

Washburn Lake Lakeshed Assessment

The lakeshed vitals table identifies where to focus organizational and management efforts for each lake. Criteria were developed using limnological concepts to determine the effect to lake water quality.

Lakeshed Vitals		Rating
Major Basin	Upper Mississippi River	descriptive
Major Watershed	Pine River	descriptive
Minor Watershed	11038	descriptive
Lakeshed	Daggett Brook - Headwaters (1103800)	descriptive
Ecoregion	Northern Lakes and Forests	descriptive
Lake Area	1,590 acres	descriptive
Miles of Shoreline	19.75	descriptive
Miles of Stream	0.03	descriptive
Miles of Road	10	descriptive
Lake Max Depth	111 ft. (33.8 m)	descriptive
Lake Mean Depth	West Basin: 25.7 ft. (7.8 m); East Basin: 4.9 ft. (1.5 m)	+/-
Water Residence Time	3.7 years	+
Municipalities	None	+
Sewage Management	Individual waste treatment systems (septic systems and holding tanks – inspections to be completed in 2009)	+
Public Drainage Ditches	None	+
Lake Management Plan	Healthy Lakes & Rivers Partnership program, 2004	+
Lake Vegetation Survey/Plan	Survey Completed August 2006	+
Forestry Practices	Multiple areas of proposed clear-cut with reserves – time of harvest unknown	-
Development Classification	General Development	-
Shoreline Development Index	3.5	-
Total Lakeshed to Lake Area Ratio (total lakeshed includes lake area)	4.7:1	x
Public Lake Accesses	1	x
Inlets	1 – Daggett Brook	x
Outlets	1 – Daggett Brook	x
Shoreland Conservation Potential (% shoreland identified for conservation)	30%	+
Feedlots	None	+
Agriculture Zoning	None	+
Public Land : Private Land	1.7:1	+
Wetland Coverage	10%	+
Lake Transparency Trend	Improving trend (99.9% probability)	+
Exotic Species	None	+

Rating Key:

- + beneficial to the lake
- possibly detrimental to the lake
- x warrants attention

Lakeshed



Understanding a lakeshed requires the understanding of basic hydrology. A watershed is the area of land that drains into a surface water body such as a stream, river, or lake and contributes to the recharge of groundwater. There are three categories of watersheds: 1) basins, 2) major watersheds, and 3) minor watersheds.

Washburn Lake is found within the **Upper Mississippi River Basin**, which includes the **Pine River Major Watershed** as one of its sixteen major watersheds (Figure 1). The basin covers 20,000 square miles, while the Pine River Watershed covers 784 square miles (approximately 502,013 acres). Washburn Lake falls within **minor watershed 11038**, one of the 69 minor watersheds that comprise the Pine River Major Watershed (Figure 2).

Within this watershed hierarchy, lakesheds also exist. A lakeshed is defined simply as the land area that drains to a lake. While some lakes may have only one or two minor watersheds draining into them, others may be connected to a large number of minor watersheds, reflecting a larger drainage area via stream or river networks. Washburn Lake falls within the **Daggett Brook - Headwaters (1103800) lakeshed**, covering 7,405 acres (includes lake area) (Figure 3). Even though Washburn Lake receives water from minor watershed 11037, for the purpose of this assessment it is decided that only the immediate lakeshed be inventoried and assessed.

Washburn Lake Lakeshed Water Quality Protection Strategy

Each lakeshed has a different makeup of public and private lands. Looking in more detail at the makeup of these lands can give insight on where to focus protection efforts. The protected lands (easements, wetlands, public land) are the future water quality infrastructure for the lake. Developed land and agriculture have the highest phosphorus runoff coefficients, so this land should be minimized for water quality protection.

A large percentage of the land within Washburn Lake's lakeshed is private forested uplands. This land can be the focus of development and protection efforts in the lakeshed.

