Figures

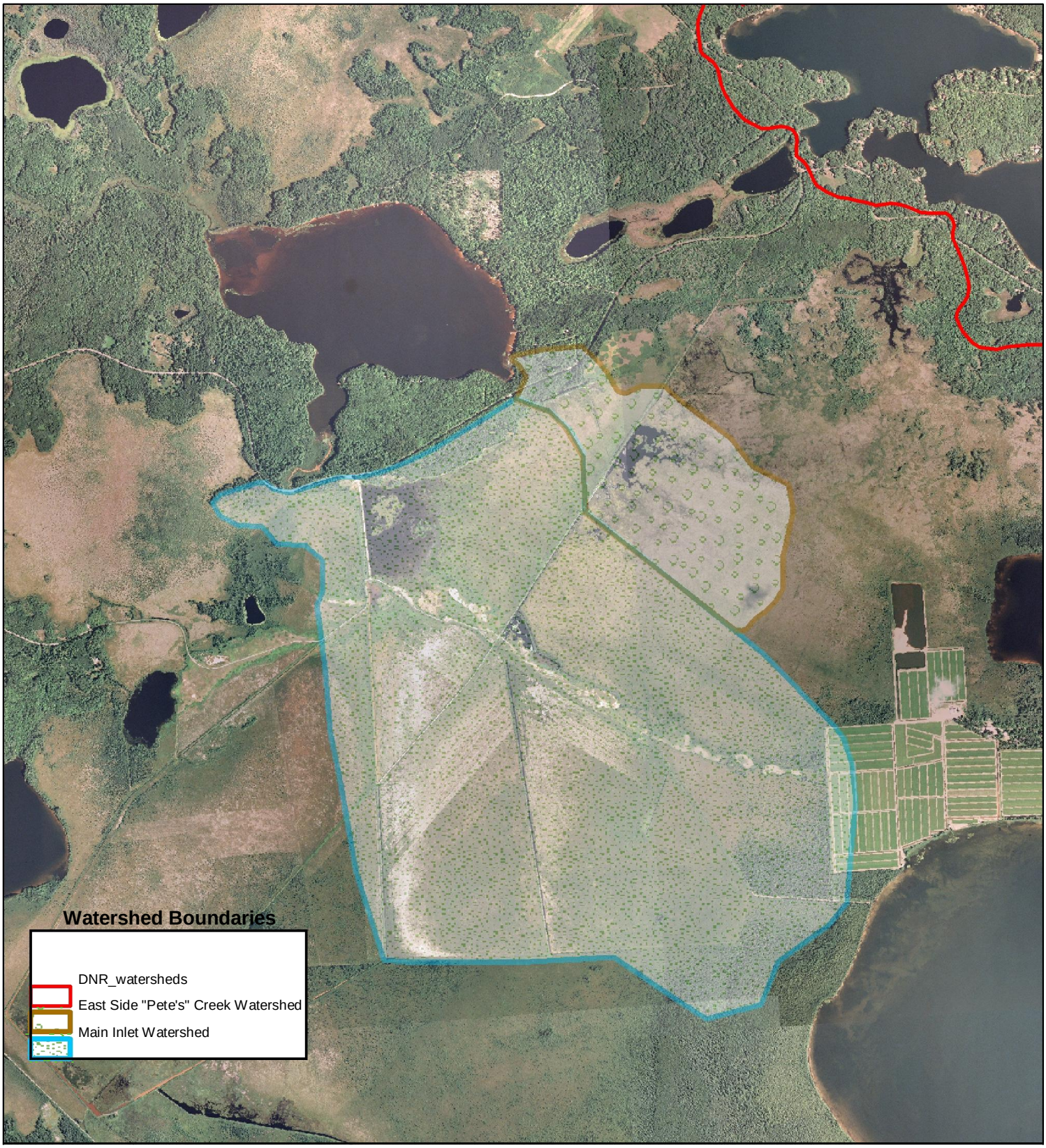
0 1,200 2,400 4,800
Feet

Figure 1-1
Aerial photograph of
Powell Marsh and Dead
Pike Lake from 2005

Figure 1-2. Iron stained water entering Dead Pike Lake from the Powell Marsh at the Main Inlet to Dead Pike Lake.

Figure 3-1
Aerial photograph of
Powell Marsh and Dead
Pike Lake from 1937

Figure 4-1. **Pictures taken at Dead Pike Lake on September 25, 2010 following elevated discharges of water from the Powell Marsh control structures.**



Imagery: NAIP, 2005

N

Feet

1,200 0 1,200 2,400 3,600

Figure 4-2
Estimated Powell Marsh Watershed Area Contributing to the Main Inlet and Creek

Near East Side of Dead Pike Lake

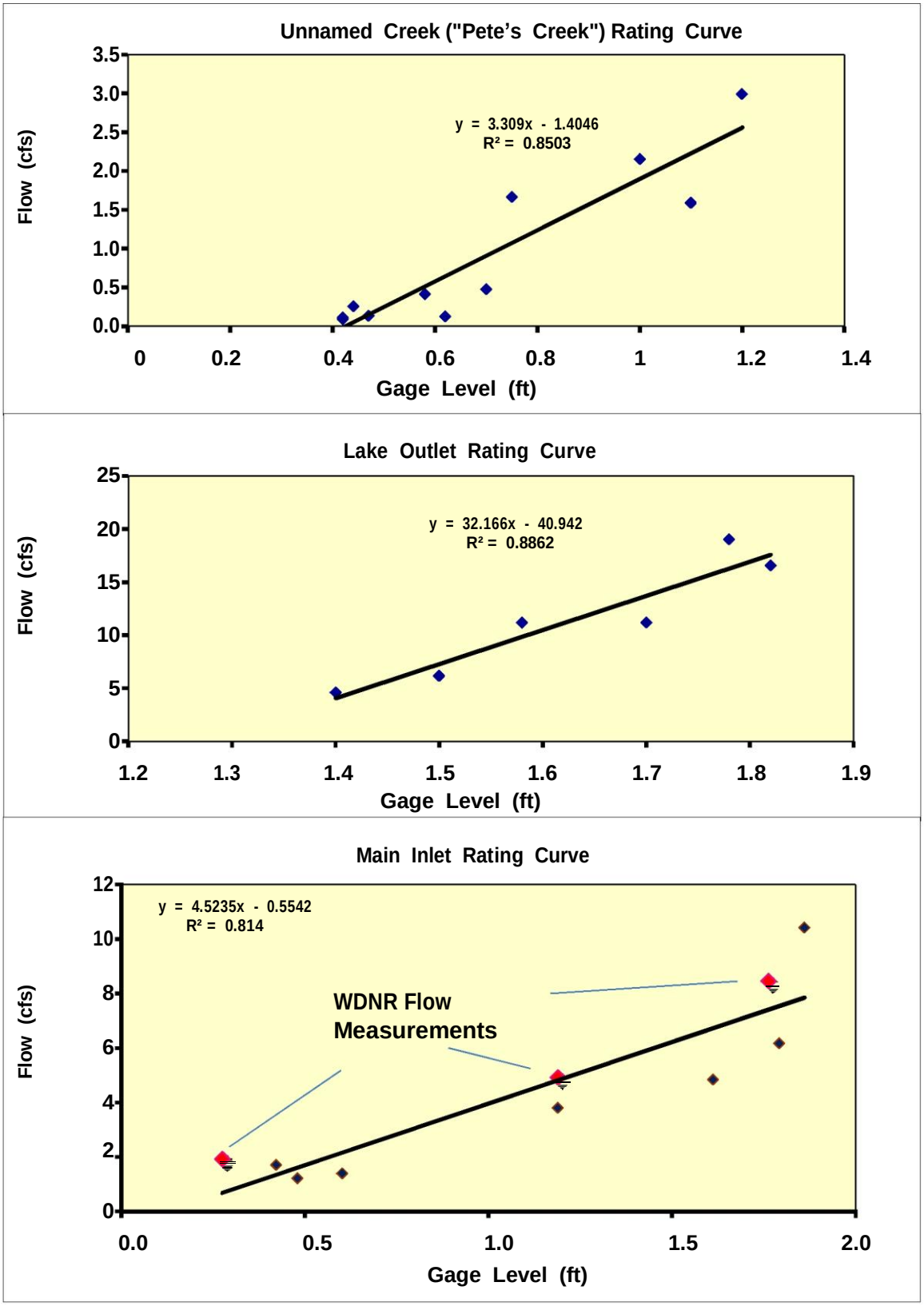


Figure 4-3. Rating curves for the main inlet, the unnamed creek inlet, and the outlet from Dead Pike Lake.

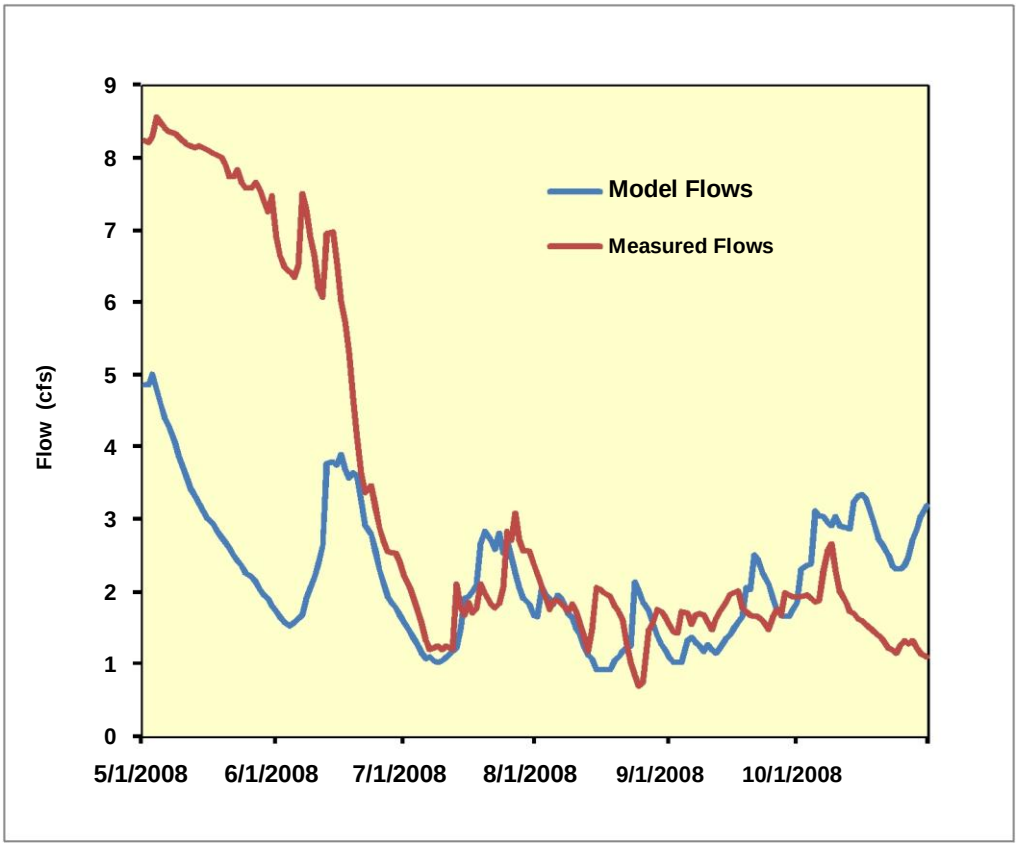


Figure 4-4. Comparison of measured and modeled flows at the main outlet of the Powell Marsh at Powell Road.

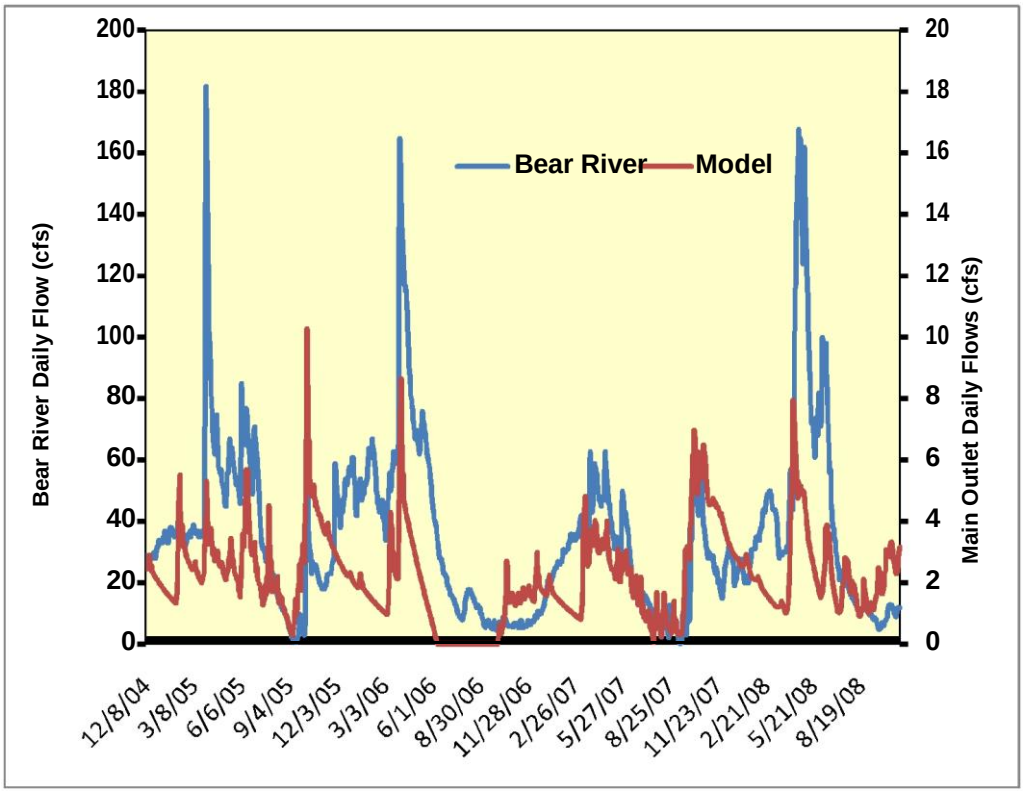


Figure 4-5. Comparison of modeled flows at the main outlet of the Powell Marsh at Powell Road with flow in the Bear River at USGS gauge 05357335.

