Minnesota Pollution Control Agency

Prepared in cooperation with the
Minnesota Department of Natural Resources

Echo Lake

St. Louis County

Sentinel Lakes

Minnesota Lake ID: 69-0615
Area: 1,139 acres
Watershed Area: 30,929 acres
Ecoregion: Northern Lakes and Forests (NLF)

Trophic State: Eutrophic
Maximum Depth: 10 feet
Mean Depth: 6 feet
Mixing Status: Polymictic

Figure 1. Echo Lake Watershed map

Legend

- Developed
- Cultivated (Ag)
- Pasture & Open
- Forest
- Water
- Wetlands

Figure 2. Echo Lake bathymetric map

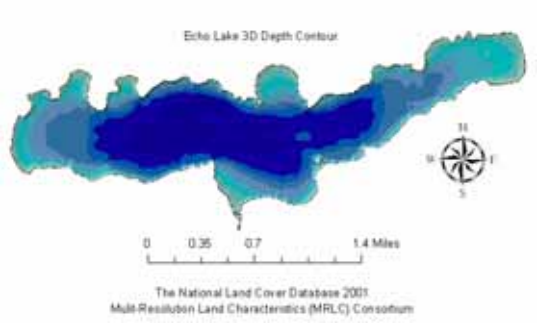

Table 1. land use compositions

Land use	Echo Lake land use percentage	NLF typical land use percentage
Developed	<1	0 – 7
Cultivated (Ag)	<1	<1
Pasture & Open	1	0 – 6
Forest	83	54 – 87
Water & Wetland	15	14 – 31
Feedlots (#)	0	

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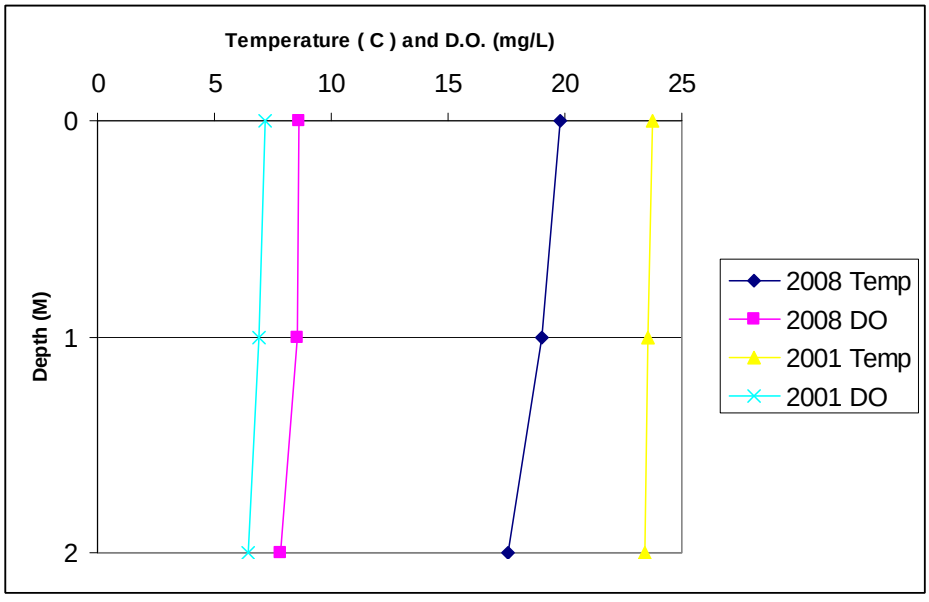
Table 2. Echo Lake data as compared to typical range for NLF ecoregion reference lakes
MPCA data based on 2001 and 2008 sample collections

Parameter	Echo Lake 2008	Echo Lake, MPCA 2001 Assessment	NLF
Number of reference lakes			32
Total Phosphorus (µg/L)	39	42	14 – 27
Chlorophyll mean (µg/L)	8.1	13.5	4 – 10
Secchi Disk (feet) (meters)	3.6 1.1	3.0 0.9	8 -15 2.4 – 4.6
Total Kjeldahl Nitrogen (mg/L)	0.78		0.4 – 0.75
Alkalinity (mg/L)	12		40 – 140
Color (Pt-Co U)	88		10 – 35
pH (SU)	6.48		7.2 – 8.3
Chloride (mg/L)	1.07		0.6 – 1.2
Total Suspended Solids (mg/L)	4.5		<1 – 2
Total Suspended Inorganic Solids (mg/L)	1.8		<1 - 2
Conductivity (umhos/cm)	38.5		50 – 250
TN:TP ratio	19:1		25:1 - 35:1

µg/L = micrograms per liter	Pt-Co-U = Platinum Cobalt Units
mg/L = milligrams per liter	SU = Standard Units
umhos/cm = micromhos per centimeter	

Figure 3. Echo Lake July 2001 and July 2008 dissolved oxygen (DO) and temperature profiles



Watershed, water quality, and fishery summary

Echo Lake is a very shallow lake that covers 1,139 acres and has a watershed area of 30,929 acres (48 square miles). The watershed is almost entirely forest and wetland (Figure 2). Lakeshore development is minimal, highlighted by two resorts and a U.S. Forest Service Campground. The lake is shallow and has a large fetch. These characteristics yield polymictic in-lake conditions. The Minnesota Pollution Control Agency (MPCA)conducted a lake assessment on Echo Lake in 2001.

