

#### 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 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 Fertile area, most is stored in Lahontan Reservoir for use in the Nevada 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 1905-68.

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 1960'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.

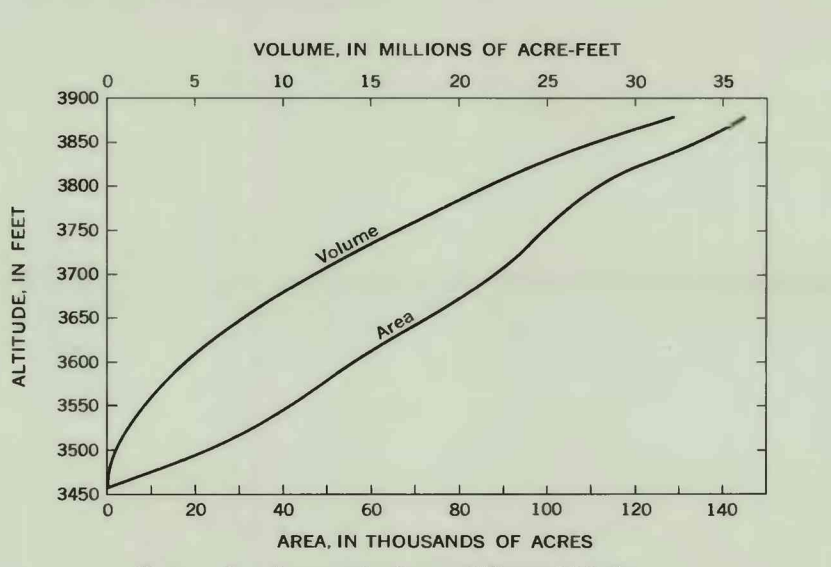


FIGURE 3.—Area and volume of Pyramid Lake.