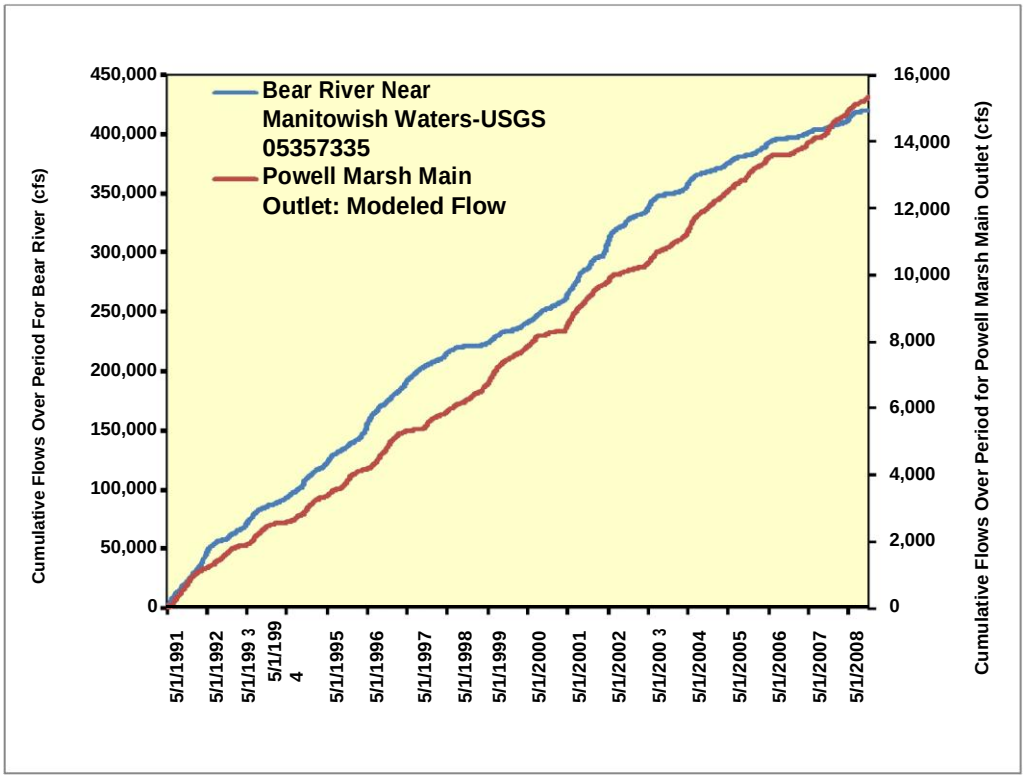


Figure 4-6. Comparison of cumulative modeled flows at the main outlet of the Powell Marsh at Powell Road with flow in the Bear River at USGS gauge 05357335.

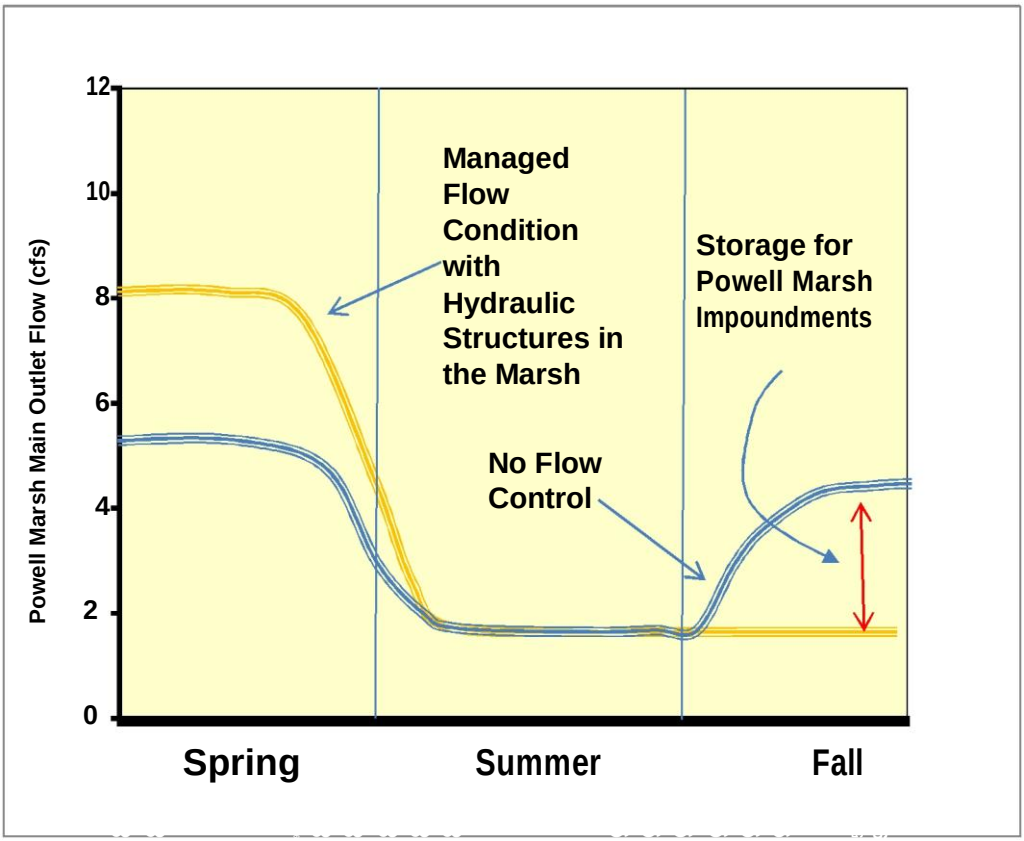


Figure 4-7. Conceptual working model of water control and release from the Powell Marsh.

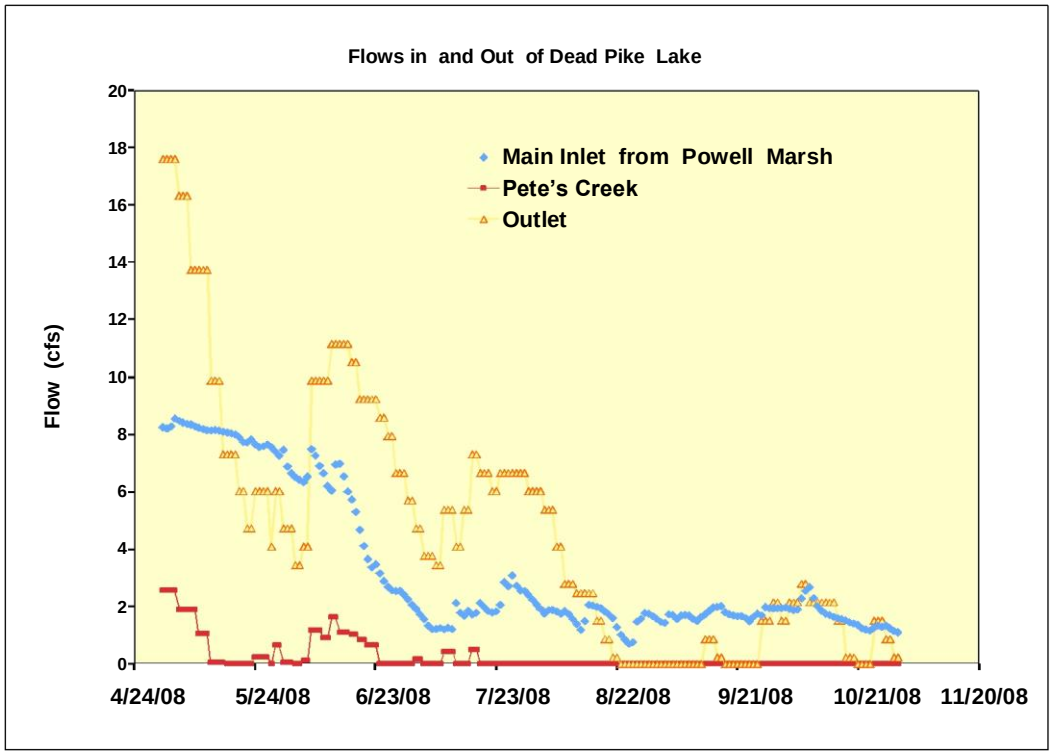


Figure 4-8. **Rating curves for the main inlet, the unnamed creek inlet, and the outlet from Dead Pike Lake.**

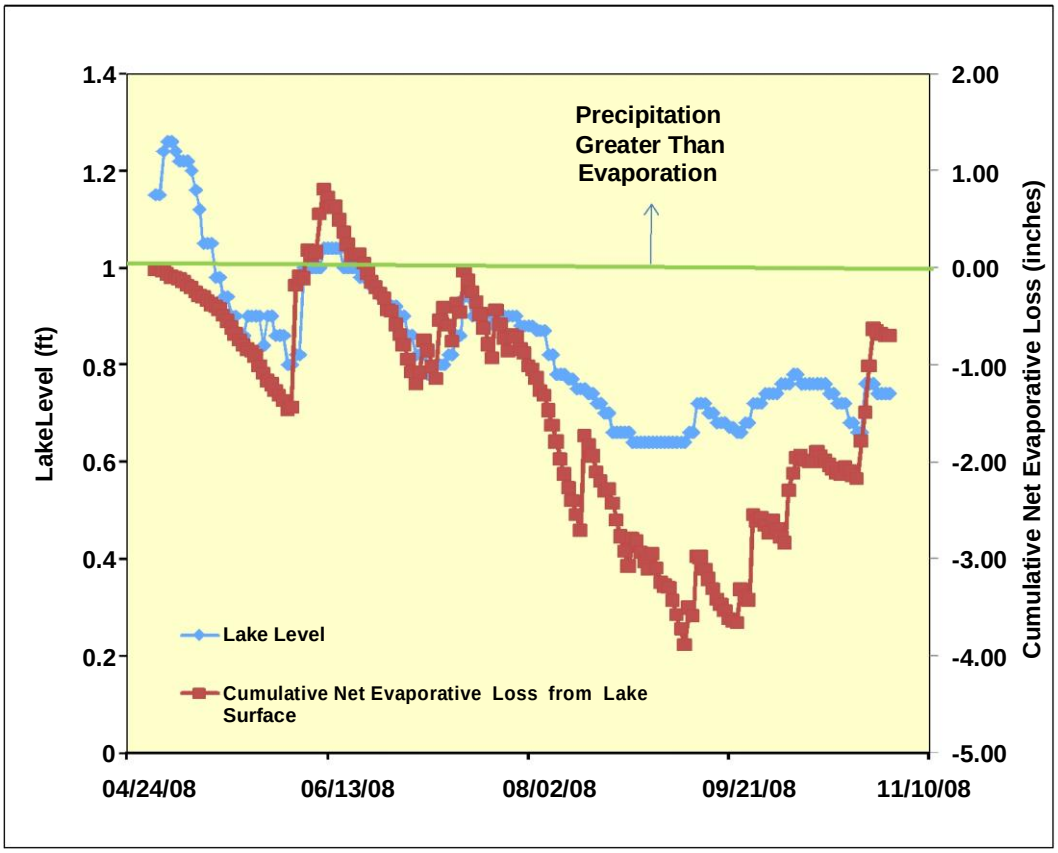


Figure 4-9. **Estimated net evaporative loss (precipitation minus evaporation) and measured lake levels for Dead Pike Lake.**

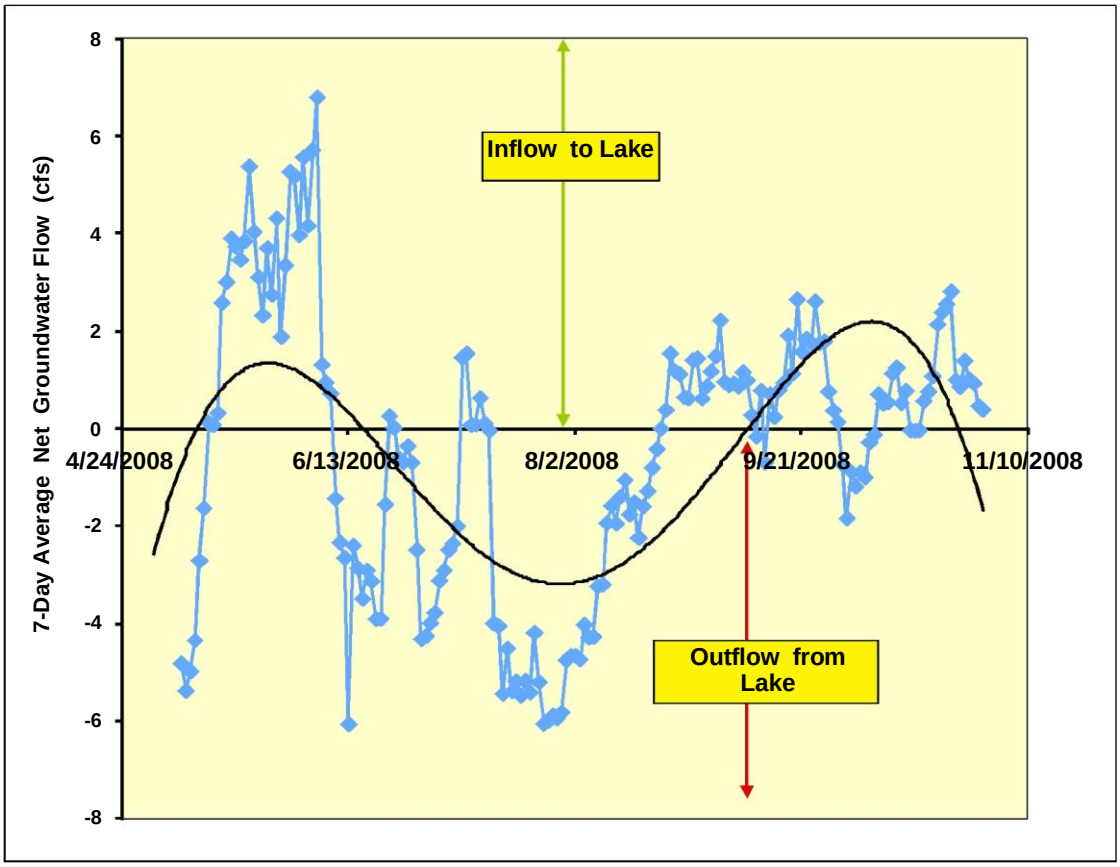


Figure 4-10**. Calculated net groundwater inflows and outflows from Dead Pike Lake. Net groundwater inflow is equal to the difference between groundwater inflows minus outflows from the lake. Net groundwater inflow calculated as the difference of all water balance components that were measured for the Dead Pike Lake.**

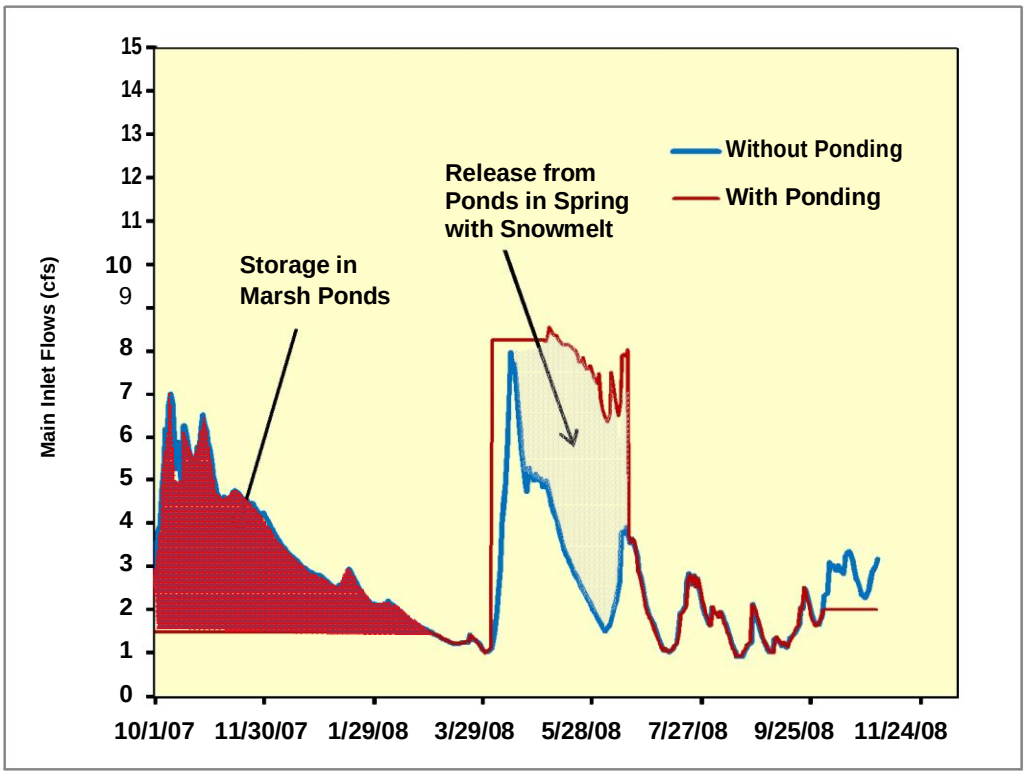


Figure 4-11. Modeled flows at the Main Inlet to Dead Pike Lake with and without the application of controls in the Powell Marsh to manage water levels in the Marsh ponds.

