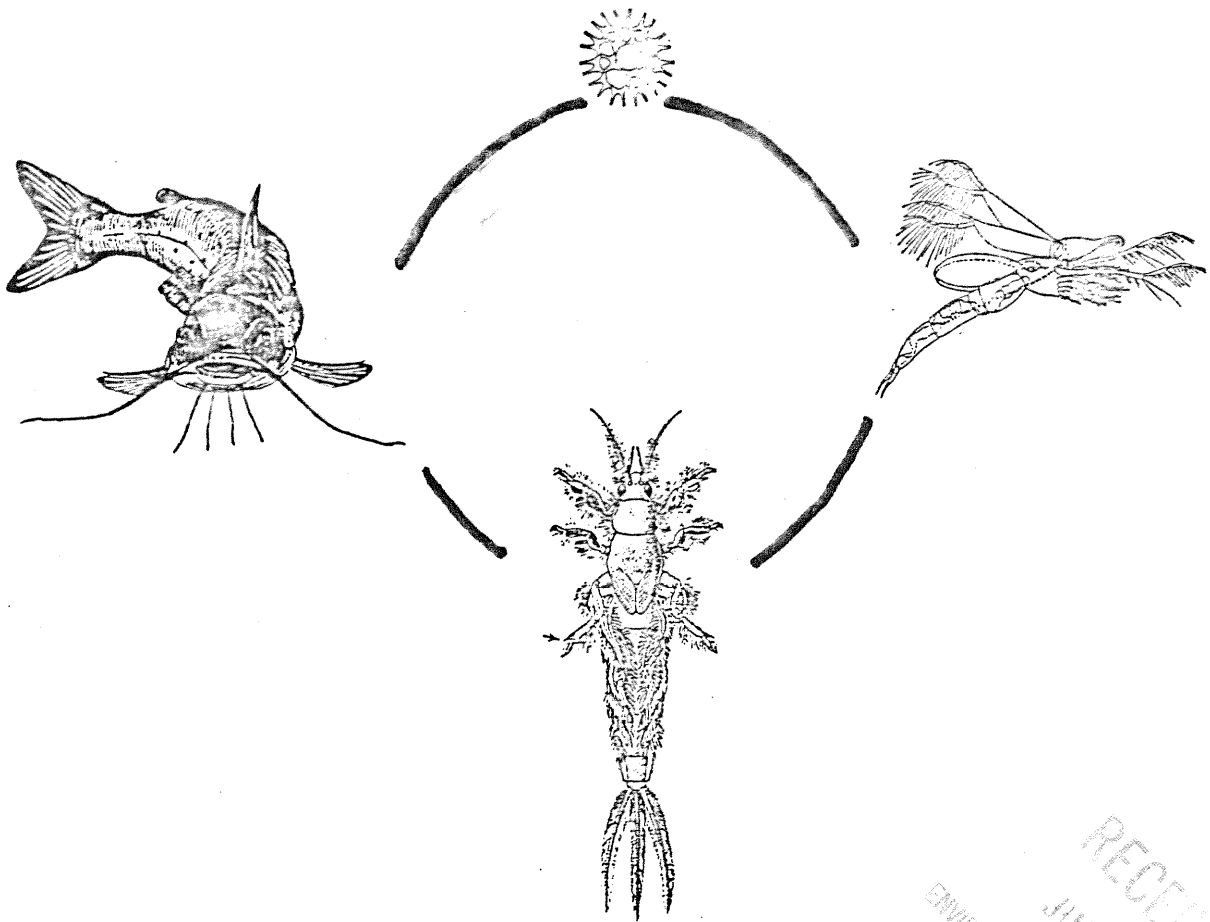


SOUTHEASTERN WATER POLLUTION  
BIOLOGISTS ASSOCIATION  
NEWSLETTER



MAY 1990

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JUN 6 1990  
ENVIRONMENTAL SCIENCE



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## HIGHLIGHTS

Spring has sprung here in the South. On a recent canmping/fishing trip to the Land-Between-Lakes area, I was reminded of just what a natural treasure we are blessed with. Wildflowers in bloom, warblers and other birds in song, crappie and bass biting, it was great to get out doors after a long winter.

As you will gather from the information presented, this newsletter is actually a combination of the winter and spring newsletters. This has made the newsletter longer than usual. I will try and get the next newsletter out a little quicker.

Highlights of this newsletter include: information regarding the 1990 SWPBA meeting at Jekyll Island in October, a brief note on the Environmental Monitoring Workshop held in Asheville, select abstracts from the 1990 Midwest Pollution Control Biologist meeting held in Chicago in April, and a listing of activities in each state during American Rivers Month.

The mystery taxon for the last newsletter was Macrobdella ditetra, a leech described by Klemm (1982) as common and widely distributed in the Gulf States and coastal plain areas of the Carolinas, appearing less common elsewhere. Thanks to all who sent in their answers!

Noteable quotes:

"Obviously, ducks like water."

Don Walker, wetland expert

PLEASE CIRCULATE YOUR COPY OF THE NEWSLETTER

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The Southeastern Water Pollution Biologists Association Newsletter is a publication for those interested in biological water pollution monitoring in Environmental Protection Agency IV.

SWPBA 1989-1990 President: Dave Chestnut, South Carolina Department of Health and Environmental Control, 2600 Bull Street, Columbia, SC 29201

SWPBA 1989-1990 Secretary: Lythia Metzmeier, Kentucky Division of Water, 18 Reilly Road, Frankfort, KY 40601

SWPBA Newsletter Editor: Giles Miller, Kentucky Division of Water. Same address as above.

## 1990 MEETING UPDATE!!

Hello Again! Plans are well under way for the 1990 Annual Meeting of the Southeastern Water Pollution Biologists Association. The dates: October 2,3, and 4. The place: The Buccaneer Clarion Resort, Jekyll Island, Georgia. Basic room rates: \$52 /night courtside, \$59 /night oceanside. single or double occupancy. Also available: kitchenettes, \$62 courtside and \$67 oceanside, and deluxe accomadations (with in room jacuzzi) \$85 courtside and \$95 oceanside. A wide variety of bicycles, fishing gear, and water sports equipment may be rented from the motel. The motel also has a clay tennis court. And volleyball!! We may even get a tournament organized (sorry, no handicap for beer guzzling teammates). Brochures with information about the motel and island are enclosed with this newsletter. Lets go ahead and make those reservations early, (912) 635-2261.

Mr. Delbert Hicks, USEPA, Athens, has graciously offered to barbeque a pig for this years cookout. The cookout will be held the first evening of the meeting, October 2, in a pavilion at South Dunes Park. Many thanks Del, my mouth is already watering.

Does anyone have any suggestions for special session topics for this years meeting? I would be interested in seeing a session devoted to heavy metals impacts on biological communities. This could be a sort of an open forum or panel type discussion, maybe following a series of individual presentations. In South Carolina our water hardness is so low that the calculated USEPA hardness based metals criteria are way below our analytical detection limits. We aren't really seeing any biological impacts at the concentrations we routinely measure, which exceed the calculated criteria values. Does anybody have any metals standards other than the USEPA criteria? What are average hardness values in other states? What are other state's detection limits? What metals concentrations have caused documented biological impacts in the other Region IV states? Perhaps we can get one representative from each state to discuss how their state handles metals issues. If anyone is interested in such a session please let me know, (803) 734-5393.

The possibility of workshops has been brought up also. Would anyone be interested in putting on or attending a taxonomy workshop on a particular group, or maybe demonstrating any unique techniques they have developed? (I am referring to biological sampling techniques.) Maybe people could bring preserved specimens to allow comparison of id's. Again, let me know if anyone is interested. This is a great opportunity to get together with your counterparts from other states and draw on a lot of experience (I am refering to work related experience.)

Dave Chestnut, Prez 1990  
SC Dept. of Health and  
Environmental Control

## MEETING THE CHALLENGE

or, "Give me information, not your data!"

The Environmental Monitoring Workshop held in Asheville, NC on April 25-27 was well attended by representatives of most Region IV states and EPA. The purpose of the workshop was to "address the challenge" of acquiring data and turning it into the information needed to make water quality assessments and management decisions. The success of the workshop can be measured by the comments of the attendees; everyone I talked to agreed it was one of the better meetings they'd been to recently.

Because the issues addressed in each session were outlined prior to the meeting, each session had a cohesiveness that stimulated further discussion. Many questions were asked, a few were answered, and new ones were formulated as we "talked shop" well into the evening hours.

Special thanks were extended to Randy Crawford (North Carolina's database designer), Suzanne Marcy (U.S. EPA, Washington), and Florence Kessler (U.S. EPA, Cincinnati), for their participation in the workshop, and to Combs and Associates for the excellent hospitality room.

North Carolina's initiative in sponsoring this workshop, and the amount of work they obviously put into its organization is greatly appreciated.

I've attached a copy of the meeting's agenda. I think the feeling among most of the people I've talked to is that we hope the next SEWPBA meeting generates the same level of enthusiasm. Please send along your suggestions for topics and issues to your PREZ, Dave Chestnut, as early as possible.

Lythia Metzmeier  
Kentucky

## Region IV Environmental Monitoring Workshop

April 25-27, 1990

Agenda...

Asheville, N.C.

**Purpose:** Exchange of ideas and information pertaining to the collection, storage, retrieval, reduction and interpretation of data necessary to address the needs of water pollution control programs.

### Wednesday April 25

12:45 Welcome Address

Steve Tedder

#### Session 1 Physical Chemical Network

**Issue:** Design and utility of fixed station network and special studies to collect water and sediment chemistry. How do we maximize the use within our programs?

1:00	Coastal Marinas: A Water Quality Assessment	Mary Jaynes
1:30	Ambient Network: Design and Data Management	David Chestnut
2:00	Sediment Oxygen Demand: Program Needs & Utility	Jay Sauber
2:30	Break	
2:45	Sediment Chemistry: Collection and Use (Criteria??)	Del Hicks
3:15	Fish Tissue Data: Collection and Use (Criteria??)	Russ Sherer
3:45	Discussion: Moderator	Jerry Stober

### Thursday, April 26

#### Session 2 Data Base Concepts and Construction

**Issue:** Designing data networks to grow with program needs.

8:30 Program and Discussion

Randy Crawford

#### Session 3 Multi-users of Data in Programs

**Issue:** Data collected is eventually used in enforcement, classification, state and federal assessment documents. Planning for multiple users can increase efficiency.

9:30 Regulations, Classifications, and Enforcement.

Greg Thorpe

10:00	Federal and State Assessments: Share Your Information	Vicki Tauxe
10:30	Overview of Draft Guidance: Biological Criteria	Suzanne Marcy
11:00	Wetlands: Waters of the State	John Dorney
11:30	Discussion: Moderator	Jimmie Overton

12:00 Lunch

#### Session 4 Biological Program

Issue: Biological data yields information which lends understanding to technical issues. Current trends see biological information used directly within regulations, enforcement, and compliance. This path away from the more traditional use of biological data as merely a supportive descriptive tool places new challenges before the biologist. How can we meet this challenge?

1:00	Methods and uses of Phytoplankton Data within regulatory programs.	Dianne Reid
1:30	Periphyton: Their Niche instream and in the program	Lythia Metzmeier
2:00	Macroinvertebrates: Meeting multiple Needs Within State Programs	Dave Lenat
2:30	Biological Integrity According to the Fish	Mike Mills
3:00	Break	
3:15	Ecoregions: Biological Reference	Larry Eaton
3:45	Discussion: Integration and Limitations of Biological Data.	Trish MacPherson

Friday, April 27

**Session 6 Whole Effluent Toxicity**

Issue: Asking ourselves the tough questions. Experience has familiarized the regulatory agencies with the majority of concerns regarding this program. Experience has also answered many of these questions. Are we all singing from the same sheet of music?

9:30 The Questions We Answer

Ken Eagleson

10:30 Break

10:45 Statistical Interpretations

Florence Kessler

11:45 Summary and Concluding  
Remarks

Steve Tedder

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Abstracts from the 1990 Midwest Pollution Control Biologists  
Meeting - April 10-13, 1990

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Use of *Ceriodaphnia Dubia* and MICROTOX<sup>TM</sup> Tests to Assess  
Ambient Toxicity in Illinois Waters

Michael S. Henebry and Robert B. Sulski

Illinois Environmental Protection Agency  
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In 1989, 41 receiving waters associated with NPDES effluent discharges, in Illinois were tested for ambient toxicity using the MICROTOX<sup>TM</sup> test in conjunction with the standard U.S. EPA protocols for fathead minnow, daphnid and *Selenastrum* algal bioassays. Among the standard bioassay organisms, *Ceriodaphnia dubia* was the most sensitive to toxicants in ambient waters, identifying 4 of the 41 as toxic. Thirteen of the 41 ambient water samples were toxic to MICROTOX<sup>TM</sup>. The *Ceriodaphnia dubia* chronic test was conducted at times of yearly low flow on samples from 10 stations on the Calumet River System (Chicago) to assess toxicity levels instream. Impacts to the system were suspected to come from multiple point sources. The first year, the river system flow was at or near the 7Q10; in the second year the system was at near normal flow. Results from the first year indicate instream inhibition of *Ceriodaphnia dubia* survival at three stations, and inhibition of reproduction at three other stations. The second year, a survival effect was observed at one station where survival had been inhibited the first year, and at one station where no effect had been observed previously. In the second year, the standard bioassays and the MICROTOX<sup>TM</sup> test were conducted on effluent from the MWRD Calumet which flows into the Calumet river system. The effluent was toxic to *Ceriodaphnia dubia*, but not to the MICROTOX<sup>TM</sup> bacterium. Because different bioassay organisms have differing responses to toxicants, and because the MICROTOX<sup>TM</sup> test is efficient, economical, and sensitive, it is recommended that the MICROTOX<sup>TM</sup> and the *Ceriodaphnia dubia* bioassay be used in combination to assess ambient toxicity.



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**A Comparison of Lab to Field Data in the Aquatic  
Hazard Assessment of an Effluent**

**Philip B. Dorn, Remi van Compernelle, and Charles L. Meyer**

**Shell Development Company  
Houston, TX 77251-1380**

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U.S. EPA effluent hazard assessment guidelines were applied to determine the environmental safety of discharged chloroether fractions from a chemical plant effluent that were identified in a Toxicity Identification Evaluation (TIE). The chloroethers mixture, consisting of 1,3 and 2,3 pentachloroethers, and tetra chloropropyl ether (TCPE), which was present in largest concentrations, was acutely toxic between 1.5 and 20 mg/L and exhibited chronic toxicity (NOEC) from 1-3.2 mg/L. Individual chloroether components isolated from the effluent showed acute toxicity (LC50) from 1.5-56 mg/L. Acute toxicity predictions from EPA SAR relationships were within a factor of 4. Acute to chronic ratios for specific chloroether components were <6. Sediment studies showed moderate sorption of TCPE with log  $K_{oc}$  between 2.7 and 2.9. The log  $K_{ow}$  was 3.2 for TCPE, and the bioconcentration potential (log BCF) for the mixture was <2.7. Laboratory-scale and field-scale stream experiments confirmed laboratory predictions, with NOEC observed for trout growth >0.6 mg/l, and *Gammarus* feeding effects at 1.0 mg/L of the mixture. An assessment of exposure and effects demonstrated that the effluent discharge presented little potential for environmental effects, and recent process modifications have reduced discharge concentrations to below chronic effects levels, even without consideration for dilution in a mixing zone.

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Use of Acute and Chronic Bioassays to Assess the  
Applicability of Selected Advanced Wastewater Treatment  
Technologies for the Green Bay Metropolitan Sewerage District

John Kennedy

Green Bay Metropolitan Sewerage District  
P.O. Box 19015, Green Bay, WI 54307-9015

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In 1987 the Green Bay Metropolitan Sewerage District (GBMSD) began extensive pilot studies using several state-of-the-art Advanced Wastewater Treatment (AWT) technologies. Each treatment endpoint was sampled intensively for chemical parameters and whole effluent bioassays. Results indicated that existing GBMSD carbonaceous treatment produces an effluent which is toxic most of the time, primarily to the fathead minnow. Ammonia was thought to be the main cause for the toxicity. Nitrified effluent streams showed no failures in any bioassay. However, effluent from these systems did show a slight effect on *Ceriodaphnia* reproduction.

Residual sulfide caused several bioassay failures in the alum/sodium sulfide treatment system. Two chronic failures in the high lime system were believed to be the result of a statistical anomaly associated with the generation of the NOEC value. From a toxicity perspective, the high lime system typically improved effluent quality. Carbon column treatment significantly improved *Ceriodaphnia* bioassay test results if the influent sample showed toxicity.

Bioassay results identified possible toxicity problems affiliated with some of the treatment systems, even when results of chemical analysis did not clearly show such evidence. However, several inconsistencies were noted relating to the statistical program which calculates final NOEC values. One example relates to low replicate variability resulting in a more stringent NOEC value. Another involves control water toxicity which the statistics program responds to by lowering the "standards" of the test. This means that it is to a discharger's advantage to conduct effluent bioassays using dilution water that is mildly toxic. Results obtained during the GBMSD pilot study support the need to review all bioassay results, such as graphic plots of actual data, in addition to NOEC values.

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## **An Evaluation of Ambient Chronic Toxicity in the Rouge River Basin**

**Bruce R. Walker**

**Michigan Department of Natural Resources  
P.O. Box 30028, Lansing, MI 48909**

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The Rouge River system in southeastern Michigan is very urbanized with extensive residential, commercial, and industrial development in the 48 communities within the basin. The river drains 438 square miles and has potential as an important recreational resource for over 1.5 million people. Past studies have documented impaired uses, contaminated sediments, and the overall degraded aquatic community in the river. As a result, efforts are underway to identify and document problem areas, pollution sources, and clean-up/control strategies for the river system.

The objective of this basin wide, ambient toxicity evaluation was to help determine if the degraded aquatic community was the result of the presence of water column toxicity. The seven-day tests with *Ceriodaphnia dubia* and larval *Pimephales promelas* were used to evaluate ambient chronic toxicity at up to 20 stations. Both tests were conducted four times during summer storm, early summer, and winter flow conditions.

The test results suggest that there was not a continual presence of widespread and severe ambient toxicity in the river system. This suggests that the overall degraded aquatic community in the basin is not due solely to the presence of ambient, water column toxicity. The tests did reveal, however, that some localized river segments can periodically exhibit ambient toxicity. The toxicity observed seemed to be episodic in nature and appeared to be related to storm events. The implications, use, and limitations of this study will also be discussed.

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**Comparison of Ohio EPA's Invertebrate Community Index (ICI)  
and U.S. EPA's Rapid Bioassessment Techniques  
in Two Southwest Ohio Streams**

**Donald J. Klemm, Phil A. Lewis, and James Lazorchak**

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**Jeff DeShon**

**Ohio Environmental Protection Agency  
1030 King Avenue, Columbus, OH 43212**

**Michael J. Barbour**

**EA Engineering, Science, and Technology  
15 Loveton Circle, Sparks, MD 21152**

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As part of a two-and-a-half day workshop on Rapid Bioassessment Protocols (RBP) two southwest Ohio streams were assessed by two macroinvertebrate methods: 1) U.S. EPA'S RBP III, and 2) Ohio EPA'S ICI method based on artificial substrate and natural substrate collections. For the RBP, one reference station on Turtle Creek was chosen as a control for both streams, one affected by an industrial effluent and the other by a municipal wastewater treatment plant discharge. ICI values derived from downstream sites on both streams were evaluated by comparison with benchmark values established using a set of regional reference sites and upstream controls. Comparison of results of the two methods indicate different levels of performance. This study will show that additional comparisons of the Rapid Bioassessment techniques with more traditional methods are warranted.

