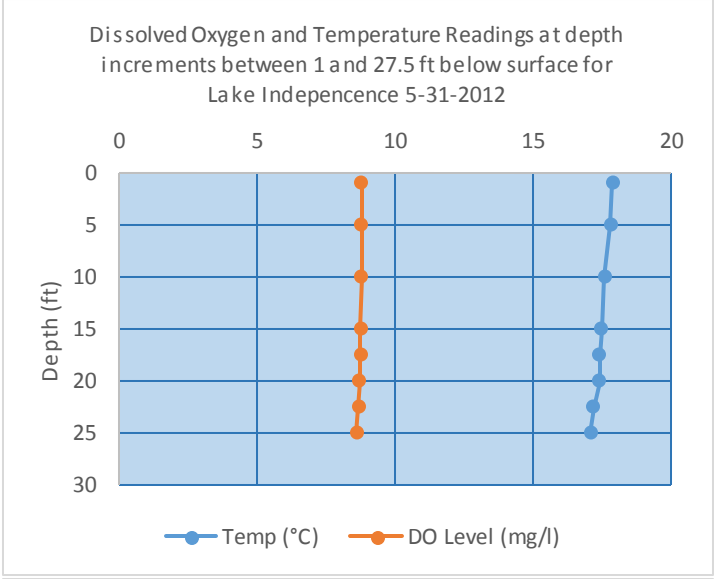
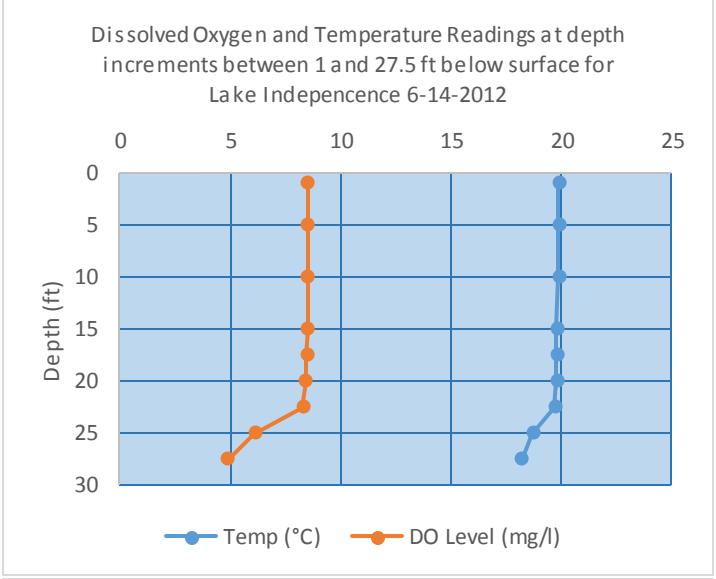
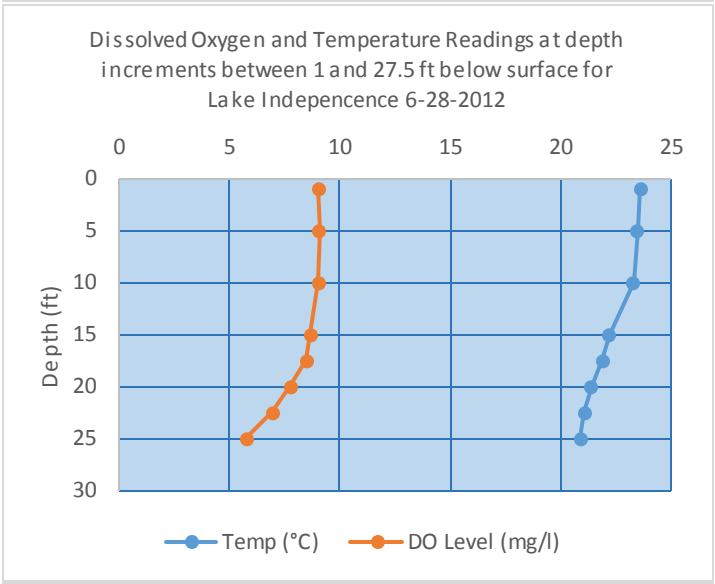
