

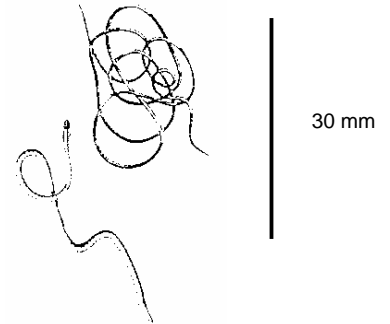
Common Macroinvertebrates in the Clinton River Watershed

Phylum-Annelida

Class- Oligochaeta

Aquatic worms

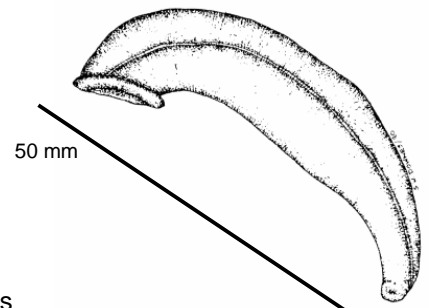
Where to find:	Sediment, leaf pack, vegetation
Body shape:	Long, thin, cylindrical, segmented
Size:	1 – 30 mm
Food source:	Organic matter
Lifecycle:	Varies
Distinguishing Characteristics:	Similar to earthworm in appearance Red, tan, black, or brown in color



Class- Hirudinea

Leeches

Where to find:	Sediment, leaf pack, vegetation
Body shape:	Flattened dorsoventrally (top to bottom) many segments
Size:	5 – 100 mm
Food source:	Predaceous, collector
Distinguishing Characteristics:	Anterior and posterior suckers; no eye spots Usually much wider than aquatic worm Tan to brown in color

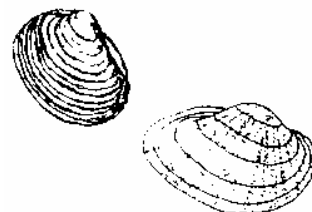


Phylum-Mollusca

Class-Pelecypoda (Bivalvia)

Clams

Where to find:	Attached to substrate
Body shape:	Two shells attached by a hinge
Size:	Varies
Food source:	Filtering collector
Lifecycle:	
Distinguishing Characteristics:	Only live clams may be counted in determining water quality



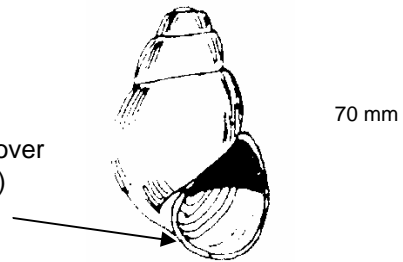
Class-Gastropoda

Gilled Snail

Where to find: Grazing on a variety of substrate
 Body shape: Hard, spiraled shell
 Size: 2 - 70 mm
 Food source: Grazer
 Distinguishing Characteristics:

With point held up, opening is on your right and faces you (right = good = gilled)
NOTE: If the shell has a plate-like cover (operculum) over the opening, it is a gilled snail (on left and right facing shells.)
 Shells coiling in one plane are counted as a Pouch Snail (Group 3)
 Respire via gills

Plate-like cover (operculum) present

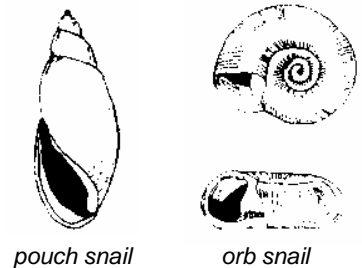


Lunged Snails (Pouch snail & Orb Snail)

Where to find: Grazing on a variety of substrate
 Body shape: Hard shell usually spiral, but may be flattened
 Size: 2 - 70 mm
 Food source: Grazer
 Distinguishing Characteristics:

With point held up, opening is on your left (Left=Lunged) and faces you AND there is NO plate-like cover over the opening. NOTE: If the shell has a plate-like cover (operculum) over the opening, it is a gilled snail, even though it faces left. Snails with shells coiling in one plane are counted as a Pouch Snail. Respire via lungs so not dependent on dissolved oxygen.

