

BIOLOGICAL MONITORING DATA SHEET

Date / / Begin Time : (am/pm) # Adults
MM DD YY

End Time : (am/pm) # Students

Certified Monitors' Names _____ Volunteer ID _____

Organization Name _____

Watershed Name _____ Watershed # _____

Stream/River Name _____ Site ID _____

(Please do not abbreviate.)

(Above ID numbers are required.)

Check Methods Used

- Kick Seine Net (3 times)
- D-Net (20 jabs or scoops)

Check Habitats Sampled

- Riffles
- Undercut Banks
- Sediment
- Leaf Packs
- Snags/Vegetation
- Other

POLLUTION TOLERANCE INDEX (PTI)

PT GROUP 1

Intolerant

- Stonefly Nymph _____
- Mayfly Nymph _____
- Caddis Fly Larvae _____
- Dobsonfly Larvae _____
- Riffle Beetle _____
- Water Penny _____
- Right-Handed Snail _____

PT GROUP 2

Moderately Intolerant

- Damselfly Nymph _____
- Dragonfly Nymph _____
- Sowbug _____
- Scud _____
- Crane Fly Larvae _____
- Clams/Mussels _____

PT GROUP 3

Fairly Tolerant

- Midges _____
- Black Fly Larvae _____
- Planaria _____
- Leech _____

PT GROUP 4

Very Tolerant

- Left-Handed Snail _____
- Aquatic Worms _____
- Blood Midge _____
- Rat-tailed Maggot _____

Of TAXA _____ # Of TAXA _____ # Of TAXA _____ # Of TAXA _____

Weighting:

Factors (x 4) _____ (x 3) _____ (x 2) _____ (x 1) _____

23 or More	Excellent
17 - 22	Good
11 - 16	Fair
10 or Less	Poor

POLLUTION TOLERANCE INDEX RATING

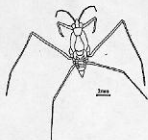
(Add the final index values for each group.)

Other Biological Indicators

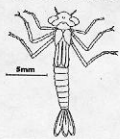
- Native Mussels
- Zebra Mussels
- Submerged Aquatic Plants
- % Algae Cover
- Diversity Index

