KOOSHAREM RESERVOIR

Introduction

Koosharem Reservoir is at the north end of Grass Valley, south of Salina and north of Koosharem. It is an intermediate-sized, shallow impoundment of a low elevation valley. The reservoir was created in 1919 by the construction of an earth-fill dam.

The reservoir shoreline is privately/publicly owned and administered by the BLM and the Koosharem Irrigation Company with unrestricted public access. Current water use if for agriculture and a cold water fishery. The reservoir and watershed lie within the boundaries of the Otter Creek Reservoir watershed which is currently under study to investigate the feasibility of improving water quality.

Characteristics and Morphometry

Lake elevation (meters / feet)	2,132 / 6,995
Surface area (hectares / acres)	125 / 310
Watershed area (hectares / acres)	14,930 / 36,894
Volume (m^3 / acre-feet)	
capacity	9,214,260 / 7,470
conservation pool	
Annual inflow (m^3 / acre-feet)	
Retention time (years)	
Drawdown (m^3 / acre-feet)	
Depth (meters / feet)	
maximum	6 / 20
mean	3.6 / 12
Length (meters / feet)	2.2 / 13.6
Width (meters / feet)	1.2 / .77
Shoreline (km / miles)	2.4 / 1.5

Location

County	Sevier
Longitude / Latitude	111 50 08 / 38 35 05
USGS Map	Burrville, Utah, 1968
DeLorme's Atlas & Gazetter™	Page 27, A-5 & 37, D-5
Cataloging Unit	East Fork Sevier (16030002)

Recreation

Koosharem Reservoir is directly accessible from U-24 between Salina and Loa near milepost 38. The reservoir is 2 miles north of the U-24/U-62 junction near Koosharem and 13 miles south of the U-119/U-24 junction.

The reservoir is highly productive due to a high input of nutrients into the system. The reservoir is popular with

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perennial fisherman. Fishing is good with larger fish taken later in the year. Water levels are greatly reduced late in the year and the reservoir may be drained some years. Other types of recreational usage is limited.

There are limited recreational facilities at the reservoir. Vault toilets are provided. It is possible to launch a boat in the reservoir, and primative camping is possible along the shore. No fees are charged for use. There are no Forest Service Campgrounds in the area, and the nearest private campground is in Koosharem.

Watershed Description

The reservoir is in the north end of Grass Valley, between the Fish Lake Plateau and the Sevier Plateau. It is an impoundment of a flat valley resulting in a fairly shallow body of water. Heavy agricultural use of the watershed has resulted in a long history of water quality problems. The headwaters of Otter Creek reservoir are in the Fish Lake mountains where snowpack provides inflow to the reservoir throughout the summer. The mountains have beautiful meadows and coniferous forests in stark contrast to the valley below.

The watershed high point, The Fish Lake Hightop Plateau, is 3,546m (11,633 ft) above sea level, thereby developing a complex slope of 18.3% to the reservoir. The inflows are Otter Creek and Boobe Hole Creek. Boobe Hole Reservoir, the only upstream impoundment, is in the headwaters of Boobe Hole Creek. The outflow is Otter Creek. The average stream gradient above the reservoir is 5.9% (309 feet per mile).

The soil in the surrounding high country is derived from the underlying volcanic rocks, and the soil in the vicinity of the reservoir is made up of alluvial deposits from the high country. Soil Associations are listed in Appendix III.

The vegetation communities are comprised of bitterbrush-mountain mahogany, pinion-juniper, sage-grass, pine, aspen, spruce-fir, oak and maple. The watershed receives 30 - 75 cm (12 - 30 inches) of precipitation annually with a frost-free season of 80 - 100 days at the reservoir.

Land use in the watershed is 48% multiple use, 48% private grazing land and 4% pasture and hayland. The shoreline is mostly privately owned, the remainder being controlled by the BLM. Public accessibility is unrestricted.

