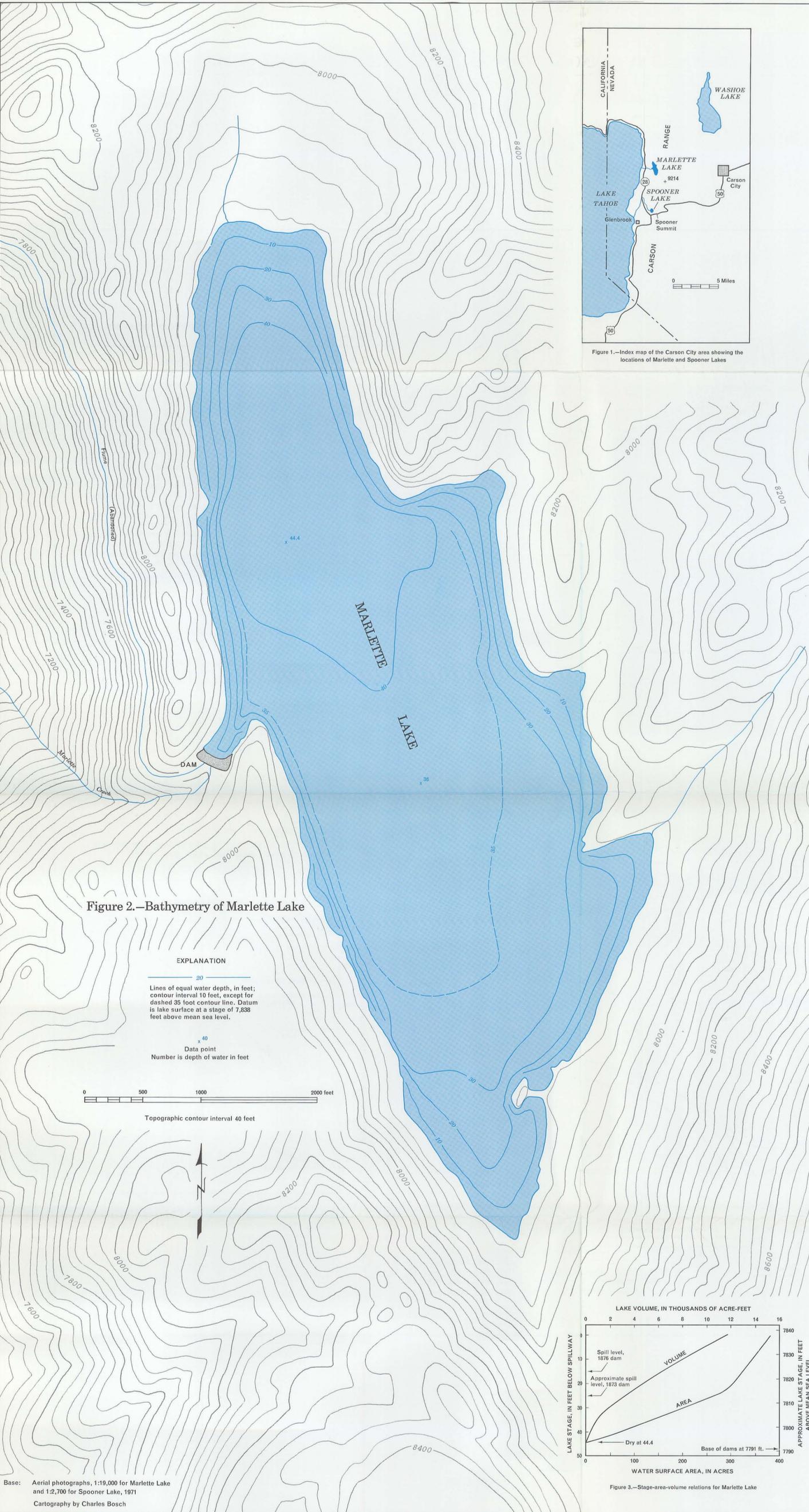


Figure 2.—Bathymetry of Marlette Lake

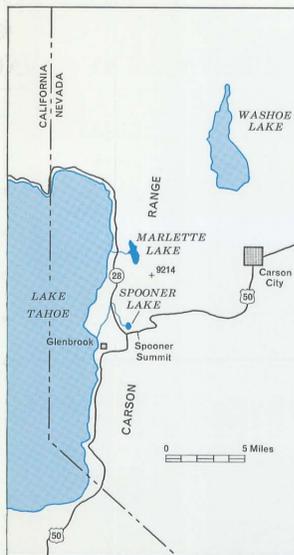


Figure 1.—Index map of the Carson City area showing the locations of Marlette and Spooner Lakes