The dissolved oxygen (DO) and temperature profiles from July 2001 and 2008 are shown in Figure 3. Little change was seen in mid-summer DO profiles, although temperatures were slightly higher in 2001. 2008 results show little change in total phosphorus (TP), chlorophyll-a, and Secchi transparency as compared to 2001 (Table 2). Echo Lake is a soft-water lake and naturally bog stained as a result of the dominance of forests and wetlands in the watershed. TP, chlorophyll-a and Secchi values are above the typical range for NLF ecoregion reference lakes (Table 2) and suggest eutrophic conditions. Long term trends in water clarity or water quality could not be determined due to a lack of historical data. Echo would be a good candidate for participation in the Citizen Lake Monitoring Program

Figure 4. Echo Lake plant species richness

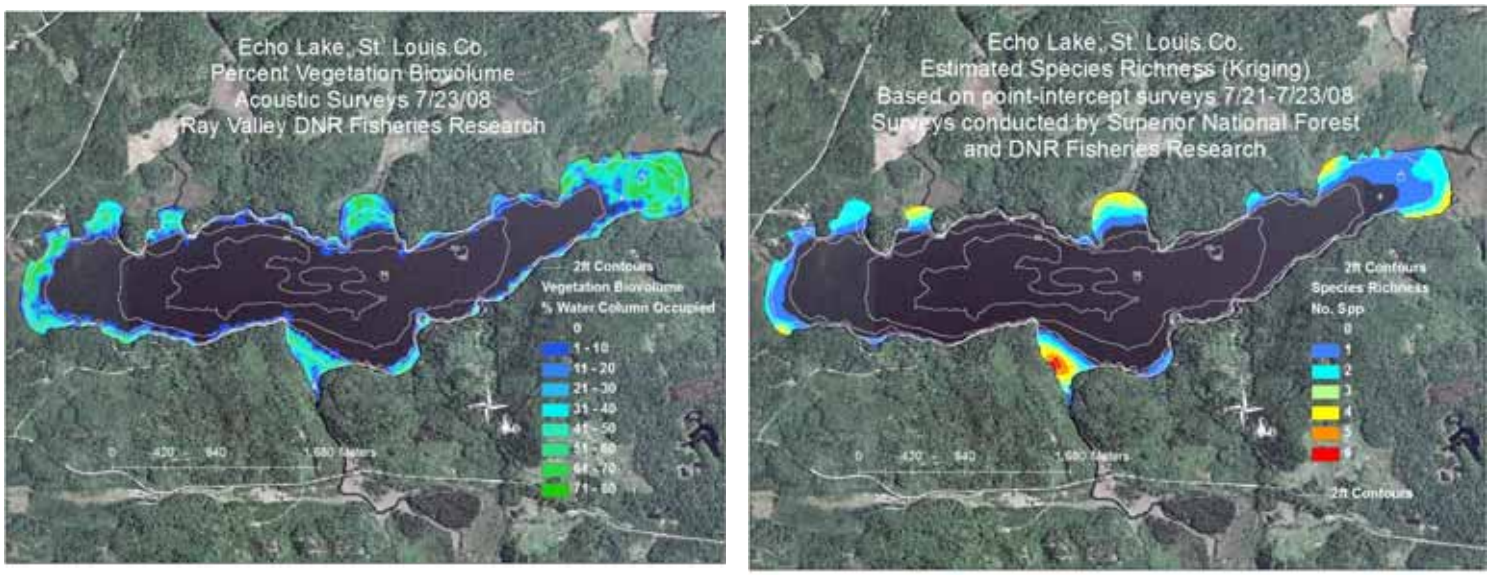


Table 3. Focal species captured during 2008 surveys and their size and abundance compared with other lakes in its lake class

Species	Stocked	Abundance	Size	Notes
Walleye*	N	High	Large	
Northern Pike	N	High	Large	
Yellow perch		Low	Small	
Black Crappie	N			Discovered in 1988
Largemouth bass	N	Average	Average	Discovered in 2006
Smallmouth bass		Average	Average	Discovered in 1980
Bluegill	N			Discovered in 1991
Pumpkinseed		Low		
Rock bass	N	Low		
White sucker	N	Average	Average	

*Primary species managed

Table 4. Aquatic plant summary

Percent cover of aquatic plants ≤ 15 ft deep	25.8%
Lake depth beyond which most vegetation disappeared	5.9ft
Number of common species (i.e., ≥ 10% cover)	1
Non-native plant infestation	NA

Narrative

Echo maintains a high quality self-sustaining walleye and northern pike fishery. Similar to other lakes in the border lakes ecoregion, warm-water centrarchids are becoming increasingly abundant, and Echo supports a high-quality crappie fishery. Sustained low catches of yellow perch, an important cool-water forage species may impact production of walleye and northern pike over the long-term. Despite its shallow depth, bog-stained turbid water limits aquatic plant growth to shallow depths in Echo (Figure 4). Nevertheless, aquatic plants, primarily wild rice and wild celery were very common and abundant near-shore and in shallow bays.