

## WHITNEY RESERVOIR



### Introduction

Whitney Reservoir is in the headwaters of the West Fork of the Bear River in the western High Uintas. It is located at the base of Moffit Peak, nestled at the base of several ridges that climb rapidly above the reservoir. During early spring and summer this area displays great scenic beauty. Snow drifts that have accumulated near

the upper ridges is usually present late into summer. From here, the Bear flows north to Wyoming. The river crosses the 111<sup>th</sup> meridian several times as it meanders through Utah and Wyoming before it enters into Idaho. It

### Characteristics and Morphometry

Lake elevation (meters / feet)	2,822 / 9,260
Surface area (hectares / acres)	76 / 188
Watershed area (hectares / acres)	1,620 / 4,002
Volume (m <sup>3</sup> / acre-feet)	
capacity	7,180,000 / 5,820
conservation pool	616,500 / 500
Annual inflow (m <sup>3</sup> / acre-feet)	40,070,000 / 33,000
Retention time (years)	5.7
Drawdown (m <sup>3</sup> / acre-feet)	
Depth (meters / feet)	
maximum	21 / 70
mean	9.4 / 31
Length (km / miles)	1,829 / 6001
Width (km / miles)	488 / 1601
Shoreline (km / miles)	4.2 / 2.6

### Location

County	Summit
Longitude / Latitude	110 55 44 / 40 50 06
USGS Map	Whitney Reservoir, UT 1972
DeLorme's Utah Atlas & Gazetteer™	Page 54, A-3
Cataloging Unit	Upper Bear (16010101)

eventually turns south and works its way back through Utah and into the Great Salt Lake.

The shoreline is owned by the Wasatch-Cache National Forest, and public access is unrestricted. Water use in addition to recreation is used primarily for irrigation in Wyoming for the Upper Bear River and Mill Creek Water Users Association.. The reservoir was created in 1966 by construction of an earth-fill dam and several dikes. Water may be drained each year down to the 500 acre-foot

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conservation pool each summer.

### Recreation

Whitney Reservoir is west of the Mirror Lake Highway, U-150, after it drops down from Hayden Pass and follows the Middle Fork Bear River towards the Wyoming State Line. Whitney Road, FS-032, a gravel road running from U-150 to and beyond Whitney Reservoir, is found about 1.5 miles north of Hayden Fork Campground and 1.5 miles south of Stillwater campground. It climbs the valley wall with a several switchbacks to the plateau. Continue on this fairly good gravel base road for approximately five miles to the West Fork of the Bear River. Shortly after crossing the river take FS-069 which leads south to the reservoir. This road will pass the Whitney Guard Station which is viable from the junction (about 0.5 miles in) and continues about two miles further to Whitney Reservoir. The route around the reservoir is not maintained as well and travel can be difficult to Beaver Lake or the south end of the reservoir.

Fishing, camping, picnicking, scenic beauty and hiking are all popular. There are relatively few other lakes in the area, and all are much smaller than the reservoir. Most are beaver ponds rather than glacial lakes, and all are strikingly beautiful. The low water level from early summer to the following spring leaves large areas of mud exposed in the reservoir.

The area receives moderate recreational use throughout the summer. U-150 is closed during the winter and much of the spring, but groomed for cross country skiers, snowmobilers and hikers. Whitney Reservoir is extremely remote in the winter.

There are no campgrounds at the lake, but primitive camping is permitted. Register with the Kamas Ranger Station and familiarize yourself with the backcountry use regulations and follow them. This will preserve the quality of the reservoir and watershed.

There are numerous USFS campgrounds along U-150, both north and south of the Whitney Road turnoff.

### Watershed Description

Whitney Reservoir is in a basin covered with marshes and beaver ponds and surrounded by high peaks. The area is in the extreme western Uintas, where elevations are lower and glaciation did not produce the striking valleys and peaks characteristic of the central part of the range. Construction of the reservoir destroyed some of the wetland area, but ponds and marshes are still intact above the high water line of the reservoir, as is easily seen on the USGS 7.5' map.

The watershed is bounded to the south by the hogback ridges surrounding the uplifted precambrian rock of the Uinta Mountains. The mountains are chemically and physically different than the peaks further south

composed of the actual Uinta Mountain Group. Moffit Peak and Gold Hill are high outcroppings of Weber Sandstone. The Uinta Mountain Group (rock formation) is chemically inert, which is why lakes in the Uintas have soft water. Whitney Reservoir is chemically similar to reservoirs in other mountains ranges, but not other lakes in the Uintas.

The watershed is quite small, almost visible in its entirety from the reservoir. The watershed high point, Moffit Peak, is 3,354 m (11,003 ft) above sea level, thereby developing a complex slope of 18.9% to the reservoir. There are at least four small, perennial streams entering the lake, the average gradient being 4.0% (210 feet per mile). The inflows drain small natural lakes in the watershed, many of which are beaver ponds rather than glacial lakes. Beaver activity probably modifies the drainage such that water flows in these streams year round, rather than only during spring and summer runoff.

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

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

What use of watershed land takes place is 100% recreation. The pristine nature of the area is a result of its unsuitability to other forms of exploitation by humans.

