CAUSEY RESERVOIR

Introduction

Causey Reservoir is an intermediate-sized reservoir on the South Fork of the Ogden River above Huntsville. It is one of the most scenic and beautiful reservoirs in Utah. The reservoir is nestled in steep valley terrain. The reservoir extends away from the main body into 3 distinct canyons.

Travel into these areas is inspiring with shear vertical walls and heavily forested areas. Most of the area has the appearance of remote wilderness. The majority of shoreline is administered by the U.S. forest service, but access is limited due to private ownership at key access areas which restricts access to the area except by existing waterways. Use of this reservoir offers a unique experience. It was built by the Bureau of Reclamation, using federal funds to subsidize the cost of providing water to the northern Wasatch Front. Causey Reservoir was created in 1966 by the construction of an earth-fill

Characteristics and Morphometry

Lake elevation (meters / feet)	1,735 / 5,692
Surface area (hectares / acres)	57 / 142
Watershed area (hectares / acres)	18,648 / 46,080
Volume (m^3 / acre-feet)	
capacity	10,764,0907 / 8,730
conservation pool	none
Annual inflow (m^3 / acre-feet)	
Retention time (years)	1.5
Mean annual vertical fluctuation (meters / feet)	19 / 62
Drawdown (m^3 / acre-feet)	7,274,700 / 5,900
Depth (meters / feet)	
maximum	55 / 182
mean	20 / 65
Length (km / miles)	4.0 / 2.5
Width (meters / feet)	143 / 469
Shoreline (km / miles)	11.8 / 7.3

Location

County	Weber
Longitude / Latitude	111 35 17 / 41 17 55
USGS Map	Causey Dam, 1991
DeLorme's Utah Atlas & Gazetteer™	Page 61, C-4
Cataloging Unit	Lower Weber (16020102)

dam. The reservoir shoreline is almost entirely owned by the Forest Service, but

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there are several privately-owned key access areas, and the owner does not permit public access to neighboring Forest Service lands. Although water is consumed for agricultural (75%) and culinary (25%) uses, it is used for recreation and cold-water aquatic habitat too. The culinary use will probably increase as suburban sprawl continues to displace local farmland.

Recreation

Causey Reservoir is east of Ogden in Ogden Canyon. Travel on U-39 up Ogden Canyon to Huntsville, and continue for eight more miles to a turnoff on the right. Follow this improved gravel road for two miles to the reservoir. The turnoff should be well marked, as there is a Boy Scout Camp on the north arm of the reservoir.

Access to the reservoir is limited, as some portions of the shore are privately owned, restricting land access to most of the reservoir. Boating is permitted, but there is no boat ramp, and fishing from motorized boats is prohibited.

The Forest Service once maintained latrines at the reservoir, but they have fallen victim to vandals. A Weber County Park is located just below the dam, with drinking water, camping, and latrines. Deep drawdowns by late summer can restrict recreational use. There are USFS campgrounds on U-39 between Huntsville and the reservoir.

Watershed Description

Causey Reservoir is in the southern end of the Monte Cristo Range. These mountains were created by a major twisting of the earth, which then eroded down and was covered with the Tertiary Wasatch Formation, then re-uplifted. Most of the surface is still the Wasatch Formation, but deep canyons expose complex folds of Paleozoic rocks. Causey Reservoir is an impoundment of such a canyon. These rocks are more resistant than the softer Wasatch Formation, resulting in steep canyon walls and rocky outcroppings, providing pockets of sheltered habitat for spruce-fir vegetation. The canyon has several bends and three inundated tributary arms, so the only way to access or even see much of the reservoir is by boat. All of the major tributaries have long, deep, winding canyons cut through the Paleozoic rocks for much of the distance to their sources.

Further away from the reservoir, the land is hilly with sage-grass and oak-maple vegetation. The headwater areas are only moderately high mountains.

The watershed high point, Monte Cristo Peak, is 2,788 m (9,147 ft) above sea level, thereby developing a complex slope of 3.7% to the reservoir. The average stream gradient above the reservoir is 9.4% (494 feet per mile). The major inflows are Dry Bread Creek, Wheat Grass Creek, Left Fork South Ogden River, Right Fork South Ogden River, and Skull Crack Creek. The outflow is the South Fork Ogden River.

