

# Stream Monitoring Kit

## Why do stream monitoring?

Take Action is all about looking after streams – but first we need to find out the health of our stream. There are some easy tests anyone can do – children especially enjoy them.

You can take your class on a day-long field trip to find out the state of a local stream. It's fun, rewarding and easy to organise.

The stream monitoring kit has been designed for teachers to run their own field trip independent of the Action Crew. You don't need an expert to help you! Anybody can test a stream and find out how healthy it is.

## What is included in this kit?

You simply test a number of indicators using the 'Stream Report Card', the most important being, what is living in the stream.

The following 6 instruction sheets show you how to use these indicators. They include:

- Macro-invertebrate identification
- Algae identification
- Temperature
- Water clarity
- Stream cover and erosion
- Water colour and smell

## Where is a good site for stream monitoring?

The Action Crew can suggest possible field trip sites (call us on 04 384 5708). We have already identified a number of sites around Wellington Region that would be suitable for school field trips. However, all sites should be checked prior to going on the field trip. We recommend visiting 2 local streams, one which is fairly healthy and another which is less healthy, so that the students can compare findings. It will be a full day!

## What are the risk management issues?

We can also provide an example of a 'Risk Assessment and Management System'. This gives you a start on considering the health and safety issues involved. Every teacher will need to undertake their own RAMS sheet as required by their school – but we can at least provide a start point.

For safety reasons we suggest that only adults enter the stream. The health and safety of the students is the responsibility of the school at all times.



# Macroinvertebrate Identification

## Why measure macroinvertebrates?

Macroinvertebrates are the tiny (macroscopic) animals that live in the stream. Different species of macroinvertebrates can survive in different levels of pollution. By identifying which species are living in a waterway, you can tell how healthy or polluted the water is.

Macroinvertebrates are one of the best indicators of stream health.

## How to measure macroinvertebrates

1. Take 1 or 2 rocks from streambed and carefully place into white tray (adult task).
2. Sluice rocks gently with water from bottles to wash any macroinvertebrates onto tray.
3. Use your magnifying glass and identification chart to identify each macroinvertebrate.
4. Use the scoring system to determine the health of the stream.



## Scoring system

**Excellent** = Lots of mayflies, large stoneflies and lots of other species

**Good** = A few mayflies, large stoneflies and other species

**Fair** = No mayflies or large stoneflies but some other species

**Poor** = Only worms and snails, and hardly anything else

**NB:** Number of macroinvertebrates and diversity of species is important. A really healthy stream will have about 5-10 macroinvertebrates scuttling around each rock.

## Discussion points:

What causes macroinvertebrates to die?

What effect does this have on the health of the stream?

How could this be prevented?



# Algae Identification

## Why measure algae?

Algae are the tiny green, red or brown plants that live on the rocks in the stream. By looking at the length, colour and spread of the algae we can tell how healthy the stream is.

In a healthy stream, algae will be grazed by the macroinvertebrates and kept to a thin film covering the rocks. If there is too much algae this is usually a sign of excess nutrients in the stream. These nutrients could come from a number of sources, such as leaking sewerage pipes or fertilisers. They can increase due to low or slow flowing water and high stream temperatures.

## How to measure algae

1. Stand by edge of stream and look at the algae on streambed rocks. Or remove some algae-covered rocks from the stream (adult task) and study with a magnifying lens.
2. Use algae identification chart to determine algae size.
3. Use the following scoring system to determine the health of the stream.



## Scoring System

**Excellent** = Thin film or mat

**Good** = Medium film or mat

**Fair** = Thick mat

**Poor** = Long filaments

## Discussion points:

What causes algae to grow too large?

What effect does this have on the health of the stream?

How could this be prevented?



# Water Clarity / Turbidity Tube

## Why measure water clarity?

Looking to see how clear the water is (water clarity) is a good way to measure the levels of sediment pollution in a stream. If there is a lot of sediment (tiny bits of soil, gravel, dust etc) in the water it will be hard to see through the water. A turbidity tube is a special instrument used to measure how far you can see through the water.

## How to measure water clarity

1. Get the turbidity tube ready by putting the magnet with black dish (dish faces end without lid) on the inside of the turbidity tube and the other one on outside of tube.
2. While standing in the stream or on the stream bank, face upstream and dip the turbidity tube into water until full. Try not to get any sediment you stir up into the tube. (adult task)
3. Move the magnets to zero end (opposite end to rubber cap).
4. Hold tube horizontally at eye level and look through the end without the cap. Move magnet back slowly until edge of black disc starts to become unclear (blurry).
5. Read the measurement on the ruler and use the scoring system to determine



## Scoring system

**Excellent** = 80 – 100 cm

**Good** = 50 – 80 cm

**Fair** = 25 – 50 cm

**Poor** = 0 – 25 cm

## Discussion points:

What causes murky or muddy or unclear water?