50 mm



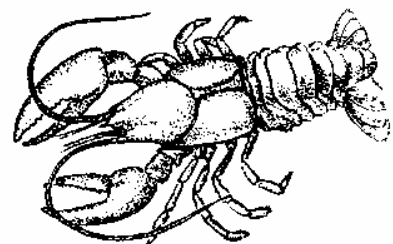
Phylum-Arthropoda

Class-Crustacea

Crayfish

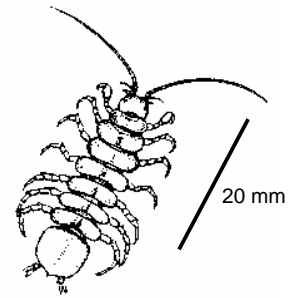
Order: Decapoda
 Where to find: Crawling on bottom
 Body shape: Resembles a small lobster
 Size: 15 mm - 150 cm
 Food source: Predator
 Lifecycle: Adults typically live 2 years (some species up to 6 years)

Distinguishing Characteristics: Large lobster-like claws
 Usually red, orange, brown, or dark colored
 Eyes stand out from body



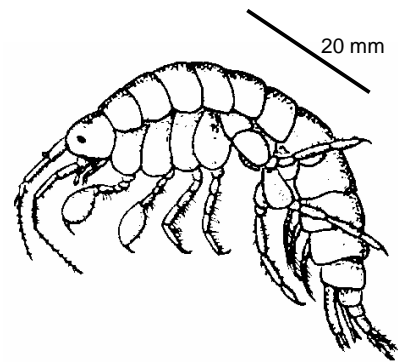
Aquatic Sowbugs

Order:	Isopoda
Where to find:	Crawling on substrate, overhanging vegetation
Body shape:	Hard bodied and flattened dorso-ventrally
Size:	5 – 20 mm
Food source:	Omnivorous
Distinguishing Characteristics:	7 pairs of legs Dark brown to grey in color Two pair of antennae, one usually much longer Similar in appearance to terrestrial “roly-poly”; tend to crawl



Scud

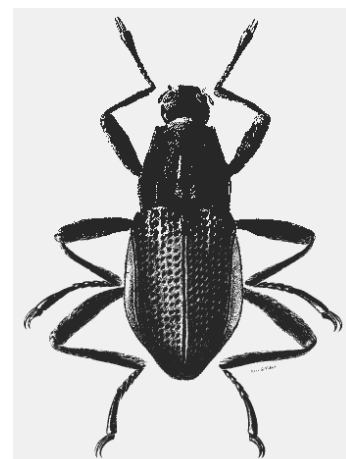
Order:	Amphipoda
Where to find:	Overhanging vegetation
Body shape:	Flattened laterally (side to side)
Size:	5 – 20 mm
Food source:	Filtering collector
Distinguishing Characteristics:	Shrimp-like; laterally compressed Swims on side or upside down White to clear in color Distinct black eyes



Class-Insecta

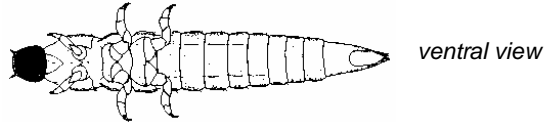
Beetle adult (Riffle Beetle)

Order:	Coleoptera
Family:	Elmidae
Where to find:	Crawling on stream bottom
Body shape:	Oblong, oval, hard
Size:	1 – 6 mm
Food source:	Gatherer collector
Lifecycle:	Complete metamorphosis
Distinguishing Characteristics:	Walks very slowly underwater Black in color Hardened, stiff appearance of entire body True “beetle” appearance with 6 legs Shielded forewings