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**Biological Assessment of New Remedial Technologies for PCB  
Contaminated Sediment in the Sheboygan River, Wisconsin**

**Thomas P. Aartila**

**Wisconsin Department of Natural Resources  
P.O. Box 12436, Milwaukee, WI 53212-0436**

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In 1985, the Sheboygan River and Harbor was designated as a federal Superfund site with Tecumseh Products Company agreeing to conduct a Remedial Investigation/Feasibility Study aimed at identifying alternative cleanup technologies best suited to resolve the river's PCB problem. The technologies under investigation include removal of contaminated sediment (concentrations greater than 686 ppm) to a confined treatment facility where bacterial dechlorination (biodegradation) will be monitored, and instream armoring of less contaminated sediments. Water column samples (filtered and unfiltered for PCBs), in situ bioaccumulation tests on caged fish and mussels, macroinvertebrates from both depositional and riffle areas, and sediment traps are all being utilized to evaluate the effectiveness of these technologies in reducing PCB bioavailability in the Sheboygan River and to monitor the potential impacts of instream construction activities.

A comparison of pre-implementation water column and caged fish data between an upstream control site and from within the contaminated area appeared to best define the magnitude of the PCB contamination and its bioavailability within the study area. A similar relationship using macroinvertebrate data was less conclusive. Typical water column PCB concentrations collected in September 1989 ranged from 0.081 ppb to 0.094 ppb for unfiltered samples. The caged fish (juvenile fathead minnows) rapidly accumulated PCBs during this same period with resultant concentrations averaging 4.8 ppm after 1 week and 10.2 ppm after three weeks. Additional macroinvertebrate samples will be analyzed to better define natural variability before any potential PCB impacts to individual species or to the community are identified.

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## **The Biological Stream Characterization of Illinois Streams**

**Robert Hite**

**Illinois Environmental Protection Agency  
2209 W. Main Street, Marion, IL 62959**

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In 1984 Illinois Environmental Protection Agency and Department of Conservation stream biologists met and formed the Biological Stream Characterization (BSC) Work Group. This committee developed a five-tiered classification system predicated largely upon the type and condition of lotic fishery resources. The five categories which describe stream quality as a function of biotic integrity, range from excellent to very poor. The Index of Biotic Integrity (IBI) is the priority metric of the stream classification system with IBI values ranging from 20 to 60 constituting the basis of the five stream classes. When quality stream fishery data are lacking for IBI determination, BSC ratings may be derived by a subjective evaluation of narrative fishery criteria. In the absence of fishery data, aquatic macroinvertebrates may be used for Limited or Restricted Aquatic Resource ratings (Class C and D respectively) for stream segments five miles in length or longer. As of December 1988, 920 fishery samples from 478 streams have been evaluated and BSC ratings applied to 614 stream segments in Illinois. Of the stream segments classified, 4% were rated as Unique, 30% Highly Valued, 48% Moderate, 17% Limited, and 1% as Restricted Aquatic Resources. To date, the Unique Aquatic Resource or Class A rating has been assigned to 24 excellent stream segments in various locations in Illinois. Three watershed areas currently stand out for the nature and extent of quality streams in the basin: The Kishwaukee in northern Illinois, the Vermilion in east central, and the Mackinaw in central Illinois. Selected Ohio River tributaries including sections of Lusk and Big Creeks in the Shawnee National Forest of southern Illinois also exhibited exceptional fishery resources.

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*In Situ and Laboratory Sediment Toxicity  
Testing Using Pimephales promelas Larvae,  
Daphnia magna and Ceriodaphnia dubia*

G. Allen Burton, Jr., C. Skalski, and G. Sasson-Brickson

Wright State University, Biological Sciences Department  
Dayton, OH 45435

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Ecological assessments of contaminated stream sites are enhanced by field testing. *In situ* exposures (2-7 days) of fathead minnows and cladocerans were conducted in streams impacted by non-point and point source pollution. Sediments contained high concentrations of metals and polynuclear aromatic hydrocarbons. Fish and benthic macroinvertebrate community indices were depressed. *In situ* sediment toxicity was frequently less than laboratory exposures and *in situ* reference survival rates were acceptable. *In situ* interstitial water exposures with *Daphnia magna* also revealed survival rates significantly different from laboratory exposures. *In situ* sediment exposures proved to be useful and sensitive indicators of both degraded and nondegraded stream conditions.

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**A Sediment Bioassay Using the Tubificid  
Oligochaete Worm *Tubifex tubifex***

**Trefor B. Reynoldson**

**National Water Research Institute, 867 Lakeshore Road  
CCIW, Burlington, Ontario L7R 4A6**

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Contaminated sediments have been identified as a problem hindering remediation of many of the areas of concern in the Great Lakes. Recent developments in sediment assessment have strongly recommended the use of bulk chemistry, community structure and sediment bioassays. Unfortunately, few true sediment assays have been developed using infaunal species. The aquatic oligochaete *Tubifex tubifex* was examined as a candidate bioassay organism. Four life history variables can be examined in terms of their sensitivity and ability to distinguish between sediments: survivorship of breeding adults, a measure of acute toxicity; total number of cocoons produced, an estimate of the effects of sediment quality on gametogenesis in the adults; the number of empty cocoons, an estimate of the effects of sediment toxicity on embryogenesis; and the number of offspring, also an estimate of embryogenesis and toxicity to newly hatched individuals. The assay as initially designed used a predetermined number of cultured breeding individuals, as defined by the presence of ovaries. At the end of the bioassay the numbers of cocoons and newly hatched worms are determined and used as an indicator of the effect of the test sediment on reproduction. The initial development of this bioassay shows this to be a simple, sensitive and reproducible test and recommends a standard test method.



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## **Factors Influencing the Composition and Toxicity of Sediment Elutriates and Pore-water Preparations**

**James J. Coyle and Christopher G. Ingersoll**

**U.S. Fish and Wildlife Service  
Columbia, MO 65201**

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Many approaches are used to assess sediment toxicity depending on the scope of the investigation. These approaches include sediment toxicity testing, toxicity identification evaluation, mutagenicity assays, and benthic invertebrate surveys. One of the simplest approaches involves conducting toxicity tests with an aqueous extract prepared from the whole sediment. The purpose of this presentation is to compare toxicity results obtained from two types of aqueous sediment extracts, sediment elutriates and sediment pore-water preparations. Numerous methods for preparing aqueous sediment extracts exist and each has advantages and limitations. Factors that influence the composition and toxicity of aqueous sediment extracts include: equilibrium partitioning, contact time,  $K_{oc}$ , redox potential, and diffusion coefficients. Practical considerations regarding suitability of aqueous extracts will be discussed including: equipment requirements, ease of preparation, sediment volume requirements, and disposal of waste material. The need for establishing consistent methods will be emphasized. Toxicity comparisons between pore water and elutriate preparations will be evaluated.

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**The Role of Acid Volatile Sulfide in Determining Cadmium Bioavailability  
in Freshwater Sediments: Laboratory and Field Studies**

**By Gerald T. Ankley, Anthony R. Carlson, Gary L. Phipps, and Vincent R. Mattson**

**U.S. Environmental Protection Agency  
6201 Congdon Boulevard, Duluth, MN 55804**

**Patricia Kosian and Anne Cotter**

**ASCI Corporation  
6201 Congdon Boulevard, Duluth, MN 55804**

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The formation of metal/sulfide complexes in sediments could be an important factor influencing the bioavailability and toxicity of metals to benthic organisms. Recent studies with marine sediments demonstrated that the acid volatile sulfide (AVS) content of the sediments could be used to predict the toxicity of spiked cadmium. When the cadmium to AVS molar ratio exceeded one, sediments were toxic to benthic test species. The objective of our study was to determine whether AVS also was important in limiting bioavailability and toxicity of cadmium in freshwater sediments. In initial experiments, five different concentrations of cadmium were spiked into sediments with three different concentrations of AVS, and 10 d exposures with the oligochaete, *Lumbriculus variegatus*, and the snail, *Helisoma sp.* were conducted. The results of these experiments corroborated the studies conducted with marine sediments, i.e., when the cadmium to AVS ratio exceeded one, toxicity was observed.

To ascertain whether the influence of AVS on metal bioavailability also applies in the field, toxicity tests with the amphipod, *Hyalella azteca*, and *L. variegatus* are being conducted with 17 samples from Foundry Cove, a system with relatively high concentrations of cadmium and nickel in the sediments. Metal to AVS ratios in the Foundry Cove sediments range from zero to greater than 250, with a number of samples exhibiting ratios in the range of one to 10; thus, they provide a unique opportunity to evaluate the role of AVS in determining metal toxicity. These studies, as well as the implications of their results for the development of sediment quality criteria, will be discussed.

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**Sediment Toxicity in the Upper Illinois River:  
A Search for the Toxic Substance(s)**

**Frank S. Dillon, Philippe E. Ross, Richard E. Sparks, and LouAnn C. Burnett**

**Illinois Natural History Survey, Forbes Biological Station  
Havana, IL 62644**

**Anthony A. Paparo**

**Southern Illinois University, School of Medicine and Department of Zoology  
Carbondale, IL 62901**

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The presence of sediment-associated toxicity in the Upper Illinois River has been documented by several investigators. This toxicity has been linked to declines in benthic invertebrates and subsequent drastic decreases in fish and waterfowl populations on the Illinois River. To date, a clear relationship between specific toxic compounds and observed toxicity has not been established. Due to the complex mixtures of contaminants that are present in most toxic sediments, it has been difficult to link individual compounds or elements directly to toxicity.

Recently, methodologies have been developed to identify specific toxic compounds in complex mixtures. Toxicity Identification Evaluation (TIE) techniques are toxicity-based fractionation schemes, designed to characterize and identify compounds exhibiting acute toxicity to aquatic organisms. These techniques were applied to Illinois River sediments in an effort to identify the substance or substances responsible for the disappearance of benthic invertebrates. In addition, a suite of microbiological assays and a functional assay using the fingernail clam (*Musculium transversum*) were used to determine relative levels of toxicity in sediments, in an effort to locate the primary source(s) of toxicity.

Preliminary findings have identified two patterns. Sediment toxicity increases upstream, peaking near river mile 313.0 (Chicago Sanitary and Ship Canal at Summit). TIE analysis indicates the presence of one or more pH-dependent toxicity.

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**Indiana's Clean Lakes and NPS Programs**

**Gary D. Doxtater**

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**James K. Ray**

**Indiana Department of Environmental Management  
105 South Meridian St., P.O. Box 6015, Indianapolis, IN 46206-6015**

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Although a variety of existing programs have helped curb non-point source (NPS) water pollution in Indiana, the effects have often been only coincidental to their primary goals. State conformance with Section 319 of the Clean Water Act has recently resulted in development of an integrated, multi-disciplinary NPS control plan that refocuses many programs on the issue of water quality, and has established a number of new initiatives. This effort has been significantly enhanced by national attention on the topic, with shifts toward a water quality emphasis by federal agencies such as the Department of Agriculture. Indiana is now able to address NPS water pollution in a much more unified fashion, guided by a comprehensive plan. Indiana's new Lake Enhancement Program is a part of "T by 2000," a statewide strategy for dealing with soil erosion and sedimentation problems. The goal for lake enhancement is to control the flow of sediment and associated nutrients into public lakes. Toward that goal, Indiana Department of Natural Resources' (IDNR) Division of Soil Conservation is providing technical and financial assistance for lake enhancement needs in accordance with guidelines set by the State Soil Conservation Board, the policy-making body for the division. The Lake Enhancement Program's policies and procedures will be reviewed and specific examples of how the program operates will be discussed.

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**Strategies for Evaluating Responses of Fish  
Assemblages to Reductions in Non-point Source Pollution of Streams**

**John Lyons**

**Wisconsin Department of Natural Resources  
3911 Fish Hatchery Road, Fitchburg, WI 53711**

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Improved fish populations and fisheries are among the major goals of Wisconsin's program to reduce non-point pollution (NPS) of streams. However, documentation of changes in fish assemblages in response to pollution reduction has been hampered by inherent ("natural") differences among streams and sites, seasonal and year-to-year variation in assemblage structure, and differences between localized versus cumulative pollution impacts. This presentation focuses on Wisconsin's strategies to deal with these difficulties. To account for inherent differences among sites requires a detailed understanding of the underlying natural factors that influence fish assemblage structure. In Wisconsin, this understanding takes the form of a stream "classification" for stratifying sampling sites. Seasonal variation can be minimized by consistently sampling during the same time of year. In Wisconsin, summer sampling is usually most appropriate because spring and fall samples are more likely to be affected by fish migrations and fluctuating physical conditions. Year-to-year variation in assemblage structure is typically high in Wisconsin streams. This variation can only be dealt with through multi-year sampling schemes, including two or more years of abatement activities. Given the long lifespan of many important Wisconsin fish species, most evaluation projects must last at least eight years, although sampling is not required in all years. Fish assemblage responses to localized NPS pollution reduction (e.g., installing the best management practices in a particularly bad feedlot) can usually be assessed using classical "upstream/downstream" sampling designs. However, an evaluation of responses to decreases in diffuse, cumulative pollution must have a watershed-wide network of sampling sites plus reference sites in other watersheds. Overall, accurate documentation of fish assemblage response to non-point source pollution control in Wisconsin streams requires extensive, long-term monitoring efforts.

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**The Use of Biological Criteria to Evaluate  
Non-point Source Impacts Associated with Surface  
Mining in the Buffalo Fork Basin, Ohio**

**Jack T. Freda**

**Ohio Environmental Protection Agency  
1030 King Avenue, Columbus, OH 43212**

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Biological and water quality sampling was conducted to evaluate non-point impacts associated with active, abandoned and reclaimed coal mining areas in Buffalo Fork, a 72 square mile drainage basin in eastern Ohio. The watershed is one of the most extensively mined basins in the state. Due to the pervasiveness of mine drainage, streams within the basin were originally assigned a limited aquatic life use with an exemption from the Warmwater Habitat (WWH) criteria for dissolved solids. A major focus of this study was a redesignation to more appropriate uses based on results of the survey. Chemical water quality throughout most of the basin was characterized by elevated levels of dissolved solids, sulfate, iron, manganese and conductivity. Fish community health as measured by the Index of Biotic Integrity (IBI) and modified Index of Well-Being (Iwb) fell mostly in the fair to poor range. Communities were highly influenced by excessive sedimentation and habitat alteration associated with mine runoff. Macroinvertebrate community health measured by the Invertebrate Community Index (ICI) was in the fair to good range with marginal attainment of WWH criteria at most stations. Full attainment of the fish and invertebrate criteria was limited to a small watershed with little or no mining activity (Crane Run) and the headwaters of Yoker Creek, a tributary with less extensive mining activity compared to other sections of Buffalo Fork. An evaluation of biological performance in conjunction with physical habitat conditions, land use and long-range prospects for recovery were factored into decisions on the applicable use designation for each stream within the basin.

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**Data Variability in Arthropod Samples  
Used for the Biotic Index**

**William L. Hilsenhoff**

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Several factors influence the reliability of the biotic index for evaluating the extent of organic pollution in streams. These include sample size, substrate sampled, current, method of processing samples, temperature, time of the year, and level of arthropod identification. Comparison of the standard deviation of sample sizes of 50, 100, 150, and 200 showed that a sample of 100 was adequate for most purposes. By sampling only riffles, effects of differences in substrate and current are minimized. Differences between riffles in the same stream were detected, but were not substantial enough ( $SD=0.25$ ) to alter evaluations made with the biotic index. Processing samples in the laboratory or in the field creates biases in the species of arthropods that are picked from the sample, but these biases had little effect on the biotic index. By processing samples in the laboratory, less valuable time in the field is needed to make collections. Cold water enhances the ability of arthropods to cope with organic pollution, and effects of organic pollution in cold-water streams are less. The greatest variability in biotic index evaluations results from seasonal differences in the fauna, with index values being highest in summer when water temperatures are warmest, currents are slower, and species that are collected are those that are most tolerant of low dissolved oxygen. Much time can be saved by evaluating streams with a family-level biotic index, but the ability to discriminate between various levels of pollution is decreased and precision is lost.

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## Interpretation of Scale Dependent Inferences from Water Quality Data

Nels H. Troelstrup, Jr. and James A. Perry

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1250 Gibbs, St. Paul, MN 55108

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Concepts of hierarchical theory suggest that biological systems may be viewed at different scales. Levels within the hierarchy are defined by processes operating at different rates. Thus, processes defining a level operate over characteristic intervals of time and space. Control over processes at lower levels is achieved through constraints imposed by processes operating at higher levels within the system. These biological concepts have important implications for water quality scientists. Designated uses of water resources and associated criteria influence our perspective of the way monitoring and investigative studies should be designed. Further constraint is imposed by logistic and financial resources. These limitations define the spatial and temporal scale upon which inferences can be made from water quality data. Differences in perspective (scale) may lead to inconclusive or conflicting results from studies performed by different investigators addressing similar questions.

The development of regionalization as a tool for monitoring and management is a large step toward a better understanding of water quality at multiple scales. We examined the water quality of trout streams in southeastern Minnesota at the subregional, watershed, and reach levels. Fine grain analyses suggested that turbidity levels, substrate characteristics, light energy, and the abundance of shredder and collector-filterer invertebrates were controlled by processes operating at the reach level within the system. *In-situ* benthic metabolism and herbicide concentrations appeared to be controlled by watershed level processes while nitrate-nitrogen, specific conductance and Hilsenhoff BI values appeared to be controlled by processes operating at a higher (i.e., subregional) level. Thus, variables commonly used to evaluate water quality are controlled at different scales. Selection of monitoring variables should be based on processes which control the spatial and temporal variability of criteria that meet specific designated uses.



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**Use of Benthic Macroinvertebrates to Monitor Changes in an Effluent  
Stream Following Treatment Plant Upgrades and Variability of Data**

**Jeffrey C. Steven**

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Stevens Point, WI 54481**

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The Madison Metropolitan Sewerage District began an in-depth study in 1982 of its effluent stream, Badfish Creek. The purpose of this study was to provide baseline data to monitor changes in the aquatic community that may have occurred as a result of upgrades in the wastewater treatment which were completed in 1986. The district also anticipated that these biosurvey data may be an important tool in future years when examining necessary permit limits.

Kick samples and artificial substrate data were analyzed at four sites along Badfish Creek at approximately five-mile intervals from the outfall to where the effluent stream enters a larger river system. The spring and fall data indicated that the upper reaches of Badfish Creek were degraded by organic wastes prior to advanced secondary wastewater treatment. Recovery of the upper sites was documented using the Hilsenhoff Biotic Index, EPT Index, and changes in the dominant species. Changes in the Biotic Index were obvious in the upper sites (B.I. 1983 = 9.07, B.I. 1987(8) = 6.67) although they were less pronounced downstream (B.I. 1983 = 6.65, B.I. 1987 (8) = 5.85).

These data suggest that improvements in the biological community of Badfish Creek were controlled more by the four feeder streams entering Badfish Creek and non-point source pollution, than by the effluent water quality. Additional water quality improvements in the effluent may not change the biological community structure, especially in the downstream sections. The upstream sections may show minimal changes with increased water quality of the effluent.

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**Variability in the Taxa Richness of  
Stream Invertebrate Communities**

**David R. Lenat**

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It has been well established that taxa richness values are related to water quality: unpolluted streams have many species, and polluted streams have fewer (more tolerant) species. Many states are developing criteria to relate taxa richness values (from a standardized collection technique) to a water quality rating. However, other factors affect taxa richness, including season, stream size, ecoregion, and flow. North Carolina is in the process of adjusting its "EPT" taxa richness criteria to make adjustments for: seasonal changes, more ecoregions and 3 stream sizes. In addition, we are accumulating some good long-term data sets which will allow an examination of between-year changes in flow on the invertebrate community, especially the effects of floods and droughts.

