

What is Wai Care?

Wai Care is a water quality monitoring, education and action programme delivered by the Auckland Council. Wai Care aims to work together with individuals, community groups, schools, businesses and private landowners to become active in the protection, health and management of local waterways and catchments across the Auckland region.

The Wai Care programme supports and enables local communities by providing waterway education, scientific methods and resources to learn about and take care of local waterways and catchments. Wai Care takes a 'mountains to the sea' or catchment-based approach, as we need to care for our waterways from their origin in the mountains to where they terminate in the harbour or sea. Healthy streams and catchments mean healthy communities.

Wai Care Vision - Together for healthy waterways

Information about the tests:

pH:

pH is a measure of acidity or alkalinity of the water – a neutral pH of 7 is optimal for our streams to be healthy. Anything greater than 8 or lower than 5.5 would indicate that some sort of pollution may have taken place and the pollution hotline should be called.

Concrete washings are one of the worst pollutants to affect pH increasing it to levels (10+) and can cause major fish kills.

Why high or low pH can be a problem:

- Acid water causes fish and other aquatic organisms to suffer from skin irritations, tumours, ulcers and impaired gill functioning
- Alkaline water irritates sensitive membranes such as skin or gills
- Extremely high or low pH levels will lead to death of aquatic life



Temperature:

Optimal habitat for out freshwater macroinvertebrates (bugs) and fish is cool, shaded, clear, fast flowing water. The oxygen that they breathe (dissolved in the water) is affected by temperature – the cooler the water the more oxygen can remain dissolved, the warmer the water the less oxygen remains in the water and in addition to this, the bugs become more active in warmer water increasing their need for oxygen.

Why high water temperature can be a problem:

- Warmer water will stress most aquatic animals and then they become vulnerable to disease and other problems
- 'Sensitive' water bugs aren't generally found in water warmer than 19 degrees
- Temperatures above 21 degrees will kill many water bugs and fish



Clarity:

The clarity test is looking for an indication of how much sediment is suspended in the water. Sediment is one of the most underestimated of pollutants as its effects are long lasting and wide-reaching.

Why sediment can be a problem:

- Aquatic animals suffer from blocked gills
- Habitats are silted up making them unsuitable for many animals
- Fish egg hatching and larval development is interfered with
- Water heats up because murky water absorbs more sunlight
- Reduced light means that less photosynthesis occurs in plants, so less oxygen is produced
- Animals that rely on vision to catch prey are less successful (and hungry)



Dissolved Oxygen (DO):

As mentioned in the temperature section, dissolved oxygen is very important for the survival of our freshwater fish and bugs in our streams. Cool, clear fast flowing water keeps dissolved oxygen levels high thus riparian planting is essential to provide shade for the stream.

Why low dissolved oxygen can be a problem:

- Low dissolved oxygen may result in loss of the more 'sensitive' species including mayflies, stoneflies and caddisflies
- At very low DO levels, only a very few hardy species such as midge larvae may be present, but these are often present in great abundance
- Nuisance algae and anaerobic organisms (that live without oxygen) may also become more prolific



Nitrates/Nitrites:

This is a test for nutrients in the water – nitrogen based nutrients can enter the water through serious pollution events (eg. Effluent or fertilizer run-off), or by less obvious means such as rotting plant matter (eg dumped weeds or grass clippings).

Why high nitrate levels can be a problem:

- Nitrate is a plant nutrient and as such will cause an increase in the growth of algae (blooms) and other aquatic plants. Abundant growth/blooms may restrict flow and lead to increased water temperature and pH
- Dissolved oxygen is depleted as plant matter rots

Why high nitrite levels can be a problem:

- Nitrite is a useful indicator of the proximity of a waste source as it is rapidly converted to nitrate under normal conditions



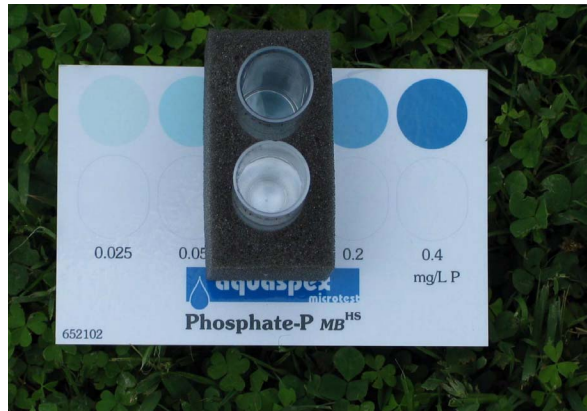
Phosphate/phosphorous:

This is a test for another type of dissolved nutrient. Phosphorous enters the water through sewage/animal effluent, through fertilizer run-off, plant or animal decay, and in more often in urban environments through detergents being washed down stormwater drains (eg. washing a car on the street/pavement). It can also be carried into the water bonded to soil particles (through erosion and sediment run-off) and can naturally leach out of rock substrates and soils.

Both phosphorus and nitrate are required to stimulate excessive plant growth so problems are more likely where both are present. Also test for nitrate levels and look for signs of excessive growth of algae and stream plants (periphyton and macrophytes). Phosphate/phosphorous is a plant nutrient and is often a 'limiting factor' for plant growth.

Why high phosphate/phosphorous can be a problem:

- Increase in the growth of algae (blooms) and other aquatic plants. Abundant growth of aquatic plants may choke the waterway, restricting flow and reducing penetration of light leading to increased water temperature
- Depletion of DO due to night time respiration and as plant matter decomposes
- Eutrophication
- Altered habitat leading to reduced aquatic animal and plant diversity



Interpreting the macroinvertebrate sample:

The type of macroinvertebrates ('bugs') found in a stream provides an overall picture of stream health as there is a range of species, some of which are more sensitive to changes in optimal stream health and condition, thus in healthy streams a wider range of bugs (including the more sensitive species eg. Mayflies, stoneflies and caddisflies) will be found in the sample. Stream health can be influenced and impacted by the following:

- Pollution from stormwater run-off, washing of pollutants down stormwater drains (even simple detergent from washing the car is extremely harmful to stream life) and uncontrolled washing of sediment into the stormwater system (thus into drains, streams and ultimately the sea) due to earthworks, riparian clearance, and erosion.
- Trampling of stream edges and in-stream habitat by stock leads to pugging and changes in habitat type (eg. Stream to bog), to full-scale habitat loss. Banks become more susceptible to erosion and sediment is more likely to be washed in and away, and suspended in the water column. Only the most tolerant of bugs

