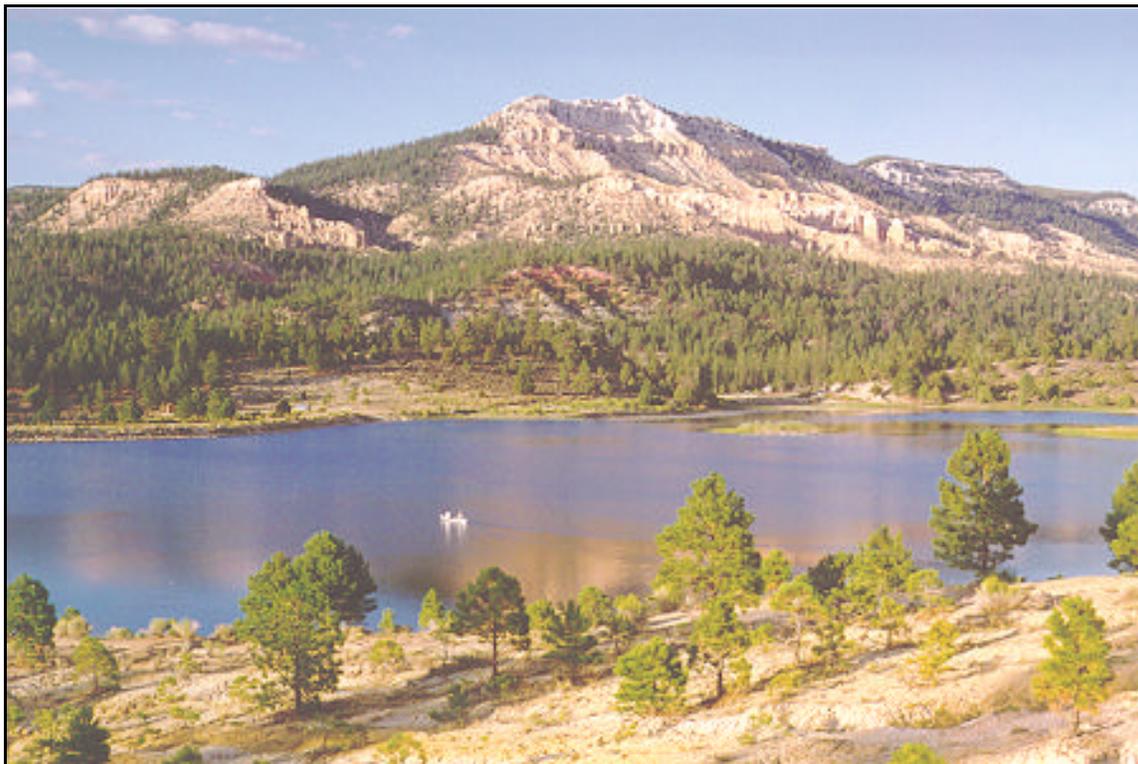


PINE LAKE



Introduction

Pine Lake is an intermediate-sized off stream reservoir on the west slopes of the Table Cliff Plateau in south-central Utah. The reservoir shoreline is owned and administered by the Dixie National Forest with unrestricted public access. The dam was rebuilt in 1988 by the Utah Division of Wildlife Resources.

Recreation

Pine Lake is accessible on FS-132, which intersects

the road from Bryce Canyon to Antimony (formerly U-22) 11 miles north of U-12 and 25 miles south of Antimony. Pine Lake is 6 miles east of U-12 on FS-132.

Fishing, boating, picnicing, cross country skiing and snowmobiling are popular around the lake. There is a boat ramp, but the lake can only accommodate small boats. The water is too cold for most swimmers and waterskiers, and the road is not maintained in the winter. Usage is usually fairly light, but high during the summer.

Pine Lake Campground is adjacent to the lake and maintained by the Forest Service. It has 33 campsites

Characteristics and Morphometry

Lake elevation (meters / feet)	2,496 / 8,192
Surface area (hectares / acres)	31.2 / 77
Watershed area (hectares / acres)	1,784 / 4,409
Volume (m ³ / acre-feet)	
capacity	1,356,852 / 1,100
conservation pool	0
Annual inflow (m ³ / acre-feet)	
Retention time (years)	
Drawdown (m ³ / acre-feet)	
Depth (meters / feet)	
maximum	6 / 20
mean	4.36 / 14.29
Length (meters / feet)	823 / 2,700
Width (meters / feet)	610 / 2,000
Shoreline (km / miles)	2.07 / 1.28

Location

County	Garfield
Longitude / Latitude	111 57 20 / 37 44 26
USGS Map	Pine Lake, Utah 1964
Cataloging District	East Fork Sevier/Otter Creek?? (16030002)

and 2 group sites. Facilities include vault toilets, water, and

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cemented fire pits. Usage fees are collected.



Watershed Description

Pine Lake is located on the deeply dissected, forested terrain between Barney Top and John's Valley. Historically inflow water was a diversion canal from Clay Creek and Pole Canyon Creek. The primary source of water was Clay Creek but due to heavy sedimentation and high turbidity water is typically not diverted into the reservoir. Inflow water consists primarily of minimal watershed runoff from precipitation and a spring developed by DWR near Clay Creek and piped to the reservoir. Excess water from the reservoir is discharged to a wash which eventually returns to Clay Creek.

