

Southeastern Water Pollution Biologists Association

2004 Winter Newsletter



February 2004

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President's Letter

Hi Everyone,

I hope everyone is having a productive winter season. Around here, we are catching up from last year and planning for the coming year. At this point, many folks are begging for summertime weather, but I'm sure we'll be wishing for cooler temperatures around July or so.

Many thanks go to Jimmy, Amy, and all the other TN folks for hosting an excellent meeting in Nashville last year. Alabama has been very busy planning for this year's meeting and we are excited about hosting the 2004 meeting in Orange Beach, AL on November 2-4, 2004. The meeting will be at the Hilton Garden Inn on the beautiful gulf coast. Arrangements are underway and more details will follow.

It is not too early to start thinking about presenting your newest project at this year's meeting. So, please consider this a first call for papers. Also, we would like to have a large poster session area, so dust off those old posters and plan to bring them with you. There are several new folks that haven't seen them yet and a lot of old topics that are coming around again (i.e. data comparability, nonwadeable bioassessment methods, etc.).

Lisa and I have decided to rename the SWPBA positions for this year to presitary and secredent. So, now when you have a question for one of us, you'll have to guess which one will answer it. All kidding aside, if you need anything, just give one of us a call.

Mark your calendars for the next SWPBA meeting on November 2-4, 2004 in Orange Beach, AL. We hope to see you there.

Until Warmer Weather,
Janet Branch
Jlg@adem.state.al.us
(334)260-2749

Lisa Huff
Esh@adem.state.al.us
(334)260-2752



December 16, 2003

Ms. Janet Branch
SWPBA
1890 Cong. Dickinson Drive
Montgomery, AL 36109

Dear Ms. Branch:

Thank you for choosing the **Hilton Garden Inn** for your groups accommodations in November 2004. A block of rooms have been reserved in the name of your group for Oct. 31 ~ Nov 3, 2004:

Southeastern Water Pollution Biologist Association

Please include the following information in all correspondence to your members.

Your room rates are as follows:

(2) Queens Poolside:	\$64.95	(Per night/Plus 11% tax)**15 blocked
(2) Queens Beach View:	\$64.95	(Per night/Plus 11% tax)**15 blocked

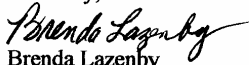
Guests must call Hilton Direct at (800) 445-8667 to make reservations. They should identify themselves as part of the group and specify the group code : **SWP**

Reservations **must** be made no later than **October 15, 2004** in order to receive the group rates. ***Any reservations made after this date will be on a space available basis at regular rack rate.***

Individuals will need to guarantee their reservations with a credit card or first night's deposit at the time the reservation is made. Individual cancellations must be made **48 hours prior** to the arrival date or the guest will be billed the first night room and tax.

If any questions or problems making your reservation, please do not hesitate to call me.

Sincerely,


Brenda Lazenby
Director of Sales

2003 SWPBA Business Meeting Minutes

The SWPBA Business Meeting was called to order at 10:45 a.m.

Old Business

- There was no old business to discuss.

New Business

- Jimmy Smith thanked all meeting coordinators, moderators and participants for their efforts and asked if any new business needed to be discussed.
- Skip Call suggested that the SWPBA host, scheduled to host two years in advance, state whether or not they want to accept that responsibility and begin planning for the SWPBA meeting two years in advance instead of one.
- Skip Call also suggested that SWPBA expand their membership to other agency biologists such as the Department of Transportation.
- Jimmy Smith suggested that a formal proposal be written up to expand the SWPBA membership eligibility and that this be decided upon during the 2004 SWPBA meeting. If adopted, the SWPBA Constitution and By-Laws could then be modified to open membership to other agency biologists.
- Kim Sparks suggested that SWPBA registration fees be raised to a flat rate of \$50.00. Mike Beiser stated that the registration fees be left up to the individual states hosting the meeting. Jimmy Smith suggested that the registration fees be set to cover the actual cost of the use of the facilities and banquet.
- Mike Beiser formally accepted responsibility for the State of Mississippi to host the SWPBA meeting in 2005.
- Jimmy Smith asked if having the meeting earlier than the first week of November was a problem. Skip Call clarified that there is not set time for the meeting but that Nov. 1 was the beginning of the federal fiscal year. Lisa Huff added that after Nov. 1, hotel rates go down to off-season.
- Dana Denson suggested that all presentations be put on a CD to be made available to all the states. Jimmy Smith stated that this years presentations will be either be made available on the Florida website or burned on to a CD and mailed to each of the states SWPBA contact person.
- Bill McDermott asked that a list of meeting attendees be included in the next newsletter. Janet Branch stated that a list will be included.
- Greg Pond asked about the status and use of "List Serve". The current moderators of the "List Serve" were determined to be Greg Pond and Joy Jackson. Jimmy Smith suggested that the current status of "List Serve" be explored by one of the moderators.
- Jimmy Smith asked Alabama if they accepted responsibility for the 2004 SWPBA meeting. Janet Branch accepted responsibility.

- Jimmy Smith opened the floor for nominations of the 2004 SWPBA President and Secretary at 11:05 a.m. Mike Beiser nominated Janet Branch for President. Skip Call seconded the nomination. Janet accepted the nomination. Mike Beiser nominated Lisa Huff for Secretary. Skip Call seconded the nomination. Lisa accepted the nomination.

- Jimmy Smith passed “The Worm” to Janet Branch. Janet stated that the next meeting will be during the first week of November on the beach or in Montgomery, AL if funding remains low.

- Mike Beiser made a motion to adjourn the business meeting. Dave Melgaard seconded the motion.

The business meeting formally adjourned at 11:11 a.m.

2003 SWPBA PRESENTATIONS

Are available for viewing at

<http://www.dep.state.fl.us/water/bioassess/swpba03.htm>

Thanks to Florida for posting the presentations
on their website!

2003 SWPBA List of Attendees

Alabama
Janet Branch
Lisa Huff

EPA Region IV
Chris Decker
Ed Decker
Morris Flexner
Jim Harrison
Dave Melgaard

EPA Headquarters
Treda Smith

Florida
Dana Denson
Donald Ray
Johnny Richardson

Georgia
No Attendees

Kentucky
Skip Call
Susan Cohn
Mike Compton
Steve McMurray
Rodney Pierce
Greg Pond
Danielle Rogers
Jessica Schuster
Mark Vogel

Mississippi
Mike Barnes
Mike Beiser
Alice Dossett
Emily Cotton

North Carolina
Larry Eaton
Ed Schwartzman
Kathy Herring
Trish MacPherson

South Carolina
Jake Bickley
Bill McDermott

Tennessee
Pat Alicea
Chad Augustin
Seaton Bonney
Joellyn Brazille
Jonathon Burr
Linda Cartwright
Rich Cochran
Greg Denton
David Duhl
Tamika Douglas
Larry Everett
Amy Fritz
Annie Goodhue
David Hale
Greg Harris
Lew Hoffman
Joe Holland
Kristen Howerton
Sharon Kington
Dan Murray
Pat Patrick
Carrie Perry
Tina Robinson
Jimmy Smith
Kim Sparks
David Stucki
Sherry Wang
Steve Winesett

Others
Bill Brode, TDOT
Keven Brown, TDOT
Dennis Crumby, TDOT
Lilah Miller, TDOT
Matt Richards, TDOT
Jennifer Thompson, TDOT
Mike Williams, TDOT

News from ALABAMA

Reservoir Water Quality Monitoring (RWQM) Program

Monthly sampling was completed during October for the *Tributary Embayment Water Quality Assessment of the Tennessee River Basin and Water Quality Assessment of Alabama Reservoirs for Nutrient Criteria and Total Maximum Daily Load Development*. Sampling was conducted at 28 Tennessee River reservoir embayment sites for the Tennessee basin project and at 38 sites in other basins for nutrient criteria and/or TMDL development. Data compilation for these projects was completed in December and data analysis initiated.

Compliance monitoring for established lake-specific nutrient criteria was completed in October at Harris, Weiss, and Martin Reservoirs. Additionally, TMDL sampling of the Sugar Creek embayment of Martin Reservoir was completed during October. Sampling was conducted at 14 sites on these reservoirs.

Data compilation was completed and analysis initiated for critical-period monitoring data from Purdy, Gantt, Point A, Aliceville, Gainesville, Demopolis, Coffeeville, Inland, Jackson, West Point, Harding, Walter F. George and Big Creek reservoirs.

The following reports have been completed: *Intensive Water Quality Survey of the Chattahoochee and Conecuh River Reservoirs 1999*, *Intensive Water Quality Survey of Coosa, Tallapoosa, and Alabama River Reservoirs 2000*, and *ADEM Reservoir Water Quality Monitoring Program Compliance Monitoring Report 2002*. Work on the draft report for the *Intensive Water Quality Survey of Black Warrior River Reservoirs 2002* continued during the 1st Quarter. Completion of the final report is scheduled for February 2004. Draft reports have been initiated on the following: *ADEM Reservoir Water Quality Monitoring Program Compliance Monitoring Report 2003* and *Tributary Embayment Water Quality Assessment of the Tennessee River Basin 2003*. For more information on this project contact Gina LoGiudice at glogiudice@adem.state.al.us or 334-260-2700.

Fish Tissue Monitoring Program

Fish tissue sampling was completed with 463 fish collected from 45 locations October-December. Forty-one locations were FTMP sampling sites with 401 fish collected. One site on the Alabama River was sampled as part of a site assessment conducted by ADEM/Land Division with 12 fish collected. Three sites were sampled as part of the EPA National Fish Tissue Study with 50 fish collected.

Requests for FTMP data and information were processed for Gulf States Marine Fisheries Commission, Auburn University Fisheries Dept., University of Alabama, and QEA (Quantitative Environmental Analysis Inc. For more information on this project contact Mike Len at milen@adem.state.al.us or 334-260-2700.

303(d) Water Quality Assessment Program

Sampling for FY03 303(d) water quality assessments has been completed. Water quality parameters collected at these stations include organic enrichment, total and recoverable metals, and fecal coliform. Chlorophyll-a and Atrazine Screen samples were collected at the Ecoref stations in addition to the other parameters. Intensive fecal studies were conducted at 30 stations during the June to September time period. Pre-planning and reconnaissance trips are being

conducted for the FY04 303(d) sampling season. For more information on this project contact Ransom Williams at rw@adem.state.al.us or 334-260-2715.

