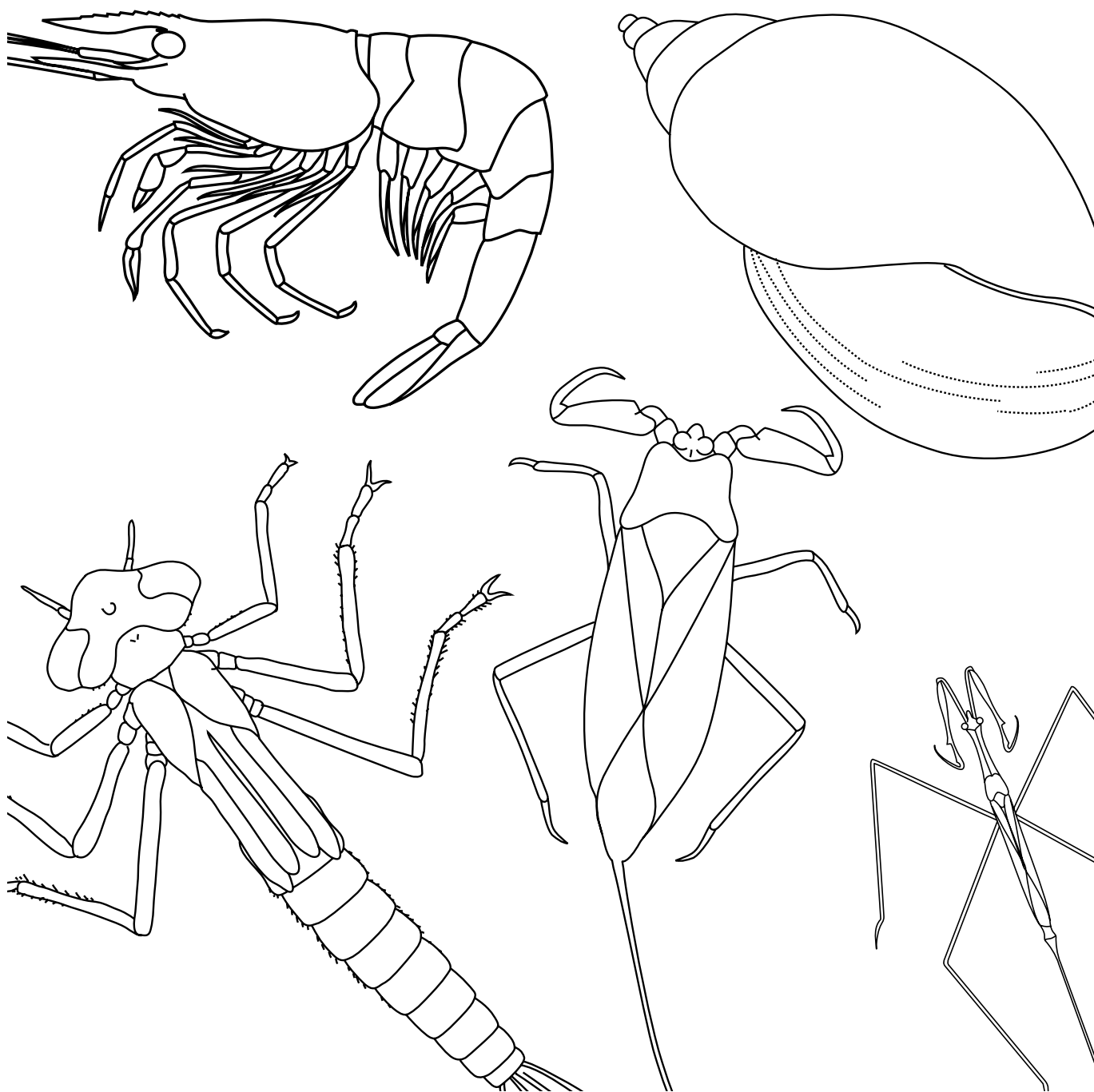


# Water bug and riparian vegetation snapshot - Part B

## Guide to identifying macro-invertebrates



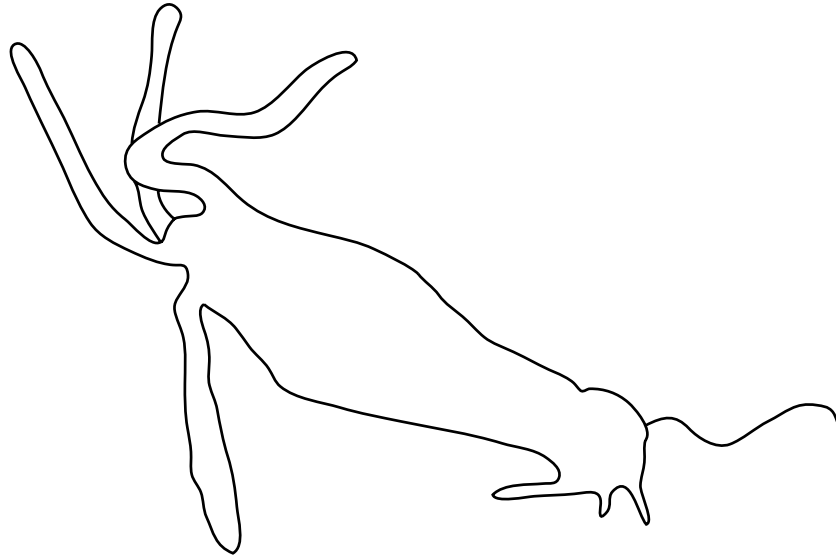
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## Acknowledgments

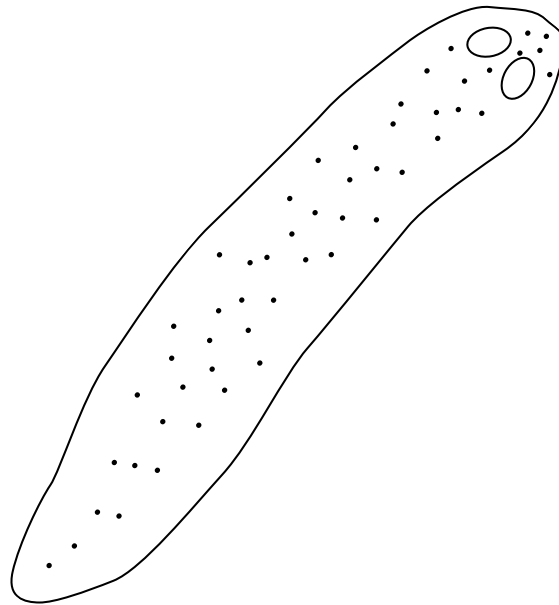
Many thanks to the New South Wales Department of Infrastructure, Planning and Natural Resources for allowing their images to be reproduced in this booklet.



## Hydra

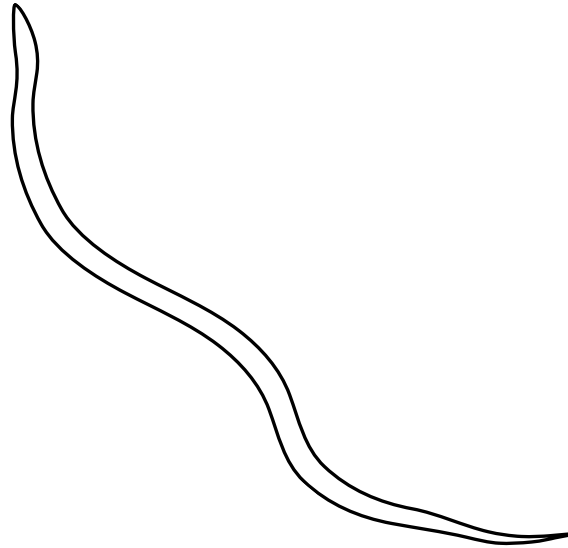
3

<b>Phylum</b>	Cnidaria
<b>Order</b>	Hydrozoa
<b>Families</b>	Hydridae and Clavidae
<b>Size</b>	1–25 mm long
<b>Habitat</b>	Shallow, turbulent or fast-moving water. They attach to stones, twigs or vegetation, and may live alone or in colonies
<b>Diet</b>	Carnivorous—small insects, copepods, aquatic worms and even small fish
<b>Features</b>	Three to eight tentacles; green, brown, white, grey, tan or red in colour