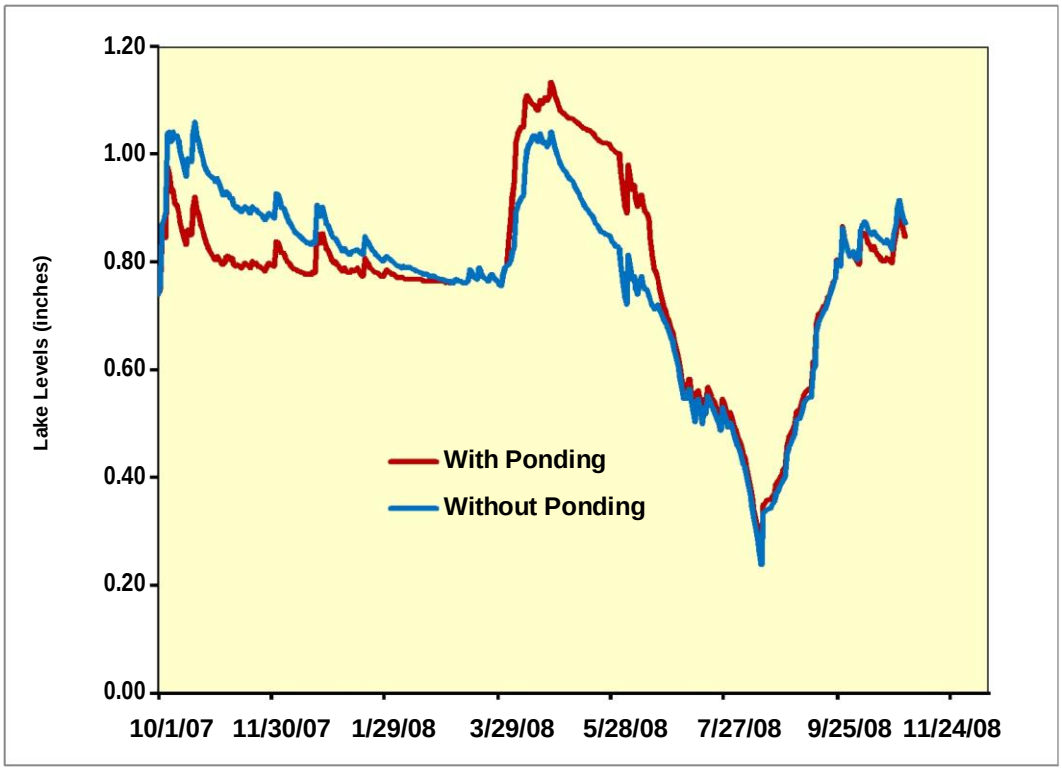


Figure 4-12. Estimated effect of controlled water releases from the Powell Marsh to Dead Pike Lake on water levels in Dead Pike Lake for the 2008 water year.

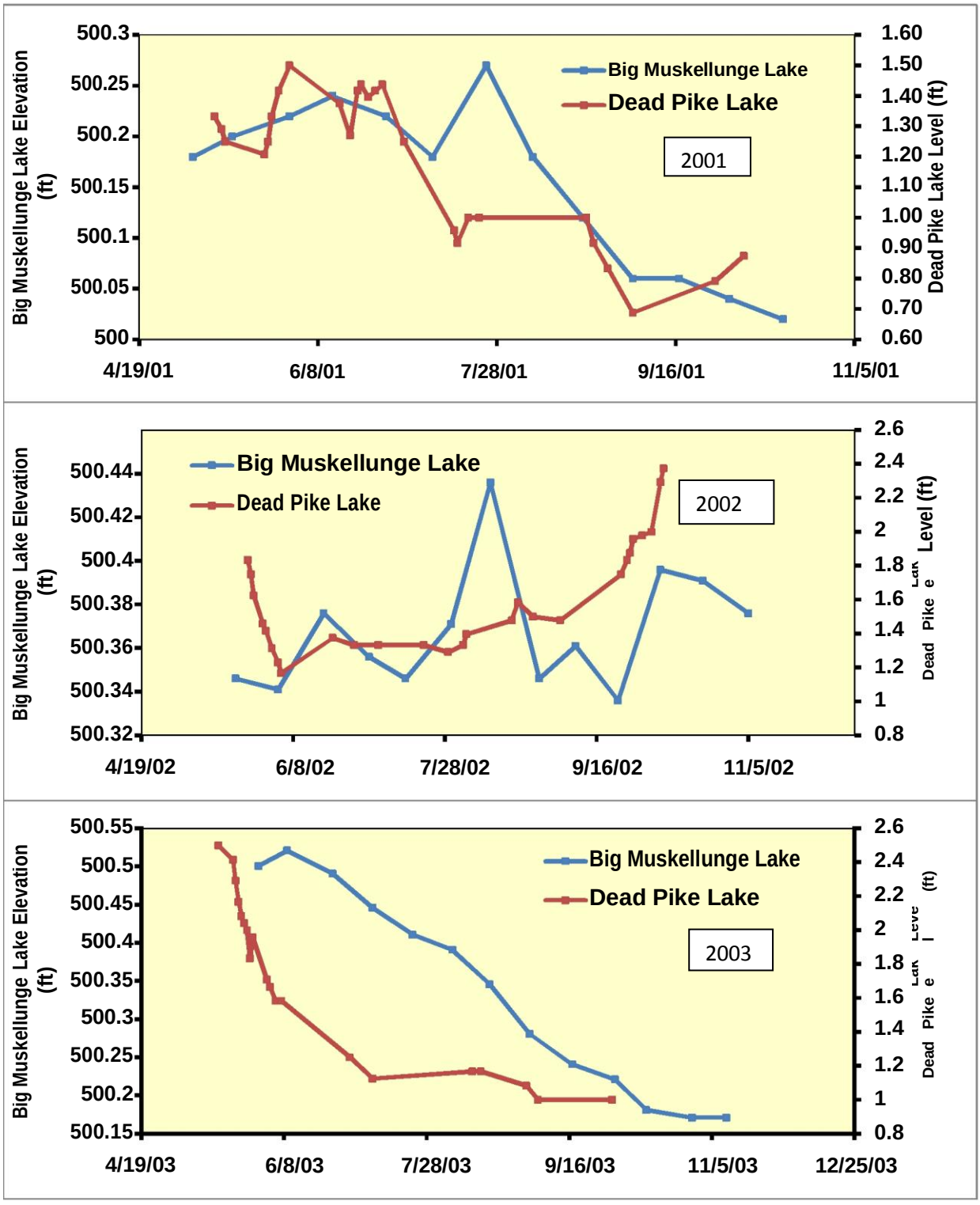


Figure 4-13. Comparison of lake levels changes for Big Muskellunge Lake near Sayner, Wisconsin and Dead Pike Lake.

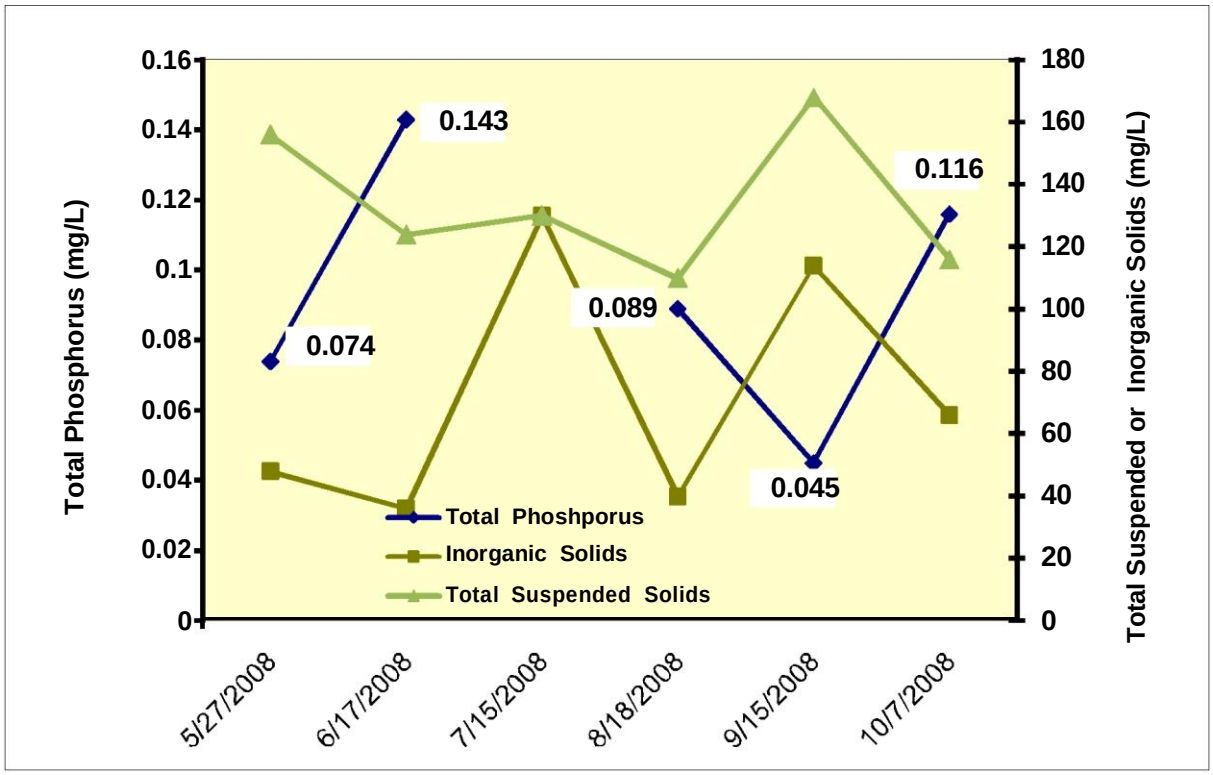


Figure 5-1**. Total phoshporous, total suspended solids, and inorganic solids (estimated) monitored in 2008 at the Main Inlet to Dead Pike Lake.**

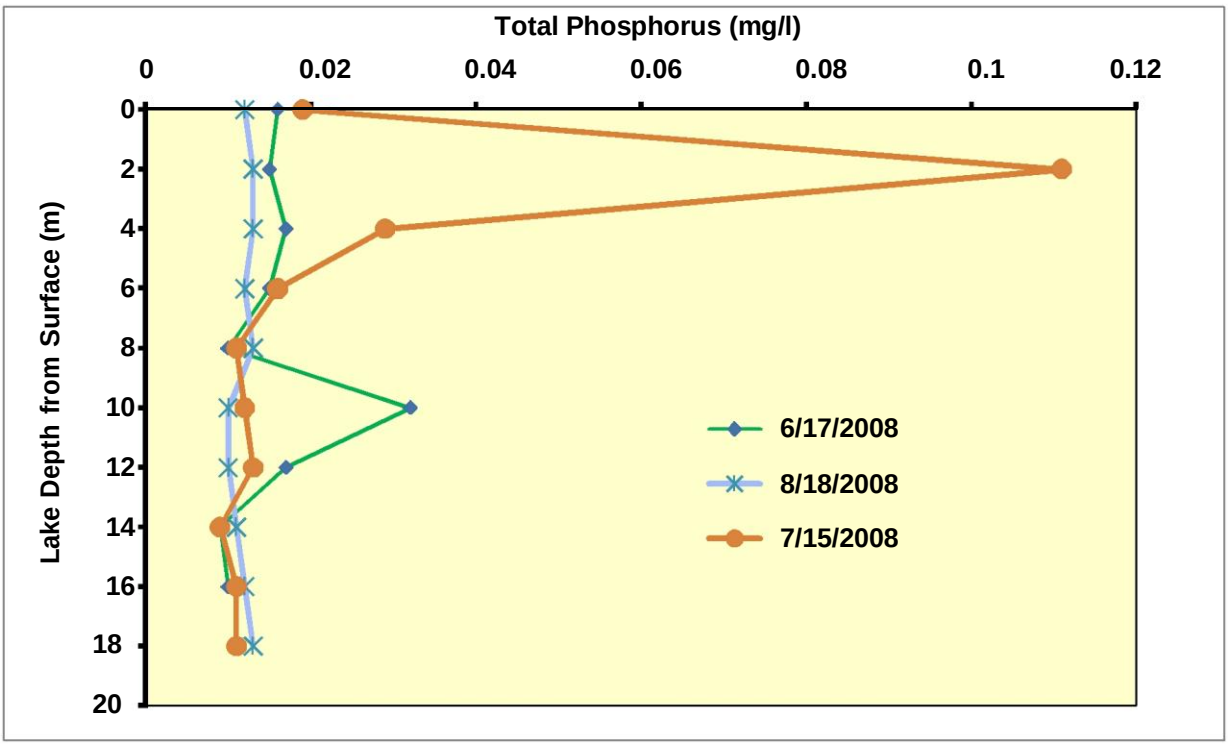


Figure 5-2**. Total phosphporus at two meter intervals from the surface to the bottom of Dead Pike Lake at the deep hole.**

