

WATER QUALITY TERMS

Clarity

Clarity refers to light transmission through water (water clarity) and has two important aspects: visual clarity and light penetration. Visual clarity indicates how much sediment or runoff is in the water. Sediment can come from road runoff during rain, or from slips or bank erosion. As well as making the water unsuitable for drinking by stock, murky water can also make areas unsafe for swimming and can harm aquatic life. Light penetration is also important as it controls light availability for growth of aquatic plants.

Conductivity

An indirect measure of charged particles (electrolytes) in water. For example, salt water has high, and freshwater low, conductivity. A higher conductivity value in freshwater indicates that there are more chemicals dissolved in the water.

Dissolved oxygen (DO)

The oxygen content of water. Dissolved oxygen is important for fish and other aquatic life to breathe. For example, water quality guidelines recommend that water should be more than 80 percent saturated with DO for aquatic plants and animals to be able to live in it.

E. coli (*Escherichia coli*)

E. coli (*Escherichia coli*) is a type of bacteria commonly found in the gut of warm-blooded animals and people. *E. coli* naturally occurs in freshwater and is not usually **harmful in itself**. However, high concentrations of this bacteria exceeding water quality guidelines indicate faecal contamination which can be harmful to humans.

Flow

Flow refers to the volume of water in the river flowing past a point in one second and is given in cubic metres of water per second. A cubic meter per second can be written as m³/s, or cumecs, and equals 1000 litres per second. To give you an idea about how much water that is, 0.7 m³/s would fill an Olympic swimming pool in an hour. A flow of 42 m³/s would fill the same pool in a minute.

Habitat

The environment in which biological communities naturally occur. It includes the physical and biotic characteristics that are relevant to a certain species. For example, the habitat of the blue duck consists of swift water with an abundance of freshwater insects.

Invertebrate

An animal that has no backbone or spinal column. Invertebrates make up the biggest number of animal species. Insects, worms, slaters, snails and many marine animals such as corals, sponges and jellyfish are examples of invertebrates.

Macroinvertebrate Community Index (MCI)

MCI stands for Macroinvertebrate Community Index which is an indicator of general river health: excellent >119; good 100-119; fair 80-99; poor <80. It is a qualitative sampling method, which means it will tell you which species are present or absent in your sample. If you want to know the abundance (i.e., how many) of a certain species are in your sample, you will need to use the Quantitative MCI (QMCI) sampling method.

Nitrogen

Nutrient is essential for plant and animal life. Too much can cause large amounts of weeds and algae to grow, harming river health. In some forms it can be toxic to fish and other aquatic animals.

Ammoniacal nitrogen

Covers two forms of nitrogen: ammonia and ammonium. Animal waste (particularly from humans and farmed animals such as sheep and cows) is the major source of ammoniacal nitrogen in New Zealand waterways. If ammoniacal nitrogen reaches very high concentrations it can become toxic under certain temperature and pH conditions.

Dissolved inorganic nitrogen (DIN)

This is the sum of nitrite (NO₂), nitrate (NO₃) and ammonia (NH₃). These forms of nitrogen are readily available to phytoplankton and often control the formation of blooms.

Nitrite-nitrogen

Nitrite is an ion with the chemical formula NO_2^- . Concentrations of nitrite are normally low compared to the other forms of nitrogen (nitrate and ammoniacal nitrogen).

Nitrate-nitrogen (nitrate)

A highly soluble form of nitrogen that is both a nutrient and, in excess quantities, a toxic substance.

Ammoniacal nitrogen is converted to nitrate-nitrogen in soils, from where it can then leach into waterways. Nitrate is a plant fertiliser, however, due to its high solubility in water, it is one of the most common contaminants in rural and urban areas.

Nitrite Nitrate Nitrogen

Nitrite Nitrate Nitrogen is a combination of nitrate nitrogen (NO_3^-) and nitrite nitrogen (NO_2^-). Nitrite nitrogen is typically low in riverine systems due to oxidation to nitrate, so NNN is usually an accurate measurement of nitrate nitrogen.

Nitrate comes from the oxidation of ammoniacal nitrogen ($\text{NH}_4\text{-N}$) in soils, and can easily leach into waterways given its negative polarity. Nitrate is a plant fertiliser; however, due to its high solubility in water, it is one of the most common contaminants in rural and suburban areas. It is also toxic at very high concentrations and is measured in mg/L.

Total Nitrogen (TN)

Total Nitrogen is a measure of all organic and inorganic forms of nitrogen that are found in a sample. High total nitrogen can be a cause of eutrophication in lakes, estuaries and coastal waters and can cause algal blooms.

pH

The degree of acidity or alkalinity as measured on a scale of 0 to 14 where 7 is neutral, less than 7 is more acidic, and greater than 7 is more alkaline. Most natural waters fall within the slightly alkaline range between pH 6.5 to 8.0 and in the absence of contaminants most waters maintain a pH value that varies only a few tenths of a pH unit.

Phosphorus

Nutrient essential for plant and animal life. Too much can cause large amounts of weeds and algae to grow, harming river health.

Increased phosphorus levels often come from runoff from pastures, crops and lawns that have been fertilised. Phosphorus is measured either as 'total phosphorus' (TP), or 'dissolved reactive phosphorus' (DRP).

Dissolved reactive phosphorus (DRP)

This is a measure of the dissolved (soluble) phosphorus compounds that are readily available for use by plants and algae. Dissolved reactive phosphorus concentrations are an indication of a waterbody's ability to support nuisance algal or plant growths (algal blooms).

Total Phosphorus (TP)

Total phosphorus is a measure of all forms of phosphorus that are found in a sample, including dissolved and particulate, organic and inorganic. High levels of total phosphorus in water can come from either wastewater or run-off from agricultural land. Too much phosphorus can encourage the growth of nuisance plants such as algal blooms.

Sediment

Sediment refers to the small bits of soil, plant and/or animal matter that are transported by water, either in suspension or by movement in the river bed. Fine sediment, which is smaller than 2mm, can fill up the small spaces between rocks and make the habitat unsuitable for fish and macroinvertebrates to live in.

Total Suspended Solids

Particles of silt, clay, or organic matter suspended in the water column.

Turbidity

Turbidity is an index of cloudiness of water. It measures the scattering of light caused by fine particles in our waterways. Turbid water with high turbidity can be caused by heavy rainfall, disturbance of the riverbed or bank by heavy machinery or through direct discharges. Turbidity is measured in nephelometric turbidity units (NTU).

Water Temperature

Temperature impacts both the chemical and biological characteristics of water. It affects the dissolved oxygen level in the water, photosynthesis of aquatic plants, metabolic rates of aquatic organisms, and the sensitivity of these organisms to pollution, parasites and disease.