## Flatworm

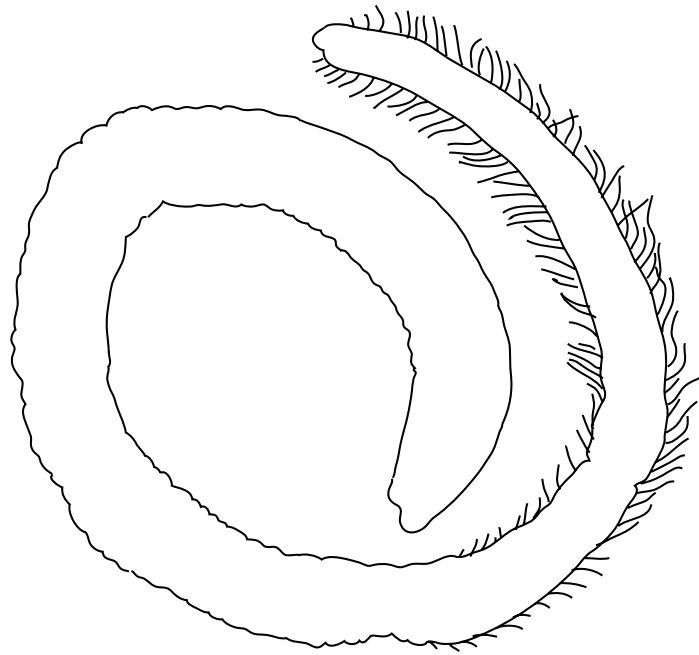
<b>Phylum</b>	Platyhelminthes
<b>Class</b>	Turbellaria
<b>Order</b>	Tricladida
<b>Size</b>	Up to 30 mm
<b>Habitat</b>	Substrate or the underside of the water surface film—in springs, ponds, brooks, ditches, marshes and lakes
<b>Diet</b>	Carnivorous—soft or decomposing animal matter
<b>Features</b>	Elongated body—flattened or cylindrical; dark eyes within white spots that can often be seen; blind gut that allows them to feed and remove waste from the same opening



## Round worm

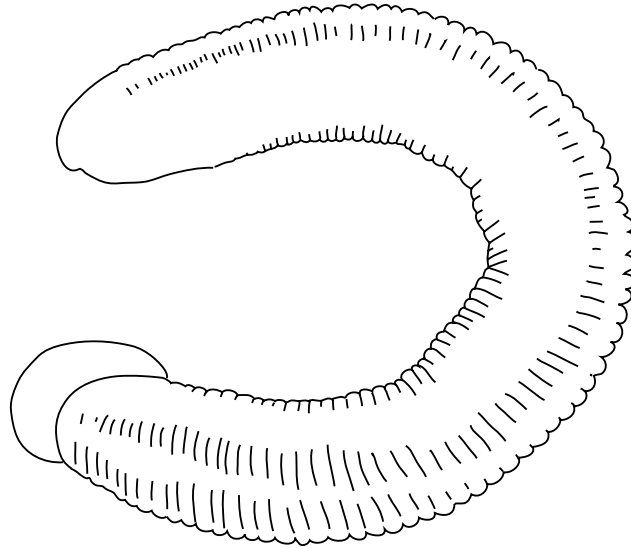
5

<b>Phylum</b>	Nematoda
<b>Orders</b>	Dorylaimida, Mononchida, Monhysterida, Tripylida
<b>Size</b>	Up to 12 mm
<b>Habitat</b>	Substrata of inland waters—either on or just above its surface, or burrowed in shallowly. May be found in large numbers in organically polluted waters
<b>Diet</b>	Omnivorous—all manner of organic matter, both dead and alive
<b>Features</b>	Thin, elongated, and cylindrical in cross section; posterior end tapers to a point; unlike segmented worms (Oligochaets) as they have no hairs or setae (needle-like structures); also called nematodes



## Freshwater segmented worm

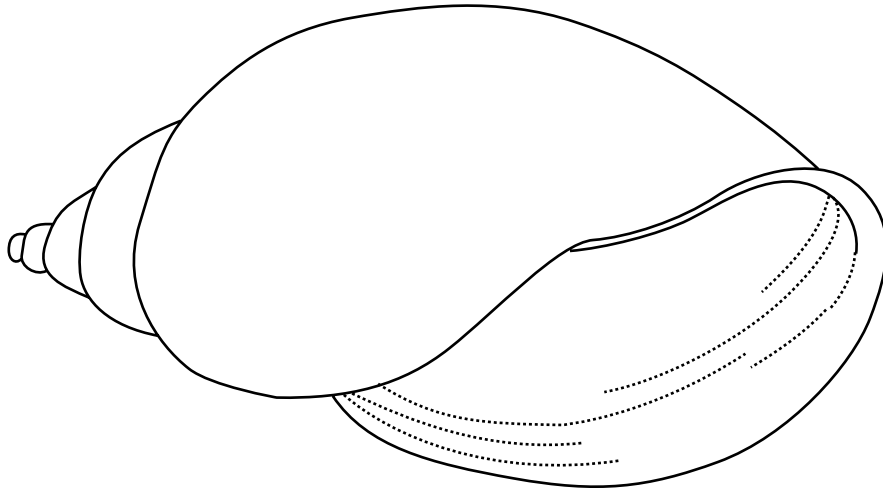
<b>Phylum</b>	Annelida
<b>Class</b>	Oligochaeta
<b>Family</b>	Seven families
<b>Size</b>	1–30 mm
<b>Habitat</b>	Almost all water bodies
<b>Diet</b>	Detritivorous and carnivorous—small pieces of dead and decomposing plants; animals including other invertebrates
<b>Features</b>	Usually red or brown; stiff, needle-like structures (setae) located on the top and bottom of each of the body segments; similar to earthworms in appearance and movement



## Leech

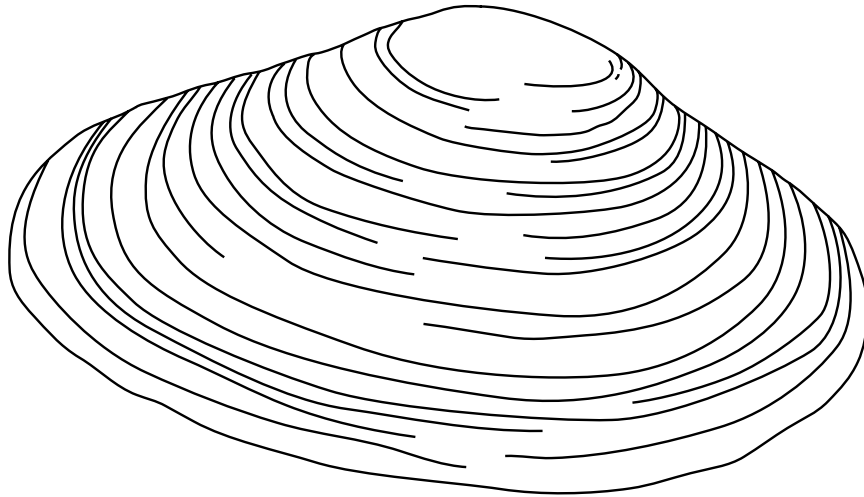
7

<b>Phylum</b>	Annelida
<b>Class</b>	Hirudinea
<b>Family</b>	Five families
<b>Size</b>	5–50 mm long
<b>Habitat</b>	Freshwater ponds, marshes, lakes and slow streams; among plants, stones and debris
<b>Diet</b>	Carnivorous and parasitic—animal matter, snails, insects and other small invertebrates; blood of frogs, fish and turtles
<b>Features</b>	Bodies with 34 segments; red, yellow and orange stripes; sucker located at the rear end of the body



## Freshwater snail

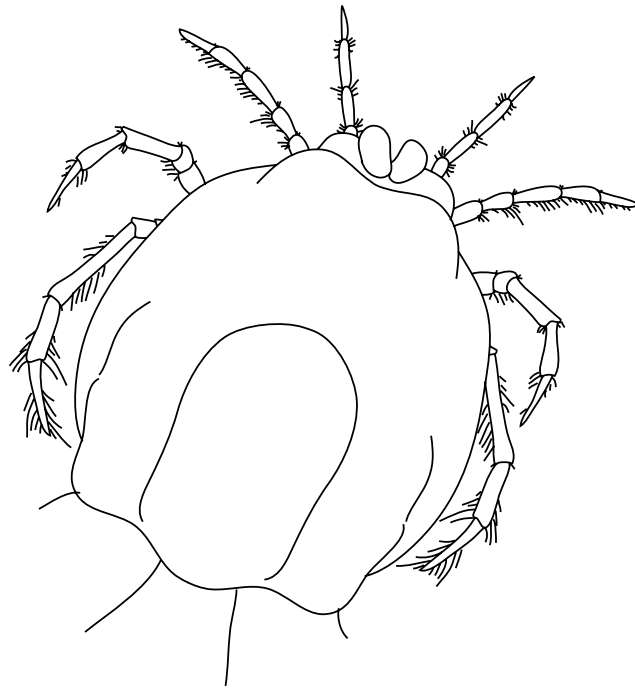
<b>Phylum</b>	Mollusca
<b>Class</b>	Gastropoda
<b>Families</b>	Twelve families
<b>Size</b>	3–65 mm in diameter
<b>Habitat</b>	Among weeds and stones in slow and still sections of the creek
<b>Diet</b>	Herbivorous—algae from the surface of rocks and plants
<b>Features</b>	Coiled or limpet-like shell