The watershed is made up of mountains, mountain valleys, and rolling hills. The soil associations that compose the watershed are listed in Appendix III.

The vegetation communities consist of sage-grass, oak, maple, pine, aspen, and spruce-fir. The watershed receives 64 - 76 cm (25 - 30 inches) of precipitation annually. The frost-free season around the reservoir is 100 - 140 days per year.

The reservoir and watershed are within the Wasatch-Cache National Forest, but 66% of the land is privately owned. The area on the north west side of the reservoir is used for intensive recreation, including Camp Keiser, a Boy Scout Camp. The eastern areas of the reservoir are closed to land access by the owner of several parcels of private property around the reservoir. The Weber County line follows the watershed boundary, and all of the area adjacent to Morgan County is privately owned for a width of about three miles. Land use is primarily grazing and dispersed recreation, although logging and small mining operations have taken place in the past. At present, 1% of the watershed contains summer homes, but as population increases on the Wasatch Front, more development will probably occur.

Limnological Assessment

The water quality of Causey Reservoir is very good. It is considered to be hard with a hardness concentration value of approximately 165 mg/L ($CaCO_3$). The only parameters that have exceeded State water quality standards for defined beneficial uses are phosphorus and dissolved oxygen. Although the average concentration of total phosphorus in the water column has generally not exceeded the State pollution indicator for phosphorus of 25 ug/L, in 1989 phosphorus concentration did average 40 ug/L in the water column and in the east arm hypolimnion in August, 1989 reached a level of 152 ug/L. This increased concentration occurred when the reservoir was stratified, and anoxic conditions were present near the bottom. These types of conditions allow for the reintroduction of phosphorus previously stored in the sediments. Dissolved oxygen concentrations in late summer consistently substantiate the fact that water quality impairments do exist. Concentrations dropped dramatically below the thermocline to approximately 3.0 mg/L. It does appear after reviewing the 1991 data that the trophic state of the reservoir is improving and the conditions in 1991 indicate that the reservoir is in an oligotrophic state. All three periods of record indicate that the reservoir is characterized as a phosphorus limited system. TSI values indicate the reservoir has declined from

a mesotrophic state (47.34) to an oligotrophic state (38.79) in 1991. All late season profiles indicate that a thermocline develops at a depth of approximately 18 meters with anoxic conditions developing below the thermocline. These conditions are deleterious to the fishery rendered approximately 1/3 of the water column unsuitable for a fishery. According to DWR no fish kills have been reported in recent years. The reservoir supports populations of rainbow trout (*Oncorhynchus mykiss*), and cutthroat trout (*Oncorhynchus clarki*). DWR typically stocks the reservoir with fingerling trout with some catchable rainbow trout.

The reservoir has not been chemically treated by the DWR to eliminate rough fish competition, so populations of native fish may be present. Macrophytes are not typically present and not a problem.

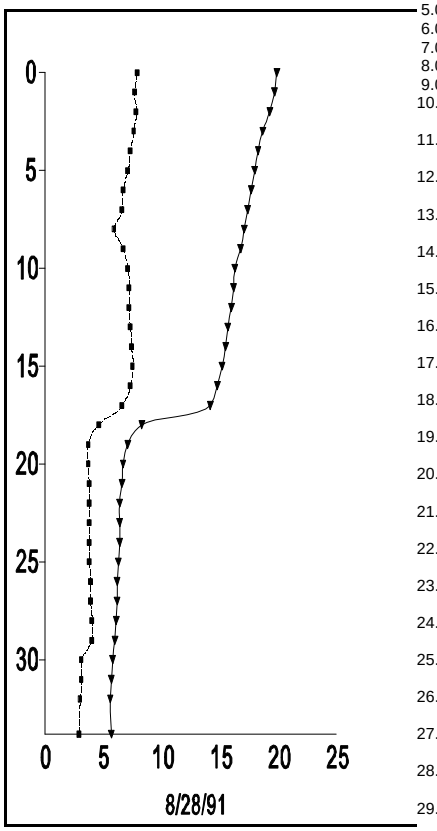
On August 28, 1991, phytoplankton in the euphotic zone were as follows:

Species	Cell Volume (mm^3/liter)	% Density By Volume
Sphaerocystis schroeteri	26.410	70.79
Sphaerocystis schroeteri	10.564	28.31
Fragilaria crotonensis	0.229	0.61
Asterionella formosa	0.047	0.13
Pennate diatoms	0.040	0.11
Oocystis sp.	0.017	0.04
Chlamydomonas globosa		0. 0 0 2 0.01
Total	37.309	
Shannon-Weaver [H']	0.65	
Species Evenness	0.34	

Limnological Data

Data averaged from STORET site: 492473, 492474, 492475.