### Limnological Assessment

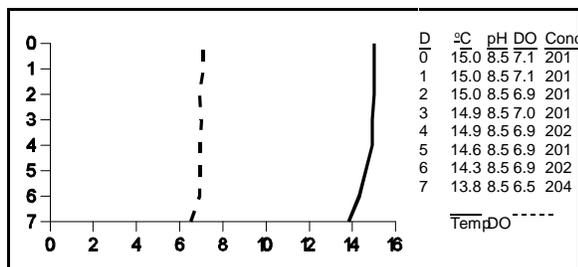
The water quality of Whitney Reservoir is very good. It is considered to be moderately hard with a hardness concentration value of approximately 109 mg/L (CaCO<sub>3</sub>). Those parameters that have exceeded State water quality standards for defined beneficial uses are total phosphorus and dissolved oxygen. Although the average concentration of total phosphorus in the water column has not exceeded the recommended pollution indicator for phosphorus of 25 ug/L, concentrations from samples in the hypolimnion were 45 ug/L and 59 ug/L in 1989 and 1991 respectively. This increased concentration are enhanced when anoxic conditions are present near the bottom. Dissolved oxygen concentrations in late summer substantiate the fact that water quality impairments do exist. Although the profile from September 3, 1991 does not indicated a substantial decline in the dissolved oxygen at the time of sampling evidence has been obtained that extensive dissolved oxygen depletions do occur in the reservoir prior to turnover in late summer. In August of 1989 there was essentially no dissolved oxygen below the thermocline and the profile from June, 1991 indicates the development of anoxic conditions in the hypolimnion after the reservoir

LAKE REPORTS

Limnological Data			
Data sampled from STORET site: 590778			
Surface Data	1981	1989	1991
Trophic Status	-	M	M
Chlorophyll TSI	-	49.11	41.38
Secchi Depth TSI	-	48.00	44.91
Phosphorous TSI	-	23.20	46.22
Average TSI	-	40.10	44.13
Chlorophyll <i>a</i> (ug/L)	-	6.6	3.0
Transparency (m)	-	2.3	2.9
Total Phosphorous (ug/L)	20	4	13
pH	8.3	8.8	8.4
Total Susp. Solids (mg/L)	<5	-	4
Total Volatile Solids (mg/L)	-	-	4
Total Residual Solids (mg/L)	-	-	2
Temperature (°C / °f)	15/59	13/55	13/55
Conductivity (umhos.cm)	169	221	189
Water Column Data			
Ammonia (mg/L)	0.05	<0.05	0.03
Nitrate/Nitrite (mg/L)	0.37	0.15	.18
Hardness (mg/L)	112	-	105
Alkalinity (mg/L)	105	-	107
Silica (mg/L)	-	-	1.25
Total Phosphorous (ug/L)	40	13	19
Miscellaneous Data			
Limiting Nutrient	N	N	N
DO (Mg/l) at 75% depth	8	0.3	6.9
Stratification (m)	3-8	6-7	NO
Depth at Deepest Site (m)	14	11.0	7.0

becomes stratified.

Data suggest that the reservoir is a nitrogen limited system with TSI values indicating the reservoir is mesotrophic. The reservoir was stratified during a summer monitoring trip was in June, 1991 at a depth of 4-6 meters, but that by September 3, the reservoir had turned over due to drawdown which left the lake with a maximum depth of only 7 meters. These conditions are deleterious to the fishery during the summer period and may be even more sever during later winter. This period needs to be evaluated to determine the extent of impairment to the



fishery.

According to DWR no fish kills have been reported in recent years. The reservoir supports populations of brook trout (*Salvelinus fontinalis*), rainbow trout (*Oncorhynchus mykiss*), and cutthroat trout (*Oncorhynchus clarki*). The lake has not been treated for rough fish competition, so populations of native fishes may still be present in the lake. Current stocking reports indicate that DWR stocks the reservoir annually with approximately 4,000 catchable rainbow trout, although historically they have stocked the reservoir with fingerling of all species present.

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

Species	Cell Volume (mm <sup>3</sup> /liter)	% Density By Volume
<i>Sphaerocystis schroeteri</i>	5.282	88.01
<i>Dinobryon divergens</i>	0.330	5.50
<i>Pandorina morum</i>	0.222	3.71
<i>Asterionella formosa</i>	0.057	0.94
<i>Tolypothrix sp.</i>	0.055	0.93
Pennate diatoms	0.030	0.50
<i>Ankistrodesmus falcatus</i>	0.013	0.22
<i>Oocystis sp.</i>	0.008	0.14
Centric diatoms	0.003	0.05
Total	6.000	
Shannon-Weaver [H']	0.53	
Species Evenness	0.24	
Species Richness	0.36	

The phytoplankton community is dominated by the presence of green algae and flagellates indicative of fairly good water quality and moderate productivity.

**Pollution Assessment**

Nonpoint pollution sources include the following: sedimentation and nutrient loading from grazing; litter and wastes from recreation.

Grazing takes place around the reservoir and throughout the watershed. Two sheep allotments are grazed in the watershed and it is not uncommon for the unloading of sheep to occur in direct proximity to the reservoir.

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

**Information**

**Management Agencies**

Mountainland Association of Governments	377-2262
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146
Wasatch-Cache National Forest	524-5030
Kamas Ranger District	783-4338

**Recreation**

Mountainland Travel Region (Provo)	377-2262
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**Reservoir Administrator**

Upper Bear River and Mill Creek Irrigation	807-789-2596
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