## Freshwater mussel

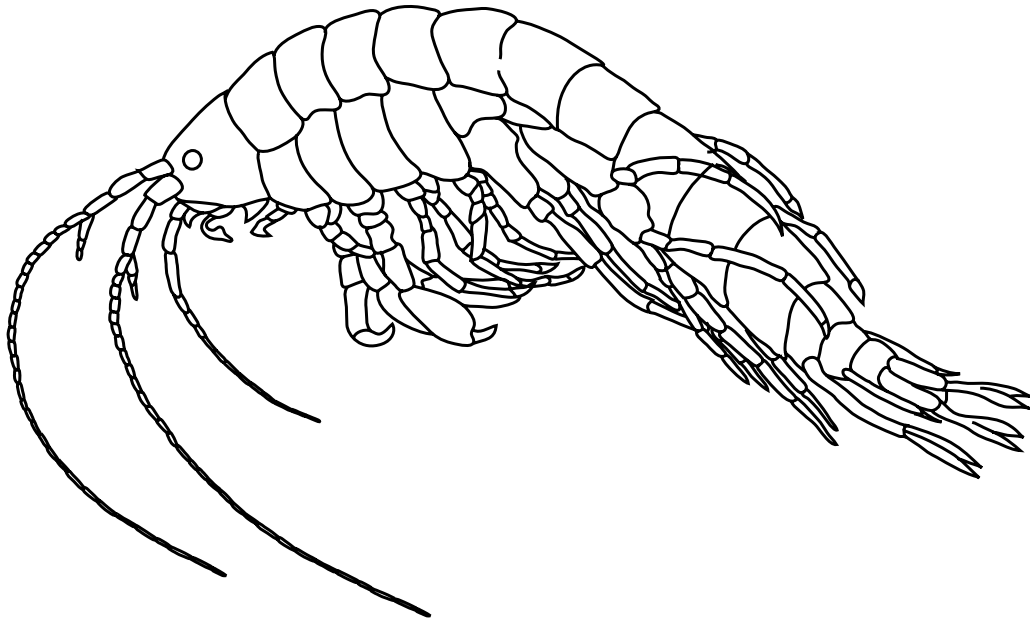
9

<b>Phylum</b>	Mollusca
<b>Class</b>	Bivalvia
<b>Families</b>	Hyriidae, Corbiculidae, Sphaeriidae
<b>Size</b>	10–150 mm
<b>Habitat</b>	Variety of unpolluted inland waters
<b>Diet</b>	Filter feeding—food particles such as zooplankton, phytoplankton, and organic detritus from the water
<b>Features</b>	Shell consists of two separate valves hinged together



## Water mite

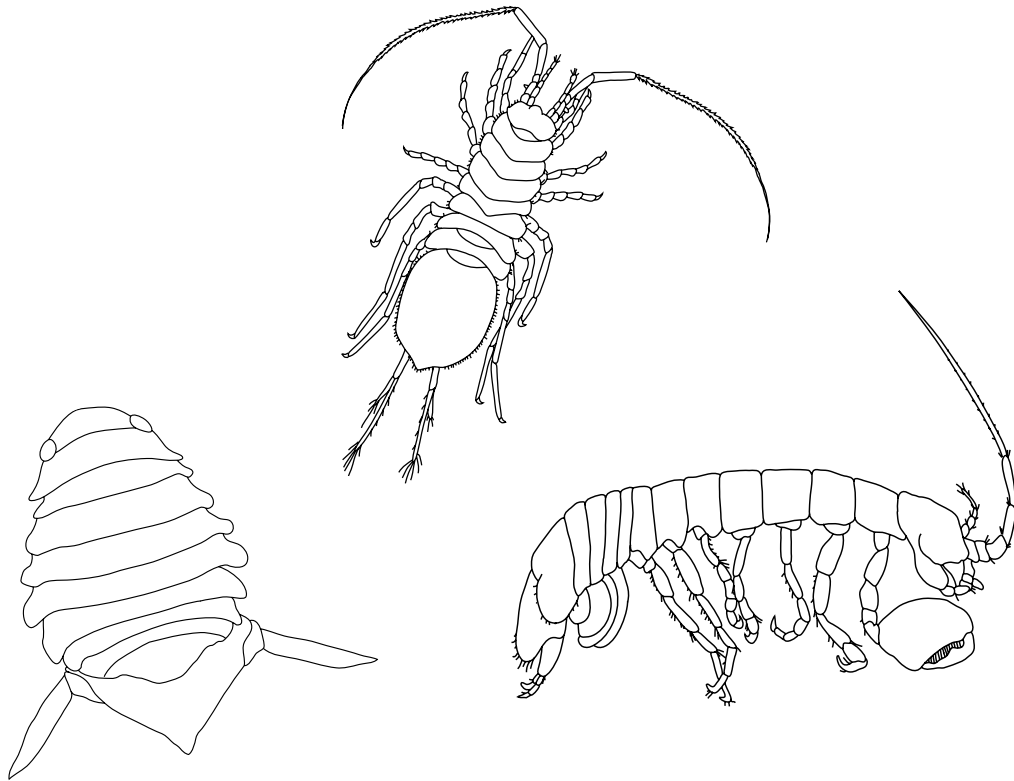
<b>Phylum</b>	Arthropoda
<b>Class</b>	Arachnida
<b>Order</b>	Acariformes
<b>Size</b>	Up to 2.5 mm
<b>Habitat</b>	Most abundant in fresh, standing water that is heavily vegetated, shallow and sheltered
<b>Diet</b>	Carnivorous, parasitic (piercing, sucking)—eat small animals, or are parasitic on other aquatic animals
<b>Features</b>	Four pairs of legs; another pair of appendages that are used for feeding; no antennae; can be brightly coloured; good swimmers



## Scud or side swimmer

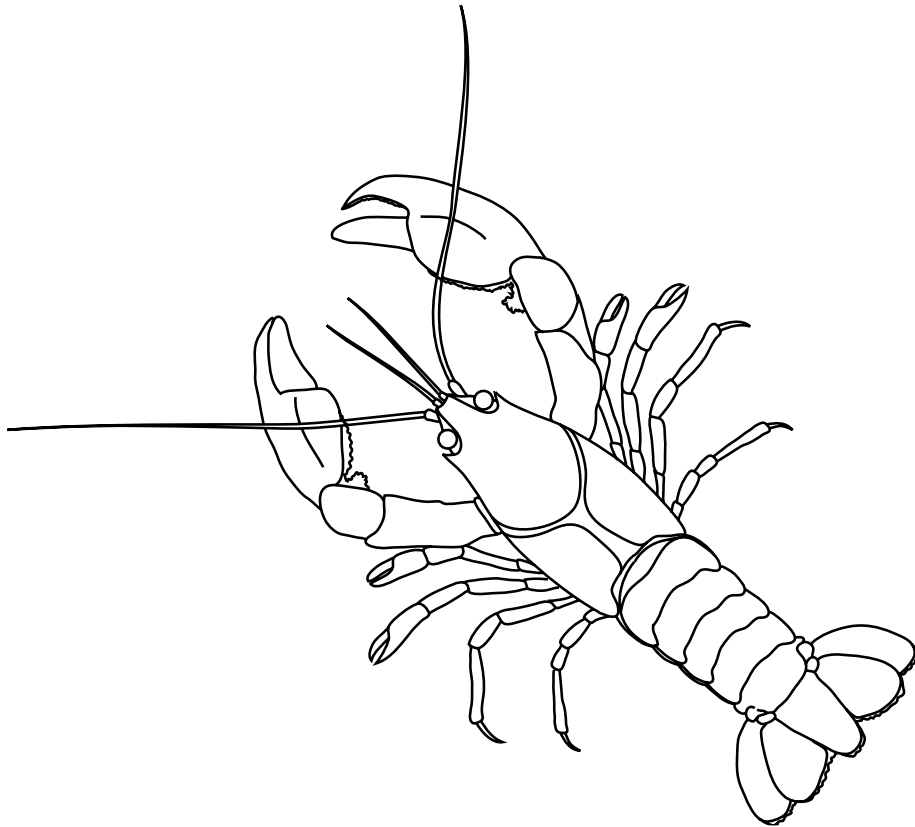
11

<b>Phylum</b>	Arthropoda
<b>Class</b>	Crustacea
<b>Order</b>	Amphipoda
<b>Family</b>	Eight families
<b>Size</b>	5–25 mm long
<b>Habitat</b>	Typically along the edges of streams; large numbers in the weedy habitat of wetlands; occasionally in ponds
<b>Diet</b>	Scavenger—any dead animals and aquatic vegetation
<b>Features</b>	Small, shrimp-like and fast-swimming; seven pairs of legs, the first two adapted for grasping; also known as freshwater sandhoppers



