

WATER BUG DETECTIVE GUIDE

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.

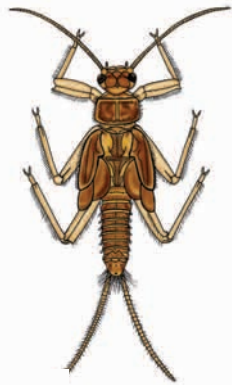
STREAM POLLUTION INDEX = calculation based on the abundance and diversity of bugs and their SIGNAL 2 score.

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

Very Sensitive Bugs - 10,9

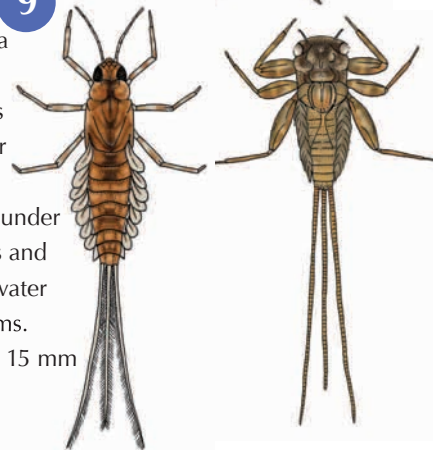
Stonefly nymph **10**

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



Mayfly nymph **9**

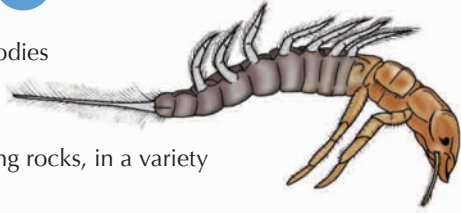
Order: Ephemeroptera
Description: Three long thin tails and gills along the sides of their bodies.
Habitat: Found on or under rocks or among plants and leaf litter in standing water and fast flowing streams.
Maximum size: Up to 15 mm



Sensitive Bugs - 8,7,6

Alderfly larva **8**

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



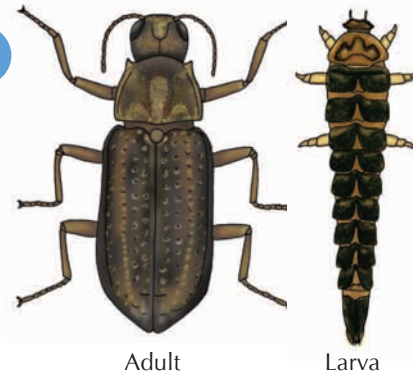
Caddisfly larva **8**

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



Riffle beetle and larva **7**

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



Water mite **6**

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



Tolerant Bugs - 5,4,3

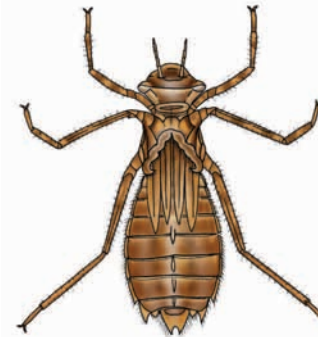
Beetle larvae **5**

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 **4**

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



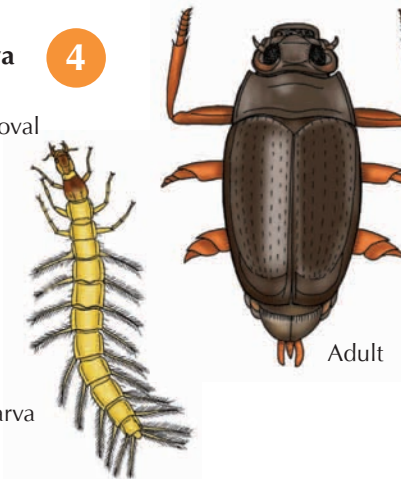
Water strider **4**

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



Whirligig beetle and larva **4**

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



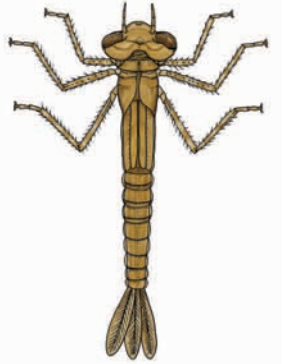
Freshwater yabby/crayfish **4**

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



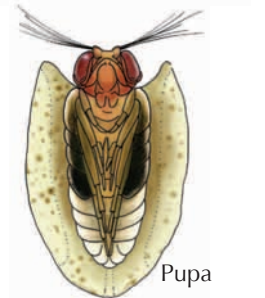
Damselfly nymph **3**

Order: Odonata
Description: Nymphs have three gill structures extending from the tail.
Habitat: Found on plants, among rocks and leaf litter or burrowing into the sediments.
Maximum size: 16-33 mm



