

INTRODUCTION
Pyramid Lake, about 30 miles northeast of Reno, Nev., is the terminal water body of the Truckee River system. The principal inflow to the lake is from the Truckee River; local drainage around the lake contributes little. There is no outlet stream; therefore the only outflow is by evaporation. Considerable interest in the lake has developed in recent years because it is an important feature in the management of water in the Truckee and Carson River systems, and because of its potential as a recreation area. An important tool in the evaluation of Pyramid Lake from a management and recreation standpoint is an adequate physiographic and hydrologic survey. This report was prepared under the general direction of G. F. Worts, Jr., district chief of the Geological Survey's Water Resources Division in Nevada.

HISTORY
The earliest written record of Pyramid Lake is in the diary of John C. Fremont, who encountered the lake in January 1844. The next record is that by King (1878), who visited the lake in 1867 and 1871. Russell (1885) surveyed the lake in August-September 1882. From records of these early visits and other evidence, the lake at that time, under natural conditions, covered about 140,000 acres (220 square miles), and its stage fluctuated perhaps as much as 20 feet between wet and dry periods (A. M. Piper, U.S. Geol. Survey, oral commun., 1968). Diversions from the Truckee River for irrigation began about 1860, and they were accelerated considerably following construction of the Truckee Canal in 1905 (fig. 1). The canal diverts water from the Truckee River to Lahontan Reservoir on the Carson River. Although some of this water is used for irrigation in the Ferry area, most is stored in Lahontan Reservoir for use in the Newlands project near Fallon. U.S. Bureau of Reclamation records show that an average of about 250,000 acre-feet per year was diverted into Truckee Canal during the period 1905-66. Altitudes of the level of Pyramid Lake from 1867 to 1968, taken from the U.S. Geological Survey records, are shown in figure 2. From 1909 to 1968 the lake level declined from an altitude of 3,869 feet to 3,789 feet above sea level, or 80 feet in 59 years.

BATHYMETRIC SURVEY
With the exception of a few fathometer surveys made by the Nevada Fish and Game Commission in the 1950's, the only previous systematic survey of Pyramid Lake was made by Russell in 1882 (1885, pl. 9). For the present survey, section corners and east-west section lines were used to locate accurately the present shoreline and control points for the fathometer survey grid. A boat-mounted recording fathometer was used to obtain cross-sectional profiles of the lake bottom. Twenty-three cross-sectional profiles were run in an east-west direction at one-mile intervals. One long profile was run roughly north-south from The Needle Rocks to Anaho Island. Additional fathometer soundings were made around The Needle Rocks, Anaho Island, The Pyramid, the mouth of the Truckee River, and several beach areas along the west shore. The boat was operated at a constant speed on all profiles, and was kept on line by transit crews on both shores, which were in radio contact with the boat. Hand soundings were made as checks on fathometer readings at 6, 25, 68, 282, and 322 feet. Aerial photography was obtained to provide details on the present shoreline configuration. Altitudes in this report are expressed in feet above mean sea level (datum of 1929, adjustment of 1956), referenced to U.S. Coast and Geodetic Survey benchmark N-21 at 3,940.29 feet altitude. The fathometer profiles and aerial photographs were used to contour the lake bottom.

LAKE AREA AND VOLUME
Tables 1 and 2 and figure 3 may be used to obtain the area and volume of the lake at given altitudes. Below altitude 3,789 feet, lake area and volume are based on the bathymetric survey above altitude 3,802 feet; they are based on planimetry of U.S. Geological Survey topographic maps at scales of 1:24,000 and 1:62,500 by A. M. Piper. Area and volume data have been extended to altitude 3,880 feet, which is approximately the highest recorded lake level.

