

A close-up photograph of a stonefly nymph resting on a person's hand. The hand is positioned over a body of water, with the water's surface and some submerged vegetation visible in the background. The nymph has a segmented, brown and black body with prominent legs. A dark green rectangular box with a thin white border is superimposed over the top half of the image, containing the title 'Lunch with Bugs' in white serif font.

# Lunch with Bugs

Order: Plecoptera,  
Stoneflies

Family: *Perlidae*,  
Common stoneflies



# Macroinvertebrates



Order: Odonata,  
Dragonflies + Damselflies  
Family: *Libellulidae*, Skimmers

- Animals without backbones, large enough to be seen with the naked eye who live all or part of their lives in a waterbody. Can include:
  - gastropods (snails)
  - bivalves (clams + mussels)
  - Crustaceans (crayfish)
  - insects (both adult and larval forms)

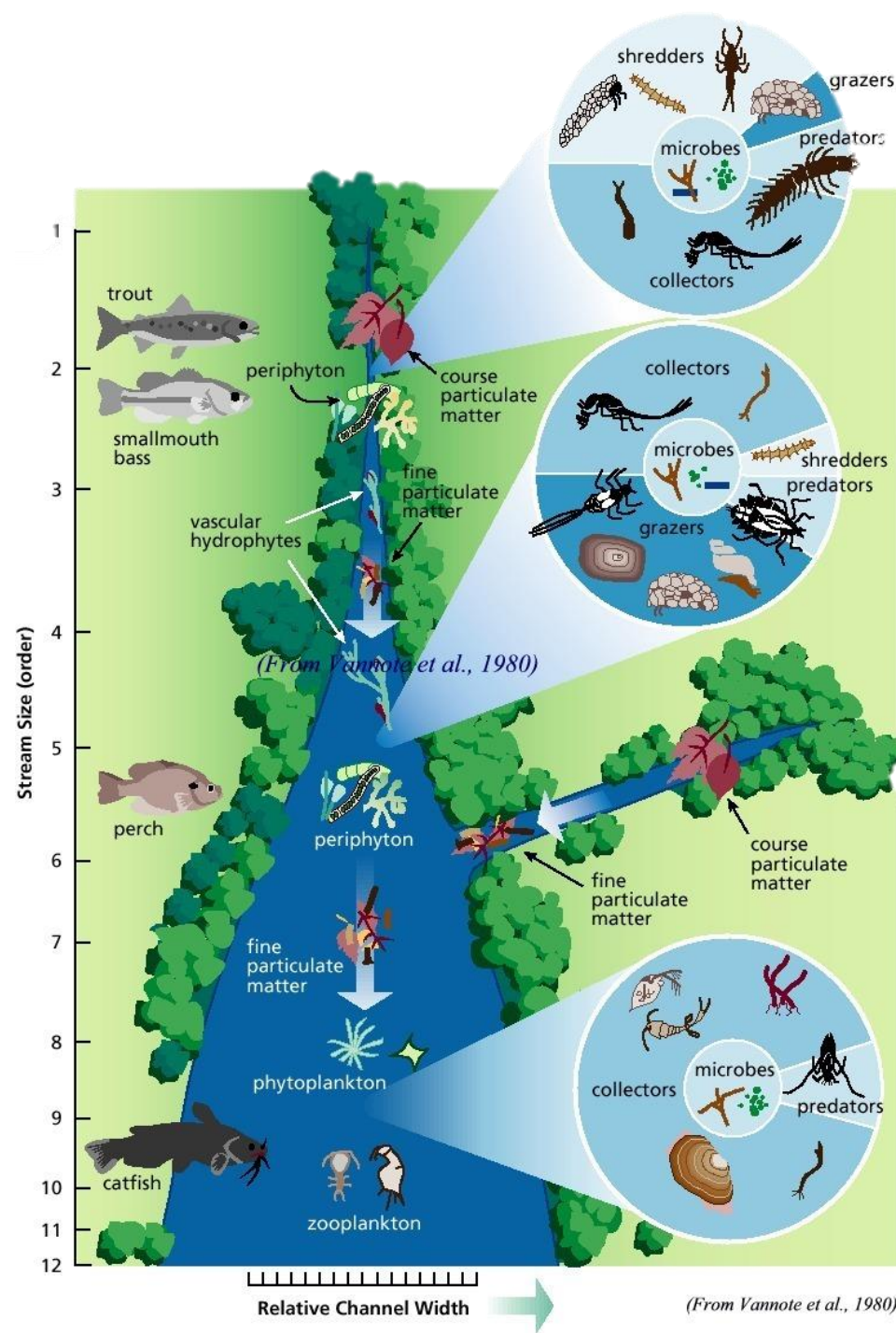


WILLISTOWN  
CONSERVATION TRUST

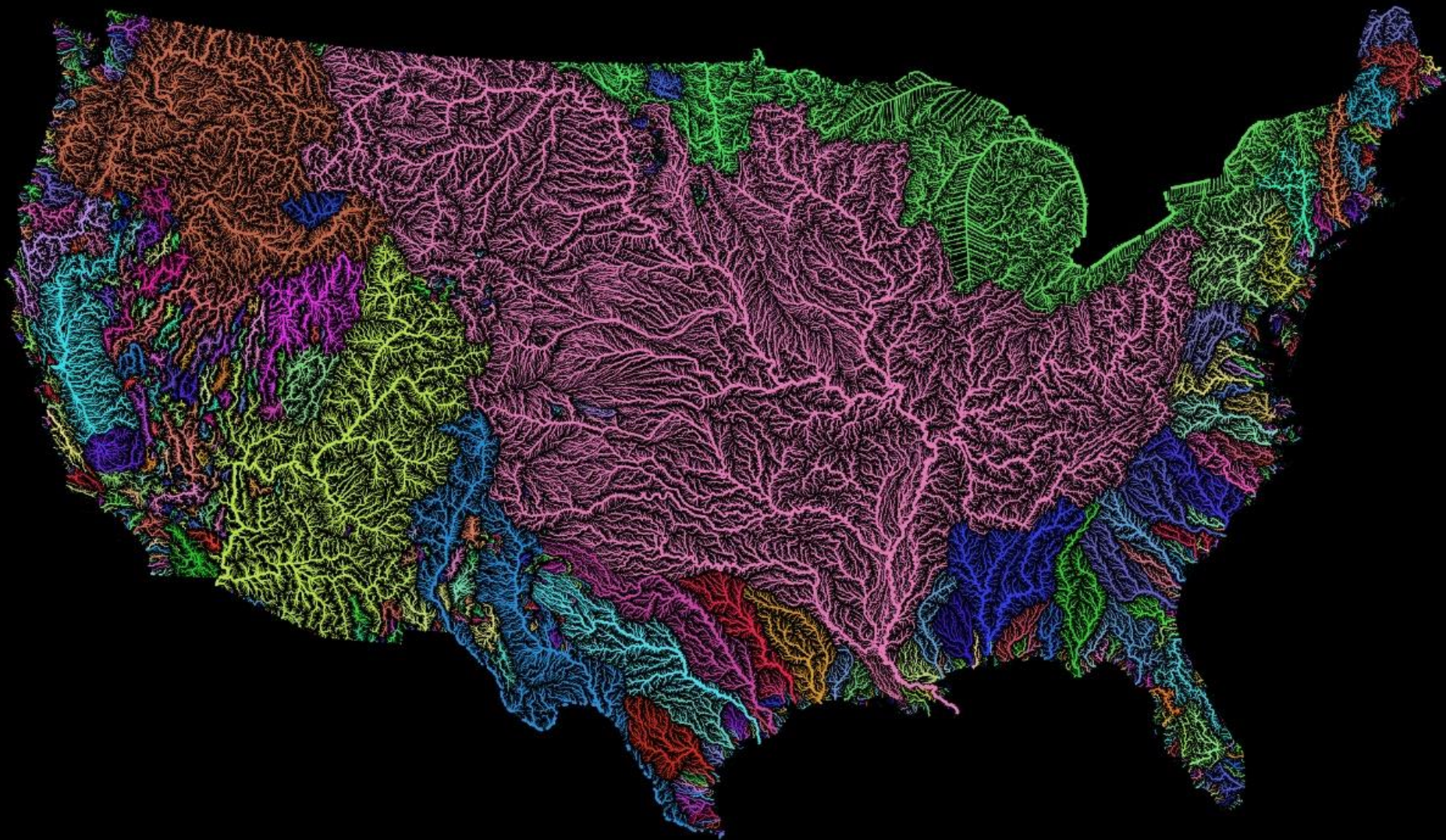


# River Continuum Concept

- a model for classifying and describing flowing water, in addition to the classification of individual sections of waters after the occurrence of indicator organisms



