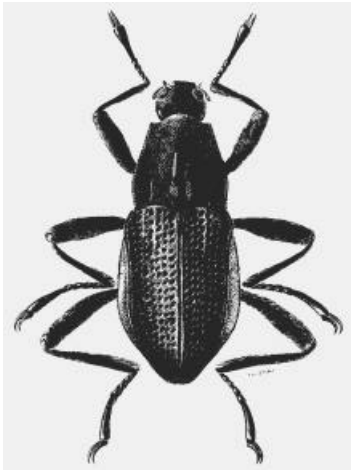
# Common Macroinvertebrates in the Clinton River Watershed

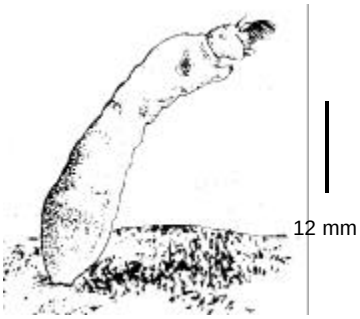
# Group 1

## Beetle adult (Riffle Beetle)



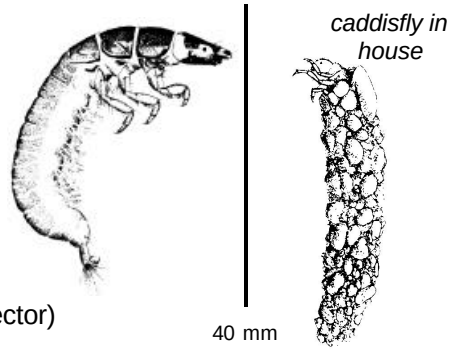

| | |
|---|---|
| Order: | Coleoptera |
| Family: | Elmidae |
| Where to find: | Crawling on stream bottom |
| Body shape: | Oblong, oval, hard |
| Size: | 1 – 6 mm |
| Food source: | Gatherer collector |
| Lifecycle: | Complete metamorphosis |
| Distinguishing Characteristics: | Walks very slowly underwater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

## 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<br>Single proleg directly under head - no true legs<br>Fan-like mouth bristles may be present<br>Head usually black, less often brown, tan, or green |

## Caddisfly larvae




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

| | |
|---|---|
| Lifecycle: | Complete metamorphosis |
| Distinguishing Characteristics: | Usually found in houses made of pebbles, wood, or sticks<br>Abdomen ends in 2 prolegs, each with a claw<br>May have darker, harder plates on top of thorax<br>Some form nets at end of house to collect food (net-spinning caddisfly) |

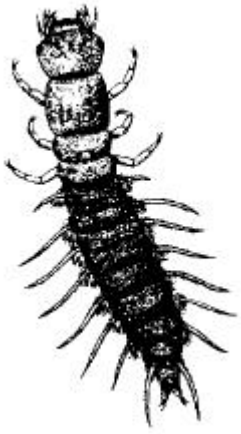
## Gilled Snail

| | |
|---|---|
| Phylum: | Mollusca |
| Class: | Gastropoda |
| Where to find: | Grazing on a variety of substrate |
| Body shape: | Hard, spiraled shell |
| Size: | 2 - 70 mm |
| Food source: | Grazer |
| Lifecycle: | |
| Distinguishing Characteristics: | With point held up, opening is on your right and faces you<br>(right = good = gilled)<br>Shells coiling in one plane are counted as a Pouch Snail (Group 3)<br>Respire via gills |

70 mm

## Hellgrammites larvae (Dobsonfly and Fishfly)

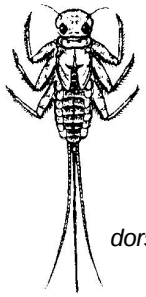
| | |
|---|---|
| Order: | Megaloptera |
| Family: | Corydalidae |
| Where to find: | Soft substrate; soft, rotting logs and stumps |
| Body shape: | Long and slightly flattened |
| Size: | 10 - 65 mm |
| Food source: | Predator |
| Lifecycle: | 2 – 5 years |
| Distinguishing Characteristics: | 7 - 8 pairs of lateral filaments on abdomen<br>3 pair of well-developed legs on thorax<br>Abdomen ends in pair of <u>short</u>, spiny prolegs, each with 2 hooks |