## Freshwater slater

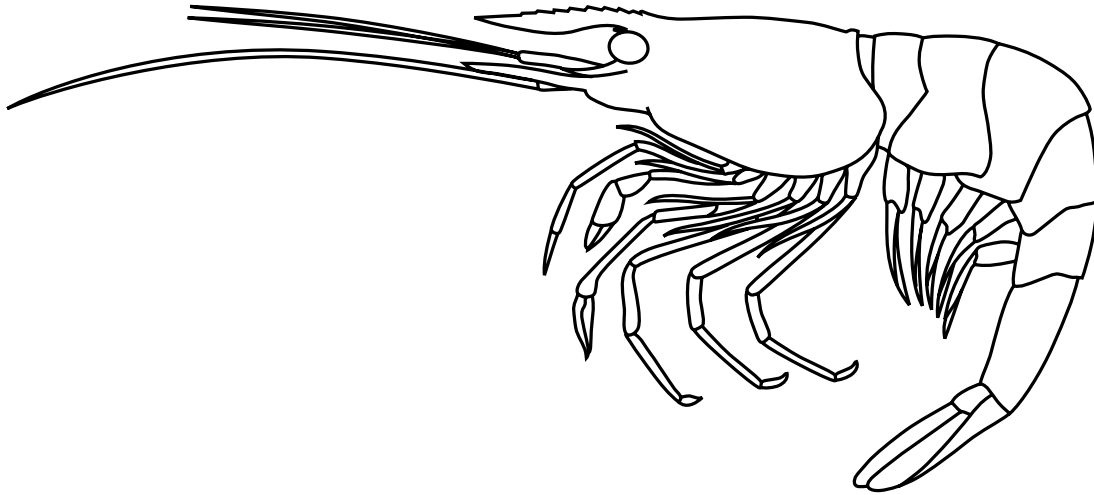
<b>Phylum</b>	Arthropoda
<b>Class</b>	Crustacea
<b>Order</b>	Isopoda
<b>Family</b>	Twelve families
<b>Size</b>	2–12 mm long
<b>Habitat</b>	Isopods inhabit a number of different environments including freshwater streams, pools and lakes and permanent inland saline waters
<b>Diet</b>	Detritivorous—small pieces of dead and decomposing plants and animals
<b>Features</b>	Distinct head and no body shield (carapace); seven pairs of walking legs; slow crawling movement



## Freshwater yabby

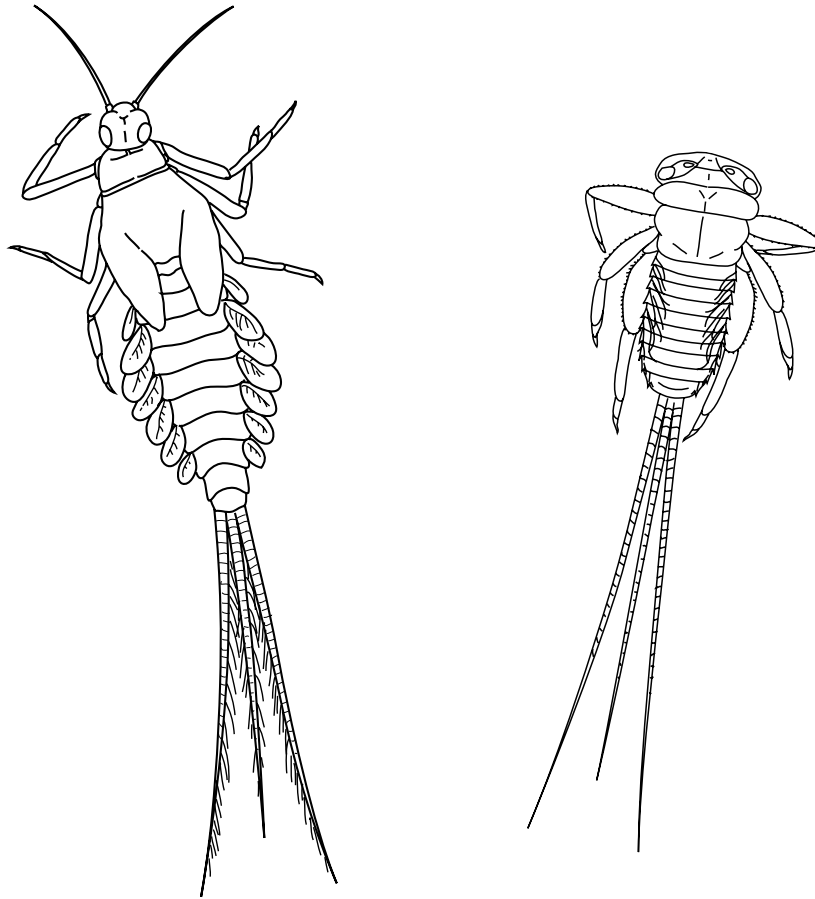
13

<b>Phylum</b>	Arthropoda
<b>Class</b>	Crustacea
<b>Order</b>	Decapoda
<b>Family</b>	Parastacidae
<b>Genus</b>	<i>Cherax</i> , <i>Euastacus</i> , <i>Tenuibranchiurus</i>
<b>Size</b>	15–20 cm long
<b>Habitat</b>	Slow-flowing and still water
<b>Diet</b>	Omnivorous—plant and animal matter
<b>Features</b>	Prominent beak-like extension at the front of the head; well-developed abdomen with tail fan (used to swim backwards quickly); well-developed legs and claws; tail without spines; dormant in burrows over winter and can survive in burrows if surface water dries out; can walk over land from one water body to the next



## Freshwater shrimp and prawn

<b>Phylum</b>	Arthropoda
<b>Class</b>	Crustacea
<b>Order</b>	Decapoda
<b>Families</b>	Atyidae and Palaemonidae
<b>Size</b>	Up to 65 mm
<b>Habitat</b>	Lowland rivers, streams and standing fresh waters.
<b>Diet</b>	Omnivorous—animal and plant material
<b>Features</b>	Fanned tail. <i>Shrimp</i> : bumpy appearance of rostrum; similar first two pairs of legs with tufts of long setae on their tips; crawl over creek bed, or beat abdomen to swim rapidly backwards. <i>Prawn</i> : elongated second pair of legs

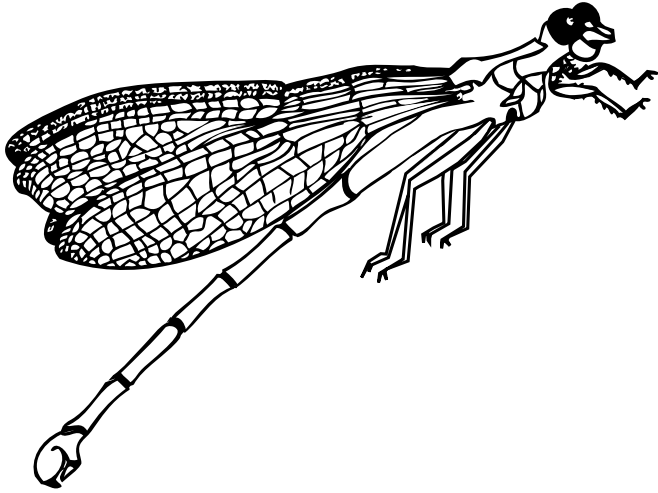


## Mayfly nymph

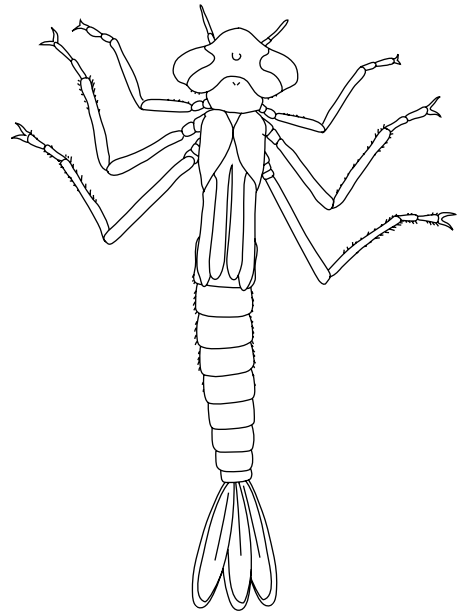
15

<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Ephemeroptera
<b>Family</b>	Nine families
<b>Size</b>	2–32 mm long
<b>Habitat</b>	Varies from standing water to rapids—streams, rivers, ponds, reservoirs, ditches and swamps; under rocks and logs in streams; free-swimming in ponds
<b>Diet</b>	Varies according to species—algal films scraped from the surface of reeds and rocks (herbivorous); small pieces of decaying animal and plant material (detritivorous—scavengers, shredders or collectors)
<b>Features</b>	Three long tails (cerci) at the end of the abdomen; gills on abdominal segments that can be waved through the water to gain oxygen