The watershed high point, the south end of Barney Top, is 3,231m (10,600 ft) above sea level, thereby developing a complex slope of 10.5% to the lake. The average stream gradient above the reservoir is 3.7% (195 feet per mile).

The soil is of limestone origin with rapid permeability and erosion is rapid. The soil associations that compose the watershed are listed in Appendix III.

The vegetation communities are comprised of shadscale, greasewood, saltbrush, grass-forbs, pinyon-juniper, pine, aspen, spruce-fir, oak, and maple. The watershed receives 41 - 51 cm (16 - 20 inches) of precipitation annually with a frost-free season of 80 - 100 days at the reservoir.

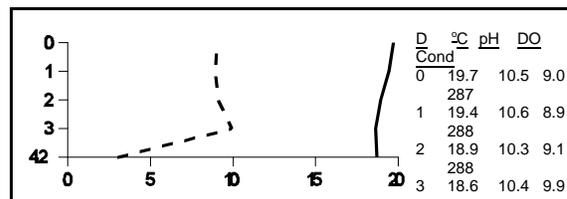
Land use is multiple use and recreation. Dixie National Forest encompasses the entire drainage area.

Limnological Assessment

The water quality of Pine Lake is considered very good. It is considered to be hard with a hardness concentration value of approximately 179 mg/L (CaCO3). Those parameters that have exceeded State water quality standards are pH and dissolved oxygen. It appears that both of these exceedences are due in part to the biological production occurring in the reservoir. It is not uncommon

Limnological Data			
Data sampled from STORET site: 594609			
Surface Data	1981	1989	1991
Trophic Status	H	M	O
Chlorophyll TSI	-	39.59	22.77
Secchi Depth TSI	-	49.31	41.95
Phosphorous TSI	64.34	43.52	38.72
Average TSI	64.34	44.14	34.48
Chlorophyll a (ug/L)	-	2.5	0.5
Transparency (m)	-	2.1	3.5
Total Phosphorous (ug/L)	20	19	11
pH	-	9.7	10.1
Total Susp. Solids (mg/L)	<5	<3	<3
Total Volatile Solids (mg/L)	-	-	2
Total Residual Solids (mg/L)	-	-	<2
Temperature (°C / °f)	-	17/62	17/62
Conductivity (umhos.cm)	-	356	297
Water Column Data			
Ammonia (mg/L)	0.05	0.02	0.04
Nitrate/Nitrite (mg/L)	0.11	0.01	0.05
Hardness (mg/L)	175	-	183
Alkalinity (mg/L)	170	241	176
Silica (mg/L)	-	-	2.35
Total Phosphorous (ug/L)	25	15	8
Miscellaneous Data			
Limiting Nutrient	N	N	N
DO (Mg/l) at 75% depth	-	10.9	8.9
Stratification (m)	-	NO	NO
Depth at Deepest Site (m)	-	2.0	4.2

for high pH values to be reported during periods of high production of macrophytes of algae. The major influence appear to be associated with macrophytes in the lake. It has been reported by DWQ staff that at times the entire bottom of the lake where light penetration occurs is covered by macrophytes. During daylight hours photosynthetic activity increase pH values in the water column and during night time hours plant respiration reduces the concentration of dissolved oxygen near the bottom of the lake. Although these exceedences have occurred, it does not appear that the water quality is significantly impaired during the summer period. Some winter monitoring should be conducted to determine if impairments are present due to dissolved oxygen depletion during extended ice coverage conditions during



LAKE REPORTS

the winter.

Current data suggest that the reservoir is currently a nitrogen limited system. TSI values indicate the reservoir is oligotrophic or low mesotrophic in a state of low productivity. Phytoplankton productivity may be offset due to the large production of macrophytes which compete for the available nutrients. The potential for stratification in the lake is greatly reduced due to the shallow nature of the lake. The profile shown of August 20, 19912 does not show stratification.

According to DWR fish kills have been reported in recent years but efforts have been taken to enhance winter dissolved oxygen concentration by increasing aeration from the delivery of the spring water into the lake. The reservoir supports a population 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 lake with with 8-10,000 catchable rainbow trout and 3,000 fingerling brook and cutthroat trout. Macrophytes reported as present in the lake include *Myriophyllum* and *Potamogeton*.

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	97.89
<i>Oocystis sp.</i>	0.066	0.62
<i>Merismopedia sp.</i>	0.055	0.52
Pennate diatoms	0.040	0.37
<i>Ankistrodesmus falcatus</i>	0.035	0.32
<i>Merismopedia sp.</i>	0.011	0.10
Centric diatoms	0.009	0.09
<i>Scenedesmus bijuga</i>	0.007	0.07
<i>Wislouchiella planktonica</i>	0.002	0.02
Total	10.788	
Shannon-Weaver [H']	0.14	
Species Evenness	0.06	
Species Richness	0.35	

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

Pollution Assessment

Nonpoint pollution sources include: sedimentation and nutrient loading from grazing, and wastes or litter from

recreation. Cattle graze in the watershed and around the reservoir.

There are no point pollution sources 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

Information	
Dixie National Forest	586-2421
Escalante Ranger District	826-4221
Five County Association of Governments	
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146

(3A) and agricultural uses (4).

PINE LAKE