Indian Lake Water Quality

The results of the water quality monitoring during the summer of 2019 show that Indian Lake has excellent water quality for a recreational lake. Lake water quality is evaluated based on the productivity of the water body. Lakes like Indian Lake that have multiple purposes such as fishing, swimming and boating need to have water quality that will allow for the production of a desirable fishery while allowing for desirable swimming and boating as well. Although lakes with very low productivity have very clear water that is desirable for swimming and boating, they usually have poor fish populations due to low productivity. Conversely, lakes with very high productivity have diverse fisheries but often have undesirable water quality for swimming and boating. Indian Lake has water quality that allows for a productive fishery without the problems found in lakes with higher productivity such as noxious algae blooms.

Productivity is classified based on a model called Trophic State Index (TSI). TSI's are calculated using the water quality data collected and give a "rating" for certain water quality parameters that indicate the health or condition of the lake. The three trophic state water quality parameters used are: total phosphorus, Secchi depth and chlorophyll *a*. Phosphorus is a key nutrient used by plants and algae to grow. Phosphorus is needed to produce the food at the lower end of the food chain for the fish population, but too much is a bad thing. High levels of phosphorus are associated with noxious algae blooms. Secchi depth is a measure of water clarity. Thus, the better (numerically higher) the Secchi depth the clearer the water is. The last parameter is chlorophyll *a*. Chlorophyll is found in algae and therefore; the more chlorophyll present usually means more algae is present.

A calculation is performed after the data is collected to determine a number that is the TSI and will be between 1 and 100. A trophic state index of less than 35 indicates that the lake would have low nutrients and low productivity. These lakes would have clear water for swimming, but their fish population is usually slow growing and less than desirable from a fishing perspective. A TSI of 35 to 50 indicates a lake that would have moderate nutrients and productivity. These lakes are considered most desirable for recreation as they have good water quality for swimming, boating and fish productivity. This season the TSI numbers for Indian Lake were as follows: total phosphorus-27.4, Secchi-45.5 and chlorophyll *a*-41.1. These TSI values show that the water quality for Indian Lake is quite favorable. There are enough nutrients present to support healthy aquatic life without causing undesirable conditions in the lake. The other parameters measured during the season; such as oxygen levels, pH, conductivity and dissolved/suspended solids all indicate that Indian Lake is a healthy thriving waterbody.

The environmental monitoring program for Indian Lake is a great asset. The extensive, historic database that is being developed allows for a detailed evaluation of changing water quality

conditions that occur throughout a given season. The collection of monthly data on a seasonal basis provides a database of irreplaceable information. Therefore, it is recommended that the monitoring program be continued in 2020. The monitoring program should include both chemical and biological water quality characteristics. Past monitoring programs provide Indian Lake Borough with an excellent database for the lake. This database can be used to determine if annual information is following a long-term trend or is the result of annual climatological variations. This information can then be used to evaluate management options.

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