

# **Leon County Lakes Ecology**

## **Lake McBride**

McGlynn Labs Inc.

### 5.1.4: Lake McBride

Surface Area: 182 acres

Drainage basin: Lafayette

Classification: Mesotrophic

Location: Tallahassee Hills

Number of Stations: 3

Duration of Monitoring: 08/91-06/06

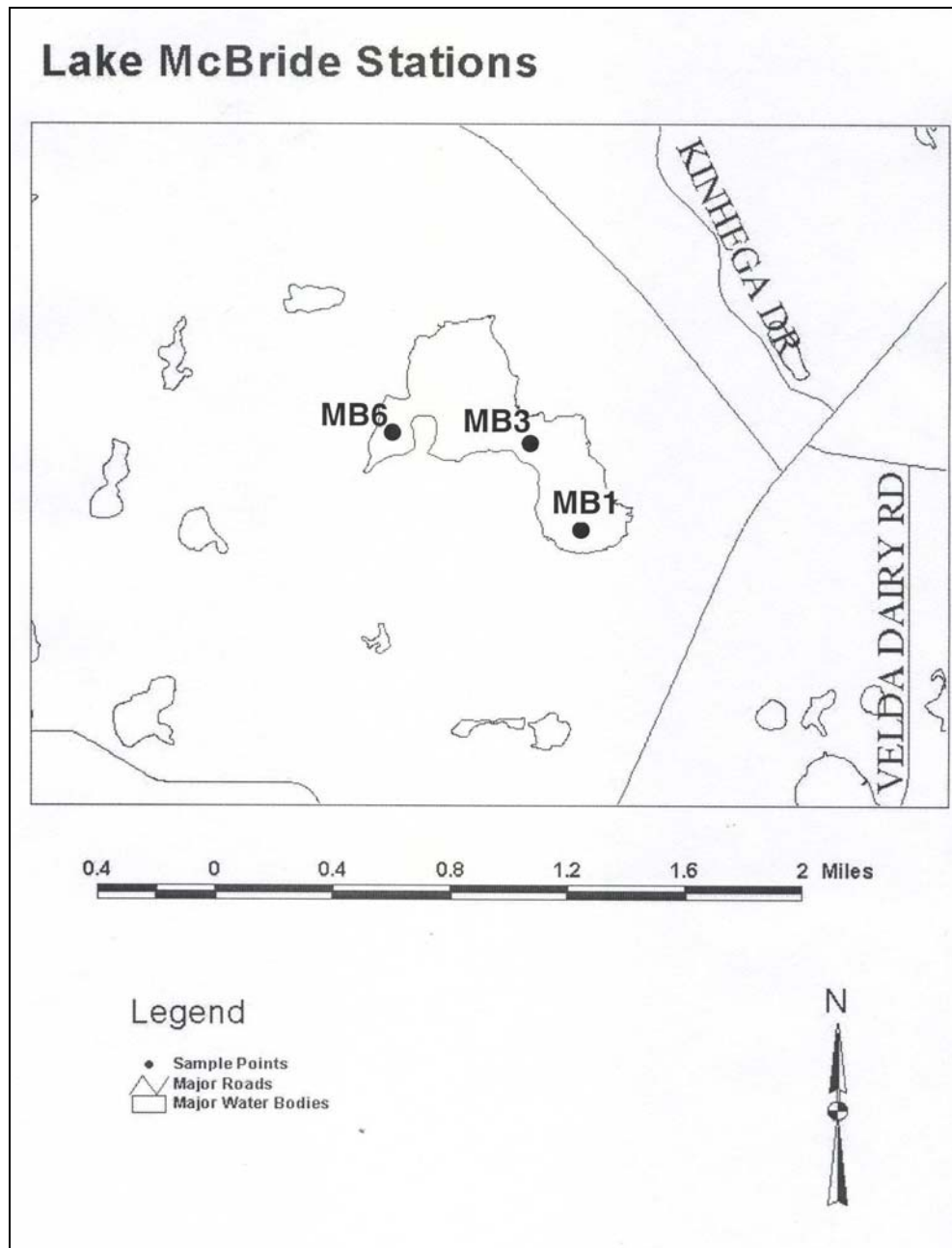


Figure 5.1.4.1: Lake McBride sampling stations



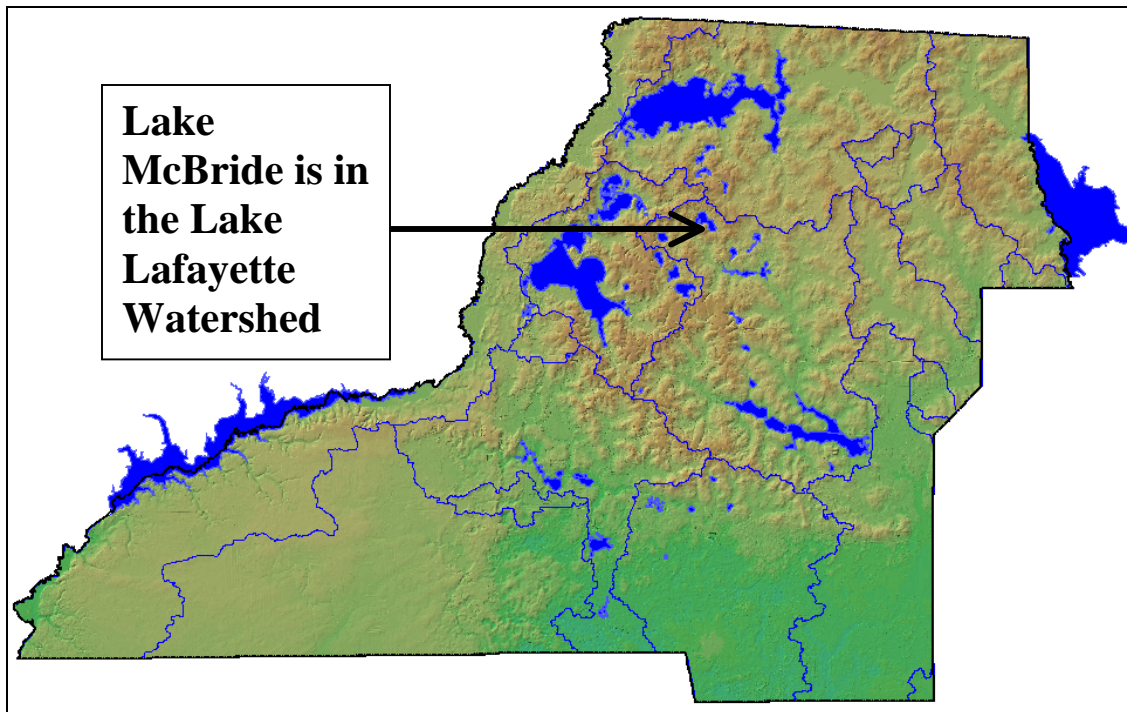


Figure 5.1.4.2: Map by Greg Mauldin, Tallahassee-Leon County GIS

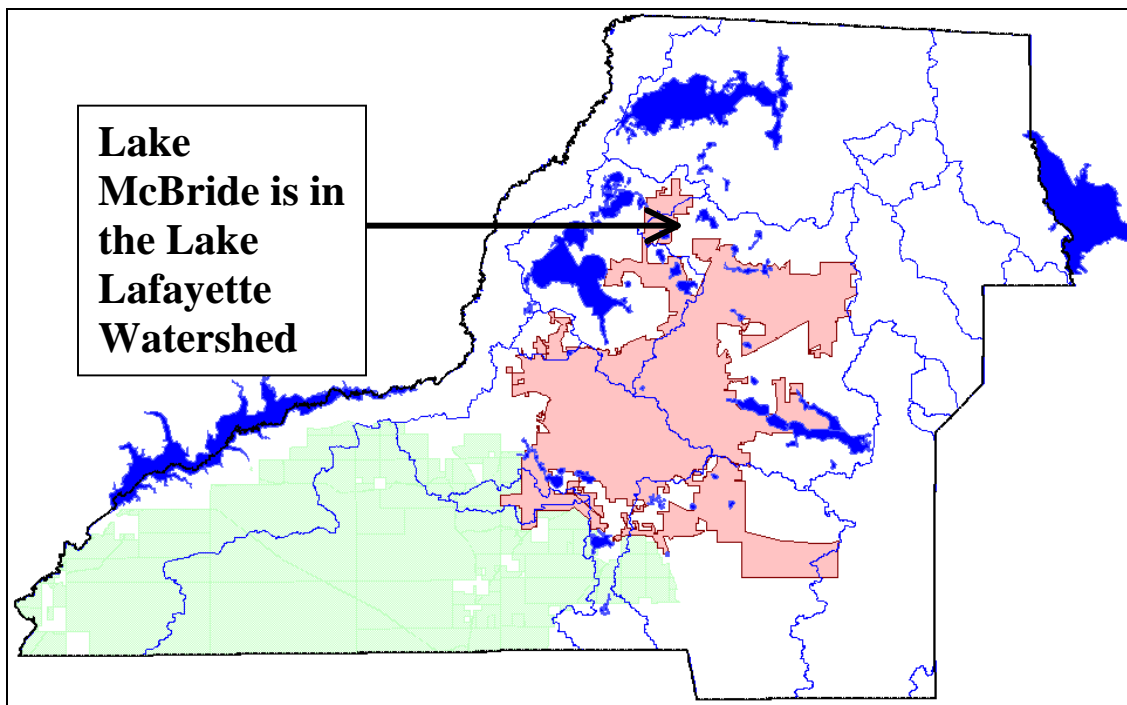


Figure 5.1.4.3: Map by Greg Mauldin, Tallahassee-Leon County GIS

Lake McBride is a natural lake, under moderate to substantial developmental pressure. It has a long water residence time, taking approximately one year to flush and because of this Lake McBride is prone to degradation and stagnation. It is the only lake in Bradfordville with significant