

## GUNLOCK RESERVOIR



### Introduction

Gunlock Reservoir is an intermediate size impoundment of the Santa Clara River in extreme southwestern Utah. A warm water fishery, it is known for Bass and Crappie fishing. It is the site of an undeveloped state park. The reservoir was created in 1970 by the construction of an earth-fill dam.

The shoreline is owned by the State of Utah with unrestricted public access. Water is consumed for agricultural uses, but also used for recreation and

warmwater aquatic habitat. Some of the water use may change to culinary if the St. George is unsuccessful in developing other water storage facilities.

#### Location

County	Washington
Longitude / Latitude	113 46 28 / 37 15 30
USGS Map	Gunlock 1972
DeLorme's Utah Atlas and Gazetteer	Page 16, C-3
Cataloging Unit	Upper Virgin (15010008)

#### Characteristics and Morphometry

Lake elevation (meters / feet)	1,092 / 3,584
Surface area (hectares / acres)	108 / 266
Watershed area (hectares / acres)	76,400 / 189,000
Volume (m <sup>3</sup> / acre-feet)	
capacity	2.5510 x 10 <sup>7</sup> / 20,680
conservation pool	2.837 x 10 <sup>6</sup> / 2,300
Annual inflow (m <sup>3</sup> / acre-feet)	4.9 x 10 <sup>6</sup> / 4,000
Retention time (years)	5
Drawdown (m <sup>3</sup> / acre-feet)	4,934,008 / 4,000
Depth (meters / feet)	
maximum	35 / 115
mean	23 / 77
Length (km / miles)	2.9 / 1.8
Width (km / miles)	1.2 / .7
Shoreline (km / miles)	8.2 / 5.1

### Recreation

Gunlock Reservoir is located about 20 miles northwest of St. George. Access from the south is via old US-91 to the Paiute Indian Reservation (the town of Shivwits) and north for five miles to Gunlock. From the north, travel south on the Legacy Loop Highway (U-18) to Veyo, then southwest to Gunlock. All access routes are paved.

The area offers many recreational opportunities, including fishing, boating, camping, and swimming. Because of the low elevation and southern location, winter temperatures are mild, extending the water recreation

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season into the spring and fall.

Gunlock State Park encompasses the reservoir. Gunlock Reservoir has high recreational use pressures. Although there is a Utah State Park established at the south end, recreational facilities are limited. There is a boat ramp, parking, picnic tables, campgrounds, and restroom facilities. Boating, fishing, waterskiing, and swimming are all common activities on the reservoir, along with a minimal amount of windsurfing. There is an annual two day speed racing event which draws approximately 1000 visitors.



### Watershed Description

Gunlock Reservoir is the second and largest of the three major reservoirs on the Santa Clara River. It is located west of the Red Mountains, which terminate in a spectacular lava-capped Navajo Sandstone cliff.

The watershed high point, Signal Peak, is 3,159 m (10,365 ft) above sea level, thereby developing a complex slope of 7.8% to the reservoir. The inflow and outflow is the Santa Clara River. The average stream gradient above the reservoir is 4.7% (248 feet per mile).

The watershed is made up of alluvial fans, mesas, floodplains, upland plains, terraces, mountains, plateaus, undulating uplands, and rockland. The soil associations that compose the watershed are found in Appendix III.

The vegetation communities are comprised of shadscale, greasewood, saltbrush, sage-grass, bitterbrush-mountain mahogany, pinyon-juniper, mahogany, grass-forbs, pine, aspen, spruce-fir, oak, and maple. The watershed receives 25 - 76 cm (10 - 30 inches) of precipitation annually with a frost-free season of 180 - 200 days at the reservoir.

Land use is multiple use (94%), pasture (3%), cropland (3%) and urban (<1%). The major use of the watershed is livestock grazing.

### Limnological Assessment

The water quality of Gunlock Reservoir is very good. It is considered soft water with a hardness concentration of approximately 200 mg/L (CaCO<sub>3</sub>). The only parameter that exceeds State standards is dissolved oxygen. All other parameters including total metals obtained near the bottom at the deep sites were within State standards for

#### Limnological Data

Data averaged from STORET sites: 495051, 495052

Surface Data	1981	1989	1991
Trophic Status	E	M	M
Chlorophyll TSI	-	42.87	37.98
Secchi Depth TSI	-	48.06	41.98
Phosphorous TSI	-	36.48	46.97
Average TSI	51.95	42.47	42.31
Chlorophyll <i>a</i> (ug/L)	-	3.5	2.2
Transparency (m)	.5	2.3	3.1
Total Phosphorous (ug/L)	50	10	15
pH	-	7.9	8.4
Total Susp. Solids (mg/L)	44	-	<3
Total Volatile Solids (mg/L)	-	-	7
Total Residual Solids (mg/L)	-	0	0
Temperature (°C / °f)	21/71	22/71	21/69
Conductivity (umhos.cm)	1500	466	444
<b>Water Column Data</b>			
Ammonia (mg/L)	-	0.04	0.04
Nitrate/Nitrite (mg/L)	0.2	-	<0.01
Hardness (mg/L)	380	-	207
Alkalinity (mg/L)	-	-	182
Silica (mg/L)	-	-	24.8
Total Phosphorous (ug/L)	-	11	18
<b>Miscellaneous Data</b>			
Limiting Nutrient	-	N	N
DO (Mg/l) at 75% depth	6.5	1.1	2.0
Stratification (m)	5-6	8-14	12-13
Depth at Deepest Site (m)	28	14	13

