

LAKE MARY

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Introduction

Lake Mary is a high elevation glacial lake in Big Cottonwood Canyon east of Salt Lake City. It has been augmented with a dam and retains winter snowmelt until summer for culinary use in the Salt Lake Valley. It is within the Brighton Ski Resort, and also receives heavy summer recreational use.

Lake Mary was deepened and enlarged in 1915

by construction of a 72' concrete dam. The reservoir shoreline is 95% publicly owned by the Wasatch-Cache National Forest. Public access is unrestricted. Current water use is for culinary purposes and some recreation with no changes expected.

Characteristics and Morphometry

Lake elevation (meters / feet)	2,903 / 9,528
Surface area (hectares / acres)	9.3 / 23
Watershed area (hectares / acres)	103 / 339
Volume (m ³ / acre-feet)	
capacity	740,101 / 600
conservation pool	
Annual inflow (m ³ / acre-feet)	
Retention time (years)	
Drawdown (meters / feet)	
Depth (meters / feet)	
maximum	27.4 / 90
mean	9.1 / 30
Length (meters / feet)	483 / 1,584
Width (meters / feet)	274 / 898
Shoreline (meters / feet)	1,247 / 4,092

Location

County	Salt Lake
Longitude / Latitude	111 35 17 / 40 35 17
USGS Map	Brighton 1955
DeLorme's Utah Atlas and Gazetteer™	Page 53 C-6
(Not labeled on map, one mile southeast of Twin Lakes Res)	
Cataloging Unit	Jordan (16020204)

Recreation

Lake Mary is on the hiking route from Brighton to Alta. Access is easiest from the top of Big Cottonwood Canyon. Exit I-215 at Exit 7 (South of I-80 and east of I-15) and follow signs to Big Cottonwood Canyon and Brighton Ski Resort. At the top of the canyon, locate the Sunset Peak Trailhead and follow the trail about 0.75 miles to the lake. Although Big Cottonwood Canyon is plowed throughout the

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inter, the lake is most easily accessed between Memorial

Day and before the first heavy snowfall of the autumn. Summer access to Big Cottonwood Canyon is also possible via improved gravel road from Park City or Midway.

The lake offers fishing and solitude. Because the lake is a culinary water source, swimming is not permitted. Most visitors do not have this lake as a destination, but are enjoying the experience of hiking around under high mountain peaks and glacial lakes.

The lake is in a popular hiking area. Sunset Peak, Lake Martha, and Lake Catherine are all renowned for their scenic beauty. While such high elevation lakes are common below the ridgeline from Park City to Lone Peak, this area is popular because of easy automobile access.

Redman Campground, administered by the USFS, is between Brighton and Solitude Ski Resorts, and has 37 campsites, drinking water, toilets and picnic sites. Spruces Recreation Area is several miles down canyon and has 90 campsites.

Watershed Description

Lake Mary is a cirque lake just under the peaks of the Wasatch Mountains. The lake lies just above the timberline, with barren peaks rising 1,200 feet above the lake and slopes up to 100%. The watershed is very small. There are no ski runs in the watershed, but adjacent basins to the northeast and southwest are routinely revegetated to maintain ski runs.

The watershed high point, Mount Wolverine, is 3,290 m (10,795 ft) above sea level, thereby developing a complex slope of 40.3% to the reservoir. Inflow is from snowmelt, with no perennial streams. The outflow is a small stream that joins Big Cottonwood Creek in Brighton. Lake Catherine and Lake Martha are two smaller lakes within the watershed.

The soil in the watershed is entirely glacial till and barren rock. See Appendix III for a complete soil description.

The vegetation communities are composed of aspen, pine, spruce-fir and alpine. The watershed receives 127 cm (50 inches) of precipitation annually with a frost-free season of 20 - 40 days.

Land use is 100% recreation. There is no grazing in the watershed, and dogs are prohibited.