**Damselfly adult**

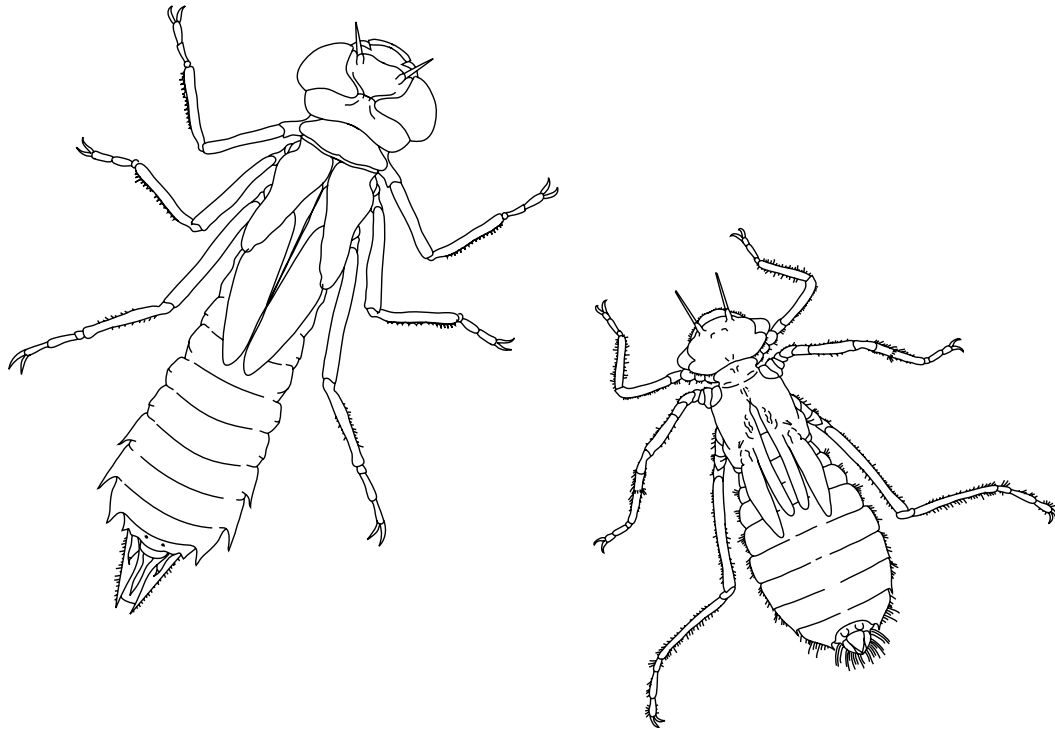


**Damselfly nymph**



## Damselfly nymph

<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Odonata
<b>Suborder</b>	Zygoptera
<b>Family</b>	Eleven families
<b>Size</b>	Up to 35 mm including gills
<b>Habitat</b>	Under stones and among reeds in slow-flowing pools
<b>Diet</b>	Carnivorous—aquatic insects and crustaceans
<b>Features</b>	Slender bodies with three leaf-like gills at the rear of the abdomen

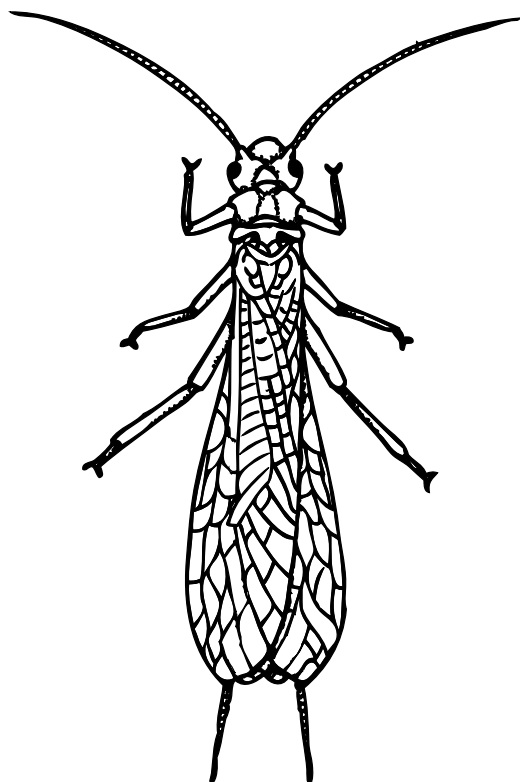


## Dragonfly nymph

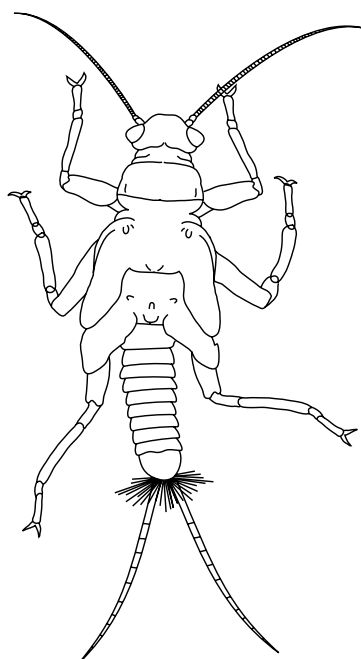
17

<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Odonata
<b>Suborder</b>	Anisoptera
<b>Family</b>	More than fourteen families
<b>Size</b>	Up to 50 mm
<b>Habitat</b>	Under stones and among bark, branches and reeds in slow-flowing pools
<b>Diet</b>	Carnivorous—aquatic insects and crustaceans
<b>Features</b>	Stout bodies; no external gills, but water can be passed rapidly through an internal rectal gill for breathing or to escape predators; rectal gill is connected to outside of body by an anal pyramid on the end of the abdomen