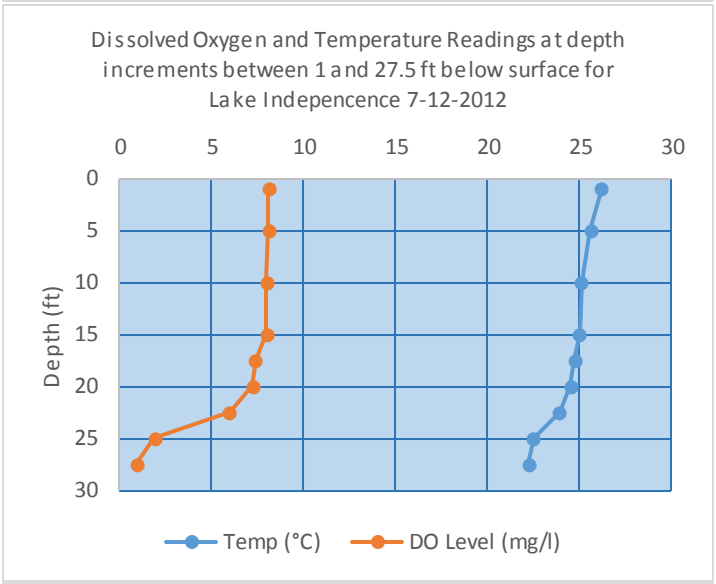
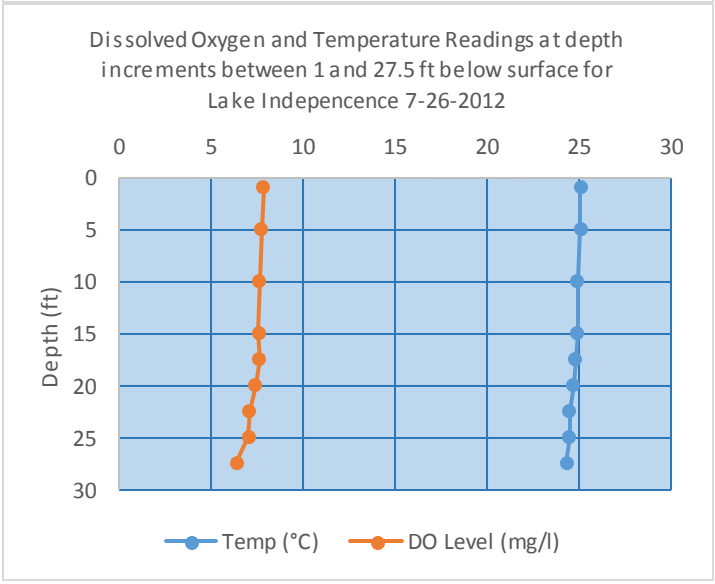
Lake Independence Cooperative Lakes Monitoring Program Results 2012