#### 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)	(thousands of acres)									
	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	123.8	124.3	124.9	125.4	125.9	126.4	127.0	127.5	128.0	128.6
3,820	118.6	119.1	119.6	120.1	120.7	121.2	121.7	122.2	122.8	123.3
3,810	114.7	115.1	115.6	116.1	116.6	117.1	117.6	118.1	118.6	119.1
3,800	111.3	111.8	112.3	112.8	113.3	113.8	114.3	114.8	115.3	115.8
3,790	108.2	108.6	109.1	109.6	110.1	110.6	111.1	111.6	112.1	112.6
3,780	105.3	105.7	106.2	106.7	107.2	107.7	108.2	108.7	109.2	109.7
3,770	102.7	103.1	103.6	104.1	104.6	105.1	105.6	106.1	106.6	107.1
3,760	100.5	100.9	101.4	101.9	102.4	102.9	103.4	103.9	104.4	104.9
3,750	98.5	98.9	99.4	99.9	100.4	100.9	101.4	101.9	102.4	102.9
3,740	96.7	97.1	97.6	98.1	98.6	99.1	99.6	100.1	100.6	101.1
3,730	95.1	95.5	96.0	96.5	97.0	97.5	98.0	98.5	99.0	99.5
3,720	93.6	94.0	94.5	95.0	95.5	96.0	96.5	97.0	97.5	98.0
3,710	92.2	92.6	93.1	93.6	94.1	94.6	95.1	95.6	96.1	96.6
3,700	90.8	91.2	91.7	92.2	92.7	93.2	93.7	94.2	94.7	95.2
3,690	89.5	89.9	90.4	90.9	91.4	91.9	92.4	92.9	93.4	93.9
3,680	88.2	88.6	89.1	89.6	90.1	90.6	91.1	91.6	92.1	92.6
3,670	87.0	87.4	87.9	88.4	88.9	89.4	89.9	90.4	90.9	91.4
3,660	85.8	86.2	86.7	87.2	87.7	88.2	88.7	89.2	89.7	90.2
3,650	84.6	85.0	85.5	86.0	86.5	87.0	87.5	88.0	88.5	89.0
3,640	83.5	83.9	84.4	84.9	85.4	85.9	86.4	86.9	87.4	87.9
3,630	82.4	82.8	83.3	83.8	84.3	84.8	85.3	85.8	86.3	86.8
3,620	81.3	81.7	82.2	82.7	83.2	83.7	84.2	84.7	85.2	85.7
3,610	80.2	80.6	81.1	81.6	82.1	82.6	83.1	83.6	84.1	84.6
3,600	79.1	79.5	80.0	80.5	81.0	81.5	82.0	82.5	83.0	83.5
3,590	78.0	78.4	78.9	79.4	79.9	80.4	80.9	81.4	81.9	82.4
3,580	76.9	77.3	77.8	78.3	78.8	79.3	79.8	80.3	80.8	81.3
3,570	75.8	76.2	76.7	77.2	77.7	78.2	78.7	79.2	79.7	80.2
3,560	74.7	75.1	75.6	76.1	76.6	77.1	77.6	78.1	78.6	79.1
3,550	73.6	74.0	74.5	75.0	75.5	76.0	76.5	77.0	77.5	78.0
3,540	72.5	72.9	73.4	73.9	74.4	74.9	75.4	75.9	76.4	76.9
3,530	71.4	71.8	72.3	72.8	73.3	73.8	74.3	74.8	75.3	75.8
3,520	70.3	70.7	71.2	71.7	72.2	72.7	73.2	73.7	74.2	74.7
3,510	69.2	69.6	70.1	70.6	71.1	71.6	72.1	72.6	73.1	73.6
3,500	68.1	68.5	69.0	69.5	70.0	70.5	71.0	71.5	72.0	72.5
3,490	67.0	67.4	67.9	68.4	68.9	69.4	69.9	70.4	70.9	71.4
3,480	65.9	66.3	66.8	67.3	67.8	68.3	68.8	69.3	69.8	70.3
3,470	64.8	65.2	65.7	66.2	66.7	67.2	67.7	68.2	68.7	69.2
3,460	63.7	64.1	64.6	65.1	65.6	66.1	66.6	67.1	67.6	68.1
3,450	62.6	63.0	63.5	64.0	64.5	65.0	65.5	66.0	66.5	67.0
3,440	61.5	61.9	62.4	62.9	63.4	63.9	64.4	64.9	65.4	65.9
3,430	60.4	60.8	61.3	61.8	62.3	62.8	63.3	63.8	64.3	64.8
3,420	59.3	59.7	60.2	60.7	61.2	61.7	62.2	62.7	63.2	63.7
3,410	58.2	58.6	59.1	59.6	60.1	60.6	61.1	61.6	62.1	62.6
3,400	57.1	57.5	58.0	58.5	59.0	59.5	60.0	60.5	61.0	61.5
