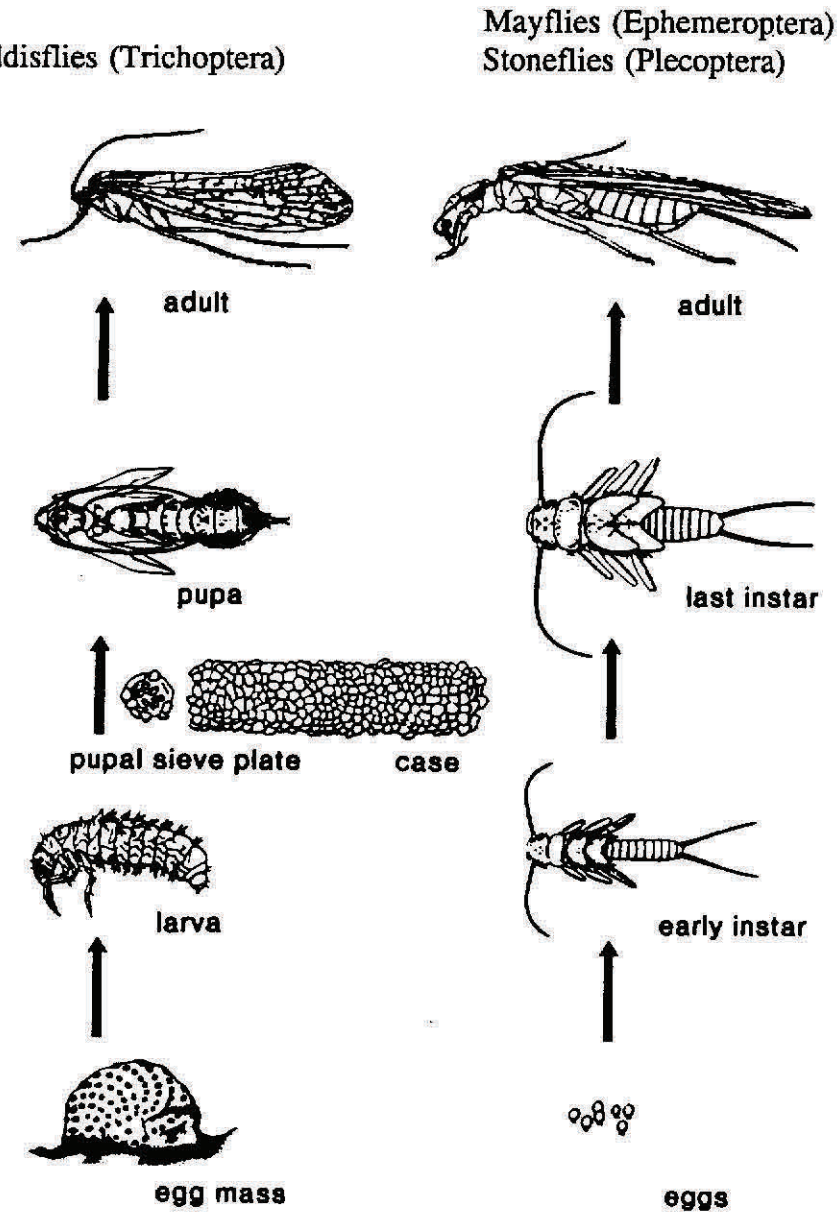
Aquatic Invertebrate Life Cycle Stages



COMPLETE METAMORPHOSIS (Holometabolous)

INCOMPLETE METAMORPHOSIS (Hemimetabolous)

Source: Rob Plotnikiff, Ambient Monitoring Section, Washington Dept. of Ecology

Figure 1.

Key to Immature Aquatic Insects or Invertebrates

Things you should know before using this key.