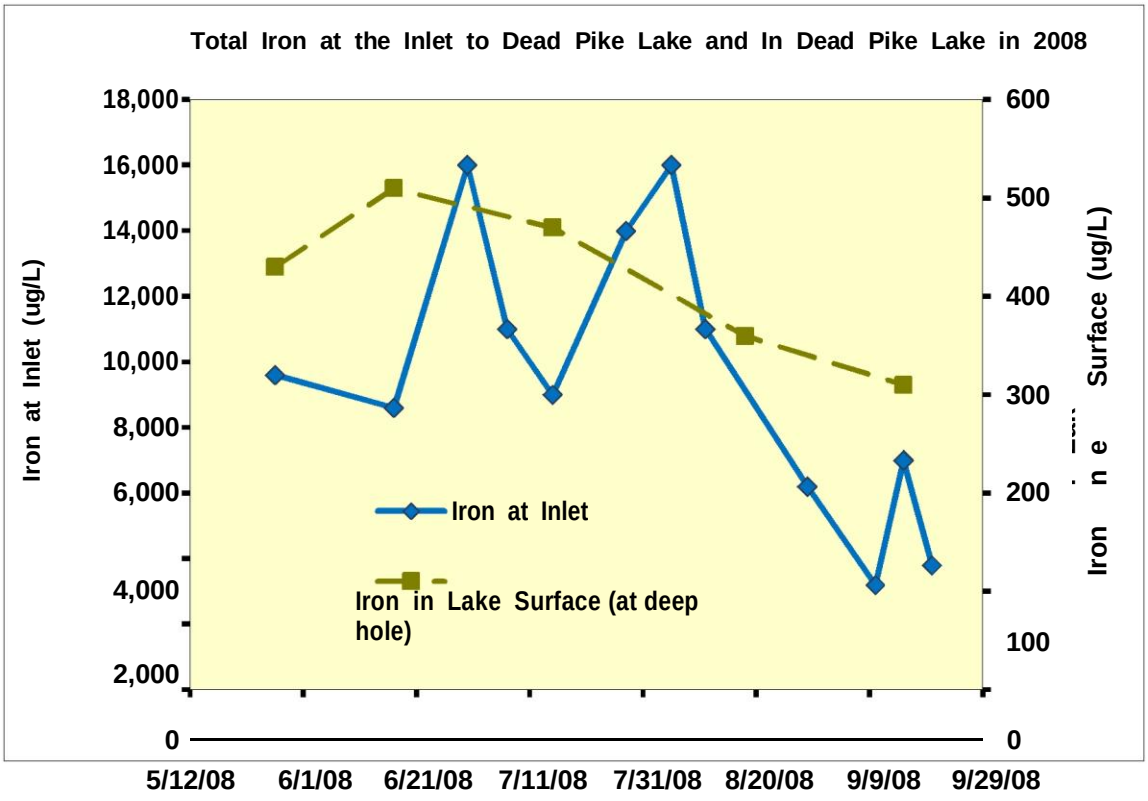


Figure 5-3. **Total iron monitored in 2008 at the Main Inlet and in the surface of Dead Pike Lake.**

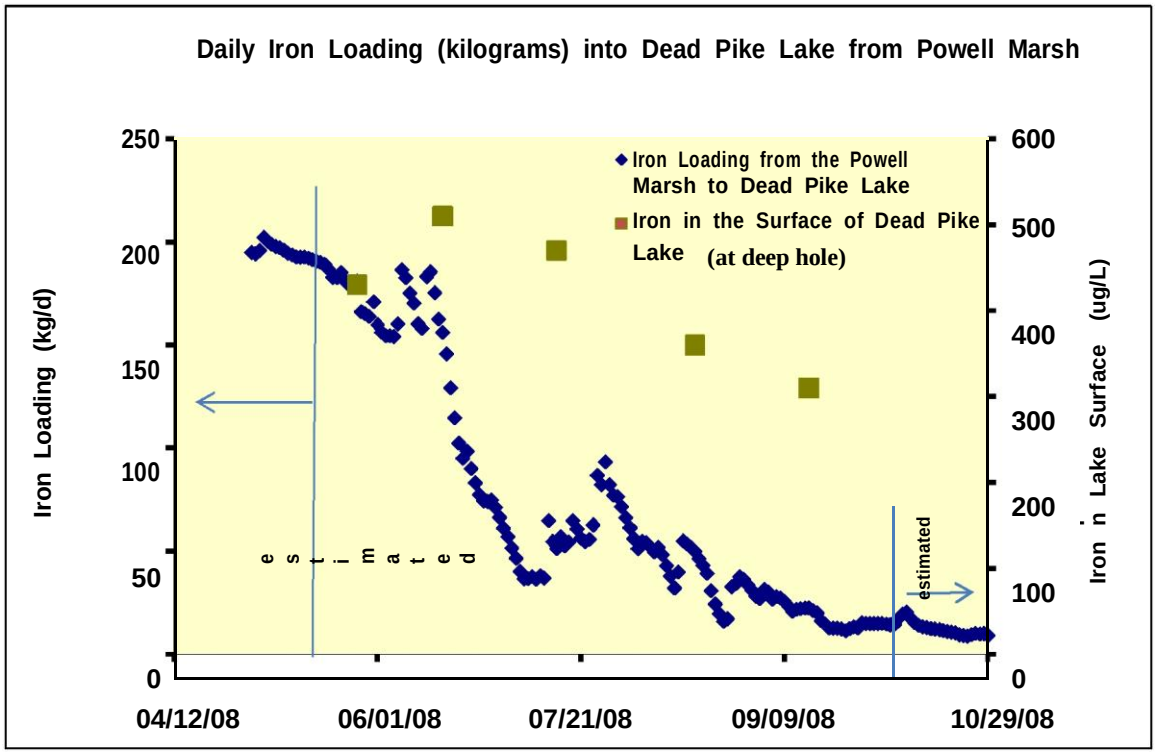


Figure 5-4. **Total iron loading at the Main Inlet to Dead Pike Lake (calculated from flow and iron concentrations) compared to iron at the surface of Dead Pike Lake.**

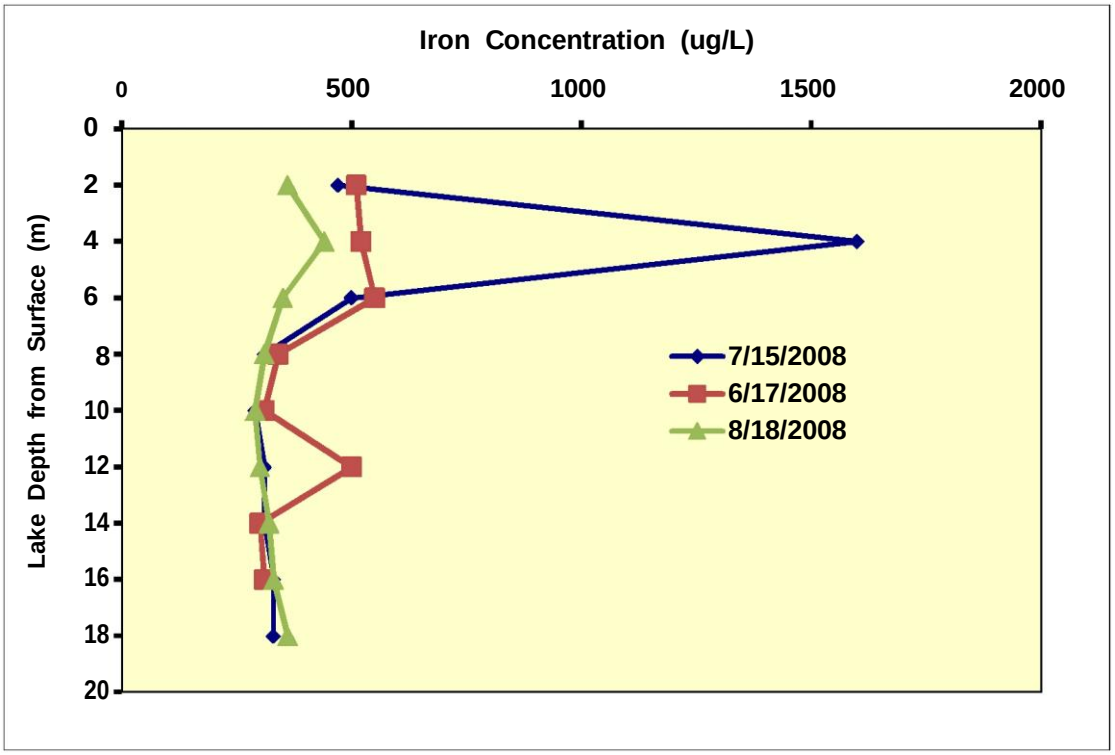


Figure 5-5. **Iron concentration at the deep hole of Dead Pike Lake.**

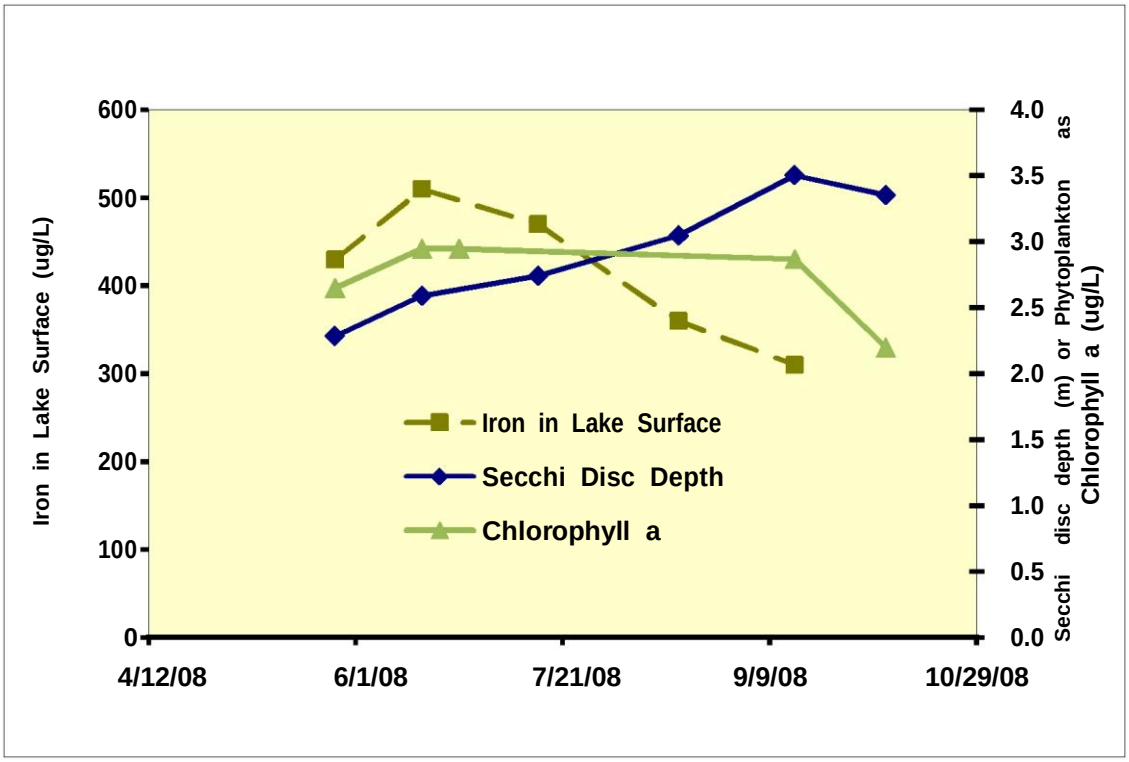


Figure 5-6. **Comparison of iron concentration, lake clarity, and chlorophyll a concentrations in the surface of Dead Pike Lake. Sampling conducted at the deep hole of the lake.**

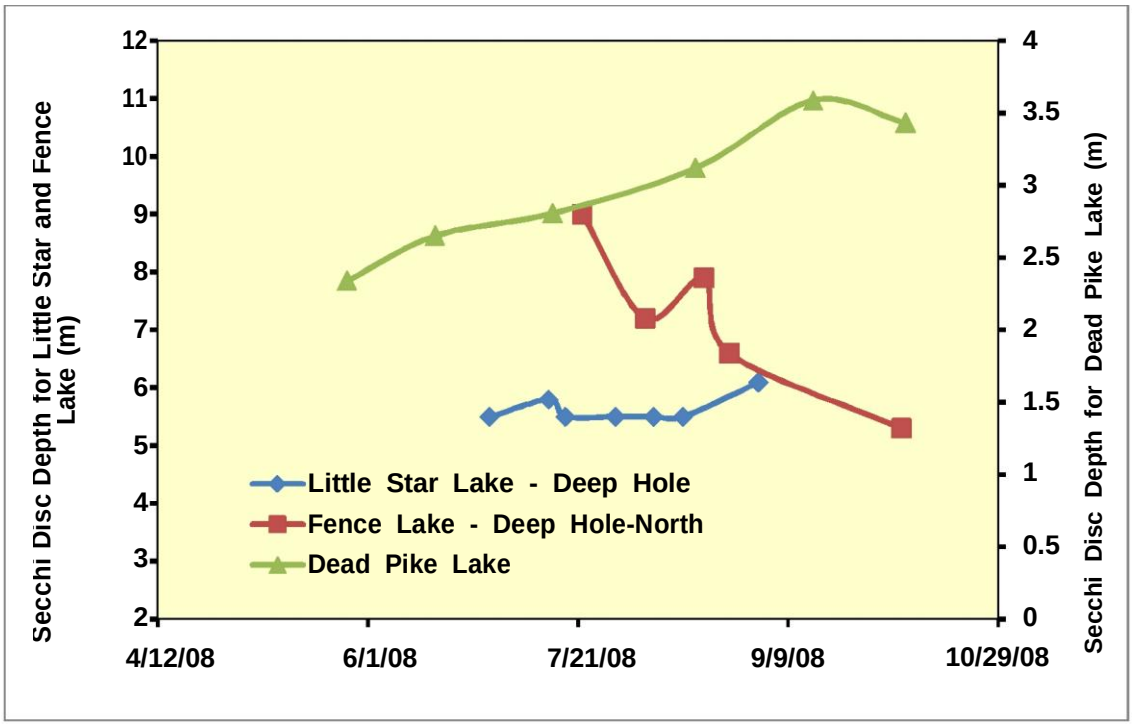


Figure 5-7. **Comparison of Secchi disc depth in Dead Pike Lake with two lakes near Dead Pike Lake.**

