Macroinvertebrate sampling and waterway health

Sampling will reveal information about the abundance and diversity of macroinvertebrates and their tolerance to pollution. This will provide an indication of the health of the waterway.

**ABUNDANCE** = the total number of macroinvertebrates present

**DIVERSITY** = the number of different types of bugs present. Healthy streams usually have a greater diversity of bug types

**POLLUTION TOLERANCE** = the ability of macroinvertebrates to withstand pollution. This is reflected by its SIGNAL 2 score based on their sensitivity to pollution.

**STREAM POLLUTION INDEX** = calculation based on the abundance and diversity of bugs and their SIGNAL 2 score.

**HEALTHY WATERWAYS** = a high SIGNAL score and a large number of bug types

**Very Sensitive Bugs - 10,9**

**Stonefly nymph**
Order: Plecoptera
Description: Two thin tails and gills extending from their abdomen.
Habitat: Found among stones or plants, in fast-moving waters.
Maximum size: 7-12 mm

**Maggot**
Order: Megaloptera
Description: Their bodies are flabby with a hard-shelled head.
Habitat: Found among rocks, in a variety of flow conditions.
Maximum size: Up to 20 mm

**Water mite**
Order: Acarina
Description: Mites usually have simple rounded bodies with eight legs.
Habitat: Found among plants or stones on the stream bed in standing or slow-moving waters.
Maximum size: Up to 5 mm

**Riffle beetle and larva**
Order: Coleoptera
Description: Beetle-like, tiny and usually black. Larvae have circular stripes or rings.
Habitat: Fast flowing water.
Maximum size: Up to 4 mm

**Mayfly nymph**
Order: Ephemeroptera
Description: Three long thin tails and gills along the sides of their bodies.
Habitat: Found on or under rocks or among plants and leaf litter in standing water and fast flowing streams.
Maximum size: Up to 15 mm

**Whirligig beetle and larva**
Order: Coleoptera
Description: A streamlined oval beetle that swims in circles.
Habitat: Found on the surface around the edges of ponds an streams.
Maximum size: 5-25 mm

**Difficult to identify**

**Sensitive Bugs - 8,7,6**

**Alderfly larva**
Order: Megaloptera
Description: Their bodies are flabby with a hard-shelled head.
Habitat: Found among rocks, in a variety of flow conditions.
Maximum size: Up to 20 mm

**Caddisfly larva**
Order: Trichoptera
Description: They are often enclosed within a case of twigs and plant material or silk.
Habitat: Found among sediment and rocks in streams, ponds and lakes.
Maximum size: Up to 20 mm

**Water strider**
Order: Hemiptera
Description: Flat spider appearance with long pairs of middle and hind legs.
Habitat: Found on the surface of slow moving rivers and streams.
Maximum size: 8-12 mm

**Tolerant Bugs - 5,4,3**

**Beetle larvae**
Order: Coleoptera
Description: Larvae are usually elongated with well-developed legs and a large head.
Habitat: A variety of habitats including still waters or quiet areas of flowing water.
Maximum size: Up to 35 mm

**Dragonfly nymph**
Order: Odonata
Description: Stout bodies, no external gills and extendable mouth parts.
Habitat: Found within the substrate of rivers and streams.
Maximum size: 12-50 mm

**Fly larva and pupa**
Order: Diptera
Description: Larva usually have an elongated body with a small head. They do not have true legs.
Habitat: Found in shallow regions of ponds and stream amongst mud and detritus.
Maximum size: Up to 30 mm

**Midge larva and pupa**
Order: Diptera
Description: Often small and C shaped.
Habitat: Attached to debris by their tiny legs and can be found anywhere that water collects.
Maximum size: Up to 50 mm

**Freshwater mussel**
Class: Bivalvia
Description: Freshwater mussels have paired hard shells (valves) with a flabby body between them.
Habitat: Found in or on sandy or muddy stream beds.
Maximum size: Up to 150 mm