Aquatic Beetle larvae

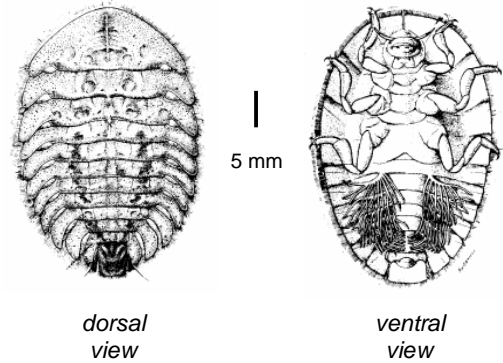
Order:	Coleoptera
Body shape:	Diverse
Size:	2 – 60 mm
Food source:	Predator
Lifecycle:	6 – 8 months
Distinguishing Characteristics:	



Distinct head with well developed chewing mouth parts
 Body is long with many segments and relatively hard and stiff
 Reduced antennae; small eyes
 May be confused with dobsonflies and alderflies, but never ends with hooks like the dobsonflies
 May also be confused with caddisflies, but caddisfly larvae only have a hard covering over the first two or three segments

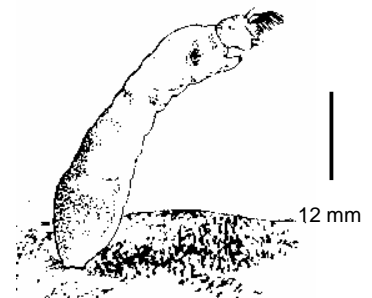
Water penny beetle larvae

Order:	Coleoptera
Family:	Psephenidae
Where to find:	Stones and other substrate
Body shape:	Disk
Size:	3 - 5 mm
Food source:	Scraper, grazer
Distinguishing Characteristics:	Brown, black, or tan colored Often difficult to remove



Blackfly larvae

Order:	Diptera (True Flies)
Family:	Simuliidae
Where to find:	In swift current on rocks, submerged vegetation
Body shape:	Bowling pin shaped with sucker on wide end
Size:	3 - 12 mm
Food source:	Filtering collector
Lifecycle:	Incomplete metamorphosis



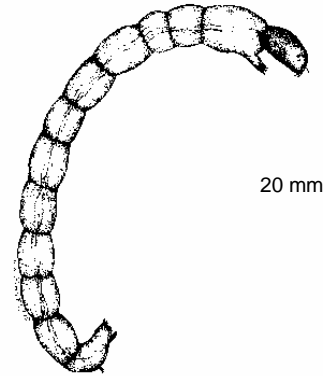
Distinguishing Characteristics:	Soft body Single proleg directly under head - no true legs Fan-like mouth bristles may be present; suckers at both ends Head usually black, less often brown, tan, or green "Bowling pin" or "club" shaped Often attach themselves to sorting trays
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Midge larvae

Order:	Diptera (True Flies)
Family:	Chironomidae
Where to find:	Sediment, vegetation, leaf pack
Body shape:	Cylindrical, thin, soft, and often curled
Size:	2 - 20 mm
Food source:	Gathering collector
Lifecycle:	Complete metamorphosis

Distinguishing
Characteristics:

Hardened head capsule
No true legs
Anterior and posterior prolegs
May be bright red in color in low oxygen conditions
Often confused with aquatic worms, but midge has head and prolegs

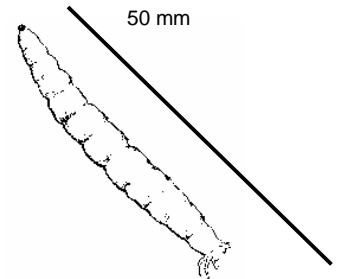


Cranefly larvae

Order:	Diptera (True Flies)
Family:	Tipulidae
Where to find:	Under rocks, overhanging vegetation, leaf-pack
Body shape:	Caterpillar-like (or maggot-like) and segmented
Size:	10 – 100 mm
Food source:	Shredder
Lifecycle:	Incomplete metamorphosis 6 weeks – 5 years in aquatic stage

Distinguishing
Characteristics:

No true legs or wing buds
Prolegs may be visible as small lobes
Milky, light brown, or greenish in color with digestive tract often visible
Finger-like appendages extend from posterior end
If no appendages on hind end, probably a deer or horse fly larvae