**Stonefly adult**

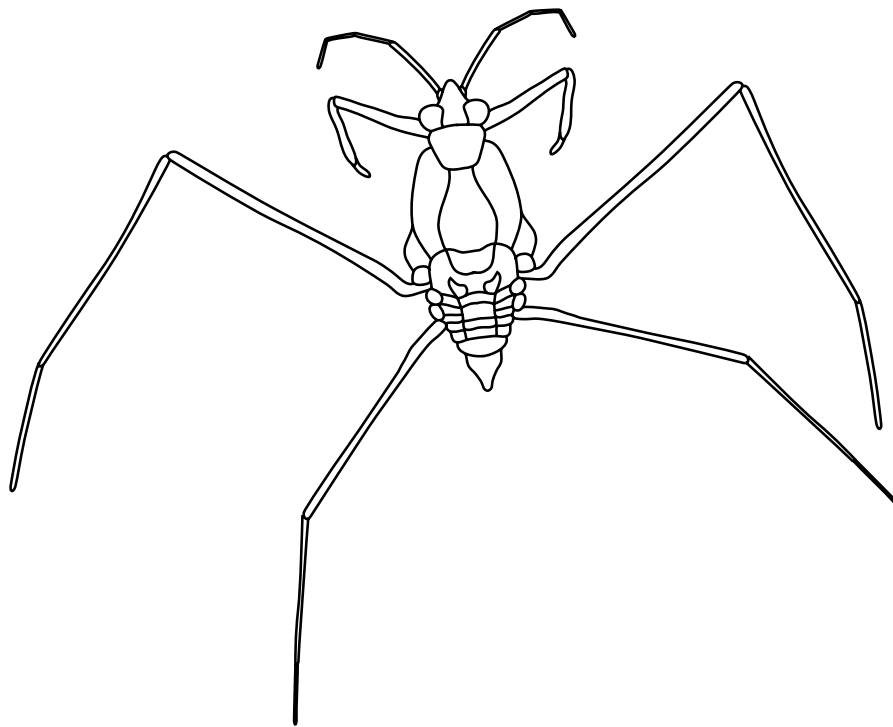


**Stonefly nymph**



## Stonefly nymph

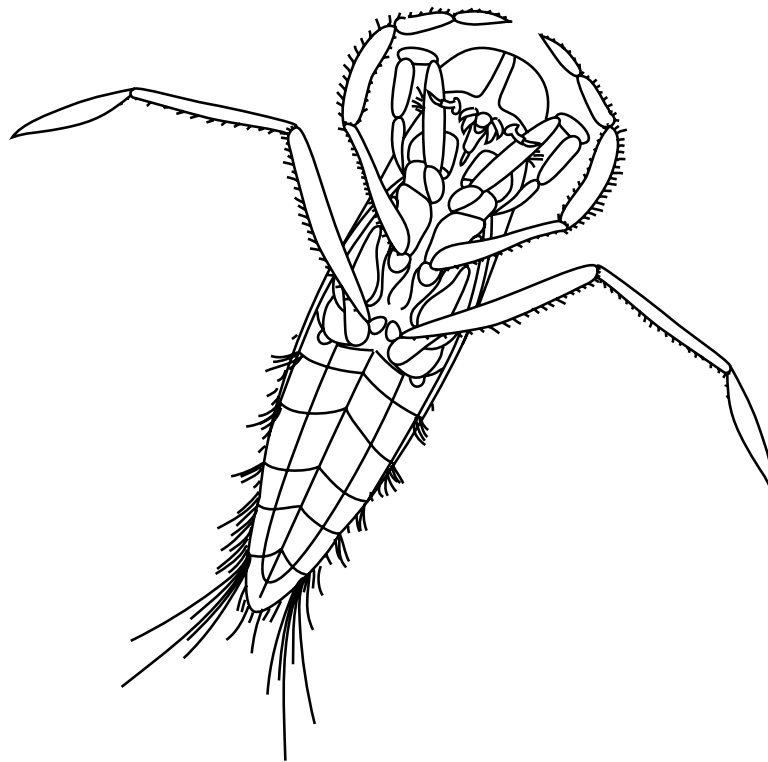
<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Plecoptera
<b>Families</b>	Eustheniidae, Austroperlidae, Gripopterygidae, Notonemouridae
<b>Size</b>	Up to 40 mm
<b>Habitat</b>	On stones in fast-flowing sections of creeks; among reeds and vegetation in slow-flowing pools
<b>Diet</b>	Carnivorous, detritivorous or herbivorous depending on species—animals, dead plant material and decaying organic material
<b>Features</b>	Two long tails (cerci) at the end of the abdomen; gills at the posterior end of the abdomen (waved around in still water to gain oxygen); crawling movement; very sensitive to pollution and high sediment loads; most common in streams where flow persists for a minimum of four to five months



## Water strider

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<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Hemiptera
<b>Family</b>	Gerridae
<b>Size</b>	Up to 12 mm
<b>Habitat</b>	On the surface of ponds, streams, and small dams; common to most water bodies throughout Australia
<b>Diet</b>	Carnivorous—insects and other aquatic animals; body fluids are extracted from the prey using piercing and sucking mouth parts
<b>Features</b>	Long legs, with front limbs to handle prey; very active; found in small groups, which scatter in all directions when disturbed



## Back swimmer

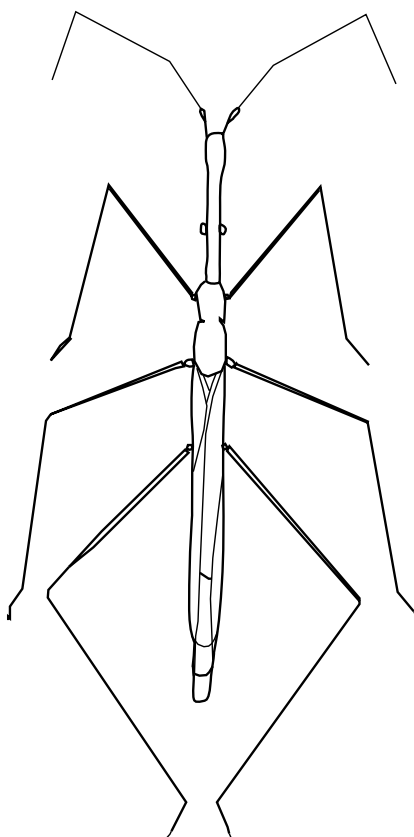
<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Hemiptera
<b>Family</b>	Notonectidae
<b>Genera</b>	Anisops, Enithares
<b>Size</b>	Up to 11 mm
<b>Habitat</b>	Ponds, farm dams, and pools in slow-flowing streams
<b>Diet</b>	Carnivorous (piercers)—extract body juices of other insects, tadpoles and small fish through pointed sucking mouth parts
<b>Features</b>	Large eyes to assist with catching prey; elongated body; swim on their backs



## Water boatman

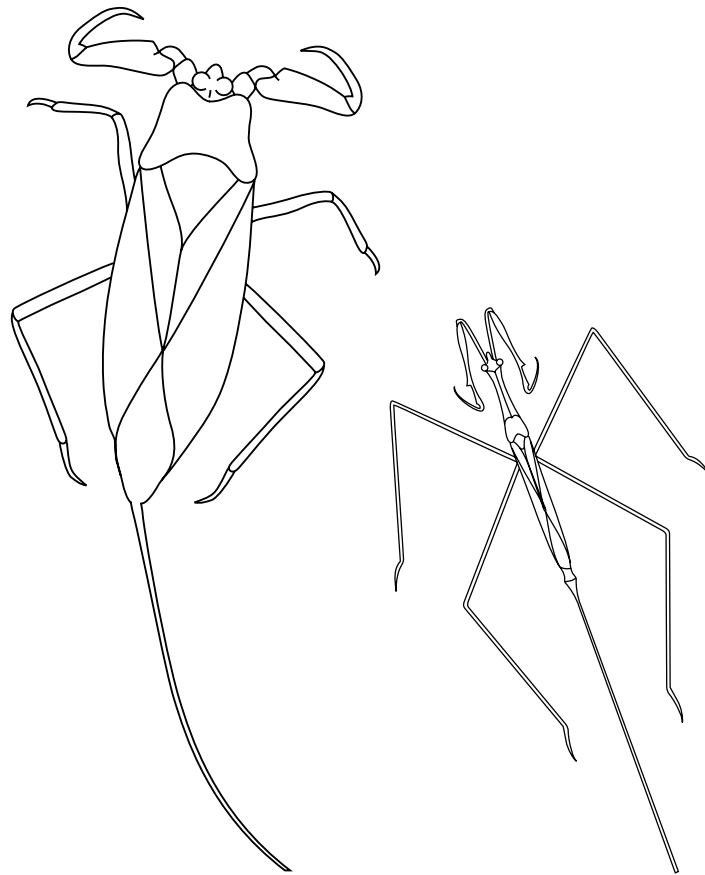
21

<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Hemiptera
<b>Family</b>	Corixidae
<b>Size</b>	Up to 10 mm
<b>Habitat</b>	Still and slow-flowing pools; on streambeds
<b>Diet</b>	Omnivorous—algae or other small organisms
<b>Features</b>	Long, flat, oval-shaped bodies; long, oar-like hind legs



## Water measurer

<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Hemiptera
<b>Family</b>	Hydrometridae
<b>Genus</b>	Hydrometra
<b>Size</b>	Up to 30 mm
<b>Habitat</b>	Among emergent vegetation at the edge of still waters
<b>Diet</b>	Carnivorous—small animals associated with the surface film of water
<b>Features</b>	Long and very slender body; head as long as the thorax; long legs and feet (tarsi), which assists it to travel across the water surface using surface tension

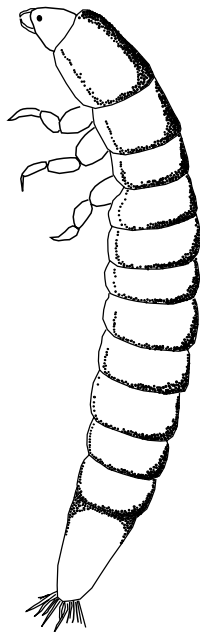


## Water scorpion

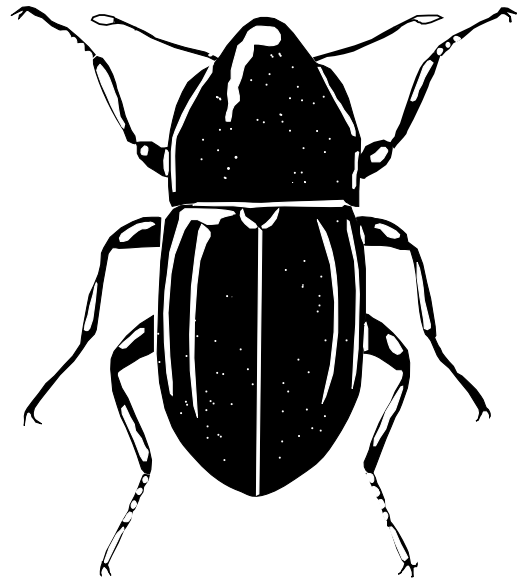
23

<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Hemiptera
<b>Family</b>	Nepidae
<b>Genera</b>	Laccotrephes, Ranatra
<b>Size</b>	Up to 50 mm
<b>Habitat</b>	Among submerged vegetation in still or slow-flowing fresh waters, particularly in ponds, dams and wetlands
<b>Diet</b>	Carnivorous—adults eat small aquatic insects, which they capture with their front legs
<b>Features</b>	Long, broad and flat bodies; sharp, claw-like prehensile front legs and a long rear breathing tube; also known as needle bugs