INTRODUCTION

Marlette and Spooner Lakes are between Carson City and Lake Tahoe (fig. 1) in the Carson Range of the Sierra Nevada. Marlette Lake is at an altitude of 7,838 feet and Spooner Lake, at about 6,980 feet. Marlette Lake is about 1,600 feet higher than Lake Tahoe and about 3,200 feet higher than Carson City. Both lakes drain to Lake Tahoe; Marlette Lake by way of Marlette Creek and Spooner Lake by way of North Canyon and Slaughterhouse Creeks. Marlette Lake is in a consolidated-rock depression (graben), probably containing little sediment. Spooner Lake is in an alpine meadow area, probably underlain by a veneer of alluvium. Both lakes are surrounded by pine-covered mountain ridges and peaks extending as high as 9,000 feet at Marlette Lake and 7,800 feet at Spooner Lake.

The principal source of water for the lakes is snowmelt in their small basins; the Marlette Lake basin has an area of 3.0 square miles and Spooner Lake basin, about 1.2 square miles. Precipitation at Marlette and Spooner Lakes averages about 27 inches per year, or an average annual total of each basin of about 4,500 acre-feet and 1,700 acre-feet, respectively. Of these amounts, an estimated 60 percent runs off to the lakes. The principal use of Marlette Lake in 1971 was as a source of cutthroat trout spawn for the Nevada Department of Fish and Game and is administered by that department. Most of the land adjoining Marlette and Spooner Lakes is within the Lake Tahoe Nevada State Park.

In 1873, according to Galloway (1947) and the Nevada Legislative Commission (1969), Duane L. Bliss and H. M. Yerington (Carson and Tahoe Lumber and Fluming Company) placed a 26-foot high dirt-fill and rock dam (Scott, 1957, p. 301) across the natural outlet from a small lake, then called Goodwin Lake but later named Marlette Lake. Water from the reservoir was conveyed southward to Spooner Summit (fig. 1), by a 6-mile-long V-flume, where it was used to flume lumber 12 miles to a lumber yard a mile south of Carson City. Most of the lumber was transported to the summit by a short railroad (Lake Tahoe Railroad) extending past what is now Spooner Lake to sawmills at Glenbrook on the nearby shore of Lake Tahoe.

In 1876, the Virginia and Gold Hill Water Co. received consent from Bliss and Yerington to draw water from Marlette Lake to be conveyed to the Virginia City area, 17 miles to the northeast. The dam was raised to a reported height of 37 feet, with a length of 213 feet. The top of this dam was at an altitude of 7,828 feet, according to Walter G. Reid, Virginia City (written commun., 1971). With a maximum lake stage of 7,823 feet above sea level, the estimated storage volume was 6,100 acre-feet, according to Galloway (1947) and 5,000 acre-feet according to Reid. The Virginia and Gold Hill Water Co. built a 14-inch by 30-inch flume northward along the west side of the crest of the Carson Range, a distance of 4.38 miles, to the west portal of a tunnel extending eastward through the crest of the Carson Range. The tunnel, 3,994 feet long, connected to another flume which conveyed the water eastward to an inverted siphon and again by flume to Virginia City.

In 1959, the dam at Marlette Lake was raised 15 feet to an altitude of 7,843 feet, bringing the high-water line to 7,838 feet and the storage volume to an estimated 10,400 acre-feet (Reid, written commun., 1971). The tunnel that conveyed water for Virginia City collapsed prior to 1963, preventing the usual movement of water from Marlette Lake to Virginia City and Carson City. In 1966, a diesel-operated pump was installed to pump water from Marlette Lake through a pipeline over the crest of the Carson Range to Red House diversion dam, near Hobart Reservoir, 2 miles northeast of Marlette Lake. Pumping has been infrequent.