Ecoregional Reference Reach Program

Reference Reach assessments are conducted in cooperation with our 303(d) water quality assessments. Monthly water quality sampling events and one time intensive aquatic macroinvertebrate and fish community assessments are conducted at sites that are located in ecoregions found within our targeted annual river basin-group (5 year rotating basin approach). During FY03 twenty-five Ecoref sites were assessed monthly from March to November. Water quality parameters include indicators of sedimentation and nutrient enrichment, metals (dissolved and total recoverable), fecal coliform, and an Atrazine screen (March and April only). Habitat assessments and reach characterization were conducted once during April/May and July August. For more information on this project contact Vickie Hulcher at vjh@adem.state.al.us or 334-260-2700.

Nonpoint Source Assessment Program

2003 Basinwide NPS Assessment: Seventy-three Tennessee basin NPS screening stations in 30 sub-watersheds were selected for sampling by FOD personnel. Sampling, to include water quality samples, a macroinvertebrate assessment, and a fish community survey on selected stations, began in May 2003, but due to heavy precipitation, was delayed for three weeks. Sampling was reinitiated in June 2003, with water quality and macroinvertebrate assessments conducted at all stations. Macroinvertebrate collections are currently being processed. Preliminary evaluation of the macroinvertebrate data produced a list of 60 stations for fish community surveys. For more information on this project contact Brien Diggs at lod@adem.state.al.us or 334-260-2700.

In addition, two NPS intensive surveys were conducted in the Tennessee basin this summer; the Sand Mountain area, and the Big Nance Creek sub-watershed. These are being conducted in an effort to demonstrate an improvement in water quality of streams that have had best management practices implemented in their sub-watersheds. Twenty-one stations in five sub-watersheds were sampled during April, June, August and October 2003 and included water quality samples, a macroinvertebrate assessment, and on most a fish community survey. All intensive water quality sampling events, macroinvertebrate collections, and fish community surveys have been completed.

The final report of the 2001 Escatawpa, Tombigbee, and Mobile NPS Screening Assessment was completed. The report and appendices are available for distribution and downloading from the Department's website. The 2002 NPS Basin wide Screening Assessment of the Black Warrior and Cahaba River Report is currently being drafted.

Bioassay Program

Our commitments for FY03 have been met so we are helping out in other programs until we get started on next year's commitment list in September of this year. For more information on this program contact Janet Branch at jljg@adem.state.al.us or 334-260-2700.

Fish Community IBI Assessments

Fifty-four fish community surveys were completed. Six were not attempted due to dry stream conditions or bridge work. All but three fish have been identified. A visit to Auburn University is planned to attempt to identify the three and to confirm the identity of twenty-eight fishes to be added to the reference collection. Field parameters were collected during fish community surveys. All are entered in the database and QA'd. All new fish collections have been entered in the master taxa database along with their trophic status, habitat preference, distribution, and tolerance to adverse environmental conditions. Streams will be scored after all identifications are confirmed. For more information on this project contact Lee Davis at mld@adem.state.al.us or 334-260-2700.

Ambient Monitoring Program

ALAMAP- The 2003 ALAMAP sampling season is complete. Sixty stations were sampled. All data has been entered and QA'd. TKN was added as a new parameter for FY '03 to assist Water Division in establishing nutrient criteria for streams. Ortho-phosphorus was added in 2002. Preparation for 2004 ALAMAP sampling has begun. For more information on this project contact Lee Davis at mld@adem.state.al.us or 334-260-2700.

Data Management/Storage

Development of the Department's Surface Water Quality Database (SWQD) is still underway. User testing is underway to assure appropriate and accurate function. Initial test exports from the Department's LIMS systems have been successful, as was the test export to STORET. Additional LIMS and STORET exports must be accomplished to verify the accuracy and consistency of the populated STORET database. For more information on this project contact Vickie Hulcher at vjh@adem.state.al.us or 334-260-2700.

Other Items of interest

A draft report is in progress for ADEM's Periphyton Bioassessment Pilot Project which was initiated during 2002 to test the ability of three bioassessment methods to document impairment from nutrient enrichment. For more information on this project contact Lisa Houston at esh@adem.state.al.us or 334-260-2700.

We are in the process of working with an architect to design a new laboratory and office building. Plans should be completed in the very near future. Actually building the facility may be a different story, we'll just have to wait and see.

FLORIDA

SWPBA Newsletter Update

Central District - Orlando

The Watershed Management and Monitoring Section in FDEP's Central District office in Orlando is just beginning 2004 TMDL sampling. This year, we will be busy in the Kissimmee River Basin, a large area south of Orlando that forms the headwaters of Florida's Everglades. We anticipate almost doubling the amount of TMDL sampling we carried out last year, including 25 to 30 bioassessments of lakes and streams within the basin. To be as effective as possible in this endeavor, we are working with municipal, county, water management district, and military agencies to coordinate and facilitate sampling.

We will also be continuing annual reference Stream Condition Index and Biorecon sampling in streams throughout central Florida. In addition, we will be performing Floristic Quality Index (macrophyte) ecological assessments on 30 small lakes in the Ocklawaha River basin (north of the Orlando area) during the summer.

In addition to active participation in SWPBA, Central District biologists have recently been involved in a number of taxonomic workshops, the most recent of which was an EPA-sponsored larval odonate identification workshop led by Ken Tennessen, which was held at Auburn University in late January. Several staff are active in the Florida Association of Benthologists (FAB), currently holding the offices of president-elect and endowment chairman within that organization. Other tasks and projects in which CD personnel are involved include:

- responding to complaints such as fish kills and contamination of surface waters
- outreach events such as "bug talks" and judging science fairs
- working with taxonomic specialists in developing and updating identification manuals for the state
- independent bioassessment-related studies, as time allows

Central Laboratory - Tallahassee

Algal Biology Subsection

The Algal Biology Subsection of the FDEP Bureau of Laboratories Biology Section continues to grow. We now have a total of six taxonomists, three for soft algal ID and three for diatom ID. Maosen Hua, Meiqin Chen, and Amy Weaver are our soft algal taxonomists while Tiffany Burns, Isaura Lorenzo-Perez, and Ambika Tiwari perform the diatom identifications. In addition several of these employees are trained on both types of identification so that we can switch people around as need to accommodate our ever-increasing sample load.

We continue to identify algae from lakes, streams, rivers, wetlands, springs and marine sites all over the state of Florida in support of our Point Source Bioassessment Program, Everglades Restoration, Lakes Bioassessment Program, Ambient Monitoring, Remote Sensing Project, Springs Monitoring, and other small projects as needed by the Department. In 2003, we identified approximately 1050 algal samples. Elizabeth Miller of the Algal Biology Subsection can be contacted via email or phone. Email: Elizabeth.B.Miller@dep.state.fl.us Phone: 850-245-8190

Central Laboratory - Tallahassee

Bench Biology Subsection

The microbiology lab worked on a study looking for bacteria proposed by EPA as a water quality indicators for coastal recreational waters. The study targeted enterococci bacteria and fecal coliforms in both water and sediments in a remote bay in the northern Gulf of Mexico. Preliminary results found enterococci bacteria counts above the proposed safe criteria of 104 cfu/ml (single-sample maximum) even though the area is not subjected to direct storm water runoff or any facility wastewater discharge. The elevated enterococci levels are believed to be coming from wildlife sources that are not likely to pose as great a risk to human health as those from human sources.

The microbiology lab assisted the department in a study that looked at the disinfection efficacy in wastewater treatment plants on enterococci bacteria by various disinfection means; sodium hypochlorite, chlorine gas and UV. The study examined if current technologies would need any adjustments to disinfect enterococci and E. coli bacteria in the event those indicators become water quality standards. The lab assisted with sampling, testing, and data support for three rounds of sampling that included almost 300 individual microbiology tests. The lab tested pre- and post- disinfection samples for fecal coliform, E. coli, and enterococci. The draft report concluded that current disinfection technologies are suitable for the new bacterial indicators.

Central Laboratory

Invertebrate Zoology Subsection

The Subsection has continued to develop protocols for sampling Point Sources in marine waters. Four studies to date have been completed. These as well as other Bioassessment Reports can be found at: <http://www.floridadep.org/labs/cgi-bin/reports/search.asp>

The Subsection continues to support Florida's Springs Initiative by conducting on-going algal and invertebrate bioassessments of Florida's state park. A web site is available that contains information on various springs in Florida. For more information: <http://www.dep.state.fl.us/labs/reports/springs.htm>

The Subsection has been actively involved in processing most of the States TMDL sites. To access information on the TMDL program in Florida, please visit: <http://www.dep.state.fl.us/water/tmdl/index.htm>

FDEP Southwest District - Tampa

Total Maximum Daily Loads. The Southwest District is busy monitoring water bodies for the TMDL program. Water quality monitoring and biological assessments are being performed for the following water bodies:

- Peace River Basin
- Withlacoochee River Basin
- Springs Coast basin

In addition, an intensive monitoring study is ongoing in the Myakka River to determine site-specific alternative criteria for dissolved oxygen. Water quality is tested monthly for discrete and continuous parameters, and biological assessments are done quarterly at eight sites in 5 sub-basins.

Point Source Biological Monitoring. Several high-profile permit issues required biological assessment. These included:

- Piney Point Phosphate, Inc, holding water discharge into Bishop Harbor.
- Tampa Bay Reservoir construction spill and discharge violations in Fishhawk Creek
- Illegal dredging activity in Terra Ciega Bay

Ambient Biocriteria Development. Sampling continues at our ambient reference sites to provide continuing data for the development of State Biocriteria in streams, rivers and lakes.

Northeast District – Jacksonville

TMDL has been the bulk of our efforts in the Northeast District.

We are currently involved in the St. Marys/Nassau River basins. This involves several sampling trips for 32 stations. Primarily nutrients, bacteria, dissolved oxygen and suspended solids are the parameters of concern. There will also be macroinvertebrate sampling in these basins. This survey will be completed by December 2004.

In addition, in February, we will start TMDL sampling for the Upper East Coast Basin to be completed by December 2005. At this point there are 238 stations that need to be addressed. However, this number will probably decrease as more data becomes available. The area is the Intercoastal Waterway and its tributaries.

There are several Fifth Year Inspections inspections scheduled. This involves extensive chemical and biological sampling upstream and downstream of permitted facilities.

We have been and will continue to be involved in several outreach programs. Next month, biologists from our section will be at the Museum of Science and History in Jacksonville involving several hundred elementary students with a hands on demonstration of macroinvertebrates and their role in the environment.

Northwest District – Pensacola

Stream monitoring sampling consisted of 15 Reference and Test streams and 11 Reference and Test Lakes.

TMDL sampling in the Choctawhatchee Bay watershed consisted of 15 stream surveys and 1 lake survey.