Surface Data	1981	1989	1991
Trophic Status	M	M	O
Chlorophyll TSI	-	42.40	44.40
Secchi Depth TSI	47.38	37.44	42.05
Phosphorous TSI	47.30	49.86	29.90
Average TSI	47.34	43.23	38.79
Chlorophyll a (ug/L)	-	3.35	4.36
Transparency (m)	2.4	4.8	3.8
Total Phosphorous (ug/L)	10	24	6.2
pH	-	8.36	8.86
Total Susp. Solids (mg/L)	<5	-	<3
Total Volatile Solids (mg/L)	-	-	4
Total Residual Solids (mg/L)	-	-	<3
Temperature (°C / °f)	18/64	17/62	18/64
Conductivity (umhos.cm)	280	317	306
Water Column Data			
Ammonia (mg/L)	0.05	0.02	0.03
Nitrate/Nitrite (mg/L)	0.17	-	0.29
Hardness (mg/L)	157	-	173
Alkalinity (mg/L)	157	-	160
Silica (mg/L)	-	-	4.7
Total Phosphorous (ug/L)	10	40	12
Miscellaneous Data			
DO (Mg/l) at 75% depth	7.1	8.3	3.8
Stratification (m)	NO	17-18	17-19
Limiting Nutrient	P	P	P
Depth at Deepest Site (m)	40	38.0	33.0



D	°C	pH	DO	Cond
0.0	19.9	8.5	7.9	306
1.0	19.7	8.5	7.7	306
2.0	19.3	8.5	7.8	306
3.0	18.7	8.4	7.6	316
4.0	18.3	8.4	7.3	322
5.0	18.0	8.3	7.1	323
6.0	17.7	8.3	6.7	325
7.0	17.4	8.2	6.6	325
8.0	17.1	8.2	5.9	329
9.0	16.8	8.1	6.7	322
10.0	16.3	8.1	7.1	321
11.0	16.2	8.1	7.2	323
12.0	16.0	8.2	7.2	327
13.0	15.7	8.3	7.3	333
14.0	15.5	8.3	7.4	344
15.0	15.2	8.4	7.5	353
16.0	14.8	8.2	7.3	355
17.0	14.2	7.9	6.6	358
18.0	8.3	7.7	4.6	351
19.0	7.1	7.7	3.7	374
20.0	6.7	7.7	3.7	390
21.0	6.6	7.7	3.8	390
22.0	6.4	7.7	3.8	392
23.0	6.4	7.7	3.8	390
24.0	6.4	7.7	3.8	392
25.0	6.3	7.7	3.8	392
26.0	6.2	7.7	3.9	390
27.0	6.2	7.8	3.9	389
28.0	6.1	7.8	4.0	390
29.0	6.0	7.7	4.0	389
30.0	5.8	7.7	3.1	390
31.0	5.7	7.7	3.1	390
32.0	5.6	7.7	3.0	393
33.8	5.7	7.7	2.9	394

Temp – ---– DO
•---•

Species Richness 0.26

As observed the phytoplankton community is dominated by green algae which are indicative of oligotrophic to mesotrophic water. The presence of the diatom Fragilaria crotonensis is more indicative of more eutrophic conditions.

Pollution Assessment

Nonpoint pollution sources include grazing, recreation, summer home areas, and abandoned mining areas.

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	
Wasatch Front Regional Council	292-4469
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146
Wasatch-Cache National Forest	524-5030
Ogden Ranger District	625-5112
Recreation	
Golden Spike Empire Travel Region (Ogden)	627-8288
Reservoir Administrators	
Ogden River Water Users Association	621-6555
DOI	524-5403