recreational potential. Millstone Plantation is publicly owned and represents a considerable cultural asset to the community (Bradfordville Stormwater Study).



**Figure 5.1.4.4:** Henry Beadle, Healy and Harry Bradley about to boat on Lake McBride (April 27, 1918).



**Figure 5.1.4.5:** Lake McBride today. The first picture is taken from the same general area, currently Millstone Plantation, with a view of station MB3 in the center of the lake. The second picture is of station MB1, the easternmost station in Lake McBride near Thomasville Road and Water Oak Plantation.



**Figure 5.1.4.6:** Lake McBride has livestock living happily on its margins. Two historic plantations on the lake preserve our cultural heritage. Millstone Plantation and Water Oak Plantation maintain herds of sheep, horses, cattle and llamas.

Conductivity data does not show any significant trends for Lake McBride. This is a good sign since most readings are very low. Lake McBride is rather clean and stable. The surface Dissolved Oxygen levels of Lake McBride are increasing. This relationship is moderately significant statistically. This is a good sign except when values become too high or supersaturated. This may indicate increasing algal biomass since dissolved oxygen is a product of algal photosynthesis since there are no submergent aquatic plants except along the lakes shoreline. The bottom levels of dissolved oxygen is also increasing in Lake McBride over the past 12 years. This is a very good sign. As in Lake Hall, anoxic bottom conditions have all but vanished since 1997. This indicates a net improvement in conditions within Lake McBride. Lake McBride still has lower dissolved oxygen levels than Lake Hall, but the current levels are much improved.