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**The Nature of Interyear and Sampling Variability  
in the Index on Biotic Integrity (IBI) in Ohio Streams**

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**Ohio Environmental Protection Agency, Ecological Assessment Section  
1030 King Avenue, Columbus, OH 43212**

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The Index of Biotic Integrity (IBI) and its associated metrics were examined from a number of Ohio streams to determine the amount of variation that can be expected: (1) among years, (2) among samples within years, (3) and among river reaches and subbasins with various degrees of cultural impact. Biosurvey data were collected with pulsed DC electrofishing techniques by the Ohio EPA over the past 10 years as part of its surface water monitoring program. In general, the variation among samples within years and between years is lowest in stream reaches and subbasins with the lowest cultural pollution and increases in streams as cultural pollution increases. Indeed, high variability among samples in a year is a characteristic of impacted water bodies. Variability among years and sampling passes also increases with decreasing habitat quality as measured by the Qualitative Habitat Evaluation Index (QHEI).

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**Data Variability and the Use of Chironomids in Environmental Studies:  
The Standard Error of the Midge**

**Martin B. Berg and Ronald A. Hellenthal**

**University of Notre Dame, Environmental Research Center  
and Department of Environmental Sciences  
Notre Dame, IN 46556**

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Many aquatic insect taxa have been used as indicators of environmental disturbance. However, none has been used as extensively as chironomids (*Diptera: Chironomidae*). The successful use of midges in environmental studies relies heavily on the integrity and reliability of chironomid databases with species-specific environmental requirements. Inconsistencies within these databases often lead to inconclusive or misleading results. These inconsistencies are largely due to the high degree of variability between studies using chironomids as indicators. Much of this variability can be attributed to common methodological errors associated with using midges. We've grouped these errors under the heading of "the standard error of the midge." These errors include: 1) failure to identify species, 2) inaccurate identifications, 3) inappropriate sampling programs, and 4) inadequate sampling, sorting and sample preparation techniques. These sources of variability can have substantial impacts on the determination of species richness, species diversity, the ability to detect environmental change and the ability to detect changes in the patterns of energy flow in aquatic ecosystems.

## AMERICAN RIVERS MONTH - 1990

The following information for states in Region IV was taken from the American Rivers Month 1990 National Calendar of Events sponsored by American Rivers, Inc.. Morgan Jones, Kentucky's contact provided the information.

Alabama contact: Don Elder (205) 322-5326

June 9: State Free Fishing Day.

Florida contact: Butch Horn (904) 422-1566

June 2: River Rat Race: Inverness, FL, Florida Paddlers.

June 2-3: Oklawaha River, Florida Sea Kayaking Association.

June 9-10: Blackwater River Campout.

June 9-10: Rock Spring Run.

June 9: Waterway-Beach-Causeway Cleanup, Hobe Sound, FL.

June 16: Wacissa Canoe Race.

(Florida holds its River month in October due to climate.)

Georgia contact: David Ashley (404) 656-3111

June TBA: Toccoa/Acoee Rivers, Flood Cleanup.

June TBA: Free Fishing Day.

Kentucky contact: Morgan Jones (502) 564-3410

May 31 - June 1: River Recreation and Outdoor Show.

June 2: Rockcastle River Day.

June 2: Kentucky River Historic Cruise.

June 2: Cumberland River Day.

June 2-3: Free Fishing Weekend.

June 8: Full Moon Float.

June 16: Kentucky River Historic Cruise.

June 16: Ohio River Clean Sweep.

June 23-24: Green River canoe camping trip.

June 30: Kentucky River Historic Cruise.

North Carolina            contact: John Sutherland (919) 733-9064

June 2: Annual New River Canoe Race.

June 2: Canoe Trip on the Tar River.

June 2: Mitchell River Streamwatch Training & River  
Cleanup

June 3: French Broad Whitewater Rafting & Cleanup Trip.

June 8: Neuse Riverbank Night Hike, Cliffs of the Neuse  
State Park

June 9: New River Walk, at New River State Park.

June 16: New River Festival, New River State Park.

June 16: French Broad River Canoe Trip through Biltmore  
Estates, Asheville.

June 16: Father's Day Broad River Float Trip.

June 16: Yadkin River Hikes, Albemarle.

June 16-17: Overnight Canoe and Camping Trip on Lower  
Lumber River.

June 23: Hike along Cape Fear River, Carolina Beach  
State Park.

June 23: Neuse River Sweep-up and River Appreciation  
Day.

South Carolina            contact: Barry Beasley (803) 737-0800

June 2, 9, 16, 23, 30: Hike Congaree Swamp Floodplain

June 9-10: Edisto Riverfest.

June 30: Licklog Creek Hike and Swim.

June 30: Crabbing Clinic. Palmetto Island County Park.

Tennessee                contact: Bob Allen (615) 742-6685

June 1-3: Birmingham Canoe Club, Canoe School Hiwassee  
Scenic River.

June 2: Tennessee Scenic Rivers Association Duck River Float.

June 8-10: Tennessee Scenic Rivers Association Tandem Canoe School. Hiwassee River.

June 15-17: Choto Canoe Club School. Hiwassee River.

June 15-17: Tennessee Sportsfest 1990, Canoe and Kayak Races. Hiwassee River.

June 15-17: Tennessee Scenic Rivers Association Overnight Canoe Trip, Buffalo River.

June 15-24: Chattanooga Riverbend Festival.

June 22-24: Tennessee Scenic Rivers Association Deck Boat School.

June 22-24: Tennessee Scenic Rivers Association Hiwassee River Float.

June 22-24: Ocoee River Rodzo.

\* Mississippi did not list any activities





## SWPBA NEWSLETTER ITEMS - ALABAMA

Once more our Special Studies Section biologists begin preparation for the summer's sampling frenzy. We plan on conducting our 'normal' amount of Water Quality Demonstration Studies, intensive wasteload allocation studies and special surveys. We are hoping Alabama has already received it's share of rain for the summer so our sampling efforts will not be as hindered as in 1989.

Our reservoir monitoring program for this year will kick off the 4th week of April. We will be conducting studies on 15 reservoirs over the course of the summer; sampling for nutrients, chlorophyll a and transparency. Additionally, a surface to bottom dissolved oxygen/temperature profile will be conducted at each site allowing the identification of the epilimnion and hypolimnion. We have applied for two Phase I Diagnostic Feasibility Study grants for work on Weiss Lake in northern Alabama and West Point Lake on the Alabama/Georgia Border. We are fortunate to have a new biologist with us, Fred Leslie, who will be heading up the reservoir monitoring program. Fred holds a Masters degree in Fisheries Biology from Auburn University. He worked with Auburn University last year in the Joint Lakes Assessment Project with us. We are glad to have him aboard. The report of the Joint Water Quality Assessment-Alabama Public Lakes 1989 is now available. Those interested in obtaining copies should contact Bob Cooner at (205) 271-7931.

The Toxics Unit is in the process of finishing up the municipal testing for fiscal year 1990 and awaits the FY-91 commitment list due in June. We hope to begin some preliminary chronic toxicity testing by mid-summer on a trial basis to establish our chronic toxicity procedures. Norman and Cathy attended a Toxicity Reduction Evaluation (TRE) training workshop in Jacksonville, Florida the first week of March. This will enable us to be of assistance to the permit writers when overseeing a TRE. We have also been in the process of reviewing toxicity test reports submitted by municipal and industrial permittees with toxicity limits incorporated into their permits. This is a quality assurance measure for toxicity testing laboratories.

Congratulations go out to Marion Bertolotti on the birth of his daughter and his recent promotion where he will assume additional responsibilities in the Toxics Unit.

Congratulations also go out to Norman Blakey on the birth of his son.

The first week of May there will be an EPA sponsored Ecoregion meeting here in Montgomery. It will be attended by representatives of Alabama, Mississippi, EPA and the U.S. Forest Service. The objective of this meeting will be to identify possible regional reference sites to further document our ecoregions. We have spent this spring field testing our methods for Rapid Bioassessment and Habitat Assessment. We will be utilizing these methods this year at our wadeable trend stations and our special studies as well as our reference sites. Vickie and Brien are looking forward to sampling as many reference sites as time will allow. It will be quite a refreshing change to sample areas other than those downstream of sewage treatment plant discharges. We have completed our

first draft of our Biological SOP/QA Manual for Macroinvertebrates and hope to have the final draft ready sometime in the next month or so. Dave Smith from EPA-Athens recently completed the Quality Control/Quality Assurance Inspection of our macroinvertebrate biological monitoring group. Many thanks for the hours spent looking at those wonderful Orthocladinae. A preliminary analysis of the past 10 years biological data from Alabama's trend stations is in the process of being completed with a goal of a ten-year report to be completed in the next year. Representatives from Alabama will be attending the Environmental Management Workshop in Ashville, N.C. April 25-27, 1990. We hope to bring back ideas that will allow us to increase our efficiency and streamline our program.

ADEM has recently begun publishing a bimonthly newsletter containing articles of interest in areas such as Waste minimization, Hazardous Waste, Air Quality, and Water Quality. This publication is available free of charge upon request by writing to : Public Affairs Office, ADEM, 1751 Cong. W.L. Dickinson Drive, Montgomery, AL, 36130.

## FLORIDA

### Perdido Bay - Center of Environmental Controversy

Most states in Region IV probably have their share of environmentally controversial areas. The following series of news clippings was forwarded from Florida for print in the newsletter. The clippings outline the recent history of controversy in the Perdido Bay area - a history involving a major manufacturer and employee, the Champion Paper Company at Cantonment, Florida, citizens concerned about the health of the Perdido Bay ecosystem, the Florida Department of Environmental Regulations, and the U.S. EPA. During the course of the controversy, three of our association members were reprimanded for truthful testimony provided on behalf of Perdido Bay environmentalists at an administrative hearing. The clippings are arranged chronologically as they appeared in the newspaper.

9/21/58 PWT

# EPA studies pollutants in bay from paper mill

By Michael Burke  
News Journal

Preliminary data from a federal study of Perdido Bay show that the Champion paper mill in Cantonment is responsible for more than half of the oxygen-consuming pollutants that enter Perdido Bay.

The data was released recently by the Environmental Protection Agency without any conclusions as to how Champion's wastewater affects Perdido Bay.

But Jacqueline Lane, chairman of an environmental group called Friends of Perdido Bay, said the EPA study shows that upper Perdido Bay is "an overenriched environment."

Lane, who holds a doctorate in biology, said that at certain times of the year, pollutants from the paper mill deplete bay waters oxygen supply. She said the levels of nitrogen found by EPA in parts of upper Perdido Bay were double what a healthy bay should have.

Champion officials, however, said the jury is still out on whether the paper mill is harming Perdido Bay and Eleven Mile Creek. The creek carries about 23 million gallons per day of treated wastewater from the mill to Perdido Bay.

Champion's spokesman Frank Westmark said the company needs

better information before it can try to correct problems. "We've made the commitment to find out what's going on out there," Westmark said.

Westmark and Champion's environmental supervisor, David Arceneaux, also disputed whether water quality data obtained last year by EPA accurately reflected the bay's year-round condition.

Arceneaux said some of the EPA data was gathered during a period of low rainfall. As a result, he said, EPA charts tend to show "worst case conditions" regarding Champion's contribution to the overall pollution load.

The EPA, which gathered its bay samples in 1986-87, still is several months away from releasing a final report. EPA officials have been tight-lipped about what the final report will show.

Mark Koenig, an EPA environmental engineer in Athens, Ga., said it now is premature to assess the bay's problems. He said more data is needed about other pollution sources affecting Perdido Bay.

The agency had more to say, however, about Champion's impact on Eleven Mile Creek. Last week, the agency released initial results from a computer model intended to evaluate Champion's impact on the creek.

The model predicted that because of the high level of certain pollutants discharged by Champion, Eleven Mile Creek cannot meet water quality standards for dissolved oxygen.

Philip Vorsatz, chief of EPA's Water Quality Standards Unit in Atlanta, said the computer model will help the agency in setting discharge limits for Champion under a new federal permit.

Vorsatz said the model "tells us that Champion is going to have to significantly adjust their effluent somehow."

The Cantonment mill treats its wastewater with a system of aeration basins and settling ponds where 95 percent of solids and oxygen-demanding pollutants are removed before discharge to Eleven Mile Creek.

Vorsatz said the mill might have to further reduce its discharge of ammonia and other oxygen-demanding pollutants, or it might be able to add dissolved oxygen to its effluent. "We expect it will take a combination of all three," he said.

Champion has hired a leading marine ecologist, Dr. Skip Livingston, to evaluate the mill's impact on the bay. "If we are contributing to problems, then we are going to do something about it," Arceneaux said.

## DER-permitting flaws show up in report

Recently, the long awaited EPA data on Perdido Bay was released. Part of this data included a computer model simulation of oxygen-producing and consuming characteristics of Eleven Mile Creek. The results from the model were really no surprise to us who see Eleven Mile Creek.

For a minimum (safe) oxygen level to be maintained in Eleven Mile Creek,

Champion must reduce the oxygen-consuming chemicals in its effluent by eightfold. It looks like Champion is going to have to improve its level of treatment. I am hopeful the company will comply, as it often said it does, with the spirit as well as the letter of the law.

However, the results of this study raise interesting questions about the permitting process of the Florida Department of Environmental Regulation (DER). In 1987, DER proposed to give Champion a permit for five years, allowing them to discharge pollutants at present levels. The DER has said that these levels are not harmful to the environment. Yet, EPA has found these levels eight times too high. How does DER arrive at environmentally safe limits?

A more methodical approach to granting permits is necessary. To not do so will lead to loss of credibility in environmental agencies, environmental harm, and costly corrections having to be made by Florida industries. Florida DER did Champion no favors when they decided to reissue a 5-year permit at the present limits. Champion is now having to defend the reissuance of this permit in court, paying for an expensive study to find how much of an impact it is having on Perdido Bay, and, most likely, it will have to invest considerable sums of money in upgrading treatment. Luke-warm environmental laws, enforcement and permitting can no longer be tolerated.

Jacqueline M. Lane  
Pensacola

# State may act against Champion

## DER concerned about wastewater from Cantonment mill

By Michael Burke  
News Journal

The Florida Department of Environmental Regulation is considering enforcement action against Champion's paper mill in Cantonment and its wastewater discharge to Perdido Bay.

Robert Kriegel, DER manager for Northwest Florida, confirmed Tuesday that the agency is drafting a consent order for Champion. The order would replace a controversial five-year permit that has been proposed for Champion.

A consent order spells out environmental violations and sets a schedule for evaluating or correcting pollution problems.

Like a wastewater discharge permit, a consent order can be challenged at an administrative hearing.

Kriegel said DER officials will discuss a possible consent order with Champion officials on Friday. Champion officials reserved comment until they see the proposed order.

If approved by the agency and Champion, the order would mark a major change in direction for the environmental agency. A year ago,

DER announced plans to approve a five-year wastewater permit for Champion. That permit included exceptions that would have allowed the mill to dump pollutants in excess of four water quality standards.

The proposed permit never became final. It was opposed by the Perdido Bay Environmental Association, which intends to challenge the DER and the Champion permit at a Nov. 14 administrative hearing.

Kriegel said the hearing was not a reason for the department's new approach.

But Doug MacLaughlin, a DER attorney in Tallahassee, acknowledged that it would be difficult for the department to defend a permit for Champion "when we've discovered problems that don't meet our standards."

"We have talked about it a lot," MacLaughlin said. "We realize that we're going to have to do something."

Kriegel said the enforcement approach was prompted by information from an Environmental Protection Agency study of Eleven Mile Creek.

Preliminary data and a computer model developed by the EPA suggest that Champion's discharge is responsible for water quality violations in Eleven Mile Creek. That is consistent with previous data gathered by the DER showing low levels of dissolved oxygen in parts of Eleven Mile Creek.

The creek receives about 22 million gallons per day of treated wastewater from the Cantonment mill. The creek carries this wastewater about 12 miles before it empties into upper Perdido Bay.

Kriegel said that if Champion is causing water quality violations, "we need to address the problems and their future operation. A consent order would be a vehicle that could do both."

The decision to go to an enforcement order comes in the wake of studies that attribute water quality violations to Champion's discharge.

The DER discovered earlier this year that Champion was discharging ammonia and dissolved salts in excess of DER's limits.

Department biologist Donald Ray reported that chloride concentrations measured in Eleven

Mile Creek in January were considered toxic to aquatic life. And in June, DER compliance engineer Edward Chilvers reported that ammonia violations in the mill's effluent had been a problem for many months. Chilvers said the discharge of ammonia — an oxygen-consuming pollutant — was 12 times the standard.

According to a Chilvers memo to his superiors on June 27, Champion's attempts to solve its nitrogen and ammonia problem "have shown no significant effect."

In addition to the state findings, the EPA released data showing that Champion contributes a large percentage of the oxygen-consuming pollutants entering Perdido Bay.

The EPA has not, however, released a final report explaining what effect these pollutants are having on the health of the bay.

Environmentalists contend Champion's discharge is depleting the bay of the oxygen it needs to support a strong fish population. Champion officials say more information is needed about the bay before they can move to solve pollution problems.

*Pensacola News Journal Tuesday 2-2, 1988*

# Residents complain of polluted water

## Supporters defend paper mill

By Michael Burke  
News Journal

Residents near Perdido Bay told an administrative hearing officer Monday that wastewater from a Cantonment paper mill has degraded Perdido Bay so that people no longer want to swim there.

Meanwhile, supporters of the Champion International mill defended the company as a "good neighbor" that has contributed to the economic quality of life for people in Escambia County. The paper mill employs about 1,000 people and has invested millions on improvements to its air and water pollution controls.

The state is conducting the hearing to determine if it should approve a new wastewater discharge permit sought by Champion. The hearing or trial began last week in Tallahassee and continued Monday in Pensacola City Hall. Proceedings will resume today.

Arnie Rosenbleeth, who operates a drug store in Cantonment, said Champion has always done what it promised to do and he urged the hearing officer to give the company time to meet its environmental commitments.

Others demanded action against Champion, saying the state had failed to enforce its own environmental policies.

One 91-year-old resident of Inverarity Point recalled how fish and oysters were once plentiful in Perdido Bay. He said that after the mill opened in 1941, the waters became darker and oysters gradually disappeared from the bay.

"A compromise needs to be worked out," said Joe Ragland, executive vice president of the Pensacola Area Chamber of Commerce. "This is not a we or they situation."

Another Champion supporter,

Pensacola Mayor Vince Whibbs, praised the company as an "outstanding citizen of our community." Whibbs urged state hearing officer Michael Ruff to approve the new wastewater discharge permit for Champion.

Ruff said Champion has the burden of proving that it is entitled to the temporary operating permit and variances proposed.

After the hearing, Ruff will make a recommendation on the proposed permit to the boss of the Department of Environmental Regulation.

The permit was challenged last year by the Perdido Bay Environmental Association. Since that time, the DER has become more strict with Champion, requiring more environmental studies and corrective actions based on those studies. The company also has agreed to study alternative treatment technologies, including disposal of its wastewater on land.

The DER has not dropped its plans, however, to grant Champion four variances to state water quality standards. The variances also are being challenged at the hearing.

Most of Monday's testimony came from two DER biologists, Donald Ray and Glenn Butts. Both agreed that Champion has caused water quality violations in Eleven Mile Creek, a tributary of Perdido Bay.

Ray testified that the DER has known about some water quality problems in the creek for many years.