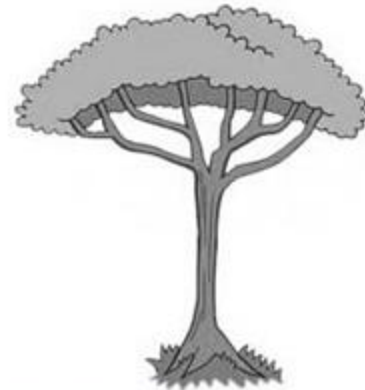






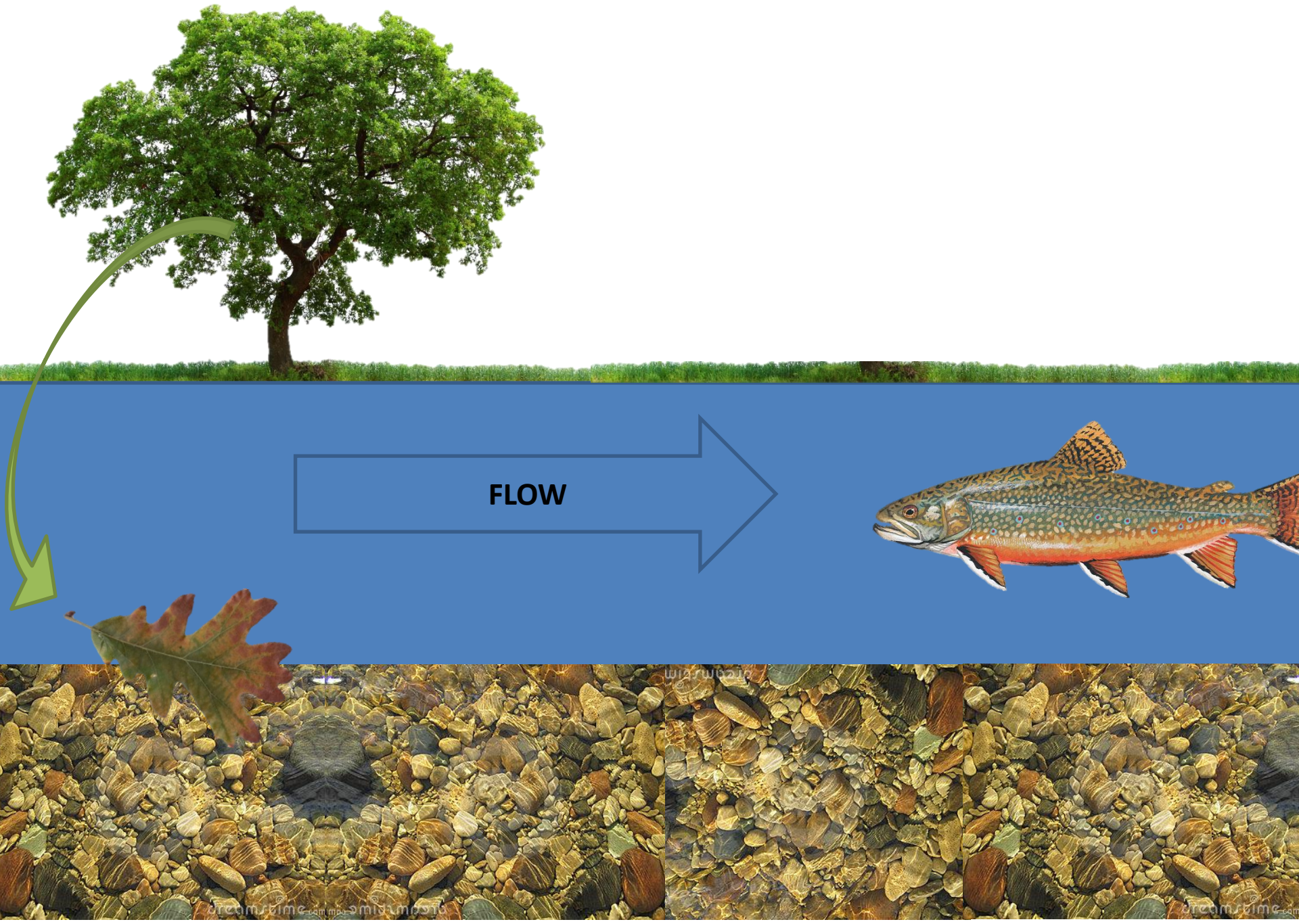


# Trophic levels

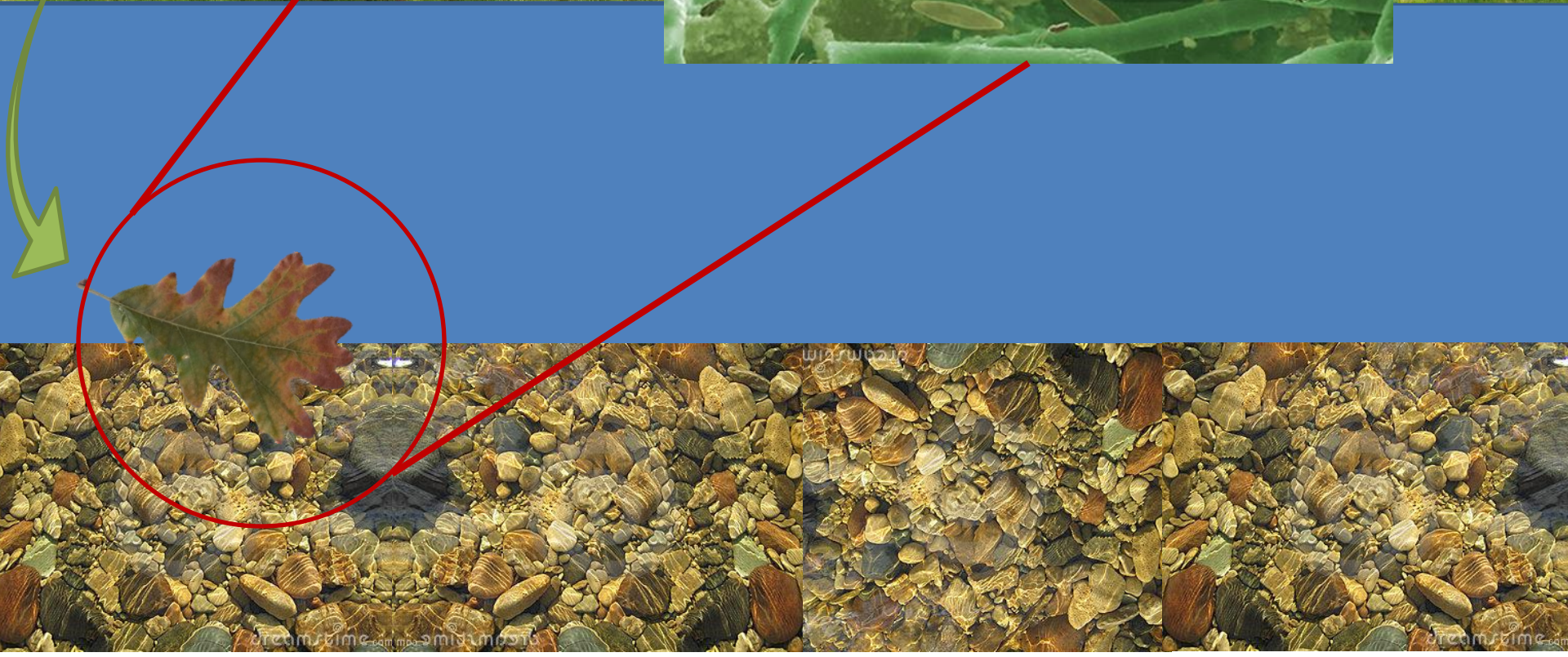