Limnological Assessment

The water quality of Lake Mary is considered very good. It is considered to be soft with a hardness concentration value of approximately 23 mg/L (CaCO₃). The only parameter that has exceeded State water quality standards for defined beneficial uses is phosphorus. Prior

to 1992 total phosphorus concentration were well below the pollution indicator. In 1992 the average concentration of total phosphorus in the water column was 55 ug/L which exceeds the recommended pollution indicator for phosphorus of 25 ug/L. The phosphorus concentration in the hypolimnion on September 3, 1991 reached a level of 143 ug/L. The average concentration in the water column on that date was 103 ug/L. This increased concentration occurred even though the depth of the lake was 10 meters with aerobic conditions present throughout the water column (3.1 ug/L near the bottom). This is not consistent with previous data and additional data will need to be obtained to confirm these increases in nutrient concentrations. A review of the September 3, 1992 profile indicates a sharp decline in temperatures near the bottom with no stratification present. It should be noted that this profile was obtained immediately adjacent to the dam by lowering the field instrumentation from the crest of the dam. Although in 1981 the reservoir was characterized as a phosphorus limited system, the 1990-92 data suggest that the reservoir is currently a nitrogen limited system. TSI values indicate the reservoir is mesotrophic with the exception of 1992 when high phosphorus and chlorophyll-

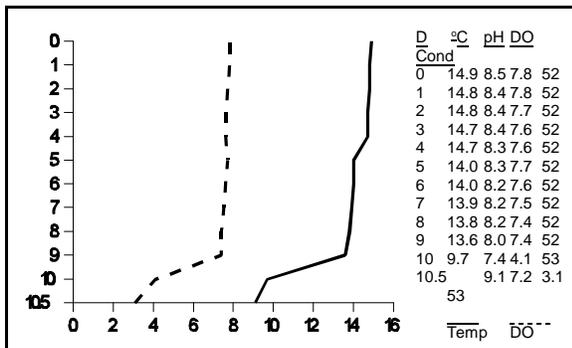
Limnological Data			
Data sampled from STORET site: 591168			
Surface Data	1981	1990	1992
Trophic Status	M	M	E
Chlorophyll TSI	-	39.19	51.59
Secchi Depth TSI	-	57.37	47.05
Phosphorous TSI	42.50	29.98	55.62
Average TSI	42.50	42.18	51.53
Chlorophyll <i>a</i> (ug/L)	-	2.4	8.5
Transparency (m)	-	1.2	2.45
Total Phosphorous (mg/L)	5	6	36
pH	6.6	8.6	7.8
Total Susp. Solids (mg/L)	<5	<3	4.3
Total Volatile Solids (mg/L)	-	-	2
Total Residual Solids (mg/L)	-	-	3
Temperature (°C / °f)	18/64	15/59	14/57
Conductivity (umhos.cm)	27	62	55
Water Column Data			
Ammonia (mg/L)	0.05	0.03	0.03
Nitrate/Nitrite (mg/L)	.17	0.09	0.04
Hardness (mg/L)	25	23.2	20.2
Alkalinity (mg/L)	19	21	21
Silica (mg/L)	-	-	1.7
Total Phosphorus (ug/L)	5	8	55
Miscellaneous Data			
Limiting Nutrient	P	N	N
DO (Mg/l) at 75% depth	-	6.9	7.4
Stratification (m)	-	NO	9-10
Depth at Deepest Site (m)	-	8	10.5

LAKE REPORTS

a values late in the season shifted the status to eutrophic. The eutrophic status in 1992 appears abnormal but additional data will need to be collected to verify this trend. According to DWR no fish kills have been reported in recent years. The lake has not been treated for rough fish competition, so populations of native fishes may still be present in the lake. The DWR reports that the only fish Lake Mary is presently stocked with is brook trout (*Salvelinus fontinalis*) fingerlings. A few lake trout (*S. namaycush*) have survived from an initial plant made in the 60's and 70's. Redside shiner (*Richardsonius balteatus*) is also found in the reservoir. Fishing is allowed from the shore only and swimming and wading in the lake are prohibited.

No phytoplankton samples have been taken during our study period.

Information	
Management Agencies	
Salt Lake County Commission	468-3610
Wasatch National Forest	524-5030
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146
Recreation	
Reservoir Administrators	
Salt Lake City Corporation	535-7880



Pollution Assessment

Nonpoint pollution sources include: human wastes and litter from recreation. There are no domestic animals permitted in the watershed.

There are no point pollution sources in the watershed.

Beneficial Use Classification

The state beneficial use classifications include: culinary (1C), boating and similar recreation (excluding swimming) (2B), and cold water game fish and organisms in their foodchain (3A).