Spooner Lake was created prior to 1927 by the construction of a small earthen dam across a narrow part of Spooner Meadow, situated near and due north of the intersection of U.S. Highway 50 and State Route 28, as shown in figure 4. The lake was built by Charles L. Fulstone to store irrigation water. In the past, the lake was called Fulstone Reservoir and Spooner Meadow Reservoir.

Altitudes of the dam and lake are based on the approximate altitude of a nearby feature, a large rock at the north end of the dam. The top of this rock has an altitude of about 6,990.7 ± 1.0 feet.

BATHYMETRY

A continuously recording, electronic fathometer was used to measure the depths of Marlette and Spooner Lakes, making a total of 19 traverses on Marlette Lake and 17 on Spooner Lake. The results of the survey are summarized in figures 2, 3, 4, and 5. The dimensions of Marlette Lake at high-water lines with 1873, 1876, and the 1959 dams are summarized in the following tabulation:

Spillway level, 1873 dam

Stage, approximate (feet)	7,813 ± 1
Area (acres)	270 ± 13
Volume (acre-feet)	3,400 ± 300
Maximum depth (feet)	19.4 ± 1

Spillway level, 1876 dam

Stage (feet)	7,823
Area (acres)	325
Volume (acre-feet)	6,400
Maximum depth (feet)	29.4

Spillway level, 1959 dam

Stage (feet)	7,838
Area (acres)	381
Volume (acre-feet)	11,800
Maximum depth (feet)	44.4

It can be seen from the data presented in this report that previous estimates of lake volume for the old and present dams were low with reference to the data resulting from this bathymetric survey.

The bottom of Marlette Lake, or that area below a depth of 35 feet, generally can be characterized as a very gently sloping plane. The plane, dipping to the northwest, may have been formed as a horizontal playalike surface that has been tilted by faulting along the western margin of the lake. The short time since faulting has limited the modification of the surface by sedimentation or erosion.