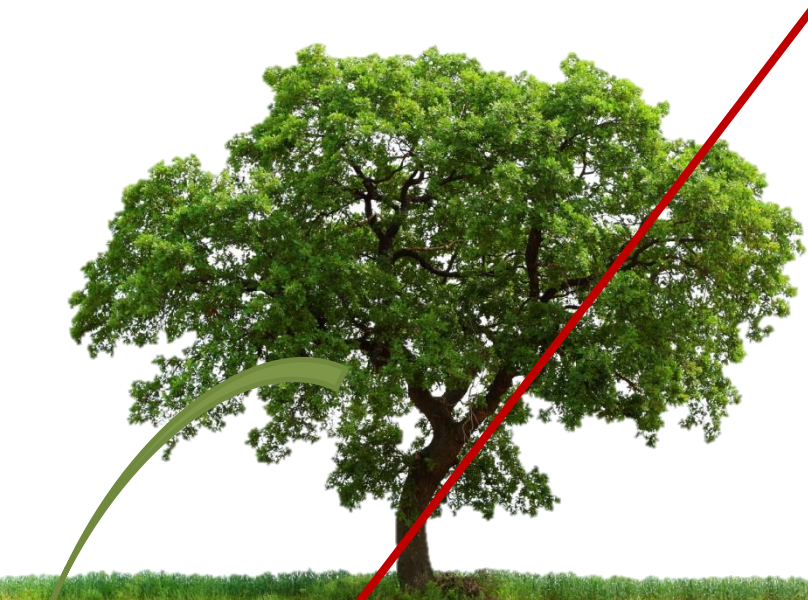


The FISH... eat the INSECTS... on the LEAVES.... that come from TREES!









