

# **AQUATIC INSECT ECOLOGY FOR ENVIRONMENTAL PROFESSIONALS – LEVEL 2**

**Michael Baker Intl and Penrose Environmental**

**June 14 - 17, 2022**



## **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.

## **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 the Laurel Community Center in Shelton Laurel, NC (<https://www.laurelcommunitycenter.org/>). Field trips will be geared to local streams, including the Laurel River which is an Outstanding Resource Water and extremely diverse. Lodging will primarily be in Hot Springs and has many options. It is best to reserve a room early as these tend to fill up fast. For travel and visitor information visit [www.hot Springsnc.org](http://www.hot Springsnc.org).

## Workshop Schedule

The Level 2 Workshop is primarily a field and laboratory exercise<sup>1</sup> however, we intend also to have several presentations each day. We will have copies of the Morse 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<sup>2</sup>.

### 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.
4:00	Metrics, SQT, Success Criteria



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<sup>1</sup> 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.

<sup>2</sup> 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

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

## **Registration Information**

- **Fees**

- NCAEP Member Fee - \$740
- General – Non-member Fee - \$765
- Book Purchase – Clemson University Public Service Publishing - \$40 (optional)

- **Payment Instructions**

Registration and online payment can be made at [NCAEP.org](http://NCAEP.org). If payment by check is preferred, please let NC Association of Environmental Professionals (NCAEP) know via email [ncaep.treasurer@outlook.com](mailto:ncaep.treasurer@outlook.com) and mail the check to NCAEP, PO Box #17512, Raleigh, NC 27619. Workshop participation will be limited to 20 people.

- **Cancellation and Refund Policy**

Cancellation requests should be sent to NCAEP for processing. Registrants cancelling their registration two (2) weeks or more prior to the event will receive a refund of the registration fee, less a (3%) administrative fee. Registrants canceling between two (2) and one (1) week(s) prior to the event will receive a refund, less a (5%) administrative

fee. No refunds will be given for cancellations less than seven (7) days prior to the event. Registrants may transfer their registration to another attendee with the same membership status (e.g., regular member, government employee member, non-member) at any time. Only one transfer per registration is permitted. 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 is 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

## 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, Caddisflies and North American Chironomids 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.



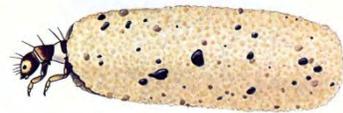
**Dave Penrose** retired from the Water Quality Group at North Carolina State University in 2008 and moved to Western North Carolina to relax but failed. He was elected as the president of the Society for Freshwater Science in 2012 and to Board of the Council of Scientific Society Presidents in 2015. 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 Master's 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.

**Please contact the instructors if you are interested in pursuing SFS Taxonomic Certification.**