65 mm

## Mayfly nymph

| | |
|---|---|
| Order: | Ephemeroptera |
| Where to find: | Underside of rocks |
| Body shape: | Elongated and flattened |
| Size: | 3 - 20 mm |
| Food source: | Gathering collector |



*dorsal view*

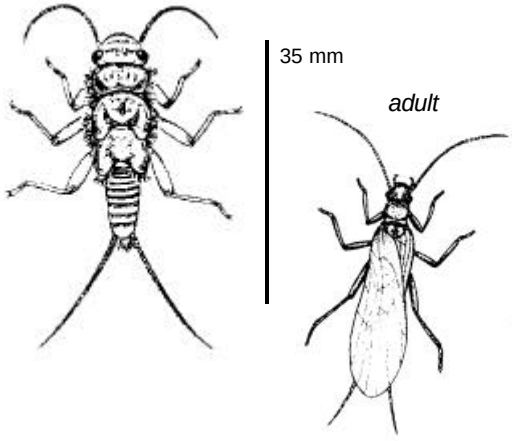
20 mm

*lateral view*

| | |
|---|---|
| Lifecycle: | Incomplete metamorphosis<br>Larval development lasts 3 months to 3 years |
| Distinguishing Characteristics: | Abdomen ends in three filamentous tails (some species have two)<br>Feathery gills line sides of abdomen<br>1 tarsal claw |

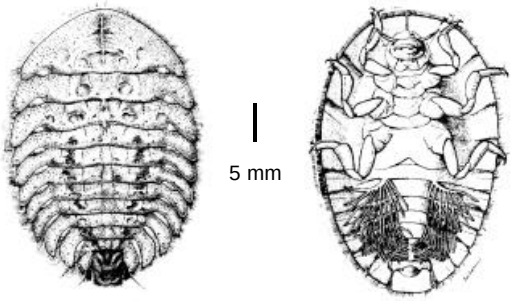
## Stonefly nymph

| | |
|---|---|
| Order: | Plecoptera |
| Where to find: | Underside of rocks |
| Body shape: | Elongated |
| Size: | 5 - 35 mm |
| Food source: | Predator or shredder |
| Lifecycle: | Incomplete metamorphosis<br>3 months to 3 years |
| Distinguishing Characteristics: | Abdomen ends in two tails<br>No gills visible on abdomen<br>2 tarsal claws |




## Water penny beetle larvae

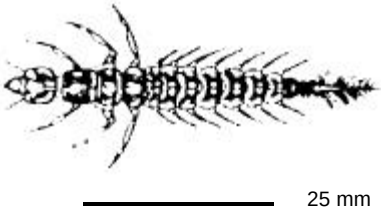
| | |
|---|---|
| Order: | Coleoptera |
| Family: | Psephenidae |
| Where to find: | Stones and other substrate |
| Body shape: | Disk |
| Size: | 3 - 5 mm |
| Food source: | Scraper, grazer |
| Lifecycle: | |
| Distinguishing Characteristics: | Brown, black, or tan colored<br>Often difficult to remove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




# Group 2

## Alderfly larvae

| | |
|---|---|
| Order: | Meglaoptera |
| Family: | Sialidae |
| Where to find: | Underside of rocks, leaf-pack, overhanging vegetation |
| Body shape: | Elongated and slightly flattened |

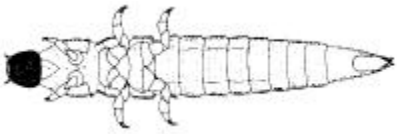


| | |
|---|---|
| Size: | 1 - 25 mm |
| Food source: | Predator |
| Lifecycle: | 1 – 4 years |
| Distinguishing Characteristics: | 7 pairs of lateral filaments on abdomen<br>3 pairs well-developed legs on thorax<br>Very similar to Hellgrammites, but alderfly abdomen ends in long, thin, branched tail with no hooks |