Point source monitoring surveys reviewed 8 facilities via Fifth Year Survey or Third Year Survey.

Restoration monitoring/compliance-enforcement sampling consisted of 7 streams and 2 lake surveys.

Current TMDL work consists of planning the upcoming sample schedule for the Pensacola Bay watershed. Unfortunately, due to limited staff and laboratory capability we will be able to sample only 30 of 100 water bodies that need verification on Florida's Impaired Water List.

With the help and patience of our Co-Op student from the University of West Florida we have made great strides in re-organizing our macro-invertebrate reference collection, and we have begun to put together an electronic photo-atlas of macroinvertebrates found in the Northwest District of Florida.

GEORGIA

The Ambient Monitoring Unit (AMU) biological monitoring team is wrapping up the 2003-2004 field season. The focus area for this season's monitoring is located in the eastern part of the Piedmont, within the Savannah, Oconee, Ocmulgee, and Chattahoochee River Basins. These sites were sampled by the Georgia Department of Natural Resources Wildlife Resources Division's (WRD) stream survey team who conducted fish bioassessments during the 2003 index period. We have approximately 5 more weeks of sampling and are trying to stay warm!

Work is continuing with Columbus State University on the multi-phase project to develop ecoregional reference sites and biological criteria for Georgia. The field work for this project has been completed. We should receive the final report for the level IV ecoregion reference sites this spring. We are currently working with the reference data and working through a difficult transition period to incorporate many changes.

Georgia is continuing its water quality trend monitoring throughout the state. During the calendar year 2004, the Georgia EPD is focusing its water quality monitoring efforts in the Altamaha, Ocmulgee and Oconee River Basins in the state. Approximately 233 stations have been selected for the 2004 rivers/streams statewide monitoring.

Georgia's draft 2004 305(b)/303(d) Integrated List of Waters was public noticed on January 9, 2004. Public Comments to the draft list are welcomed through February 9, 2004. The listing documents can be viewed at <http://environet.dnr.state.ga.us/6>. We're anticipating having a final list ready for submission to the U.S. EPA by April 1, 2004.

Kentucky News

The last few months have been rather interesting here in Kentucky state government. Our new Governor was sworn in on December 9, 2003, and immediately issued several Executive Orders to cut costs in state government. Most notable of these was a hiring freeze for all vacant positions. Later orders reorganized state government at the Cabinet level, decreasing the number of cabinets from 14 to 8. Kentucky SWPBA members are now in the newly created Environmental and Public Protection Cabinet, along with staff of the old Labor Cabinet and Public Protection Cabinet. Check out <http://www.environment.ky.gov> for more information on the make-up of the new cabinet. The Governor presented his new biennial budget to the legislature on Jan. 27, so we're all planning on tightening our belts and holding on for the wild ride. Also, with Kentucky moving farther into the Internet age, our e-mail addresses have changed to "firstname.lastname@ky.gov" from the old "@mail.state.ky.us". Our old e-mail addresses should work just fine, but just in case, you might want to update your address books. Now, on to the juicy details...

Water Quality Branch

Ecological Support Section

As some of you found out at the 2003 SWPBA meeting in Nashville, Mike Mills, supervisor of the Ecological Support Section for 17 years, retired in October 2003. At the helm of the staff biologists now will be Greg (Mr. Box Plot) Pond. There is a lot of transition going on in the section, so Greg will have his hands full. Good luck, Greg!

The biologists are currently busy processing and analyzing biological samples collected in the Kentucky River basin. Many samples were taken in 303(d) streams, which have nutrient TMDLs associated with them. With Greg moving into the supervisor position, ESS is down one "bug nerd" without any sign of relief due to a hiring freeze. Planning is ongoing for this years TMDL monitoring, reference reach and ambient biological monitoring, fish tissue monitoring, and bacteriological monitoring. We are in the second year of the second watershed cycle (Salt and Licking River Basins) and focusing on identifying impairments of tributaries in 303d listed watersheds. ESSers will be asked to do a little more this coming year until the hiring freeze is lifted. Staff are also working on support documents that outline our toxic spill response protocols and a document that outlines our data integration methods for assessing streams using multiple assemblages.

Data analysis is underway to begin subsampling invertebrate riffle samples using a fixed 300-count method. Rarefaction of reference condition metrics will allow us to switch to this method without re-sampling reference

sites. Typically, we used to ID close to 1000 organisms per sample, but with rarefaction, we can re-calculate metric scoring criteria and adjust the expectations. From the Rarefaction Calculator Website: “Rarefaction uses the data from the larger sample to answer the question ‘How many species would have been found in a smaller sample?’” If you found n organisms in the less-sampled region, rarefaction takes hypothetical subsamples of n organisms from the more-sampled region, and calculates the average number of species in such subsamples. This average can be compared to the number of species actually found in the less-sampled region. (The method computes a variance and standard deviation to help you judge how significant any difference is.) For those more rare taxa living in non-riffle habitats, we will continue to sample and ID multihabitat samples in addition to the riffle kick samples.

Other news from ESS:

- The algae program was down to one position for several months, however, during the recent reorganization of the Division of Water and the abolishment of the Bioassay Section, Paulette Akers was assigned the title of “Diatom Lady In-Training”. She is doing a great job learning the 500 or so diatom taxa that call Kentucky home. John (The Scum Scraper) Brumley will be presenting “*The Use of Diatoms in Bioassessment and Assessing Nutrient Impacts*” at USEPA Region 5 Nutrient Conference in February.
- The bug people, uh, person, Skip (Its Not a Bourbon Spill until I Say Its a Bourbon Spill) Call, has been very busy with sample analysis. He also took the lead role in another bourbon spill recently. Hey, Skip, don't drink the water! In addition to his supervisory duties, Greg will probably do more fieldwork this spring and summer than he originally thought because of the hiring freeze. Mark (If It Flies It Dies) Vogel will be overseeing the QA/QC program for the collection, process, and analysis of all biological data. Being a bug monger himself, Mark will be doing bug work too this coming sampling season.
- How about the fish? If you're talking about coral reef fish off the coast of Belize, then we can talk. Stretch (Mr. Box Plot Wanabee) Compton is currently on hiatus somewhere off the coast of Belize where a hard day of work is snorkeling and working on his tan. The IBI Report has just about been finalized. All of the Kentucky River fish samples have been analyzed and IBIs run.
- The fish tissue program is gearing up for a busy sampling season. With a statewide mercury advisory in place, we will be focusing on sites with low level PCB's. In addition, Eric (Fish Tissue Cowboy) Eisiminger will be coordinating with other agencies (Fish and Wildlife and Human Health) to develop a multi-agency advisory protocol document. Fish tissue for the Mud River, Levisa Fork, and Green River Reservoir have been collected and we are patiently waiting for results to come back from the

chemistry lab. Eric just returned from the EPA-sponsored 2004 National Forum on Contaminants in Fish, held in San Diego, CA.

- The bacteriological program is currently planning sampling schedules for 2004. This coming sampling year, Gary (the Moneran Mauler) Beck may be collecting some *E. coli* data and will continue to monitor for fecal coliforms. In addition to ambient, watershed, and swimming advisory sites, Gary will also be analyzing some groundwater sites.
- The Wild Rivers Program has recently completed a comprehensive management plan for the 1500+-acre tract it purchased on Martins Fork Wild River, in Harlan County. The plan was a cooperative effort of the Division of Water, the Kentucky State Nature Preserves Commission, and the Kentucky Archaeological Survey. The document details the biological, ecological and archaeological resources of the tract, as well as providing management guidance for its permanent protection and enhancement. For more information, contact Morgan Jones at the Division of Water.
- Staff have also been involved in database development and implementation using COMPASS. This database is designed to solve our Department-wide data storage and retrieval needs using a “one-stop-shopping” framework. All water, waste and air quality programs can be linked under various program names and agency interests. Thankfully, our ecological database (EDAS) will be batch loaded into COMPASS so that we can keep the flexibility and metric calculations provided by EDAS. The COMPASS database is STORET compatible. For more information, contact Greg Pond and Eric Eisiminger.
- The latest document produced by ESS is the “Kentucky Macroinvertebrate Bioassessment Index: Derivation of Regional Narrative Ratings for Assessing Wadeable and Headwater Streams”. This document can be found at the following link:
http://www.water.ky.gov/NR/rdonlyres/3519D7A6-3F6B-42EA-A06B-6E40CA03CD23/0/Statewide_MBI.pdf. Of course, if we decide to adopt a fixed 300-count subsampling procedure, there will be addendum in the works. Contact Greg Pond if you want more information. A similar document detailing the Kentucky Index of Biotic Integrity for fish communities will be available by late February. For more information on the Fish IBI, contact Mike Compton. Stay tuned!

Standards and Specifications Section

Staff in the Standards and Specifications Section are too busy standardizing, specifying, and more importantly, working on the 305(b) Report to Congress to even talk to anybody and weren't able to

contribute to this issue of the newsletter. They'll have something in the next newsletter for sure.

TMDL Section

Staff in the TMDL Section are busy TMDLing, putting out a draft 303(d) report, and weren't able to contribute to this issue of the newsletter. They'll have something in the next newsletter for sure.

Water Quality Certification Section

Staff in the Water Quality Certification Section are busy water quality certifying, and weren't able to contribute to this issue of the newsletter. They'll have something in the next newsletter for sure.

Watershed Management Branch

Nonpoint Source Section

The Nonpoint Source Section biologists have been busily working away on several projects. Most of our time is now being spent on identifying our backlog of samples and report writing. One of our biologists decided to leave the Division and take a position with the Kentucky Transportation Cabinet, but the biological monitoring gods did not agree and his paperwork is currently in a "holding pattern" because of the hiring freeze. Below is a summary of the status of our current projects:

- *Green River Basin Monitoring and Assessment:* Fieldwork, labwork, and assessments for the ca. 30 sites sampled in this basin have been completed and final report preparation is underway.
- *Big Sandy/Little Sandy/Tygarts Creek Basin Management Unit Monitoring and Assessment:* Fieldwork, labwork, and assessments for the ca. 30 sites sampled in this basin unit have been completed.
- *Evaluation of the Obion Creek Corridor Restoration Demonstration Project:* Spring macroinvertebrate samples from 4 sites/year for 4 years have been identified. We are currently working on data analysis and final report preparation for the pre-restoration phase of this project.
- *Evaluation of the Wilson Creek Restoration Project:* We completed pre-restoration monitoring fieldwork during 2003. We are currently working on fish and macroinvertebrate identifications.