**Freshwater yabbie/crayfish**
Order: Decapoda
Description: Fan tailed with well developed claws and prominent front end.
Habitat: Slow flowing and still waters and burrow into sediment.
Maximum size: Up to 400 mm

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Environment, Climate Change & Water
**Tolerant Bugs - 5,4,3**

- **Nematode**
  - **Order:** Nematoda
  - **Description:** Thin elongated worms without segments and can look translucent.
  - **Habitat:** Burrow into the substrate.
  - **Maximum size:** Up to 12 mm

- **Freshwater sandhopper**
  - **Order:** Amphipoda
  - **Description:** Slightly curled and flattened sideways and have hard segments each with a pair of legs for swimming or walking.
  - **Habitat:** The edges of slow moving water amongst plants and stones.
  - **Maximum size:** 6-20 mm

- **Freshwater shrimp**
  - **Order:** Decapoda
  - **Description:** Covered by a shell, fanned tail and stalked eyes. Tolerant of plants and rocks in permanent slow-moving waters.
  - **Maximum size:** Up to 35 mm

- **Water scorpion/Needle bug**
  - **Order:** Hemiptera
  - **Description:** Large grasping forelegs and short breathing tube at the end of their abdomen.
  - **Habitat:** Found among plants or on the water surface of slow-moving waters.
  - **Maximum size:** Up to 50 mm

**Very Tolerant Bugs - 2,1**

- **Diving beetle**
  - **Order:** Coleoptera
  - **Description:** Slightly curved and flattened body with stumpy, shiny black legs and body.
  - **Habitat:** A variety of habitats including still water or quiet areas of flowing water.
  - **Maximum size:** Up to 40 mm

- **Flatworm**
  - **Class:** Turbellaria
  - **Description:** Flat, thin, slow-moving worms with two simple eyes spots.
  - **Habitat:** Found gliding over rocks and plants in a variety of flow conditions.
  - **Maximum size:** Up to 20 mm

- **Hydra**
  - **Class:** Hydrozoa
  - **Description:** Hydras have a simple sack-like body with a mouth encircled by tentacles.
  - **Habitat:** Found attached to rocks, plants or twigs in fast flowing water.
  - **Maximum size:** Up to 30 mm

- **Water treader**
  - **Order:** Hemiptera
  - **Description:** Long middle and back legs, and thick body.
  - **Habitat:** Found on the water’s surface of slow flowing pools near banks and plants.
  - **Maximum size:** Up to 5 mm

- **Freshwater worm**
  - **Class:** Oligochaeta
  - **Description:** Segmented worms with rounded ends with no suckers or legs and usually coloured red or flesh coloured.
  - **Habitat:** Found in soft sediment rich in organic matter.
  - **Maximum size:** Up to 30 mm

**Freshwater slater**

- **Order:** Insecta
  - **Description:** Flat, crawl from top to bottom with no body carapace or shield.
  - **Habitat:** Found in still to slow-moving waters.
  - **Maximum size:** Up to 20 mm

**Bloodworm**

- **Order:** Diptera
  - **Description:** Worm-like and C shaped. Only the red ones are called Bloodworms.
  - **Habitat:** Found in soft sediment rich in organic matter.
  - **Maximum size:** Up to 20 mm

**Leech**

- **Class:** Hirudinea
  - **Description:** Leeches are soft-bodied animals made up of 32 segments with a sucker on one or both ends.
  - **Habitat:** Found in standing or slow moving water.
  - **Maximum size:** 7-80 mm

**Mosquito larva and pupa**

- **Order:** Diptera
  - **Description:** Thorax wider than the head and breathe through a long siphon at the end of the abdomen.
  - **Habitat:** Still water.
  - **Maximum size:** Up to 25 mm

**Freshwater snails**

- **Class:** Gastropoda
  - **Description:** Small snails are soft-bodied animals enclosed in a hard, protective, coiled shell.
  - **Habitat:** Found on plants and rocks in slow flowing water.
  - **Maximum size:** Up to 25 mm

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