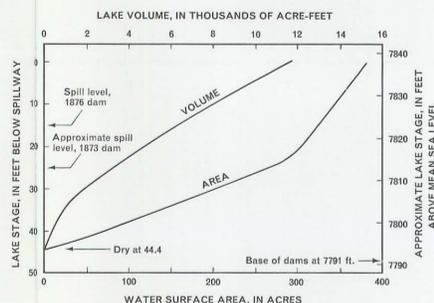


Figure 3.—Stage-area-volume relations for Marlette Lake

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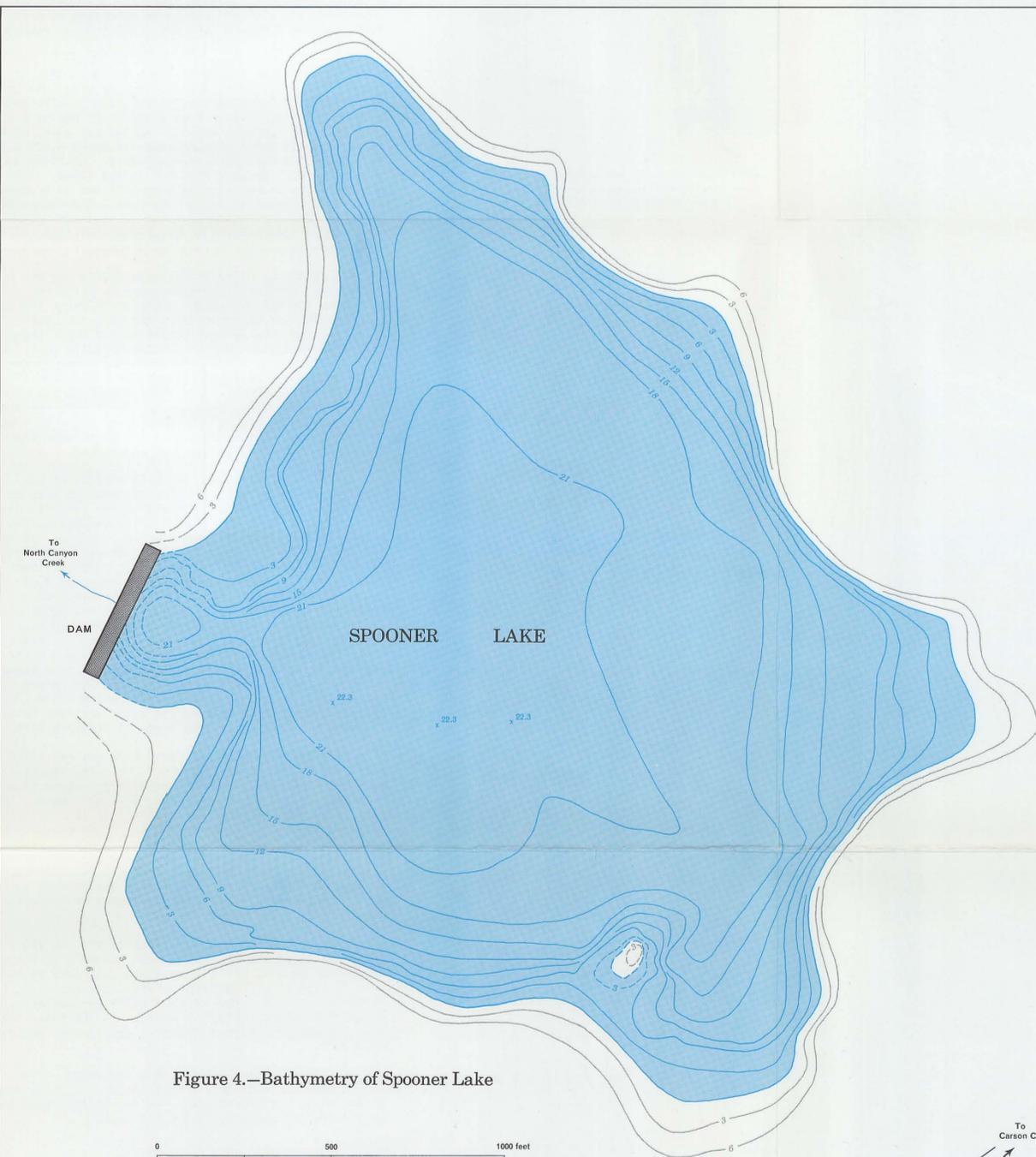
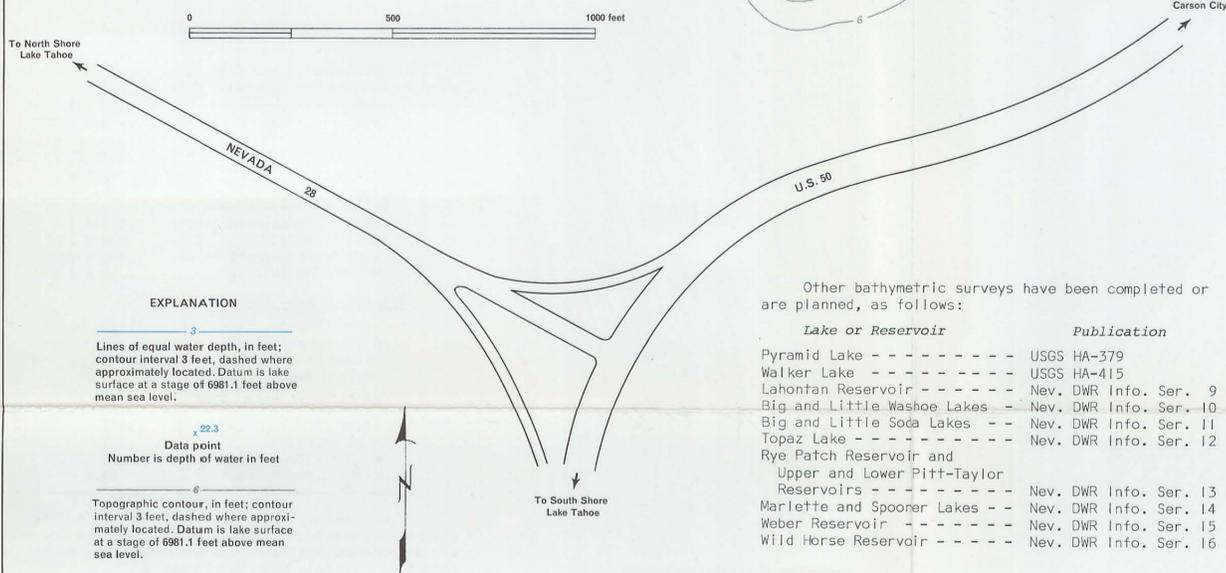