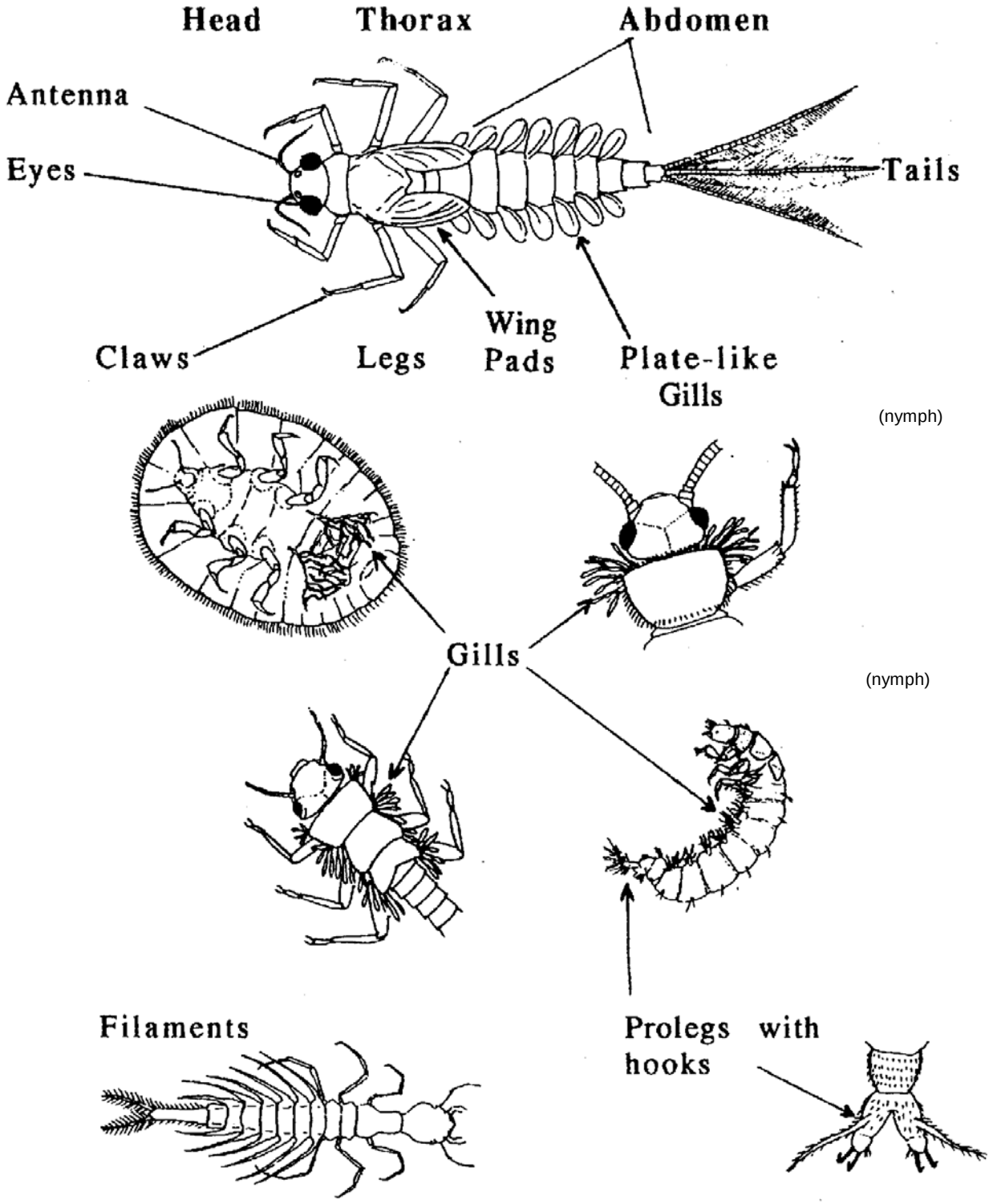


Figure 2. Key to Immature Aquatic Insects. Klamath River Education Program ©1992.

A KEY TO IMMATURE AQUATIC INVERTEBRATES - Page 1

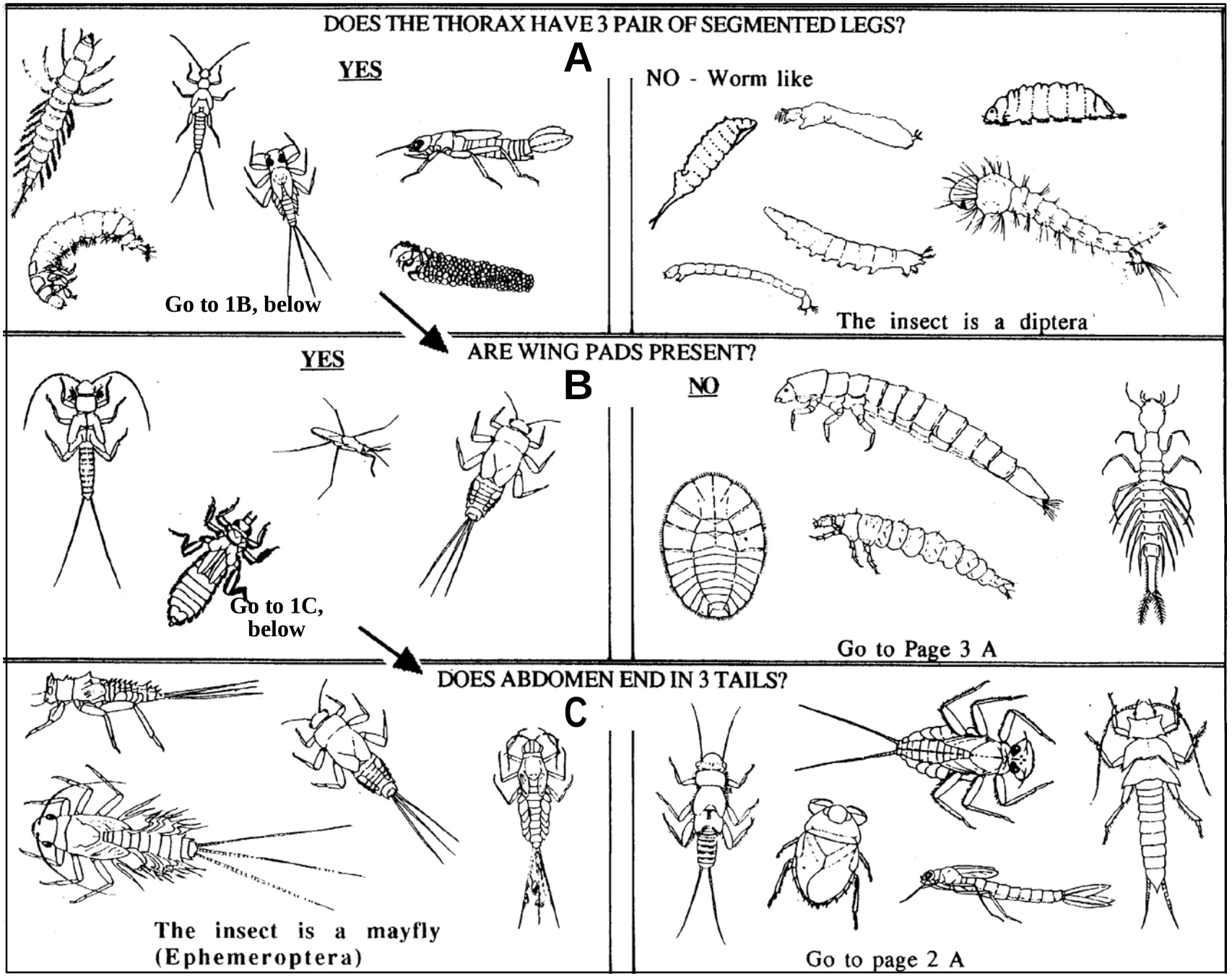
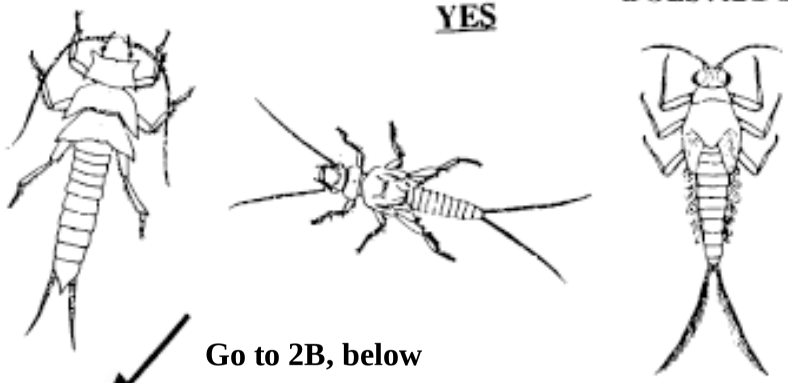


Figure 2., Continued / Klamath River Educational Program ©1992

A KEY TO IMMATURE AQUATIC INVERTEBRATES - Page 2

DOES ABDOMEN END IN 2 TAILS?

