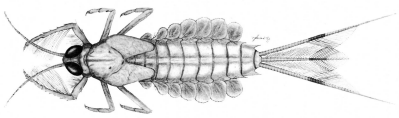
AQUATIC INSECT ECOLOGY FOR ENVIRONMENTAL PROFESSIONALS – LEVEL 2

Michael Baker Intl and Penrose Environmental

September 20 – 23, 2021



About the Level 2 Workshop

Aquatic insects (Benthic Macroinvertebrates) play key roles in many regulatory water quality programs in North Carolina and the Southeast. These insects have been used by regulatory agencies to assess water pollution and trends in stream health since the mid-70's. Many metrics have been developed to make the use of these data effective and understandable to non-biologists. Benthic insects are proposed as tools for the determination of stream restoration effectiveness and project prioritization by regulatory agencies. Despite the value of this group of organisms in regulatory programs, very little is generally known about these insects as valuable regulatory tools. This workshop series will introduce participants to the ecology and taxonomy of aquatic insects.

For those registrants who would like to become SFS (Society for Freshwater Science) certified for Eastern EPT genera, we will be offering a 20 image-collaged exam.

Level 2 Workshop is Geared to Environmental Professionals

- Local, State and Federal Aquatic Ecologists; Interagency Review Teams
- Biologists with Environmental Consulting Firms
- Faculty and Students with Aquatic Emphasis
- Managers with Citizen Science Programs

Venue and Lodging for the Level 2 Workshop

The Level 2 Workshop will take place at Broadwing Farms in Hot Springs, NC (https://www.broadwingfarmcabins.com/). Field trips include a trip to the Laurel River Community Center for field sampling in the Laurel River. Hot Springs has many options for overnight lodging. For travel and visitor information visit www.hotspringsnc.org.

Workshop Schedule

The Level 2 Workshop is primarily a field and laboratory exercise; however, we intend also to have several presentations each day. We will have copies of the Morse[1] taxonomic key available for purchase at the workshop for $40. We also recommend that participants are familiar with the Standard Operating Procedures of the NC Division of Water Resources[2].

DAY 1

12:30 pm	Registration
1:00 pm	Introductions, Workshop Overview
1:30 pm	Brief History of Bug Monitoring
2:00 pm	The Mayfly, Stonefly and Caddisfly of the Southeast
3:30 pm	Break
4:00 pm	Value of Species Level Identification
4:30 pm	Effects of Pollution to the Benthic Fauna
5:00 pm	Adjourn

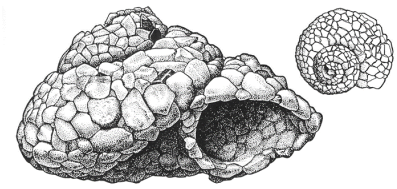
DAY 2

8:00 am	Field Collections. We will rendezvous at a local stream, discuss collection methods and practice the DWR Qual 4 protocol. Specimens will be preserved for laboratory exercises.
12:00 am	Lunch will be provided
1:00 pm	Laboratory Exercises. We will work in teams to identify specimens to genus and develop a basic species list for our field collections.
3:00	Break
3:30	Indicator Taxa – Instructors will discuss the ecology of keystone or important aquatic insect taxa as they are applied to specific projects.

[1] Morse, J. C., W.P. McCafferty, B.P. Stark, and L.M. Jacobus, Editors. 2017. Larvae of the Southeastern USA Mayfly, Stonefly, and Caddisfly Species. Biota of South Carolina. Vol 9. Clemson University Public Service Publishing, Clemson University, Clemson, South Carolina USA. 482pp.

[2] North Carolina Division of Water Resources. Standard Operating Procedures for the Collection and Analysis of Benthic Macroinvertebrates. North Carolina Department of Environmental Quality. February, 2016

4:00	Metrics, SQT, Success Criteria
5:00	Adjourn



DAY 3

8:00 am	Field Collections.
11:00 am	Other Insects, including Diptera
12:00	Lunch
1:00 pm	Laboratory Exercises and calculations of metrics.
4:00 pm	The concept of Rheophily and how it can help in your work
5:00 pm	adjourn
6:30 pm	Banquet at Broadwing Farm

Day 4

8:00 am	Laboratory Exercises, wrap up
10:00 am	Habitat Evaluation and Benthic Insects
10:30 am	Scientific Illustration and Report Writing
11:00 am	Wrap up
1:00 pm	SFS Certification Exam – Eastern EPT genera only

Registration Information - Workshop participation will be limited to 20 people.

- ### Workshop Fees
  - NC AEP Member Fee - $675
  - Non-member Fee - $700
  - Book Purchase – Clemson University Public Service Publishing - $40 (optional and available for purchase during the workshop)

- ### SFS Taxonomic Certification Exam
  - Non SFS Member Fee - $350
  - SFS Member Fee - $250

- ### Payment Instructions

  Workshop registration and online payment can be made at NCAEP.org. If payment by check is preferred, please let NC Association of Environmental Professionals (NCAEP)

know via email ncaep.treasurer@outlook.com and mail the check to NCAEP, PO Box #17512, Raleigh, NC 27619. Please reach out to Jason York (jason.york@mbakerintl.com) to arrange SFS Taxonomic Certification Exam fees.

- ## Cancellation and Refund Policy

Cancellation requests should be sent to NCAEP for processing. The cancellation request must be submitted at least twenty-one (21) days before the date of the workshop to receive a full refund. Cancellation requests made between twenty-one (21) and seven (7) days before the date of the workshop will receive a full refund minus a $50.00 administrative processing fee. Any cancellation requests made within seven (7) days of the workshop will be ineligible for refund. Attendee substitutions from within the same company may be made at any time at no cost. Please send an email to NCAEP requesting a substitution.