What effect does this have on the health of the stream?

How could this be prevented?



# Temperature

## Why measure temperature?

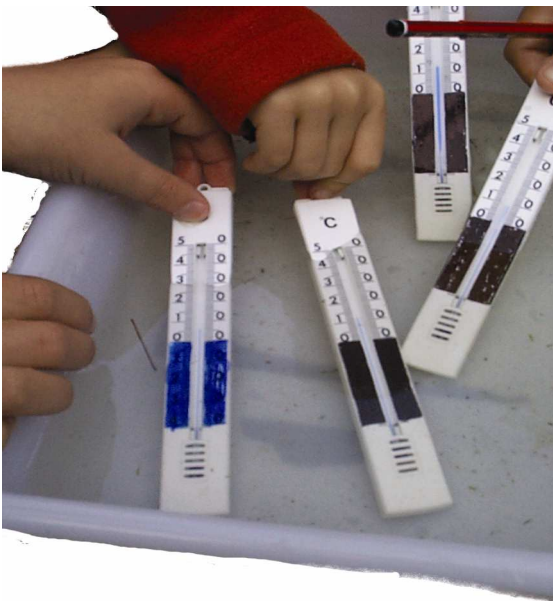
Taking the temperature of a stream can tell us whether the stream is healthy or not, just as taking a person's temperature can tell us about their health.

Streams need to be cold so that the macroinvertebrates and fish living in them can survive. If the stream is too hot, the algae may overgrow and cause problems.

Lack of shade, low water levels and particles in the water can lead to the increase in water temperature of a stream

## How to measure temperature

1. Fill a container with stream water (adult)
2. Hold thermometer at top
3. Dip thermometer in water until grate is submerged (approximately 1 minute)
4. Take thermometer out and record the measurement



## Scoring system

**Excellent** = Below 15°C

**Good** = 15°C – 18°C

**Fair** = 18°C – 20°C

**Poor** = Above 20°C

## Discussion points:

What causes streams to become too warm?

What effect does this have on the health of the stream?

How could this be prevented?



# Stream Cover and Erosion

## Why measure stream cover and erosion?

Stream cover is simply how many trees and plants are providing shade along the edges of the stream bank. Stream cover keeps the temperature of the stream cold and consistent. The trees also prevent erosion of the soil on the stream banks. Erosion creates problems in the stream water quality. Therefore a visual check for signs of good stream cover and no erosion is a way to measure stream health.

## How to measure stream cover and erosion

1. Stand by edge of stream and look along stream banks
2. Look for signs of stream bank erosion and decide how abundant tree cover is (shade)



### Stream cover:

**Excellent** = Lots of trees covering the stream

**Good** = Some trees covering the stream

**Fair** = Few trees covering the stream

**Poor** = No trees covering the stream

### Erosion:

**Excellent** = No evidence of erosion

**Good** = A small amount of erosion evident

**Fair** = Some evidence of erosion

**Poor** = A lot of evidence of erosion

## Discussion points:

What causes smelly or dirty water?

What effect does this have on the health of the stream?

How could this be prevented?



# Water Colour and Smell

## Why measure water colour and smell?

Water colour and smell are two very simple tests that we can do using our eyes and ears to tell the health of a stream. Some kinds of pollution are easily seen such as paint, oil, or detergents and many can be smelt, such as oil or sewage. However, we shouldn't forget that there are many pollutants that cannot be seen and smelt such as some chemicals, heavy metals or bacteria. That is why we need a number of stream health indicators to test streams.

## How to measure water colour and smell

1. Fill a white tray with water from middle of stream. Be careful not to stir up any sediment as you do this (adult task).
2. Use your eyes and nose to assess colour and odour of stream.



## Scoring system

### Colour:

**Excellent** = Clean, clear water

**Good** = Slightly murky water

**Fair** = Murky water

**Poor** = Oily, foamy or strongly coloured water

### Smell:

**Excellent** = No smell

**Good** = Faint smell

**Fair** = Some smell

**Poor** = Strong smell

## Discussion points:

What causes smelly or dirty water?

What effect does this have on the health of the stream?

How could this be prevented?