Figure 4.—Bathymetry of Spooner Lake



Other bathymetric surveys have been completed or are planned, as follows:

Lake or Reservoir	Publication
Pyramid Lake	USGS HA-379
Walker Lake	USGS HA-415
Lahontan Reservoir	Nev. DWR Info. Ser. 9
Big and Little Washoe Lakes	Nev. DWR Info. Ser. 10
Big and Little Soda Lakes	Nev. DWR Info. Ser. 11
Topaz Lake	Nev. DWR Info. Ser. 12
Rye Patch Reservoir and Upper and Lower Pitt-Taylor Reservoirs	Nev. DWR Info. Ser. 13
Marlette and Spooner Lakes	Nev. DWR Info. Ser. 14
Weber Reservoir	Nev. DWR Info. Ser. 15
Wild Horse Reservoir	Nev. DWR Info. Ser. 16

Dimensions of Spooner Lake at various stages are given in the following tabulation:

Time or condition	Stage (feet above mean sea level)	Area (acres)	Volume (acre-feet)
During bathymetric survey, July 1, 1971	6,976.8	84	1,030
December 2, 1971	6,975.4	80	910
At stage shown in figure 4	6,981.1	95	1,410
Overflow stage of dam	6,982.9	100	1,580

With reference to the above tabulation, it can be seen that the bathymetric map of Spooner Lake (fig. 4) was drawn at a stage about 4 feet higher than actual conditions during the time of the survey. This was done for two reasons: (1) to make the bathymetric map more meaningful by "filling" the lake, and (2) to provide the Nevada Department of Fish and Game with information on the character of the lake if more water were to be stored or if the dam were to be raised or replaced with a higher structure. The data needed to determine this increase in stage above existing field conditions in the summer of 1971 were obtained by instrument surveying peripheral to the lake.

At the time of the survey, water was leaking through or beneath the dam of Spooner Lake at an estimated rate of between 100 and 200 gallons per minute. This leakage is probably about of the same general magnitude as the evaporation from the lake, if both are evaluated on the basis of average annual quantities. Therefore, a somewhat higher stage probably could be maintained, if this leak were eliminated, as the leakage and evaporation probably are the two principal means of discharge from the lake.

REFERENCES

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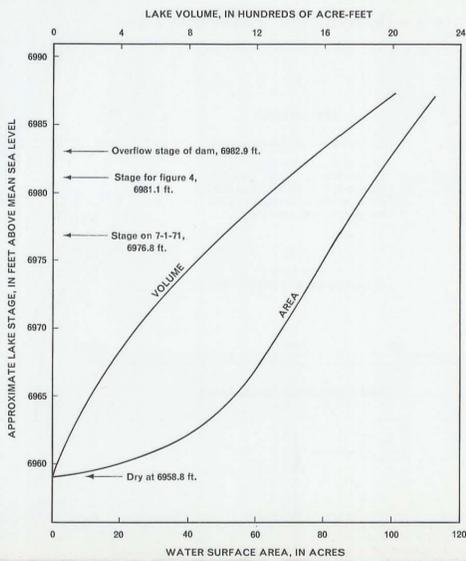


Figure 5.—Stage-area-volume relation for Spooner Lake