- *Kentucky River Basin Management Unit Monitoring and Assessment:* Fieldwork has been completed for the ca. 30+ sites in this management unit. Fish and macroinvertebrate identifications are currently underway.
- *Salt & Licking River Basin Management Unit Monitoring and Assessment:* We are currently planning our monitoring schedule for this sampling season in these two basin management units. We have randomly selected 30 14-digit HUCs in each unit for monitoring, with fish and macroinvertebrate sampling to occur at the downstream reach of each HUC. We anticipate some reconnaissance of these sites for accessibility in the next few weeks, with monitoring to begin in late March/early April.

MISSISSIPPI HAPPENINGS

Here in Mississippi we are in the middle of benthic sampling for our winter index period. We begin lake monitoring for nutrient criteria development in March, and there are a whole bunch of other things looming on our horizon. Looks like another typical year for us in Mississippi - - - hot, humid, and busy. All of us from Mississippi DEQ say congratulations to President Janet Branch on her election. Also it is appropriate for us to say “Thank you” to the folks from Tennessee for hosting a great meeting.

New Faces.

We wish to introduce and welcome three new members of the SWPBA “Family” from Mississippi, Michelle Burns, Randy Jones and Jennifer Wells. Michelle Burns will be our microbiologist in our North Regional Office in Oxford, and Randy Jones is our new Regional Biologist for the North Region. Jennifer Wells has joined the laboratory staff in Pearl, where she will be assuming the microbiological duties there. We are glad to have each of these new biologists on the DEQ staff. A bit more about each of them appears below.

Michelle Burns received her BS in Biology with a minor in Chemistry from the University of North Carolina at Wilmington. She has been with MDEQ since December 2003 serving as the microbiologist at the North Regional Office in Oxford. While at the North Regional Office, she has assisted the University of Mississippi in studying the standard methods procedure for the analysis and verification of fecal coliform

Randy Jones received a BS in general biology from the University of North Alabama in May of 2003. He began working as a regional biologist for MDEQ in November. During this time he has been involved in biological assessments of Wadeable streams and lake nutrient criteria development projects.

Jennifer Wells received her BS in Biology at the University of Mississippi. Prior to joining the Mississippi Department of Environmental Quality, Jennifer worked for two years at Argus Analytical, an independent environmental lab in Jackson. While at Argus she performed tests ranging from wet chemistry to microbiology and served as the sample administrator.

Field Activities

Our field activities have changed little since the last SWPBA Newsletter, as staff from the Biological Services Section continues with several long-term projects:

National Coastal Assessment

David Barnes and Barb Viskup represented the Biological Services Section during this sampling effort that occurred during August and September 2003. This is the fourth year of a five-year study. The Gulf Coast Research Lab led this effort. Fifty sites throughout the Mississippi Sound were sampled, with benthos, fish, sediments and water column samples collected for various analyses, as well as various field measurements.

Field Reconnaissance and Biological Sampling for Wadeable Streams

This is the fourth phase of the effort to sample the 303(d) listed waters of the state, those waters requiring WLA studies, and those wadeable streams where potential water quality problems are suspected. This year's effort consists of approximately 150 sites (including replicated and duplicated sites). During the latter part of 2003, staff biologists participated in the reconnaissance of sites for this portion of the study. Similar to the previous collection efforts, these sites were situated statewide with the exception of the Mississippi Alluvial Plain which is the focus of a separate monitoring effort (see below).

Beginning in January, staff of the Biological Services Section have been conducting bioassessments for this study. The sampling will be completed by the end of February.

Nutrient Criteria Development Projects

We have been heavily involved in data collection from lakes and reservoirs, and estuaries with the intent of using these data to develop nutrient criteria for our state's water quality standards. In 2005, an effort will begin to address nutrients in wadeable streams.

Lakes and Reservoirs Nutrient Criteria Development Study

This study begun in November of 2002 and will conclude in November of this year. The 50 largest lakes or reservoirs were chosen for sampling. A total of 98 sampling locations were situated on these lentic systems. Sample collection for nutrients, chlorophyll, dissolved oxygen, pH, specific conductance, transparency, and profiling are conducted during mid-March through mid-April, then again during June-September. During the summer months, a subset of these lakes are sampled weekly from mid-June through mid-July. This spring, we are going to sample the tributaries emptying into the lake or reservoir, and the outflow. Data will be reviewed and additional work is likely to fill in some gaps.

Beginning in November, another set of lakes of smaller surface acreage will be sampled for a two-year period according to a scheme similar to that outlined above.

Estuarine Nutrient Criteria Development Study

This effort has been structured similarly to the study for lakes and reservoirs. Much of the sample collection has been contracted to the Gulf Coast Research Laboratory, with MDEQ Laboratory chemists providing analysis of the water samples. Barb Viskup, South Regional Office Biologist has been providing oversight on behalf of MDEQ.

Wadeable Streams Nutrient Criteria Development Study

In March 2005 we will begin to collect data to ultimately use for the development of nutrient criteria for wadeable streams. Sample size for this study will be 102 sites, most of which have

been previously biologically assessed during one of our recent winter index periods. Two samplings will be conducted in the spring (March and April) followed by two in the late summer (September and October). Water samples will be collected for chlorophyll, nutrient analysis, in-situ parameters will be measured, and at a subset of the sites a periphyton survey will be conducted once per sampling period. The study is expected to be of two years duration.

Ecoregion Projects

In past issues of the SWPBA Newsletter, we have reported on two efforts and Ecoregion delineation and refinement that have been ongoing in Mississippi for several years. These are the Mississippi Level IV Ecoregion Project, with EPA Corvallis and MDEQ Biological Services Section taking the lead role, and the Mississippi Alluvial Plain Ecoregion Project, with EPA Corvallis and Dr. Barb Kleiss (U.S. Army Corps of Engineers) assuming the lead roles. Both of the final work products are complete and at the printers. Delivery to be in the near future for the “Ecoregions of Mississippi” poster. Hopefully, we can distribute to interested parties at the next SWPBA Meeting.

Natural Resource Damage Assessments

Staff Biologists continue to be involved in several projects of this nature:

Leaf River Oil Spill near Collins.

We have completed the Assessment Phase of this NRDA and are ready to move into the Restoration Phase. The Draft Restoration Plan was submitted for public comment, and a public meeting to hear comments was held in Collins on January 29th. We have some minor insertions into the Draft Restoration Plan to bring it to final form, and begin the restoration activities. Restoration activities include: a Rosgen-type stream restoration on the unnamed tributary into which the bulk of the spilled crude flowed; construction, placement, and monitoring of wood duck boxes to replace the losses and lost services resulting from the wood duck mortality associated with the spill; enhancement of wetland acreage and restoration of stream riparian zones at a nearby Nature Conservancy Preserve; and continued monitoring and potential remediation of the groundwater resources that were contaminated.

Oil Spill in Boggy Hollow, near Purvis, Mississippi.

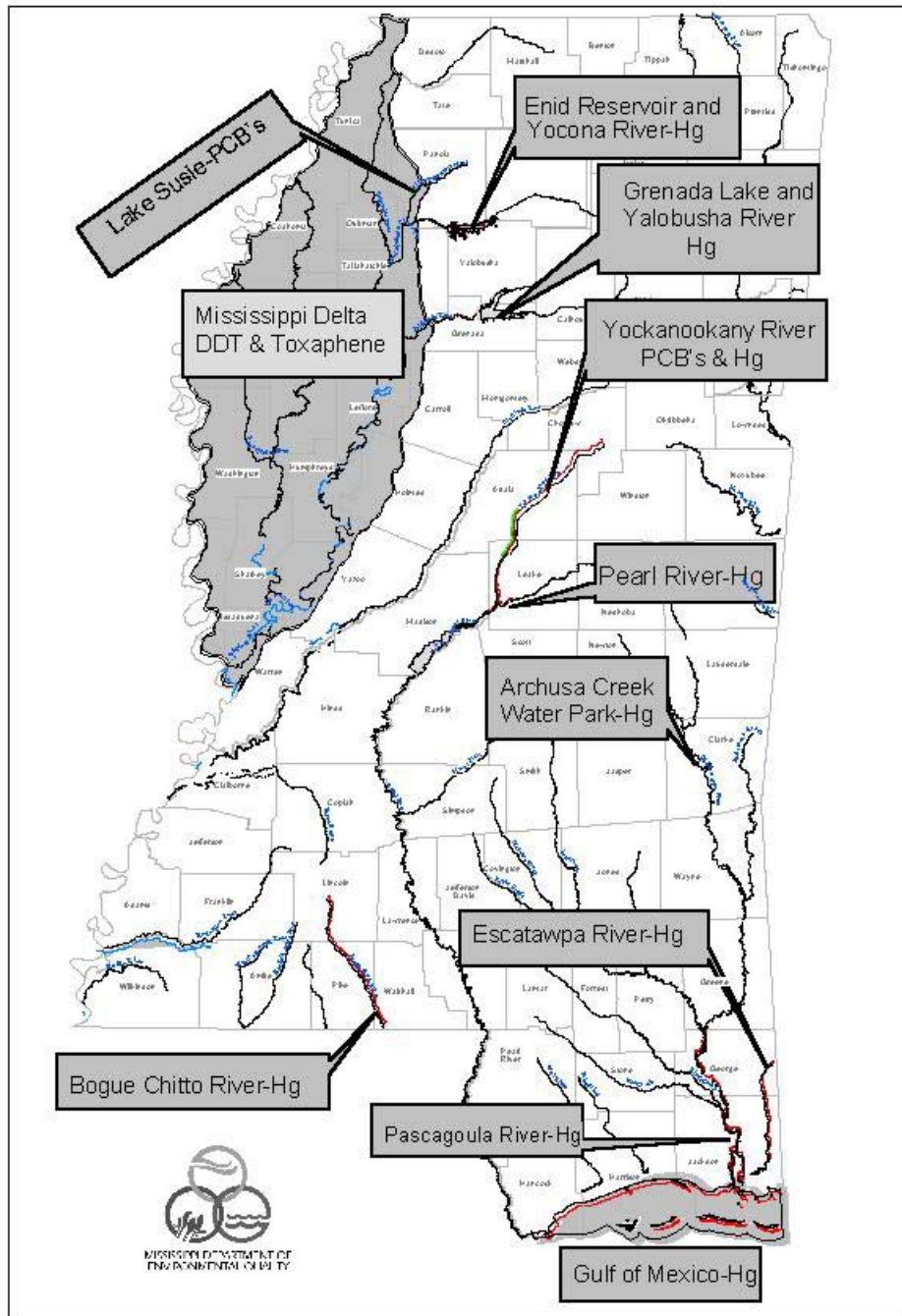
The results of the biological assessments done in conjunction with this spill have been completed and forwarded to our section for review. The biological assessments indicate that the spill and clean-up activities damaged some of the communities. A Damage Assessment and Restoration Plan (DARP) is in preparation.

