

TONY GROVE LAKE



Introduction

Tony Grove Lake is a small, glacial lake in the Bear River Range in extreme northern Utah. Although it has been enlarged by the construction of a dam, water storage rights are owned by the Forest Service, so there is no vertical fluctuation. The Forest Service maintains a campground, and the area is a trailhead for the Naomi Peak Wilderness Area. Utah State University Limnology

Students have studied this lake for a number of years.

Tony Grove Lake is a natural lake that was enlarged in 1939 by the construction of an earth-fill dam. The reservoir shoreline is 100% publicly owned by the Wasatch-Cache National Forest. Public access is unrestricted. The lake is not used for water storage, and this is not expected to change in the foreseeable future.

Recreation

Tony Grove Lake is accessible from US-89 in Logan

Characteristics and Morphometry

Lake elevation (meters / feet)	2,451 / 8,043
Surface area (hectares / acres)	10 / 25
Watershed area (hectares / acres)	538 / 1,330
Volume (m ³ / acre-feet)	
capacity	400,888 / 325
conservation pool	400,888 / 325
Annual inflow (m ³ / acre-feet)	
Retention time (years)	
Drawdown (meters / feet)	0 / 0
Depth (meters / feet)	
maximum	11 / 36
mean	4 / 13
Length (meters / feet)	667 / 2,187
Width (meters / feet)	238 / 781
Shoreline (meters / feet)	1,633 / 5,360

Location

County	Cache
Longitude / Latitude	111 38 25 / 41 53 25
USGS Map	Naomi Peak 1969
DeLorme's Utah Atlas and Gazetteer™	Page 63, B-4
Cataloging Unit	Little Bear-Logan Rivers (16010203)

Canyon. The turnoff is at the Tony Grove Guard Station, 22 miles northeast of downtown Logan and 17 miles west of Garden City. Follow a gravel road (FS-003) for about
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miles to the lake. The route is well marked, as it is also the primary trailhead to the Naomi Peak Wilderness.

The lake offers fishing, boating, hiking, swimming, and solitude. Fishing is not particularly good, as the lake has a winter fish kill problem. Tony Grove Campground, administered by the Forest Service, has 37 campsites, a swimming area, running water, and primitive latrines.



Watershed Description

Tony Grove Lake is a cirque lake, a water-filled depression created by a glacier pushing downward at its base in the middle of the cirque. The 300' vertical wall behind the lake is the edge of a small cirque.

The entire watershed has been glaciated, leaving rugged cliffs and chaotic mounds of moraine. Slopes of >100% are common. Much of the land is bare rock without vegetation. Forest growth is limited to the more sheltered areas. Boggy meadows occur in many areas which are not very steep.

The watershed high point is Naomi Peak, the highest peak in the Bear River Range, 3,042 m (9,979 ft) above sea level, thereby developing a complex slope of 20.0% to the reservoir. Inflow is from an ephemeral stream fed by snowmelt (stream gradient 10.1% (534 feet per mile), as well as many other flows during peak snowmelt. The outflow is Tony Grove Creek, a tributary of the Logan River.

The soil in the watershed is entirely glacial till and alluvium. A complete listing of the soil composition is contained in Appendix III.

The vegetation communities are comprised of spruce-fir, aspen, and alpine. The watershed receives 127 cm (50 inches) of precipitation annually with a frost-free season of 40 - 80 days.

Land use is 100% multiple use. The major use of the watershed is sheep grazing, resulting in devegetation and increased soil erosion.

Limnological Assessment

The water quality of Browne Reservoir is fairly good. It is considered to be moderately hard with a hardness concentration value of approximately 136 mg/L (CaCO₃). Those parameters that have exceeded State water quality standards for defined beneficial uses are total phosphorus and dissolved oxygen. Although the average concentrations of total phosphorus in the water column for the last two study periods were only slightly over the recommended pollution indicator for phosphorus of 25 ug/L levels of 149 ug/L have been reported in the hypolimnion. These elevated concentrations of