Asked if he was satisfied with the DER's proposed agreement with Champion, Ray said that rather than having Champion spend money on additional studies of water quality, he would prefer engineering studies aimed at finding solutions.



## No decision on permit for paper mill

By Michael Burke  
News Journal

It may be February or later before a state hearing officer makes a recommendation on Champion International's right to discharge paper mill wastes into Perdido Bay.

A proposed permit for Champion's mill in Cantonment was the subject of a legal battle this week pitting the Perdido Bay Environmental Association against Champion and the Florida Department of Environmental Regulation.

Residents around Perdido Bay oppose DER's plan to grant a five-year, wastewater discharge permit to Champion. A group of bay area residents also objected to the state's plan to issue variances exempting Champion from four water quality standards.

An administrative hearing on the Champion permit concluded in Pensacola Tuesday after Hearing Officer P. Michael Ruff took a first-hand look at Eleven Mile Creek. Wastewater from Champion's mill is discharged into the creek, which drains into Perdido Bay.

On Tuesday, DER biologist Laurence Donelan agreed with two other state biologists who said they were not satisfied with the permit conditions proposed by their superiors. Donelan said the permit didn't address some pollutants as it should.

Champion spokesman Frank Westmark said he expects Ruff will take at least two to three months before issuing a decision. Westmark said Ruff can recommend approval or denial of the permit, or approval with added conditions.

Ruff's recommendation on the Champion permit will go to DER Secretary Dale Twachtmann. Randie Denker, attorney for the Perdido Bay Environmental Association, said Twachtmann's final order could be appealed to the courts.

The disputed permit would give Champion several years to complete a variety of environmental and engineering studies. Based on those studies, Champion agreed to bring the mill into compliance with water quality standards.

Environmentalists maintain that Perdido Bay is not capable of absorbing the continuing load of pollutants. They also are concerned that very low traces of dioxin have been found in fish in Eleven Mile Creek.

Westmark said Champion will spend about \$750,000 for an environmental study of the bay, and another \$1 million on research and development required by the proposed permit.

Westmark said legal costs associated with the administrative hearing were more than \$200,000.

# Champion deserves permit but pressure mustn't stop

We have to agree with the action of the state Department of Environmental Regulation in granting the Champion wastewater discharge permit.

One, we believe Champion is — if belatedly — committed to cleaning up its discharge. That takes time. Two, the only alternative appears to be closing the mill. Champion is one of the county's larger employers and losing it would be a blow to the economy of the county, as well as to mill employees.

Also, it should not be forgotten that Champion isn't the only polluter of Perdido Bay. It might be reasonable to suppose that the bay is hurt almost as much by the accumulated runoff from roads, subdivisions and septic tanks as by Champion. Those sources of pollution must be dealt with, too.

At the same time, we are uncomfortable supporting a permit that grants variances to state water quality standards for a plant which is clearly the largest single source of pollution in Perdido Bay.

It's no secret that the progress that has been made on this issue is due to the persistent, informed, united actions of a number of Perdido Bay area residents. Once again they have proven that citizens can get action — and that sometimes it's the only way to get it.

It's also no secret that DER's performance has been disappointing. Without the impetus provided by the angry and alarmed citizens' groups, it seems clear DER would have granted the permit long ago, with fewer restrictions, and without real scrutiny.

In an ideal world Champion would reuse its discharge. At present, Champion pulls about 22 million gallons a day of water from the ground through wells, and discharges the same amount into 11 Mile Creek. To its credit, Champion's technology allows it to use as much as 50 percent less water than other mills, partly by reusing some of the water.

However, most of the water ends up too dirty to be reused and is discharged into 11 Mile Creek and eventually Perdido Bay. Champion does treat the discharge, but it's a sobering thought that the state lets water too dirty to be reused for manufacturing to be discharged into the bay.

Reusing the water would conserve the groundwater and would protect Perdido Bay from pollution. But it would undoubtedly be complicated to do, and at best it would be expensive. The price of paper products would rise, and probably the mill couldn't compete in the marketplace unless its competition had to follow the same regulations.

But someday we'll have to decide: Is having inexpensive paper products — or plastics, or steel — worth polluting our rivers and bays?

In September, the state hearing officer, in his report supporting DER's desire to grant the permit, concluded that "in short, Champion needs time to pollute Eleven Mile Creek while the necessary research and construction of treatment equipment... is accomplished."

In the same report, the hearing office chastised Champion and DER by noting, "it is a singular circumstance for Respondents (Champion and DER), after years of mill operation, and after the 1986 permit proceeding, and related investigations, to purportedly not have more knowledge of the chemical constituents of the discharge and the receiving water, and some inkling of the effect of it..."

In other words, after all this time, why don't they know more about the chemicals and how they are affecting the bay? To carry it further, without that knowledge, how can they make informed decisions about what needs to be done?

Later in the report, the hearing officer concludes that the discharge "will not be unreasonably destructive to the quality of Eleven Mile Creek and Perdido Bay."

Well, what's not unreasonable to a state hearing officer in Tallahassee might be very unreasonable to someone swimming or fishing in the bay.

In fairness, the hearing officer also concluded that Champion was using the best available technology, and is making a bonafide effort to improve its discharge. Champion does seem to be a responsible corporate citizen, as evidenced by the recent corporate record set by the plant of two million hours without an employee accident.

In that same spirit, we believe Champion is reacting in a responsible way to the concerns of area residents. Remember, it was only just a few years ago that the real outcry against Champion began. It's the nature of industry to take the least expensive way out, and it's no condemnation of Champion that, in the absence of significant opposition, it took what DER would give it.

Under the permit, Champion will conduct further studies of the bay and investigate new treatment technologies. It has hired Dr. Robert Livingston, an independent and respected scientist, to conduct the study of the bay.

Still, studies themselves accomplish nothing. They have to be acted on. It's a time-honored tactic of bureaucracies to keep studying an issue until everyone interested in it has gone away.

No one should be lulled to sleep by studies. Let's do the studies, and then act on them.

The permit gives Champion a five-year breathing spell before it has to reapply for a permit. We urge the citizens who have so tenaciously fought for the purity of Perdido Bay to keep fighting.

DER is supposed to protect the quality of state waters for Florida taxpayers and residents. Citizens shouldn't have to take the lead to protect the public's interests, but it's obvious they must.

The people who have risen to protect Perdido Bay deserve the thanks of all of us. And it should be an instructive — and heartening — lesson for everyone in West Florida.

Simply, it is that if you don't stand up for your interests, the odds are no one else will, either. But if you do, you can have an impact.



# Perdido Bay/Champion saga causing internal DER strife

by Fred Garth,  
Guest Columnist

PENSACOLA

**O**N NOVEMBER 21-22, 1988, the Northwest District of the DER was challenged by its own employees in what may be an unprecedented event in DER history. At an administrative hearing in Pensacola, three DER biologists testified that permits were continuously being issued without regard to their field data—which clearly showed that permits should have been denied.

In this case, Champion Paper Company, had applied for several variances along with their application for a new operating permit. The plant, which is just north of Pensacola, in the industrial community of Cantonment, converted from a brown paper to a bleached kraft paper process in 1986. Accord-

Fred Garth is the Editor of *Scuba Times* magazine and a Pensacola resident.

The mill's poor location is compounded by the fact that it is not built near a river. Consequently, the millions of gallons needed in the production process are being pumped from 28 deep-water wells. Some experts report that this massive drain on the freshwater aquifer is causing a decline in the water table. Some Cantonment residents have been forced to move because of a loss of well water.

The plight of the three DER biologists is unknown at this time. According to DER lawyer, Dough McLaughlin, the employees were "not out of line" in their testimony, which was made under oath.

Results of the November hearing have yet to be released but are expected to be announced sometime in March by hearing officer Michael Ruff. ■

ing to Champion officials, the variance was needed as part of the new construction.

Immediately after Champion's request, a protest to the variances and a request for an administrative hearing was submitted by several community members, as well as by the Perdido Bay Environmental Association (PBEA). (The Cantonment mill is currently permitted to discharge up to 28,000,000 gallons of wastewater per day into 11-Mile Creek, a tributary to Perdido Bay.)

At the Administrative Hearing, the biologist pointed out that continued degradation of 11-Mile Creek and upper Perdido Bay were the direct result of Champion's daily discharge of wastewater. In addition, they testified that their field reports, which specifically pointed to Champion as the culprit of the Bay's serious pollution problem, were altered by DER officials to allow Champion to receive its permit.

Robert Kriegel, Regional Director of the Northwest District, denied that any documents had been tampered with and stated that the DER would continue to study the problem. Kriegel did point out that St. Regis Paper Company picked a poor location when they built the mill in the early 1940s. (Perdido Bay is a non-flushing bay and pollutants tend to collect and intensify rather than dilute.) However, Kriegel offered no explanation as to why the DER has continued to allow increases in wastewater output limits year after year, especially with the inadequate location of the mill. The DER has permitted new-owner Champion to increase its output five-fold since they purchased the mill in 1984 - including permits for the \$250 million conversion process from brown to white paper.

# DER reproaches 3 staffers for Perdido Bay testimony

by Mike Burke and Roger T. Robinson,  
Guest Columnists

PENSACOLA

THREE STATE biologists who testified on behalf of Perdido Bay environmentalists at an administrative hearing have been reproached by their superiors.

Glenn Butts, Laurence Donelon and Donald Ray of the Florida Department of Environmental Regulation received memos after they testified during the Nov. 21-22 hearing involving a permit for Champion International. The hearing concerned objections by the Perdido Bay Environmental association to a wastewater permit that DER wants to issue to Champion International.

During their testimony, the three employees said they weren't satisfied with conditions their supervisors proposed in granting Champion a permit to discharge paper mill waste into Eleven Mile Creek and Perdido Bay.

On Dec. 5, Buddy Page, the administrative assistant to DER district manager Robert Kriegel, sent a memo to the three veteran biologists saying he was disappointed with their testimony. Page said the biologists, who were subpoenaed to testify by the Perdido Bay group, gave the impression they were supporting the environmentalists' case.

Ray testified that the DER did not take enforcement action against Champion, although the agency has known for years that Champion was causing water quality problems in the creek.

After learning of the memos, the Perdido Bay Environmental Association questioned in a recent newsletter why DER employees could "be criticized for telling the truth."

Page denied that was the cause of his memo, and he said the criticism of their conduct would not go in the employees's personnel files. "It is not a reprimand," Page said. "We saw it as... a coaching tool."

Kriegel added: "Biology is just one part of the (environmental) picture. This agency has specialized technicians from many fields on staff. They (the biologists) left the image the department is not doing what it really should be doing, but you can't voice

that without knowledge of all pieces of the issues."

Biologist Butts was given a formal written reprimand that was separate from the Dec. 5 memo sent to the three biologists. Kriegel said Butts was reprimanded for disregarding instructions to avoid discussing the case with the attorney for the environmental group without first consulting DER's attorney.

Butts declined comment.

Lee McKnight, a former DER employee and unsuccessful candidate for state senator in 1988, said he felt responsible for the memos.

"I suggested the Perdido group subpoena them because I knew they would tell the truth. Now they're being reprimanded because the agency got caught with its hand in the cookie jar and the employees refused to lie," McKnight said.

A permit recommendation should be issued in the spring of this year. ■

Mike Burke and Roger Robinson are staff writers for the *Pensacola News Journal*. This article was reprinted by permission of the *Pensacola News Journal*.

# Plan reduces toxic waste

## Champion to use less chlorine in production

lant scales back/3B

By Michael Burke  
Pens Journal

Champion International in Cantonment plans to phase out some chemicals used in its bleaching process to reduce or eliminate dioxin from the mill's wastewater.

Janet Price, senior process engineer at Champion's environmental control group, said the mill hopes to eliminate dioxin or reduce it to below detectable levels by using less chlorine. The company hopes to replace 50 percent of its chlorine with chlorine dioxide, which tests show produces less or even no dioxin in the bleaching process.

Dioxin, a highly toxic chemical, is an unwanted byproduct of the paper industry's use of chlorine bleaching to

convert brown pulp into white paper products. The Environmental Protection Agency said it may cause cancer, skin disease, reproductive problems and reduced resistance to disease.

In a 1980 report, the EPA said it's possible that a trace of dioxin in the environment may have adverse effects on human health and the environment.

Champion also plans to replace a foam-reducing chemical used in the pulping process that may be causing dioxin to form.

Price said the company will follow steps taken by paper mills in Canada and Scandinavia to prevent the formation of dioxin.

"This is a trial program," Price said. "We think this is a very promising and aggressive approach to take."

Government researchers found traces of the chemical last year in fish caught downstream from Champion in Eleven Mile Creek.

Because the creek carries Champion's discharge into Perdido Bay, some bay area residents question whether it is safe to eat Perdido's fish or swim in its waters.

Jacqueline Lane, president of a citizens group called The Friends of Perdido Bay, wrote in a recent newsletter, "The people who use this bay for fishing and swimming need to know if there is a greater than normal risk of getting cancer from dioxin exposure in Perdido Bay."

At the EPA's request, Champion already has agreed to test fish, shellfish, sediments and water in Perdido Bay for evidence of dioxin contamination.

Saturday, March 25, 1989

Pensacola News Journal

3B

# Carolina dioxin limit won't be

## model for Cantonment mill

Champion chemicals/1B

By Michael Burke  
News Journal

The U.S. Environmental Protection Agency has set a limit for the amount of dioxin that a Champion International paper mill in Canton, N.C., can legally discharge with its wastewater.

But authorities said that limit cannot be applied to other plants such as the Champion plant in Cantonment.

Hagan Thompson, EPA spokesman in Atlanta, said a federal wastewater permit proposed for the Canton mill includes the first dioxin discharge limit imposed on a paper mill in the Southeast.

Several years ago, the EPA discovered that the bleaching process used in many paper mills produces small traces of dioxin as a byproduct. Dioxin is considered to be so poisonous to fish and animals that even extremely small doses are a major concern.

EPA officials set the Canton mill's dioxin limit at .1 part per quadrillion, even though the most

measure such an infinitesimal amount. Champion has three years to comply with the permit limit.

Dave Ryan, an EPA spokesman in Washington, D.C., said the limit proposed for the Canton mill cannot be viewed as a model that will be applied to other paper mills such as the Champion mill in Cantonment.

"We are studying the feasibility of a dioxin limit in our effluent guidelines for pulp and paper mills," Ryan said. But he added that it may be two or three years before EPA adopts a uniform standard for paper mills.

The North Carolina mill was the focus of an environmental dispute between the states of Tennessee and North Carolina. The Champion mill discharges cola-colored wastewater into the Pigeon River, which travels from North Carolina into Tennessee.

Tennessee recently refused to give Champion a variance to one of its water quality standards dealing with the color of the stream. Champion responded by announcing that it will have to drastically cut back its Canton operation to

comply with Tennessee's standard.

The Cantonment plant had asked the state of Florida for a similar variance, with water color one of the grounds for the request. But the permit and variances have been held up by a legal challenge from Perdido Bay residents. A decision on the plant is expected soon.

Thompson said science has leaped forward in recent years in its ability to measure extremely small amounts of pollution.

Today, EPA officials said, "state of the art" testing methods allow researchers to detect chemicals as low as 1 part per trillion in fish tissue. With wastewater, the best labs can now measure down to 1-10 parts per quadrillion.

According to Thompson, EPA officials set a dioxin limit of .1 part per quadrillion because of a belief that within the next three years, technology may be available to measure it.

The agency estimates there would be one additional case of cancer out of a million people exposed over a lifetime to that .1 level of dioxin.



# Perdido Bay debate will drag on — unless people demand action

By Fred D. Garth  
Board of Directors  
Perdido Bay Environmental Association

## VIEWPOINT

Two years have gone by and everyone is still wondering. What's all the fuss about Perdido Bay? Is Champion really polluting the resort area? Is the seafood safe to eat? Can people swim in the bay? What's the deal anyway?

A lot of people would like the answers to these questions — especially the property owners around the bay. The ruckus actually began in 1970 when citizens took the paper company to court.

Two years ago, the fight was rekindled when the Perdido Bay Environmental Association (PBEA) was formed. That first year alone, over 500 members joined. Something was awry. People were fighting

nizing the bay. Other environmental groups have been formed and are trying to curve their piece of the pollution pie. The media has focused its intense eyes on the bay.

The Perdido Bay Environmental Association has become a household phrase. And yet, after all of the money, the studies, the lawyers and the pollution, no one knows what is going to happen.

You want to know the answer? Cut this article out and refer back to it in two years. Here it is. All of these studies will find all kinds of problems. But, the lawyers and scientists will disagree and want another study so they can spend more government money and continue to disagree.

Champion will get its permits. Eleven-Mile Creek will keep getting 22 million gallons of Champion's waste water every

day — along with everything from fecal coliform, arsenic and dioxin to lead, mercury and chlorides.

Underfunded environmental groups like the PBEA will keep fighting the corporate giants. And the media will keep the public informed.

Bob Krieger may get axed from his position, just because things have gotten so hot, but that's uncertain. The certainty is that he and his associates at DER will continue spouting figures about BOD, TSS, DO, and biological terms so as to keep the public in total confusion.

The little remaining life in Eleven-Mile Creek will completely die off and the death toll will steadily keep into Perdido Bay. And that's what will happen.

Unless we wake up.  
Recently in Tennessee, the governor canceled down Pigeon River where Cham-

pion has another paper mill.  
Above the plant, in North Carolina, the stream is popular with fishermen, kayakers and the like. Below the plant, in Tennessee, the Pigeon River is dead.

When the governor saw the atrocity, he demanded immediate action. In a few weeks, corrective steps were being taken. There were no more drawdown studies, no more governmental red tape, just action. Justice was served, it's that simple. It's a shame that neither Alabama nor Florida has a governor like that.

No one has the right to destroy the environment for profit. It's a sad day in America when government agencies, scientists and lawyers shield polluters from punishment and stymie justice.

Yes, it's a sad day in America. It's a sad day for Perdido Bay.

Saturday, February 25, 1989

Pensacola News Journal

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## Champion to sample for dioxin in Perdido Bay

By Michael Burke  
News Journal

Champion International Corp. has agreed to test fish, shellfish and sediments in Perdido Bay and Eleven Mile Creek for possible dioxin contamination.

David Arceneaux, environmental supervisor at Champion's paper mill in Cantonment, said a company consultant will conduct dioxin tests that were requested recently by the Environmental Protection Agency.

As part of the dioxin program, Champion also will test its paper mill discharge

into Eleven Mile Creek, a tributary of Perdido Bay. Arceneaux said the company will take the samples as soon as possible. Dioxin is highly toxic to fish and laboratory animals. It causes cancer in animals at very low doses.

But there is still debate about how toxic the chemical is to humans. Many Vietnam veterans have claimed their exposure to dioxin in the defoliant Agent Orange caused cancer, birth defects in their children and other ailments.

For at least four years, the EPA has suspected that the bleaching process used in many paper mills produces small

amounts of dioxin.

In June 1988, the agency reported that traces of dioxin were found in fish taken from Eleven Mile Creek, downstream from Champion. The 4.4 parts per trillion of dioxin found in a fish fillet was far below the fish consumption "level of concern" recommended by the Food and Drug Administration.

FDA recommends that fish consumption be limited when fillets contain more than 25 parts per trillion.

The EPA recently announced fish sampling results from sites near paper mills in eight Southeastern states. The

sampling were taken from St. Andrews Bay near Panama City. Penholloway River at Perry and Eleven Mile Creek.

None of the fillets sampled had dioxin levels exceeding 25 parts per trillion.

The FDA guideline, however, has been criticized by environmental groups such as Greenpeace. "It is not a health-based standard and would never hold up in court," said Shelley Stewart, Greenpeace spokeswoman. "Dioxin is so incredibly toxic that no amount, no matter how small, can be considered safe."

