

# AQUATIC MACROINVERTEBRATES

## Water Quality Indicators for Streams

Classifying general stream water quality based on the tolerance of aquatic organisms to organic pollution.

**CLASS I ORGANISMS:** These organisms are generally pollution-intolerant. Great numbers of these in a stream generally indicates **GOOD WATER QUALITY**.



Hellgrammite (Dobsonfly larva)



Water Penny  
(beetle larva)



Stonefly nymph



Caddisfly larva



Mayfly nymph

**CLASS II ORGANISMS:** These organisms are somewhat tolerant of water pollution. They can exist in a wide range of water quality.



Damselfly nymph



Scud



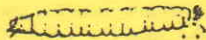
Black fly larva



Beetle larva



Dragonfly nymph



Crane fly larva



Crayfish



Sowbug

**CLASS III ORGANISMS:** These organisms are generally tolerant of pollution. Their dominance usually indicates **POOR WATER QUALITY**.



Leech



Tubifex worms



Mosquito larva



Rat-tailed maggot



Midge larva



## PHYSICAL FACTORS THAT AFFECT AQUATIC LIFE\*

### DISSOLVED OXYGEN

Oxygen is essential to the living things in streams, lakes, rivers, and ponds. Generally, the faster water is moving, the greater the amount of dissolved oxygen contained in it.

A stream with a dissolved oxygen reading (or a "D.O.") of 10 mg/L (ppm) is considered "very good" and could support fish with high oxygen needs such as trout. A very low D.O. reading (below 3 ppm) indicates a pollution problem (ie, septic tanks or water treatment plant).

### D.O. REQUIREMENTS FOR SOME AQUATIC SPECIES

(Levels required for spawning, growth and well-being)

<i>Some Native Fishes/Insect Larvae</i>	<i>D.O. in ppm or mg/L</i>
Salmon, trout, caddisfly, stonefly, mayfly	6 ppm and above
Bass, crappie, catfish, carp	5 ppm and above

### TEMPERATURE RANGES

Temperature and dissolved oxygen are closely related: the warmer the water, the less dissolved oxygen. Warmwater species can be found in lakes and large rivers; coldwater species, in small streams.

<i>Warmwater species (70°F and up)</i>	Largemouth bass, crappie, bluegill, carp, catfish, caddisfly
<i>Coolwater species (65° - 75°F)</i>	Perch, sauger, walleye, smallmouth bass, pike, muskellunge, pickerel, rock bass, stonefly, mayfly, caddisfly, water beetles
<i>Coldwater species (70° and below)</i> <i>20°C</i>	Trout, salmon, caddisfly, stonefly, mayfly

### pH RANGES THAT SUPPORT AQUATIC LIFE .

MOST ACID	NEUTRAL												MOST ALKALINE
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Bacteria	1.0												13.0
Plants (algae, rooted, etc.)					6.5	_____						12.0	
Carp, suckers, catfish some insects					6.0	_____			9.0				
Bass, crappie					6.5	_____		8.5					
Snails, clams, mussels						7.0	_____		9.0				
Largest variety of animals (trout, mayfly, stonefly, caddisfly)					6.5	_____		7.5					

\*Information from: *Aquatic Project WILD; Water, Water Everywhere, But . . .* from Hach Inc.; "Sport Fishes of Pennsylvania"