

## MEDINA COUNTY PARK DISTRICT

### Summary of 2018 Chippewa Lake Study

Researchers from Aqua Doc, a lake and pond management company based in Geauga County, studied Chippewa Lake from May through November.

Aqua Doc's investigation included the following:

- Water clarity monitoring
- Water column profile sampling (at two foot intervals)
- Physical water quality data (temperature, dissolved oxygen, pH, and conductivity)
- Nutrient sampling at four stream inlets and the outlet
- Nutrient sampling at surface and bottom
- Lakebed sediment test (nutrients only)

The cost of the study was \$34,000. It was partially underwritten by the Save the Lake Coalition. The results detail a combination of internal and external nutrient loading contributing to harmful algal blooms. Thermal stratification of the lake is creating low-oxygen conditions near the bottom, allowing phosphorus to be released from nutrient-rich sediments. Prolonged stratification conditions (a natural phenomenon) perpetuate an extended algal bloom season in Chippewa Lake.

#### ➤ **Internal Loading**

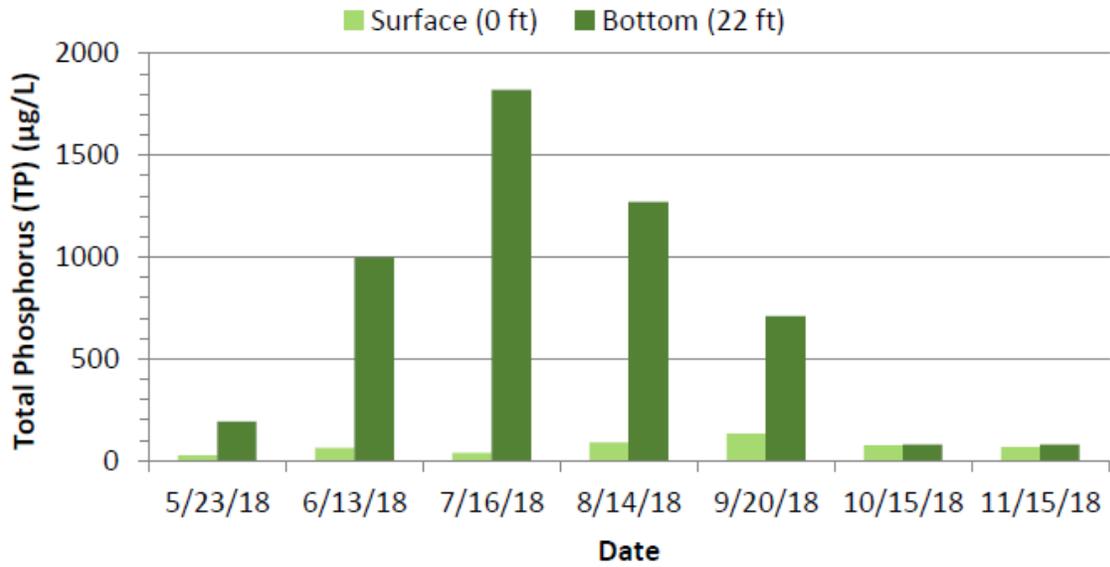
- One researcher said these were the highest nutrient levels he has ever seen.
- This is a "legacy" issue; it's decades in the making

#### ➤ **External Loading**

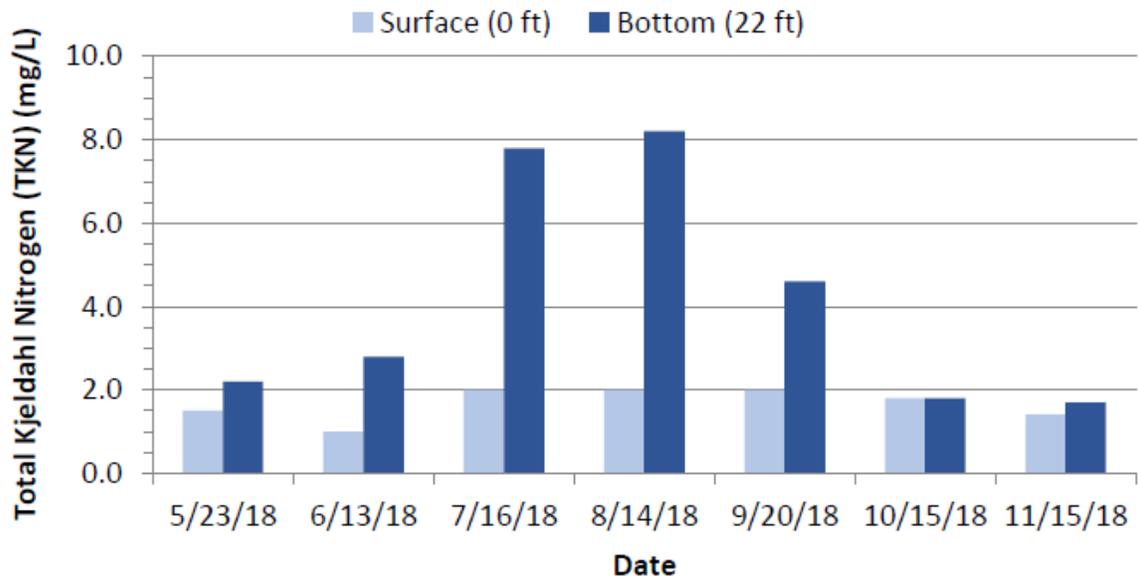
- Nutrients still flowing into the lake via inlets 1, 2, 3
- Lawn fertilizers, farm fields, septic systems
- Significant rain events contribute to the "flooding" of nutrients into the system; stormwater management is important