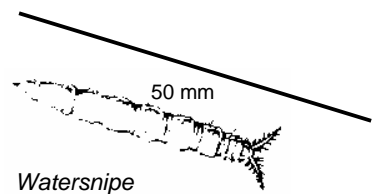


Other Diptera larvae (Watersnipe, Horse and Deer Flies)

Where to find:	Under rocks, overhanging vegetation, leaf-pack
Body shape:	Caterpillar-like and segmented
Size:	10 – 250 mm
Food source:	Shredder
Lifecycle:	Complete metamorphosis

Distinguishing
Characteristics:

Similar to crane fly, but body tapered on both ends with no appendages
No true legs on the mid-section of the body
Usually worm-like and segmented
Milky, light brown, or greenish in color with digestive tract often visible
Watersnipe: feathery "horns" at back end ("hairy antlers")

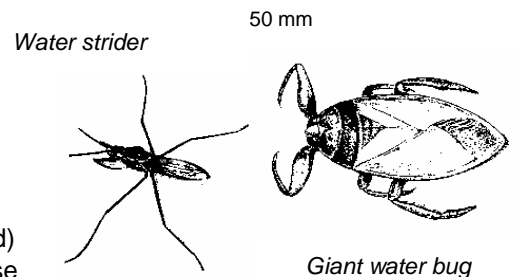
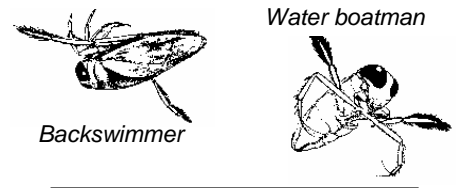


True bugs (Backswimmer, Giant water bug, Water boatmen, Water strider)

Order: Hemiptera
 Where to find: Often seen skimming or walking along water surface
 Body shape: Hard, oval, and somewhat flattened
 Size: 1 – 65 mm
 Food source: Predator. Injects chemicals that dissolve the internal parts of prey.
 Lifecycle: Incomplete metamorphosis

Distinguishing Characteristics:

Head and eyes often well developed
 3 pairs of legs may be dissimilar (hindlegs may be flattened and hinged)
 Forewings, when at rest, are held close over the back and overlap
 May be confused with adult water beetle, but beetle's wings do not overlap
 Because adults are mobile, they are not a good indicator of water quality



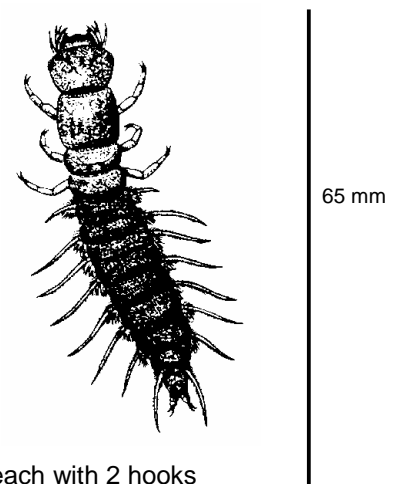
Waterboatman: swims right side up, back is black
 Backswimmer: swims on back, back is white
 Water Strider: lives on surface
 Giant water bug: grasping front legs, up to three inches in length

Hellgrammites larvae (Dobsonfly and Fishfly)

Order: Megaloptera
 Family: Corydalidae
 Where to find: Soft substrate; soft, rotting logs and stumps
 Body shape: Long and slightly flattened
 Size: 10 - 65 mm
 Food source: Predator
 Lifecycle: 2 – 5 years

Distinguishing Characteristics:

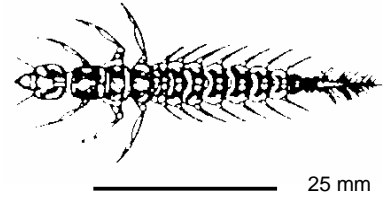
7 - 8 pairs of lateral filaments on abdomen
 3 pair of well-developed legs on thorax
 Abdomen ends in pair of short, spiny prolegs, each with 2 hooks