## Aquatic Beetle larvae

*dorsal view*

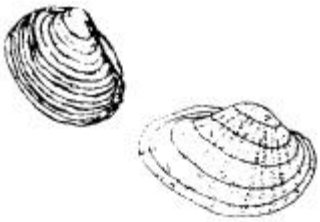
60 mm



*ventral view*

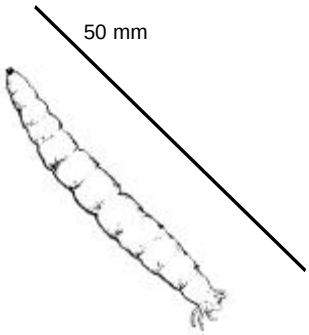
| | |
|---|---|
| Order: | Coleoptera |
| Where to find: | |
| Body shape: | Diverse |
| Size: | 2 – 60 mm |
| Food source: | Predator |
| Lifecycle: | 6 – 8 months |
| Distinguishing Characteristics: | Distinct head with well developed chewing mouth parts<br>Body is long with many segments and relatively hard and stiff<br>May be confused with dobsonflies and alderflies, but never ends with hooks like the dobsonflies<br>May also be confused with caddisflies, but caddisfly larvae only have a hard covering over the first two or three segments |

## Clams



| | |
|---|---|
| Class: | Bivalvia |
| 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 |

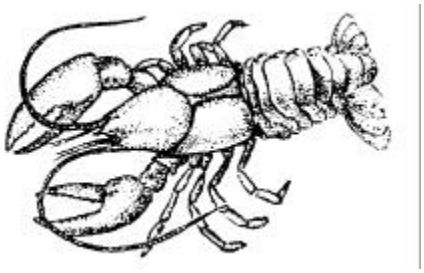
## Cranefly larvae




| | |
|---|---|
| Order: | Diptera (True Flies) |
| Family: | Tipulidae |
| Where to find: | Under rocks, overhanging vegetation, leaf-pack |
| Body shape: | Caterpillar-like and segmented |

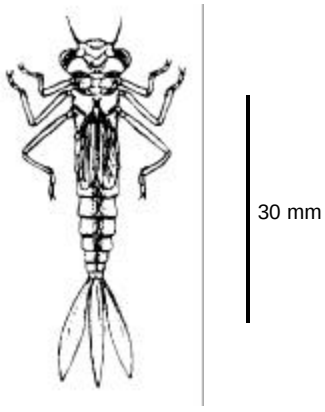
| | |
|---|---|
| Size: | 10 – 100 mm |
| Food source: | Shredder |
| Lifecycle: | Incomplete metamorphosis<br>6 weeks – 5 years in aquatic stage |
| Distinguishing Characteristics: | No true legs or wing buds<br>Prolegs may be visible as small lobes<br>Milky, light brown, or greenish in color with digestive tract often visible<br>Finger-like appendages extend from posterior end<br>If no appendages on hind end, probably a deer or horse fly larvae |

## Crayfish



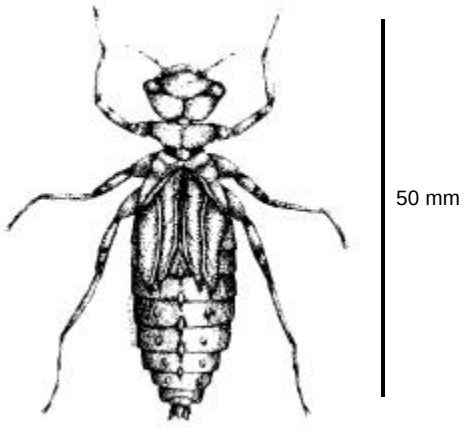
| | |
|---|---|
| Order: | Decapoda |
| Family: | Astacidae or Cambaridae |
| Where to find: | Crawling on bottom |
| Body shape: | Resembles a small lobster |
| Size: | 15 mm - 150 cm |
| Food source: | Predator |
| Lifecycle: | Adults typically live 2 years (some species up to 6 years) |
| Distinguishing Characteristics: | Large lobster-like claws<br>Usually red, orange, brown, or dark colored<br>Eyes stand out from body |

