

MARSHALL LAKE



Introduction

Marshall Lake is a small, natural lake in the western High Uintas. Biologically and geologically it is comparable to hundreds of similar lakes in the High Uintas. It is included in this report for that reason and because it is accessible by vehicle. It is near the Mirror Lake area, but accessible from the Murdock Basin Road. It has two sister

lakes, Shepherd and Hoover. Hoover is also included in this report.

The lake shoreline is owned by the Wasatch-Cache National Forest, and public access is unrestricted. The

Characteristics and Morphometry

Lake elevation (meters / feet)	3,045 / 9,990
Surface area (hectares / acres)	7 / 18
Watershed area (hectares / acres)	43 / 106
Volume (m ³ / acre-feet)	
capacity	310,842 / 252
conservation pool	
Annual inflow (m ³ / acre-feet)	
Retention time (years)	
Drawdown (m ³ / acre-feet)	
Depth (meters / feet)	
maximum	11 / 36
mean	4.3 / 14
Length (meters / feet)	35 / 1,150
Width (meters / feet)	305 / 1,000
Shoreline (meters / feet)	1,189 / 3,900

Location

County	Duchesne
Longitude / Latitude	110 52 25 / 40 40 32
USGS Map	Hayden Peak, UT 1972
DeLorme's Utah Atlas & Gazetteer™	Page 54, B-3
Cataloging Unit	Duchesne (16060003)

lake drainage is part of the headwaters of the Duchesne River.

Recreation

Marshall Lake is accessible by a two mile hike from the Moosehorn Campground, just south of Mirror Lake. Follow the trail to the east and south to Shepherd Lake, then go due south along the base of the escarpment (a good map and a compass are helpful) for several hundred meters to Marshall Lake. To get there by vehicle take the Murdock Basin turnoff (about 21 miles east of Kamas or

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10 miles southwest from Mirror Lake). Follow FS-027 and
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137 (gravel roads) for about 8 miles. About 1/2 mile before the end of the road, (there are probably no signs) there is a turnoff which leads due west for about 1/4 mile to the lake. The lake is approximately 100 yards to the northwest..

Fishing, camping, picnicking, scenic beauty and hiking are all popular. The lake is too small for motorized boats. Air and water temperatures are too cold for most swimmers. The backdrop of high, barren peaks are reflected in the still water of the lake.

The area receives heavy recreational use throughout the summer. Tread lightly so that the area remains relatively pristine. U-150 is closed during the winter and much of the spring, but groomed for cross country skiers and snowmobilers.

There are no recreational facilities at the lake, but there are campgrounds on U-150. If you camp in the area, pack out your trash.

Watershed Description

Marshall Lake is located in the western end of the High Uintas. The watershed is very small. The lake is perched on a bench high on the Duchesne River Gorge, and at the foot of Murdock Mountain, a 500' high rocky escarpment. The area is densely forested, interspersed with rocky peaks and barren peaks. In this area of the Uintas, glaciation has removed the majority of the high mountains, with isolated peaks remaining.

The watershed high point, the south arm of Murdock Mountain, is 3,286 m (10,780 ft) above sea level, thereby developing a complex slope of 55.8% to the reservoir. There are no streams flowing into the lake, but because of the high elevation, snowmelt runoff flows into the summer period. There is no surface outflow.

The watershed is made up of high mountains and rocky outcroppings. The soil associations that compose the watershed are listed in Appendix III.

The vegetation communities consist of pine, oak, maple, spruce-fir, aspen, and alpine. The watershed receives 76 - 102 cm (30 - 40 inches) of precipitation annually. The frost-free season around the reservoir is 0 - 20 days per year.

The watershed is 100% recreation. The watershed is too high and rocky to be of any other use.

Limnological Assessment

The water quality of Marshall Reservoir is very good. It is considered to be very soft with a hardness concentration value of approximately 8.5 mg/L (CaCO₃). Although there are no average water column concentrations that exceed State water quality standards, there are violations of parameters near the bottom of the lake. These parameters include phosphorus, dissolved oxygen and pH. At various times of the year, the

hypolimnion of the lake develops oxygen deficiencies. Most of the occurrence are noted during the first monitoring trip usually in June. It may be that anoxic conditions developed during the winter are still exerting an influence in lower depths of the reservoir. There are also some low dissolved oxygen values reported during late summer. These values typically are in the 2-3 mg/L range. Total phosphorus values reported in the hypolimnion are slightly higher than the recommended pollution indicator value of 25 ug/L with values reported in the range of 40 ug/L. The pH values have dipped to a low of 5.2 on one occasion. Although these exceedences have occurred, it does not appear that the water quality is significantly impaired. It does indicate that some winter monitoring should be conducted to determine the extent of impairment present during extended ice coverage.