Limnological Data

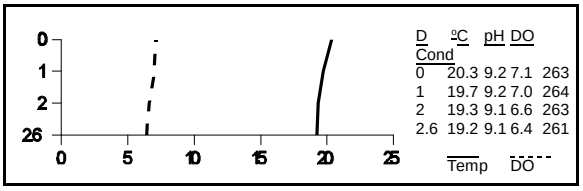
Data averaged from STORET sites: 594577, 594578

Surface Data	1981	1990	1992
Trophic Status	H	H	E
Chlorophyll TSI	-	60.38	44.08
Secchi Depth TSI	-	80.27	51.14
Phosphorous TSI	65.41	80.95	70.97
Average TSI	65.41	73.87	55.40
Chlorophyll a (ug/L)	-	21.2	3.95
Transparency (m)	-	0.25	1.85
Total Phosphorous (ug/L)	93	211	103
pH	-	8.4	8.9
Total Susp. Solids (mg/L)	43	40.5	<3
Total Volatile Solids (mg/L)	-	-	-
Total Residual Solids (mg/L)	-	-	3
Temperature (°C / °f)	-	22/71	8/47
Conductivity (umhos.cm)	-	292	279
Water Column Data			
Ammonia (mg/L)	0.07	0.08	0.03
Nitrate/Nitrite (mg/L)	0.24	0.11	0.04
Hardness (mg/L)	130	132	123
Alkalinity (mg/L)	141	136	130
Silica (mg/L)	-	-	32.3
Total Phosphorous (ug/L)	93	211	107
Miscellaneous Data			
Limiting Nutrient	N	N	N
DO (Mg/l) at 75% depth	-	6.7	6.6
Stratification (m)	-	NO	NO
Depth at Deepest Site (m)	-	1.0	2.6

Limnological Assessment

The water quality of Koosharem Reservoir is fair. It is considered to be moderately hard with a hardness concentration value of approximately 128 mg/L ($CaCO_3$). The only parameters that have exceeded State water quality standards for defined beneficial uses are phosphorus and temperature. The average concentration of total phosphorus in the water column in 1990 and 1992 was 211 and 107 ug/L which significantly exceeds the recommended pollution indicator for phosphorus of 25 ug/L. The reservoir is a highly nutrient rich system with high production. This production is dominated by extensive blue-green algal blooms and leads to impaired water quality conditions. Is is not uncommon for the temperature regime of the reservoir to exceed the standard of 20°C for a cold water fishery. High productivity and the shallow nature of the reservoir leads to elevated temperature during the summer season. It is apparent that the entire water column approaches the limit at this time as evidenced by the profile of August 19, 1992. The reservoir is characterized as a nitrogen limited system. Excessive levels of phosphorus push the levels downward. TSI values indicate the reservoir is usually hypereutrophic. The phosphorus concentrations are excessively high. The reservoir does not typically stratify due to its shallow nature. Although conditions are present that are conducive for a potentioal fish kill, according to DWR no fish kills have been reported in recent years. Rainbow trout (*Oncorhynchus mykiss*) and Utah chub

(*Gila atraria*) are the dominant fish of Koosharem Reservoir. Approximately 20,000 fingerling rainbow trout are stocked annually by DWR as part of their put and take management of the reservoir. DWR reports that caddisflies and midges are common invertebrates. Macrophytes are present but with a rapidly receding reservoir during irrigation season it is difficult for the macrophytes to become established.



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

Species	Cell Volume (mm^3/liter)	% Density By Volume
Anabaena sp.	2.224	90.73
Aphanizomenon flos-aquae	0.106	4.31
Oocystis sp.	0.044	1.81
Centric diatoms	0.027	1.09
Pennate diatoms	0.022	0.91
Ankyra judayi	0.017	0.68
Ankistrodesmus falcatus	0.009	0.36
Chlamydomonas sp.	0.003	0.11
Total	2.447	
Shannon-Weaver [H']	0.45	
Species Evenness	0.22	
Species Richness	0.32	

The phtoplankton commnunity as can be expected is dominated by blue-green algae which is indicative of poorer water quality.

Pollution Assessment

Nonpoint sources of pollution are grazing, irrigated agriculture, and recreation. Cattle graze throughout the watershed. Very heavy grazing takes place around the reservoir and cattle follow the exposed reservoir bottom as water levels recede late in the year.

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).

Information

Management Agencies

Bureau of Land Management	
Sevier River Resource Area (Richfield Office)	896-8228
Six County Comissioners Association	896-9222
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146

Reservoir Administrator

Koosharem Irrigation Company

Recreation

Koosharem Campground and Cafe	638-7310