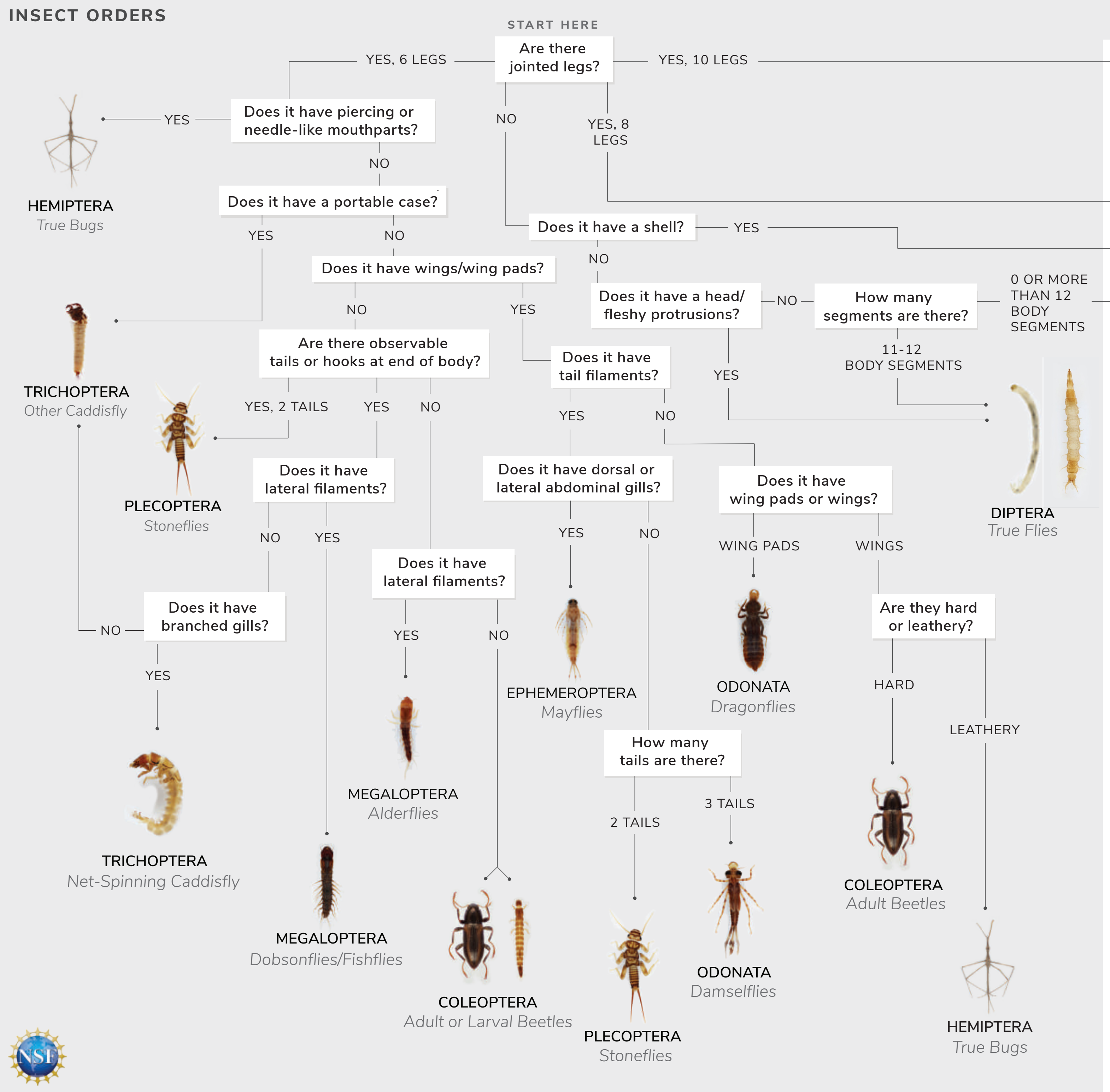
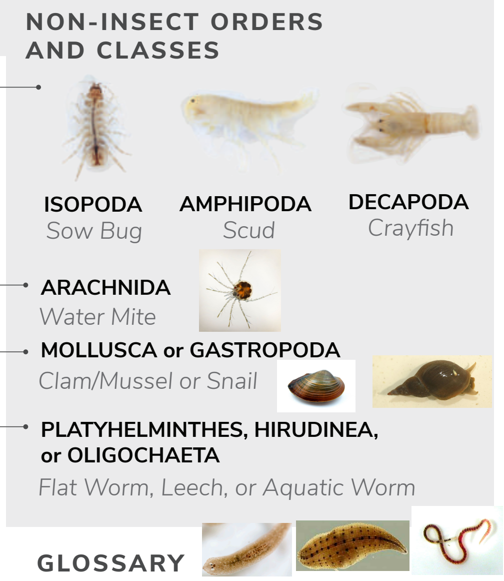
Aquatic Macroinvertebrate Order Level Key