# Biofilm

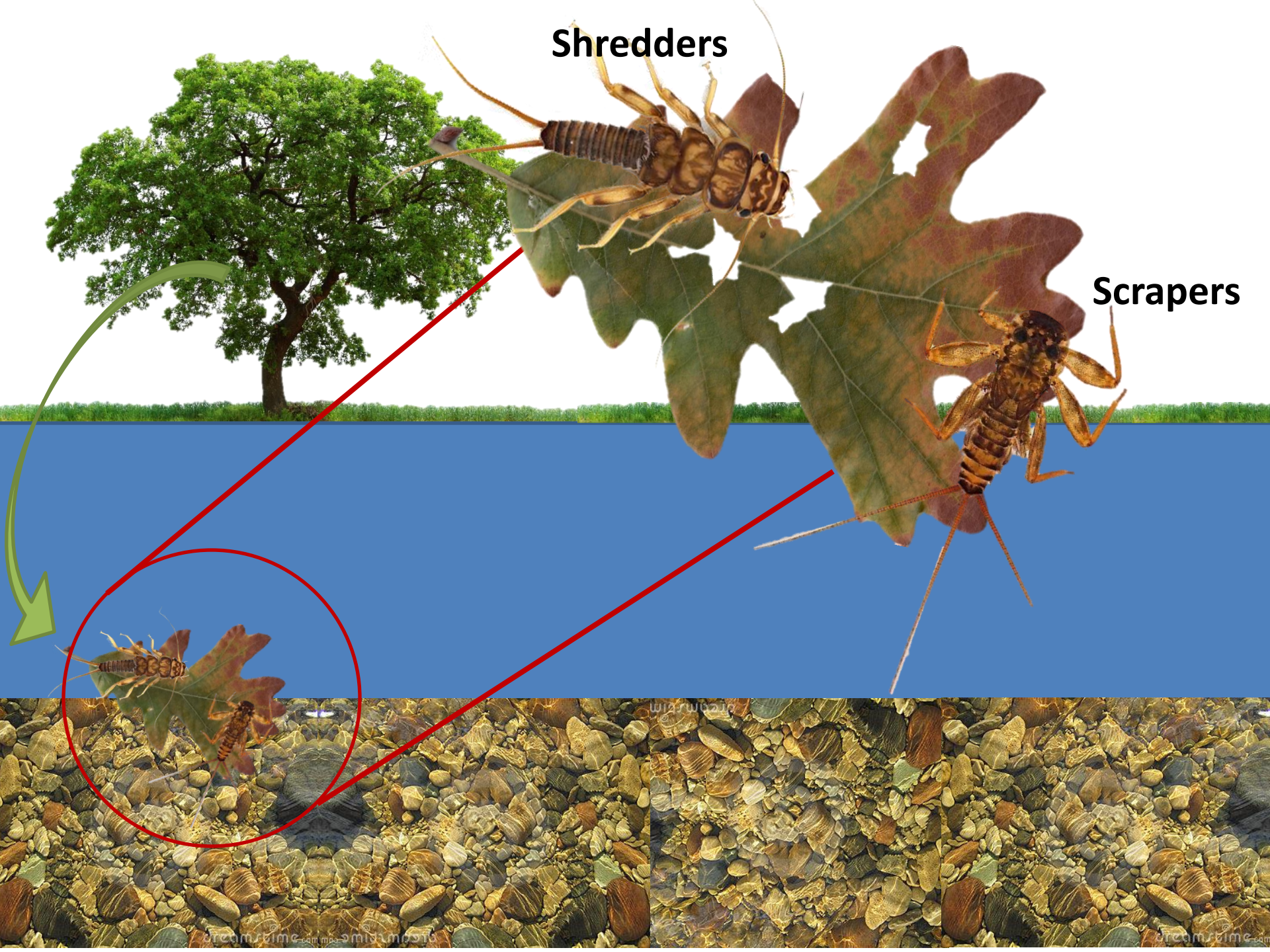
- Base of the food chain in an aquatic environment
- Algae, diatoms, fungus and bacteria begin the decomposition process
  - Conditions the detritus to be more nutritious and palatable to the next level of the food chain