	Private (28%)					26%	Public (46%)		
	Developed	Agriculture	Forested Uplands	Other	Wetlands	Open Water	County	State	Federal
Land Use (%)	2%	0.2%	21%	0.8%	4%	26%	0%	46%	0%
Runoff Coefficient Lbs of phosphorus/acre/year	0.45 - 1.5	0.26 - 0.9	0.09		0.09		0.09	0.09	0.09
Description	Focused on Shoreland	Cropland	Focus of development and protection efforts	Open, pasture, grassland, shrubland	Protected				
Potential Phase 3 Discussion Items	Shoreline restoration	Restore wetlands; CRP	Forest stewardship planning, 3 rd party certification, SFIA, local woodland cooperatives		Protected by Wetland Conservation Act		County Tax Forfeit Lands	State Forest	National Forest

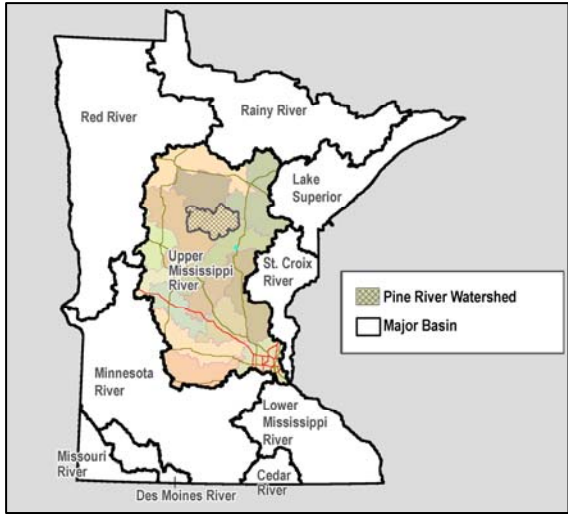


Figure 1. Upper Mississippi Basin and the Pine River Watershed.

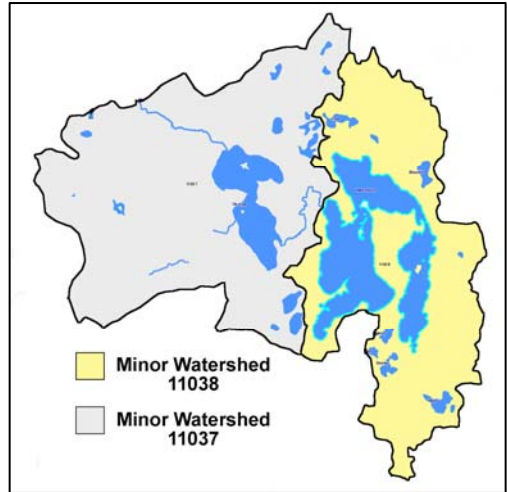


Figure 2. Minor Watersheds 11038 & 11037 contribute water to Washburn Lake.

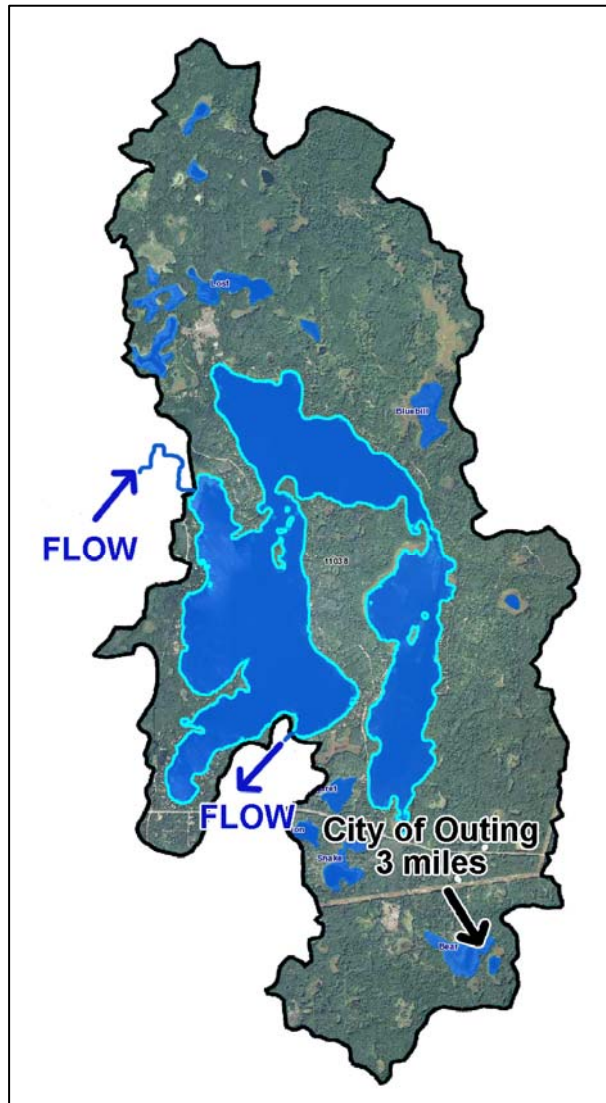


Figure 3. The Daggett Brook - Headwaters (1103800) Lakeshed (Aerial Imagery 2008 1M).