Hellgrammites have "cottony" gills on abdomen
 Fish flies have smooth abdomens

Alderfly larvae

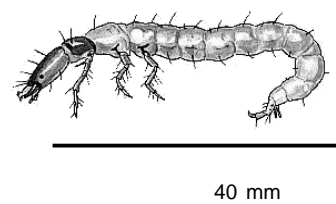
Order: Megaloptera
 Family: Sialidae
 Where to find: Underside of rocks, leaf-pack, overhanging vegetation
 Body shape: Elongated and slightly flattened
 Size: 1 - 25 mm
 Food source: Predator
 Lifecycle: 1 – 4 years



Distinguishing Characteristics: 7 pairs of lateral filaments on abdomen
 3 pairs well-developed legs on thorax
 Very similar to Hellgrammites, but alderfly abdomen ends in long, thin, branched tail with no hooks (“spikey”)

Caddisfly larvae

Order: Trichoptera
 Where to find: Underside of rocks
 Body shape: Usually cylindrical and “C”-shaped
 Size: 2 - 40 mm
 Food source: Shredders
 (net-spinning caddisfly is a filtering collector)
 Lifecycle: Complete metamorphosis

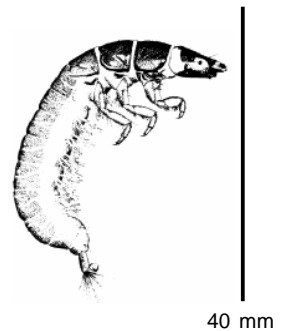


caddisfly in house

Distinguishing Characteristics: Usually found in houses made of pebbles, wood, or sticks
 Abdomen ends in 2 prolegs, each with a claw
 Three pairs of legs on thorax
 May have darker, harder plates on top of thorax
 Some form nets at end of house to collect food (net-spinning caddisfly)
 Head simple, but visible eyes

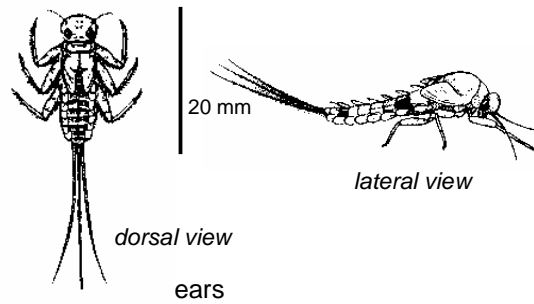
*Net Spinning Caddisflies

Distinguishing Characteristics: Brown to green depending on what it has been eating
 Two “tufty” tails
 Only caddisfly to have significant gills on its abdomen
 (may require magnification)
 Does NOT make a case



Mayfly nymph

Order:	Ephemeroptera
Where to find:	Underside of rocks
Body shape:	Elongated and flattened
Size:	3 - 20 mm
Food source:	Gathering collector
Lifecycle:	Incomplete metamorpho: Larval development lasts

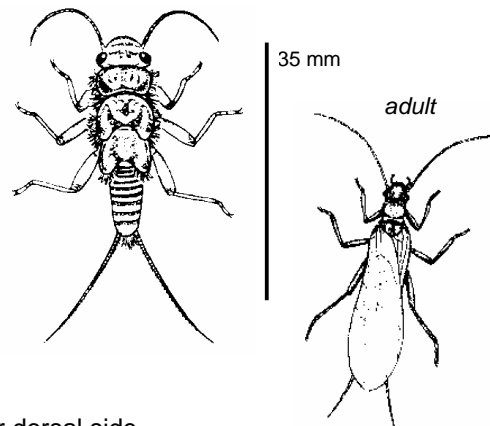


Distinguishing
Characteristics:

Abdomen ends in three filamentous tails (some species have two)
Feathery gills line sides of abdomen
1 tarsal claw

Stonefly nymph

Order:	Plecoptera
Where to find:	Underside of rocks
Body shape:	Elongated
Size:	5 - 35 mm
Food source:	Predator or shredder
Lifecycle:	Incomplete metamorphosis 3 months to 3 years