Chlorophyll levels in Lake McBride place it firmly in the mesotrophic TSI Range. Increasing levels of chlorophyll may indicate a shift in productivity within Lake McBride from macrophyte dominated to a phytoplankton dominated system. This shift may not be due to water quality changes (water quality seems to be improving), but is probably due to the Grass Carp, which were stocked in the lake approx. 50 years ago in an effort to control the aquatic plant population. These fish keep the bottom stirred up, especially as they grow larger over the years. Without the Grass Carp this lake would have a lot of aquatic plant biomass. Aquatic plants tie up nutrients rendering them unavailable to the algae. Without the aquatic plant population in the lake these nutrients are translated into algal growth. The few ephemeral algal blooms that have occurred in this lake were found to be harmless, lacking toxins.

Nitrate values do not show a statistically significant increase in Lake McBride over the past 12 years and indicates that nutrients are not increasing in the basin. Ammonia values show no statistically significant increase in Lake McBride over the past 12 years and indicate that nutrients are not increasing in the basin. Spikes are probably due to algal blooms, not storm events. Reactive phosphate values show no statistically significant increase in Lake McBride over the past 12 years and indicate that nutrients are not increasing in the basin.

In the summer of 2002 homeowners on the northern shore of Lake McBride contracted an aquatic plant removal consultant to remove emergent vegetation along the shoreline of the lake. This contractor removed a lot more than plants. He basically removed the littoral zone of the lakeshore causing increased sedimentation and contributing to an algal bloom station MB1 during the month of October 2002. Insitu chlorophylls were measured at the surface as 54 ug/L. The bloom did not persist below 0.3 meters from the surface where chlorophyll levels were at background levels. The bloom was identified as being primarily composed of *Anabaena* species, a harmless but unsightly organism. The algal bloom was not found at any other stations in the lake. A lot of in lake excavation was taking place at this time along the eastern shore of the lake. I believe it was this activity that led to the bloom. Lake levels were still low due to the drought, but there was still plenty of water in this lake. Algal blooms were not observed in the lake during subsequent months. Oxygen levels were good in the lake during this quarter except for one low reading at MB6 in October where bottom oxygen was depleted. Nutrients and other water quality parameters were normal with this lake having good TSI's. Bacteria levels were rather low for a lake with livestock.



