

KOLOB RESERVOIR



Introduction

Kolob Reservoir is on the Upper Kolob Plateau upstream from the Zion Narrows in Zion National Park (ZNP). It is an intermediate size reservoir of a stream valley fed by a small watershed and many springs. Much of the surrounding highland is deeply dissected by

canyons, resulting in the reservoir seeming unusually large for its location. It is also known as Kolob Creek

Characteristics and Morphometry	
Lake elevation (meters / feet)	2,474 / 8,118
Surface area (hectares / acres)	136 / 249
Watershed area (hectares / acres)	1605 / 3965
Volume (m ³ / acre-feet)	
capacity	8,528 / 6,914
conservation pool	
Annual inflow (m ³ / acre-feet)	
Retention time (years)	
Drawdown (m ³ / acre-feet)	
Depth (meters / feet)	
maximum	15.5 / 51
mean	6.3 / 20.6
Length (km / miles)	1.74 / 1.08
Width (km / miles)	1.81 / 11.3
Shoreline (km / miles)	7.01 / 4.35

Location	
County	Washington
Longitude / Latitude	113 02 09 / 37 26 00
USGS Map	Kolob Reservoir, Utah, 1980
DeLorme's Atlas & Gazetteer™	Page 17, B-6
Cataloging Unit	Upper Virgin (15010008)

Reservoir or Big Creek Reservoir. The reservoir was created by the construction of an earth-fill dam in 1956.

Although the reservoir shoreline is privately owned public access is virtually unrestricted. Water is consumed for agricultural use and used for recreation and cold water aquatic habitat while stored in the reservoir.

Recreation

Kolob Reservoir is on the road that follows North Creek and continues to Cedar City. It begins as a paved road at

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U-9 in Virgin, UT (between I-15 and Zion National Park). It goes north, skirting the west boundary of ZNP and finally crossing to the east side of the Kolob section of the park. As it leaves the park, about 15 miles north of Virgin, it becomes gravel. Kolob Reservoir is about 20 miles north of Virgin on this road.

Access from the north is more complicated, with access to this road possible from a gravel road following Murie Creek (three miles north of Kanarrville at Exit 57) or from U-14 (approximately six miles east of Cedar City) in Cedar Canyon. The later road is paved for the ascent to the summit. As you travel up this road the panorama's that unfold are unsurpassed in the State. Good maps or detailed directions are recommended if using these routes.

Fishing, boating, picnicking, cross country skiing and snowmobiling are popular around the lake. The water is too cold for most swimmers and waterskiers. The road is not maintained in the winter, and access is often impossible. Usage is heavy. The reservoir can have extensive drawdown by September.

There are no public campgrounds in the vicinity, although primitive camping is available in the area. RV parks are available in Springdale and Hurricane.

Watershed Description

Kolob Reservoir is located in the Carmel Formation, which is immediately above the Navajo Sandstone which form the canyons of Zion. The drainage basin is relatively unspectacular topographically. The drainage basin is also quite small for a reservoir of this size, but precipitation is supplemented by a number of springs.

The watershed high point, a few miles north of the reservoir, is 2,874 m (9,432 ft) above sea level, thereby developing a complex slope of 7.5% to the reservoir. The inflow and outflow is Kolob Creek. The average stream gradient above the reservoir is 6.6% (348 feet per mile).

Soil associations are listed in Appendix III.

The vegetation communities are comprised of pine, aspen, spruce-fir, oak, and maple. The watershed receives 51 - 64 cm (20 - 25 inches) of precipitation annually with a frost-free season of 40 - 80 days at the reservoir.

Land use is multiple use recreation and livestock grazing. Much of the watershed is heavily grazed, resulting in increased runoff and soil erosion.

Limnological Assessment

The water quality of Kolob Reservoir is good. It is considered to be hard with a hardness concentration value of approximately 156 mg/L (CaCO₃). The only parameter that has exceeded State water quality standards for defined beneficial uses is phosphorus. The average concentration of total phosphorus in the water column in