YES

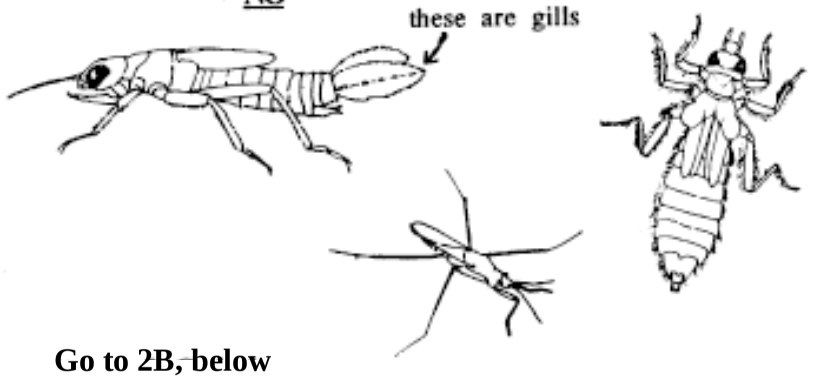


Go to 2B, below

A

NO

these are gills

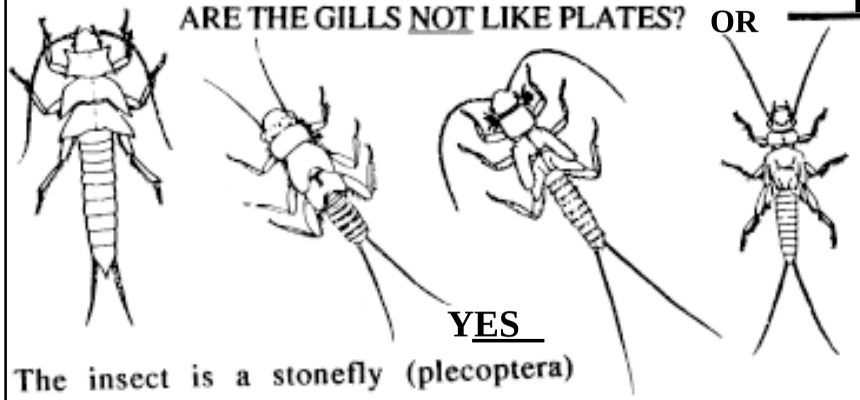


Go to 2B, below

ARE THERE TWO CLAWS AT END OF LEGS and ARE THE GILLS NOT LIKE PLATES? OR

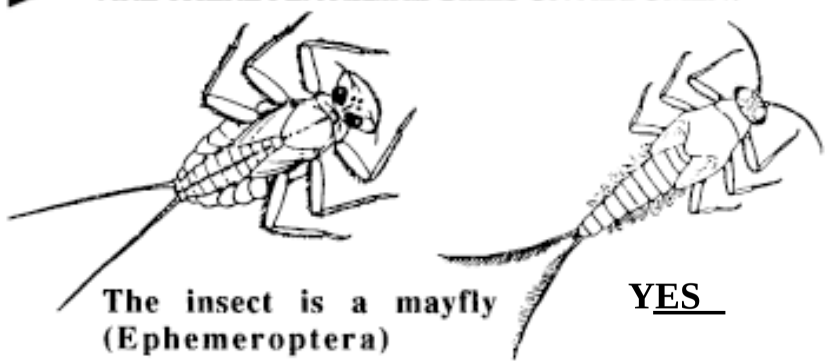
B

IS THERE ONE CLAW AT THE END OF LEGS and ARE THERE PLATELIKE GILLS ON ABDOMEN?



YES

The insect is a stonefly (plecoptera)



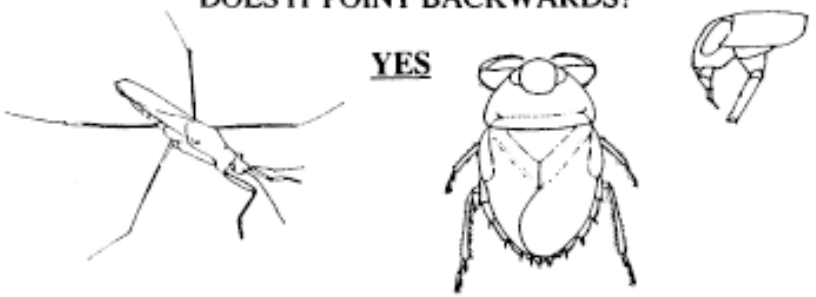
The insect is a mayfly (Ephemeroptera)

YES

IS THE MOUTH SHAPED LIKE A BEAK AND DOES IT POINT BACKWARDS?

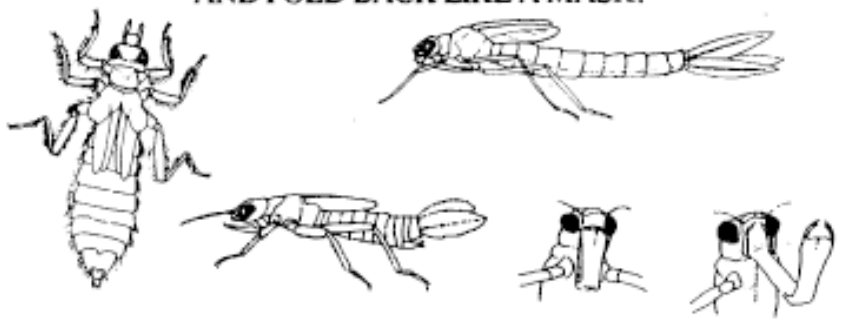
C

YES



The insect is a hemiptera

DOES THE MOUTH EXTEND OUT LIKE A SHOVEL AND FOLD BACK LIKE A MASK?



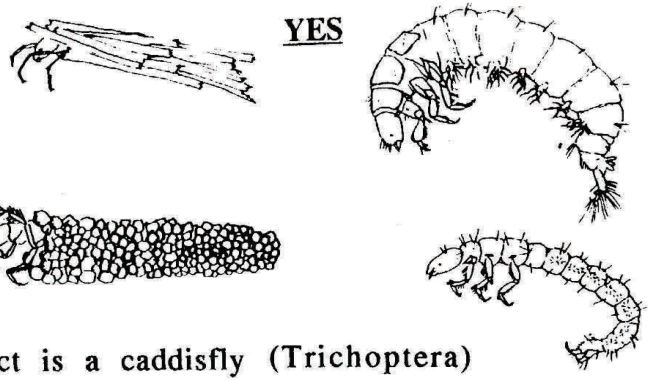
The insect is odonata

A Key to Immature Aquatic Invertebrates - Page 3

DOES ABDOMEN END IN PAIR OF CLAWS or IS INSECT INSIDE A CASE?