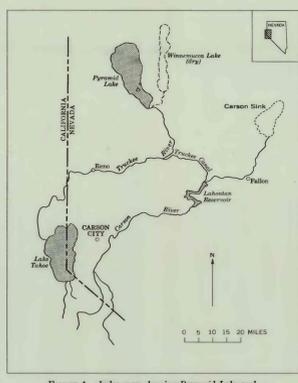


FIGURE 1.—Index map showing Pyramid Lake and the Truckee and Carson River systems.
FIGURE 2.—Water-surface fluctuations of Pyramid Lake, 1867-1968.

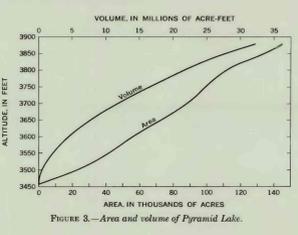


FIGURE 3.—Area and volume of Pyramid Lake.

PYRAMID AND ANAHO ISLANDS
As Pyramid Lake recedes, the effect on some of its prominent features is quite noticeable. Pyramid Island, for which the lake is named, is no longer an island but is now connected to the east shore by a narrow neck of land. Anaho Island, which is a National Wildlife Refuge, has been the nesting grounds for much of the bird life in the area. As the lake recedes, Anaho Island grows larger; and if the recession continues, it will soon be connected to the east shore much like Pyramid Island. In May, 1968, the width of the channel between Anaho Island and the east shore was 1,350 feet and its maximum depth was 27 feet.

TABLE 1.—Area of Pyramid Lake.

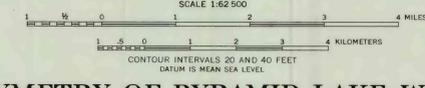
Altitude (feet)	0	1	2	3	4	5	6	7	8	9
3,880	144.3									
3,870	142.4	142.6	142.8	143.0	143.2	143.4	143.6	143.8	144.0	144.2
3,860	139.0	139.4	139.8	140.2	140.6	141.0	141.4	141.8	142.2	142.6
3,850	134.9	135.3	135.7	136.1	136.5	136.9	137.3	137.7	138.1	138.5
3,840	129.1	129.6	130.1	130.7	131.2	131.7	132.2	132.7	133.2	133.7
3,830	122.8	123.4	124.0	124.6	125.2	125.8	126.4	127.0	127.6	128.2
3,820	116.1	116.8	117.5	118.2	118.9	119.6	120.3	121.0	121.7	122.4
3,810	114.7	115.3	115.9	116.5	117.1	117.7	118.3	118.9	119.5	120.1
3,800	111.3	111.8	112.4	113.0	113.6	114.2	114.8	115.4	116.0	116.6
3,790	108.2	108.8	109.4	110.0	110.6	111.2	111.8	112.4	113.0	113.6
3,780	105.9	106.5	107.1	107.7	108.3	108.9	109.5	110.1	110.7	111.3
3,770	103.7	104.3	104.9	105.5	106.1	106.7	107.3	107.9	108.5	109.1