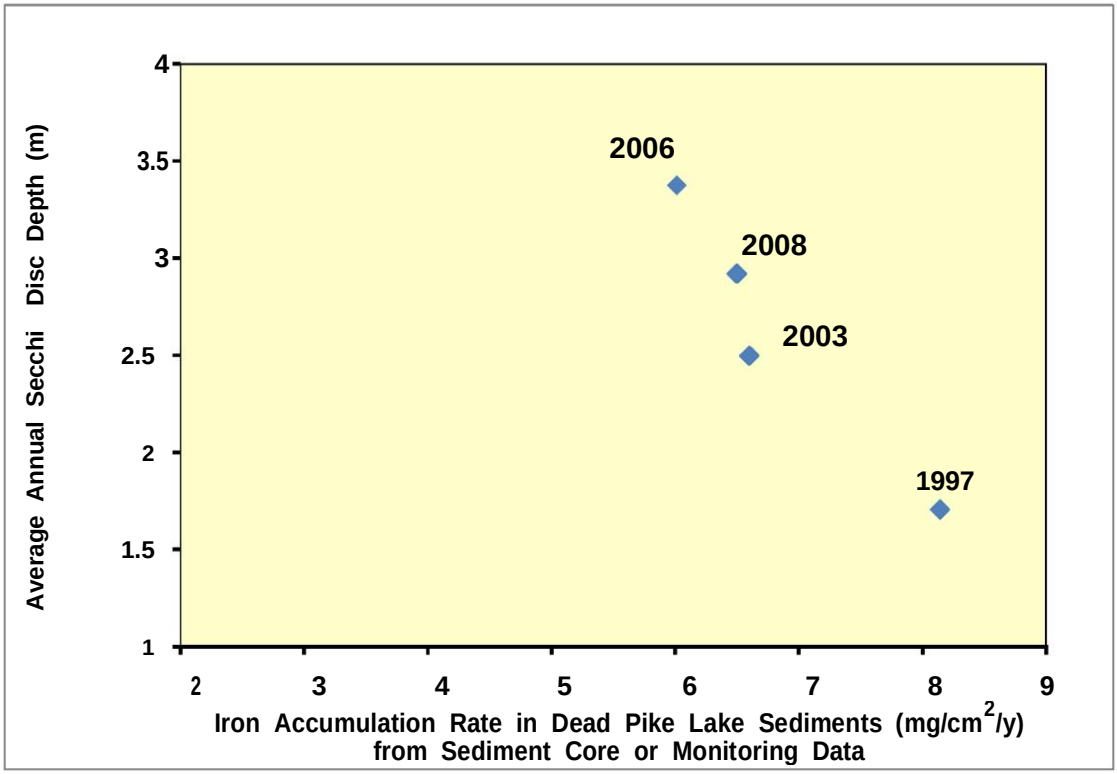


Figure 5-8. **Comparison of Secchi disc depth in Dead Pike Lake and the rate of iron accumulation in lake sediments. Note that the data point for 2006 is an estimate from average iron concentration measured by the WDNR at the Main Outlet of the Powell Marsh and estimated flow from the Powell Marsh hydrologic model (Main Outlet plus Pete's Creek).**

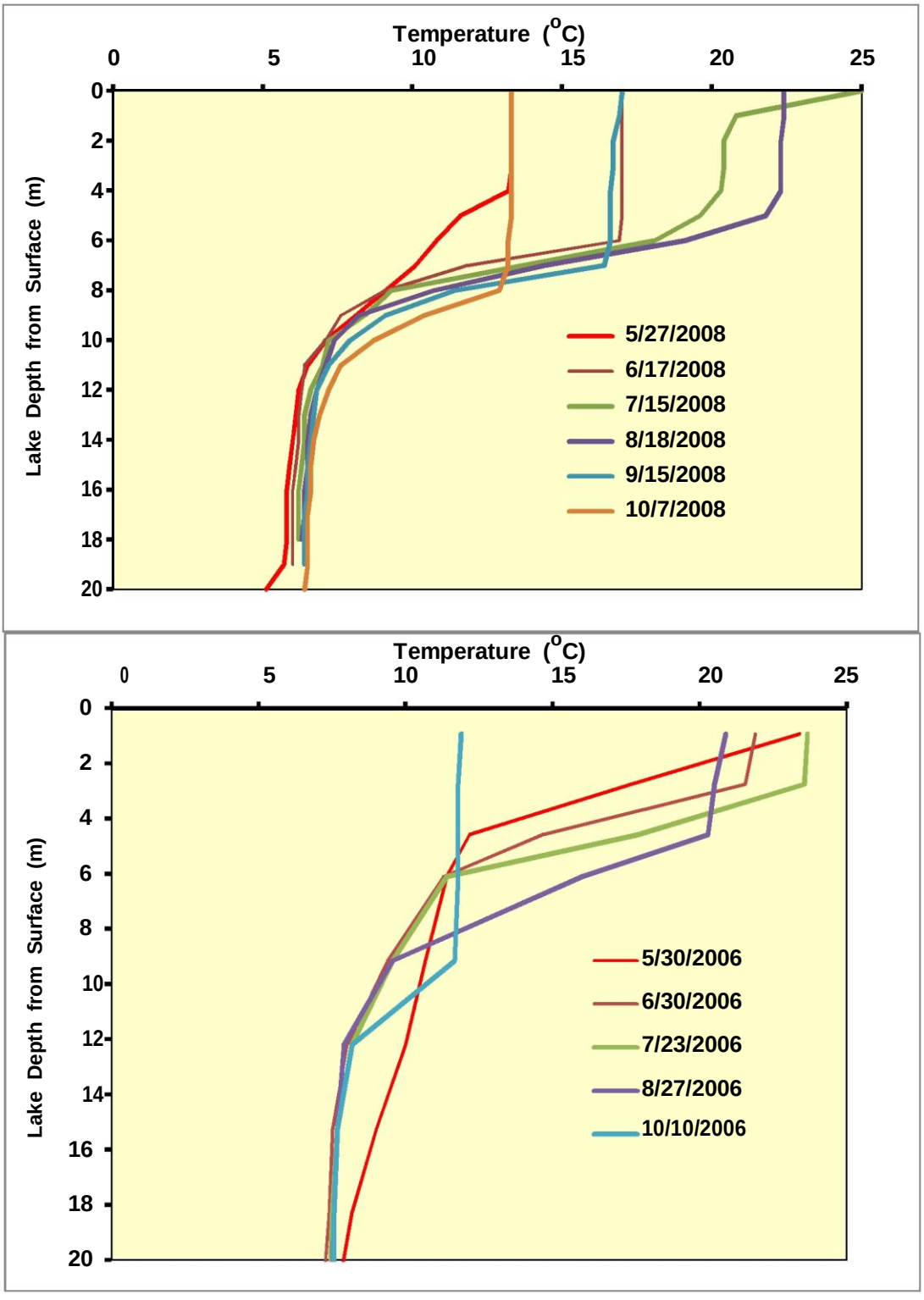
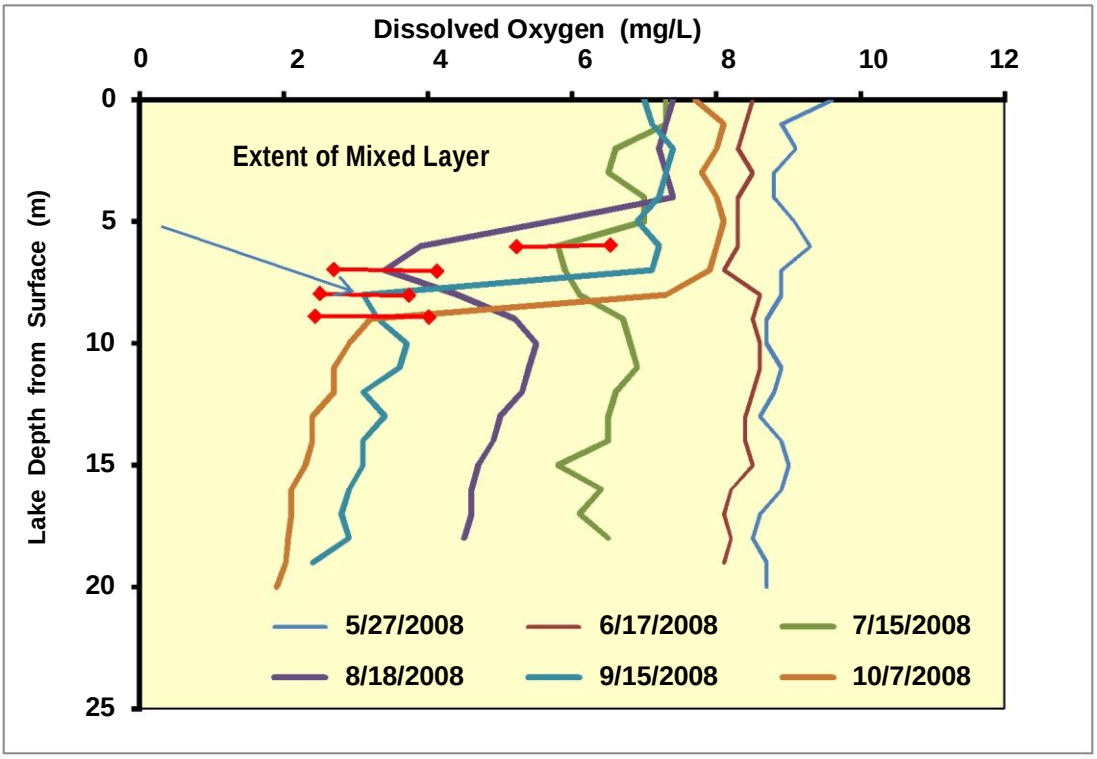


Figure 5-9. **Lake temperature profiles in Dead Pike Lake in 2008 and 2006.**



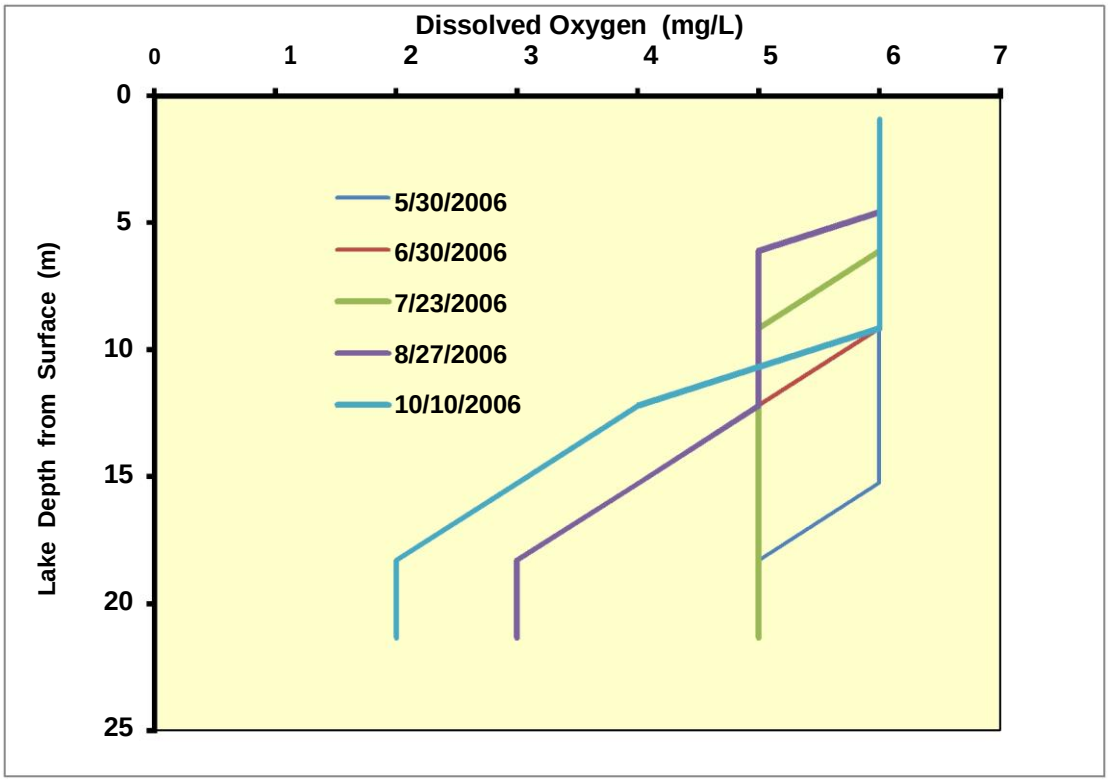


Figure 5-10. **Lake dissolved oxygen profiles in Dead Pike Lake in 2008 and 2006.**

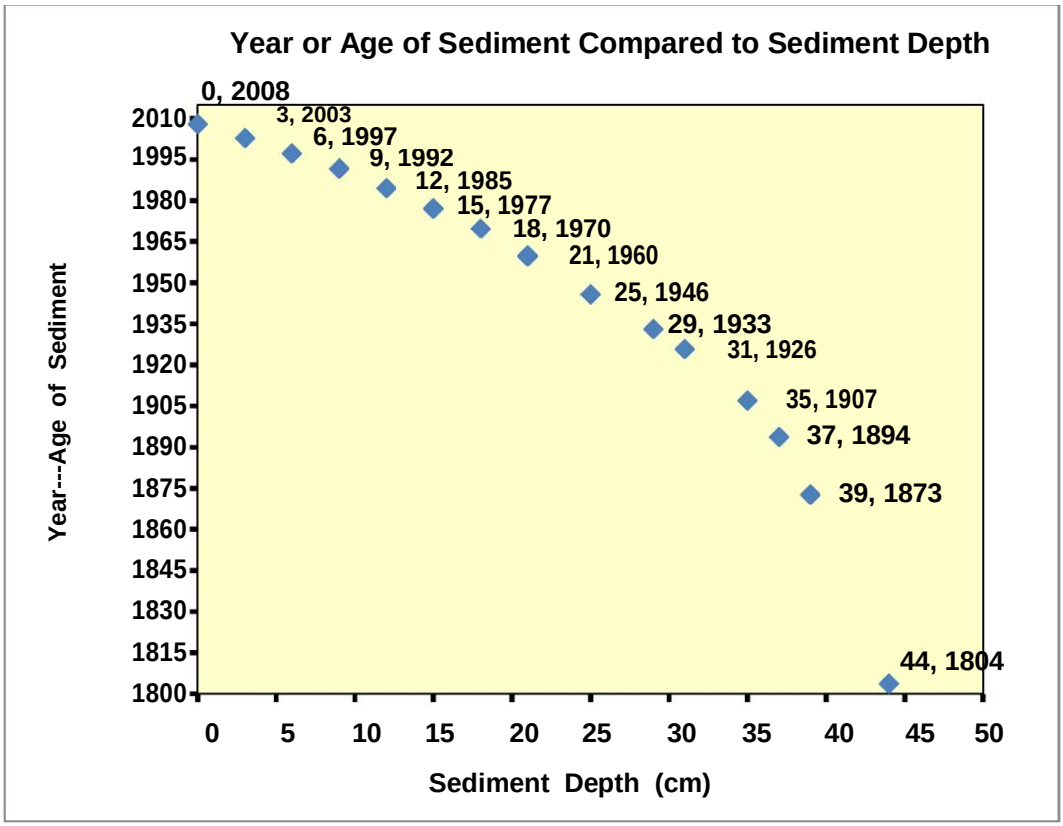


Figure 6-1. Age of sediment by date versus sediment depth.