KEY TO AQUATIC INVERTEBRATES AS WATER QUALITY INDICATOR SPECIES

VERY TOLERANT OF POLLUTION



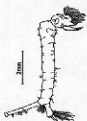
Water Strider



Damselfly Nymph



Water Beetle Nymph and Adult



Mosquito Larva

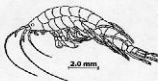


Snail

SOMEWHAT POLLUTION TOLERANT



Dragonfly Nymph



Amphipod

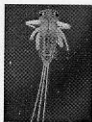


Isopod

INTOLERANT OF POLLUTION



Stonefly Nymph



Mayfly Nymph



Caddisfly Larvae



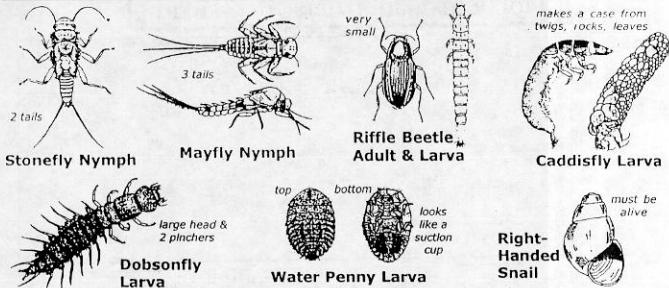
Grass Shrimp



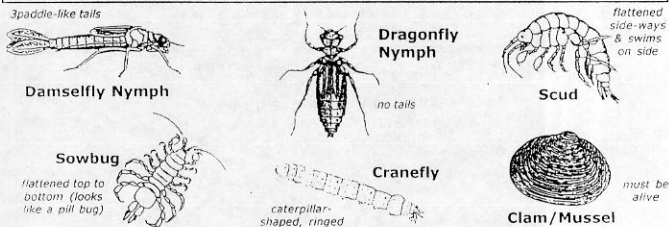
Dobsonfly Larva

Macroinvertebrate Identification Key

GROUP 1 – Very Intolerant of Pollution



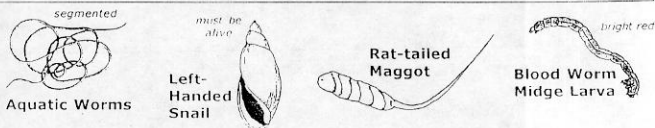
GROUP 2 – Moderately Intolerant of Pollution



GROUP 3 – Fairly Tolerant of Pollution



GROUP 4 – Very Tolerant of Pollution



Clean Water Animals

(Pollution Sensitive)

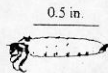
Stonefly Larva-3



Whirligig Beetle-3



Mayfly Nymph-3



Caddisfly Larva-3

1-2 in.



Grass Shrimp-3

up to 3.0 in.



Dobsonfly Larva-3

3 points for each
TOTAL POINTS =

+

Fair Water Animals

(Somewhat Sensitive)



Diving Beetle-2
1-1.5 in.



Dragonfly Larva-2

1 in.



Damselfly Nymph-2

0.3 in.



Scud-2

1 in.



Water Boatman-2

0.4 in.



Coiled Snail-2

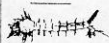
2 points for each
TOTAL POINTS =

+

Dirty Water Animals

(Pollution Tolerant)

0.3 in.



mosquito larva-1

0.3 in.



Gilled Snail-1

0.5 in.



Freshwater Clam-1

to 3 in.



Leeches-1

1 in.



Aquatic Worm-1

0.2 in.



Midge Larva-1

1 point for each
TOTAL POINTS =

IOWATER BENTHIC MACROINVERTEBRATE KEY

Pollution Intolerant (High Quality Group)



Caddisfly: 6 hooked legs on upper body, 2 hooks on end, may have stuck, rock or leaf case, 2-40 mm in length.



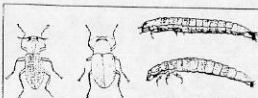
Dobsonfly: 6 legs, 8 pairs of feelers and gill tufts on lower half of body, short antennae, 25-90 mm in length.



Mayfly: 6 legs, feathery or oval-shaped gills on lower body, 2 to 3 long tails, 3-30 mm in length.



Stonefly: 6 legs with hooked tips, antennae, 2 tails, gill tufts under legs or no visible gills, 5-60 mm in length.



Riffle Beetle: Adult has 6 legs, body covered with tiny hairs, walks slowly underwater, 1-8 mm in length.

Larva has hard plates on each segment, 2-60 mm in length.

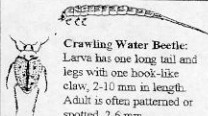


Snail (not pouch): When opening is facing you, shell opens on right, operculum (flap over opening) present.



Water Penny Beetle: Flat saucer-shaped body, 6 tiny legs and gills on underside, 4-6 mm.

Somewhat Pollution Tolerant (Middle Quality Group)



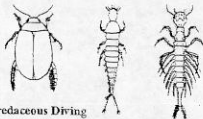
Crawling Water Beetle: Larva has one long tail and legs with one hook-like claw, 2-10 mm in length. Adult is often patterned or spotted, 2-6 mm.



Backswimmer: Forelegs not as spoon-shaped as Water Boatman's, swims upside-down, body is V-shaped, 5-17 mm in length.

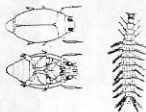


Water Boatman: Forelegs spoon-shaped and shorter compared to Backswimmer, 3-11 mm in length.



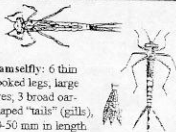
Predaceous Diving Beetle: Adults have an oval streamlined body, longer antennae than Whirligig Beetle, 1-80 mm in length.

