**Factsheet: Water clarity**

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**What is water clarity?**

**Water clarity refers to the ability of light to travel through water and has two important aspects: light penetration and visual clarity.**

 Light penetration is important as it controls the amount of light in the water needed for aquatic plants to grow. Visual clarity indicates how much suspended sediment (soil) is in the water.

**Suspended Sediment**

As erosion occurs, tiny particles of clay, silt or small organic particles are washed into waterways. These tiny particles can be supported in the water current and are termed suspended sediment. The faster the water is moving the larger the amount and size of suspended sediment particles it can carry. Soil type in the catchment can affect the amount of [suspended sediment](https://www.lawa.org.nz/learn/glossary/s/suspended-sediment/).

For example, streams in catchments with clay soils are likely to have naturally poorer water clarity than streams in sandy catchments. In slow-flowing lowland streams where sediment can be very fine, water clarity can be poor for long periods. This is due to the slow rate of flushing and the fact that very fine particles are held in suspension almost indefinitely.

**Why is poor water clarity a problem?**

Poor water clarity can have many adverse effects on stream and lake ecosystems. For example, murky water can make the water unsuitable for drinking by stock and make areas unsafe for swimming. High sediment can also harm aquatic life by clogging their gills which reduces their ability to take up oxygen. As fine particles settle in slower-moving downstream areas, the spaces between rocks and gravel are filled making the bottom habitat unsuitable for fish and other aquatic species.  Poor water clarity will also affect the amount of light reaching the river bottom, potentially limiting plant growth.

**How is water clarity tested?**

Water clarity can be assessed either by using a Black Disc, clarity tube or by measuring turbidity.

**Black Disc**

How far away (in metres) can a black target (black disc) be seen horizontally through the water. The further away the disc can be seen, the clearer the water.  National guidelines recommend Black Disk as the preferred sampling methodology for water clarity assessment.

**Clarity Tube**

A 1-metre-long, 50-mm-diameter clear acrylic tube used to visually assess water clarity. The tube has a matte black target attached to a magnetic slider which is moved through the tube away from the eye until it cannot be seen anymore. The clearer the water, the further away (in metres) the target can be seen. The clarity tube is effective for relatively turbid water with a clarity less than 1 m.  However, limitations in tube length make this method inappropriate for measuring clarity in clear waters.

**Turbidity**

Turbidity is an index of cloudiness of water and measures how light is scattered by fine particles in waterways.  Turbidity is an alternative measurement for suspended sediment and/or visual clarity and is measured in nephelometric turbidity units (NTU). Compared to black disk measurements, turbidity can be measured continuously, for example through the night.

**Important to know**

Water clarity is “correlated” with flow. As flow increases it leads to more and larger suspended sediment particles, resulting in clarity decreasing.  Due to the close relationship between clarity and flow, analyses of long-term trends are ideally done using flow adjusted data.

<https://www.lawa.org.nz/learn/factsheets/water-clarity/>