Cobb County Watershed Stewardship Program

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Vicki Culbreth

It's Bug Season!

by Vicki Culbreth, Cobb County Watershed Stewardship Program

Here at Cobb Adopt-A-Stream, bug season is that delightful time of year when benthic macroinvertebrates are at their biggest and boldest. Now is the time to get out your rubber boots and nets and take a closer look at what might be living in your waterway.

Benthic macroinvertebrates (benthic = bottom dwelling, macro = large, invertebrate = animal without a backbone) are a group of organisms that are bioindicators of water quality. The group includes many different species of insects such as dragonflies, mayflies, and beetles, as well as mollusks, worms, and crayfish. Since these animals live all or most of their lives in a relatively small aquatic habitat, their presence or absence is a good indicator of stream health. Macroinvertebrates are also an important component of the food web since they are prey for other insects, amphibians, reptiles, and birds.

The life cycle of a benthic macroinvertebrate is heavily influenced by seasonal variations. Summer is the time of year when you see beautiful jewel-winged dragonflies and damselflies performing their intricate mating displays, or the delicate mayflies fluttering above a wooded stream. These adult insects have recently emerged, and are busy laying eggs in the water. The warm temperatures and increased amount of sunlight lead to an amplified biomass in the waterway. Plant and algae growth increase, providing food and shelter for the newly hatched larva.

As Autumn approaches and leaves begin to fall, a bountiful harvest is provided for the detritivores living in the water. Craneflies and stoneflies prefer more coarse organic material, which they breakdown. The broken down fine particles are filtered out further downstream by caddisflies and blackflies. Their growth, in turn, benefits the predatory species, such as dragonflies and dobsonflies. Still others will feed on algae, bacteria, and plant and animal debris. The greatest period of growth for most macroinvertebrates is late summer through autumn when food is abundant. They continue to grow through the winter, and as spring rolls around, they have reached a size large enough for emergence.

For Adopt-A-Stream volunteers, or anyone interested in these fascinating creatures, Fall is a great time to get your feet wet. All you need is a net and a field guide to experience Bug Season for yourself!

Inside this issue:

What Are Those Nymphs... **2-3**

Biodiversity Spotlight: Trout **4-5**

Calendar **6-7**

New AAS Groups **6**

Recommended Reading **7**

Site of the Season: Little Noonday Creek **8**

Special points of interest:

- AAS Chemical and Biological Monitoring Workshops offered upon request
- Monarchs in The Classroom Teacher Workshop on 10/6
- Tree Planting & Care Workshop on 10/11
- Outdoor Classroom Symposium on 10/12

What Are Those Nymphs Telling Us?

by Adam Sukenick, Cobb County Watershed Monitoring

The aquatic populations thriving in our streams are a living, breathing and evolving community with a message to tell. Aquatic insects (macroinvertebrates) are collected and studied by aquatic scientists everywhere to assess stream health. Macroinvertebrates have been categorized by their sensitivity to pollution. Depending on types of insect diversity within a community, one can conclude the general water quality for the area being studied.

In addition to aquatic scientists, macroinvertebrates have another group of aficionados: Fish. Aquatic insects are the primary food source for many fish and this role makes them interesting to another large group of people: Fishermen. Fishermen, particularly those using a fly rod, are very interested in the macroinvertebrate population. Like the aquatic scientist, when fly fishermen arrive at a site they often get out their kick nets and collect some insects. By determining which macroinvertebrates are thriving in the stream they conclude what the fish are eating and decide which fly pattern is likely to land the big fish.

An aquatic insect's life begins when the female oviposits (lays or deposits her eggs) on or under the water surface, on emergent vegetation or on moist stream banks. Regardless of ovipositing location, development begins when the egg or small larvae reach the water. Once started, the insect will undergo several transformations before the life cycle is complete. As a larvae increases in size it must shed its skin or exoskeleton to accommodate growth. Each growth period is known as an instar and the process occurs several times during development. After the larvae phase, some insects enter a pupal stage where they mature into adults (complete metamorphosis), others transform from larvae directly to adult (incomplete metamorphosis). The majority of aquatic macroinvertebrates spend their adult lives as terrestrial insects. When it's time to leave the water most insects float, swim or crawl out of the stream before taking a winged form and fly away. This process is known as an emergence or a hatch and is well documented by fly fishermen.