Larva has many hairs on body, two feathery tails, large head, 5-70 mm in length.



Whirligig Beetle: Flattened oval body, short, clubbed antennae, erratic swimmer, 3-15 mm.

Larva has many hairs on body, short tail or no tail, up to 30 mm in length.



Damselfly: 6 thin hooked legs, large eyes, 3 broad oar-shaped "tails" (gills), 10-50 mm in length.



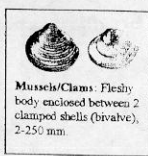
Dragonfly: Wide oval abdomen, 6 hooked legs, large eyes, 10-60 mm in length.



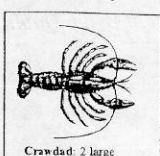
Somewhat Pollution Tolerant (Middle Quality Group) continued



Crane Fly: Milky, green, or light-brown color, caterpillar-like segmented body, 4 finger-like lobes at back end, no visible head, 10-100 mm.



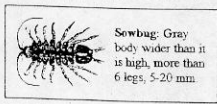
Mussels/Clams: Fleishy body enclosed between 2 clamped shells (bivalve), 2-250 mm.



Crawdad: 2 large claws, 8 legs, up to 6 inches long.



Scud: White to gray in color, more than 6 legs, swims sideways, body higher than wide, 5-20 mm in length.



Sowbug: Gray body wider than it is high, more than 6 legs, 5-20 mm.



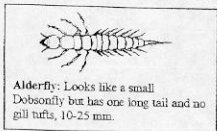
Water Scorpion: Raptor-like forelegs for catching prey, long breathing tube, stick-like long body 15-45 mm.



Giant Water Bug: Raptor-like forelegs for catching prey, leathery textured, oval body, 15-65 mm in length.

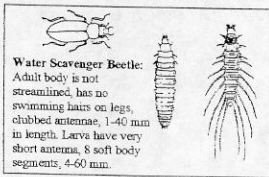


Water Strider: Slender body, long legs "walk" on water surface, 3-21 mm.



Alderfly: Looks like a small Dobsonfly but has one long tail and no gill tufts, 10-25 mm.

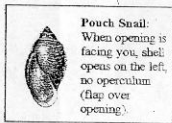
Pollution Tolerant (Low Quality Group)



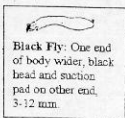
Water Scavenger Beetle: Adult body is not streamlined, has no swimming hairs on legs, clubbed antennae, 1-40 mm in length. Larva have very short antenna, 8 soft body segments, 4-60 mm.



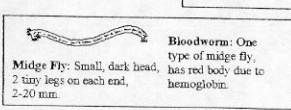
Mosquito: Head has small mouth brushes and short antennae; abdomen has breathing siphon, surfaces for air, 4-12 mm.



Pouch Snail: When opening is facing you, shell opens on the left, no operculum (flap over opening).

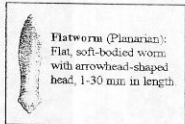


Black Fly: One end of body wider, black head and suction pad on other end, 3-12 mm.

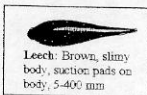


Midge Fly: Small, dark head, 2 tiny legs on each end, 2-20 mm.

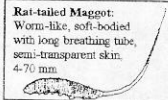
Bloodworm: One type of midge fly, has red body due to hemoglobin.



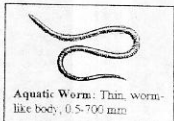
Flatworm (Planarian): Flat, soft-bodied worm with arrowhead-shaped head, 1-30 mm in length.



Leech: Brown, slimy body, suction pads on body, 5-400 mm.



Rat-tailed Maggot: Worm-like, soft-bodied with long breathing tube, semi-transparent skin, 4-70 mm.



Aquatic Worm: Thin, worm-like body, 0.5-700 mm.



SEGMENTED

NON-SEGMENTED

USUALLY ATTACHED TO PLANTS,
ROCKS ETCHydra
CNIDARIANO TENTACLES
FREE LIVING
Flatworms
TURBELLARIA

NO SHELL

SHELL

DOUBLE
Mussels
BIVALVIASINGLE
Snails
GASTROPODA

JOINTED LEGS

3 PAIRS OF LEGS
INSECTA

WITHOUT WINGS

HARD WING,
MOUTHPARTS FOR CHEWING
Adult Beetles
COLEOPTERAWITHOUT HARD WING, MOUTHPARTS
FOR PIERCING & SUCKING
True Bugs
HEMIPTERA

WITH WINGS

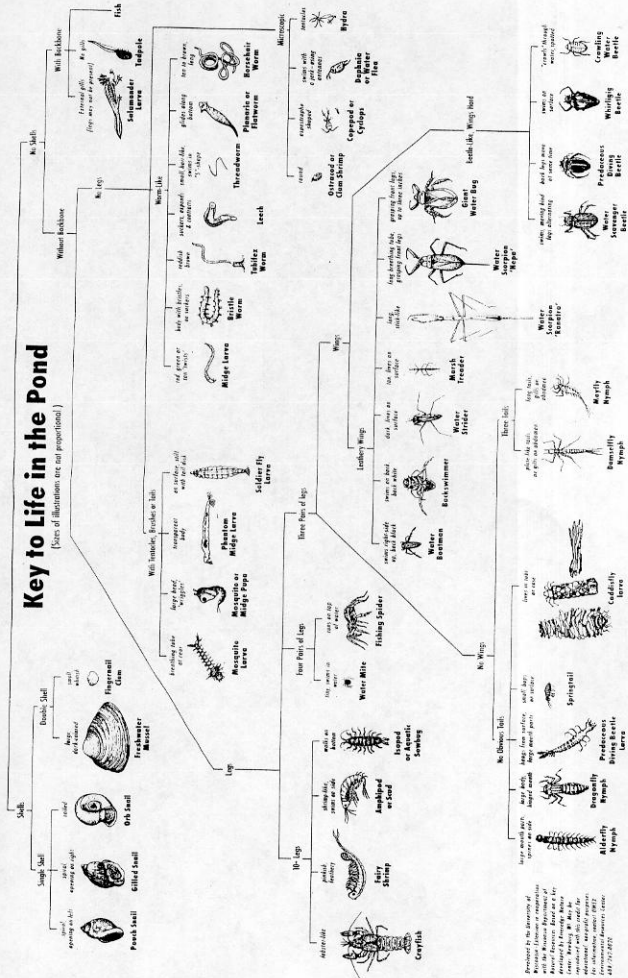
4 PAIRS OF LEGS
Water Spiders/ Watermites
ARACHNIDAMORE THAN 4 PAIRS
Yabbies, Prawns, Water
fleas, Scuds
CRUSTACEAWORM LIKE MORE
THAN 15 BODY SEGMENTS
Worms, Leeches
ANNELIDAOBVIOUS HEAD
LESS THAN
15 BODY SEGMENTS
Midges, Mosquitoes
DIPTERAWITH DEVELOPING WINGS ON
THORAX2 OR 3 OBVIOUS
TAIL APPENDAGESBODY LONG AND SLENDER
Damselflies
ZYGOPTERALONG FINE FILAMENTS, GILLS ON
SIDE OF ABDOMEN
Mayflies
EPHEMEROPTERANO OBVIOUS APPENDAGE
Dragonflies
ANISOPTERA2 TAIL FILAMENTS
LONG ANTENNAE
Stonemflies
PLECOPTERA

WITHOUT DEVELOPING WINGS

PAIR OF HOOKED PROLEGS,
SLOW MOVING.
SOME LIVE IN LONG CASE
Caddisflies
TRICHOPTERAUSUALLY VERY ACTIVE
DON'T LIVE IN CASE
Beetle Larvae
COLEOPTERAAdapted from *Invertebrate Key - SA Waterwatch Manual*

Key to Life in the Pond

(Sizes of illustrations are not proportional.)



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