**Shredders**

**Scrapers**



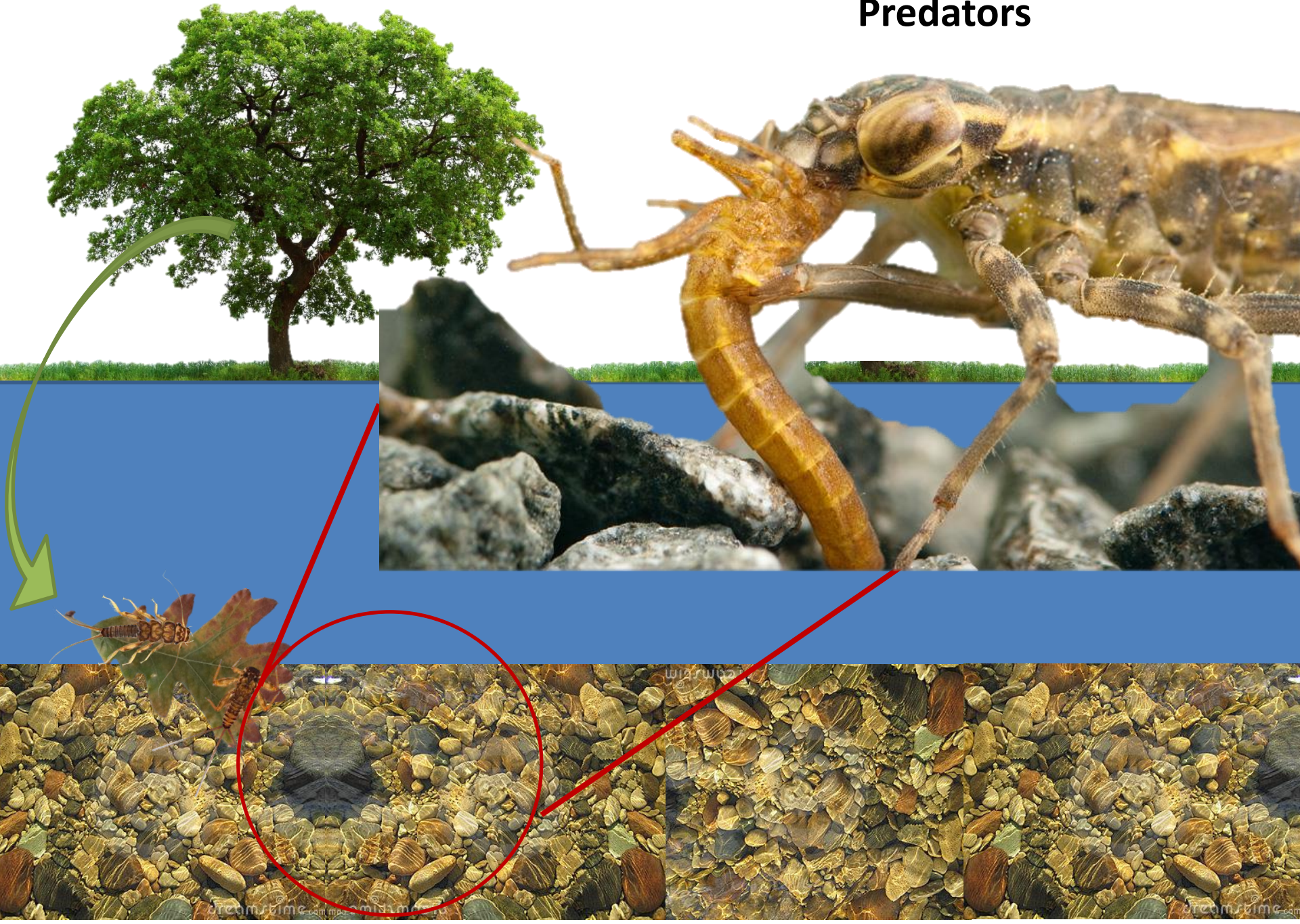


## Collectors

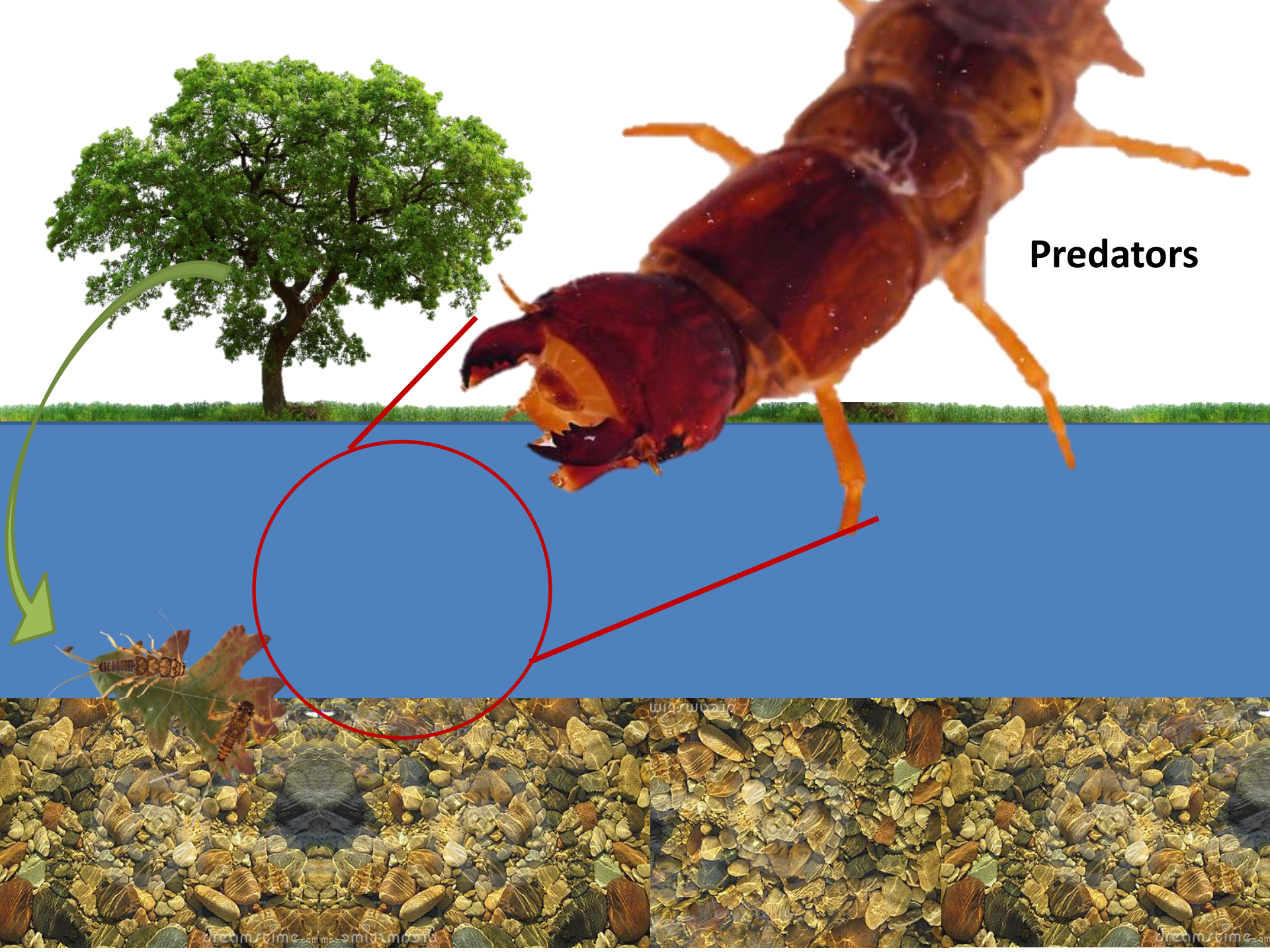




# Predators








**Predators**



# Why Study Macroinvertebrates?

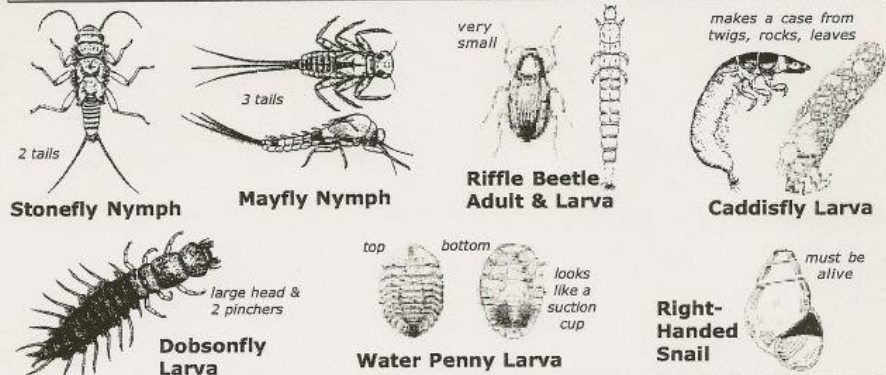
- Live in the stream all year
- Give a longer term picture of water conditions than chemistry
- Well established relationship between diversity and water quality



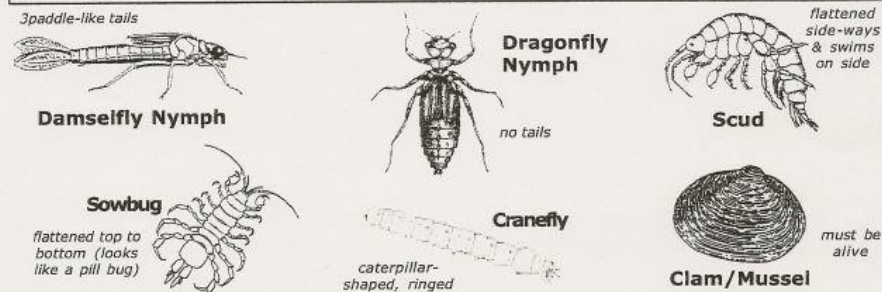
Order: Plecoptera,  
Stoneflies  
Family: *Perlidae*,  
Common stoneflies

# 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







Ephemeroptera,  
Mayflies



Plecoptera,  
Stoneflies



Trichoptera,  
Caddisflies

Highly  
sensitive  
indicator  
species



ORDER ▾ FAMILY ▾ GENUS ▾  
Ephemeroptera Heptageniidae *Stenacron*  
