

## **Interpreting Total Phosphorus and Secchi-Depth Data**

### **Total Phosphorus (TP):**

TP concentrations are ideally used to interpret nutrient status, as phosphorus is the element that controls the growth of algae in most Ontario lakes. Increases in phosphorus may decrease water clarity by stimulating algal growth. In extreme cases, algal blooms will affect the aesthetics of the lake and may cause taste and odour problems in the water.

Many limnologists (scientists who study the physical, chemical, and biological properties of lakes, rivers, and streams) place lakes into three broad categories with respect to nutrient status. Lakes with less than 10 µg/L (micrograms per litre) of TP are considered “oligotrophic”. These are unproductive lakes that rarely experience nuisance algal blooms. Lakes with TP levels between 10 and 20 µg/L are termed “mesotrophic”, and have a moderate trophic (nutritional) status. These lakes show a broad range of characteristics – from being clear and unproductive, to being susceptible to moderate algal blooms at concentrations nearing 20 µg/L. Any lakes in which the TP is over 20 µg/L are classified as “eutrophic”, and may exhibit persistent, nuisance, algal blooms.

### **Water Clarity and Secchi-Depth Readings:**

Water clarity is determined, in part, by taking measurements with a Secchi disk – a 20-cm (8-inch) disk with alternating black and white quadrants. It is lowered into the water of a lake until it can no longer be seen by the observer. This depth of disappearance, called the “Secchi depth”, measures the transparency of the water.

Algal growth (stimulated by increases in phosphorus) may decrease water clarity. This water characteristic cannot, however, be the sole factor in determining nutrient status in Ontario’s inland lakes. Light penetration in the lake can also be limited by dissolved organic carbon or by non-biological turbidity (cloudiness), which influences the colour of the lake. Water clarity can similarly be altered by invading species, such as zebra mussels. It is always best, therefore, to also use TP to evaluate the nutrient

status of the lake. Yet, water-clarity readings using Secchi-disk data can be valuable to track changes in the lake that might be occurring (e.g., watershed disturbances) and would not be noticed by monitoring TP concentrations alone.

The Lake Partner Program (LPP) – a volunteer-based, water-quality monitoring program that is facilitated by the Dorset Environmental Science Centre (DESC) – collects both total phosphorus and Secchi-depth data. Results are posted each year on the LPP website at: [www.Ontario.ca/LakePartner](http://www.Ontario.ca/LakePartner). Since 2002, TP analyses have been conducted at the DESC laboratory. Current TP data based on existing DESC analytical methods are, however, approximately 10 x more precise than data collected before 2002.

*Source: Dorset Environmental Science Centre website (2021)*