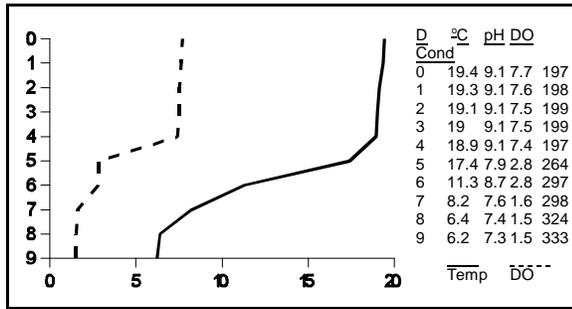
Limnological Data

Data sampled from STORET site: 590275

Surface Data	1981	1989	1991
Trophic Status	O	M	O
Chlorophyll TSI	-	39.19	36.09
Secchi Depth TSI	31.90	36.66	37.10
Phosphorous TSI	43.20	46.42	27.36
Average TSI	37.60	40.76	33.52
Chlorophyll <i>a</i> (ug/L)	-	2.4	1.8
Transparency (m)	6.3	5.1	4.9
Total Phosphorous (ug/L)	5	19	5
pH	8.3	8.9	8.0
Total Susp. Solids (mg/L)	<5	-	<3
Total Volatile Solids (mg/L)	-	-	5
Total Residual Solids (mg/L)	-	-	13
Temperature (°C / °f)	20/68	16/61	16/61
Conductivity (umhos.cm)	242	213	188
Water Column Data			
Ammonia (mg/L)	0.13	0.15	0.26
Nitrate/Nitrite (mg/L)	0.32	0.02	0.01
Hardness (mg/L)	164	-	107
Alkalinity (mg/L)	157	-	106
Silica (mg/L)	-	-	1.15
Total Phosphorous (ug/L)	12.5	29	27
Miscellaneous Data			
Limiting Nutrient	P	N	N
DO (Mg/l) at 75% depth	0.1	0.7	1.9
Stratification (m)	5-8	7-9	4-8
Depth at Deepest Site (m)	11	11	9

phosphorus occurred when the reservoir was stratified and anoxic conditions were present near the bottom as indicated in the August 28, 1991 profile. Dissolved oxygen concentrations in late summer substantiate the fact that water quality impairments do exist. Concentrations dropped dramatically below the thermocline to approximately 2.8 mg/L and continue to decline 10 1.5

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mg/L. It is not uncommon to see concentrations near zero

throughout the water column by the end of winter ice coverage. Profiles have been taken that document these conditions and as early as June, it is not uncommon to see near anoxic conditions (0.7 mg/L) at a depth beginning at 2 meters. These conditions are deleterious to the fishery rendered essentially the entire water column unsuitable for a fishery during late winter.

With the exception of 1981, data suggest that the reservoir is currently a nitrogen limited system. TSI values indicate the reservoir is oligotrophic except in 1989 when it was slightly higher than the upper TSI limit of 40.00.

According to DWR there are annual partial or complete fish kills. The reservoir is stocked annually with 2,500 catchable albino rainbow trout and 5,000 catchable rainbow trout (*Oncorhynchus mykiss*). The lake has not been treated for rough fish competition, so populations of native fishes may still be present in the lake.

The lake has not been chemically treated by the DWR to control rough fish competition, so it could contain original fish populations.

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

Species	Cell Volume (mm ³ /liter)	% Density By Volume
<i>Sphaerocystis schroeteri</i>	10.564	70.05
<i>Ceratium hirundinella</i>	3.745	24.83
<i>Fragilaria crotonensis</i>	.458	3.04
<i>Oocystis sp.</i>	.142	0.94
<i>Chlorococcum sp.</i>	.111	0.74
<i>Asterionella formosa</i>	.019	0.13
<i>Merismopedia glauca</i>	.013	0.09
Pennate diatoms	.013	0.09
<i>Ankistrodesmus falcatus</i>	.013	0.09
<i>Chlamydomonas globosa</i>	.002	0.02
Total		0.728

Shannon-Weaver Index [H'] 81

Species Evenness 0.35
Species Richness [d] 0.40

The phytoplankton community is dominated by the presence of green algae, diatoms and flagellates.

Pollution Assessment

Nonpoint pollution sources are: sedimentation and nutrient loading from grazing, and wastes and litter from recreation. Sheep graze in the watershed and around the reservoir.

There are no point pollution sources in the watershed.

Information	
Management Agencies	
Wasatch-Cache National Forest	524-5030
Logan Ranger District	753-2772
Bear River Association of Governments	752-7242
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146
Recreation	
Bridgerland Travel Region (Logan) / Logan Chamber of Commerce	752-2161

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).

TONY GROVE RESERVOIR