**Figure 5.1.4.7:** Two views of the North shore of Lake McBride prior to the sediment removal (02/02)



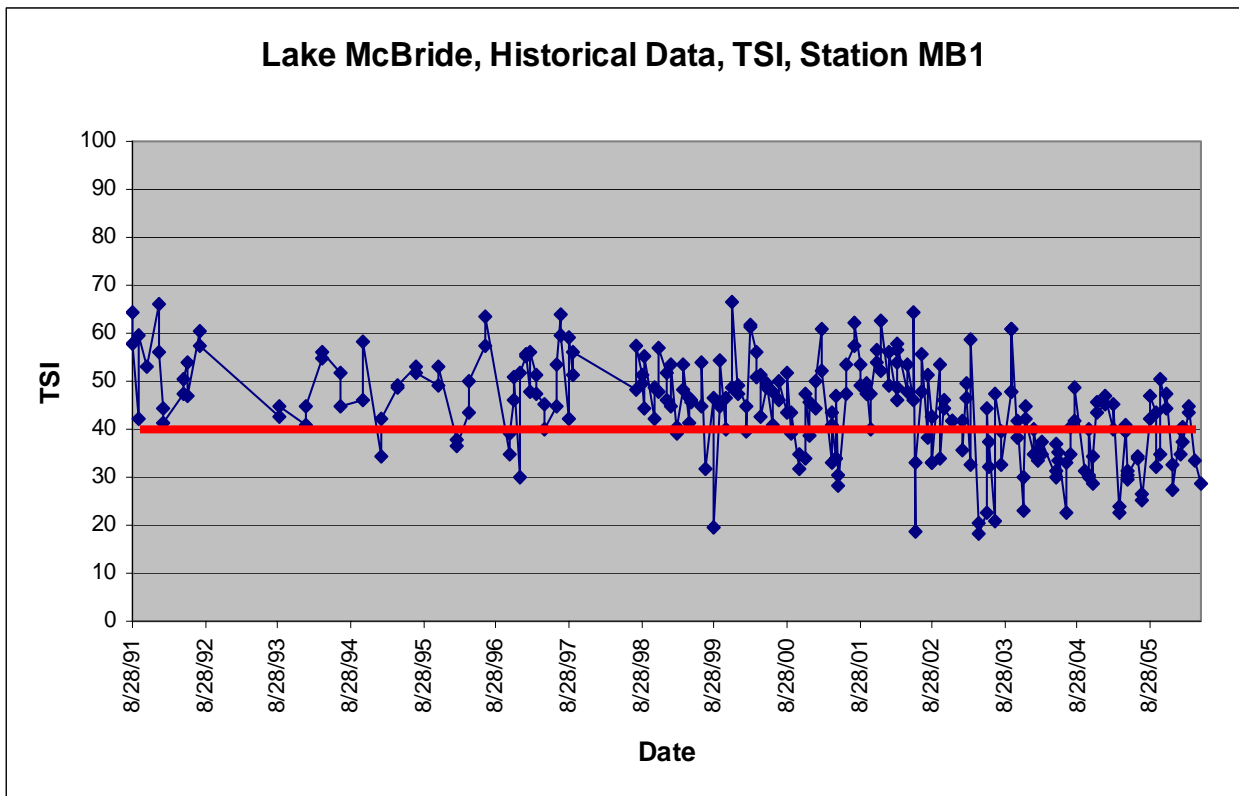


**Figure 5.1.4.8:** A later view of the northern shore of Lake McBride during the removal of sediment and aquatic plants (07/02). Photo by Jess VanDyke

Nutrients and other water quality parameters are normal with this lake having good TSI's. In early 2003, Lake McBride was chosen by FDEP as a model "Clean Lake" in their TMDL process for the Ochlockonee/ST. Marks Basin. Other lakes will be compared to this lake and the restorations of impaired waterbodies will use this lake as a model and goal for good water quality. From January to March 2003, no algal blooms were observed. The lake seems to have settled after all the sediment removal on the northern shore of the lake. Lake levels were rising after the unusually heavy March 2003 rains. Water levels were back to full pool for the first time since the beginning of the drought in 1999. Oxygen levels were good in the lake during this quarter except for one low reading at MB6 in March 2003, where bottom oxygen was depleted. All other dissolved oxygen readings were generally good. There was one elevated phosphorus reading taken at MB3 in March. Station MB6 had low phosphorus levels at this time so this may be a residual effect of the sediment removal or a fertilizer application. Elevated phosphorus was also reflected in the total phosphorus levels for March 2003, at station MB3, the highest reading of the quarter. Bacteria levels were even lower this quarter, especially the fecal coliforms that were almost nonexistent.

No algal blooms were observed since the March 2003 event. Lake levels were returning to normal as the rains returned. Oxygen levels were good in the lake during this quarter except for one low reading at MB6 in March where bottom oxygen was depleted. All other dissolved oxygen readings were generally good except for one low bottom dissolved reading taken at station MB6 in June 2003. There were elevated chlorophyll readings at station MB3 for each month of this quarter. These chlorophyll levels were not very bad, but it is interesting that MB3 had two to three times the chlorophyll a levels that were found at stations MB1 and MB6. We also recorded an elevated ammonia reading at station MB3, at the bottom of the water column near the sediments in May 2003. Bacteria levels were higher this quarter, especially for the month of May 2003. All station in the lake averaged over 100 fecal and total coliform colonies per 100ml of water during May 2003. While these bacteria levels do not pose a health threat they were higher than usual for this lake.





