



# Minnesota Pollution Control Agency

Prepared in cooperation with the  
Minnesota Department of Natural Resources

## Bearhead Lake

**St. Louis County**

Sentinel Lakes

**Minnesota Lake ID:** 69-0254

**Area:** 674 acres

**Watershed Area:** 2,063 acres

**Ecoregion:** Northern Lakes and Forests (NLF)

**Trophic State:** Mesotrophic

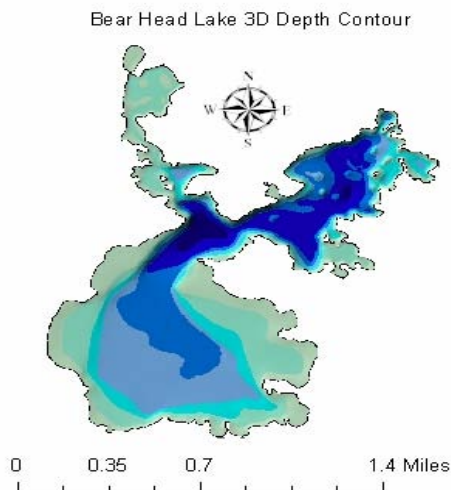
**Maximum Depth:** 46 feet

**Mean Depth:** 12 feet

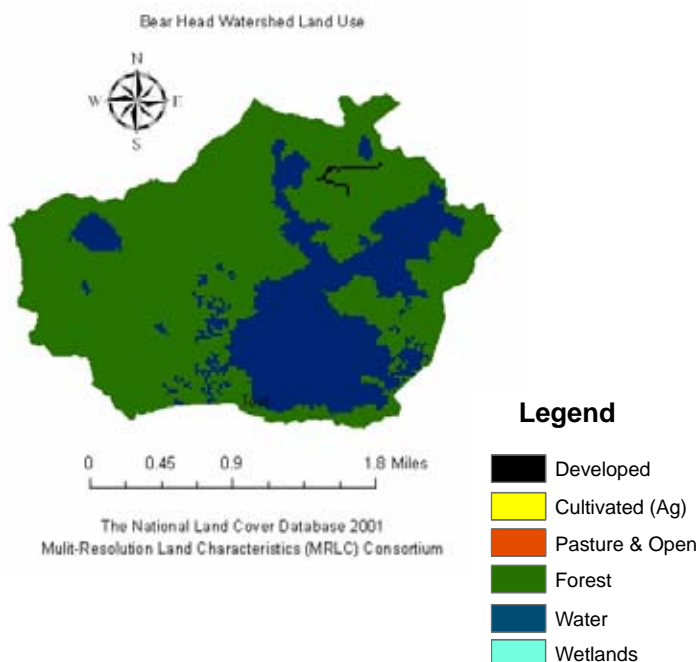
**Mixing Status:** Dimictic



**Figure 2. Lake bathymetric map**



**Figure 1. Bearhead Lake Watershed map**



**Table 1. Bearhead Lake Watershed land use as compared to NLF ecoregion reference lakes**

| Land use        | Bearhead Lake land use percentage | NLF typical land use percentage |
|-----------------|-----------------------------------|---------------------------------|
| Developed       | <1                                | 0 - 7                           |
| Cultivated (Ag) | 0                                 | <1                              |
| Pasture & Open  | <1                                | 0 - 6                           |
| Forest          | 71                                | 54 - 87                         |
| Water & Wetland | 29                                | 14 - 31                         |
| Feedlots (#)    | 0                                 |                                 |

**Table 2. Bearhead Lake 2008 data as compared to typical range for NLF ecoregion reference lakes**  
**Data from Minnesota Department of Health (MDH) laboratory**

| Parameter                               | Bearhead Lake | NLF         |
|-----------------------------------------|---------------|-------------|
| Number of reference lakes               |               | 32          |
| Total Phosphorus (µg/L)                 | 14.5          | 14 – 27     |
| Chlorophyll mean (µg/L)                 | 7.4           | 4 – 10      |
| Secchi Disk (feet)                      | 8.0           | 8 -15       |
| (meters)                                | 2.4           | 2.4 – 4.6   |
| Total Kjeldahl Nitrogen (mg/L)          | 0.45          | 0.4 – 0.75  |
| Alkalinity (mg/L)                       | 14.6          | 40 – 140    |
| Color (Pt-Co U)                         | 30            | 10 – 35     |
| pH (SU)                                 | 6.64          | 7.2 – 8.3   |
| Chloride (mg/L)                         | < 1           | 0.6 – 1.2   |
| Total Suspended Solids (mg/L)           | 2.0           | <1 – 2      |
| Total Suspended Inorganic Solids (mg/L) | 1.7           | <1 - 2      |
| Conductivity (umhos/cm)                 | 38            | 50 – 250    |
| TN:TP ratio                             | 31:1          | 25:1 - 35:1 |