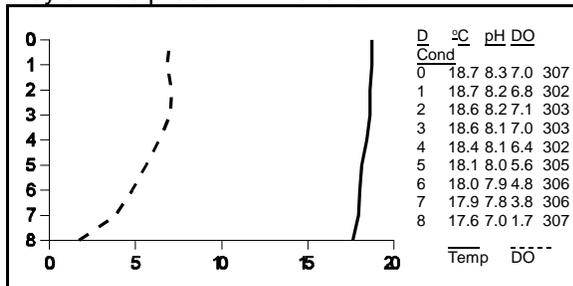
1989 and 1991 was 29 and 12 ug/L. The only time values exceeded the recommended pollution indicator for phosphorus of 25 ug/L was on August 3, 1989 at the deep site where values averaged 84 ug/L. Peak phosphorus concentration in the hypolimnion near the bottom reached a level of 143 ug/L. In general it appears that phosphorus has not been a problem in recent years. As indicated in the profile of August 14, 1991 there is a gradual decline in dissolved oxygen concentrations in late summer indicating that water quality impairments do exist. Concentrations generally decline throughout the water column to approximately 1.7 mg/L near the bottom of the reservoir. It appears that the reservoir could in fact develop anoxic problems during the winter and the reservoir should be

Limnological Data			
Data averaged from STORET sites: 495132, 495133			
Surface Data	<u>1979</u>	<u>1989</u>	<u>1991</u>
Trophic Status	M	M	M
Chlorophyll TSI	-	40.5	52.9
Secchi Depth TSI	33.00	39.1	49.4
Phosphorous TSI	55.45	44.8	41.0
Average TSI	44.23	41.5	47.8
Chlorophyll <u>a</u> (ug/L)	-	2.8	9.8
Transparency (m)	6.5	4.3	2.08
Total Phosphorous (ug/L)	33	17	14
pH	8.3	8.4	8.5
Total Susp. Solids (mg/L)	-	-	1.5
Total Volatile Solids (mg/L)	-	-	5
Total Residual Solids (mg/L)	-	-	<2
Temperature (°C / °f)	13/55	16/61	16/60
Conductivity (umhos.cm)	207	251	302
Water Column Data			
Ammonia (mg/L)	0.13	0.03	0.05
Nitrate/Nitrite (mg/L)	<.1	0.02	0.06
Hardness (mg/L)	152	-	160
Alkalinity (mg/L)	140	-	134
Silica (mg/L)	4.0	-	1.9
Total Phosphorous (ug/L)	52.5	29	12
Miscellaneous Data			
Limiting Nutrient	N	N	N
DO (Mg/l) at 75% depth	1.2	3.5	4.8
Stratification (m)	12-14	NO	NO
Depth at Deepest Site (m)	17	10.4	8.0

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surveyed to determine the extent of oxygen depletion during the winter season. Throughout the study period the reservoir has been characterized as a nitrogen limited system. The nitrogen/phosphorus ratios have generally increased during the study period and is approaching a phosphorus limited situation. TSI values indicate the reservoir is mesotrophic. It does not appear that there has been a significant rise in the concentrations of nutrients in the lake since it was originally surveyed in 1981. In fact the concentration appear to be declining. The reservoir was stratified during 1979, but recent summer monitoring has not shown that the reservoir has been stratified. Stratification is inhibited due to the high elevation which precludes excessive warming of the reservoir and recent levels of water have been abnormally low. The reservoir could stratify when the depths of the reservoir are deeper earlier in the season if warmer climatic conditions prevailed.

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 clarkii*). The lake has not been treated for rough fish competition, so populations of native fishes may still be present in the lake.



The DWR typically stocks the reservoir with 5,000 catchable and 15,000 fingerling Rainbow Trout, 5,000 fingerling Cutthroat Trout and 5,000 fingerling Brook Trout on an annual basis. DWR reports an abundant invertebrate population. Organisms observed were midge larva (*Tendipes sp.*) and snails (*Gyraulus sp.*), both of which were abundant. The plankton present, all of which were sparse, were Cladoceins (*Daphnia sp.*), Diatoms (*Fragilaris sp.*) and Desmids (*Closterium sp.*). The reservoir does have some marginal macrophyte growth and a population of crayfish have been noted in recent years.

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>	21.128	73.10

<i>Ceratium hirundinella</i>	7.490	25.92
<i>Dinobryon divergens</i>	0.146	0.51
<i>Oocystis sp.</i>	0.100	0.35
Pennate diatoms	0.013	0.05
<i>Microcystis incerta</i>	0.011	0.04
<i>Asterionella formosa</i>	0.009	0.03
<i>Ankistrodesmus falcatus</i>	0.004	0.02

Total 28.901

Shannon-Weaver [H']	0.64
Species Evenness	0.31
Species Richness	0.31

Information

Washington County Water Conservation District 673-3617
 Five County Association of Governments 673-3548
 Division of Wildlife Resources 538-4700
 Division of Water Quality 538-6146

While the flora is quite diverse, it is heavily dominated by two groups. The dominant colonies are green algae and flagellates. These are indicative of fairly good water quality.

Pollution Assessment

Nonpoint pollution sources are grazing and 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 (3A) and agricultural uses (4).