Conservation Easement Potential

In an ever-growing society, today's landscapes are being urbanized more and more to sustain the ever-growing population and behavior of recreational usage. In Minnesota, the land of ten thousand lakes, it is only natural to develop properties within the boundaries and beauty of our lakes and streams. Conservation efforts to limit or slow down the development process can only assist in the preservation of the lakeshed and inevitably the water quality of water bodies found within. Figure 4 identifies parcels within the lakeshed that are large enough to warrant the investigation of parcel conservation practices and purchase.

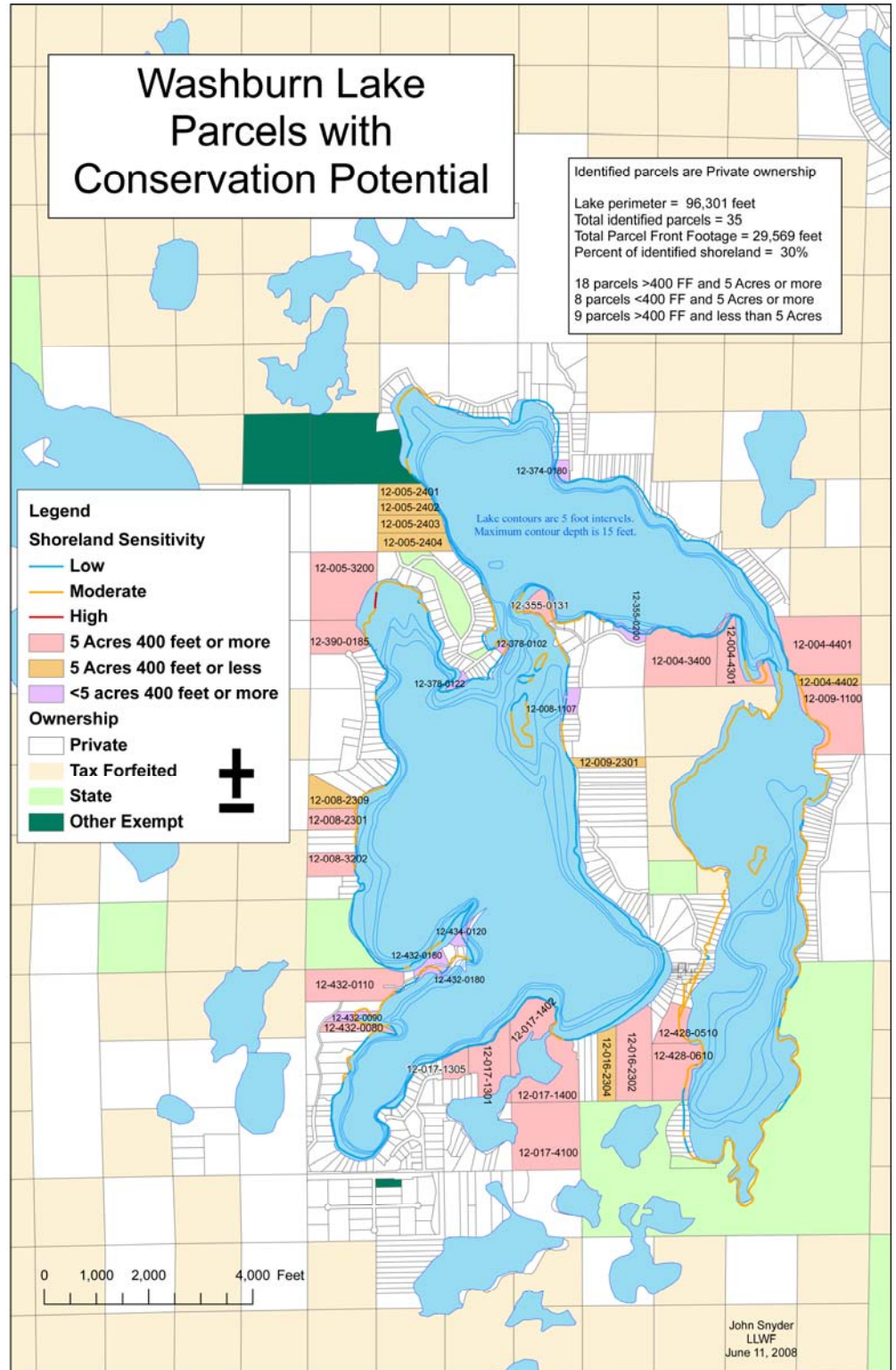


Figure 4. Lake parcels with conservation potential (developed by John Snyder, LLWF).

Land Cover / Land Use

The activities that occur on the land within the lakeshed can greatly impact a lake. Land use planning helps ensure the use of land resources in an organized fashion so that the needs of the present and future generations can be best addressed. The basic purpose of land use planning is to ensure that each area of land will be used in a manner that provides maximum social benefits without degradation of the land resource.