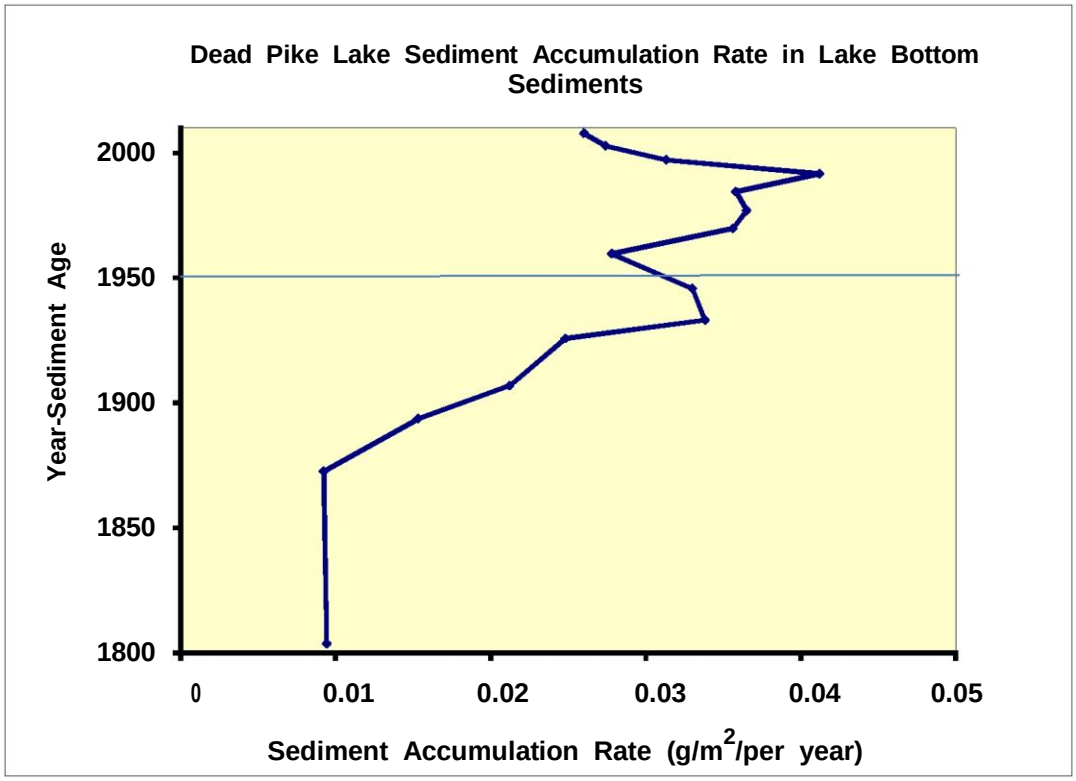


Figure 6-2. Rate of sediment accumulation for depositional zones in Dead Pike Lake.

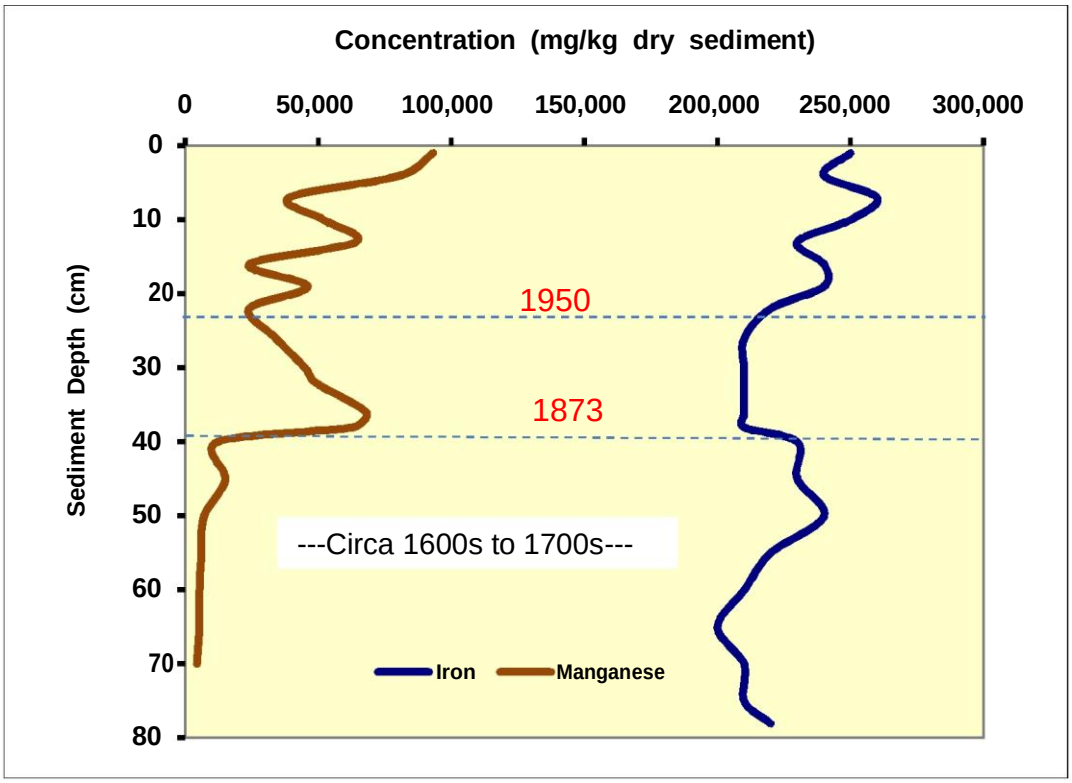


Figure 6-3. **Concentration of iron and manganese in Dead Pike sediment taken with a piston correr at 66 feet depth.**

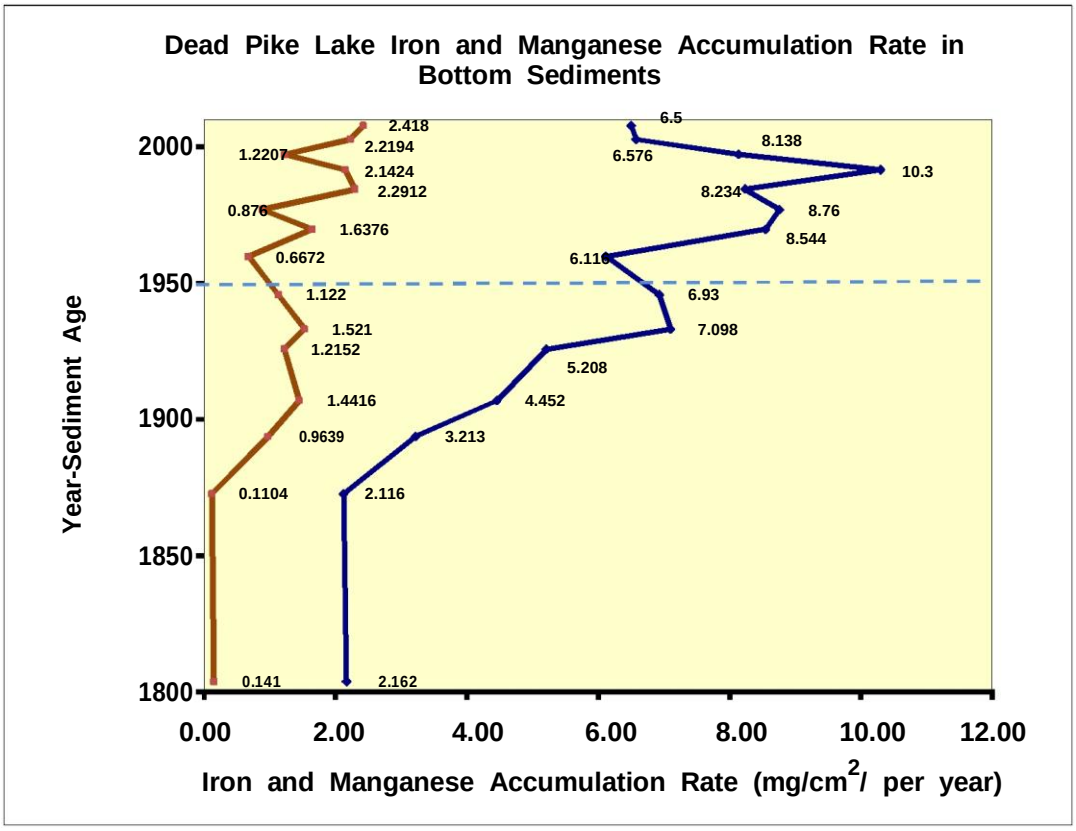


Figure 6-4. **Rate of of iron and manganese accumulation in Dead Pike sediment depositional zones. Core was taken with a piston correr at 66 feet depth.**

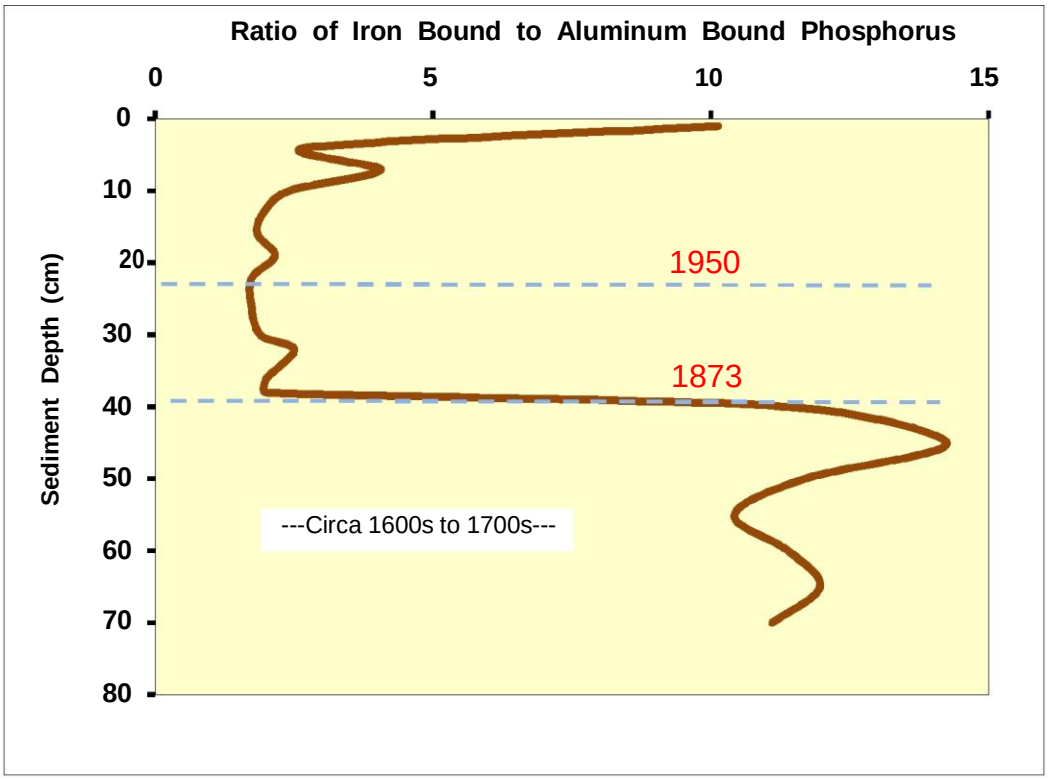


Figure 6-5**. Ratio of iron bound phosphorus to aluminum bound phosphorus in the dated sediment core.**

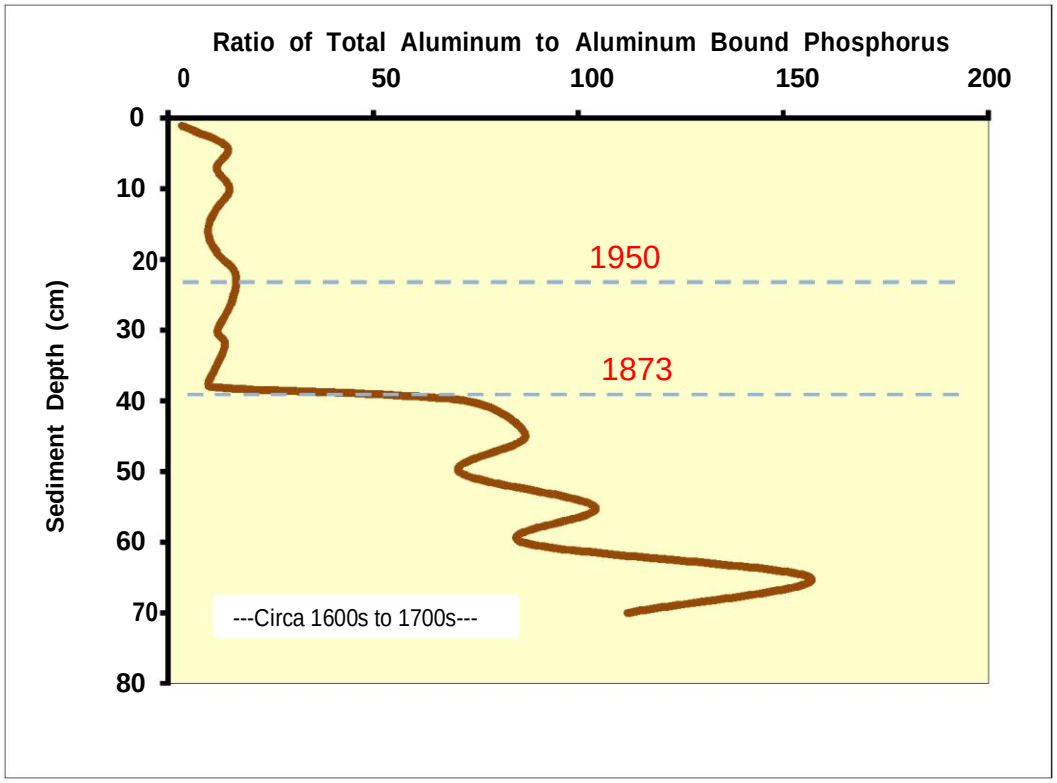


Figure 6-6**. Ratio of total aluminum to aluminum bound phosphorus in the dated sediment core.**