**Riffle beetle larva**



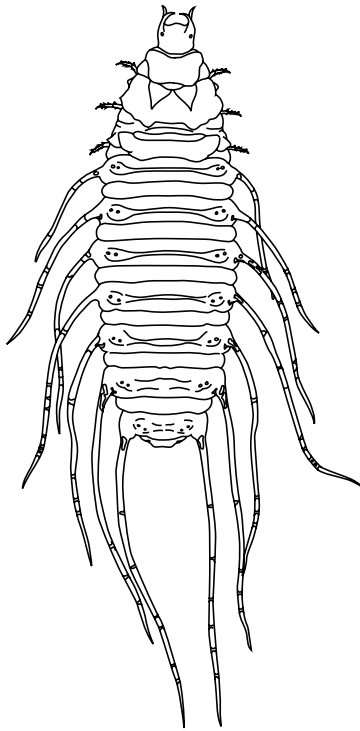
**Riffle beetle**



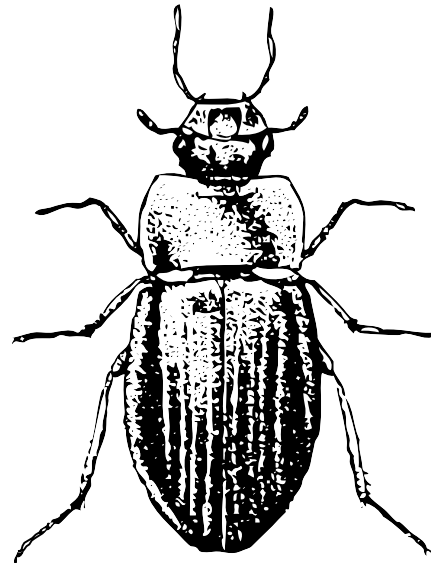
## Riffle beetle

<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Coleoptera
<b>Family</b>	Elmidae
<b>Size</b>	<i>Adult</i> : up to 5 mm. <i>Larva</i> : up to 6 mm
<b>Habitat</b>	Both adults and larvae are aquatic; stones, logs, or debris in fast-flowing sections of streams; prefer cool, high-oxygen water typical of upland streams
<b>Diet</b>	Herbivorous—adults and larvae feed on plant material
<b>Features</b>	<i>Adult</i> : long tarsal claws and long, slender antennae. <i>Larva</i> : cylindrical bodies; generally brown or dark-coloured; gills extend from a chamber at the point of the last abdominal segment

## Scavenger water beetle larva



## Scavenger water beetle

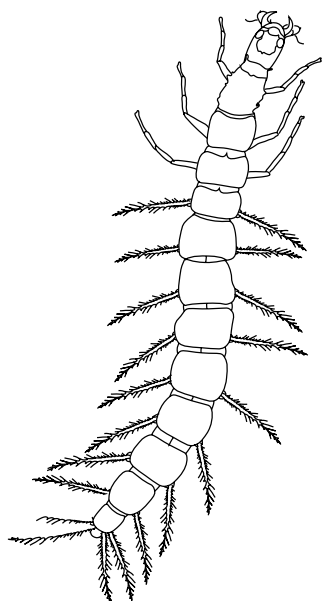


# Scavenger water beetle

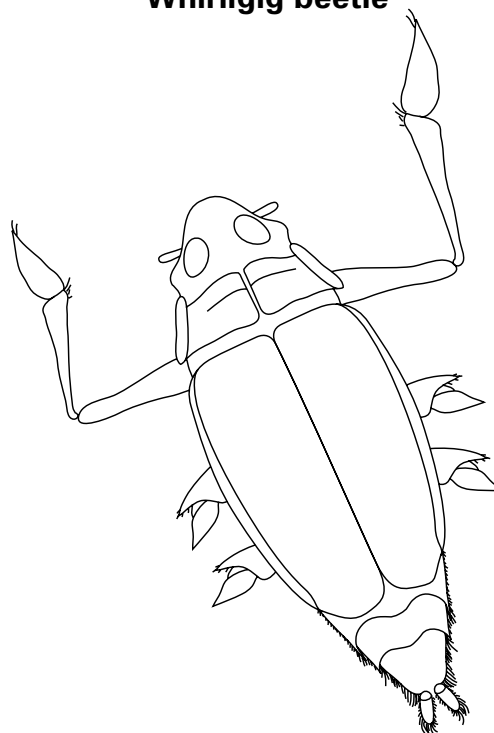
25

<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Coleoptera
<b>Family</b>	Hydrophilidae
<b>Size</b>	<i>Adult</i> : Less than 1 mm to over 40 mm. <i>Larva</i> : up to 8 mm
<b>Habitat</b>	<i>Adult</i> : still waters or quiet areas of flowing waters. <i>Larva</i> : among decaying plant material at the margins of still waters or quiet areas of flowing waters.
<b>Diet</b>	<i>Adult</i> : herbivorous (collectors, gatherers)—plant material. <i>Larvae</i> : carnivorous—small aquatic animals
<b>Features</b>	<i>Adult</i> : dark or dull-coloured with a smooth oval shape; antennae with seven to nine segments, the last three to five segments wider than the rest. <i>Larva</i> : generally slender and flat; well-developed mouth parts and may have gills on abdomen

### Whirligig larva



### Whirligig beetle

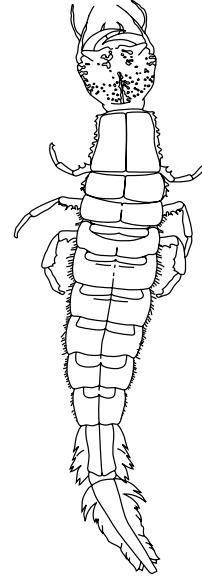
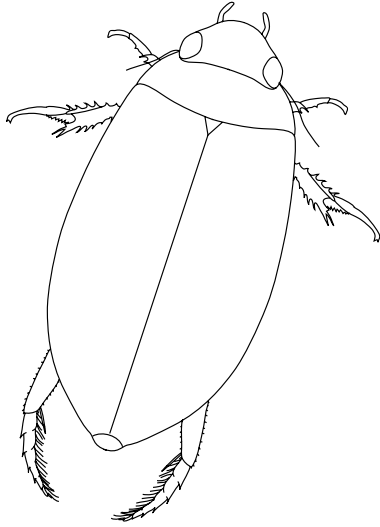


## Whirligig beetle

<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Coleoptera
<b>Family</b>	Gyrinidae
<b>Size</b>	<i>Adult</i> : 6 mm long. <i>Larva</i> : up to 20 mm
<b>Habitat</b>	<i>Adult</i> : on the surface of still and slow-flowing waters. <i>Larva</i> : on logs and with the sediment under macrophytes
<b>Diet</b>	Carnivorous—both adults and larvae feed on other animals in the water column or animals that fall into the water
<b>Features</b>	<i>Adult</i> : eyes completely divided into upper and lower sections by a strip of cuticle; very short and compact antennae; short, flattened and paddle-like mid and hind legs. <i>Larva</i> : feathery gills on the first eight body segments; two pairs of gills on the ninth abdominal segment; pair of hooks at the end of the tenth segment

## Predacious diving beetle

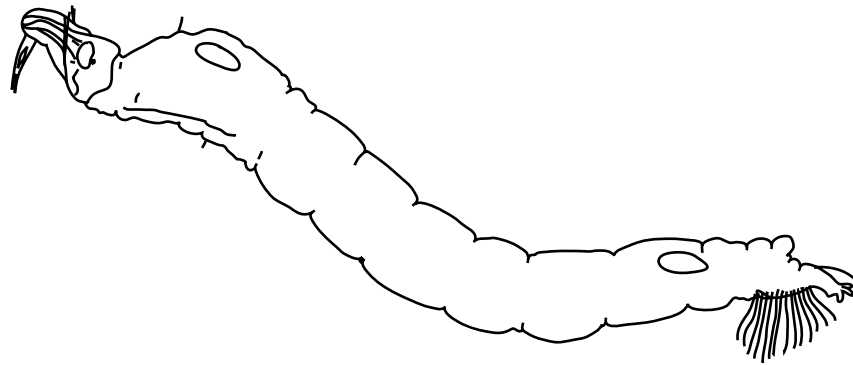
## Predacious diving beetle larva



## Predacious diving beetle

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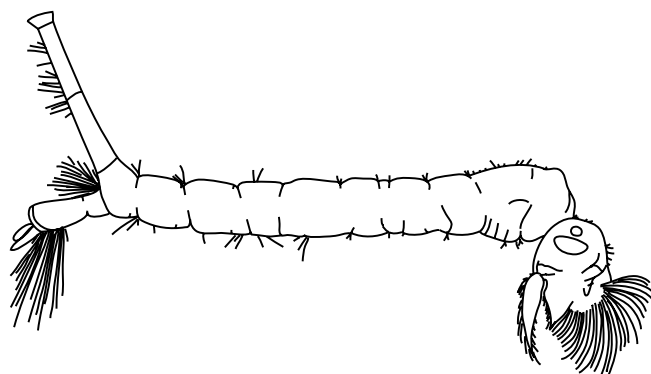
Phylum	Arthropoda
Class	Insecta
Order	Coleoptera
Family	Dyticidae
Size	<i>Adult</i> : 3–35 mm long. <i>Larva</i> : up to 55 mm
Habitat	Ponds and slow-flowing streams; adults are often the first to colonise new habitats
Diet	Carnivorous—small invertebrates or even small vertebrates including tadpoles, frogs and fish fry
Features	<i>Adult</i> : long and slender antennae; flat, fringe-haired hind legs that act as oars. <i>Larva</i> : elongated and slender; rounded, large head with prominent mouth parts