Changes in land use, and ultimately land cover, impact the hydrology of a lakeshed. Land cover is also directly related to the land's ability to absorb and store water rather than cause it to flow overland (gathering nutrients and sediment as it moves) towards the lowest point, typically the lake. Impervious intensity describes the land's inability to absorb water, the higher the % impervious intensity the more area that water cannot penetrate into the soils. Monitoring the changes in land use can assist in future planning procedures to address the needs of future generations.

Phosphorus export, which is the main cause of lake eutrophication, depends on the type of land cover occurring in the lakeshed. Figure 5 depicts Washburn Lake's lakeshed land cover.

The University of Minnesota has online records of land cover statistics from years 1990 and 2000 (<http://land.umn.edu>). Table 1 describes Washburn Lake's lakeshed land cover statistics and percent change from 1990 to 2000. Due to the many factors that influence demographics, one cannot determine with certainty the projected statistics over the next 10, 20, 30+ years, but one can see the transition within the lakeshed from agriculture and water acreages to forest, grass/shrub/wetland, and urban acreages. The largest change in percentage is the decrease in agriculture cover (80.7%); however, in acreage, water cover has decreased the most (230 acres). In addition, the impervious intensity has increased, which has implications for storm water runoff into the lake. The increase in impervious intensity is consistent with the increase in urban acreage.