3,390	56.0	56.4	56.9	57.4	57.9	58.4	58.9	59.4	59.9	60.4
3,380	54.9	55.3	55.8	56.3	56.8	57.3	57.8	58.3	58.8	59.3
3,370	53.8	54.2	54.7	55.2	55.7	56.2	56.7	57.2	57.7	58.2
3,360	52.7	53.1	53.6	54.1	54.6	55.1	55.6	56.1	56.6	57.1
3,350	51.6	52.0	52.5	53.0	53.5	54.0	54.5	55.0	55.5	56.0
3,340	50.5	50.9	51.4	51.9	52.4	52.9	53.4	53.9	54.4	54.9
3,330	49.4	49.8	50.3	50.8	51.3	51.8	52.3	52.8	53.3	53.8
3,320	48.3	48.7	49.2	49.7	50.2	50.7	51.2	51.7	52.2	52.7
3,310	47.2	47.6	48.1	48.6	49.1	49.6	50.1	50.6	51.1	51.6
3,300	46.1	46.5	47.0	47.5	48.0	48.5	49.0	49.5	50.0	50.5
3,290	45.0	45.4	45.9	46.4	46.9	47.4	47.9	48.4	48.9	49.4
3,280	43.9	44.3	44.8	45.3	45.8	46.3	46.8	47.3	47.8	48.3
3,270	42.8	43.2	43.7	44.2	44.7	45.2	45.7	46.2	46.7	47.2
3,260	41.7	42.1	42.6	43.1	43.6	44.1	44.6	45.1	45.6	46.1
3,250	40.6	41.0	41.5	42.0	42.5	43.0	43.5	44.0	44.5	45.0
3,240	39.5	39.9	40.4	40.9	41.4	41.9	42.4	42.9	43.4	43.9
3,230	38.4	38.8	39.3	39.8	40.3	40.8	41.3	41.8	42.3	42.8
3,220	37.3	37.7	38.2	38.7	39.2	39.7	40.2	40.7	41.2	41.7
3,210	36.2	36.6	37.1	37.6	38.1	38.6	39.1	39.6	40.1	40.6
3,200	35.1	35.5	36.0	36.5	37.0	37.5	38.0	38.5	39.0	39.5
3,190	34.0	34.4	34.9	35.4	35.9	36.4	36.9	37.4	37.9	38.4
3,180	32.9	33.3	33.8	34.3	34.8	35.3	35.8	36.3	36.8	37.3
3,170	31.8	32.2	32.7	33.2	33.7	34.2	34.7	35.2	35.7	36.2
3,160	30.7	31.1	31.6	32.1	32.6	33.1	33.6	34.1	34.6	35.1
3,150	29.6	30.0	30.5	31.0	31.5	32.0	32.5	33.0	33.5	34.0
3,140	28.5	28.9	29.4	29.9	30.4	30.9	31.4	31.9	32.4	32.9
3,130	27.4	27.8	28.3	28.8	29.3	29.8	30.3	30.8	31.3	31.8
3,120	26.3	26.7	27.2	27.7	28.2	28.7	29.2	29.7	30.2	30.7
3,110	25.2	25.6	26.1	26.6	27.1	27.6	28.1	28.6	29.1	29.6
3,100	24.1	24.5	25.0	25.5	26.0	26.5	27.0	27.5	28.0	28.5
3,090	23.0	23.4	23.9	24.4	24.9	25.4	25.9	26.4	26.9	27.4
3,080	21.9	22.3	22.8	23.3	23.8	24.3	24.8	25.3	25.8	26.3
3,070	20.8	21.2	21.7	22.2	22.7	23.2	23.7	24.2	24.7	25.2
3,060	19.7	20.1	20.6	21.1	21.6	22.1	22.6	23.1	23.6	24.1
3,050	18.6	19.0	19.5	20.0	20.5	21.0	21.5	22.0	22.5	23.0
3,040	17.5	17.9	18.4	18.9	19.4	19.9	20.4	20.9	21.4	21.9
3,030	16.4	16.8	17.3	17.8	18.3	18.8	19.3	19.8	20.3	20.8
3,020	15.3	15.7	16.2	16.7	17.2	17.7	18.2	18.7	19.2	19.7
3,010	14.2	14.6	15.1	15.6	16.1	16.6	17.1	17.6	18.1	18.6
3,000	13.1	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5
2,990	12.0	12.4	12.9	13.4	13.9	14.4	14.9	15.4	15.9	16.4
2,980	10.9	11.3	11.8	12.3	12.8	13.3	13.8	14.3	14.8	15.3
2,970	9.8	10.2	10.7	11.2	11.7	12.2	12.7	13.2	13.7	14.2
2,960	8.7	9.1	9.6	10.1	10.6	11.1	11.6	12.1	12.6	13.1
2,950	7.6	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0
2,940	6.5	6.9	7.4	7.9	8.4	8.9	9.4	9.9	10.4	10.9
2,930	5.4	5.8	6.3	6.8	7.3	7.8	8.3	8.8	9.3	9.8
2,920	4.3	4.7	5.2	5.7	6.2	6.7	7.2	7.7	8.2	8.7