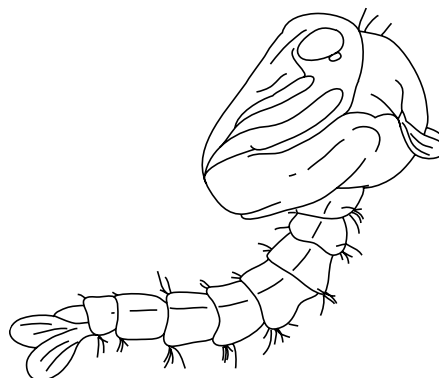
## Black fly larva

<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Diptera (true flies)
<b>Family</b>	Simuliidae
<b>Size</b>	Up to 7 mm
<b>Habitat</b>	Attached to rocks and boulders of fast flowing waters
<b>Diet</b>	Omnivorous (collectors and filter feeders)—algae and other organic debris from the water
<b>Features</b>	Mouth brushes and cylindrical bodies; a ring of many sharp hooks on the end of the body used to attach to the substrate; silk used to attach to substrate

## Mosquito larva



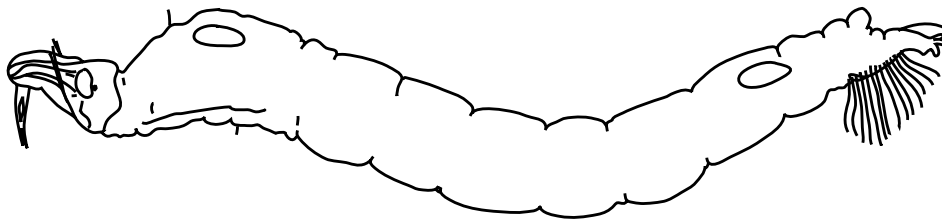
## Mosquito pupa



## Mosquito larva

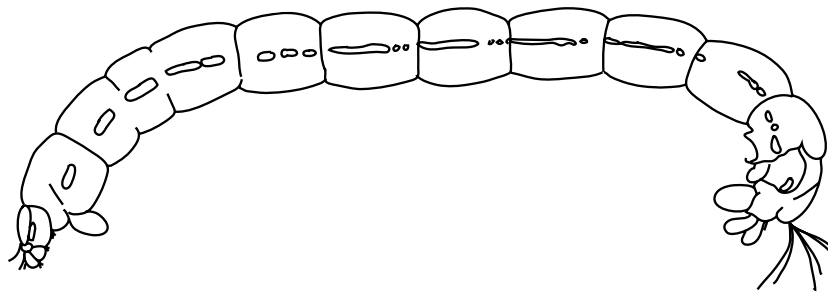
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<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Diptera (true flies)
<b>Family</b>	Culicidae
<b>Size</b>	3–6 mm long
<b>Habitat</b>	Still water of any depth
<b>Diet</b>	<i>Larva</i> : algae or organic debris. <i>Pupa</i> : (transformation stage between larva and adult) no feeding
<b>Features</b>	<i>Larva</i> : no legs (called ‘wrigglers’); thorax wider than the head or abdomen; mouth brushes; siphon at end of abdomen for breathing. <i>Pupa</i> : tubes on thorax for breathing



## Biting midge larva

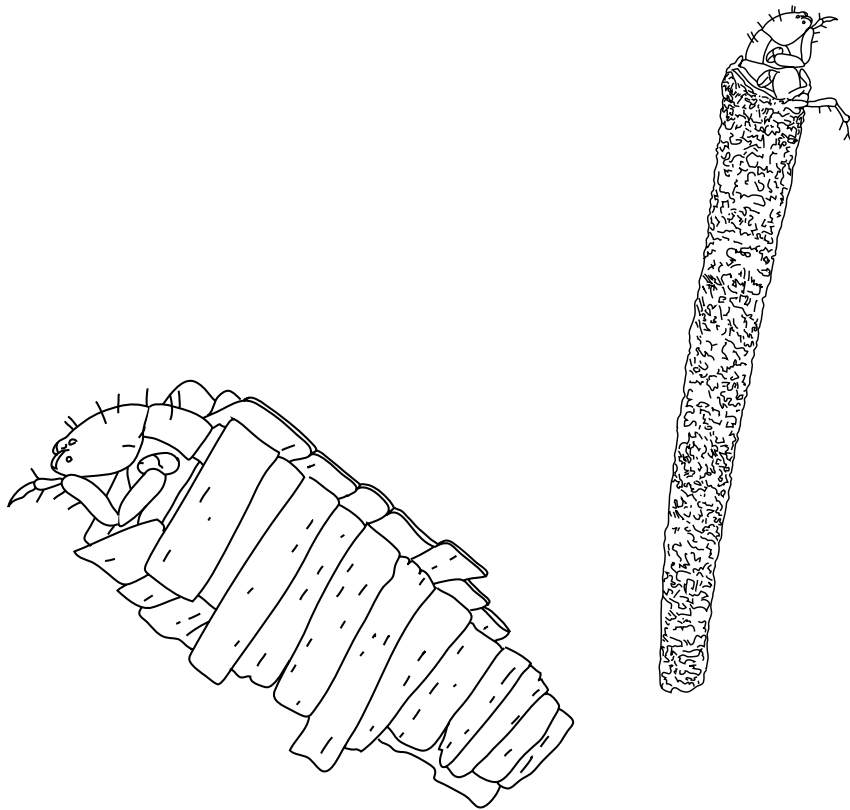
<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Diptera (true flies)
<b>Family</b>	Ceratopogonidae
<b>Size</b>	Up to 12 mm
<b>Habitat</b>	Wet sand and mud at stream, lake or pond margins
<b>Diet</b>	Carnivorous (engulfers, collectors or gatherers)—algae and other debris; other animals
<b>Features</b>	Shaped like a worm with bead-like segments; thin and soft-bodied, usually with a hardened head capsule; no prominent gills; swims like an eel or snake



## Non-biting midge larva

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<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Diptera (true flies)
<b>Family</b>	Chironomidae
<b>Size</b>	Up to 30 mm
<b>Habitat</b>	Sediments of virtually all aquatic habitats; found in large numbers in environments with low oxygen concentrations as well as in healthy environments
<b>Diet</b>	Omnivorous, carnivorous or detritivorous depending on species—algae and other debris; animal matter
<b>Features</b>	Long, cylindrical and worm-like; visible head; usually a pair of small legs (called prolegs) on first thoracic and last abdominal segment; characteristic figure-of-eight thrashing motion, and backwards motion when attempts are made to pick them up; one group known as bloodworms are light or dark red in colour and are frequently found in large numbers in polluted waters



## Caddisfly

<b>Phylum</b>	Arthropoda
<b>Class</b>	Insecta
<b>Order</b>	Trichoptera
<b>Family</b>	Twenty-six families
<b>Size</b>	1.5–40 mm
<b>Habitat</b>	In sediment, on rocks and branches, and among algae and aquatic plants in streams, ponds and lakes
<b>Diet</b>	Carnivorous, herbivorous or detritivorous depending on species—algae scraped from the surface of surrounding rocks; material filtered from currents using specially constructed conical webs; insects and crustaceans
<b>Features</b>	Two main types, divided on the basis of behaviour and structure. One group constructs a portable case out of sand, algae, plant material and silt (cases often look like sticks) and are generally found in still waters where they feed on algae and plants. The second group does not have a case, or has a fixed retreat. Some are common in fast-flowing waters where they feed on other animals (often building a net of silk across the stream to capture their food). Some species will swim in their case; most just crawl around. Some of the caseless will move away backwards.