µg/L = micrograms per liter

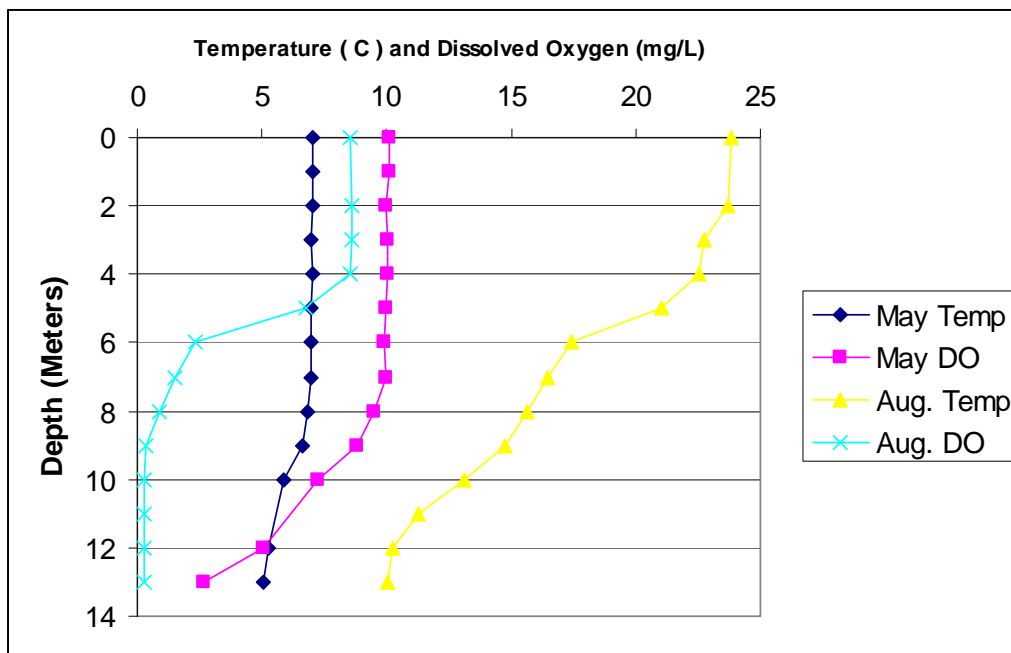
Pt-Co-U = Platinum Cobalt Units

mg/L = milligrams per liter

SU = Standard Units

umhos/cm = micromhos per centimeter

**Figure 3. Bearhead Lake May and August 2008 dissolved oxygen and temperature profile**



Bearhead Lake covers an area of 674 acres and is located 10 miles east of Tower, Minnesota. The lakeshore is entirely managed by the Minnesota Department of Natural Resources, via Bearhead Lake State Park - a partner in the Sentinel Lake project. There is no distinct surface water outlet from Bearhead Lake. The lake has a very small (3:1) watershed to lake surface ratio (Figure 2). The watershed is almost entirely forest and wetland, and is located at the headwaters of the Birch Lake / Kawishiwi River watersheds. With the exception of the State Park campground, in the northwest part of the lake, the entire lakeshore is undeveloped.

Prior to the 2008 monitoring there was very limited historical data for Bearhead Lake. In mid-May a thermocline had not yet developed; however, by the end of May a thermocline was apparent. By August, a thermocline had developed at approximately five meters and the lake was anoxic from 8 m to the bottom (Figure 3). 2008 data indicates mesotrophic conditions, and generally good water quality with concentrations of total phosphorus, chlorophyll-a, and Secchi transparency well within the range of reference lakes in the Northern Lakes and Forests ecoregion (Table 2).

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

| Species         | Stocked | Abundance | Size          | Trend      | Notes              |
|-----------------|---------|-----------|---------------|------------|--------------------|
| Walleye*        | Y       | High      | Average       | Increasing |                    |
| Northern Pike   | N       | High      | ?             | Increasing |                    |
| Black Crappie   | N       | ?         | Average       | Increasing | Discovered in 1989 |
| Largemouth bass | N       | High      | Average       | ?          |                    |
| Bluegill        | N       | High      | Small-average | Increasing | Discovered in 1969 |
| White sucker    | N       | Average   | Large         | Decreasing |                    |
| Yellow perch    | N       | Low       | Small         | Decreasing |                    |

\*Management emphasis on this species

**Table 4. Aquatic Plant Summary:**

|                                                     |         |
|-----------------------------------------------------|---------|
| Percent cover of aquatic plants $\leq$ 15 ft deep   | 61.8%   |
| Lake depth beyond which most vegetation disappeared | 10.9 ft |
| Number of common species ( i.e., $\geq$ 10% cover)  | 5       |
| Non-native plant infestation                        | NA      |
| Frequency of <i>Chara</i>                           | 9.5%    |

## Narrative

Bearhead maintains a high quality walleye fishery that is supplemented through fry stocking. Similar to other lakes in the border lakes ecoregion, warm-water centrarchids are becoming increasingly abundant. Catches of yellow perch, an important cool-water forage species in 2008 were much lower than normal for Bearhead and other lakes in its lake class. The aquatic plant community in Bearhead is moderately diverse with vegetation growing to modest depths.