*EXAMINATION OF THE LAKE:*

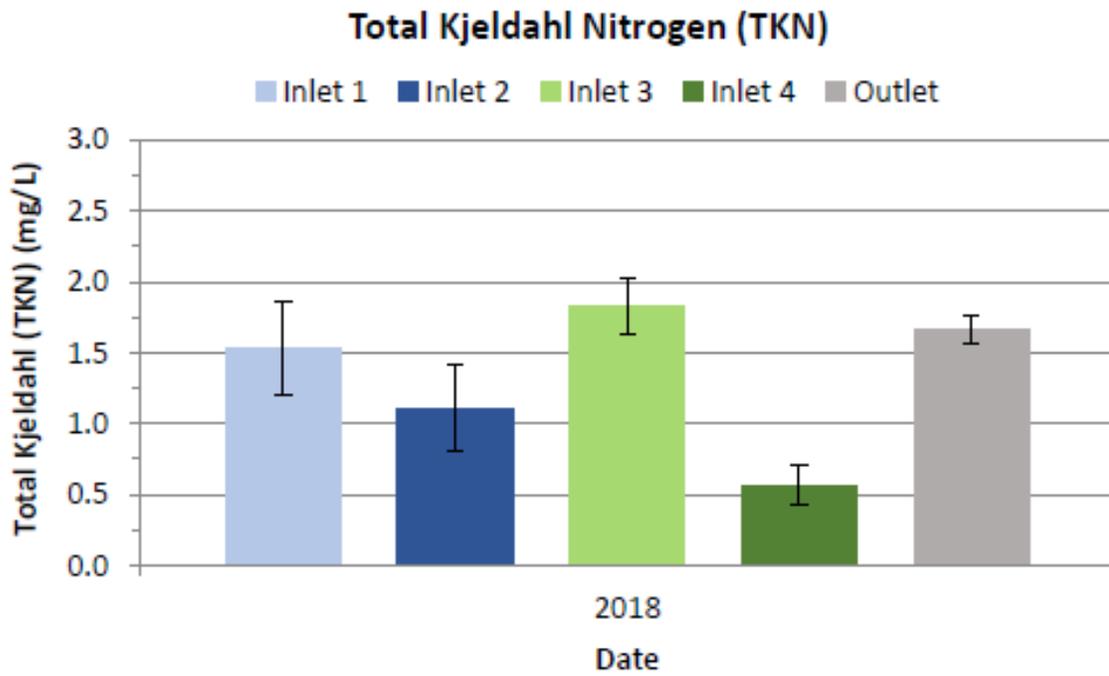
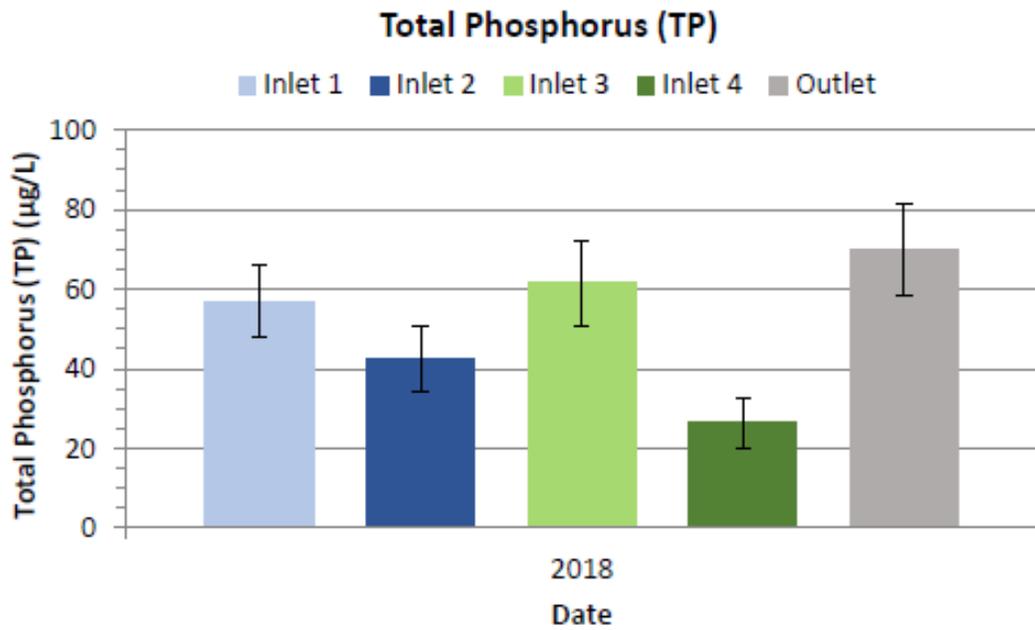
**Total Phosphorus (TP)**



**Total Kjeldahl Nitrogen (TKN)**



## EXAMINATION OF THE INLETS:



Aqua Doc detailed the costs/relevancy of three possible management techniques:

- **Aeration**
  - Installation of 25 units: \$500,000
  - Electricity: approximately \$60,000/year
  
- **Alum Treatment(s)**
  - \$1.6 million to \$1.8 million
  - Would “trap” nutrients in the sediment for about 10 years
  
- **Dredging**
  - Not recommended; extremely cost-prohibitive
  - Would stir up nutrients and make the problem even worse, at least in the short term

Medina County Park District is considering additional management options, including the creation of wetlands and additional restoration/reforestation in the watershed, the long-term viability of bio-reactors in the lake (depending on results from the 2018-19 pilot project), and more.