## Damselfly nymph



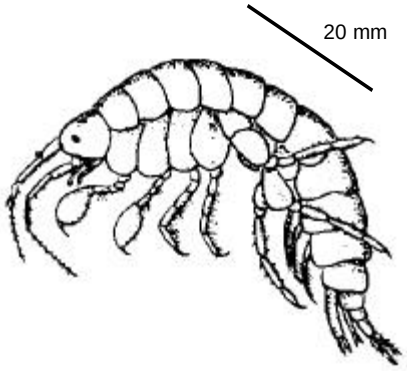

| | |
|---|---|
| Order: | Odonata |
| Suborder: | Zygoptera |
| Where to find: | Overhanging vegetation |
| Body shape: | Elongated, narrow, tapering rearward |
| Size: | 15 - 30 mm |
| Food source: | Predator |
| Lifecycle: | Incomplete metamorphosis<br>1 – 4 years |
| Distinguishing Characteristics: | No gills present on sides of abdomen<br>Abdomen ends in 3 wide, oar-shaped gill-plates resembling tails<br>Large eyes and long legs<br>Grey, green, or brown in color<br>May be confused with mayflies, but damselflies have no abdominal gills and tails are more paddle-shaped |

## 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<br>1 – 4 years |
| Distinguishing Characteristics: | Large eyes<br>No visible external gills<br>Distinct mouthparts that extend to catch prey<br>Grey, green, or brown in color<br>Body is generally rough |

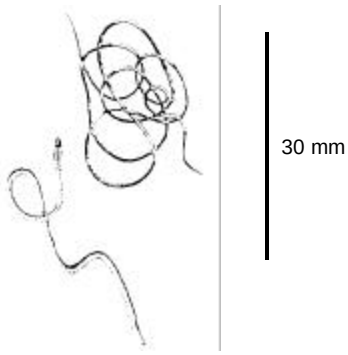
## Scud




| | |
|---|---|
| Class: | Crustacea |
| Order: | Amphipoda |
| Where to find: | Overhanging vegetation |
| Body shape: | Flattened laterally (side to side) |
| Size: | 5 – 20 mm |
| Food source: | Filtering collector |
| Lifecycle: | |
| Distinguishing Characteristics: | Shrimp-like<br>Swims on side<br>White to clear in color<br>Distinct black eyes |

# Group 3

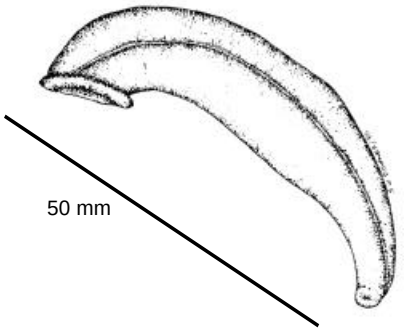
## Aquatic worms




| | |
|---|---|
| Phylum: | Annelida |
| Class: | Oligochaeta |
| Where to find: | Sediment, leaf pack, vegetation |
| Body shape: | Long, thin, cylindrical, segmented |
| Size: | 1 – 30 mm |
| Food source: | Organic matter |

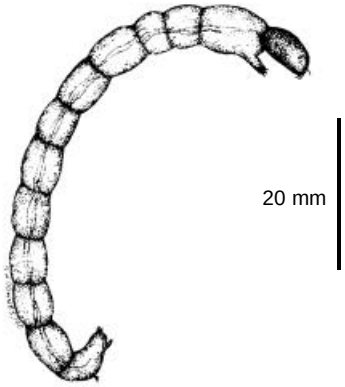
| | |
|---|---|
| Lifecycle: | Varies |
| Distinguishing Characteristics: | Similar to earthworm in appearance<br>Red, tan, black, or brown in color |