- ## Severe Weather Cancellation and Refund Policy

In the event of severe weather, this workshop may be postponed or cancelled at the discretion of the workshop instructors. If the workshop if postponed, you may receive a refund if you are unable to attend the newly scheduled date, time, and location. Please contact NCAEP if you are unable to attend the rescheduled workshop. If the workshop is cancelled, you will receive a full refund. If the workshop is postponed or cancelled, the workshop instructors and staff are not responsible for participants not meeting their PDHs or CEUs requirements with their various professional licensing boards.

What to Bring

We will provide the necessary field gear to collect aquatic insects using the protocols developed by the NC Division of Water Resources. Our instructors can also demonstrate collecting protocols from other State regulatory agencies as needed and/or field identification of most aquatic insects to genus.

- Hip Waders
- Raingear
- Bug spray and sunscreen
- Water and snacks
- Magnifiers and cameras

Message Regarding Coronavirus – Updated February 2021

It is difficult to say what the status of the COVID-19 pandemic will be in September 2021. The statement below assumes that the status of the pandemic will remain the same as it stands at the time of writing in February 2021.

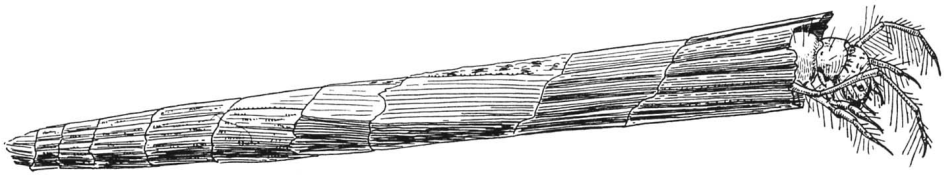
It is our top priority to look after the safety of our instructors and workshop participants during the COVID-19 Pandemic. The facility at Broad Wing Farms is a covered pavilion with large doors and windows that can be opened to create an open-air setting. This space is large enough to accommodate the workshop and allow for adequate social distancing. Wearing of masks or face coverings is required when social distancing is not possible. Participants will be asked to drive company or private vehicles to our outdoor field trips to minimize exposure. Hand sanitizer will be made available to workshop participants. Registered participants are asked to abstain from international or domestic air travel for two weeks prior to the start date of the workshop. We ask that if you or any member of your household has exhibited COVID-19 related symptoms or received a positive COVID-19 test within two weeks of the start date of the workshop to please notify us and a refund will be issued. If it is determined by the North Carolina Association of Environmental Professionals or the instructors that the workshop cannot safely proceed, participants will be offered a refund, or their registration will be saved for a later workshop when the pandemic situation has become more safe.

Instructors

Jason York

Jason is an Environmental Scientist for Michael Baker Intl. (MBI) in Asheville, NC where he oversees MBI's NC Certified Laboratory for Population Studies of Benthic Macroinvertebrates. His work is focused on pre and post construction biological monitoring of streams using aquatic insects as indicators of water quality. Jason has completed several large contracts throughout the mid-Atlantic region with MBI and Penrose Environmental Consulting assessing water quality using aquatic insects. He is a certified taxonomist for Eastern Mayflies, Stoneflies, and Caddisflies through the Society for Freshwater Science of which he is also a member. Jason has lived in Madison County, NC since 2006 where he enjoys his family, the rivers, the insects, and the people.

Dave Penrose retired from the Water Quality Group at North Carolina State University in 2008 and moved to Western North Carolina to relax but failed. He was elected as the president of the Society for Freshwater Science in 2012 and to Board of the Council of Scientific Society Presidents in 2015. Most of his career was spent as a benthic taxonomist with the NC Division of Water Resources where he helped with the development of several metrics that are used to evaluate stream health using aquatic insects. There have been many highlights of Dave's career, but perhaps the best was teaching as a Fulbright Scholar a class on Stream Ecology and Restoration at Kathmandu University in Nepal. "Everyone should see the Himalaya Mountains at least once in their life".



Workshop Series

The ecology of aquatic insects is a dynamic field of study and can take on many forms at many levels of interest or experience. Aquatic ecologists at Michael Baker Intl. and Penrose Environmental are proposing a multi-tiered workshop series. All workshops will be held in Madison County North Carolina. The availability and diversity of stream types within a very short distance from the Hot Springs/Marshall area is exceptional. During the COVID pandemic we will encourage the use of private vehicles and social distancing during lecture/laboratory exercises.

- Level 1. This first level is primarily for Citizen Scientists, students of streams and rivers or management professionals who have little or no experience. This will also be a field-oriented workshop with limited laboratory time and based primarily on the ecology of the Mayflies, Stoneflies and Caddisflies at the family taxonomic level. Lectures will be geared to individuals with little professional experience.

- Level 2. This workshop will be developed to appeal to professional contractors; municipal, state or federal biologists who need more information about how this group of insects can be used in their professions, or managers of Citizen Science organizations. Field and laboratory exercises will be a large part of the agenda at this level, but also how these data can be used and/or interpreted. The focus will primarily be at the genus level of taxonomy. Lectures will be given that deal with metric development, effects of pollution, indicator taxa and habitat evaluation.

- Level 3. The level 3 workshop series will be developed for individuals with experience in the ecology of aquatic insects or would like advanced instruction on taxonomy. We hope that this workshop series can be developed to help with Masters or PhD students with dissertations, or a forum for professional benthic ecologists to collaborate. We envision this workshop series to be topic focused and case studies will be encouraged. For example, we would like to consider a Level 3 workshop on stream/wetland restoration.