INSECT ORDERS

START HERE

- Are there jointed legs?
  - YES, 6 LEGS
    - Does it have piercing or needle-like mouthparts?
      - YES
        - **HEMIPTERA** True Bugs
      - NO
        - Does it have a portable case?
          - YES
            - **TRICHOPTERA** Other Caddisfly
          - NO
            - Does it have wings/wing pads?
              - NO
                - Are there observable tails or hooks at end of body?
                  - YES, 2 TAILS
                    - **PLECOPTERA** Stoneflies
                  - YES
                    - Does it have lateral filaments?
                      - NO
                        - Does it have branched gills?
                          - NO
                            - **TRICHOPTERA** Other Caddisfly
                          - YES
                            - **TRICHOPTERA** Net-Spinning Caddisfly
                      - YES
                        - **MEGALOPTERA** Dobsonflies/Fishflies
                  - NO
                    - Does it have lateral filaments?
                      - YES
                        - **MEGALOPTERA** Alderflies
                      - NO
                        - **COLEOPTERA** Adult or Larval Beetles
              - YES
                - Does it have tail filaments?
                  - YES
                    - Does it have dorsal or lateral abdominal gills?
                      - YES
                        - **EPHEMEROPTERA** Mayflies
                      - NO
                        - How many tails are there?
                          - 2 TAILS
                            - **PLECOPTERA** Stoneflies
                          - 3 TAILS
                            - **ODONATA** Damselflies
                  - NO
                    - Does it have wing pads or wings?
                      - WING PADS
                        - **ODONATA** Dragonflies
                      - WINGS
                        - Are they hard or leathery?
                          - HARD
                            - **COLEOPTERA** Adult Beetles
                          - LEATHERY
                            - **HEMIPTERA** True Bugs
  - YES, 8 LEGS
    - **ARACHNIDA** Water Mite
  - YES, 10 LEGS
    - **ISOPODA** Sow Bug
    - **AMPHIPODA** Scud
    - **DECAPODA** Crayfish
  - NO
    - Does it have a shell?
      - YES
        - **MOLLUSCA or GASTROPODA** Clam/Mussel or Snail
      - NO
        - Does it have a head/ fleshy protrusions?
          - YES
            - **DIPTERA** True Flies
          - NO
            - How many segments are there?
              - 11-12 BODY SEGMENTS
                - **DIPTERA** True Flies
              - 0 OR MORE THAN 12 BODY SEGMENTS
                - **PLATYHELMINTHES, HIRUDINEA, or OLIGOCHAETA** Flat Worm, Leech, or Aquatic Worm



NON-INSECT ORDERS AND CLASSES

ISOPODA
Sow Bug

AMPHIPODA
Scud

DECAPODA
Crayfish

ARACHNIDA
Water Mite

MOLLUSCA or GASTROPODA
Clam/Mussel or Snail

PLATYHELMINTHES, HIRUDINEA, or OLIGOCHAETA
Flat Worm, Leech, or Aquatic Worm

GLOSSARY

abdominal gills	Gills located on the third and most posterior major body region.
branched gills	Gills that have divisions or an offshoot off the main axis; branching.
lateral filaments	Slender and thin appendages off the sides of the body.
piercing mouthparts	Sharp or needle-like mouthparts for sucking nutrients such as blood or plant fluids
portable cases	Protective retreats made from leaves, twigs, or sand that some caddisfly and midge larvae carry with them.
tail filaments	An appendage located on the abdomen; used often for navigation and respiration.
wing pads	Developing wings or the sheath of a developing wing.

Atlas of Common Freshwater
www.Macroinvertebrates.org
of Eastern North America
modified by Ross Vander Vorste

Stream Sampling Instructions

(modified from https://mostreamteam.org/assets/macrodatasheet.pdf)

- Select your sampling area. Preferred habitats are
    1. a riffle (area where shallow water is moving quickly and the surface is broken). If no riffles are available, select
    2. a root mat (area of tangled roots hanging over/into the stream). If no root mats are available, select
    3. a snag (dead tree or very large branch fallen in the stream). If no snags are available, select
    4. a pool (area where the water is deep and moving very slowly).

- If you are comparing two different sites, sample the same type of habitat at both sites.

- Sample an area of approximately one square meter using either a dipnet or kicknet, as demonstrated by your instructor. If your sampling site includes larger rocks, use your hands to rub the surface of the rocks to dislodge invertebrates.

- Transfer your sample into a sorting tray and then sort macroinvertebrates into an ice cube tray.
    - ***If you are using a dipnet,*** the net can be inverted over the tray and rinsed. Also be sure to check the net carefully for smaller organisms, which should be gently collected with soft forceps. Place organisms in an ice cube tray, keeping similar-looking organisms grouped together.
    - ***If you are using a kicknet,*** place the net on a flat surface, remove larger organisms (e.g., crayfish or cranefly larvae), and carefully examine the net for smaller organisms, which should be gently collected with soft forceps. Place organisms in an ice cube tray, keeping similar-looking organisms grouped together.

- Use the Aquatic Macroinvertebrate Order Level Key to identify the macroinvertebrates to order and the Aquatic Macroinvertebrate Tolerance & Traits worksheet to find the tolerance value for each order/group. Count the number of individuals in your sample from each order/group. Use these data to fill out the Bioassessment Index Worksheet and calculate the Hilsenhoff Biotic Index number for your site(s).