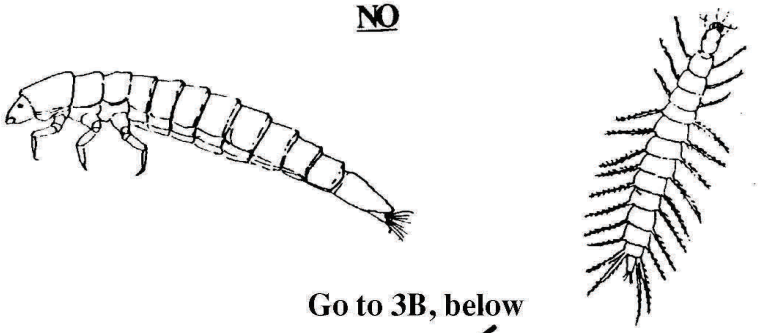
A

YES



The insect is a caddisfly (Trichoptera)

NO

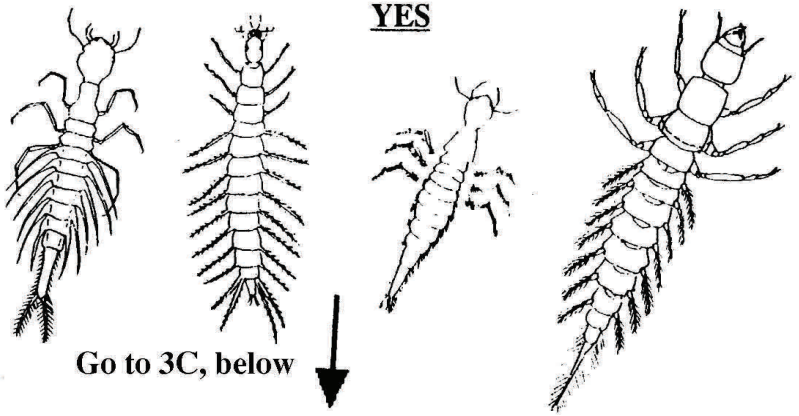


Go to 3B, below

ARE THERE MANY FILAMENTS ON THE SIDES OF THE ABDOMEN?

B

YES



Go to 3C, below

NO

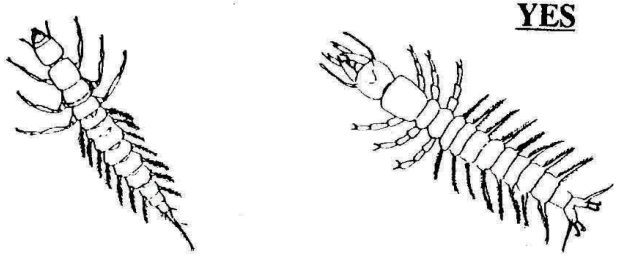
water penny underside

The insect is a Coleoptera

DOES ABDOMEN END IN ONE LONG, SLENDER TAIL or IN A PAIR OF PROLEGS, EACH WITH A PAIR OF HOOKS?

