

## Turbidity and Alberta Lakes

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### Highlights

- Turbidity is a measure of the clarity of water.
- Turbidity varies greatly based on local conditions.
- High turbidity can result in decreased recreational use of Alberta lakes.
- Human activities and land management practices around lakes can impact turbidity.

### What is turbidity?

Turbidity is a measure of the relative clearness or clarity of water. It is related to the amount of particles suspended in the water. Particles may include clay, silt, organic matter and living organisms. Turbidity should not be confused with color, since darkly coloured water can still be clear and not turbid.

### What is a turbidity test?

A turbidity test provides an indication of the amount of material suspended in water by determining how much light can pass through the water.

For the turbidity test in the Alberta Water Quality Monitoring Day kit, a sticker of a black and white disk is attached to the bottom of the sampling container. This sticker is referred to as a secchi disk and larger versions of it are used for standardized turbidity testing. Once the sampling container is filled, an indication of turbidity is gained when samplers look through the water sample to the secchi disk. The higher the amount of suspended solids, the less light that will pass through the water and the less distinct the secchi disk will appear.

### What is the normal range of turbidity in Alberta?

The turbidity of Alberta rivers and lakes has a wide range depending on local conditions. All three levels of turbidity, indicated in the test kit, can be found in Alberta.

### Why is turbidity important?

Rivers, streams, reservoirs and lakes that are clear are more attractive for recreation. Turbid or murky lakes are considered by most to have poor water quality. Recreation activities may be limited or unsafe due to a high degree of turbidity due to excessive runoff or severe algal blooms. For example, fewer people choose to swim in a lake during an algal bloom.

High turbidity can have negative impacts on public health. High turbidity can lead to concerns about drinking water. High turbidity can mean that there are increased amounts of pathogenic bacteria and other microscopic organisms that enter water through runoff and effluent. Excessive turbidity can interfere with the water treatment process. As the amount of material suspended in water increases water treatment processes such as filtering and chlorination may need to be increased. This makes proper treatment of drinking water both more intensive and more expensive.

It should be noted that in some cases, turbidity can indicate pristine water quality conditions. For example, high concentrations of suspended sediments and particularly, glacial silts are common in mountain and foothill streams, lakes and reservoirs in Alberta. These fine particles come from glacial melt waters and cause the water to appear milky to turquoise blue. To most people, this is an indication of a “pure” or pristine environment and is viewed as a desirable water quality conditions. Hence, turbidity itself is not the issue for many people it is the nature of the source of turbidity that is of concern.

### **What influences turbidity in lakes?**

Turbidity is influenced by a wide range of suspended materials including silt, sediment, algae, cyanobacteria, microscopic animals, and soluble organic compounds derived from decomposing plant matter. These materials can enter lakes as a result of natural conditions or human activities. Turbid waters may result from natural runoff, soil erosion, urban runoff, erosion, algal and cyanobacterial blooms and the resuspension of bottom sediments by wind or boat traffic (sediment from the bottom of lakes that is stirred up by boat traffic or wind).

Land management and development practices can have a significant impact on turbidity. For example, clearing vegetation along the banks of lakes to allow for development removes the natural filter the vegetation provides. Without the filter, runoff water and all the materials suspended in it will flow directly into the stream or river. Removal of vegetation also can increase erosion and therefore increase turbidity.