In a report written last summer by Friends of Perdido Bay, a local environ-

mental group, biologist Jacqueline Lane said it's likely that fish from Perdido Bay will have much lower levels of dioxin than fish from Eleven Mile Creek.

For people eating fish that might be contain dioxin, Lane advised: "Since dioxin, like many other contaminants, tends to accumulate in the fatty tissues, proper preparation of fish can reduce levels in the eaten portion. Use skinless fillets and remove the strip of dark colored meat from the lateral line area of the fillet." The EPA has not set limits on the amount of dioxin that can be discharged into surface waters.

## DER sacrifices Perdido Bay to save Champion

BY LINDA YOUNG

After two years of waiting, the Perdido Bay Environmental Association learned last Friday that Champion International will be issued a temporary operating permit and a consent order which will require certain corrective actions to be taken.

The decision was made only a week after the results from a \$250,000 study of Perdido Bay were released, which confirmed that discharges from the Champion plant are creating higher than normal levels of nutrients in the bay. The study, concluded by the DER and financed by the National Oceanic and Atmospheric Administration addressed only nutrient levels. It did not address a potentially more dangerous problem with Dioxin, which is also present in Eleven Mile Creek and Perdido Bay. The Dioxin is being produced in the chlorine bleaching process which Champion uses to take the color out of its pulp.

Joe Trapp, president of PBEA says there is no doubt in his mind that Perdido Bay is in trouble. He cites the four dead dolphins which have washed up on Perdido Bay since April and numerous cancerous fish that have been caught in the Bay as evidence that contamination has reached a dangerous level.

Trapp says his organization is not discouraged by the decision because Champion has been operating without a permit for the past two years anyway, therefore nothing has really changed. He says his group will intensify their efforts to stop Champion from using chlorine bleach at the Cantonment plant and from violating state standards for water quality.

Jackie Lane, President of Friends of Perdido Bay, another environmental organization trying to clean up the bay, said she is waiting for the results from another study being conducted by Dr. Robert Livingston of Florida State University, which should be complete next June.

"I think Champion realizes now that they have a problem. I believe they will try to clean it up. Right now they are looking at their options, as they are realizing the problem is much bigger than they first realized," said Lane.

"We are disappointed with the variance, but we will continue to work with Champion and work toward a better bay. If Champion doesn't make more progress toward cleaning up their operation, then we will go back to court and

sue the DER for not doing their job," Lane continued.

Lane said she is just as concerned about the Dioxin problem and hopes that recent studies on Dioxin levels in the Bay will bring

light to that situation.

According to Marshall Hyatt of the EPA in Atlanta, two years ago the EPA required 104 mills in the United States, which are using a chlorine bleaching process to take color out of their pulp, to do studies which were designed by the EPA. Two different isomers were measured, 2,3-7-8 TCDD (better known as Dioxin) and 2,3-7-8 TCDF (Furan). The purpose of the study was to get an idea of what is going on in terms of Dioxin contamination from papermills and if there is contamination present, then at what level does the contamination exist.

The Champion mill in Cantonment was one of the mills required to conduct the one time sampling study. They sampled the effluent, pulp and sludge from their plant. The sludge sample showed TCDD present at the 14.0 ppt (parts per trillion) level and TCDF present at the 21.0 ppt level. The effluent sample showed TCDD present at a 11 ppq (parts per quadrillion) level and TCDF present at a 38 ppq level.

The study also looked at how much of the chemicals are present in fish taken from Eleven Mile Creek. One sample, a composite fillet of 2 white catfish had 9.43 ppt, which according to Hyatt is high relative to other places in Florida, but lower than some places in the region. A composite whole body analysis of two carp revealed 25.49 ppt. A single fillet of a large mouth bass had 4.43 ppt of TCDD.

The FDA recommends that fish with Dioxin levels above 25 ppt should only be consumed occasionally. Fish that exceed 50 ppt should not be eaten at all. The government has not indentified a safe level for consumption of Dioxin, however due to the fact that it does accumulate in fat and is one of the most carcinogenic chemicals known, it is handled with extreme caution.

The EPA then selected about 25 of the mills which showed the highest levels of contamination to waterways and ordered another special, long term study to monitor contamination levels. That study was completed last month, however according to Frank Westmark of Champion, the results will not be available for some time, possibly six months.

Hyatt says that according to Section 304L of the Clean Water Act, states are required to list water bodies that have pollution problems. Florida did not list the Perdido River or require Champion to get a special permit to exceed acceptable levels of Dioxin pollution. However, the EPA has added the Cantonment Champion plant to their list and will be issuing a permit to Champion which will set levels of acceptable contamination limits and minimization requirements.

Hyatt said he expects Champion to challenge the permit and it is likely that a long court battle will be forthcoming.

Westmark says that Champion will use the best technology available to improve the water quality in Perdido Bay and that nationally, the paper industry is responsible for only 1% of the dioxin contamination. He says that Champion installed technology at their Cantonment plant in 1986 to reduce dioxin in their production process. The technology included the substitution of chlorine dioxide for chlorine.

Westmark says the EPA has 45 days to amend, reject or approve the DER order to issue a permit to Champion and he expects to receive EPA approval before that time. He says that the local environmental organizations can appeal the permit in the 1st District Court of Appeals if they disagree with the decision.

Bob Pooley, a DER engineer, says the temporary operating permit will require Champion to monitor for Dioxin, but will not require corrective action. He emphasizes that the permit is a non-compliance permit and recognizes that Champion still has problems to address.



# Champion's permit questions unanswered

By Thornton Garth  
PBEA Member

I am a member of the Perdido Bay Environmental Association and have worked diligently for three years to correct one of many environmental injustices. Members of the PBEA have spent literally thousands of hours educating themselves about what the Florida Department of Environmental Regulation (FDER) is, what it is supposed to do, and understanding the laws that govern its actions.

When Champion Paper applied for variances to exceed state standards for pollution we, as concerned citizens, set in motion a campaign to learn all we could about the situation and how to stop it if it were hurting our Perdido Bay ecosystem. Upon reading through the volumes and volumes of laws and correspondence between Champion and FDER (which is public information on file at FDER, available to anyone during working hours) we concluded, along with FDER, that there were some serious problems with Perdido Bay due to Champion Paper's activities.

We then immediately responded to a notice in the newspaper of an "intent to issue a permit and variance" to Champion Paper. We obtained a lawyer and

## VIEWPOINT

followed the legal course of events set forth by law by petitioning for an administrative hearing — not as a radical out-of-control group, but as a law-abiding group of rationally oriented people. We obtained expert witnesses and went to court.

Throughout the course of the three years, there have been many contradictions that would make a sane man question the system. In July 1988 FDER published the "1988 Florida Water Quality Assessment 305 (b) Technical Appendix" in which it states on the first page "Champion's partially treated waste water entering 11 Mile Creek negatively effects many water quality parameters" also "Champion's been operating without a permit and out of compliance with the old permit," also "the effluent has also been found toxic to bioassay test organisms." The report goes on to say "the most concentrated and voluminous pollution source in the entire 300-square-mile Perdido Basin is Champion Paper Company."

In light of the previous statement by FDER, why is the public continuously

deceived that Champion Paper is a minor source of pollution and that other sources are equally as bad. Granted there are many sources of pollution, everyone knows that, but Champion Paper by admittance of FDER is the greatest source by far and should have been a much bigger fish in the Pensacola News Journal cartoon of Oct. 8.

PBEA is a group of sound-thinking concerned citizens following the accepted establishment route to change. Even though it is difficult to do when one of our officials, state hearing officer Michael Ruff, ruled in Champion Paper's favor by saying "In short, Champion needs more time to pollute 11 Mile Creek while necessary research and construction of treatment equipment . . . is accomplished."

This is backward, the research should have been done before the plant was allowed to upgrade in an already overstressed system.

The most basic question of all which has not been answered is, "Why was Champion given the opportunity to install an even more toxic process when the FDER knew before that the system would pollute more than ever in an already overstressed Perdido Bay?"

Now it is your time to ask this question of your local representatives.

Other News from Florida....

# Water quality laboratory may face relocation

## Consolidation might delay local testing

From staff and wire service reports

Employees at the Florida Department of Environmental Regulation laboratory in Pensacola are worried that DER may consolidate the state's regional labs at a new facility in Tallahassee, a lab employee said Monday.

DER has said it has made no decision yet on whether to move people and equipment to Tallahassee from the regional labs in Pensacola, Jacksonville, Port St. Lucie, Punta Gorda, Orlando and Tampa, said Assistant Secretary John Shearer.

"It's mostly kind of wait and see," said Bob Brazzell, supervisor for DER's chemistry and biology labs in Pensacola.

The Pensacola labs employ three chemists and four biologists, Brazzell said.

Pensacola labs monitor water quality standards in the area and handle complaints from residents who think they have water problems, he said.

Centralization could mean a two-week or longer backlog for certain kinds of testing that take a day or two in district laboratories, DER employees have said. The tests include drinking water samples and effluent testing.

DER communications director Jack Maynard said the workers would not lose their jobs if the labs are consolidated.

The centralization issue heated up several weeks ago when the lease on the Tampa lab ran out.

It was then that DER revealed the idea of centralizing.

Instead of signing a new lease, a temporary lab was set up in DER's Tampa offices.

The Tallahassee lab, formerly in an office building, traditionally has done more sophisticated testing such as for dioxins and metals, including mercury, which has been found in fish taken from several Florida rivers and lakes.

Yet chemists in Port St. Lucie and Jacksonville are particularly sensitive because they have built sophisticated laboratories over the years, financed in part by fines paid by polluters.

"We have pulled ourselves up by our own bootstraps. It would be disappointing to see equipment go to Tallahassee,"

### Biologists heart of DER 2/11/80

Could this be factual or just a rumor, the Florida Department of Environmental Regulation's plan to disband the biology department of DER? In my opinion, the biologists are the "main stream" of any environmental department.

If this does take effect, there will be no need for the rest of the Florida Department of Environmental Regulation. By closing DER down, our tax dollars could be used to help restore the polluted bays, rivers, creeks and bayous.

Do we need an environmental department to issue permits to pollute, then if the state standards can't be met just ask for a variance?

When our beautiful planet is destroyed with pollution, because the greed for money is more important than human lives, will there be another planet for people to destroy?

*Pens. News  
Journal*

Ester Johnson  
Pensacola

A note from a retired Florida Biological Scientist

The majority of the Northwest District's interstate streams and estuaries have been found by permanent network monitoring, basin surveys, point source assessments, and complaint investigations to be chronically degraded, especially during periods of low rainfall. These waters have been rendered unsuitable for the approved water classification uses per Florida Water Quality Standards Chapter 17-3.080 Criteria: Class II Waters - Shellfish Propagation and Harvesting and Chapter 17-3.090 Criteria: Class III Waters - Recreation - Propagation and Maintenance of a Balanced Population of Fish And Wildlife.

Fish and shellfish populations of Northwest Florida estuaries and the adjacent Gulf of Mexico littoral waters have declined in the past two decades due to ever-increasing water pollution degradation.

This January the Florida Department of Natural Resources and the Marine Fisheries Commission set catch limits on important food species of fish such as red snapper, redfish, and mullet that appear to be threatened by extinction. The unbelievable limit of two red snapper per day was set! Following the fishery hearings I was informed by a reliable party boat fishing company of Destin that no fish were being caught in the nearby Gulf of Mexico. Following extensive fishing and diving efforts, it was concluded that no significant number of fish were encountered between Destin and Pensacola up to thirty or forty miles out. The presence of noxious winter plankton blooms were blamed. Yellow "blankets" of apparently plankton were observed settling over reefs. Lobsters and bottom fishes were observed dying. Dolphins were also observed dead.

With the loss of the Gulf fishery and the frequent occurrence of poor beach water quality, Northwest Florida's economy is seriously threatened. The outwelling of degraded estuaries has long been the indicated cause of degradation of littoral Gulf waters. The possibility of chronic water quality degradation leading to the extinction of near-shore fish species is a sobering situation. The need for coordinated agency assessment of the water quality and biological/fishery populations is clearly indicated, involving FDER, FDNR, and possibly EPA, and the National Marine Fisheries at the working /field level.

Submitted by SWPBA member  
Bill Young



FOR OUR FLORIDA MEMBERS and INTERESTED OTHERS

Last year I became aware of an organization which might be of interest to you. The Florida Association of Benthologists (FAB) is a group primarily of Florida area biologists interested in the taxonomy and ecology of benthic organisms. The taxonomic guide to identification of marine and freshwater genera of Enchytraeidae and Propappidae which appeared in the last SWPBA newsletter was taken from the FAB newsletter (Vol. 3, No. 2 1989). I am enclosing an invitation to membership to the organization and a questionnaire from their latest newsletter.



# INVITATION TO MEMBERSHIP

THE FLORIDA ASSOCIATION OF BENTHOLOGISTS CONSISTS PRIMARILY OF PERSONS IN THE FLORIDA AREA WITH INTERESTS IN THE TAXONOMY AND ECOLOGY OF BENTHIC ORGANISMS. THE MAJOR FUNCTION OF THE ASSOCIATION IS TO PROVIDE A FORUM FOR THE EXCHANGE OF INFORMATION AMONG MEMBERS. THE ASSOCIATION PUBLISHES A NEWSLETTER AND HOLDS TWO WORKSHOPS AND ONE TECHNICAL MEETING EACH YEAR. THE ANNUAL MEMBERSHIP FEE IS \$15.00.

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## APPLICATION FOR MEMBERSHIP Florida Association of Benthologists

Name \_\_\_\_\_

Organization \_\_\_\_\_

Address \_\_\_\_\_

Telephone-Business \_\_\_\_\_

Home \_\_\_\_\_

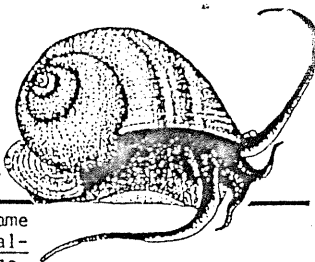
Professional Interest \_\_\_\_\_

Make checks payable to:

Ms. Kathleen Dollar  
University of Florida  
Phelps Lab  
Gainesville, Florida 32611



# Questionnaire on the Florida Apple Snail, Pomacea paludosa



I have been contracted by the Florida Game and Fresh Water Fish Commission, Nongame Wildlife Division, to assemble a bibliography and other information on Pomacea paludosa, the Florida apple snail. I ask your assistance in providing reprints of recent work, knowledge of gray literature, and names of additional individuals and organizations to contact. Please help my effort by responding to the requests below either directly on this sheet or on additional pages. I urge you to photocopy this form and to distribute it to other potential respondents. Thank you for your reply.

Dr. Richard L. Turner, Department of Biological Sciences, Florida Institute of Technology, 150 West University Boulevard, Melbourne, FL 32901-6988 (407-768-8000, ext. 8196)

## RECENT RESEARCH

Are you, your students, or associates currently working on or have you recently worked on Pomacea paludosa? ☐ No ☐ Yes (please describe)

Do you have a paper on P. paludosa that has been submitted, accepted for publication, or recently published? ☐ No ☐ Yes (please provide information or preprints/reprints)

## LEADS TO GRAY OR NOT-SO-GRAY LITERATURE

If you are aware of information on P. paludosa in the formats listed below, please supply bibliographic information: abstracts, theses, dissertations, student class reports, internal reports, newsletters, newspapers and popular journals, pamphlets, publications of limited circulation, environmental impact reports, faunal surveys, bibliographies, films, videotapes. Copies of less available items and ordering information for items from obscure sources would be appreciated.

## NETWORKING

Please give the names and addresses of other individuals or organizations that might provide access to gray literature or information on current research on apple snails.

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## SYMPOSIUM

I will organize a special session of contributed papers on apple snails within the Biological Sciences Section of the Florida Academy of Sciences at its annual meeting, 22-24 March 1990, at Florida Institute of Technology, Melbourne. Please consider presenting your work and submitting your abstract by the deadline of 8 December 1989. If you have not received a call-for-papers, ask a member of FAS for one; or contact me or FAS headquarters (Dr. A. Dickison, Florida Academy of Sciences, Orlando Science Center, 810 East Rollins St., Orlando, FL 32803; 407-323-1450, ext. 431). It would be helpful for you to indicate here your level of interest in the symposium: WILL/MIGHT/WON'T submit abstract WILL/MIGHT/WON'T attend. Area of interest in apple snails:

## MAILING LIST

Use the spaces to the right to have your name and address ☐ added to or ☐ corrected on my mailing list, or check here ☐ to have your name removed. (If, for any reason, your name and address do not appear on the reverse of this page, please include them here.)

## RSVP

Paula M. Mikkelsen, Harbor Branch Oceanographic Institution, is assembling the bibliography. Please mail your response to her for initial processing at: IHCM, Harbor Branch Oceanographic Institution, 5600 Old Dixie Highway, Ft. Pierce, FL 34946.



# SCIENTIFIC PUBLISHERS NATURE GUIDES

No. 3

NEW RELEASE - JUNE 1990

- HIGH SCHOOL & UP -

## DAMSELFLIES OF FLORIDA

Bermuda, and the Bahamas

by Sidney W. Dunkle

This is the first color guide to the damselflies of any part of North America. All of the 46 species found in Florida, Bermuda, and the Bahamas are illustrated, a total that includes a third of all North American damselfly species. Thus, the book is useful in all parts of the United States and Canada. Over 100 color photographs depict all species in the area of coverage for identification in the field with binoculars, as in bird watching. The book minimizes technical language, yet is scientifically accurate and thorough. The text includes chapters on classification, geographical distribution, anatomy, life history, photography, collecting techniques, conservation, and a complete bibliography. Special features are discussions of damselflies in education, a "Quick Guide" to Florida damselflies, a pronunciation guide to scientific names, and checklists for Florida, Bermuda, and the Bahamas. Each species account has sections describing identification, similar species, ecology, and behavior.

\$12.95 paper (ISBN: 0-945417-85-3) 6 x 9 in., ca. 100pp, 101 color fig.

\$19.95 cloth (ISBN: 0-945417-86-1)

PREPUBLICATION PRICE (prepaid): \$9.95 paper (\$16.95 cloth)

Until March 31, 1990

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STILL AVAILABLE: DRAGONFLIES OF THE FLORIDA PENINSULA,

No. 1

Bermuda, and the Bahamas

by Sidney W. Dunkle

1989. 6 x 9 in., 154pp, 129 color fig.  
(ISBN: 0-945417-23-3)

\$12.95 paper  
(price increase to \$14.95 April 1, 1990)

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## KENTUCKY

Derby time has come and gone for another year. Peonies are in bloom. Strawberries will be ripe in about two weeks. It must be mid-spring.

Our biologists are gearing up for summer sampling. Next month begins monitoring at our fixed ambient network stations. Our toxics team has been hard at work already having completed one study in the Prestonsburg area of eastern Kentucky. This week they are off once again testing municipal dischargers in the upper Kentucky River basin. Spring sampling of lakes has kept Cliff Schneider and Tom VanArsdall quite busy in recent weeks.

Gary Beck, our resident microbiologist and old car enthusiast, has had just about everyone collecting bact samples as part of an intensive survey of the North Fork Kentucky River. Results from our monitoring station at Jackson have shown recurrent violations of the Kentucky Primary Recreation standard for fecal coliforms. This study was designed to determine the extent of the contamination problem. Initial results indicate use violations in the river from its mouth at least upstream as far as Hazard, Kentucky (a distance of 107+ miles). Waste water treatment plants at Jackson, Hazard, and Hindman appear to be functioning marginally at best.

Skip Call has been busy getting out intensive survey reports, having recently released reports of the South Fork of Red River and Millers Creek.