During a hatch, insects are both active and vulnerable, making them easy targets for fish looking for a meal. A hatch can be small in numbers or very large with many individuals emerging at once. The latter creates a feeding frenzy among fish and is a welcome sight to fly fishermen. Some fish are quite selective in their feeding and during a hatch the best "flies" for fishermen are those that are patterned like the emerging insect and are fished "wet" or submerged just below the surface of the water. Hatches of many species are seasonal and well documented; fishing trips are often scheduled around hatch cycles.

Hatches occur throughout the year, but last only a few days. During the rest of the year the fly fisherman must rely on his or her knowledge of aquatic life within the stream and the behavior displayed by insects during the various stages of their life cycle. Nymph fishing uses fly patterns that closely mimic the macroinvertebrates inhabiting a particular stream. Other flies mimic the winged stages of aquatic nymphs and are fished "dry" or on the water surface. Depending on the skill of the individual tying the fly the finished lure may mimic the general form of a particular family, a specific nymph species or even a particular insect exhibiting a specific behavior (such as an adult ovipositing). The importance of imitating a specific look versus presenting a specific behavior is a contestable point among fishermen and both topics are widely covered in an endless selection of fly fishing books.

Fishing is a wildly popular pastime and it is no surprise that fishing organizations are a driving force in the pursuit to protect local waterways. Together, scientists and fishermen have collected a wealth of information on the life cycle and behavior of aquatic insects. Whether it's a textbook or fishing guide on your bookshelf you'll learn the same thing; the macroinvertebrate population of your local stream has a lot to tell.

Sources:

Photos from www.percyflies.com; www.mchenry.edu; www.glooskapandthefrog.org; www.ukfishersonline.com; www.flyfishermanforum.com; www.troutnut.com

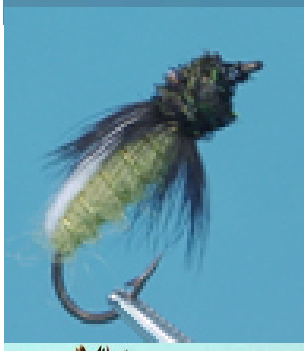
McCafferty, W. Patrick 1999. Aquatic Entomology, The Fishermen's and Ecologists' Illustrated Guide to Insects and Their Relatives. Jones and Bartlett Publishers, Sudbury, Massachusetts.

Some Examples of Macroinvertebrates and the Comparable Fishing Fly

Midge Larvae (Insect)
or Blood Worm

Caddisfly Adult (Insect)
or Tent Caddis

Caddisfly Pupa (Insect)
or Green Emerger



Mayfly Larvae (Insect)
emerging to Adult

Mayfly Adult (Insect)
or Blue Wing Olive

Scud (Crustacean)

Biodiversity Spotlight: Family Salmonidae (Trouts)

by Erin Feichtner, Cobb County Watershed Monitoring

Rainbow Trout (*Oncorhynchus mykiss*)

Rainbow Trout are native west of the Rockies from Alaska to Mexico. They are introduced and stocked in the eastern United States. There are black spots on the head, back, upper sides, and on the dorsal, adipose, and caudal fins. The dorsum is greenish while the flank is pinkish. The fins have no spines.

Look for them in faster water; they like to hold in riffles and current seams. Rainbow Trout are unsuccessful in maintaining viable populations in water exceeding 21 ˚C or 69.8 ˚F. North American Rainbow Trout spawn in winter and spring months when water temperatures are 5 -12 ˚C (41 – 53.6 ˚F). Females create a shallow depression nest (redd) over which the male stands guard. The eggs are released over the nest and fertilized by milt. The female disturbs the gravel upstream, which lightly covers the eggs. The act can be repeated with the same or a different male. Eggs are 3-5 mm and hatch after twenty-three days. Fish reach sexual maturity in two years for males and three years for females. Juveniles eat a variety of immature aquatic insects. Mature fish eat aquatic insects, terrestrial insects, crayfish and fish.