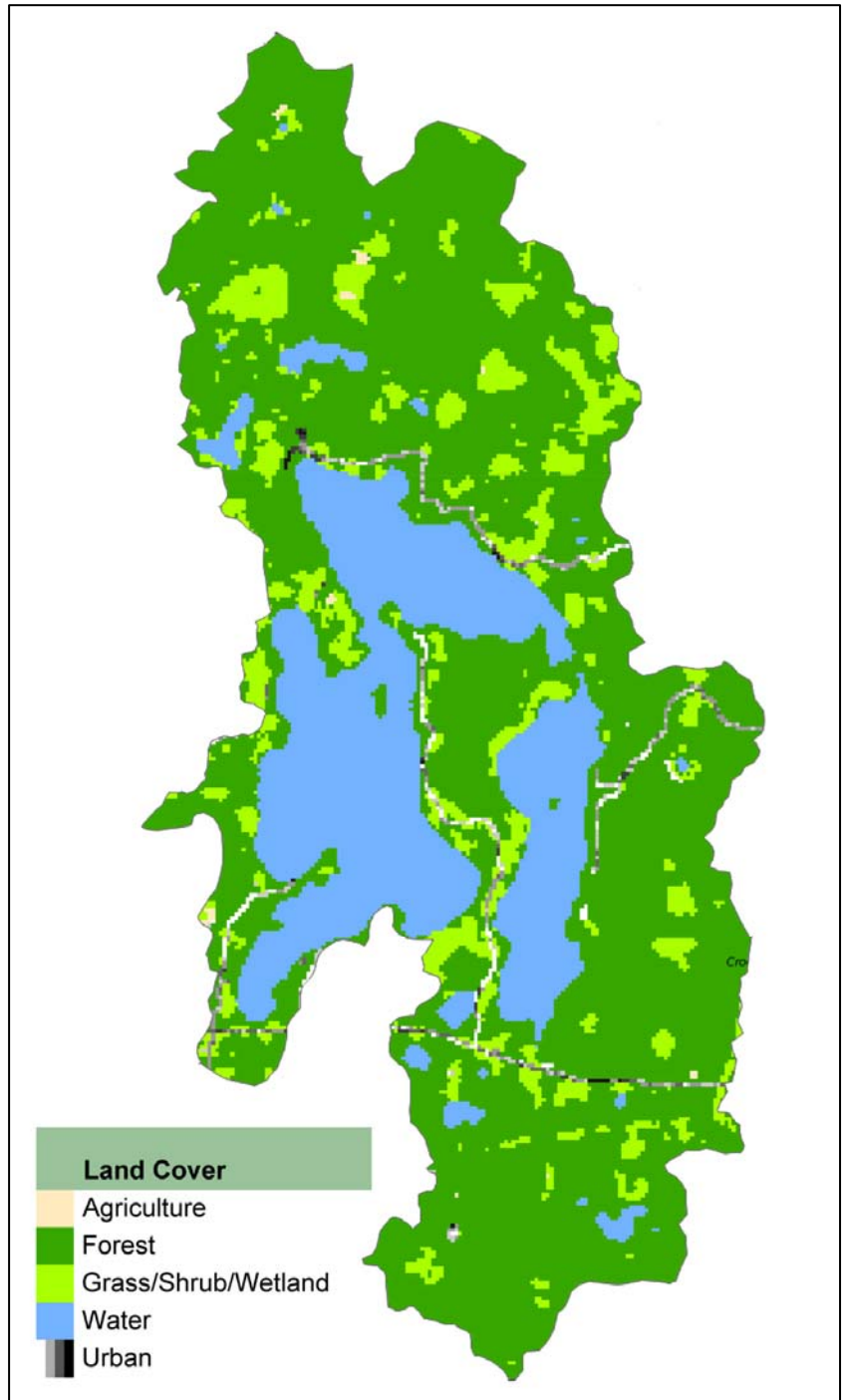


Figure 5. The Daggett Brook - Headwaters (1103800) lakeshed land cover (<http://land.umn.edu>).

Table 1. Washburn Lake's lakeshed land cover statistics and % change from 1990 to 2000
<http://land.umn.edu>.

Land Cover	1990		2000		% Change 1990 to 2000
	Acres	Percent	Acres	Percent	
Agriculture	57	0.77	11	0.15	80.7 % Decrease
Forest	4,741	64.02	4,836	65.31	2.0 % Increase
Grass/Shrub/Wetland	592	7.99	765	10.33	29.2 % Increase
Water	1,869	25.24	1,639	22.13	12.3 % Decrease
Urban	146	1.97	153	2.07	4.8 % Increase
Impervious Intensity %					
0	7,334	99.04	7,288	98.42	0.63 % Decrease
1-10	41	0.55	39	0.53	4.9 % Decrease
11-25	22	0.3	46	0.62	109.1 % Increase
26-40	6	0.08	17	0.23	183.3 % Increase
41-60	2	0.03	9	0.12	350 % Increase
61-80	0	0	5	0.07	500 % Increase
81-100	0	0	1	0.01	100 % Increase
Total Area	7,405		7,405		
Total Impervious Area (Percent Impervious Area Excludes Water Area)	8	0.14	24	0.42	200 % Increase

Demographics

Washburn Lake is classified as a general development lake. General development lakes usually have more than 225 acres of water per mile of shoreline and 25 dwellings per mile of shoreline, and are more than 15 feet deep.

The Minnesota Department of Administration Geographic and Demographic Analysis Division extrapolated future population in 5-year increments out to 2035. These projections are shown in Figure 6 below. Compared to Cass County as a whole, Crooked Lake and Thunder Lake Townships have higher extrapolated growth projections.