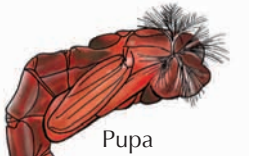
Fly larva and pupa **3**

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



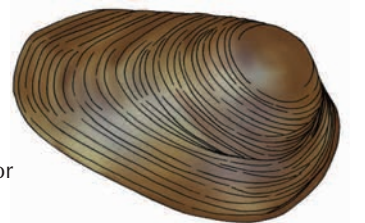
Midge larva and pupa **3**

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 **3**

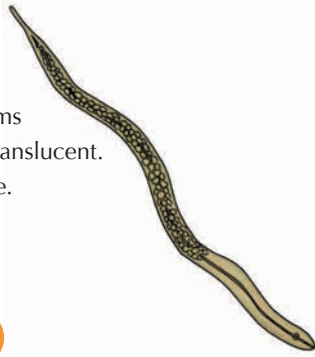
Class: Bivalvia
Description: Freshwater mussels have paired hard shells (valves) with a fleshy body between them.
Habitat: Found in or on sandy or muddy stream beds.
Maximum size: Up to 150 mm



Tolerant Bugs - 5,4,3

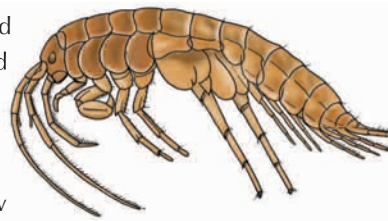
Nematode 3

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



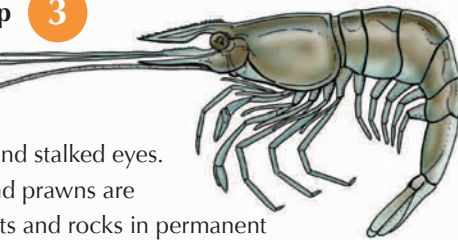
Freshwater sandhopper 3

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



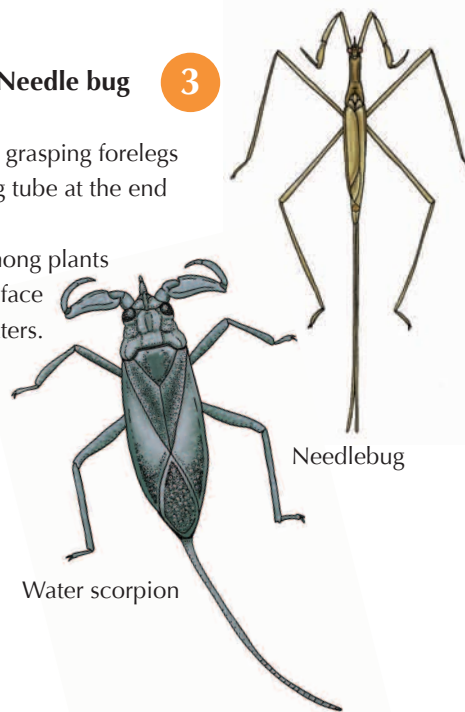
Freshwater shrimp 3

Order: Decapoda
Description: Covered by a shell, fanned tail and stalked eyes.
Habitat: Shrimps and prawns are found amongst plants and rocks in permanent slow-moving waters.
Maximum size: Up to 35 mm



Water scorpion/Needle bug 3

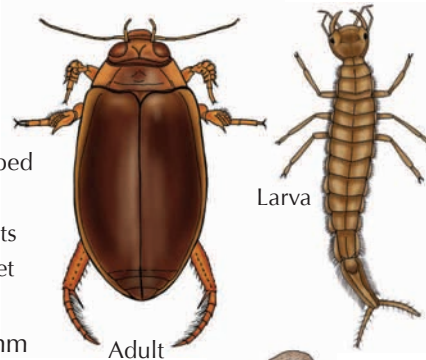
Order: Hemiptera
Description: Large grasping forelegs and short breathing tube at the end of their abdomen.
Habitat: Found among plants or on the water surface of slow-moving waters.
Maximum size: Up to 50 mm



Very Tolerant Bugs - 2,1

Diving beetle 2

Order: Coleoptera
Description: Sleek, shiny beetles with hard-shelled body and hairy paddle-shaped hind legs.
Habitat: A variety of habitats including still waters or quiet areas of flowing water.
Maximum size: Up to 40 mm