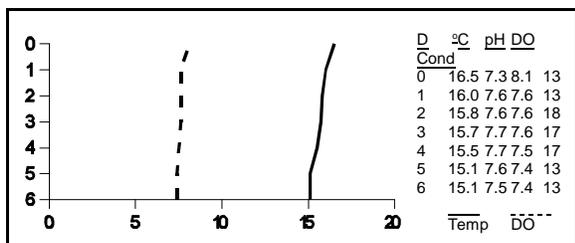
Stratification in the lake does occur. Although the profile shown of August 5, 1992 does not show it, stratification has been evident during other years. As stratified conditions develop they will contribute to the process of oxygen loss as previously discussed. Current

Limnological Data			
Data sampled from STORET site: 593592			
Surface Data	<u>1981</u>	<u>1990</u>	<u>1992</u>
Trophic Status	M	O	0
Chlorophyll TSI	-	34.90	26.37
Secchi Depth TSI	38	39.32	34.79
Phosphorous TSI	47	34.57	27.35
Average TSI	42.5	36.26	29.50
Chlorophyll <i>a</i> (ug/L)	-	1.6	0.6
Transparency (m)	4.5	4.2	5.8
Total Phosphorous (ug/L)	20	8	5
pH	8.1	7.1	6.7
Total Susp. Solids (mg/L)	<5	<3	<3
Total Volatile Solids (mg/L)	-	-	0
Total Residual Solids (mg/L)	-	-	3
Temperature (°C / °f)	16/61	16/60	15/58
Conductivity (umhos.cm)	11	9	15
Water Column Data			
Ammonia (mg/L)	0.05	0.03	0.03
Nitrate/Nitrite (mg/L)	0.06	-	0.03
Hardness (mg/L)	10	7.9	7.6
Alkalinity (mg/L)	6	23	5
Silica (mg/L)	-	-	0.5
Total Phosphorous (ug/L)	20	17	12
Miscellaneous Data			
Limiting Nutrient	N	N	N
DO (Mg/l) at 75% depth	6.6	5.1	7.5
Stratification (m)	2-6	5-7	NO
Depth at Deepest Site (m)	9	10	5.5

data suggest that the reservoir is currently a nitrogen limited system. TSI values indicate the reservoir is oligotrophic in a state of low productivity.

According to DWR no fish kills have been reported in recent years. The reservoir supports a population of brook trout (*Salvelinus fontinalis*). The lake has not been treated for rough fish competition, so populations of native fishes may still be present in the lake.

cold water game fish and organisms in their food chain (3A) and agricultural uses (4).



Information	
Management Agencies	
Uinta Basin Association of Governments	722-4518
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146
Wasatch-Cache National Forest	524-5030
Kamas Ranger District	783-4338
Recreation	
Dinosaurland Travel Region (Vernal)	798-6932

The DWR stocked the lake most recently in 1990 with 1,800 fingerling brook trout.

Phytoplankton in the euphotic zone include the following taxa (in order of dominance)

Species	Cell Volume (mm ³ /liter)	% Density By Volume
Bluegreen unicell	0.193	32.25
<i>Chroococcus</i> sp.	0.161	26.88
<i>Anabaena</i> sp.	0.111	18.54
<i>Oocystis</i> sp.	0.075	12.51
<i>Chroococcus limneticus</i>	0.028	4.63
Centric diatoms	0.023	3.89
Pennate diatoms	0.008	1.30
Total	0.597	
Shannon-Weaver [H']	1.62	
Species Evenness	0.78	
Species Richness	0.35	

The phytoplankton community is dominated by the presence of blue-green algae and flagellates. This is due to the fact that the system is nitrogen limited and although low in productivity, blue-greens are able to fix atmospheric nitrogen as required.

Pollution Assessment

Nonpoint pollution sources is primarily associated with recreation.

There are no point sources of pollution in the watershed.

Beneficial Use Classification

The state beneficial use classifications include: boating and similar recreation (excluding swimming) (2B),

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