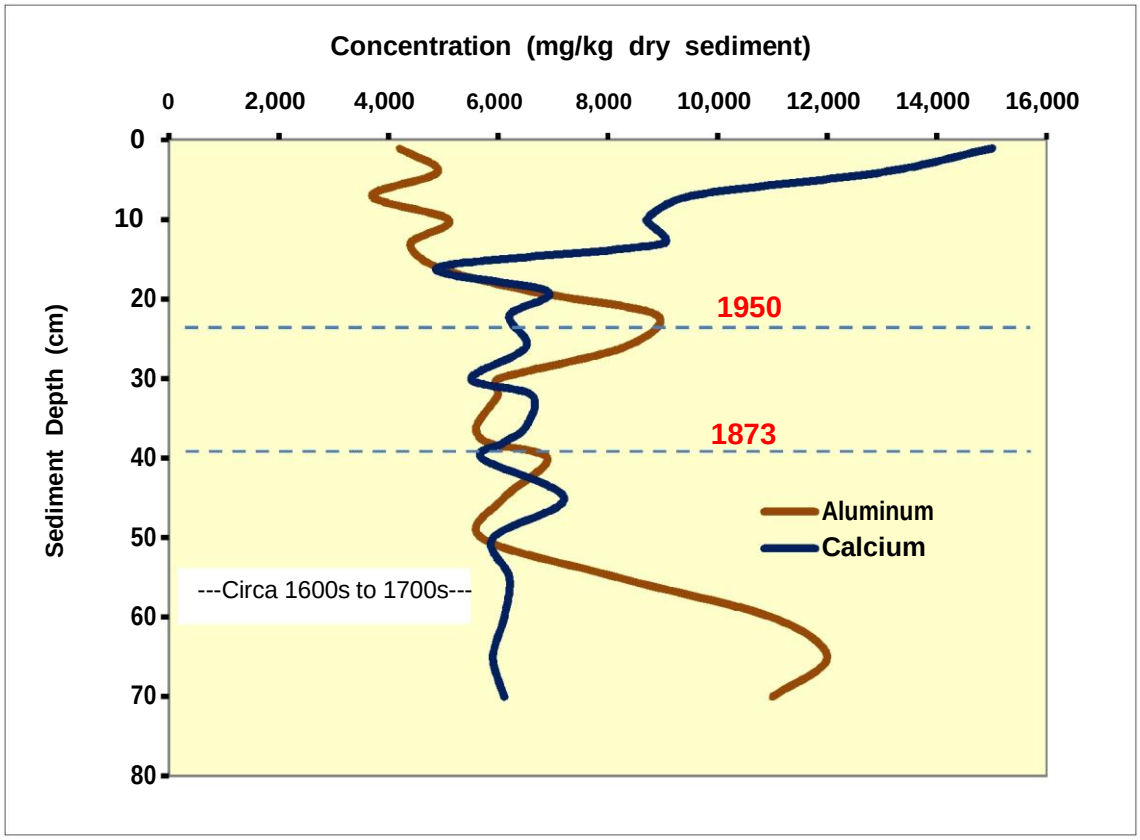


Figure 6-7. **Concentration of calcium and aluminum in the dated sediment core.**

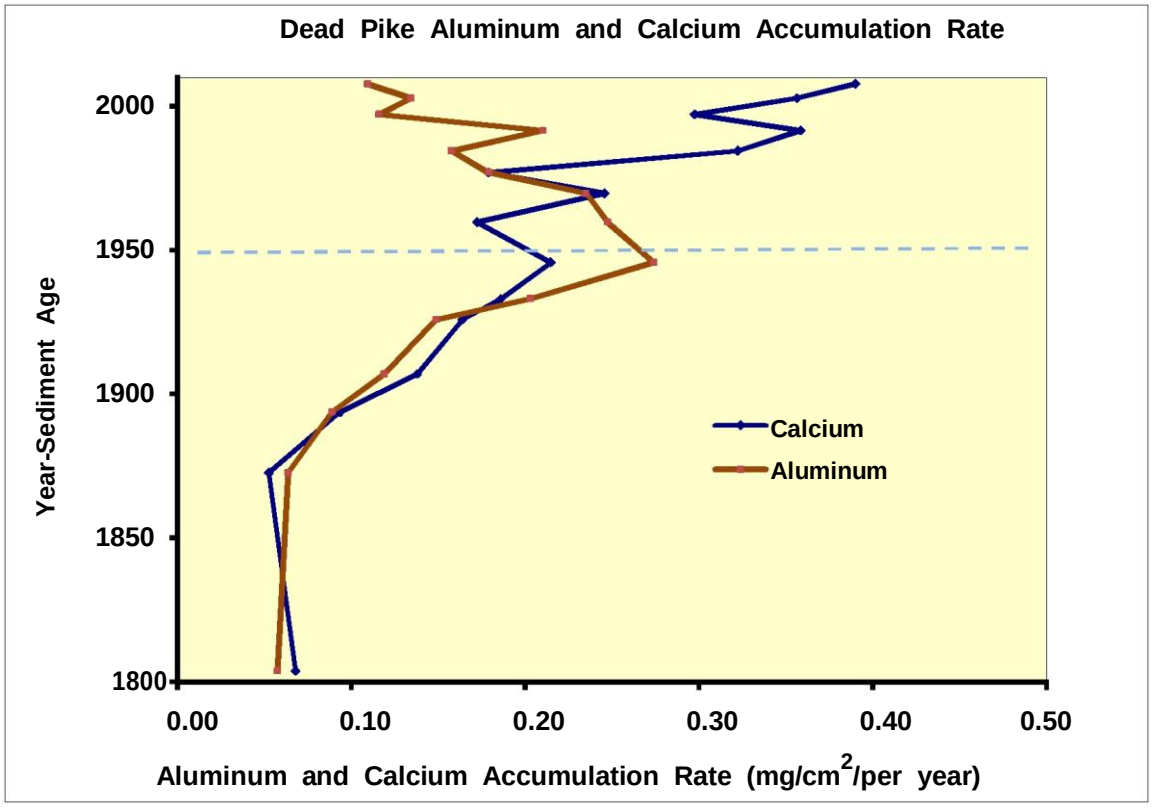


Figure 6-8. **Rate of calcium and aluminum accumulation in the dated sediment core.**

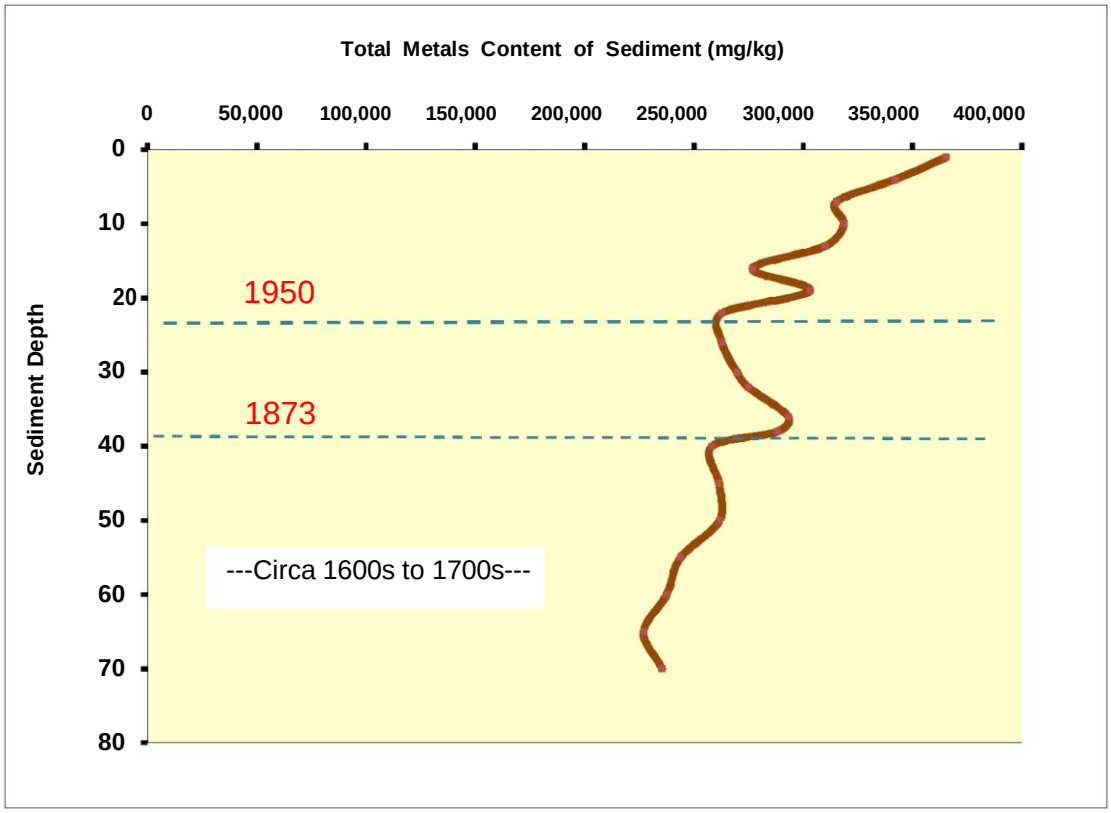


Figure 6-9. **Concentration of all metals anlyzed in the dated core.**

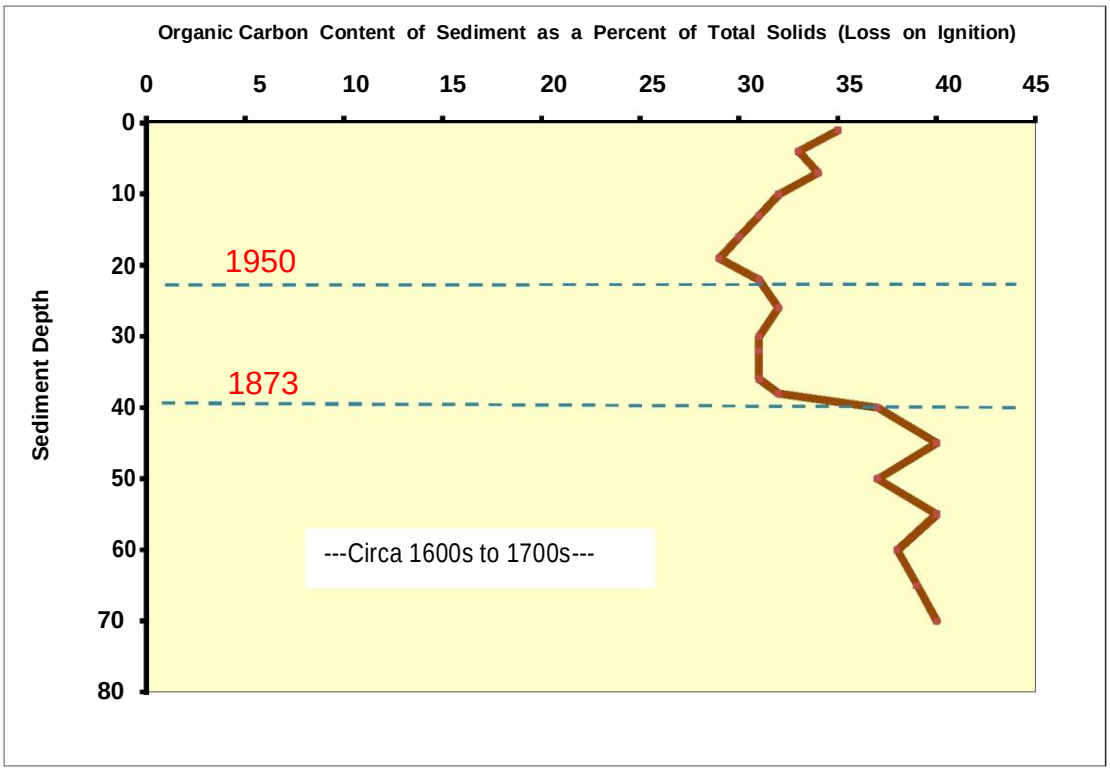


Figure 6-10. **Organic carbon concentration in the dated sediment core.**

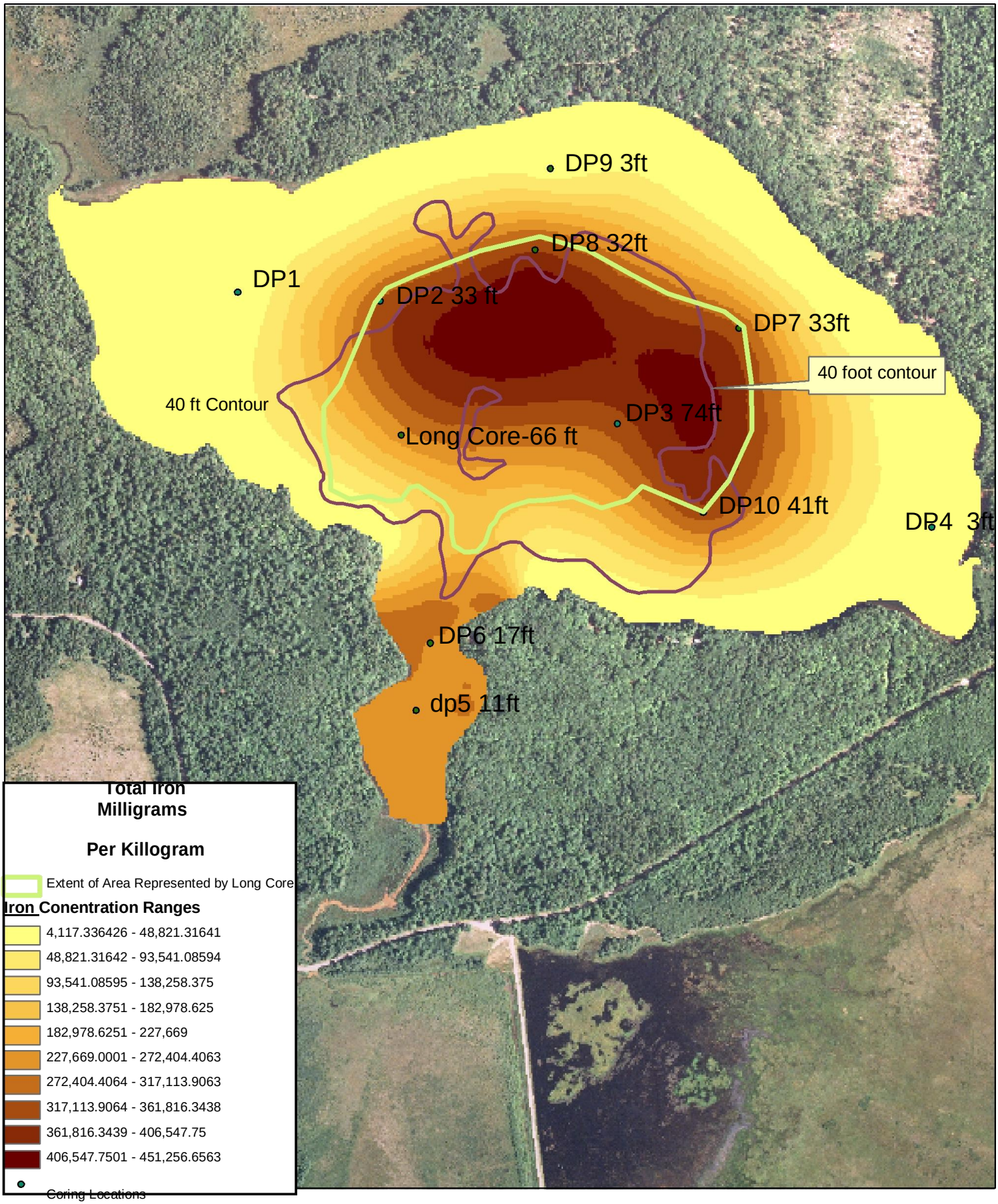


Figure 6-11.
Spatial Distribution of Iron in Dead Pike Lake Sediment and Estimated area Where the Long Core is Representatitve of Iron Deposition Rates