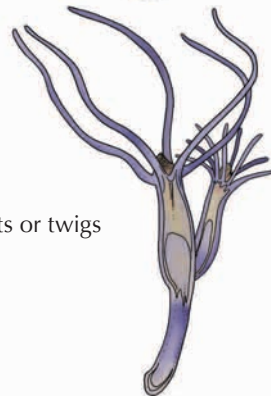
Flatworm 2

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



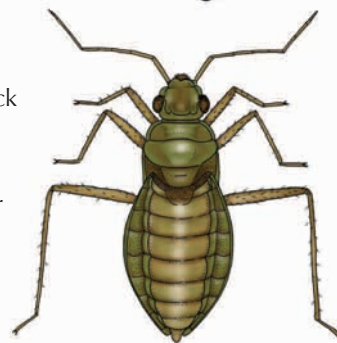
Hydra 2

Class: Hydrozoa
Description: Hydrazes 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 2

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



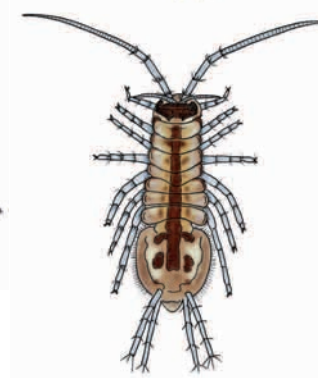
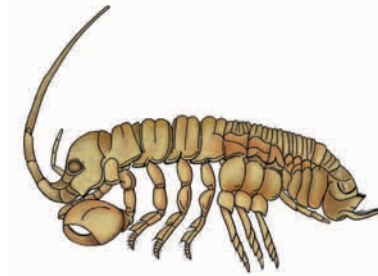
Freshwater worm 2

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



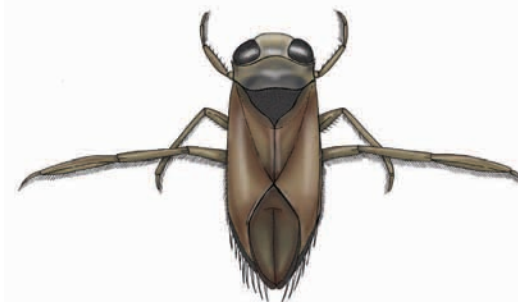
Freshwater slater 2

Order: Isopoda
Description: Flattened from top to bottom with no body carapace or shield.
Habitat: Found in still to slow-moving waters.
Maximum size: Up to 20 mm



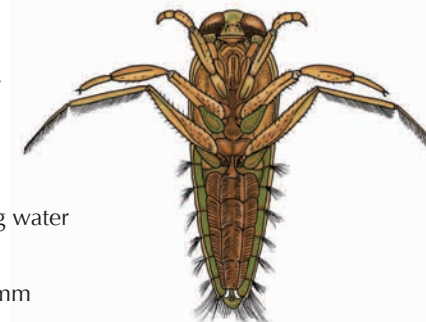
Waterboatman 2

Order: Hemiptera
Description: Boat-shaped with piercing mouth parts and boat shape appearance.
Habitat: Found among plants on the water surface or swimming freely in still to slow-moving waters.
Maximum size: Up to 10 mm



Backswimmer 2

Order: Hemiptera
Description: Curved back, large eyes, long hairy hind legs and swim on their backs.
Habitat: Found in standing water or slow flowing ponds.
Maximum size: Up to 11 mm



Bloodworm 1

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



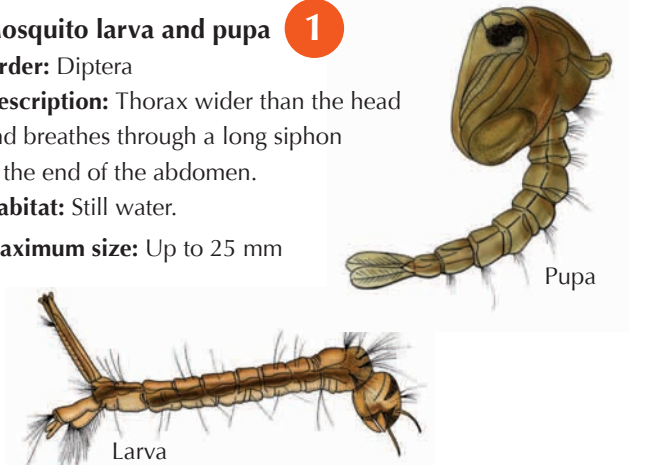
Leech 1

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 1

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



Freshwater snails 1

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