*“Flat-headed or Cookie-headed Mayflies”*







Order: Ephemeroptera,  
Mayflies

Family: *Heptageniidae*,  
Flat Headed Mayflies







ORDER ▾

FAMILY ▾

GENUS ▾

Ephemeroptera Ephemeridae *Hexagenia*  
“Common Burrowing Mayflies”



+

-



DORSAL





Order: Ephemeroptera,  
Mayflies  
Family: *Ephemeridae*,  
Common Burrowing Mayflies



Order: Ephemeroptera,  
Mayflies

Family: *Isonychiidae*,  
Brush Legged Mayflies



ORDER ▾

FAMILY ▾

GENUS ▾

Plecoptera Perlidae *Agnatina*

*“Common Stoneflies”*



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DORSAL

VENTRAL



Order: Plecoptera,  
Stoneflies  
Family: *Perlidae*,  
Common stoneflies

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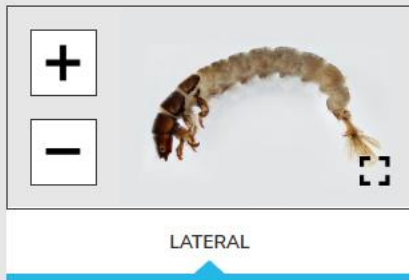
ORDER ▾