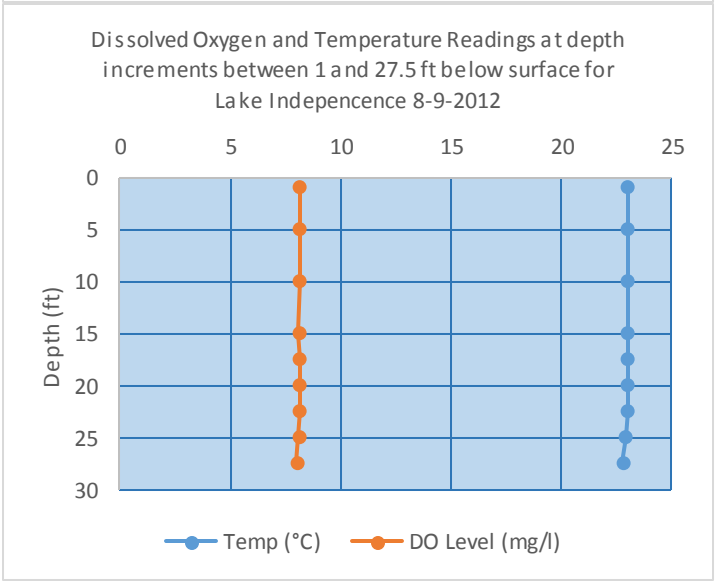


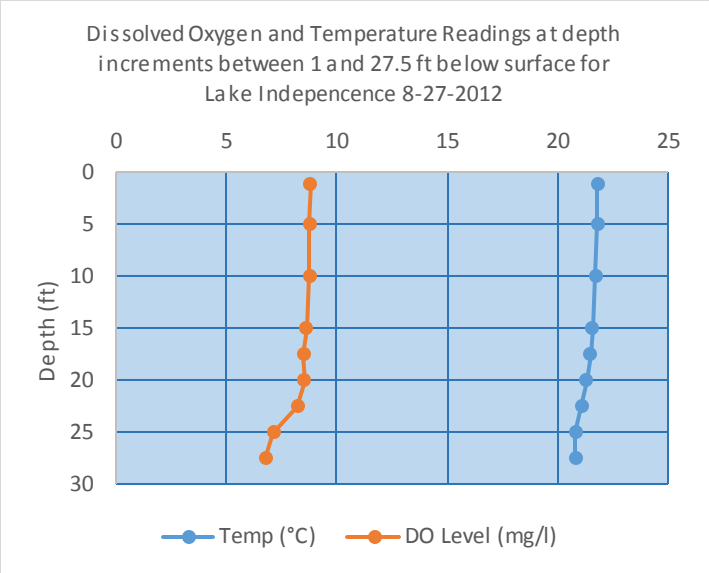












The Yellow Dog Watershed Preserve is enrolled in the MiCorps Cooperative Lakes Monitoring Program which is directed by a partnership between the MDEQ and the Michigan Lake and Stream Association. The ML&SA administers the program under the Michigan Clean Water Corps. The program goal is to provide baseline water quality data for lakes throughout the state and to educate residents about water conditions while building support in a cost-effective way. It aims to provide an assessment of lake eutrophication at the end of each season. Lake eutrophication, is a natural aging process which occurs though the gradual accumulation of nutrients, increasing productivity, and a slow filling in of the lake basin with accumulated sediments, silt and muck. Although the process is naturally occurring, humans can speed it up.

Lake Independence has been enrolled in the CLMP since 2009, and in 2012 the monitoring constituents included: total phosphorus, chlorophyll, clarity, dissolved oxygen and temperature. These constituents, when measured consistently over time, can be summed up with a Trophic State Index, which is a precise method of describing the productivity of a lake with a numerical index calculated directly from water quality data. The TSI expresses lake productivity on a continuous scale from 0 to 100, with increasing numbers indicating more eutrophic conditions. In other words the continuum progresses from very good to very poor. The leading cause of human-influenced eutrophication, or cultural eutrophication, is contamination by excessive inputs of nutrient, usually nitrogen or phosphorus. Some of the sources of excess nutrients include: runoff from lawns, farm fields and pastures, discharges from septic tanks, and emissions from combustion.

All CLMP measurements and samples are collected in the deepest basin of the lake. Water is sampled and the amount of total phosphorus is measured in units of µg/L (micrograms per liter). Plants are the primary users of nutrients in a lake, and excessive nutrients will often cause increases in algal growth. Chlorophyll is a component of the cells in most plants, and can be measured to show the concentration of algae in the water. Water is sampled and the amount of chlorophyll is measured and reported in units of µg/L (micrograms per liter). Transparency is also known as clarity, and measurements indicate the presence of suspended particles or algal or nutrient enrichment. Clarity is measured with a device called a secchi disk, which measures how far light travels through the water. Measures of dissolved oxygen and temperature are taken with a meter that is lowered into lake. Readings are taken every five feet for the first measurements, then every 2.5 feet until the meter is three feet from the bottom. When graphed, these measures will indicate the lake stratification. Low levels of dissolved oxygen can cause fish kills and temperature affects the growth of plants. Many lakes have distinct levels of dissolved oxygen and temperature at varying depths. In a deeper lake, these levels will be clearly stratified at increasing depth, but the levels will be less distinct during spring and fall overturn when more mixing occurs with wave action. The graphs above show less stratified temperature in the spring and fall whereas the mid-July graphs show more distinctly colder and less oxygenated bottom depths.

As a result of 2012 sampling, CLMP total phosphorus measurements have found Lake Independence to have a Carlson TSI_{TP} of 40, and the secchi disk measurements indicate a Carlson TSI_{SD} of 43. The chlorophyll measurements were not conclusive in 2012. The two Trophic State Indices classify the lake as mesotrophic, which is a measure of mid-productivity indicating a shallow lake with clear water, some amount of aquatic growth, and generally sufficient dissolved oxygen in the cool, deep-bottom water. The CLMP dissolved oxygen and temperature graphs have classified Lake Independence as a "shallow mesotrophic lake that does not maintain summer stratification." Lake Independence does not maintain stratification of temperature and dissolved oxygen levels and is instead continuously mixed by summer storms because the lake is so shallow. The secchi disk measurements from 2011 indicate a Carlson TSI_{SD} of 46 which indicates that the trophic state is fairly stable. In conclusion the CLMP assessment between 2011 and 2012 does not indicate a state of productivity that is excessively eutrophic.