

Turbidity and Alberta Streams and Rivers

Highlights

- Turbidity varies greatly based on local conditions.
- High turbidity can make treatment of drinking water more intensive and expensive.
- High turbidity can lead to decreased fish populations.
- Human activities and land management practices 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, whereas those that are turbid or murky are considered by most to have poor water quality. High amounts of turbidity can limit recreation opportunities or make them unsafe. For instance, wading in turbid streams while fishing can be dangerous as submerged obstacles like large rocks, tree branches or deep depressions and drop-offs are not easily visible.

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 or augmented. This makes proper treatment of drinking water both more intensive and more expensive.

Turbidity can have negative effects on aquatic life. In streams and rivers suspended particles from runoff eventually settle out to the bottom. If this occurs during the spawning period of fish, silt can cover the eggs. Fish eggs require plenty of oxygen to develop and hatch. A layer of silt covering the eggs acts as a barrier to the supply of oxygen. As a result, the eggs suffocate and die.

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 streams and rivers?

Turbidity can be influenced by a wide range of suspended materials such as mud, silt, sediment, algae, cyanobacteria, microscopic animals and soluble organic compounds derived from decomposing plant matter. These materials can enter streams and river as a result of natural conditions or human activities. Turbid waters may result from natural runoff, soil erosion, urban runoff, and stream bank erosion.

Land management and development practices can have a significant impact on turbidity. For example, clearing vegetation along the banks of streams and rivers 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.