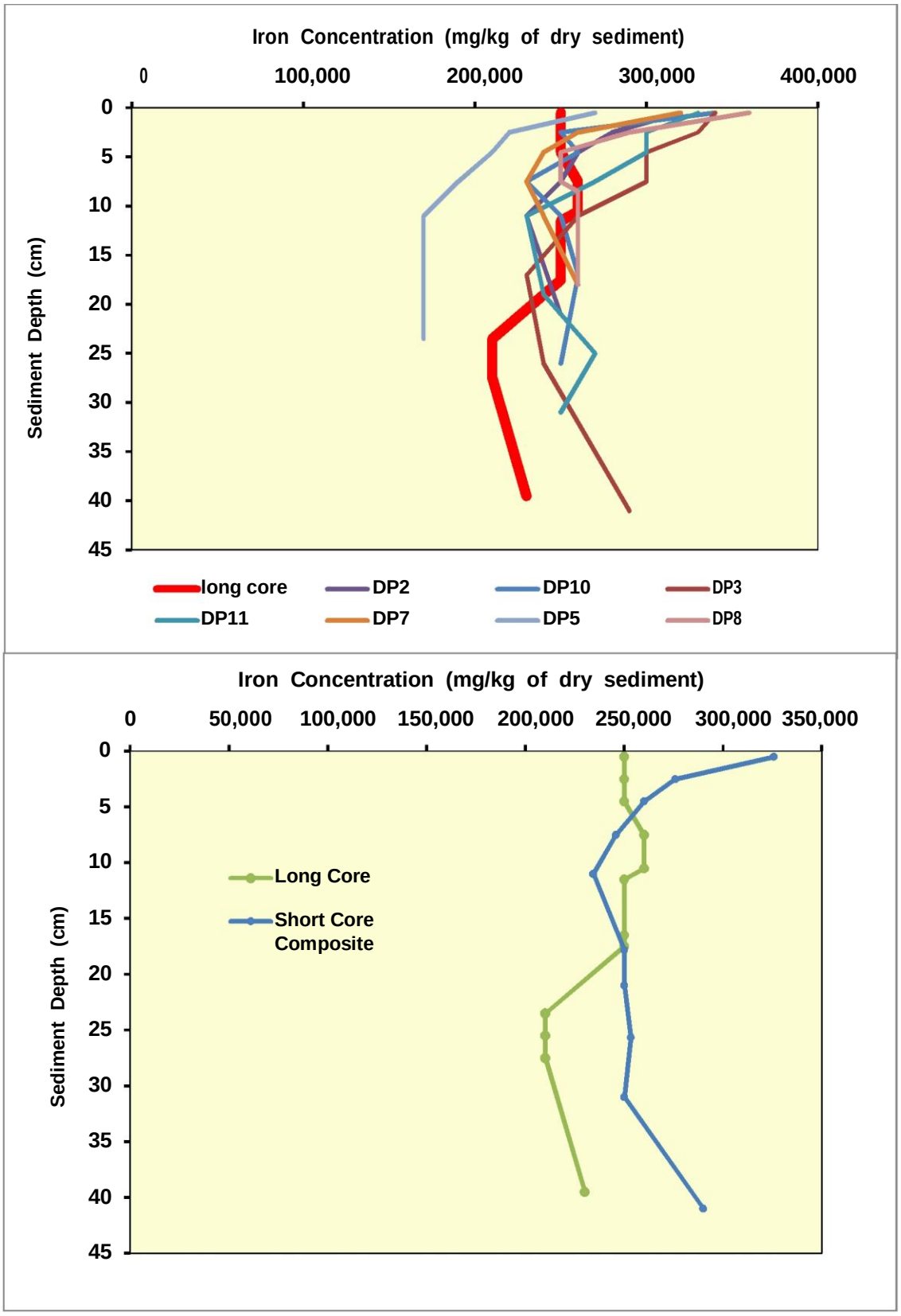


Figure 6-12. **Comparison of iron in short cores and the dated long core.**

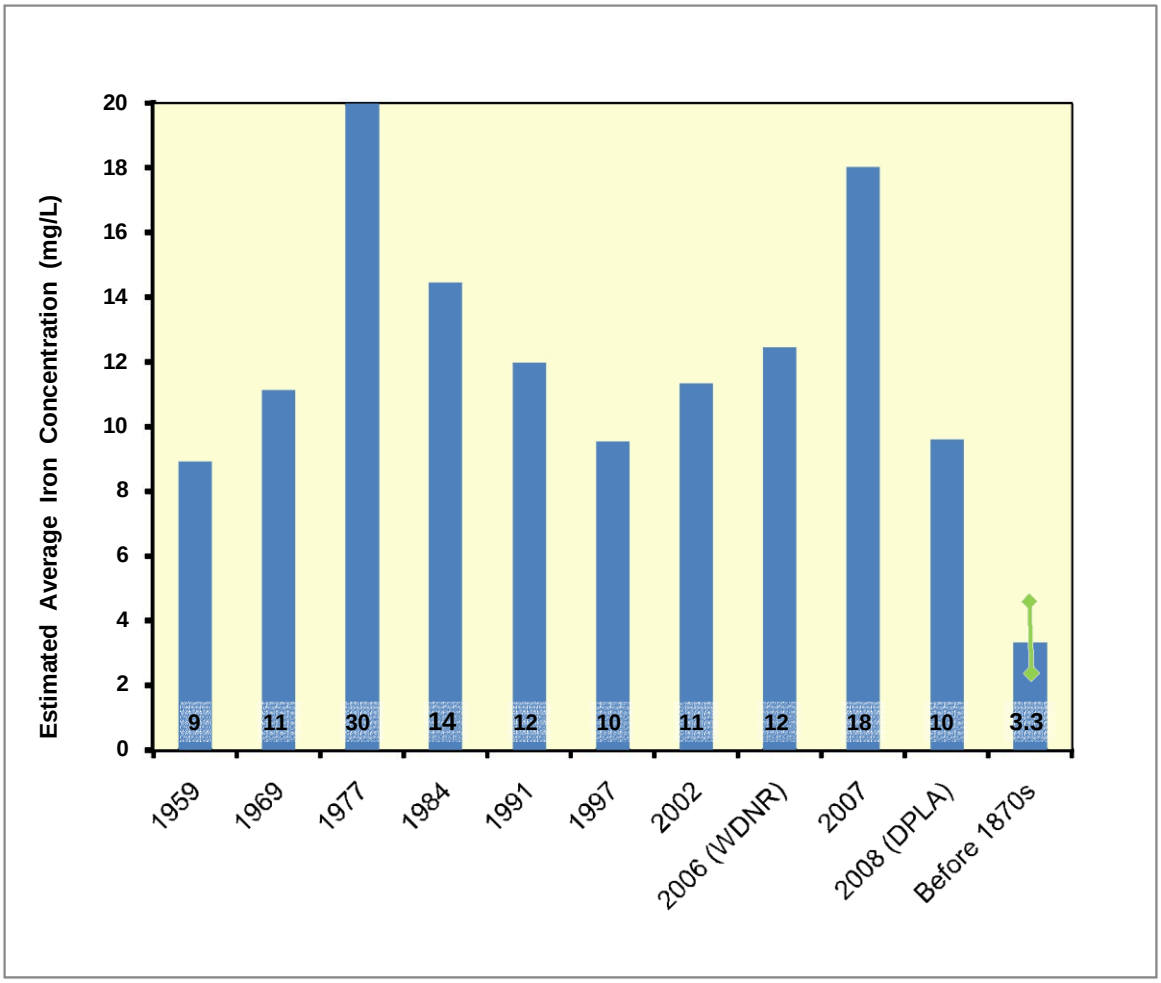


Figure 6-13**. Historical reconstruction of average iron concentrations at the Main Inlet based upon iron deposition rates in Dead Pike Lake and estimated annual average surface water discharge from the Powell Marsh. Iron concentrations in 2006 and 2008 were from water samples taken in those years. The error barr for the pre-1870s iron concentration estimate is based upon the 80th and 20th percentile of estimated flows.**

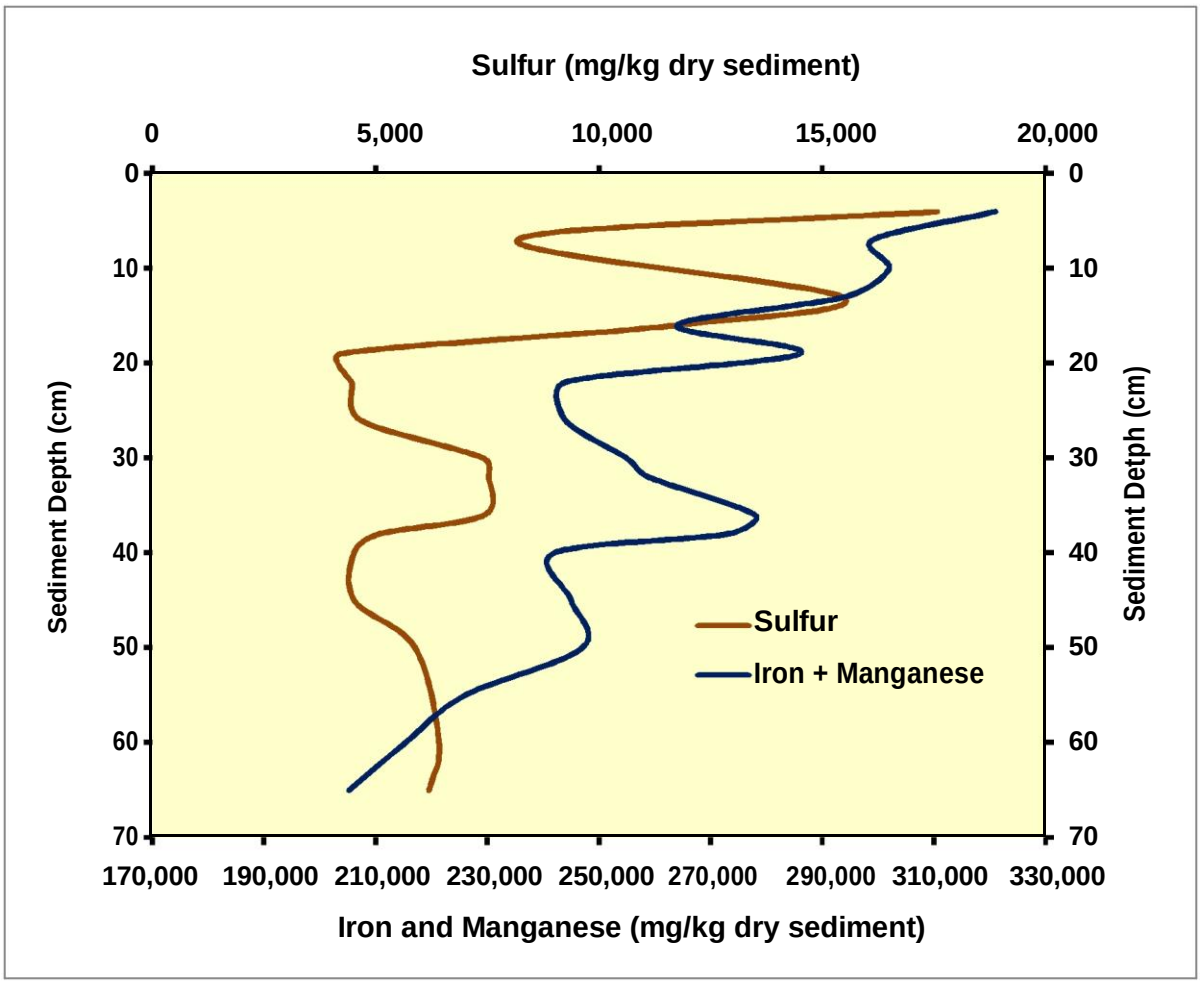


Figure 6-14. Comparison of sulfur and iron plus manganese in Dead Pike Lake sediments.

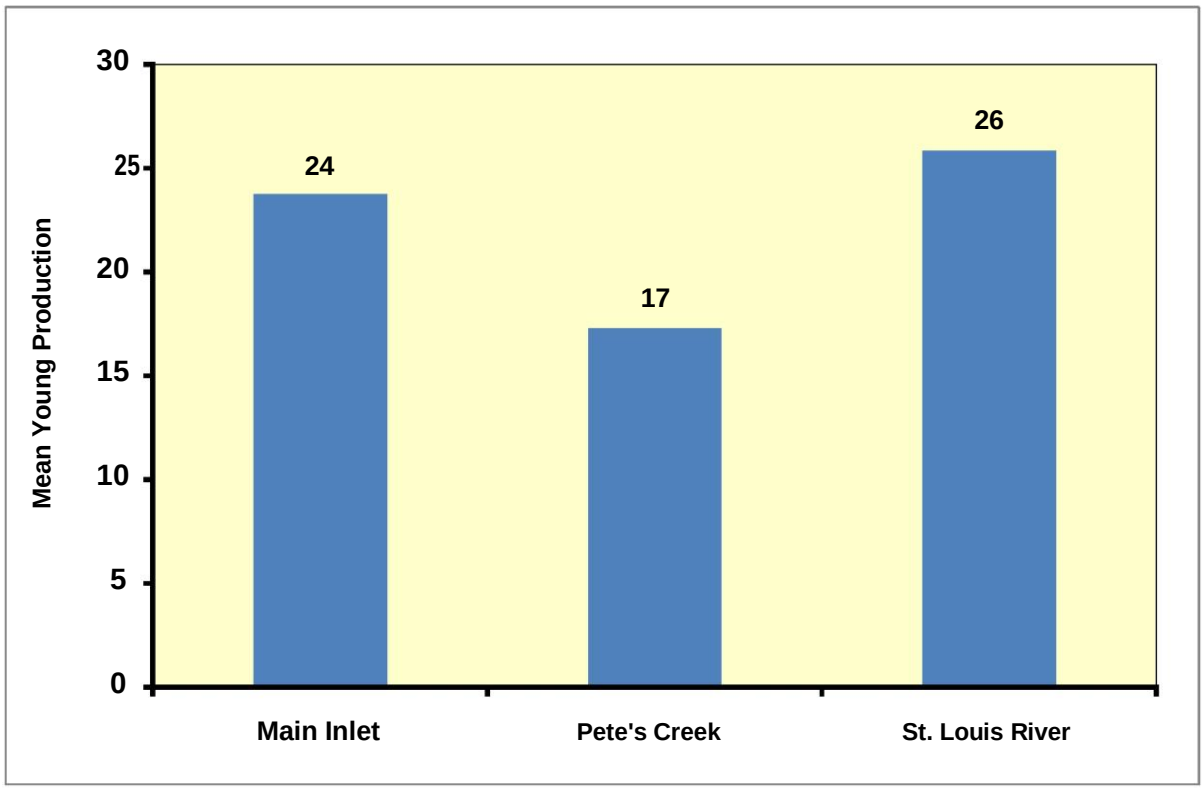


Figure 7-1. Mean young production for a 7-day toxicity test using the test species Ceriodaphnia dubia **and water collected at two inlets to Dead Pike Lake and a reference water from northern Minnesota.**

Figure 8-1**. Photograph showing the accumulation of sediment on rocks in Dead Pike Lake.**