**Figure 5.1.4.9: Lake McBride,  
Station MB1,**

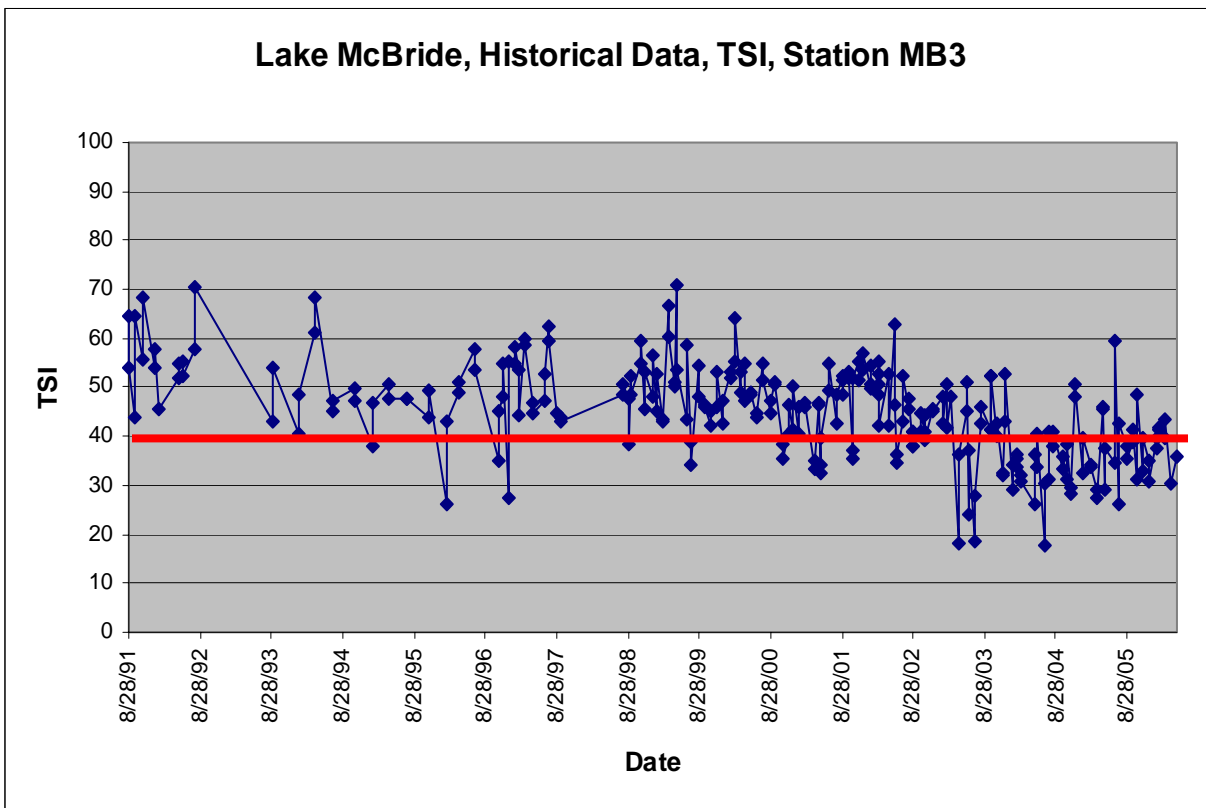
Clear lake,

According to FDEP criteria this lake would be impaired at TSIs greater than 40 units,

Data duration:08/91-06/06,

Data source LCL Data (McGlynn Laboratories Inc) data from before 1997 LCL Data (CARRMa).