Within the Chattahoochee River, The Buford Dam creates a tailwater trout fishery; water coming out of the dam is cool enough to support Rainbow Trout. Due to the lack of spawning habitat, the river is heavily stocked with Rainbow Trout, to support the fishery. Recent studies by the National Park Service (NPS) have found evidence of stocked rainbows from the Chattahoochee River migrating up small, first-order warmwater streams and spawning. Although Cobb County Water System Watershed Monitoring Program has occasionally observed Rainbow Trout far up some of our larger tributaries to the Chattahoochee River, we have never found any evidence of successful spawning. The habitat of these large tributaries would not support a viable population, as the temperatures are too warm and there are too many fine sediments. The NPS study concluded that streams protected from urban development, such as those within NPS lands, may be used particularly by trout for reproduction. This is because they still have high canopy coverage and a more natural hydroperiod based on groundwater input to reduce high summer instream temperatures lethal for juvenile trout.

Brown Trout (*Salmo trutta*)

Brown Trout are found throughout North America in waters ranging from 18-24 ˚C (65-75 ˚F). They were brought from Europe and Asia in 1883. There are dark spots on the dorsum and small red spots along the flanks. There are no spots on the venter; the leading edge of the anal and pelvic fins are white. There are no spines in the fins. Large breeding males develop a prominent hook, called a kype, on the lower jaw. These fish are more tolerant of higher temperatures than rainbow or brook trout.

They spawn in the fall and early winter when water temperatures are 6-10 ˚C (43-50 ˚F). Redds are constructed by females in gravely headwater streams. Eggs develop in forty-six days at 9 ˚C (48 ˚F). Eggs will become abnormal at temperatures above 10 ˚C (50 ˚F). Critical maximum temperature for the fish is 25 ˚C (77 ˚F). Longevity is eight or more years. Adults are inclined to be sedentary. They feed mostly at night on aquatic insects, terrestrial insects, crayfish, fish, and amphibians. Browns are more piscivorous fish than other trout with large specimens feeding heavily on minnows, sculpins, darters, and young trout.

Brook Trout (*Salvelinus fontinalis*)

The Brook Trout is the only native trout in the southeastern United States. It occurs naturally in the Southern Appalachian streams of Tennessee and Georgia. Rainbow and Brown Trout have periodically been successfully introduced into various streams, often to the detriment of the native brook trout, with which they compete. The Brook Trout is the least competitive of the three species.

The Brook Trout is slate gray to dark green dorsally, with pale spots and vermiculations (wormlike irregular or wavy lines) silvery to bright yellow. Body with pale spots and a few red spots ringed by pale areas.

Brookies, as they are called, live in small, rocky mountain streams. They require cool, clear water and are sensitive to habitat degradation and poorly oxygenated water. They prefer waters 11-13 ˚C (52-55 ˚F), with 16 ˚C (61˚F) being the maximum temperature. The Southern Appalachian Brook Trout rarely exceeds 12 inches and lives 3-4 years. Adults feed on small fish, insects, invertebrates, and snakes.

Rainbow Trout (*Oncorhynchus mykiss*)

Brown Trout (*Salmo trutta*)

Brook Trout (*Salvelinus fontinalis*)

For Info on Fishing Regulations: http://www.gadnr.org/ Images: http://images.fws.gov/

Sources:

Etnier, D.A. and W.C. Starnes. 1993. The Fishes of Tennessee. The University of Tennessee Press, Knoxville, 689 p.

Long, J.M., D. Lairson, C. Martin, B. Couch, 2007. Evidence of Rainbow Trout Spawning in Small Warmwater Tributaries of the Chattahoochee River, Georgia. *Proceedings of the 2007 Georgia Water Resources Conference*, held March 27-29, 2007, at the University of Georgia.

Schedule of Events

Monarchs In The Classroom

Date: Saturday, October 6th
Time: 9:30 am - 2:30 pm
Location: Water Quality Lab
Cost: $25.00
Call: Susan, 404-388-8228

Tree Planting & Care

Date: Thursday, October 11th
Time: 6:30 pm - 8:00 pm
Location: Water Quality Lab
Cost: Free
Call: 770-528-4070

Outdoor Classroom Symposium

Date: Friday, October 12th
Time: 8:00 am - 5: 00 pm
Location: Fernbank Science Center
Cost: $75.00
Info:http://www.eealliance.org

Tritt River Kids sampling for macroinvertebrates

October 2007

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6 Monarchs Workshop
7	8	9	10	11 Tree Workshop	12 Outdoor Classroom Symposium	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			AAS Workshops upon request

Welcome, New Adopt-A-Stream Volunteers!

We've had a plethora of new adoptions in the past few weeks! A big Thank You to all of our volunteers for assisting Cobb Water with watershed protection.

Loraine Brooks and 5th Grade Students at The Walker School

Ms. Brooks and her students have adopted the pond on their school property.

Leigh Lyjak & Cynthia Lind, East Side Elementary School 3rd Grade

Ms. Lyjak and Ms. Lind will be monitoring Sewell Mill Creek near East Side Elementary with their students.

Lisa Slauson and the Due West River Kids

Ms. Slauson and her 3rd grade students have adopted a portion of Lost Creek near Due West Elementary School.

Tamera Neal and the Tritt River Kids

Ms. Neal will be monitoring Chimney Springs Creek with her 3rd grade students.

Sue Silverman and Mt. Bethel Elementary Target

Ms. Silverman and her 3rd grade students will be monitoring a tributary of Willeo Creek.

The Ellis Family

The Ellis Family, led by Kim Ellis, have adopted Sope Creek near Johnson Ferry Road.

November 2007

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
		North American Association for Environmental Education Annual Conference				
18	19	20	21	22	23	24
				Thanksgiving Holiday		
25	26	27	28	29	30	

Schedule of Events

NAAEE Conference

Date: November 14-17
Location: Virginia Beach, VA
Cost: $490.00
Info: http://www.naaee.org

Recommended Reading

Developing Ecological Consciousness: Paths To A Sustainable World by Christopher Uhl

"Uhl (ecology, Pennsylvania State U.) taught a standard lackluster course in the environment for non-science majors for over a decade before realizing that it was only further alienating students from the environment. He pondered how to awaken interest and concern, and here presents the text he came up with.

This book offers an ecology-based, wonder-filled initiation to the Universe and the Planet Earth. It examines the ways in which humans are damaging the Earth and their own bodies and spirits. It also presents paradigms, values, and tools essential for both planetary and personal transformation."

Publisher Comments from www.Powells.com

I learned of this publication during my graduate program. It was part of the curriculum in my ecological literacy course and I think it's a great resource. My advisor describes the publication as a step by step guide to facilitating ecological consciousness in students. I found it to be a great way to explore my thoughts and attitudes about the environment and the work I do with students and volunteers. Each chapter guides you through a series of activities designed to make you think deeper about the materials you are reading. For those of you that journal, this book contains great material to focus your reflections. I highly recommend this publication as a tool for increased eco-literacy.

-Jennifer McCoy

This publication, like all those profiled in our *Recommended Reading* feature, are available for checkout from the Watershed Stewardship Library, housed in the Water Quality Laboratory.

Cobb County Watershed Stewardship Program

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Cobb County...Expect the Best!

Site of the Season: Little Noonday Creek

by Pradip Shah, Water Quality Lab Chemist and Volunteer

Karan & Arjun Shah collecting monthly samples at Little Noonday Creek

Karan Shah and his Magnet Group of Arjun Shah, Terry Bennekou and I have been monitoring Little Noonday Creek at Sycamore Lane for the last five years. The head-waters of this small stream originate by Piedmont and Sandy Plains Roads and it flows through neighborhood yards down to the sampling site. The riparian zone is vegetated and fully shaded. There is very little flow and few riffles. However, analysis of chemical parameters indicates a Water Quality Index score of 0.30, or **Best**.

Sampling has occurred once a month for five years. Air temperature ranged from 12 ˚C to 27 ˚C, depending on season. Water temperature ranged from 8 ˚C to 23 ˚C. Dissolved Oxygen ranged from 8.0 to 12.0 ppm. The trend is lower in summer and higher in winter, which is very common due to the ability of cold water to hold more oxygen. Hardness was 35-40 ppm, indicating soft water. Alkalinity was 40 ppm. When hardness and alkalinity are equal, it is considered bicarbonate alkalinity. If hardness is greater than alkalinity, the excess is termed non-carbonate hardness. Fecal Coliform levels varied from 80 – 300 Colony Forming Units (CFU) per 100 mL. PH remains the same throughout the year, 6.8-7.0, indicating low biological activity and less contamination. Access to the Water Quality Lab has allowed us to test for conductivity, turbidity, suspended solids, phosphorus, NOX, and various metals. All results of analyses support the statement that the Water Quality Index at our site on Little Noonday Creek is rated **Best**.

If you would like to have your volunteer monitoring project profiled in *The Thalweg*, please contact Jennifer McCoy.