Fish Tissue Monitoring Program

A figure illustrating all advisories currently in effect in Mississippi waters is given below:

Mississippi Fish Advisories

July 2001



NEWS FROM THE NC DIVISION OF WATER QUALITY

Biological Assessment Unit (BAU)

Staff Changes

Since the last newsletter, we've had some major staff changes within BAU. In October 2003, Dave Lenat retired after 30 years with the state. He's now spending his time starting a benthos consulting firm, selling books, and doing all the birding that he can. He still drops by on a regular basis to get data on rare taxa - a project to better document these taxa within our Natural Heritage Program that typically only tracks mussels, crayfish, and fish in the aquatic community. Blair Prusha started in August 2003. He comes to us after getting a master's at Colorado State University. He is already making the switch from western bugs to eastern bugs. The last staff addition is Jeff DeBerardinis who is filling on fish community position that has been vacant for two years. Jeff did IBI work in Maryland before working on his master's at UNC-CH.

Basinwide Monitoring

Basinwide sampling for fish and benthos in the Cape Fear River basin was complicated by continual high flows during spring and summer of 2003 that followed extreme drought during 2002. Over 120 benthos basinwide samples were collected in 2003, along with 55 fish community samples. New River basin sampling for benthos was also conducted. Basin reports for both these are nearing completion. Planning is underway for basin sampling in 2004 in the Savannah, Hiwassee, Little Tennessee, Watauga, Roanoke and White Oak River basins. We'll be all over the state this year.

Benthic Macroinvertebrate Special Studies

The emphasis continues on TMDL stressor studies and watershed characterization for our Wetlands Restoration Program. Over 180 special study benthos samples were collected from 17 watersheds in 2003. As presented at the annual meeting, urban watersheds are frustrating areas to use benthos to determine specific causes of impairment, as so many factors contribute to degradation.

Our drought study showed that it took nearly a year with above average rainfall for most Carolina Slate Belt streams to recover, and some have still not fully recovered.

One intriguing benthos study was conducted after a spill of 3,000 gallons of sodium hydroxide from a water treatment plant into a mountain trout stream (Middle Fork of South Fork New River). A fish kill was documented for about 8 miles and pH readings as high as 12 were found the day after the spill. Basinwide sampling provided good "before" data. Sampling for benthos after the spill showed no change in EPT taxa composition, or abundance - still had 33 EPT taxa! This makes no sense as there was adequate gradient and flow for good mixing and a pH of 12 should have eliminated all benthos. We are still seeking possible explanations or if any other states have found little/no impact to the benthos from sodium hydroxide spills. Contact Trish MacPherson at 919-733-6946.

Fish Community

Despite what has seemed like a never ending deluge during most of 2003, Division of Water Quality Staff were still able to spend a considerable amount of time in the streams. The 2003 sampling season saw fish community field work completed on the Fourth Creek TMDL Stressor

Study (Yadkin River basin), Impacts of a Trout Farm (French Broad River basin), Verification of Sites Rated as Impaired in 2002, Basinwide Monitoring (Cape Fear River basin), and smaller Wetlands Restoration Programs projects.

Basinwide Monitoring

Thirty-eight sites were sampled in the Piedmont portion of the Cape Fear River basin during the spring and early summer while later in the fall 17 sites were sampled in the Sandhills and Coastal Plain region. Preliminary results showed some streams hardly influenced by last year's drought while others are more slowly recovering. Relocations of wastewater treatment plant discharges have lead to some improvements in North Buffalo and Little Troublesome Creeks. *Cyprinella lutrensis*, *Luxilus cerasinus*, *Lythrurus ardens*, *Notropis chiliticus*, *Phoxinus oreas*, and *Catostomus commersoni* appeared to be expanding their ranges in the Haw River and Deep River watersheds. A small, previously unknown population of *Notropis mekistocholas* was discovered in Buffalo Creek, a tributary to the Deep River near High Falls. It is encouraging that despite the accelerated growth and development in the upper Cape Fear River basin there remain some fish communities still rated as Good or Excellent.

Public Workshops

Public workshops on the water quality and future water quality management plans were held throughout the year for the French Broad, Tar, and Catawba River basins. At these meetings Bryn Tracy discussed the basin's water quality covering the past two or three monitoring cycles. The workshop in Burnsville was especially testy over the issue of the federally endangered Appalachian elktoe mussel and the future widening of US 19E.

Impacts of a Trout Farm Discharge

The impacts of a trout farm discharge on the fish community in the West Fork French Broad River in Transylvania County were investigated by Staff in August 2003. A one-half mile segment of the river is on the Impaired Streams List because of the discharge. Typically, the river would have low biological productivity and despite the discharge, specific conductance in the river is still extremely low -- ~10 $\mu\text{mhos/cm}$. In 1990 a study by Staff from the NC Wildlife Resources Commission and North Carolina State University determined that the discharge greatly stimulated the density and biomass of Rainbow trout, Brown trout, and Blacknose dace in the receiving stream. The production was generally greatest immediately below the discharge and declined with distance downstream.

In 2003, the results were the same as those in 1990. Schools of brown trout, many greater than 300 mm TL and several as long as 550 mm TL, were common below the discharge. Clearly, the impact of the discharge artificially enhanced and stimulated the upper trophic level fish production in the river.

The native fish community in the lower part of this watershed also seemed to have been altered by the nonnative species and by the long-term management of the stream as a popular trout stream. Only three natives (Blacknose dace, Greenside darter, and Swannanoa darter) were collected in the lower part of the watershed in 1997. At least 15 additional species including Mountain brook lamprey, Saffron shiner, Mirror shiner, Warpaint shiner, Telescope shiner, Fantail darter, Redline darter, Greenfin darter, Gilt darter, and Mottled sculpin, had been previously known from this watershed.

Since these early studies were conducted, facility operators have done a better job of capturing the waste solids on the farm rather than discharging them into the stream. The trout chow was also changed in the early 2000s to a feed with more efficient conversion from feed to fish flesh. The feed is also now more water stable and floats atop the raceways until eaten rather than settling out in the bottom of the tanks. The recent data will be evaluated by DWQ's Collaborative Assessment of Watersheds and Streams Program to determine if additional Best Management Practices can be employed so that hopefully one day this segment of the river will be removed from the Impaired Streams List.

Fourth Creek TMDL Stressor Study

As part of the development of a Total Maximum Daily Load (TMDL) Stressor Study for Fourth Creek (Yadkin River Basin, Iredell and Rowan counties), the fish communities at several sites were evaluated during July 2003. A 9.5 mile reach of the stream is on the Impaired Streams List because of sediment and turbidity.

During the past several years flows in Fourth Creek have been extreme – from as little as 1 cfs during droughts to more than 4,000 cfs during the winter of 2003. The stream also has elevated conductivity, turbidity, and fecal coliform bacteria, and degraded instream and riparian habitats. The sources of these stressors (causes of impairment) are the historic poor landuse practices in the watershed, the current urban landuse practices surrounding the City of Statesville, the erosive soils throughout the watershed, and the wastewater treatment plant.

The fish fauna was rather depauperate in species and individuals. Despite having a watershed area of more than 83 square miles, only 25 species have been documented from it and no more than 15 species have been collected at any site at any particular time. At most sites, the number of species and the number of fish collected were only about one-half the number expected for a stream of its size.

Almost one-fourth of the known species from the watershed (Common carp, Red shiner, Fathead minnow, Channel catfish, Green sunfish, and Spotted bass) are not native to the river basin. More than one-half of the species are also classified as tolerant. Intolerant species known to occur in the middle portion of the river basin (Piedmont darter, Highback chub, and Fieryblack shiner) are absent. The dominant species at most sites was the Bluehead chub; a species generally indicative of some nutrient enrichment.

Staff with the Modeling/TMDL Unit of DWQ have developed a draft TMDL for turbidity for the watershed. Preliminary calculations have determined that a 50 percent reduction in the total suspended solids loading in the watershed will be required just to attain the Water Quality Standard of 50 NTU (Nephelometric Turbidity Units). Results of this study will be presented at a public meeting in Statesville in 2004.

Fish Contaminant Program

From May to October 2003, Staff conducted fish surveys at twelve stations throughout the coastal plain of North Carolina. The surveys were conducted as part of an ambient field study to assess waterborne mercury. This study was designed to answer some basic questions about mercury in the eastern area of the state and to provide information that may be used in water quality standard and TMDL development. Fish sampling was conducted in conjunction with mercury monitoring in water, sediment, and effluent to develop site specific water to fish bioaccumulation factors (BAFs). Site specific BAFs will allow the development of a more site

specific mercury standard for use in TMDLs and to evaluate waters of North Carolina relative to other waters in the country

A statewide survey for organic pollutants in fish tissue is being conducted from 2003 to 2005 to further assess the character of pesticide contamination throughout the state. The assessment of persistent bioaccumulative compounds in North Carolina fish has not been performed by the DWQ since the late 1980's. Current data on bioaccumulative organics is lacking at most stations across the state. Composite samples of a top predator species (largemouth bass) and a bottom feeding species (catfish) will be collected at 47 stations across the state. The stations represent the exit flow points for all 8-digit hydrologic units throughout the state (excluding estuaries). The survey is designed as a Tier 1 assessment of large drainage areas for bioaccumulative compounds in freshwater species. Fish samples will be analyzed for chlorinated and organophosphate pesticides and PCB's, as well as other organic compounds suggested by a panel of researchers. Results from the survey will be used to identify areas warranting additional Tier 2 assessments

Focusing in 2003 on sites in the eastern part of the state, samples (usually of Largemouth bass, Common carp, and Channel catfish) were completed at 15 stations.

Fish Kills

Field investigators reported 43 fish kill events during 2003. Kills were reported from coastal estuarine waters westward as far as Madison County. Kill activity was documented in 10 of the 17 river basins. Staff tracks fish kill events when at least 25 fish are affected and the event is confirmed by investigators.

The cumulative mortality in 2003 was over 3.6 million fish. This represented a significant increase over the 2002 total and was the highest mortality total since systematic reporting began in 1996. 3.1 million (86%) of the 2003 total was reported from just two large events on the Neuse River. Mortality totals for individual events ranged from 50 to 1.8 million with a median mortality of 1,400. Reported activity was evenly divided between freshwater and estuarine waters although the largest events occurred in the estuaries. No reports were received from the Atlantic Ocean.

For further information on the Biological Assessment Unit, go to the Unit's web site -- <http://www.esb.enr.state.nc.us/BAU.html>; for further information on the fish community studies, contact Bryn Tracy (bryn.tracy@ncmail.net); and for further information on the fish contaminant and fish kill program, contact Mark Hale (mark.hale@ncmail.net).

Aquatic Toxicology Unit (ATU)

Total Residual Chlorine Analyses

Over the past year, Sandy Mort conducted evaluations of the latest total residual chlorine detection technology from Hach. The instruments evaluated were the AutoCat 9000, an automated amperometric titration device and the DR/2400 portable spectrophotometer which uses the DPD colorimetric method. As is to be expected, the instruments' detection limits in "real-world" matrices were somewhat higher than the instruments' factory-rated detection limits. Final recommendations for the DR/2400 portable spectrophotometer were reporting limits of 0.1 mg/L (using a 10 ml sample volume) and 10 µg/L for the "ultra low range" method (using a flow-through cell and a 50 ml sample volume). These limits apply to typical surface waters and

effluents. Detection limits in distilled/deionized water are somewhat lower. In our laboratory, the AutoCat 9000 amperometric titrator is operated with 200 ml samples yielding a practical detection limit of 5.2 µg/L in effluents and surface waters. An important issue that came to light in our evaluations (and has been reported by others) is the interference of oxidized Mn and Cr in the DPD analysis. A number of other substances commonly encountered in surface waters and effluents also interfere with the DPD method. These interferences do not occur with the amperometric titration method. For further information, please contact Sandy at (919) 733-2136 or sandy.mort@ncmail.net. This is a critical issue for NC due to the recent adoption of a water quality standard of 17 µg/L for TRC.

***Daphnia magna* Feeding Inhibition Toxicity Test**

ATU staff members Sandy Mort and Todd Christenson developed the *Daphnia magna* feeding inhibition test to evaluate sub-lethal toxicant effects on organism feeding rates, enabling utilization of a more sensitive physiological endpoint than the 48-hour *Ceriodaphnia dubia* acute lethality toxicity test. The feeding inhibition test evaluates the persistence of feeding depression after exposure to the toxicant has ended. The feeding inhibition test is being utilized to test for sub-lethal effects on stormwater and watershed assessment samples. ATU's method was developed from a procedure described by McWilliam and Baird (2002). To date, increased sensitivity and dose-response effects have been observed in ambient samples and reference toxicants.

The feeding inhibition procedure employs the principle that feeding rate is a general response to toxicant exposure, and that feeding impacts of some toxicants may persist after exposure to the toxicant has ended, indicating continued physiological impacts. These latent effects are identified during the post-exposure feeding period. Studies have indicated that exposure to a variety of metals and organic chemicals results in a significant reduction in Cladoceran feeding rates, and that feeding depression is a rapid, general, indicator of toxic stress (McWilliam and Baird, 2002). The feeding inhibition toxicity test exposes organisms through direct toxicant contact, as well as through ingestion of toxicants sorbed to algal cells. The feeding component of the *Daphnia* test provides a more realistic exposure scenario than the acute *Ceriodaphnia* test, which does not provide for feeding of the test organisms during the test.

During the feeding inhibition test *Daphnia magna* are exposed to multiple concentrations of the test sample for 24 hours. During this period the organisms are provided a known concentration of *Selenastrum capricornutum* as a food supply. After the 24-hour sample (toxicant) exposure, the organisms are transferred to non-toxic "control" water and again fed a known concentration of *Selenastrum* for a 4-hour post-exposure "feeding" period. *Selenastrum* concentrations are measured (by absorbance) at the beginning and end of both the 24-hour and 4-hour periods. The endpoints monitored are *Daphnia* survival, ingestion rate (as cells/*Daphnia*/hr), and algal cell concentration reductions. Endpoints are reported at 20% and 50% effect-levels.

Reference:

McWilliam R. A. and D. J. Baird. 2002. Postexposure feeding depression: A new toxicity endpoint for use in laboratory studies with *Daphnia magna*. Environ Toxicol Chem. 21: 1198–1205.

Stormwater Impacts

A final report on the impacts of stormwater to natural wetlands is in its final stages of preparation. The study summarizes the results of four years of research from eight wetland sites in the Piedmont and Coastal Plain of North Carolina. Sites include riparian headwater wetlands and isolated emergent and forested wetlands that receive stormwater from residential and commercial development. Parameters such as assimilative capacity, water chemistry, soil texture and composition, vegetation, and herpetofauna were assessed to test for adverse impacts to wetlands and ability of these wetlands to retain and treat stormwater.

Results indicate that stormwater discharge to natural wetlands is feasible under certain circumstances and can provide water quality benefits. Additions of stormwater can act to restore hydrology to disturbed wetlands in heavily developed areas. Comparisons of influent and effluent from wetlands receiving stormwater in the study indicated marked reductions of several stormwater constituents such as suspended solids, grease and oil, TKN, Total P, Cu, Pb.

Despite these benefits, adverse impacts to wetlands were observed in several sites. Channelization and scour of wetland substrate as well as excessive sedimentation were characteristic of two Piedmont floodplain wetland sites. Sedimentation was particularly severe where adjacent construction lacked proper sediment and erosion control measures. A shift in soil particle size was associated with these sedimentation events. Effects of stormwater discharge on wetland biota were minimal, though there was some evidence of flood-induced tree mortality. In general floodplain and streamhead wetlands appeared to provide less water quality benefit and were more adversely impacted by stormwater discharge than depressional wetlands.

Though stormwater discharge can help promote water quality in downstream waters, precautions need to be taken to minimize negative impacts associated with this practice. Pretreatment of stormwater using BMP's such as grass swales or dry detention basins can significantly reduce sediment loads and velocity of discharges to wetlands. Diffuse flow of wetland influent is necessary to ensure thorough assimilation of stormwater and to avoid problems associated with channelization and scour.

Proper site selection is essential to the feasibility of stormwater discharge to natural wetlands. The use of disturbed wetlands for stormwater assimilation is preferable to treatment in high quality or intact wetlands. Adequate sizing of stormwater wetland sites is necessary and should be based on the drainage area and the characteristics of the run-off generated by the watershed. Soils and vegetation are key components of site selection. Wetlands with dense vegetation and organic soils will likely provide greater water retention and filtration of nutrients and contaminants. Finally stormwater discharge to a natural wetland should require a detailed monitoring plan that assesses potential impacts to wetland soils, hydrology, water quality, and biota.

For more information, contact Ed Schwartzman (edward.schwartzman@ncmail.net or 919-715-3477).

Intermittent Streams

We have finally gotten two summers of data to compare from the Piedmont and the results were striking. Summer of 2002 was the driest in 50 years, while summer 2003 was much wetter than average. Long stretches of stream bed that were dry in 2002 and supported minimal aquatic life,

stayed wet all summer long in 2003 and supported aquatic communities comparable to sites further downstream that never dried. It looks like intermittent channels are really just perennial channels in need of a little more water to reach their full potential.

We have also started collecting from ecoregions other than the Piedmont. In the Slate Belt/Triassic Basins, channel features must be much more developed to attain the same level of stream permanence as the Piedmont. While most unimpacted mountain streams spring out of the hillside these 0 order spring seeps don't support as much aquatic taxa richness or abundance as further downstream, below the confluence of two of these channels. We hypothesize that in drier years these springs may dry up in summer, as groundwater tables fall, but we need another dry year to test that. We did find a couple of intermittent mountain streams, and they appear to work much like Piedmont streams. Once again, we will need a normal to dry rainfall year now to get a better handle on how or if a mountain stream behaves differently than a Piedmont stream. Poking around in these small mountain streams we have found some interesting new records, including the caddisflies *Homoplectra flinti* and *Dipletrona metequi*, the midges *Boreochlus persimilis* and maybe a new species of *Georthocladius*, plus the syrphid dipteran *Neoascia* spp.

Recently, several cities and counties in Virginia have passed very stringent buffer rules to help protect the Chesapeake Bay watershed, including the intermittent streams. Their big problem was they didn't have staff trained to recognize an intermittent stream when they see it. In April, Dave Penrose, Larry Eaton and Dr. Jim Gregory (NC State Univ) will present a week-long course to Virginia state, county and municipal employees on how to recognize intermittent and perennial streams.

For more information , contact Larry Eaton (larry.eaton@ncmail.net) or 919-715-3471.

Stream and Wetland Mitigation/Ecosystem Enhancement Program (EEP).

Recently the North Carolina Department of Transportation (NCDOT), North Carolina Department of Environment and Natural Resources (DENR), and the United States Army Corps of Engineers (COE) agreed to collectively launch an initiative to develop a structured mitigation process. This process needed to support the timely delivery of North Carolina's Transportation Improvement Program while appropriately compensating for unavoidable and minimized wetland, stream, and buffer impacts under the Clean Water Act. This would be accomplished by either improving the current mitigation process or by establishing a programmatic process that provides functional replacement at the watershed for ecosystem impacts of transportation development. In July 2003, a Memorandum of Agreement was signed between the three agencies establishing the Ecosystem Enhancement Program (EEP)—a new division within the NCDENR charged with implementing this new process. The goal of the EEP is to better protect the natural resources of the state by assessing, restoring, enhancing, and preserving ecosystem functions and compensating for developmental impacts at the watershed level. The new mitigation process will potentially save agencies time and cost, while improving communication, planning, and environmental stewardship. The recommendations will de-couple mitigation from the permitting process, allowing permits to be issued for unavoidable and minimized impacts without the reliance on mitigation sites for individual projects.

The issue identified as the highest priority was lack of functional replacement and a subsequent need to develop functional assessment methodologies. To facilitate this process three workgroups, comprised of individuals from State and Federal agencies in North Carolina, were established to address specific topics relevant to watersheds, streams and wetlands. Much of the initial emphasis of the workgroup was the establishment of watershed scale tools to predict functional loss/lift in streams and wetlands. White papers have been written that describe the issues and problems that the teams are having, including the possibility of assessing the ecological integrity of a stream reach using existing GIS data layers, and a two-day conference was recently held in Raleigh to address these issues. Speakers were invited to give presentations of work being conducted to address these issues in other parts of the country, including Greg Pond's work in Eastern Kentucky, and how the lessons learned can be incorporated into the North Carolina initiatives. For more information about the EEP process in NC please contact Dave Penrose at dave.penrose@ncmail.net.

South Carolina

Department of Health and Environmental Control

AQUATIC BIOLOGY SECTION

Macroinvertebrate Group

The macroinvertebrate group continues to remain very busy with our general monitoring activities. We are in the process of finishing our identifications of the macroinvertebrates collected in 2003 from the Pee Dee Basin of South Carolina. In 2004 we will be working in the Broad River Basin. In addition to our fixed monitoring stations, we have been collecting randomly selected sites from around the state and will continue to do so in 2004. Beginning in 2005 we will be undertaking a joint project with the South Carolina Department of Natural Resources to monitor the Reedy River and its tributaries. Money from a settlement from the Colonial Oil Pipeline oil spill of 1996 will fund the project. In addition, we anticipate participating in a survey of wadable streams project funded by the EPA using Western EMAP methods and random site selection.

Phycology Program

First, lest we forget, thanks to our colleagues in Tennessee for hosting a great 2003 SWPBA meeting! The meeting was very informative and enjoyable.

The Phycology Program staff at SC DHEC had another busy spring and summer season in 2003. We are still in the midst of analyzing phytoplankton samples collected from the ambient monitoring program. Summary reports and data analyses are also now being compiled for the 2003 chlorophyll and phytoplankton work. We looked at a number of phytoplankton samples from fish kills and algal bloom investigations, although the number of samples received in 2003 decreased. This included a decrease in the number of observations of harmful algal blooms from estuaries and brackish ponds and lagoons. The reason for the decrease in fish kills and algal blooms is not clear, but there is some belief that a return to normal or above rainfall may have been a factor.

Plans for 2004 call for collecting chlorophyll samples at one hundred seven lake and estuarine stations once per month May through October. Phytoplankton analyses will be conducted on a selected subset of these samples. An additional 60 estuarine stations will be sampled for chlorophyll once during the summer for the South Carolina Estuarine and Coastal Assessment Program (SCECAP).

We have been fortunate to have a new staff member on grant in the phycology program. Scott Hagins has been with us since last September. Scott, who is interested in marine biology, is a graduate student at the University of South Carolina. He is pursuing a master's degree in Earth and Environmental Resources Management. Scott has been conducting chlorophyll analyses and

the data management. He has been doing some data analysis on nutrients in estuaries as we move toward establishing nutrient and chlorophyll *a* criteria for estuaries. Scott was also the project manager for a study of Algal Growth Potential in selected South Carolina estuaries.

The USEPA Region IV Ecological Assessment Branch assisted us by conducting the algal growth potential tests (AGPTs) for the project. We would like to express our sincere thanks to Bill Bokey and Bob Quinn for making the project possible. We believe some insightful information will be gained about nutrient and chlorophyll relationships in our estuaries from the AGPTs and accompanying data.

Regarding more coastal issues, the SC DNR Marine Resources Institute and NOAA-NOS Charleston Laboratory has reported an interesting occurrence of algal blooms. Blooms of *Heterosigma akashiwo* have been frequently observed in tidal creeks during 2 years of routine monitoring. *H. akashiwo* blooms also have been observed in the near-shore open ocean near Bulls Bay, S.C. An extensive bloom of *H. akashiwo* occurred on 29 Apr 2003 (SCDNR, T. Murphy and D. Griffin, Fig. 1). Sea WiFS satellite imagery of chlorophyll *a* concentrations shows the spatial extent of the bloom (Fig 2., Mati Kahru, Scripps Institute of Oceanography). The bloom extended across 16 miles of shoreline, and approximately 5 miles offshore. Initial observations and laboratory bioassays by SC DNR and NOS Charleston suggest that this bloom event had significant impacts to both fish and shellfish health. Dead fish were observed during aerial surveys. Hatchery-reared oysters exposed to bloom material exhibited increased stress, as indicated by a significant increase in lysosomal destabilization (Ringwood and Keppler, unpublished data).

That's all for now folks and best of luck in your 2004 sampling season.

Nonpoint Source Monitoring Team

The NPS Monitoring Team is still a team of two. David Eargle and myself are currently working on several projects in addition to our routine duties.

New Projects

* David is working on a bacteria monitoring project in two watersheds. The project objective is to monitor the effectiveness of BMP's that were installed on several properties within each watershed.

* A study on the Awendaw Creek Watershed has been initiated to investigate elevated bacteria levels in the adjacent shellfish harvesting waters of Graham Creek.

Routine Duties

We continue to focus resources to the 303(d) list as well as sampling for enforcement cases referred to us by our agency's District Personnel.

Training

David has completed the EPT course offered by Dr. John Morse, as well as attending the recent Odonata workshop at Auburn.

If you need to contact us you can reach us at:

Mike Pearson – pearsodm@dhec.sc.gov

David Eargle – eargleda@dhec.sc.gov

WATER QUALITY MONITORING SECTION

Ambient Monitoring Group

The folks (3) in the Section are busy getting ready for 2005. We are in the process of producing maps and preparing for the recon's for the Probability-Based Monitoring Program. This will keep us out of trouble until the fieldwork starts for our summer sampling.

Just a note to those of you that are interested, we now have Ecoregional Specific Numeric Criteria in lakes for total nitrogen, total phosphorus and chlorophyll *a*. See the following if you are interested.

Numeric nutrient criteria for lakes are based on an ecoregional approach which takes into account the geographic location of the lakes within the State and are listed below. These numeric criteria are applicable to lakes of 40 acres or more. Lakes of less than 40 acres will continue to be protected by the narrative criteria.

(1)for the Blue Ridge Mountains ecoregion of the State, total phosphorus shall not exceed 0.02 mg/l, chlorophyll *a* shall not exceed 10 ug/l, and total nitrogen shall not exceed 0.35 mg/l

(2)for the Piedmont and Southeastern Plains ecoregions of the State, total phosphorus shall not exceed 0.06 mg/l, chlorophyll *a* shall not exceed 40 ug/l, and total nitrogen shall not exceed 1.50 mg/l

(3)for the Middle Atlantic Coastal Plains ecoregion of the State, total phosphorus shall not exceed 0.09 mg/l, chlorophyll *a* shall not exceed 40 ug/l, and total nitrogen shall not exceed 1.50 mg/l.

Aquatic Toxicity Program

As is the case in most states in most years, we have continued to face budget constraints and scrutiny from the regulated community this past year. Therefore, the Aquatic Toxicity Program

circulated a survey, early last year, in an effort to compare our lab practices with those of other EPA Region IV states and to gage our performance with the “norm” suggested through comparison. Abbreviated results are presented below. Please let us know if any information is incorrect, or if you have any suggestions for a follow-up survey of state labs.

Abbreviated Survey Results

Survey and respondents

The survey in Appendix A about resources, production and success of culturing and testing of *Ceriodaphnia dubia* was e-mailed to all government toxicity labs or employees that worked in labs that operate in EPA Region 4. All labs except Tennessee responded to the survey, which did not receive the survey until later in March due to e-mail problems on their end.

Lab resources

Table 1 shows that South Carolina’s resources are slightly below average, while number of cultures started each week is somewhat above average. Other efforts are close to those of other labs. Alabama only tests for four contiguous months out of the year, which gave rise to dividing transfers per week and cultures per week into when testing and when not testing categories, and biased these averages. Otherwise, our culturing and feeding efforts are close to those of other labs.

Table 1. Resources and production of Region 4 government toxicity labs.

Question	KY	NC	FL	AL	R4	AVG	SC
No. effective staff	1.5	2	2	1	3	1.9	1.5
No. staff	4	2	4	6	1	3.4	3
Sq. ft.	336	1746	600	1200	1883	1153	833
Min. no. cultures/wk	1	3	2	0	1	1.4	6
Max. no. cultures/wk	2	5	2	3	* ^A	3	6
No. C. dubia per culture	70	25	30	60	60	49	30
No. C. dubia cultured/wk	140	125	60	120	60	147	180
Transfers/wk when not testing	7	7	3	1 ^B	7	6	7
Transfers/wk when testing	7	7	3	1	7	5.4	7
Feedings/wk when not testing	7	3.5	7	5	7	6.13	7
Feedings/wk when testing	7	3.5	7	5	7	5.9	7
No. months C. dubia cultured	12	12	12	4	12	10.4	12
No. acute tests/yr	15.67	7	23.33	10.67	13.33	14	4.5 ^C
No. chronic tests/yr	7.33	45	1.67	14.33	21.33	17.93	8
No. acute invalid/yr	0.33	0	2.00	0	0	0.47	3.5
No. chronic invalid/yr	0	3.33	0.00	0.33	1	0.93	1.3
Total no. valid tests/yr	23	66.67	25.00	25	34.67	34.87	12.5
Total no. invalid tests/yr	0.33	3.33	2	0.33	1	1.4	4.8
Acute RTT ^D /month when testing.	1	2	1	1	1	1.2	0
Chronic RTT/month when testing.	1	1	1.67	1	1	1.13	1

A-Depends on need for testing.

B-Maintain only mass culture when not testing.

C-Starting 7/1/99.

D-Reference toxicity tests.

Lab practices and methods

South Carolina's lab practices do not vary significantly from those of other labs as shown in Table 2. The only factors that varied between labs were algal medium and culture water. Most practitioners report that the algal growth medium in the EPA method does not support growth as well as other media. Clyde Goulden of the Philadelphia Academy of Natural Sciences developed M4, the medium we use. Culture water may have some importance in determining culture success. Reproduction in North Carolina's cultures was exceeded only by that in Region 4's. Like most factors, there was not a consistent effect on culture performance.

Table 2. Counts of answers to qualitative questions and South Carolina's answers.

Question	Response	Total	SC
Algal medium	EPA	3	M4
	AL ^A	1	
	NC ^A	1	
Algal species	S. capricornutum	5	Yes
Alternative validity for cultures	No	4	No
	Yes	1	No
Alternative validity for tests	No	4	No
	Yes	1	No
Culture deviations	No	5	No
Culture water	MHSW ^B	2	Yes
	Surface water	1	
	DMW ^C	2	

A-State-specific media. Recipes in Appendix 2.

B-Moderately hard synthetic water

C-Diluted mineral water

Legal challenges to enforcement actions

No respondent except North Carolina reported any legal challenges to enforcement action based in part or whole to toxicity tests. Unique lab practices allowed by 40CFR136 that have been shown by experimental data to contribute to culture success should not undermine the legal defensibility of toxicity test data. North Carolina had only two challenges, and these were settled through mediation. Two tests we performed recently were challenged because our results. These objections were resolved after consideration of split sample results. The importance of these questions is that EPA lab audits and EQC lab certification inspections are done to insure that the lab is producing legally defensible data. The lack of challenges may be cited as success of these programs. However, the absence of rulings on enforcement actions gives these programs no concrete or known criteria for evaluating labs except for those in 40CFR136.