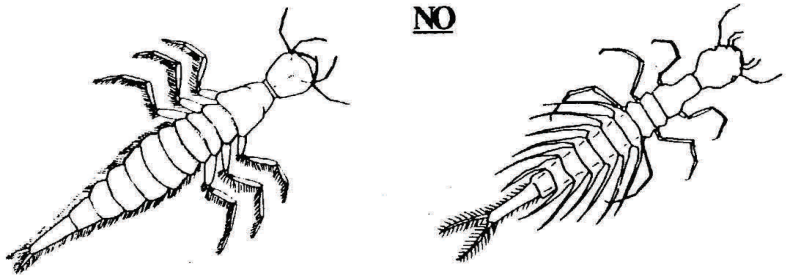
C

YES



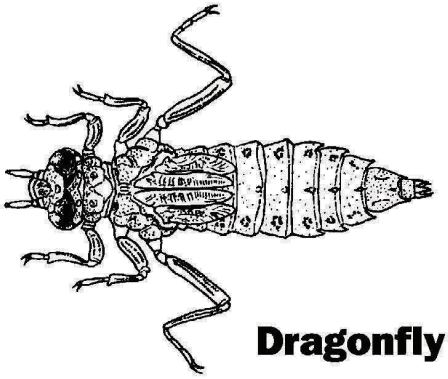
The insect is a megaloptera

NO



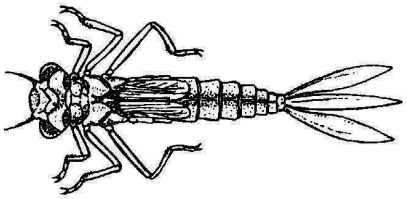
The insect is a coleoptera

IDENTIFICATION LABELS

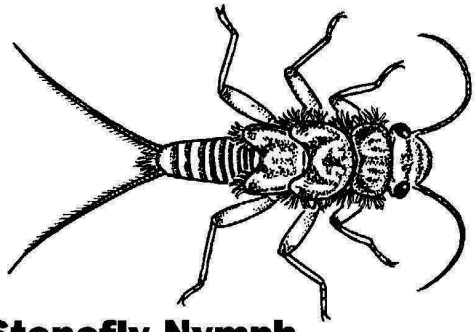


Dragonfly Nymph

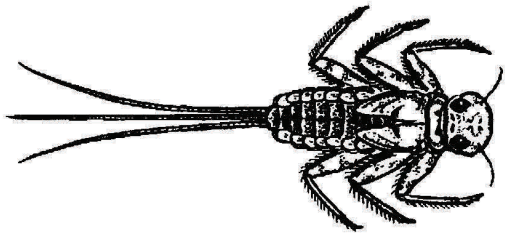
Caddisfly Larva



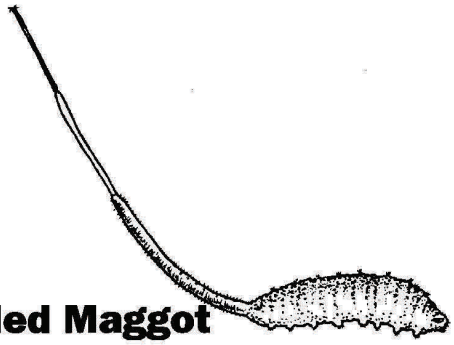
Damselfly Nymph



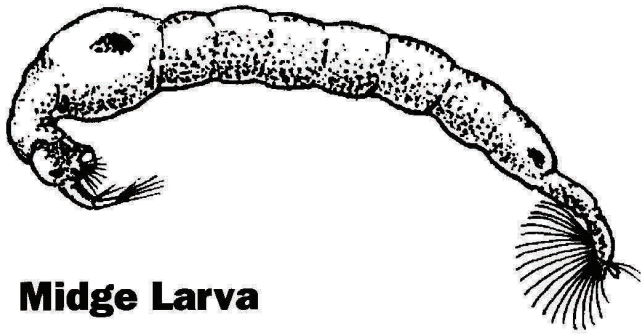
Stonefly Nymph



Mayfly Nymph



Rat-tailed Maggot



Midge Larva

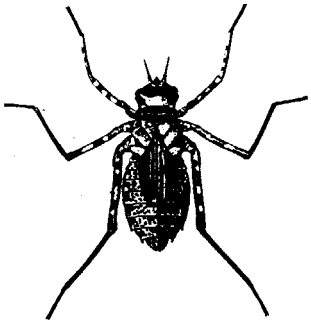
Environmental Stressor

Figure 3.
Macroinvertebrate Mayhem
Invertebrates

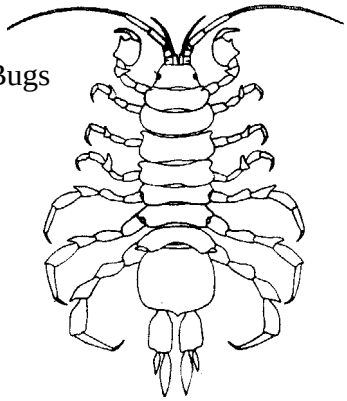
AOUATIC INVERTEBRATES THAT ARE GENERALLY TOLERANT OF WATER POLLUTION

(found commonly in pool or depositional areas of streams or rivers)

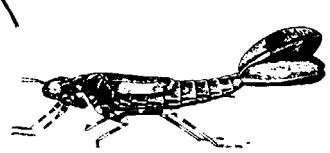
Dragonflies (Odonata)



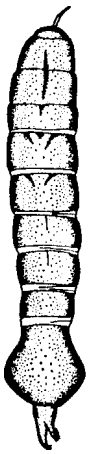
Aquatic Sow Bugs (Isopoda)



Damselflies (Odonata)

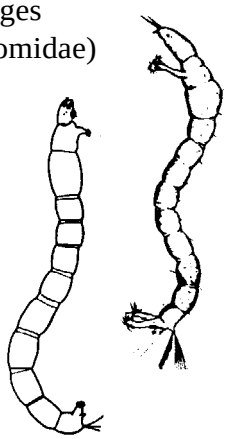


Craneflies (Tipulidae)

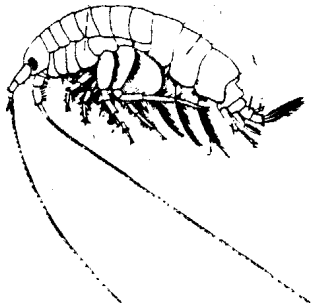


Blackflies (Simuliidae)

Midges (Chironomidae)



Sideswimmers (Amphipoda)



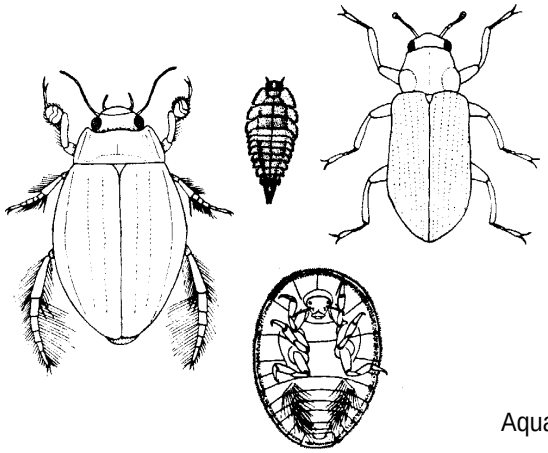
Leeches (Hirudinea)

Flatworms (Turbellaria)

R.W. Plotnikoff

Washington State Department of Ecology
Environmental Investigations and Laboratory Services
Olympia, WA 98504

Aquatic Beetles (Coleoptera)



Snails (Gastropoda)

Bivalves (Pelecypoda)

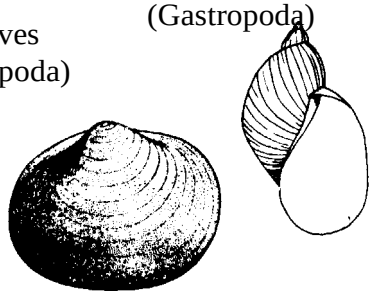


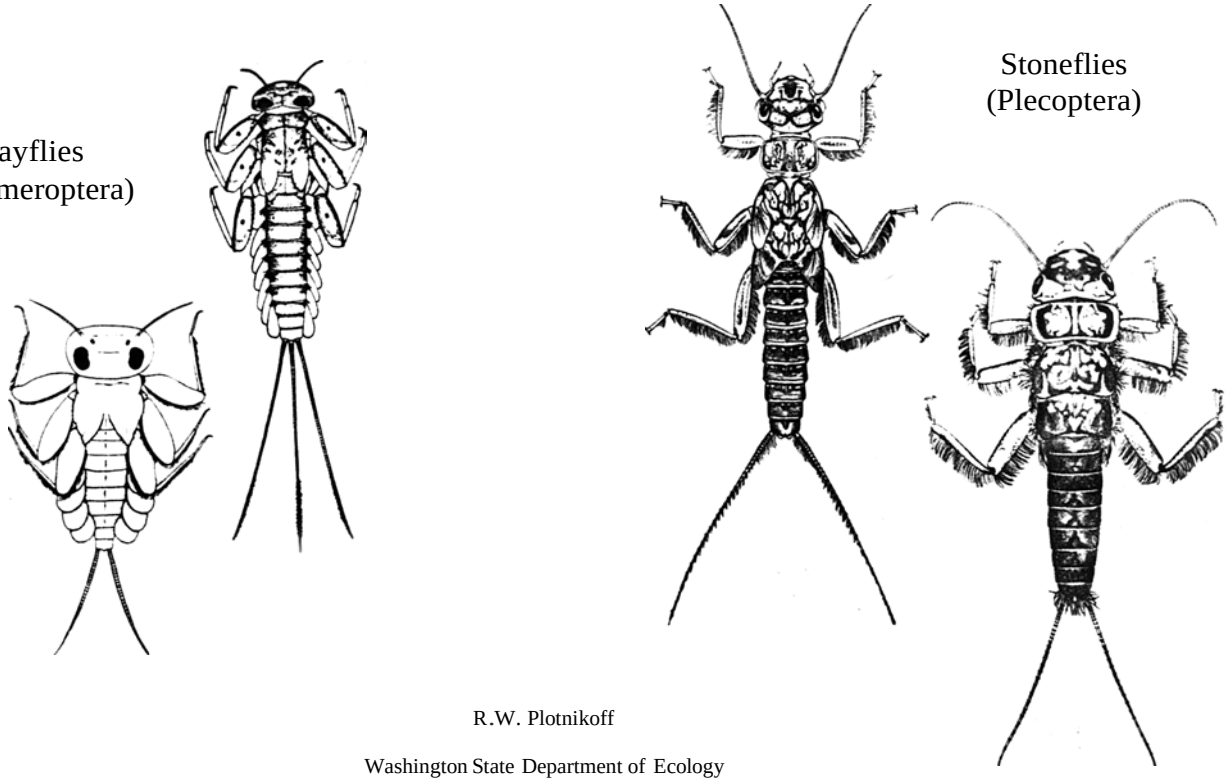
Figure 4.
Aquatic Invertebrates Tolerant to Water Pollution.
Klamath River Educational Program @1992

