

Name _____

Lab Section _____

Objectives:

- Gain an appreciation for the diversity and ecology of life in a stream community.
- To learn simple field collection technique.
- To learn a method of assessing the ecological health of a community.

Many different creatures and plants use streams. Some live in them all the time, while others only spend a short part of their lives there. Though we don't often see many of them – and some of them are so tiny we often miss them – a community of living organisms can be easily found in any stream. Ecologists often judge the health of a stream by the numbers of different types of creatures and plants found there. Others use the proportions of certain delicate aquatic invertebrates – those that don't respond well to pollutants – present in the stream to calculate an index of stream health.

Although many animals can be found in and around streams, today we are going to focus our attention on the invertebrates. Streams are home to many types of worms, including flatworms, annelids, and nematodes. One can also find several species of molluscs and arthropods. Many insects spend their larval or nymphal stages in streams. Finally, there are those creatures that are so tiny a microscope is needed to examine them. These include crustaceans such as cladocerans and copepods, rotifers, protozoa, and bacteria.

Procedure

Take a container of supplies and find an area of the stream in which to work. The aquatic invertebrates are generally found in three different layers of the stream: the surface, the water column, and the bottom. You will make collections from each of these areas first, then you will sort, identify, and catalogue what you found.

Surface Collection

To collect from the surface, you need to find an area of the stream where the water is not flowing very fast. You should be able to find some insects “crawling” along on the surface. Collect them with your net and put them in a container.

Water Column Collection

To collect from the water column, you should sweep the aquarium net back and forth through the water. Using your forceps or plastic spoon, transfer your catch to the plastic cups or the magnifying boxes. When sweeping the net through the water, be sure to sweep vertically as well as horizontally through the stream.

Bottom Collection

There are several ways to collect organisms from the bottom of the stream. One way is to have one member of your group hold the net against the bottom of the stream. Then have someone else disturb the rocks or leaves on the streambed just upstream so that all the organisms are washed into your net. Some bottom dwellers can be found on the underside of rocks. You can find these simply by picking up rocks and looking under them.

You can also use the trowel to collect some mud. You can put the mud in your white tub and sort through it with the forceps and spoons to see what is there.

The edge of the stream can be considered part of the bottom. Use your trowel to collect mud and leaf litter from the sides of the stream. Put your collection in the white tub to sort through it.

Identifying and Cataloging

After you have collected from each layer, you need to identify and catalogue what you've found. Use the Guide to Stream Invertebrates to identify your critters. Make sure you keep track of which layer each critter came from. Record your data in the table below.

Species	Number Found	Surface, Water Column, or Bottom
Backswimmer		
<u>Black Fly larvae</u>		
Caddisfly larvae		
<i>Crane Fly larvae</i>		
<i>Damselfly naiad</i>		
Dobsonfly larvae (Hellgrammite)		
<i>Dragonfly naiad</i>		
Mayfly naiad		
Mosquito larvae		
Predaceous Diving Beetle		
Stonefly naiad		
Toe Biter		
Water Boatman		
Water Penny (Beetle larva)		
Water Strider		
Whirligig Beetle		
Flatworms		
Snails		
<i>Crayfish</i>		
<u>Aquatic annelids</u>		

We know from previous research that some aquatic invertebrates are more sensitive to pollutants than others. We can use this information to assess the health of a stream. The following list shows some of the species that are most or least sensitive to pollutants.

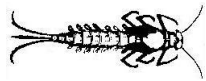
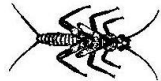
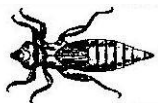
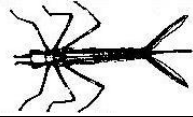

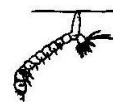


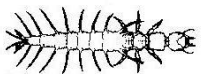

Very Sensitive	Somewhat Sensitive	Not Sensitive
Caddisfly larvae Mayfly larvae Stonefly larvae Water Pennies (Beetle larvae) Flatworms	<i>Crane Fly larvae</i> <i>Damselfly</i> <i>Dragonfly naiad</i> <i>Crayfish</i>	<u>Blackfly larvae</u> <u>Aquatic annelids</u>

Using this information, examine your data and assess the health of this creek. Is it good? Okay? Bad?


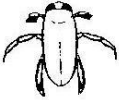
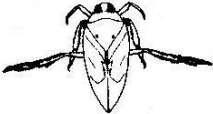
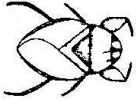
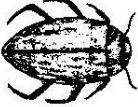
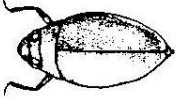




What data led you to your conclusion (e.g. the abundance of certain species indicated the water quality was good, bad, okay.)

Guide to Stream Invertebrates

Larval forms:

Common Name	Diagram	Description
Mayfly Naiad		Crawls on or under rocks. Feeds on plants and animals. Gills under abdomen.
Stonefly Naiad		Crawls on or under rocks. Feeds on plants and animals. Hair-like gills in "arm pits".
Dragonfly Naiad		Crawls on bottom. Carnivorous. Rectal gills for jet propulsion.
Damselfly Naiad		Crawls on bottom. Carnivorous. 3 gill paddles at end of abdomen.
Caddisfly Larvae		Crawls on bottom in case (may be made of sand, mud, rocks, etc.) Larvae live up to 7 years, adults live only 1 month.
Mosquito Larvae		Rests at surface or wriggles in water. Eats plants and animals. Gills at end of abdomen.
Fly Larvae		Attaches to rocks in fast moving streams. Filters detritus from water.
Crane Fly Larvae		On bottom, usually in mud No legs, tentacles on one end
Dobsonfly larvae (Hellgrammite)		Crawls on bottom. Carnivorous.
Water Penny (Psephenidae Beetle larvae)		Crawls (slowly) on rocks. Grazes on algae.

Adult forms:

Common Name	Diagram	Description
Water Strider		Walks on surface of water. Carnivorous.
Water Boatman		Swims in water, goes to surface to get air under wings. Feeds on algae and detritus.
Backswimmer		Swims in water, goes to surface to get air. Swims on back, can fly.
Toe Biter (Giant Water Bug)		Crawls on bottom, can fly. Feeds on insects or tadpoles with poisonous bite. Keeps air under wings to breathe.
Predaceous Diving Beetle		Swims and crawls on bottom. Traps air under wings to breathe. Carnivorous.
Whirligig Beetle		Swims erratically on surface. Scavenger. Has eye above and below to see both worlds.
Flatworms		Crawls on rocks. Carnivorous.
Snails		Crawls on rocks, bottom. Herbivorous.
Annelids		Crawls on bottom, in mud or under rocks, leaf litter. Scavenger
Crayfish		Crawls on bottom. Lives in holes at edge of stream. Scavenger

Lab Notes: