## 2022 Secchi Day on Beaver Lake - Water Quality Results

For the 17<sup>th</sup> annual Secchi day, 33 teams covered 35 sample sites in duplicate throughout Beaver Lake. Sampling teams take Secchi disk readings to determine water clarity and collect water samples which are tested for Chlorophyll-*a*, Total Phosphorus, and Total Nitrogen, to determine algal density and nutrient concentration. Secchi depth in late August is inversely related to the concentration of Chlorophyll-*a*. Therefore, as Chlorophyll-*a* decreases, Secchi depth increases. When it comes to producing drinking water, higher Secchi depths and lower Chlorophyll-*a* concentrations are best. Below is a summary of results.

- **Secchi Depth:** The maximum depth at which a Secchi disk can be viewed from the surface of the water.
  - > Average Secchi depth for Beaver Lake was 2.68 meters or 8.8 feet.
  - Minimum depth was 0.52 meters (1.7 ft) near White River and Richland Creek confluence.
  - Maximum depth was 5.3 meters (17.4 ft) near Beaver Lake dam.
  - Average whole-lake Secchi depth for 2022 was 2.68 meters, slightly lesser than the 17year Long Term Average (LTA) of 2.69 meters (8.83 ft).
- **Chlorophyll-***a* (Chl-*a*): A pigment in algae that is used to measure the density of the algal population of a lake.
  - > Average Chl-*a* concentration for Beaver Lake was 7.69  $\mu$ g/L.
  - > Minimum Chl-*a* concentration was 1.95  $\mu$ g/L near the Beaver Lake Sailing Club.
  - Maximum Chl-*a* concentration was 34.91 μg/L near Camp War Eagle.
  - > Near surface mean concentration for Chl-*a* was greater in 2022 than the 17-year LTA of 7.52  $\mu$ g/L.
- Total Phosphorus (TP): A nutrient that promotes algal growth. Phosphates come from a variety of sources including agricultural and urban runoff, sewage treatment plant effluent, and faulty septic systems.
  - > Average TP concentration for Beaver Lake was 24  $\mu$ g/L.
  - > Minimum TP concentration was 10  $\mu$ g/L at two locations within Indian Creek cove.
  - > Maximum TP concentration was 58  $\mu$ g/L at the upstream end of War Eagle Creek.
  - > Near surface mean concentration of TP was greater in 2022 than the 17-year LTA of 16  $\mu$ g/L.
- **Total Nitrogen (TN):** A nutrient that promotes algal growth. Nitrogen also comes from a variety of sources including fertilizer runoff, faulty septic systems, municipal wastewater and animal wastes, erosion of natural deposits, as well as atmospheric N-fixation in water.
  - > Average TN concentration for Beaver Lake was 343  $\mu$ g/L.
  - $\blacktriangleright\,$  Minimum TN concentration was 240  $\mu\text{g/L}$  in the Blackburn Arm.
  - > Maximum TN concentration was 1070 μg/L near Lost Bridge Village.
  - > Near surface mean concentration of TN was greater than the LTA of 310  $\mu$ g/L.



Figure 1: Secchi Depths ranged from 0.5 meters to 5.3 meters.



Figure 2: Chlorophyll-a concentrations ranged from 1.95  $\mu$ g/l to 34.9  $\mu$ g/L.



*Figure 3: Whole-Lake Secchi Depth average by year. The red line indicates the 17-year LTA of 2.69 meters.* 



Figure 4: Whole-Lake Chlorophyll-a average by year. The red line indicates the 17-year LTA of 7.52  $\mu$ g/L.

## 17-year Average Chlorophyll-a and Secchi



Figure 5: 17-year inverse relationship between Secchi depth and Chlorophyll-a concentration.