AOUATIC INVERTEBRATES THAT ARE GENERALLY SENSITIVE TO WATER POLLUTION

(found commonly in moderate to fast running areas of streams or rivers)

Mayflies
(Ephemeroptera)

Stoneflies
(Plecoptera)



R.W. Plotnikoff

Washington State Department of Ecology
Environmental Investigations and Laboratory Services
Olympia, WA 98504

Caddisflies
(Trichoptera)

Salmonflies
(Megaloptera)

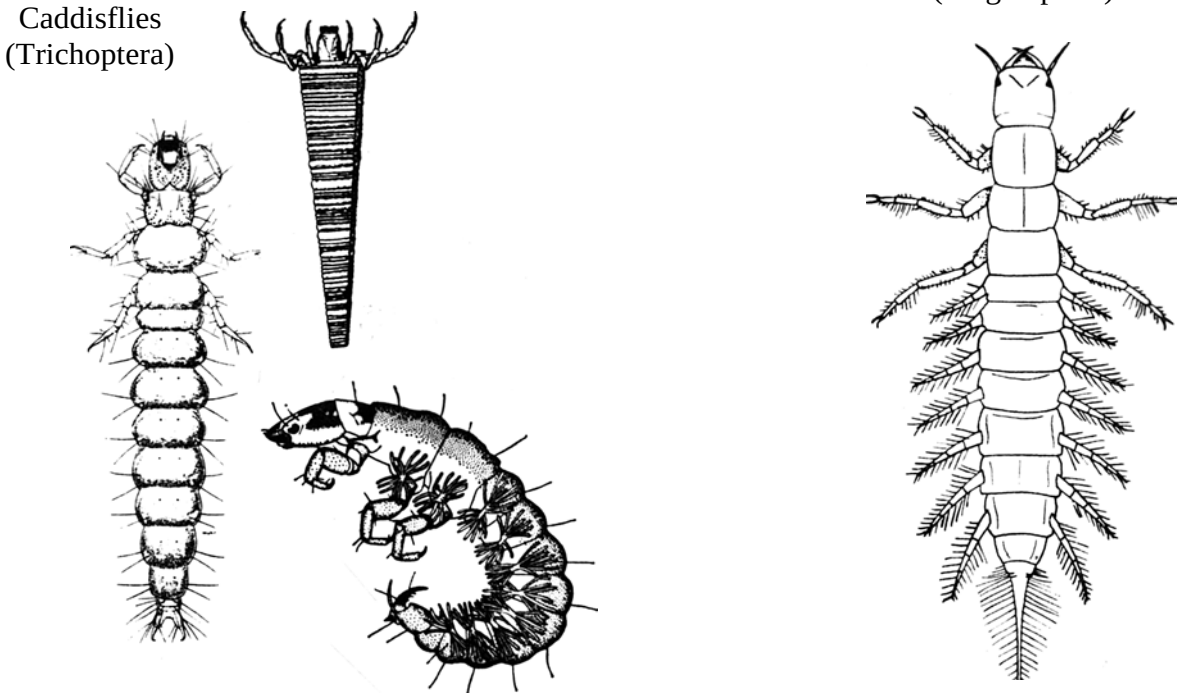


Figure 5.
Aquatic Invertebrates Sensitive to Water Pollution.
Klamath River Educational Program @1992