FAMILY ▾

GENUS ▾

Trichoptera Hydropsychidae *Hydropsyche*

*“Net-spinning Caddisflies, Common Netspinners, Seine-net Weavers”*





© Pete Hillman 2017  
Order: Trichoptera,  
Caddisflies

Family: *Hydropsychidae*,  
Net Spinning Caddisflies

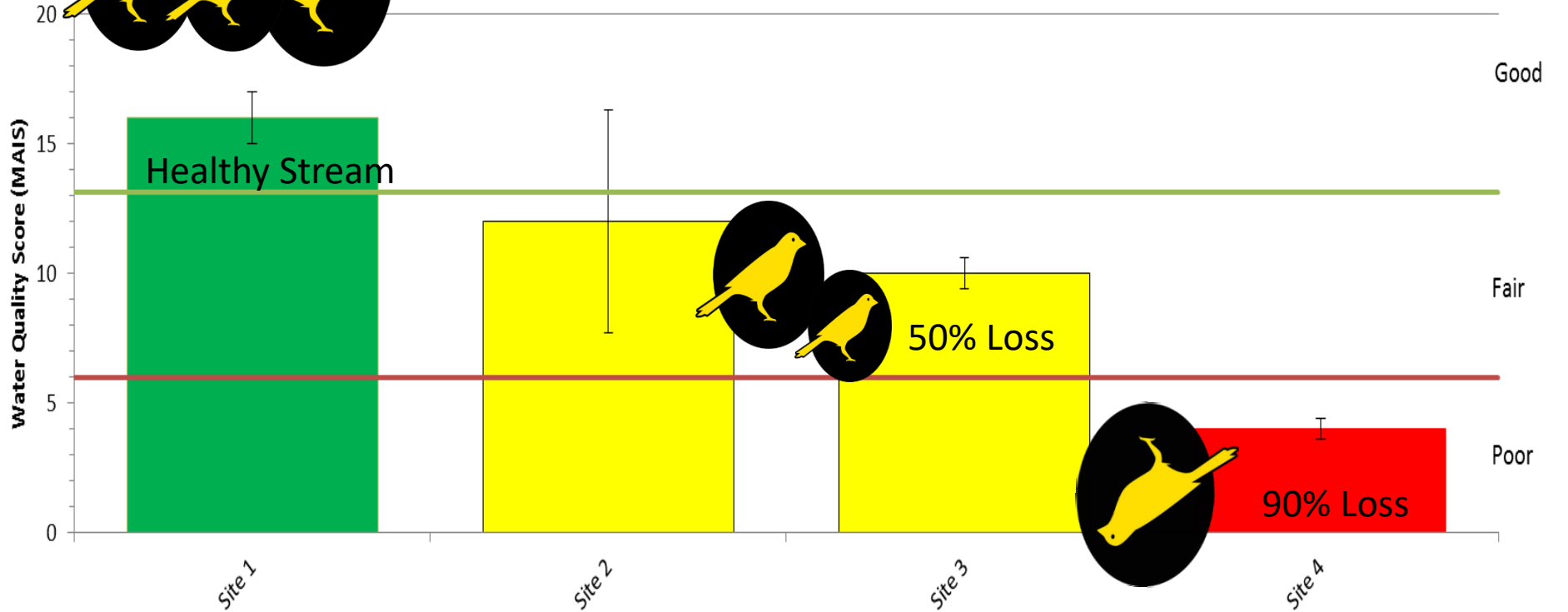


# “Canary in a Coal Mine”

- Sensitivity to water quality is well documented among different orders, allowing for a standard assessment between different streams within a watershed or region
- Presence or absence of groups of insects can be used as early signs of changes in water quality



MAIS Score





# Sample Collection Methods



Surber Sampler



D Frame Net



Kick Net



















*Hagenius*, Dragonhunter



Odonata, Dragonflies + Damselflies





# STAY INVOLVED

- Thursday April 23 at noon: Monitor My Watershed
  - David Bressler of Stroud Water Research Center
- Thursday April 30 at noon: Salt Watch
  - Lauren McGrath of Willistown Conservation Trust

If you are interested in becoming a volunteer  
contact:

**Sue Miller, Darby Creek Valley Association**

Email: [suedcva@gmail.com](mailto:suedcva@gmail.com)

**Derron LaBrake**

Email: [2ndvp@dcva.org](mailto:2ndvp@dcva.org)



**David Bressler**

Email: [dbressler@stroudcenter.org](mailto:dbressler@stroudcenter.org)



**Lauren McGrath**

Email: [LBM@wctrust.org](mailto:LBM@wctrust.org)





Questions?