The 1990 305b report was completed in early April.

Allen Robison and Al Westerman have been working on justification of EPA's dioxin criteria which Kentucky is adopting. This criteria has been hotly contested by Westvaco, a large paper plant in western Kentucky discharging to the Mississippi River.

The controversy over the dioxin criteria and the use of a one in a million risk factor have slowed the finalizing of our triennial standards review. The Environmental Quality Commission (EQC), a group designated to review environmental regulations, voted against adoption of the 10-6 risk factor and recommended that a 10-5 factor be used instead. The EQC also recommended that a dioxin criteria of 1.2 ppq, proposed by Westvaco, be adopted. Interestingly, one member of the Commission sits on the board of Westvaco. The Environmental Protection Cabinet rejected the EQC recommendations. The standards have since been favorably reviewed by one of two



legislative subcommittees. Review by the second subcommittee should occur in June.

News items included in this newsletter include: an article on our new mobile toxics lab and a health advisory for the Ohio River.

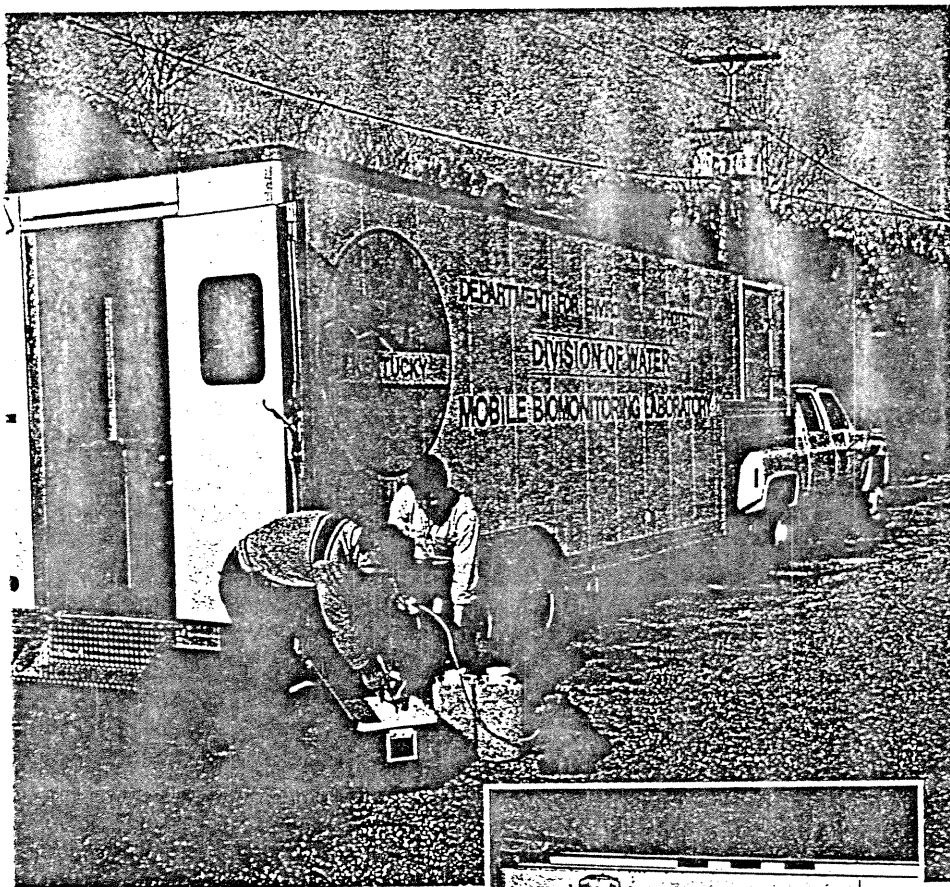
Our staff has grown by three since the last newsletter. Jeff Grubbs ,alias Bart Simpson, will be involved in advanced field ID work of wetlands in the Western Kentucky Coalfield region. His work will include assessing vegetation, soils, hydrology, and habitats. Jeff graduated from Murray State University where his thesis studies addressed the vascular flora of Hickman County.

Also joining our staff is Jackie Balassa. She is a graduate of Eastern Kentucky University and studied breeding biology of Canadian geese in strip pits of the Western Kentucky Coalfield. Jackie will be working with our Waterbody System. Among her highlights is the stay she and her husband experienced last fall while teaching on the island of St. Thomas. Unfortunately, Hugo made a brief but memorable visit during the same time period.

Morgan Jones joined our staff last fall. A 1981 graduate of West Virginia University with a B.S. in Forestry, Morgan has taken on the duties of Wild Rivers Coordinator. Previously, he held positions in the divisions of Waste Management and Forestry. He replaced Sherri Evans who decided to spend more time in her commercial wildflower business and with her baby.

In April, I, your humble newsletter editor, took the plunge and got married. I hope you wish my wife and myself good luck. Thanks!

# Toxicity Testing Takes to the Road



A mobile biomonitoring laboratory recently acquired by the Division of Water allows state technicians to conduct acute and chronic toxicity tests at industries and water treatment plants across the state.

"The new mobile lab provides a high quality, on-site unit to properly do toxicity testing. Fresh samples must be collected daily at multiple collection sites at each facility. The samples must then be analyzed under controlled temperature and lighting schedules. This is important in making sure we get the most accurate information possible," said Jack Wilson, division director.

"Before we got the mobile unit, there were limits on what we could do because of transporting large numbers of samples from remote sites to the central lab in Frankfort," Wilson said.

The mobile lab will conduct tests at facilities with biomoni-

toring requirements as part of their KPDES (Kentucky Pollutant Discharge Elimination System) discharge permits. Other facilities whose permits do not contain a biomonitoring limit, but which have the potential for toxic discharges, will also be tested.

## What is Biomonitoring?

In biomonitoring testing, small minnows and tiny water fleas are put in the discharge water from industries and large sewage treatment plants; if these living organisms fail to reproduce, become deformed or stunted in growth, or die, the water is considered toxic.

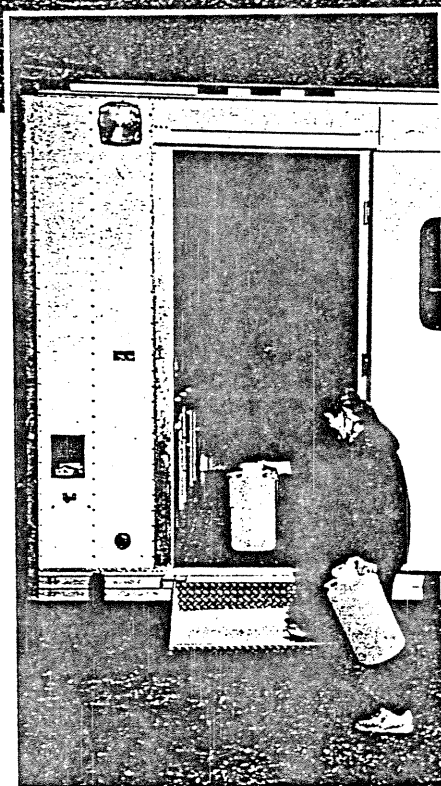
Before biomonitoring was started, state and federal agencies protected aquatic life and drinking water supplies solely by controlling the levels of toxic materials an industry or sewage treatment plant could discharge.

According to Wilson, "Just limiting the amount of chemicals that can be discharged does not tell us the effects on aquatic life of combining some of these chemicals. Biomonitoring tells us if what is allowed is safe."

Division staff traveling with the mobile unit will also conduct toxicity tests on various stream systems around the state as part of an intensive survey to designate stream uses.

The 30-foot mobile unit has a work area for taking readings from toxicity tests, conducting chemical analysis and taking meter readings on test solutions; an eight-foot section that is temperature and light-controlled where the toxicity tests are actually conducted; and a storage area for analytical instruments, meters, chemicals and other supplies, including a compact refrigerator, a 30-gallon fresh water tank and a hot water heater.

"We're ready to roll," Charles Roth, a biologist in the division's Ecological Support Section, said enthusiastically. "This is top-of-the-line equipment. We're excited about having the mobile lab. It will help us do an even better job of toxicity testing throughout the state."



*Above, division employees Al Westerman and Lee Colton check supplies, while Susan Cohn loads the mobile lab.*



# OHIO RIVER VALLEY WATER SANITATION COMMISSION

an interstate agency representing: ILLINOIS • INDIANA • KENTUCKY • NEW YORK • OHIO • PENNSYLVANIA • VIRGINIA • WEST VIRGINIA

49 East Fourth Street

Cincinnati, Ohio 45202

Contact: Jeanne J. Ison  
(513) 421-1151

## FOR IMMEDIATE RELEASE:

The Ohio River Valley Water Sanitation Commission (ORSANCO) has received results of tissue analyses performed on fish fillets collected during the Fall 1989 lockchamber studies. These results have been sent to state health, water resource and fish and wildlife agencies for evaluation and any follow-up action they deem appropriate.

Fish were collected during September and October 1989 at 16 locations along the Ohio, Allegheny, and Monongahela Rivers. Species submitted for analysis included carp, catfish (channel, flathead, blue), bass (white, striped and hybrid), white crappie, sauger, walleye, small and bigmouth buffalo, and freshwater drum.

Composite fillets of each species were tested for polychlorinated biphenyls (PCBs), selected pesticides, mercury, lead and cadmium, all of which are known to accumulate in fish tissue. The analyses revealed the continued presence of PCBs and/or chlordane in carp and channel catfish above the U.S. Food and Drug Administration (FDA) guidelines at certain locations. Flathead catfish, tested for the first time this year, showed levels above the FDA guidelines at two locations. Contaminant levels in sauger and white crappie, however, were well below the guidelines. Levels of mercury, DDT and other pesticides were also below regulatory guidelines in all samples tested. FDA guidelines were established to regulate the level of contamination in fish and shellfish in interstate commerce.

PCBs or chlordane were detected in 58 of the 67 fish tissue samples analyzed. Fifteen samples equaled or exceeded the FDA Action Level for PCBs (2.0 parts per million) and 13 samples exceeded the FDA Tolerance Level for chlordane (0.3 parts per million). Twelve samples had exceedances for both contaminants. The exceedances were detected in fish collected from Allegheny River Lock # 3, Monongahela River Lock # 2 and the following Ohio River locations: Montgomery, New Cumberland, Hannibal, Willow Island, Belleville, Racine, Gallipolis, McAlpine and Newburgh Locks & Dams. Fish were also sampled at Maxwell Lock (Monongahela River), Pike Island, Meldahl, Cannelton and Smithland Locks & Dams in the 1989 studies. The fish collected at these locations did not exceed the FDA guidelines for the contaminants tested. For comparison, TABLE 1 presents a summary of river locations where samples exceeded FDA guidelines for contamination in fish during 1987, 1988, and 1989.

At the present time, the States of Pennsylvania, Ohio, West Virginia and Kentucky have fish consumption advisories in effect for certain areas of the Ohio River. These advisories were issued in early summer 1989 after the state agencies reviewed ORSANCO's fish analysis data of 1987 and 1988.

The 1989 fish sampling effort was coordinated by ORSANCO and conducted in cooperation with Illinois, Indiana, Kentucky, Ohio, West Virginia, and Pennsylvania along with the U.S. EPA, U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers.

ORSANCO is an interstate compact water pollution control commission formed in 1948 by the states of Illinois, Indiana, Kentucky, Ohio, New York, Pennsylvania, Virginia and West Virginia. The federal government is also represented.

For further information contact ORSANCO headquarters in Cincinnati, Ohio (513) 421-1151.

February 6, 1990

*EDITOR'S NOTE: Also attached to this press release are fish advisories issued by the Commonwealth of Kentucky and the State of West Virginia for 1990.*

TABLE 1. (Cont.)

<u>LOCATION</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>
Racine Lock (Ohio R. 237.5)	Exceed	*	Exceed
Gallipolis Lock (Ohio R. 279.2)	Exceed	Not Exceed	Exceed
Greenup Lock (Ohio R. 341)	Not Exceed	*	*
Meldahl Lock (Ohio R. 436.2)	Not Exceed	Not Exceed	Not Exceed
Licking River Covington, KY (RM 5.0)	Not Exceed	*	*
Mill Creek Cincinnati, OH (OHIO R. 472.8)	Exceed	Exceed	*
Markland Lock (OHIO R. 531.5)	Not Exceed	*	*
McAlpine Lock (OHIO R. 606.8)	Not Exceed	Exceed	Exceed
West Point, KY (OHIO R. 625.9)	Exceed	Exceed	*
Cannelton Lock (OHIO R. 720.7)	Not Exceed	*	Not Exceed
Newburgh Lock (OHIO R. 776.1)	Not Exceed	*	Exceed
Green River, KY (SEBREE, RM 41.3)	Not Exceed	*	*
Uniontown Lock (OHIO R. 846)	Not Exceed	*	*
Smithland Lock (OHIO R. 918.5)	Exceed	*	Not Exceed

Exceed = PCB concentration greater or equal to 2.0 ppm  
and/or Chlordane concentration greater or equal to  
0.3 ppm in one or more species tested.

\*Location Not Sampled

# NEWS RELEASE



Natural Resources and Environmental Protection Cabinet  
5th Floor Capital Plaza Tower  
Frankfort, Kentucky 40601

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(502) 564-3596

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Division of Water  
(502) 564-3410

## FOR IMMEDIATE RELEASE

FRANKFORT, KY. (Feb. 6, 1990)--Certain fish species caught in the Ohio River should not be eaten because of the potential health risk from polychlorinated biphenyls (PCBs) and/or chlordane, the state departments for Health Services, Environmental Protection and Fish and Wildlife Resources advised today.

The Fish Consumption advisory, issued jointly by the three state agencies, cautions against eating channel catfish, carp and white bass from the Ohio River bordering Kentucky.

The advisory was issued after the agencies reviewed information from the Ohio River Valley Water Sanitation Commission (ORSANCO) and the U.S. Environmental Protection Agency's National Bioaccumulation Study. Data collected over the last three years (1987-1989) show that these species, taken from various locations in the Ohio River, are contaminated with levels of PCBs and chlordane that approach or exceed the limits set by the U.S. Food and Drug Administration. Those limits are 2.0 parts per million PCBs and 0.3 parts per million chlordane.

The data indicate that sauger and white crappie have levels of PCBs and chlordane well below the U.S. FDA limits. However, frequent consumption of even low levels of PCB or chlordane contaminated fish may increase the risk of long-term adverse health effects.

Immediate human health effects from eating PCB or chlordane contaminated fish have not been documented. PCBs and chlordane accumulate more in high-fat species such as carp and catfish. These compounds are also known to accumulate in the eggs of various fish.

Should persons decide to eat these fish, the agencies suggest these precautions be taken to reduce the risk of potential harmful effects of eating fish from the Ohio River:

- Women of childbearing age and pre-school age children should not eat the listed fish species.
- Others who intend to eat fish can minimize the intake of PCBs and chlordane by properly cleaning, skinning, trimming, and cooking the fish.

(more)

- Only skinless and boneless fillets with as much fat removed as possible should be eaten. The skin should be particularly avoided. Eggs should be discarded.
- Roasting or baking have been found to reduce levels of PCBs and chlordane more than other cooking methods such as frying or microwaving. Cooking does not destroy PCBs or chlordane or lower their toxicity. The heat from cooking simply melts some of the fat in the fish, removing pollutants at the same time.
- None of the juices or fats that cook out of the fish should be eaten or reused for cooking other foods.

The agencies are aware of the lack of data from certain portions of the river. Future activities of state and interstate agencies will focus on collecting more data from the Ohio River. However, enough evidence exists to warrant advising the public of the potential for adverse health effects.

This action is not a ban on fish consumption but allows the public to minimize or avoid the potential health risk. The Cabinet for Human Resources will continue to monitor tissue residue levels in fish from the Ohio River that are caught for commercial use.

This advisory will remain in effect until further notice.

(end)

NOTE: The following chart can be used with this release

TABLE 1. COMPARISON OF OHIO RIVER FISH CONTAMINATION DATA  
(1987 - 1989) APPROACHING OR EXCEEDING FDA ACTION LEVELS

LOCATION	SPECIES	TOTAL PCBs MG/KG (WET WT.)			CHLORDANE MG/KG (WET WT.)		
		1987	1988	1989	1987	1988	1989
Mill Creek RM 472.8	Channel Catfish	2.76	2.54	NS	0.30	0.28	NS
	White Bass	3.24	0.77	NS	0.16	0.05	NS
McAlpine RM 606.8	Channel Catfish	<0.10	4.60	2.63	<0.01	0.60	0.43
West Point RM 625.9	Carp	0.27 (1.36*)	2.35	NS	0.76 (0.4*)	0.35	NS
	White Bass	2.20	NS	NS	0.12	NS	NS
	Channel Catfish	4.94	0.64	NS	0.88	0.10	NS
Cannelton RM 720.7	Channel Catfish	0.92	NS	1.65	0.18	NS	0.21
Newburgh RM 776.1	Channel Catfish	0.27	NS	1.66	0.07	NS	0.32
Smithland RM 916.5	Channel Catfish	2.48	NS	0.43	0.21	NS	<0.10
	Carp	0.45	NS	1.66	0.07	NS	<0.10

NS = Not Sampled

FDA Action Level for PCBs = 2.00 mg/kg

FDA Action Level for Chlordane = 0.30 mg/kg

\*EPA National Bioaccumulation Study







# MISSISSIPPI



Here in Mississippi its been a long winter. No doubt you've heard about or at least seen pictures of our many rain-swollen rivers. At one point last month we were placed on alert to possibly go and rescue people from their rooftops. Hopefully, though, the water levels will drop, and recolonization of the macroinvertebrates can begin, preparing themselves for the onslaught of water pollution biologists that will steal their leaf packs, pick apart their logs, scrape their rocks, sweep their macrophytes and grab their bottoms. We can hardly wait!

## THE GREAT POO-POO-CHOO-CHOO CAPER

Many who were unable to remember this news item at the SWPBA meeting (due to the previous nights partying) will appreciate this refresher. This story was breaking while you were in Biloxi.

From The Clarion-Ledger 9 Nov., 1989.

A South Carolina company may have to go to court to get permission to return to Baltimore 12,000 tons of sewage sludge sidetracked in Moss Point (MS), a company official said Wednesday.

"We've about exhausted all the alternatives we had available to us," GSX Vice-President Roger Davis said. "It looks like the only recourse is to try and send it back to Baltimore," Davis said. GSX Chemical contracted with Baltimore to dispose of the sludge. Initially GSX sent the waste to a treatment facility in White Castle, LA; the 63 car train was moved to Moss Point on Friday after Louisiana officials protested the so called "POO-POO-CHOO-CHOO" coming to their state.

The gondola cars have holes for drainage and during heavy rains water could be seen coming from the bottom of the

cars. Dick Paul, Mississippi Export General Manager said the water was entering around the sealed contents of the cars, and draining out, not coming through the sludge.

Gov. Ray Mabus on Tuesday said the state Department of Environmental Quality would levy fines of about \$2 million per day for unauthorized dumping and air and water pollution violations. A hearing to allow the company to challenge the fines is scheduled for Nov. 21.

NOTE: This whole matter was resolved several weeks after the article appeared, when the train left to return to Baltimore. One observer was heard to say that he wasn't surprised the train had come south because, "The Yankees are still trying to shit on us"

#### ANOTHER PAPER MILL

## Construction On Schedule For Columbus Mill

COLUMBUS, Miss. (AP) — Construction is on schedule to meet the May opening date for Weyerhaeuser's \$500 million bleached kraft pulp mill southeast of Columbus, officials say.

The new plant is 60 percent complete, company vice president Scott Jenkins told a group of community leaders who toured the complex this week.