3,760	101.5	102.1	102.7	103.3	103.9	104.5	105.1	105.7	106.3	106.9
3,750	99.3	99.9	100.5	101.1	101.7	102.3	102.9	103.5	104.1	104.7
3,740	97.1	97.7	98.3	98.9	99.5	100.1	100.7	101.3	101.9	102.5
3,730	94.9	95.5	96.1	96.7	97.3	97.9	98.5	99.1	99.7	100.3
3,720	92.6	93.2	93.8	94.4	95.0	95.6	96.2	96.8	97.4	98.0
3,710	90.3	90.9	91.5	92.1	92.7	93.3	93.9	94.5	95.1	95.7
3,700	87.8	88.4	89.0	89.6	90.2	90.8	91.4	92.0	92.6	93.2
3,690	85.2	85.8	86.4	87.0	87.6	88.2	88.8	89.4	90.0	90.6
3,680	82.6	83.2	83.8	84.4	85.0	85.6	86.2	86.8	87.4	88.0
3,670	79.9	80.5	81.1	81.7	82.3	82.9	83.5	84.1	84.7	85.3
3,660	77.4	78.0	78.6	79.2	79.8	80.4	81.0	81.6	82.2	82.8
3,650	74.1	74.7	75.3	75.9	76.5	77.1	77.7	78.3	78.9	79.5
3,640	69.4	70.0	70.6	71.2	71.8	72.4	73.0	73.6	74.2	74.8
3,630	65.7	66.3	66.9	67.5	68.1	68.7	69.3	69.9	70.5	71.1
3,620	62.1	62.7	63.3	63.9	64.5	65.1	65.7	66.3	66.9	67.5
3,610	58.9	59.5	60.1	60.7	61.3	61.9	62.5	63.1	63.7	64.3
3,600	55.7	56.3	56.9	57.5	58.1	58.7	59.3	59.9	60.5	61.1
3,590	52.5	53.1	53.7	54.3	54.9	55.5	56.1	56.7	57.3	57.9
3,580	49.7	50.3	50.9	51.5	52.1	52.7	53.3	53.9	54.5	55.1
3,570	47.0	47.6	48.2	48.8	49.4	50.0	50.6	51.2	51.8	52.4
3,560	44.2	44.8	45.4	46.0	46.6	47.2	47.8	48.4	49.0	49.6
3,550	41.4	42.0	42.6	43.2	43.8	44.4	45.0	45.6	46.2	46.8
3,540	38.4	39.0	39.6	40.2	40.8	41.4	42.0	42.6	43.2	43.8
3,530	35.4	36.0	36.6	37.2	37.8	38.4	39.0	39.6	40.2	40.8
3,520	31.5	32.1	32.7	33.3	33.9	34.5	35.1	35.7	36.3	36.9
3,510	27.6	28.2	28.8	29.4	30.0	30.6	31.2	31.8	32.4	33.0
3,500	23.0	23.6	24.2	24.8	25.4	26.0	26.6	27.2	27.8	28.4
3,490	17.5	18.1	18.7	19.3	19.9	20.5	21.1	21.7	22.3	22.9
3,480	11.8	12.4	13.0	13.6	14.2	14.8	15.4	16.0	16.6	17.2
3,470	5.9	6.5	7.1	7.7	8.3	8.9	9.5	10.1	10.7	11.3
3,460										
3,450										