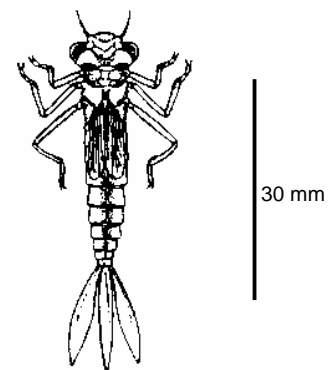


Distinguishing
Characteristics:

Abdomen ends in two tails
No gills visible on abdomen or dorsal side
2 tarsal claws

Damselfly nymph

Order:	Odonata
Suborder:	Zygoptera
Where to find:	Overhanging vegetation
Body shape:	Elongated, narrow, tapering rearward
Size:	15 - 30 mm
Food source:	Predator
Lifecycle:	Incomplete metamorphosis 1 - 4 years

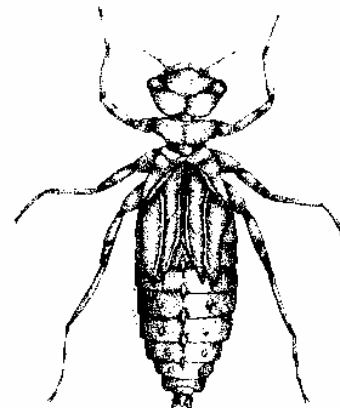


Distinguishing
Characteristics:

No gills present on sides of abdomen
Abdomen ends in 3 wide, oar-shaped gill-plates resembling tails
Large eyes and long legs
Grey, green, or brown in color
Hinged lower jaw
May be confused with mayflies, but damselflies have no abdominal gills and tails (supplemental gills) are more paddle-shaped; also appear "more delicate"

Dragonfly nymph

Order:	Odonata
Suborder:	Anisoptera
Where to find:	Overhanging vegetation
Body shape:	Wide abdomen, oval, flattened, robust
Size:	20 - 50 mm
Food source:	Predator
Lifecycle:	Incomplete metamorphosis 1 – 4 years



Distinguishing Characteristics:	Large eyes No visible external gills Distinct mouthparts (hinged lower jaw) that extend to catch prey Grey, green, or brown in color Body is generally rough Internal gills in rectal chamber-jet propels Three anal structures (often appear as one)
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Glossary

Incomplete metamorphosis: egg → nymph → adult
(mayfly, dragonfly, stonefly, true bugs)

Complete metamorphosis: egg → larvae → pupa → adult
(true flies, beetles, caddisfly)

Shredder: feeds on coarse, dead organic matter (leaves, grasses, algae, and rooted aquatic plants), breaking it into finer material that is released in their feces. Shredders include stonefly nymphs, caddisfly larvae, crane fly larvae.

Collector: feeds on fine, dead organic matter, including that produced by the shredders.

Filtering collector: filters particles out of flowing current. Examples include blackfly larvae and net-building caddisflies.

Gathering collector: gathers matter while crawling along the river bottom. Gatherers include mayfly nymphs, adult beetles, midge fly larvae

Grazer: grazes on algae growing on rocks in the substrate or on vegetation. Grazers include snails and water pennies.

Predator: feeds on other invertebrates or small fish. Jaws are specially adapted to feed on prey. Dragonflies and damselflies have scoop-like lower jaws, the jaws of hellgrammites (dobsonflies and fishflies) are pincer-like, and water strider's jaws are spear-like. Also includes beetle adults and larvae.

Material taken from:

[An Introduction to the Aquatic Insects of North America](#), Second Ed., Edited by R.W. Merritt and K.W. Cummins
[Field manual for Water Quality Monitoring](#), 10th Ed., Mark K. Mitchell and William B. Stapp
[Save Our Streams Monitor's Guide to Aquatic Macroinvertebrates](#), Loren Larkin Kellogg
[Leaf Pack Experiments Stream Ecology Kit, Macroinvertebrates Identification Flashcards](#), Ann M. Faulds, et al.