MAYFLY EXTERNAL ANATOMY

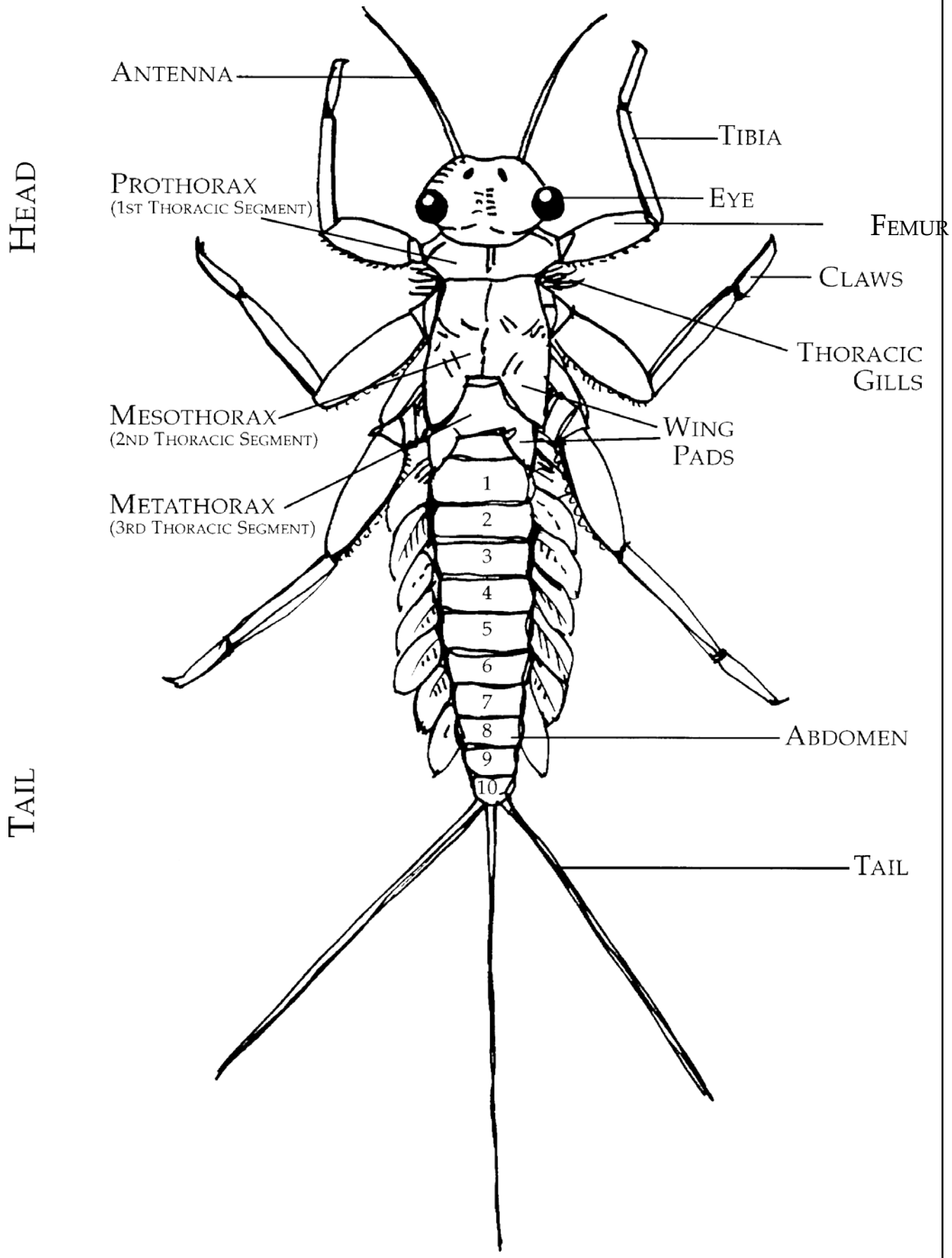
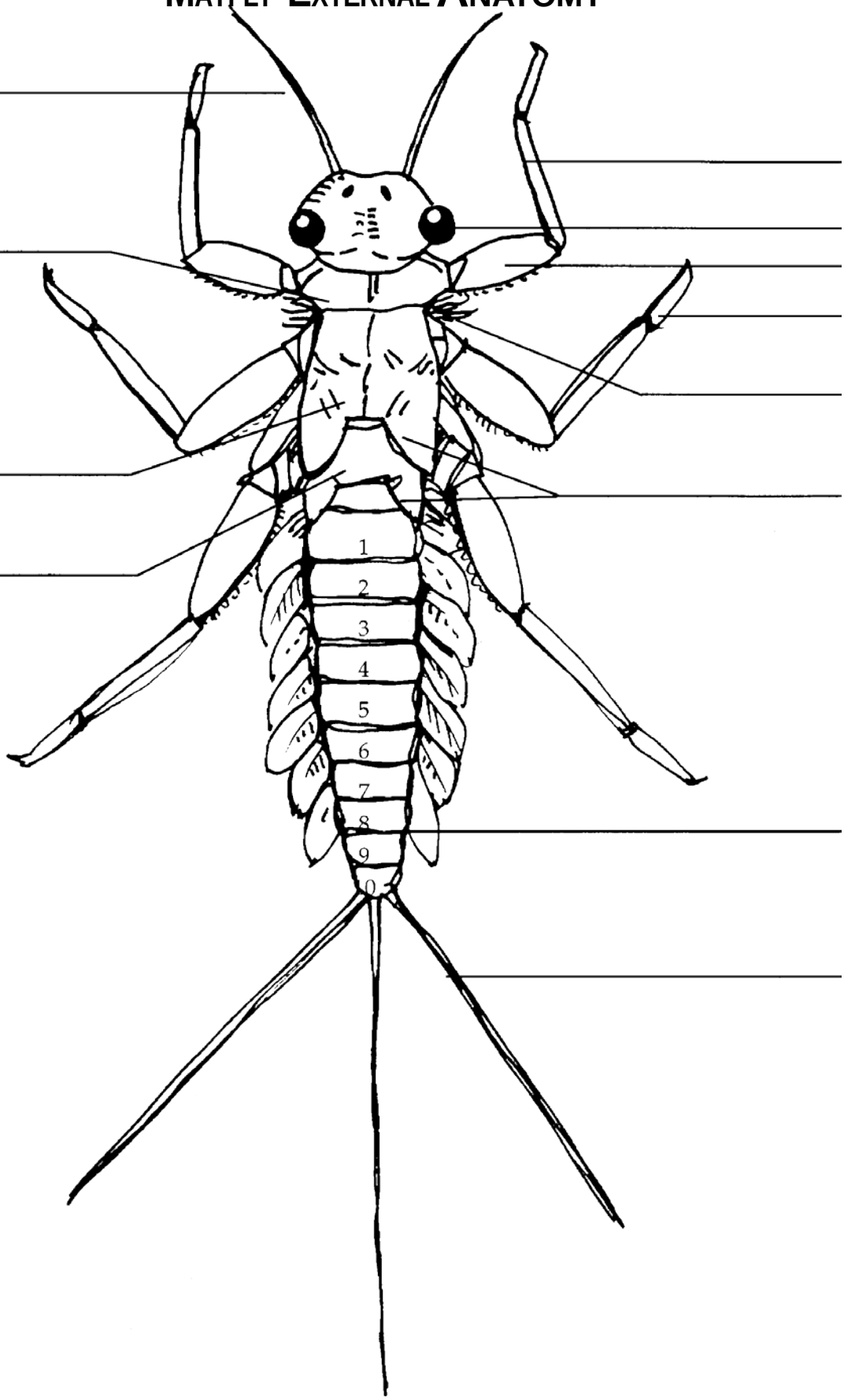