TABLE 2.—Volume of Pyramid Lake.

Altitude (feet)	0	1	2	3	4	5	6	7	8	9
3,880	32,020									
3,870	30,280	30,730	31,180	31,630	32,080	32,530	32,980	33,430	33,880	34,330
3,860	29,130	29,580	30,030	30,480	30,930	31,380	31,830	32,280	32,730	33,180
3,850	27,610	28,060	28,510	28,960	29,410	29,860	30,310	30,760	31,210	31,660
3,840	26,490	26,940	27,390	27,840	28,290	28,740	29,190	29,640	30,090	30,540
3,830	25,230	25,680	26,130	26,580	27,030	27,480	27,930	28,380	28,830	29,280
3,820	24,090	24,540	24,990	25,440	25,890	26,340	26,790	27,240	27,690	28,140
3,810	22,560	23,010	23,460	23,910	24,360	24,810	25,260	25,710	26,160	26,610
3,800	21,720	22,170	22,620	23,070	23,520	23,970	24,420	24,870	25,320	25,770
3,790	20,820	21,270	21,720	22,170	22,620	23,070	23,520	23,970	24,420	24,870
3,780	19,660	20,110	20,560	21,010	21,460	21,910	22,360	22,810	23,260	23,710
3,770	18,500	18,950	19,400	19,850	20,300	20,750	21,200	21,650	22,100	22,550
3,760	17,480	17,930	18,380	18,830	19,280	19,730	20,180	20,630	21,080	21,530
3,750	16,470	16,920	17,370	17,820	18,270	18,720	19,170	19,620	20,070	20,520
3,740	15,490	15,940	16,390	16,840	17,290	17,740	18,190	18,640	19,090	19,540
3,730	14,520	14,970	15,420	15,870	16,320	16,770	17,220	17,670	18,120	18,570
3,720	13,580	14,030	14,480	14,930	15,380	15,830	16,280	16,730	17,180	17,630
3,710	12,660	13,110	13,560	14,010	14,460	14,910	15,360	15,810	16,260	16,710
3,700	11,760	12,210	12,660	13,110	13,560	14,010	14,460	14,910	15,360	15,810
3,690	10,880	11,330	11,780	12,230	12,680	13,130	13,580	14,030	14,480	14,930
3,680	10,020	10,470	10,920	11,370	11,820	12,270	12,720	13,170	13,620	14,070
3,670	9,270	9,720	10,170	10,620	11,070	11,520	11,970	12,420	12,870	13,320
3,660	8,540	8,990	9,440	9,890	10,340	10,790	11,240	11,690	12,140	12,590
3,650	7,940	8,390	8,840	9,290	9,740	10,190	10,640	11,090	11,540	11,990
3,640	7,400	7,850	8,300	8,750	9,200	9,650	10,100	10,550	11,000	11,450
3,630	6,920	7,370	7,820	8,270	8,720	9,170	9,620	10,070	10,520	10,970
3,620	6,500	6,950	7,400	7,850	8,300	8,750	9,200	9,650	10,100	10,550
3,610	6,140	6,590	7,040	7,490	7,940	8,390	8,840	9,290	9,740	10,190
3,600	5,840	6,290	6,740	7,190	7,640	8,090	8,540	8,990	9,440	9,890
3,590	5,590	6,040	6,490	6,940	7,390	7,840	8,290	8,740	9,190	9,640
3,580	5,390	5,840	6,290	6,740	7,190	7,640	8,090	8,540	8,990	9,440
3,570	5,240	5,690	6,140	6,590	7,040	7,490	7,940	8,390	8,840	9,290
3,560	5,140	5,590	6,040	6,490	6,940	7,390	7,840	8,290	8,740	9,190
3,550	5,090	5,540	5,990	6,440	6,890	7,340	7,790	8,240	8,690	9,140
3,540	5,040	5,490	5,940	6,390	6,840	7,290	7,740	8,190	8,640	9,090
3,530	5,000	5,450	5,900	6,350	6,800	7,250	7,700	8,150	8,600	9,050
3,520	4,960	5,410	5,860	6,310	6,760	7,210	7,660	8,110	8,560	9,010
3,510	4,920	5,370	5,820	6,270	6,720	7,170	7,620	8,070	8,520	8,970
3,500	4,880	5,330	5,780	6,230	6,680	7,130	7,580	8,030	8,480	8,930
3,490	4,840	5,290	5,740	6,190	6,640	7,090	7,540	7,990	8,440	8,890
3,480	4,800	5,250	5,700	6,150	6,600	7,050	7,500	7,950	8,400	8,850
3,470	4,760	5,210	5,660	6,110	6,560	7,010	7,460	7,910	8,360	8,810
3,460	4,720	5,170	5,620	6,070	6,520	6,970	7,420	7,870	8,320	8,770
3,450	4,680	5,130	5,580	6,030	6,480	6,930	7,380	7,830	8,280	8,730

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Russell, I. C., 1885, Geological history of Lake Lahontan, a Quaternary lake of northwestern Nevada: U.S. Geol. Survey monograph 11, 288 p.

Base from U.S. Geological Survey 1:24,000
The Needle Rocks, Pyramid NE, Pyramid SW,
Tohokum Peak NW, Tohokum Peak SE, Dove Creek,
1964 and 1:62,500, Nixon and Sutcliffe, 1957



RECONNAISSANCE BATHYMETRY OF PYRAMID LAKE, WASHOE COUNTY, NEVADA

By
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1970