"Approximately \$320 million has been spent on this project to date and we have already committed \$426 mil-

lion" he said. "Six months from now we'll push the button on a half-billion dollars. When we're complete, we'll employ 700 employees in the two plants."

The company opened a thermo-mechanical pulp and lightweight coated paper mill adjacent to the new plant in August 1982.

Weyerhaeuser broke ground on the second Columbus facility in June 1988. The new state-of-the-art mill will produce bleached kraft pulp for use in manufacturing paper, paper

board, and other industrial and consumer products.

When operational in mid-1990, the new pulp mill will create 262 full-time jobs, as well as indirect employment for 400 people engaged in contract timber harvesting, and loading and hauling of logs, wood chips and wood residue, officials said.

#### A MAJOR UNDERTAKING

Laboratory biologists were recently charged with preparing a study plan to adequately assess the human health hazards along the Leaf River basin in the southeastern part of Mississippi. The Leaf River has been placed under a fish consumption advisory over a 10 mile reach from New Augusta to Beaumont. This is the fourth waterway in Mississippi to be so designated. Dioxin was detected in catfish below the effluent of Leaf River Forest Products Co. near New Augusta. Commercial fishing in this reach of the river has been banned altogether. The last issue of the Newsletter contained several newspaper articles about this problem. A complete list of fish consumption advisories issued thus far in Mississippi appears on the following page:

1. LITTLE CONEHOMA CREEK AND YOCKANOOKANY RIVER. In Clarke Co, near Kosciusko, MS. 15 stream miles affected, all species consumption advisory, and commercial fishing ban. Site is downstream of a Texas Eastern Natural Gas Pipeline Compressor Station. Agent: PCB's.
2. OLD LITTLE TALLAHATCHIE RIVER. In Pinola Co, west of Batesville. Currently a consumption advisory exists as does a commercial fishing ban on a series of oxbow lakes below a Tennessee Gas Pipeline Compressor Station. Agent: PCB's.
3. COUNTY CLUB LAKE. Near Hattiesburg. A privately owned residential lake of approximately 60 acres, downstream from a wood preserver. Consumption advisories for all species. Agent: TCDD.
4. LEAF RIVER. Below New Augusta. Approximately 10 river miles. Site downstream of Leaf River Paper, a bleach kraft pulp mill. Consumption advisory for bottom feeders, and a commercial fishing ban. Agent: TCDD.

### THE CASSIDY BAYOU SAGA CONTINUES

Yet another in a long series of lawsuits looms on the horizon as a result of the Cassidy Bayou fish kill of June 1989. Read On.

## **Fishermen sue over bayou fish kill**

The Associated Press

CLARKSDALE — Three commercial fishermen have filed a more than \$1 million lawsuit against Tallahatchie County planter Frank M. Mitchener Jr. for lost profits and other damage to their businesses after he allegedly caused a major fish kill in Cassidy Bayou last June.

The Coahoma County fishermen, Robert S. Taylor, James L. Bolen and W.D. Bolen Jr., recently filed the lawsuit in Circuit Court seeking \$50,000 in compensatory damages

and \$1 million in punitive damages for the June 3 fish kill.

The lawsuit alleges that Mitchener, also a Sumner alderman, employed Flautt Flying Service to make an aerial application of the banned pesticide Toxaphene on his land by Cassidy Bayou.

The fishermen's lawsuit alleges that in addition to immediately damaging their businesses, the fish kill is of a "continuing nature" and has produced long-term effects on the waterway.

The biology section plans to return to the bayou in June to collect additional fish and sediment samples to monitor what we feel will be long-term effects of the toxaphene on the fishery. This data will be used to determine if and when restocking of the fishery is possible, and might be used to push for a fish consumption ban.

### HELLO AND GOODBYE

HELLO TO DOUG UPTON, new member of the biology section. Doug will be responsible for conduction of all phases of our bioassay program. In the few months he's been with us, he has begun to successfully culture fathead minnows for use in toxicity testing. We hope that the fish will complement our already existing program using Ceriodaphnia dubia. Doug received his B.S. Degree in Aquatic Biology from Mississippi State University in 1981, and is a native of Jackson, MS.

GOODBYE TO MATT KADLEC, who resigned in January as our lab toxicologist to return to graduate school in a Ph. D. program under the direction of Dr. William Benson of the University of Mississippi. Matt's research project is not definite at the present time, but will probably be concerned with sediment toxicity to aquatic organisms. Those of you who attended SWPBA and various EPA Biocriteria Workshops will remember Matt as the tall gut from Mississippi. Some of you at the SWPBA meeting in Biloxi (especially some North Carolina females) will remember him by the acronym "T, D, and H".

Matt was almost solely responsible for getting our Ceriodaphnia cultures up to snuff with respect to number of broods and number of individuals produced. It was only through his hard work, long hours and dedication that this could have been accomplished. He worked tirelessly getting our bioassay lab moved into its new facility, and in taking the mobile toxicology unit over the road to do bioassays on site. As a parting gesture, he unselfishly helped Doug become acquainted with the protocols and in getting him incorporated into our bioassay program.

### AMBIENT BIOLOGICAL MONITORING

Not much to be said here this time around, as we've been busy working up the necessary data for the 305-B, as I'm sure all of the other states have been doing. We of the Biology Section are hoping to publish an Ambient Monitoring Report for 1987-88, and will advise the membership when such becomes a reality.

The 1989 macroinvertebrate data is just beginning to be analyzed, and the search for the elusive reference site is continuing. We've just about resigned ourselves to using some

site in Arkansas as a reference site to our Delta region (much of which is now underwater anyway due to all of the rain over the past few months---looks like another summer of aerial pesticide application and numerous small fish kills).

We hope to meet with the folks from Alabama soon and discuss potential reference sites in ecoregions shared by the two states. Our plans for 1990 will emphasize looking about the northern third of Mississippi, where we have about 40 sites chosen to visit for trend monitoring and as potential reference sites. We also plan to expand upstream/downstream bioassessments to complement bioassays done on NPDES permittees.

In November, Mike Beiser and Doug Upton did a series of bioassessments on Foster Creek in the Homochitto National Forest. A creosote production facility had previously operated on the banks of the stream, and even though defunct for 5-6 years, the impact of the creosote was still evident. Balls of creosote on the stream bottom were obvious at a site adjacent to the old plant, but fortunately did not seem to be in large concentration further downstream. Although no numbers are available at present, creosote was obvious in stream sediment samples taken near the plant. One good thing did seem to come of this however, the upstream site was situated about 2 miles above the old plant, and preliminary field identifications of the fauna, indicate that this might be a good reference site. Hooray!

#### MEETINGS AND WORKSHOPS ATTENDED

Stan Rodgers attended a workshop entitled "(Identifying Toxicity with Biomonitoring and Toxicity Reduction Evaluations" in Berkeley CA Feb 12-16. He also attended a Lotus 123 minicourse to further hone computer skills.

Mike Beiser attended and presented a paper at the Mississippi Academy of Sciences Meeting in Biloxi, Feb. 21-23, and attended the Lotus 123 minicourse.

Billy Justus attended the Pollution Committee meeting of the American Fisheries Society, in Memphis Feb 13-14. Billy is now working with other committee members in providing a cost of living increase to the "Monetary Values of Freshwater Fishes" publication of the AFS. Billy also attended the Mississippi-Arkansas section meeting of the AFS in Greenville, Ms Feb 15-16. In addition he attend a computer minicourse on Fundamentals of Wordperfect.

Doug Upton attended a Bioassay and Toxicity Testing Workshop for Wastewater and Chemical Specific Testing in Milwaukee March 12-13, and a minicourse titled Introduction to microcomputers and MS-DOS.

## JUST THOUGHT I'D THROW THIS IN

The following has nothing to do with Biology Section Activities, but is something Mississippi Environmentalists and all Environmentalists can be proud of:

# Eagles' Return Cause For Celebration

Few sights are grander than that of a bald eagle soaring over the treetops, balancing delicately on invisible currents of wind, wings barely ruffled with the effort of maintaining its altitude.

The bald eagle, an endangered species since 1967, appears to be an environmental success story that should gladden every American heart.

Federal officials have indicated that the bald eagle has bounded back so strongly from danger of extinction that it may soon be removed from the endangered species list and be reclassified as threatened. That would be a considerable victory for environmental advocates and federal policy. A threatened species is still not out of danger, but immediate extinction isn't likely.

The bald eagle, the national symbol of the United States, has been the object of much effort and money since the early 1960s, all aimed at its preservation. Experts suggest that its survival has hinged mainly on one federal policy: a ban on the pesticide DDT, which had caused bald eagles to lay eggs with thin,

vulnerable shells.

The bald eagle is far from out of danger. Only 2,588 breeding pairs roam the contiguous United States, barely five percent of the estimated number of eagles in this country when the Europeans first settled here. But the outlook is good. Few species have recovered after being declared endangered, although environmentalists and federal wildlife experts are still fighting for hundreds of types of birds, other wildlife and plants.

The bald eagle is coming back from the brink. Future generations of Americans seem likely to have a chance to see its magnificent wings cutting the air, the wild its kingdom and the clouds its throne. If Americans try, they can do something about environmental problems. The eagles are living proof.

We are fortunate in this area of the nation to have a few roosts.

Maybe in the coming decade, all in this area will have the chance to see the national bird soaring "live and in person," rather than just in a television commercial or nature film.

## NORTH CAROLINA

### BENTHOS GROUP

#### Recent Surveys

#### ORW

Black/South Rivers. The Black and South River catchments were sampled (12 locations) during October and December 1989 to determine the appropriate boundaries for Outstanding Resource Water classification. This information will be combined with fish collections by the Intensive Survey Group. This is the largest area ever considered for ORW designation; management decisions by the Environmental Management Commission will set important precedents.

Roaring River headwaters. Eleven sites were sampled (October 89) to determine suitability for ORW designations. Many of these sites were very small streams, leading to a need for special small stream criteria. Fish sampling in these streams will occur during Spring 1990.

Linville River. The headwater area of the Linville River was nominated as ORW by a citizen group. A November 1989 survey (6 sites) indicated that this area did not qualify. Large number of golf courses (and related developments) were found to cause water quality problems.

Middle Fork South Fork New River. This area also was nominated by a citizen group. Extensive development in this catchment (3 sites) was not found to be compatible with an ORW designation.

Bearwallow Creek. A single site was sampled in September 1989. Report still in review process.

Panthertown Creek. Five sites were sampled in September 1989. Report sent for review.

South Fork New River/North Fork New River/Watauga River. A massive sampling program was recently conducted in these watersheds, including river sites (Standard samples) and most major tributaries (Abbreviated EPT samples). A four person collection team collected samples from over 30 sites in 4 days. The group split into 2 teams for Abbreviated EPT samples and converged for Standard samples. All samples have been identified and there is a report in preparation by DP.

#### High Quality Waters

This water quality classification is facing stiff opposition, especially from mountain counties. Only one HQW survey was conducted during the last two quarters:

Little River (Montgomery County). Eight sites (October 89) were surveyed, resulting in HQW recommendation for two tributaries, and one stretch of the Little River. The headwater area was affected by nonpoint source runoff, while the most downstream segment was impacted by point-source dischargers. This left one small (and wonderful) segment right in the middle.

#### Dischargers

CR Brown Trout Farm. Four sites were sampled in January 1990 to demonstrate improvements associated with an upgrade of this discharger. We found that water quality improved substantially below the raceways. We expect to be conducting similar before-and-after surveys during 1990 on several other trout farms. A permit to expand this facility was granted, based on the biological results.

House of Raeford. Samples were collected above and below an unpermitted discharge from the House of Raeford; a chicken-processing plant. This survey demonstrated the impact of the unpermitted discharge, as well as turning up a broken sewer line in the upstream segment.



Fieldcrest Mills. Sites above and below this discharger did not record a large impact. The study was complicated by the location of a small impoundment directly above the "control" site. It was felt that this impoundment affected stream temperatures, leading to reduction in the diversity of Plecoptera.

Asheboro WWTP. Hasketts Creek was sampled above and below the Asheboro discharge to verify prior results. As expected, the upstream site was impacted by urban runoff, while the downstream site was severely impacted by the discharge. We also assisted (Ferne Winborne) with in-situ invertebrate bioassays. An organism was selected that was abundant at the upstream site (*Stenonema femoratum*), but absent at the downstream site. These organisms were put into cages at both locations, and monitored for 5 days. There was no significant mortality observed which could be attributed to the discharge.

Crowders Creek. This catchment was surveyed in September 1989 (13 sites) to determine the effects of multiple dischargers. A Fair bioclasification was assigned to most sites, although Poor conditions were noted at five locations (usually below a large discharger). Some improvement was noted since August 1988 at a site below a chicken processing plant.

Quarry studies. The Bioassessment group was asked to conduct an investigation into the potential impact of quarry dischargers, primarily resulting from the discharge of seepage water into very small streams. Studies have been completed at 4 facilities, with 3 more studies to be initiated in the next several months. Initial results indicate that land use and/or erosion from the surrounding area often has a greater impact than the actual discharge.

## Seasonality

Larry continues to collect samples 4 times a year at regional reference sites. There are about 9 sites in the current study design, with an emphasis on high quality areas. Incorporated into some of these studies will be an evaluate of the effects of stream size. One such study has already been conducted at 4 sites in the Cataloochee Creek catchment.

## Computer Data Base

We have been collecting information in a consistent manner since 1983, and all data has been coded and dumped into the computer. However, the information has been stored as many little pieces of data, with a wide variety of formats. We have made a Herculean effort (led by Ferne Winborne) to make this data set more usable. It has been put into a uniform format, all missing information has been located, and large (yearly) data sets have been formed. Approximately 1400 samples are within these data sets, encompassing a wide variety of water quality ratings, ecoregions, stream sizes and seasons of the year.

It is our intent to work with this information and develop for each taxon:

1. Regional preferences. To accomplish this, we have to more precisely define our ecoregion boundaries, a project being worked on by Larry Eaton.
2. Seasonal distribution. We have preliminary printouts, showing the "normal" seasonal pattern (by month) for all taxa.
3. Pollution tolerance. We are using this information to derive tolerance values for a revised biotic index.
4. Stream size preference. This information will be useful in developing our small stream criteria.

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"Some days are born ugly. From the very first light they are no dam good whatever the weather, and everybody knows it. No one knows the cause of this, but on such a day people resist getting out of bed and set their heels against the day. When they are finally forced out by hunger or job they find that the day is just as lousy as they knew it would be."

John Steinbeck, Sweet Thursday, 1954

## Taxonomy

"One approach [to biomonitoring]...which purports to take advantage of the fact that organisms differ in their physiological capabilities and environmental tolerances is not included [here], because I could not figure out what to call it, nor on whom to blame it. I refer to the many reports in which the benthic data are simply presented as lists of numbers of tolerant, facultative, and intolerant organisms, with no indication that the organisms were actually identified to any taxonomic level. In these cases I always have the strong suspicion that they were not, and I wonder how the authors were able to partition all their unidentified organisms into these three categories. Presumably the big red ones are put in the tolerant category, the medium-sized tan ones in the facultative group, and the little grey or green ones are considered intolerant. One of the truly wonderful things about benthic invertebrates, and the most probable reason why anyone has ever allowed this sort of report to be printed, is that even with an approach like this it is sometimes possible to come up with sensible conclusions if the samples were taken along a sufficiently steep environmental gradient or if the impact being investigated was truly catastrophic."

Richard Howmiller, 1975

### New or unusual NC records:

#### TRICHOPTERA

1. Triaenodes sp. b/marginalis Ross. Stewarts Creek, Mecklenburg Co., 2/90
2. Ceraclea n. sp. Little River near Star, Montgomery Co., 10/89. This rare species appears to be confined to about 5 miles of the river. We are trying to initiate a "status" survey (through John Morse) to see if it should be classified as an endangered species.

#### PLECOPTERA

1. Soyedina carolinensis, Valley Creek, Watauga Co., 3/90. A little different than the description of this species (supposed to be monospecific in NC?SC), maybe S. vallicularia?
2. Agnetina capitata. Bullhead Creek, Wilkes Co., 10/90. First NC record
3. Isoperla lata. Cataloochee Creek, Haywood Co, 1/90 (Our second NC record)
4. Attaneuria ruralis (?), Cataloochee Creek, Haywood Co., 1/90

#### CHIRONOMIDAE

1. A larvae sent to Broughton Caldwell elicited the following response:  
"Doesn't easily fit into any diagnoses or species descriptions. It is probably closer to Zalutschia than anything else. The relatively plumose S1 would place it in the Zalutschia-Hydrobaenus-Oliveridia-Trissocladius group of genera.... There appears to be two cardinal beard setae on the right side and possibly two sockets on the left. This is certainly not typical of Zalutschia, however. I can't discern a broadened, pointed anterior lacinal chaeta either....."

Broughton continued on in this vein for several pages. Isn't midge taxonomy fun?

"Kinsey pursued his sex research by following a particular 'taxonomic way of thought', a valid style of science that does not match most stereotypes of the enterprise. The special characters of Kinsey's work - the aspects that brought him such fame and trouble - flowed directly from the taxonomic approach he had learned and perfected as an entomologist."

Steven Jay Gould, *Of Wasps and WASPS*, 1985

"I like the country very much.  
Its good to hear and smell and touch.  
It makes you feel akin to nature,  
Though wobbly on her nomenclature."  
Ogden Nash, c. 1935

## MACROPHYTE STUDIES (From Steve Mitchell)

Those of you that read these attempts at words-of-wit know that North Carolina is one of the states privileged to have water bodies infested with the dreaded HYDRILLA. In a cooperative effort between Environmental Management, Water Resources, North Carolina State University's Crop Science, the Army Corps of Engineers, North Carolina Department of Agriculture, Carolina Power and Light, and North Carolina VEPCO, a survey was conducted centering on the "known" areas of hydrilla infestations.

This survey was similar to the original one conducted by the North Carolina Department of Agriculture in 1981 after the discovery of hydrilla in Umstead State Park, north of Raleigh. The central focus of the study was to determine the current locations of the infestations, establish how much of the macrophyte is present, determine if any of the adjacent water bodies are infested, and assess the presence or absence of flowering male plants.

To this extent, 114 sites were included in the survey. In 1984, 11 water bodies were infested. In the 1989 survey, 47 water bodies were found to be infested with hydrilla and five lakes originally thought to have the weed were removed from the list. Eighty percent of these water bodies are in the Neuse River Drainage Basin. A complete report will be available in the near future from the Division of Water Resources.

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"If you do not know where to place your facts they are not good for much. A fact is relative, and if it is placed out of its relative position it apparently is often not a fact."

Luther Burbank and W. Hall, *Harvest of the Years*, 1927

"We cannot live without the earth or apart from it, and something is shriveled in a man's heart when he turns away from it and concerns himself only with the affairs of men."

Marjorie Rawlings, *Cross Creek*, 1942

"The secret is never to lose the power of wonder at the mystery of the universe. If you keep that, you stay young forever. If you lose it, you die. ....While man might unravel the puzzled skein of life and solve the riddle of the universe, what really matters is the wonder that makes it all possible."

Sigurd Olson, *Runes of the North*, 1964

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## INTENSIVE SURVEY GROUP

**Fish Community Structure:** As part of our modifications of the index of biotic integrity for North Carolina, we are setting up a network of ten reference stations. These stations are in different ecoregions and of varying stream size. These stations will be sampled for fish community between spring and fall. Macroinvertebrate, water quality, and fish tissue sampling also will occur at these stations.

A fish community structure sampling protocol for wadable streams has been established and is in the process of being incorporated into our SOP manual.

