



Frequently Asked Questions: Turbidity in Surface Waters

What is Turbidity?

Turbidity is a measure of water clarity in streams, rivers, lakes, and the ocean. Turbidity describes the amount of light scattered or blocked by suspended particles in a water sample. Clear water has low turbidity and cloudy or murky water has a higher turbidity level. Turbidity is caused by particles of soil, organic matter, metals, or similar matter suspended in the water column.

How Do We Measure Turbidity?

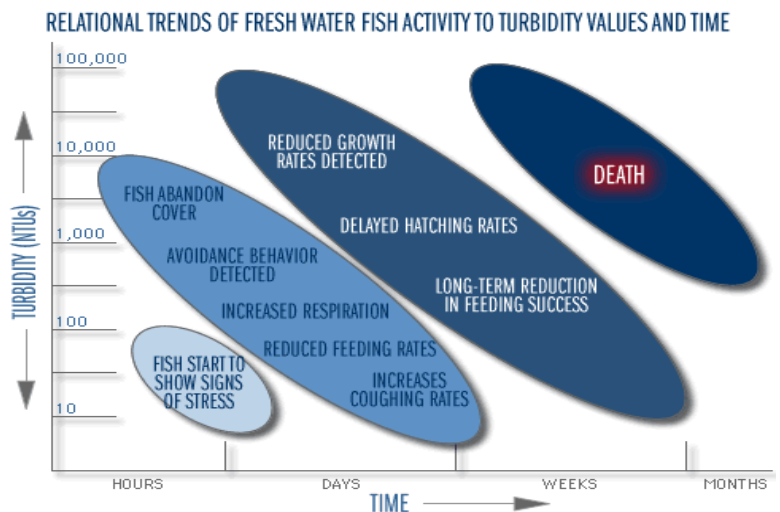
Turbidity is commonly measured in Nephelometric Turbidity Units (NTU). The nephelometric method compares how light is scattered in a water sample against the amount of light scattered in a reference solution. An electronic hand-held meter is often used to measure turbidity. Measurements can also be conducted by use of a Secchi disc or similar instrument.

What are the Sources of Turbidity?

Watersheds may have diverse physical landscape features that can affect the amount of suspended material in the water that can then cause the water to be cloudy or turbid. Natural sources of material include sediment from the weathering of rocks (e.g., glacial outwash), dead plant material, and phytoplankton. Human-caused sources include substances in stormwater from urban areas (e.g. roads, parking lots), upland industrial activities, construction and land clearing, and activities occurring directly in water bodies such as power boat use and vehicle use. Turbidity may vary over time, seasonally or on a geographic basis depending on differences in precipitation, gradient (slope), geology, flow, and disturbances such as landslides.

What are the Effects of Turbidity on Fish?

Organisms, including fish, are generally adapted to the levels of turbidity naturally found in the specific water body they inhabit. While some turbidity is natural and not dangerous to fish (e.g., glacially influenced streams), studies in Alaska¹ have demonstrated that when relatively low levels (0-5 NTU) of turbidity are present in naturally low turbidity streams, the unnatural increases can interfere with fishes' ability to find food and to avoid predators. Algae, a primary source of food for certain fish and macro-invertebrates, are affected because turbidity reduces its growth rate due to decreases in light availability for photosynthesis. Turbidity also increases water temperature because suspended particles absorb heat. Higher temperatures can result in lower dissolved oxygen in the water, and can cause physical stress in fish and decreased egg



¹ Lloyd, Denby, J. Koenings, J. LaPerrire (1987) *Effects of Turbidity in Fresh Waters of Alaska*. Journal of Fisheries Management. 7:18-13



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survival rates. Excessive sediment found in highly turbid waters can clog the gills of fish and bury bottom dwelling creatures and fish eggs if it settles to the bottom.

What are the Effects of Turbidity on Humans?

Particles in turbid waters can carry disease-causing pathogens or toxic pollutants. High turbidity in drinking water can shield bacteria or other organisms so that chlorine treatment at water treatment plants cannot disinfect the water as effectively. Some pathogens found in water with high turbidity can cause symptoms such as nausea, cramps, and headaches. Particles can also absorb toxic pollutants that may come from urban and industrial discharges and stormwater runoff. Many common contaminants that increase turbidity can also change the taste and odors of the water. Water that has high turbidity may cause staining or even clog pipes over time. It may also foul laundry and interfere with the proper function of dishwaters, hot water heaters, showerheads, etc.

How do we Regulate Turbidity?

Turbidity is addressed in Alaska’s Water Quality Standards regulations at 18 AAC 70.020. The regulation states that human-caused turbidity may not exceed 5 NTU above natural conditions when the natural turbidity is 50 NTU or less, and may not result in more than a 10% increase in turbidity when the natural turbidity is more than 50 NTU, not to exceed a maximum increase of 15 NTU. Turbidity may not exceed 5 NTU above natural turbidity for all lake waters. This is the most stringent of the applicable criteria.

What Can We Do to Lower Human-caused Turbidity?

The best approach to managing turbidity is to address its source. This includes reducing stormwater run-off from roads, parking lots, and upland industrial activities; restoring eroding stream and lake shorelines; and applying industry-specific best management practices (BMPs). BMPs are activities that help minimize the effects of a particular activity upon the environment. Examples include use of settling ponds, re-vegetating steep slopes, maintaining a minimum of 25 feet of vegetation around streams, lakes, and other waterbodies, and maintaining all drainage systems.

Source: Queensland Gov’t. Wetland Info