Factors believed to cause poor C. dubia culture performance.

This question may not have been clearly stated. All of the factors listed in Table 3 will affect culture performance, but the intent of the question was to find out what in fact may be causing culture problems. Kentucky's water system is 18 years old and requires sanitization with a chlorine bleach flush twice per year by the manufacturer. They reported that pH, alkalinity, dissolved oxygen conductivity, NH₃ and chlorine were within EPA specifications. Region 4, whose cultures performance best, believed that all these factors could cause problems, but did not offer methods to determine which ones actually caused invalid cultures in specific cases.

Table 3. Two-way contingency table of factors believed to contribute to poor culture performance.

Factor	AL	FL	KY	NC	R4	SC
Water	X		X		X	X
Food	X				X	
Temperature	X				X	
Organism Source					X	
Contaminants in building					X	X
Air source					X	X
Personnel					X	

States that do not test

Georgia closed their lab several years ago due to problems with funding sources. They did not mention using 106 money for funding. Mississippi has not tested for the past 6 or 7 years. EPA requires them to perform 4 tests per year and they contract these out. Kentucky will begin contracting out all CBI's this year, but will continue to review biomonitoring and toxicity remediation reports.

NOTE:

Jim Glover has turned over the duties of being the SWPBA contact to Bill McDermott. I can be contacted at:

mcdermwt@dhec.state.sc.us

TENNESSEE

Thanks to everyone who attended the meeting in Nashville last November. We appreciated everyone's support. We hope everyone had a good time and went home with at least one new kernel of knowledge.

Department of Environment and Conservation

The Division of Water Pollution Control has recently published two new studies. Both can be found on our home page www.state.tn.us/environment/wpc/publications. We are very excited about findings in the first study. *Probabilistic Monitoring in the Inner Nashville Basin With Emphasis on Nutrient and Macroinvertebrate Relationships*. One objective of this project was to study the relationship between the biological community and nutrient levels. Fifty streams were monitored seasonally for 18 months starting January 2000.

The macroinvertebrate community was measured using the Tennessee Macroinvertebrate Index (TMI) and seven biometrics that make up the index. We also used Kentucky's %NUTOL. Nutrients were measured as nitrate+nitrite and total phosphorus. There were no significant direct correlations between nutrients and any of the biological metrics in the spring. A slight negative correlation was observed between total phosphorus levels and the number of EPT taxa in the fall. Three components of the fall macroinvertebrate community had a weak relationship with nitrate+nitrite. These were the percent nutrient tolerant taxa, the abundance of oligochaetes and chironomids and the abundance of EPT.

Since nutrients are associated with algae growth, percent canopy was also measured. Relationships were significantly stronger when canopy was included as a variable in the comparisons between nutrients and macroinvertebrates. With the inclusion of canopy, the percent contribution of chironomids and oligochaetes showed the strongest relationship to nitrate+nitrite. The Tennessee Macroinvertebrate Index, North Carolina Biotic Index and percent clingers were responsive to total phosphorus.

Additional analyses were conducted to determine if nutrient levels were the most significant factor in the observed relationship between canopy cover and macroinvertebrate populations. Bank vegetation type, riparian width and water temperature were all tested. The macroinvertebrate population showed little response to any of these variables with or without nutrients.

Since the strongest correlations were observed in the fall when dissolved oxygen and flow are lowest these variables were also tested. Only biometrics that did not demonstrate a relationship with canopy showed a correlation with DO. Two biometrics showed a response to flow. None of these was as strong as the relationship observed between canopy, nutrient levels and the macroinvertebrate community.

Although promising, these relationships were based on a single fall and two spring sampling events at each site. Additional data are needed to help confirm these preliminary findings. Results are only applicable to the Inner Nashville Basin ecoregion. Tennessee intends to

continue these investigations to determine if similar relationships exist in other regions of the state.

The second study completed this year was a *Comparison of Nutrient Levels, Periphyton Densities and Diurnal Dissolved Oxygen Patterns in Impaired and Reference Quality Streams in Tennessee*. This was a statewide study conducted in 78 reference and test streams. The primary focus was to gather baseline information on periphyton levels at reference streams in 15 ecoregions then compare existing nutrient and dissolved oxygen information to these data.

Very little periphyton was measured in most of the reference streams. The only exceptions were the Inner and Outer Nashville Basins. Periphyton densities were not always a good predictor of nutrient levels. At many test sites, nutrient levels were elevated but periphyton growth was not excessive compared to reference streams. This was due to a variety of factors including canopy cover and the presence of grazers.

As expected, dissolved oxygen levels appeared to be affected by the amount of periphyton present in the streams. Although lows often stayed above regional criteria, diurnal fluctuations were more pronounced when algal density exceeded the level measured at reference streams. A DO study completed last year demonstrated extreme changes in dissolved oxygen levels may have a detrimental affect on aquatic life even when minimum levels are maintained.

Department of Agriculture

Sevenmile Creek, which is part of the Mill Creek Watershed, is adjacent to the property where the Tennessee Department of Agriculture is housed at the Ellington Agricultural Center in South Nashville. The creek has segments that are listed on the 303(d) list. The impairment is due to urban runoff and hydromodification. There has been much development in the Sevenmile Creek watershed. It was once farmland and now has massive urban development.

Members of the Nonpoint Source section of the Water Resources Division are developing a 319 watershed plan for Sevenmile Creek and a conservation plan for Ellington Agricultural Center. Staff are in the beginning phases of getting interested stake holders such as county and city government representatives, other state agencies, and land owners involved. The goal is to implement BMPs that would improve water quality of the stream, increase habitat for the endangered Nashville crayfish, and create a walking trail and educational greenway within Ellington. Many people already visit the Agricultural Museum that is on the Ag Center farm grounds. Since Ellington is a working farm, the project is also aimed at being a model with planned conservation treatments. Planned treatments include adding of riparian forest buffer, water and sediment control basins as well as allowing native grasses to be re-established for potential quail habitat.

U.S. EPA Region 4

Science and Ecosystem Support Division (SESD), Ecological Assessment Branch 2004 Selected Activities

The analysis of the final round of macroinvertebrate and fish samples from the Regional REMAP study should be completed within the next few months. This multi-year study involved sampling for periphyton, benthic macroinvertebrates and fishes of wadeable streams and their association with pH, DO, temperature, conductivity, nutrients and landscape features that may have impacted specific biological response variables. The completion of a final report for this effort is expected during 2004. Contact Pete Kalla for further information (706-355-8778).

SESD biologists may also be providing assistance/oversight this year to states that will be getting involved in the eastern EMAP (proof of concept) study. Contact Lonnie Dorn (706-355-8683) for further information.

Through coordination with SESD GIS staff and staff of GADNR, Wildlife Resources Division, Region 4 biologists are proposing to focus on Level 4 Ecoregion 651, Atlantic Southern Loam Plains. Initially, a desktop survey of potential candidate reference sites for 651 would entail identifying the most current land use analysis (GIS) and existing biological data from the region. Potential watersheds, from a reference condition perspective, would then be identified. Following the desktop exercise, field validation of the potential reference sites would be conducted. Contact Hoke Howard (706-355-8721) or Lonnie Dorn (706-355-8683) for further information.

SESD staff biologists attended the North American Benthological Society (NABS) meeting held in Athens in May 2003, and participated in the intermittent stream methodology workshop lead by Dave Penrose. Staff will continue their involvement in protocol developments on this emerging issue.

SESD staff biologists traveled to Guatemala in November 2003 to train government officials and investigators from the University of San Carlos in the EPA Rapid Bioassessment Protocols for benthic macroinvertebrates. Work will continue in this area and upcoming work will include taxonomic instruction from Donald Ray (FLDEP) and Hoke Howard this summer. Contact Hoke Howard (706-355-8721) or Lonnie Dorn (706-355-8683) for further information.

SESD biologists recently completed stream flow, diurnal DO and benthic collections on five tributaries to the Ogeechee River that were placed on Georgia's 303(d) list in 1996 for biota and habitat concerns. A final report for this study should be completed by April 2004. The results of this study will be used to determine whether these streams should remain on Georgia's 303(d) list. Contact Morris Flexner (706-355-8713), Lonnie Dorn (706-355-8683) or Chris Decker (404-562-9298) for further information.

SESD biologists assisted the Eastern Band of Cherokee in North Carolina in a fish collection (primarily trout) and tissue analysis study in June of 2003. Additional support

will be provided for benthic macroinvertebrate and additional fisheries work this year if funds become available. Contact Phyllis Meyer for further information (706-355-8709).

On January 27-29, 2004 SESD staff hosted a short course, Introduction to Water Quality Assessments. Topics included study planning, data quality objectives, field QA/QC, and an array of sampling methods for surface water, sediment, soil, sediment oxygen demand, suspended sediment, bedload, benthic macroinvertebrates, fish, chlorophyll a, algal assays, and microbial field investigations. Other topics and activities included planning hydrological studies, oxygen dynamics (reaeration, diffusion, community oxygen metabolism), and a half-day field demonstration that provided hands-on training in benthic macroinvertebrate sampling, SOD chamber and sonde deployment, reaeration and flow measurements, trace level metals and pore water sampling, and bedload, suspended sediment concentration (SSC) and turbidity sampling. Contact Bill Cosgrove for further information (706-355-8616).

SESD staff are gearing up to conduct a storm event study on several tributary streams to Lake Hartwell near Toccoa, Carnesville and Bowersville, GA during March/April 2004. Contact Laura McGrath for further information (706-355-8776).

Several other major studies are planned for late June through September 2004. These studies will involve diurnal DO, dye @ low flow, SOD, reaeration and/or diffusion work on the Pearl River, Tennessee Tom-Bigbee, and Escatawpa Rivers in Mississippi and the Peace River in Florida. Contact Mark Koenig (706-355-8720), John Deatrick (706-355-8774) or Morris Flexner (706-355-8713) for further information.

Bob Quinn is assisting Rick Green of the EPA Gulf Breeze Lab on a Gulf of Mexico Hypoxia Study. Bob is conducting marine algal growth potential tests (AGPTs) to determine the growth potential in GOM waters and to determine the extent to which nitrogen and/or phosphorus are limiting nutrients in these waters. Bob is conducting similar tests from estuaries in South Carolina. Chlorophyll a and AGPT work will continue to be conducted this year on several of the major studies planned for FY 2004. Contact Bob for further information (706-355-8723).