

USING AQUATIC INSECTS TO EVALUATE PHYSICAL AND BIOLOGICAL CONDITIONS IN WETLANDS



Developing Southwest Wetland Programs for Tribes
Monitoring, Assessing and Protecting Wetlands

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Tips for Identifying Macroinvertebrates (aquatic insects, snails, worms, zooplankton, etc...)

- Practice by collecting live macroinvertebrates, and observing them under a microscope.
- Our eyes need to be trained to identify different taxa.
- Observe how macroinvertebrates respond to different water levels over the years (wet or dry or during your Index (primary) sampling period; climate change...).
- Do some research, talk to professionals who can give you some historical background.
- Gain understanding of your local watershed (other agencies who conduct sampling).
- Develop objectives stating how & why this data will be used. (E.g. baseline data for future IBI development, success of implementing BMP's/ restoration project, cultural use..)
- Begin mentoring young people > intern program

Why Collect Aquatic Insects or Macroinvertebrates

1. Sensitive to environmental impacts: toxic spills, discharges...
2. Less mobile than fish, less likely to avoid discharges...
3. Indicators of overall integrated water quality.
4. Abundant in most streams, easy to collect/ sample.
5. Used to detect non-chemical impacts to the habitat (siltation, scour, substrate instability, changes in dissolved oxygen and temperature and/ or cumulative effects...)
6. The public more readily perceives aquatic insects as tangible indicators of water quality.
7. Can be used to identify specific stressors or sources of impairment.
8. Can be preserved and archived for decades, allowing direct comparison of specimens from historic collections.
9. They can bioaccumulate many contaminants, tissue analysis can be a good monitor.

Taxonomic keys (commonly used):

1. McCafferty, W.P. **Aquatic Entomology. (The Fisherman's and Ecologists' Illustrated Guide to Insects).** Jones & Bartlett Publishers Inc., 1981.
2. Merritt, R.W., and K.W. Cummins. **An Introduction to the Aquatic Insects of North America.** Kendall/ Hunt Publishing Co., 1996 Third Edition.
3. Pennak, R.W. **Fresh-Water Invertebrates of the United States, Protozoa to Mollusca.** John Wiley & Sons, Inc., 1989 Third Edition.
4. Wiggins, G.B. **Larvae of the North American Caddisfly Genera (Trichoptera).** Univ. of Toronto Press, 1996 Second Edition.
5. Or any local taxonomic key develop within your region such as:
Usinger, R.L. **Aquatic Insects of California.** Univ. of California Press - Berkeley

Taxonomic Labs: (contact for current prices/quotes):

1. Aquatic Biology Assoc.; Corvallis, OR (541) 752-1568 www.aquaticbio.com
This lab also processes EMAP BMI samples.
Contact: Bob Wisseman bob@aquaticbio.com

2. Aquatic Bioassessment Lab (ABL); Chico, CA; (530) 898-5573
<http://www.dfg.ca.gov/abl/>
 Contact: Joe Slusark, John Sandburg > www.dfg.ca.gov/abl/Lab/personnel.asp
 See also > www.dfg.ca.gov/abl/Lab/dataprocessing.asp
3. EcoAnalysts, Inc.; Moscow, ID; (208) 882-2588 www.ecoanalysts.com
 This lab also processes EMAP BMI samples
 Contact: eco@ecoanalysts.com
4. Rhithron Associates Inc; 33 Fort Missoula Rd.; Missoula, MT 59804; (406) 721-2028
 Contact: contact@rhithron.com
www.rhithron.com

Aquatic Insect Web sites:

1. http://www.dfg.ca.gov/abl/Lab/california_referencecollection.asp (Photos)
2. http://www.itis.usda.gov/advanced_search.html (Taxonomic nomenclature)
3. <http://www.epa.gov/owow/monitoring/rbp/> (EPA RBA Protocols)
4. <http://www.xerces.org/aquatic-invertebrates/> (The Xerces Society)

Useful Web sites for Wetland sampling protocols:

1. EPA: Introduction to Wetland Biological Assessment
http://water.epa.gov/type/wetlands/upload/2008_12_23_criteria_wetlands_1Introduction.pdf
2. New Mexico Rapid Assessment Method for Wetlands
<http://www.nmenv.state.nm.us/swqb/Wetlands/NMRAM/>
3. California Rapid Assessment Method (CRAM) for Wetlands; User Manual v.5.0.2
<http://www.waterboards.ca.gov/academy/courses/cram/cram502.pdf>
4. Pyramid Lake Paiute Tribe - NV, Wetlands Program
5. <http://www.plpt.nsn.us/environmental/Wetlands/wetlands.htm>
6. Hualapai Tribe - AZ, Wetlands - Biomonitoring Program
<http://hualapai.org/wetlands-biomonitoring-intro.html>
7. Minnesota: A Citizens Guide to Biological Assessments for Wetlands
<http://www.pca.state.mn.us/index.php/view-document.html?gid=6069>

Supplier for Wetland sampling nets:

1. Wildco Supply Co. ~ 1 meter sq. sampling net, 500 mm nylon mesh
<http://www.wildco.com/Zo-Seine-no-Adaptor-With-handles-Nitex-500A-m.html>
2. Wildco Supply Co. ~ 18x9 inch Kick net, 500 mm nylon mesh
<http://www.wildco.com/Zo-Seine-no-Adaptor-With-handles-Nitex-500A-m.html>
3. Wildco Supply Co. ~ Invertebrate counting trays, forceps,
http://www.wildco.com/Invertebrate_Counting_Trays.html