## Leech



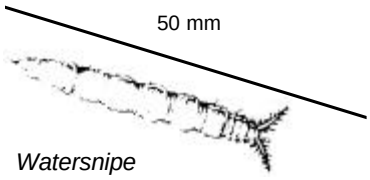

| | |
|---|---|
| Phylum: | Annelida |
| Class: | Hirudina |
| Where to find: | Sediment, leaf pack, vegetation |
| Body shape: | Flattened dorsoventrally (top to bottom)<br>many segments |
| Size: | 5 – 100 mm |
| Food source: | Predaceous, collector |
| Lifecycle: | |
| Distinguishing Characteristics: | Anterior and posterior suckers<br>Usually much wider than aquatic worm<br>Tan to brown in color |

## 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<br>No true legs<br>Anterior and posterior prolegs<br>May be bright red in color in low oxygen conditions<br>Often confused with aquatic worms, but midge has head and prolegs |

## Other Diptera larvae (Watersnipe, Horse and Deer Flies)



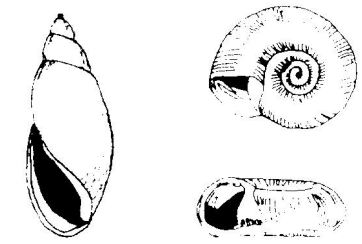

*Watersnipe*

| | |
|---|---|
| Order: | Diptera |
| 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<br>No true legs on the mid-section of the body<br>Usually worm-like and segmented<br>Milky, light brown, or greenish in color with digestive tract often visible |
| Watersnipe: | feathery “horns” at back end |

## Pouch snail

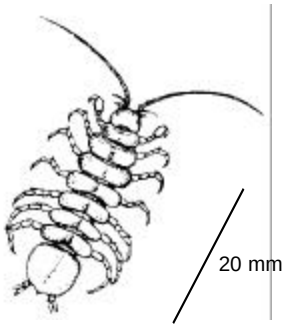
| | |
|---|---|
| Phylum: | Mollusca |
| Class: | Gastropoda |
| Where to find: | Grazing on a variety of substrate |
| Body shape: | Hard shell usually spiral, but may be flattened |
| Size: | 2 - 70 mm |
| Food source: | Grazer |
| Lifecycle: | |
| Distinguishing Characteristics: | With point held up, opening is on your left and faces you<br>Snails with shells coiling in one plane are counted as a Pouch Snail<br>Respire via lungs so not dependent on dissolved oxygen |




*pouch snail* *orb snail*

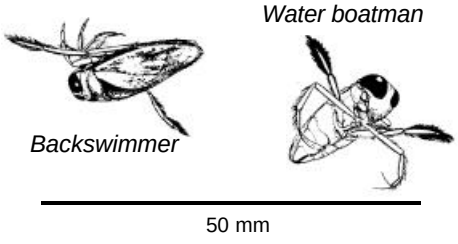
## Aquatic sowbug

| | |
|---|---|
| Class: | Crustacea |
| 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 |
| Lifecycle: | |
| Distinguishing Characteristics: | 7 pairs of legs<br>Dark brown to grey in color<br>Two pair of antennae, one usually much longer<br>Similar in appearance to terrestrial “roly-poly” |




## 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 |



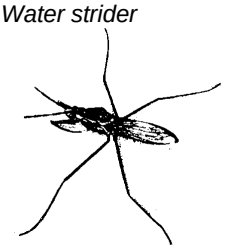
Size: 1 – 65 mm

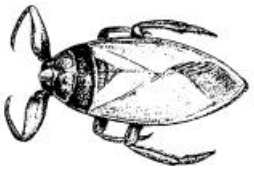
Food source: Predator. Injects chemicals that dissolve the internal parts of prey.

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

*Water strider*





*Giant water bug*

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

# 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, cranefly 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, midgefly 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.