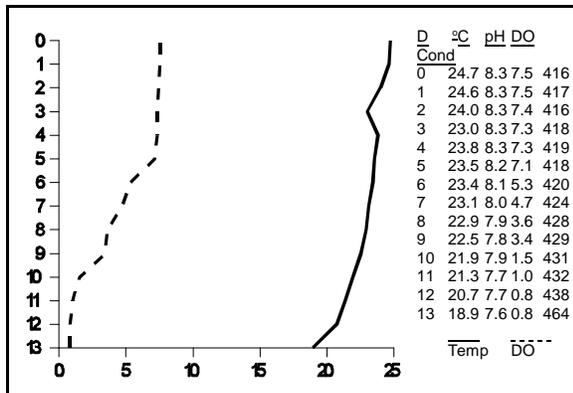
defined beneficial uses. Average total phosphorus levels have not exceeded the State pollution indicator for phosphorus of 25 ug/L. However, on a rare occasion total phosphorus values exceeded the indicator at an individual point in the water column. Phosphorus concentrations averaged 11 and 18 ug/L in 1989 and 1991. These values are well below the state indicator. Nutrients throughout the water column are typically not a problem. However it should be noted that during this period of sampling anoxic conditions were present near the bottom as depicted by the August 7, 1991 profile. Anoxic conditions permit the reintroduction of phosphorus stored in the sediments back

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into the water column and reduce the available habitat for a viable fishery. No stratification was present at that time. Data throughout the study period indicates that the lake is nitrogen limited with N/P ratios usually less than 5. Although the lake was reported as eutrophic in 1981, it appears that it is barely mesotrophic in 1989 and 1991. It appears that the trophic status for the lake has stabilized and is fairly low in productivity. Macrophytes are typically not present and are not a problem.

The types of fish present in Gunlock Reservoir as recorded by the Division of Wildlife Resources in 1973 were Mountain Suckers (*Catostomus platyrhynchus*), Virgin River Spinedace (*Lepidomeda mollispinis*), Largemouth Bass (*Micropterus salmoides*), Black Crappie (*Pomoxis nigromaculatus*), and Bluegill (*Lepomis macrochirus*). Also noted as present golden shiners (*Notemigonus crysoleucas*), green sunfish (*Lepomis cyanellus*), and carp (*Cyprinus carpio*). There is also an abundant crayfish population present. DWR currently stocks the reservoir with fingerling largemouth bass. No fishkills have been reported according to DWR.

The reservoir has not been chemically treated by the DWR to control rough fish competition, so the reservoir may include original fish populations of the Santa Clara River.



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

Sp.	Cell Density	Volume %
	(mm <sup>3</sup> /liter)	By Volume
<i>Sphaerocystis schroeteri</i>	58.09	2 . 6 4 1
<i>Fragilaria crotonensis</i>	0.916	20.15
<i>Dinobryon divergens</i>	0.699	15.38
<i>Chrysocapsa planktonica</i>	2.45	0 . 1 1 1
<i>Ankistrodesmus falcatus</i>		0 . 0 7 4

1.63		
<i>Wislouchiella planktonica</i>		0 . 0 3 3
0.73		
<i>Oocystis borgei</i>	0.022	0.49
<i>Oocystis sp.</i>	0.016	0.37
<i>Scenedesmus bijuga</i>	0.016	0.34
Pennate diatoms	0.013	0.29
Centric diatoms	0.003	0.07
Total	4.444	
Shannon-Weaver [H']	1.21	
Species Evenness	0.50	
Species Richness [d]	0.45	

The flora is quite diverse, dominated by green algae, diatoms, and gold algae. Such diversity indicates a healthy aquatic ecosystem. Biomass is not great enough to be a problem.

**Pollution Assessment**

Nonpoint pollution sources are grazing, feed lot runoff and other agricultural activities, recreation, and urban runoff.

Cattle graze in the watershed and around the reservoir. There are no point pollution sources in the watershed.

**Information**

**Management Agencies**

Bureau of Land Management	539-4001
Dixie Resource Area (St. George)	673-4654
Five County Association of Governments	673-3548
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146

**Recreation**

Color Country Travel Region (St. George)	628-4171
Saint George Area Chamber of Commerce	628-1658
Utah Parks and Recreation	538-7722
Gunlock State Park	No Phone

**Reservoir Administrators**

Washington County Water Conservation District	673-3617
Lower Gunlock Reservoir Corporation	673-2566

**Beneficial Use Classification**

The state beneficial use classifications include: culinary (1A), recreational bathing (swimming) (2A) (proposed), boating and similar recreation (excluding swimming) (2B), warm water game fish and organisms in their food chain (3B) and agricultural uses (4).