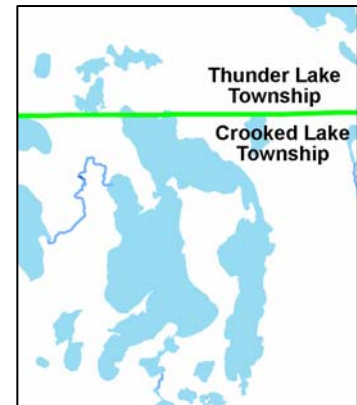
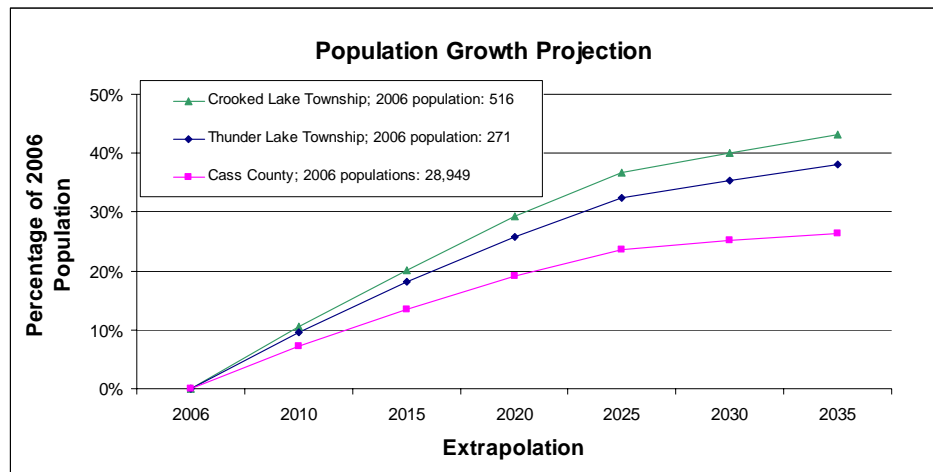


Figure 6. Population growth projection for the townships around Washburn Lake and Cass County (source: <http://www.demography.state.mn.us/resource.html?id=19332>).



Status of the Fishery (DNR, as of 08/11/2003)

Washburn Lake is a 1,554 acre lake located about three miles northwest of Outing in Cass County. The lake is comprised of 3 distinct basins. A public access is co-located at the Clinton Converse DNR Forestry Campground at the south end of the eastern basin. Based on 1993 data, development is considered moderate with 16.9 homes/cabins per shoreline mile. The maximum depth is 111' and about 48% of the lake is 15' deep or less. Shallow water substrates consist primarily of sand and gravel, although areas of rubble, boulders, and muck are also present. The aquatic plant community is quite diverse with 39 species present and is critical to maintaining healthy fish populations. Emergent plants such as bulrush are common along much of the shoreline, however just as common are numerous gaps in these beds along shorelines with developed lots. The remaining emergent plants should be protected as they are important for shoreline protection, maintaining water quality, and provide essential spawning habitat for bass and panfish species. Submerged plants provide food and cover needed by fish and other aquatic species.

The 2003 walleye catch of 5.3/gill net was the highest catch to date, but is average when compared to similar lakes. Twelve different year classes were represented with natural reproduction accounting for at least 54.7% of all walleyes sampled in gill nets. Average length and weight increased slightly from 16.9" and 2.0 lbs in 1998 to 18.5" and 2.2 lbs in 2003.

Northern pike were caught in average numbers in 2003 at 5.3/gill net, which is the second highest catch to date. Average length and weight increased slightly from 17.7" and 1.2 lbs in 1998 to 19.4" and 1.5 lbs in 2003. Growth was average with 7.6% of these fish measuring at least 24".

The largemouth bass abundance of 1.1/gill net and 1.3/trap net was the highest to date and is relatively high compared to similar lakes. Spring electrofishing resulted in a largemouth bass catch rate of 20.2/hr with an average length of 11.6" and 53.3% measuring at least 12".

Bluegill abundance was also the highest to date at 18.9/trap net. Growth was relatively slow. Black crappies were present in low numbers (0.1/gill net and 0.3/trap net) when compared to similar lakes and were near the lowest catches to date on this lake.

Tullibee and yellow perch are important forage species for the lake's game fish. The 2003 tullibee catch was the highest to date at 3.7/gill net and is comparable to similar lakes while yellow perch abundance has been low for the last 5 nettings, including this one.

See the link below for specific information on gillnet surveys, stocking information, and fish consumption guidelines. <http://www.dnr.state.mn.us/lakefind/showreport.html?downum=11005900>