**\* Result: not impaired.**



**Figure 5.1.4.10: Lake McBride,  
Station MB3,**

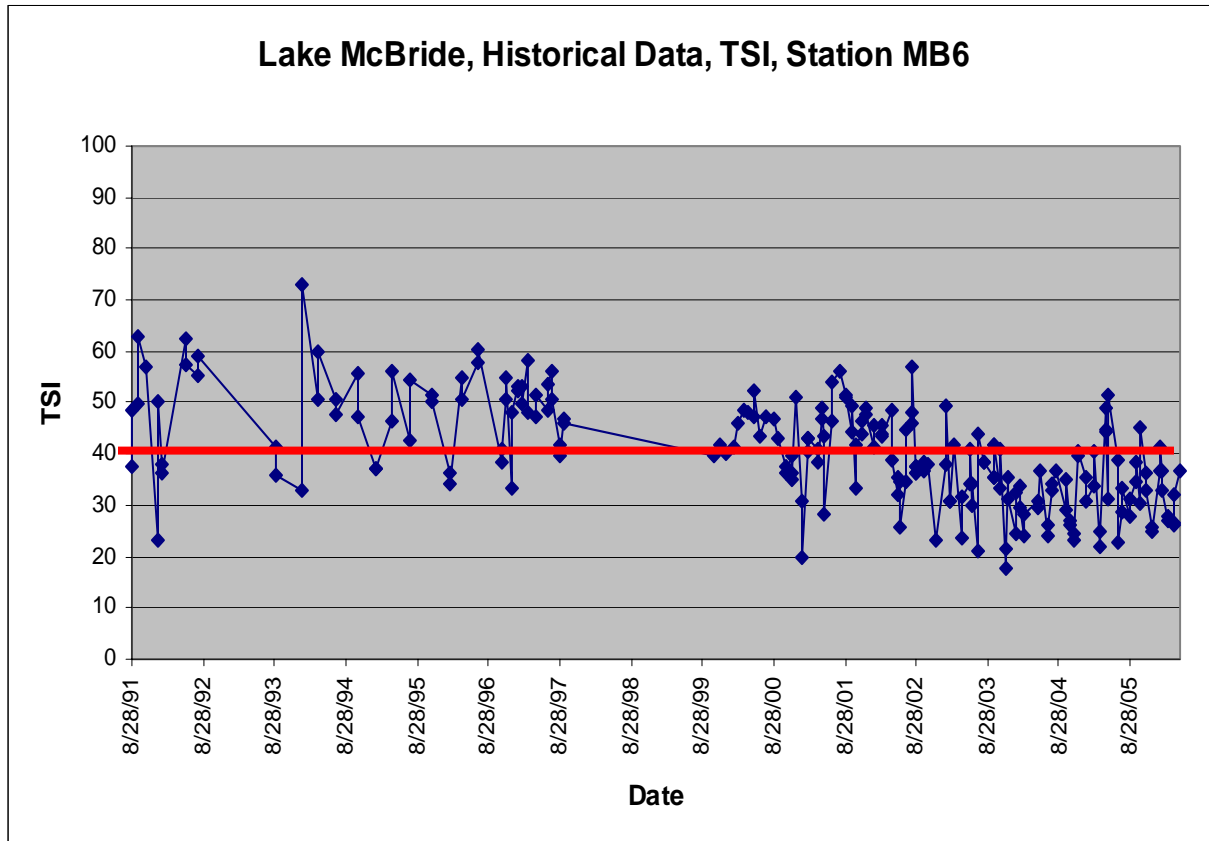
Clear lake,

According to FDEP criteria this lake would be impaired at TSIs greater than 40 units,

Data duration:08/91-06/06,

Data source LCL Data (McGlynn Laboratories Inc) data from before 1997 LCL Data (CARRMa).

**\* Result: not impaired.**



**Figure 5.1.4.11: Station MB6,**

Clear lake,

According to FDEP criteria this lake would be impaired at TSIs greater than 40 units,

Data duration: 08/91-06/06,

Data source LCL Data (McGlynn Laboratories Inc), data from before 1997 LCL Data (CARRMa).

**\* Result: not impaired.**