Figure 6. Mayfly External Anatomy / Klamath River Educational Program @1992

MAYFLY EXTERNAL ANATOMY

HEAD

TAIL



Name _____

Figure 6A. Mayfly External Anatomy / Klamath River Educational Program @1992

FOOD PROCESSING IN STREAMS

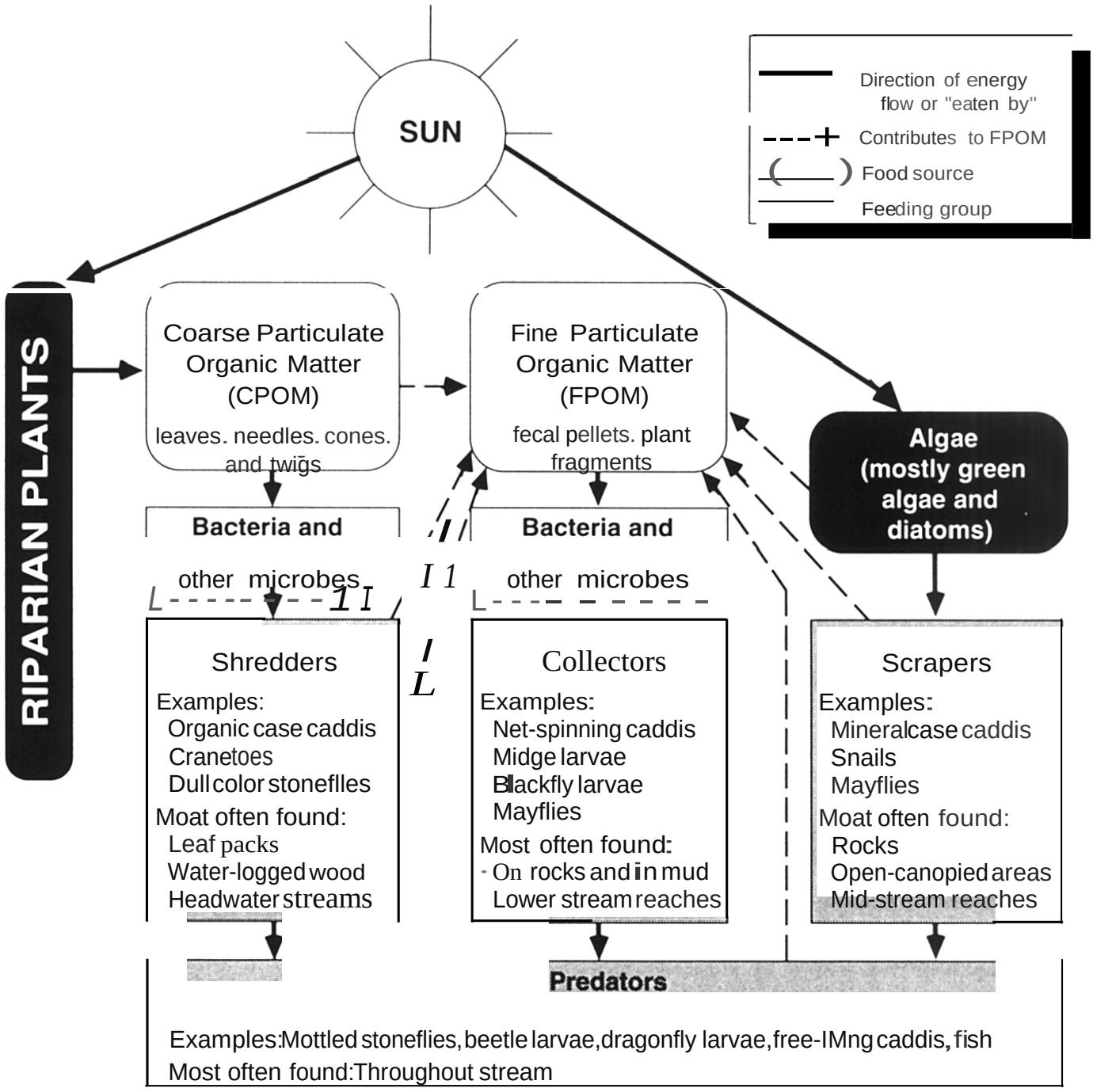
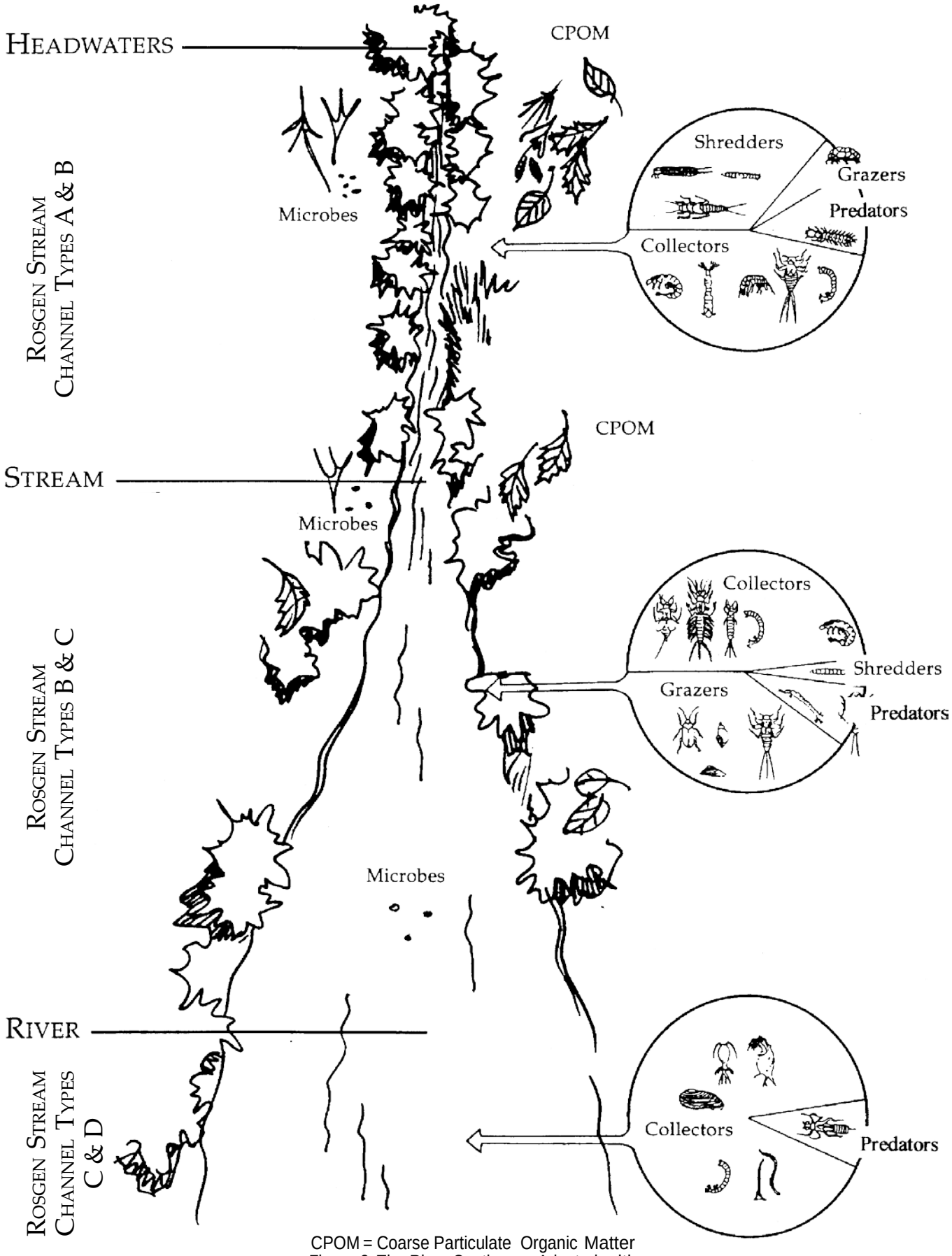


Figure 7. Food Processing In Streams
Adapted from:Ken Cummins,"From Headwater Streams to Rivers," American Biology Teacher,May 1977, p. 307

THE RIVER CONTINUUM



CPOM = Coarse Particulate Organic Matter
Figure 8. The River Continuum Adapted with permission . . .