**Fish Tissue Program:** The accomplishment of this years fish tissue program will require a herculean effort. NC DEM has received funding for laboratory support to look at non-point source contamination of fish tissue. The sampling strategy will be directed towards a river basin focus.

**Sediment Oxygen Demand:** The SOD group continues to forge ahead breaking new ground. This spring the group has been busy running duplicate SOD's at a control site. Also, tests will be run at various times during the year to provide SOD data at a single site over a wide range of ambient temperatures. This data will give us an insight as to the reliability of correcting SOD rates to sub-basin design temperatures based on hydro environmental areas and effluent modeling for winter/summer design criteria.

**Lakes:** Looks like North Carolina will receive two "phase 2" grants from EPA. These will be for Albemarle City Lake and the Abbotts Creek Arm of High Rock Lake.

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"Everything in the world, every baby, city, tenanus shot, tennnis ball, and pebble, was an outcrop of some vast and hitherto concealed vein of knowledge, apparently, that had compelled people's emotions and engaged their minds in the minutest detail without anyone's having done with it. There must be a band of enthusiasts for everything on earth - fanatics who shared a vocabulary, a batch of technical skills and equipment, and, perhaps, a vision of some single slice of the the beauty and mystery of things, of their complexity, fascination, and unexpectedness. There was no one here but us fanatics: bird-watchers, infielders, detectives, poets, rock collectors, and, I inferred, specialists in things I had not looked into - violin makers, fishermen, Islamic scholars, opera composers, people who studied Bali, vials of air, bats. It seemed to take all these people working full time to extract the interest from everything and articulate it for the rest of us.

Every least thing I picled up was proving to be the hanging end of a very long rope."

Annie Dillard, *An American Childhood*, 1987

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### Data Assessment and Certification Group :

In March, the Unit acted as a "middleman" in the EPA's pilot study for incorporating toxicity data into the Discharge Monitoring Report-Quality Assurance (DMR-QA) program. The ultimate goal of such a program would be to assess precision, accuracy, and data analysis abilities of toxicity test data by contract laboratories. For the pilot study 11 laboratories certified for toxicity testing in North Carolina volunteered to perform one or all of the following four reference toxicant tests:

- |  |   |
|--|---|
| 1. Fathead minnow ( <i>Pimephales promelas</i> ) | 24 h Acute (LC <sub>50</sub> ), non-renewal |
| 2. <i>Ceriodaphnia dubia</i>                     | 48 h Acute (LC <sub>50</sub> ), non-renewal |
| 3. Mysid ( <i>Mysidopsis bahia</i> )             | 48 h Acute (LC <sub>50</sub> ), non-renewal |
| 4. <i>Ceriodaphnia dubia</i>                     | 7-day Chronic (NOEC), daily renewal         |

The Aquatic Toxicology Unit contacted the interested labs and distributed test materials. Test results were to be returned directly to the EPA's Environmental Monitoring Systems Laboratory.

In the data assessment area, the number of dischargers required to perform self-monitoring toxicity tests grows steadily. Statewide, 309 NPDES permits now have toxicity testing self-monitoring requirements. Additionally, 73 self-monitoring requirements have been required by administrative letter. Since January 1, DAC Group personnel have also processed 15 applications for the use of biocidal compounds in cooling tower systems which have discharges to surface waters.

The Data Assessment and Certification Group bids a fond farewell to Lee Gabele and Susan Wilson. Lee has moved on to the Radian Corporation, a consulting firm located in the Research Triangle Park. Susan now works with the Division's Instream Assessment Unit of the Technical Support Branch performing wasteload allocations. The Group welcomes Dianne Williams Wilburn to its staff. Dianne comes to us from the Division of Environmental Management's Laboratory Section, where she performed wet chemistry analyses. Dianne's chemistry expertise has already proven useful in the evaluation of biocidal compounds for cooling tower application. This expertise will be utilized further in the assessment of Toxicity Reduction Evaluation plans submitted by facilities with toxicity problems. Dianne will also take a major role in the execution of the Water Quality Section's compliance enforcement strategy for whole effluent toxicity and will assume much of the administrative role in the biological laboratory certification program.

### Toxicity Evaluation Group:

The Toxicity Evaluation Group has performed a myriad of toxicity tests this fiscal year, including 44 acute screening, 24 chronic (effluent), 11 ambient, 31 contract lab-related, 5 special studies, and 54 quality assurance-related tests. *Ceriodaphnia dubia* and fathead minnow cultures are being geared up for intensive toxicity testing this spring/summer, as we anticipate a brief "down time" in the fall associated with the move into our new (i.e. permanent) lab building in Raleigh. In addition, work has begun on establishing resident cultures of mysids for use in future tox testing.

## OUTLAND



"Believe me, my young friend, there is *nothing* - absolutely nothing - half so much worth doing, as simply messing about in boats. Simply messing...."  
 Water Rat to Mole, *The Wind in the Willows*

## THE PURIST

I give you now Professor Twist,  
 A conscientious scientist.  
 Trustees exclaimed, "He never bungles!"  
 And sent him off to distant jungles.  
 Camped on a tropic riverside,  
 One day he missed his loving bride.  
 She had, the guide informed him later,  
 Been eaten by an alligator.  
 Professor Twist could not but smile.  
 "You mean," he said, "a crocodile."  
 Ogden Nash, c. 1940

## SOUTH CAROLINA

Acute and chronic pass/fail toxicity tests with Ceriodaphnia are now being required by NPDES permits on a routine basis. As a result, the number of laboratories applying for certification to perform these tests has increased dramatically. SCDHEC has conducted two "Effluent Toxicity Testing Workshops" in an effort to familiarize consultants with EPA test methods and SCDHEC modifications through classroom lecture and laboratory exercises. Test methods and statistical analyses for both Ceriodaphnia and fathead minnows were covered. These workshops have been jointly sponsored by SCDHEC, the Water Pollution Control Association of South Carolina, and the South Carolina Water Quality Institute.

The first workshop was held May 9-11, 1989, at Sumter Area Technical College. The instructors were Bill Peltier, USEPA; Florence Kessler, Computer Sciences Corporation; and David Graves, SCDHEC. Video cassette recordings of the classroom instruction are available in 60 minute segments. The most recent workshop, held January 16-18, 1990, included sessions on laboratory certification requirements instructed by Debra Sauer, SCDHEC and Matt Mathews, NCDNR.

For information regarding future workshops or VCR tapes, contact:

David Graves  
Water Quality Assessment and Enforcement Division  
SCDHEC  
2600 Bull Street  
Columbia, SC 29201-1797

(803) 734-5396





FOR SWPBA NEWSLETTER

For over 14 years now the South Carolina Department of Health and Environmental Control (SCDHEC) has been concerned with whether or not PCBs are affecting the health of the fisheries in Lake Hartwell. It appears that by the end of 1990, SCDHEC will finally have the data to address this concern.

Since 1976, SCDHEC has known that the sediment and fish in some areas of Lake Hartwell are highly contaminated with PCBs and that the contamination of fish tissue far exceeds the U.S. Food and Drug Administration's recommended safe tolerance level of 2.00 ppm. During 1989, in the most highly contaminated area of the lake, largemouth bass in the 1.5 to 3 pound range had mean PCB tissue levels of 23.01 ppm. Because of these high PCB levels in the fish, the focus of SCDHEC studies in the lake in the past have been to address the public health issue. Needless to say, funds were never available to research the effects of PCBs on the fisheries itself. However, that all changed this year when studies were conducted in Lake Hartwell to address the effects of PCBs on fisheries.

It all began with Mike Alexander, Fisheries Biologist, Corps of Engineers - Savannah District, who wanted to bring in Al Brown, Fisheries Biologist - Tennessee Valley Authority, to demonstrate a new technique developed by Ronald W. Goede, Logan, Utah, to assess general health and condition of a fish population. Mike wanted to evaluate this new technique and its feasibility toward implementation as a trend monitoring program for the Corps' reservoirs and lakes. As Mike began to talk with SCDHEC and other agencies concerning his project, the scope of work began to grow to the extent that the project became a major multi-agency undertaking which

involved several more assessment parameters. The different agencies involved thus far in the study have been the following:

- o South Carolina Department of Health and Environmental Control
- o South Carolina Wildlife and Marine Resources Division
- o Georgia Department of Natural Resources including the Game and Fish Division and the Environmental Protection Division
- o Tennessee Valley Authority
- o Oak Ridge National Laboratory
- o U.S. Army Corps of Engineers, Savannah District (Corps)
- o U.S. Environmental Protection Agency (Region IV)
- o Jim Karr and Associates (Virginia Polytechnic Institute)

The first phase of the study was completed during March 26-29, 1990, and preliminary results are expected in August 1990. It is anticipated that the results of this study will be available for presentation at the SWPBA meeting this year at Jekyll Island. For a more detailed review of the scope of study, refer to the following copy of the study plan.



TO: Hartwell Study Team  
FROM: Marshall Adams  
SUBJECT: Work Plan and Summary of 3/05/90 Hartwell Meeting

## I. Objectives of Study

The primary emphasis of the Hartwell Reservoir study is on environmental or ecological concerns with little or no emphasis on human health issues. Our three primary objectives in this study are:

- (1) to apply and demonstrate various biomonitoring techniques in the assessment of fish health,
- (2) to determine if there are biological cause and effect relationships between body burdens of contaminants (PCBs) and effects on a target fish population,
- (3) to provide preliminary information to Jerry Stober for developing a more comprehensive and long-term study on Hartwell which would be funded by EPA.

## II. Collection Strategy

### A. Sites

- worst case = SV 107
- intermediate case = SV 532
- best case = SV 641

At each site, largemouth bass (LMB) should not be collected at one specific location, but over a wider area representative of that particular site. We will sample SV-107 on 3/27, SV-532 on 3/28, and SV-641 on 3/29.

### B. Size and Number of Fish

- 1) 30 LMB between 1.5 and 3.0 lbs will be collected at each site for the tissue analysis, fish health assessment, and bioindicator study. A four digit ID tag will be affixed to each of these 30 fish by the shore crew
- 2) approximately 100 LMB will be collected at each site (returning at a later date if necessary to collect all 100) for age and growth analysis. 30 of these 100 fish will be those collected in 1) above. The 100 fish should be distributed as close as possible over age groups with the primary age groups probably being those from 1+ - 3+.

### C. Minimization of stress to captured fish

It is absolutely essential that the 30 fish captured for the health assessment and bioindicators study be treated in a manner which minimizes stress. The best strategy would be for 2 runner boats to

each take turns transporting 3-5 (maximum = 5) bass at a time to the shore crew. Upon capture fish should be placed immediately in large containers of water in the boats and 3-5 bass transported by runner boat to the shore crew.

#### D. Equipment needs and responsibilities

##### (1) Boats

- Gaymon = 2 shockers
- Self = 1 runner
- Rabern = 1 shocker
- Gaddis = 1 runner
- Alexander = 1 runner

##### (2) Other equipment

- Rabern = 1 large fish holding tank in back of truck, large tarp with poles and stakes, 1 of 2 other large containers (i.e., plastic garbage cans) to hold fish alive in boats
- Gaddis = 50 lbs dry ice and fold up table (add portable field chairs if available)
- Self and Gaymon = 1 or 2 large plastic garbage cans or tanks to hold fish alive in boats, etc.

Each agency or individual is responsible for personal equipment such as PFDs, raingear, etc.

##### (3) Other personnel

Georgia and South Carolina will supply a total of about 4 people (biologists) between them to assist in the bioindicators study

### III. Fish Processing and Analysis Strategy

#### A. PCB body burden analysis

The 30 fish collected for the health assessment and bioindicators will be processed in the following manner:

- (1) TVA (Dycus) will take fillets of 15 of these 30 fish for PCBs only,
- (2) SCDHEC will take 4 of the fish from (1) above for PCB and priority pollutant analysis. For these 4 fish, TVA will use a fillet from one side of the fish and SCDHEC will take fillet from the other side
- (3) SCDHEC will also take 6 of the 30 fish in (1) for PCB only analysis
- (4) TVA and ORNL will take the ovaries of approximately 8 female LMB per site for PCB analysis

#### B. Fish Health Assessment- TVA (Brown) will perform this assessment on all 30 LMB at each site. TVA will also pull scales and otoliths for GA and SC age and growth analysis

#### C. Bioindicators- ORNL (Adams) will perform bioindicator analysis on approximately 15 LMB at each site while trying to get equal numbers of

males and females

- D. Age and Growth Analysis- Performed by SC Wildlife (Self) and GA. DNR (Rabern). Scale and otolith measurements on 100 LMB at each site distributed over several age classes. 30 of these fish will be those processed for the health assessment and bioindicators study. Approximately 20-25% of the scales and otolith should be verified by a 2nd agency. ORNL (Adams) can perform the verification on the otoliths if needed.
- E. IBI study- This study is the responsibility of Jim Karr and associates who will be in one of the shocking boats. Various standardized procedures will be employed at each site to obtain information for the IBI. One or 2 timed twenty min. runs will be conducted at each site with all species larger than 25mm recorded including lengths and weights.

#### IV. Data Analysis and Reporting

- (1) Data analysis- each investigator will analyze and interpret their own data and provide a write-up and evaluation of the data. This information should then be sent to ORNL (Adams) for integration with information from all agencies. Of course, each agency can use their data as they see fit for other reports, etc.
- (2) Data should be sent to ORNL either in the form of a Lotus like spreadsheet or on a SAS data format
- (3) Following an evaluation of all the data, we will determine collectively whether this years efforts should be published as one integrated study in the open literature. It may be that we would want to let this years study serve as a preliminary investigation, providing the groundwork for a more comprehensive study next year. If however, we find good correlations between body burdens and biological effects, then we should seriously consider a publication on this years study.
- (4) Schedule- We should try and have all data analyzed by July 1st and our preliminary integrated analysis on each component of this project to Stover by August 1st.

#### V. Expectations and Future Initiatives

##### A. Goals

Our three major goals in this study are to:

- (1) evaluate the practical use and application of various biomonitoring techniques in assessing fish health,
- (2) determine the relationship between body burdens of a contaminant (PCB) and fish response at various levels of biological organization,
- (3) provide information to EPA-region IV for developing a long-term funding base for our Hartwell studies.

#### B. Future Initiatives

Depending on the results of this years study some possible areas of future investigations could be:

- (1) a gradient study on body burdens, health assessment, and bioindicators from the Seneca Arm to the Dam
- (2) a more detailed reproductive competence study including fertilization success, hatching success, and larval survival,
- (3) evaluation of the influence of confounding environmental factors such as productivity and food availability on the manifestation of stress responses at the worst and best case sites in Hartwell
- (4) Challenge tests such as the disease challenge tests which are integrative in nature and reflect the cumulative stress effects on organisms

#### VI. Miscellaneous Points

- a PR man from COE should be present at all sample sites to deal with the public
- for those who would like to do some preliminary planning, the tag numbers for LMB from SV 107 will be 2800-2840, site SV 535 will be 2841-2880, and site SV 641 will be 2881-2920. I'm including 10 extra numbers at each site in case we don't get enough females in our original 30 fish and have to collect a few more.
- following the meeting on 3/26, we will check out the boat launching site at SV 107 and possibly Sv 535.
- please contact me if you have any suggestions or modifications to this:  
Marshall Adams  
Environ. Sciences Division  
Oak Ridge Natl. Lab.  
Bld. 1505, P.O. 2008  
Oak Ridge, TN. 37831

(615) 574-7316 or 574-7335

Division of Water Quality  
Assessment and Enforcement  
SCDHEC  
2600 Bull Street  
Columbia, SC 29201-1797

Mr. Giles Miller  
Kentucky Division of Water  
18 Reilly Road  
Frankfort, KY 40601

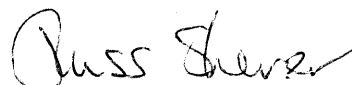
Dear Mr. Newsletter:

I've enclosed a copy of a letter which appeared in the Charlotte Observer. Although it was sent to us in South Carolina anonymously, we've got a good idea who in North Carolina sent it. Typically, we discount most of what we read in the press, particularly in the North Carolina press, but this letter really caught our eye and I wanted to share it with all the SWPBA Newsletter readers.

For those of us who have been around for awhile, we're really not surprised by what the letter contained. Even though we've referred to Steve as Mr. Silk for years and, at various meetings, followed him blindly to watering holes with the promise that 'This is where it all happens,' we've known the truth...! I guess Steve's only mistake was in accepting that last promotion and becoming more visible to the public. It didn't take them long to figure it out; did it Steve?!

Don't worry Steve, your friends are all still there and you'll always be SILK to us. None of us would ever think of calling you Captain Cesspool or probably ever mention that nickname again. You can depend on us, Captain.

I hope that all SWPBA members who read this will realize that Steve will probably be pretty sensitive about being called Captain Cesspool and respond by not calling him Captain Cesspool. Most of us have been there before and this type of thing can really get to you - right Captain Cess... - I mean SILK - or uh Steve. Let's just try to forget all about it. Sure we will..... Should you print this Giles....? Sure you should...



Russ Sherer



SEP 06 '89 14:57 TO 704 663 6040

FROM CHARLOTTE OBSERVER

T-211 P.02

JOHN BARNETT  
Charlotte

8/13/89

# Time To Stop Pollution Of Lake Wylie

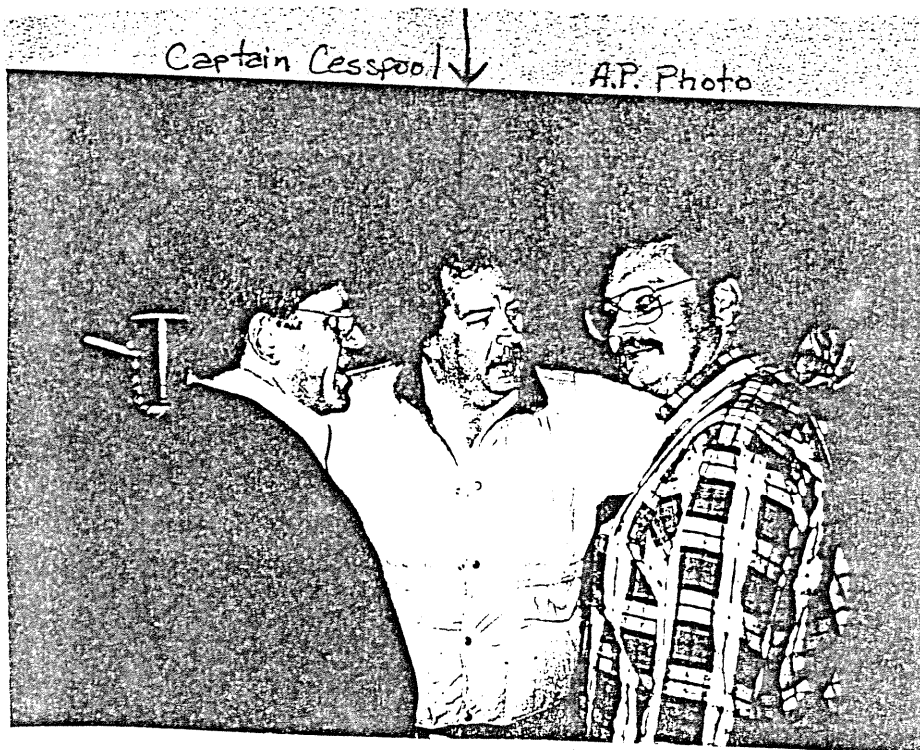
North Carolina does not have to worry about having the captain of the Exxon tanker ever polluting the water of our state because we already have someone to do it for him — Capt. Cesspool, Steve Tedder, chief of the Water Quality Section of the Department of Environmental Management. According to a string of knowledgeable people — local health officials, local environmental people, drinking water people, etc. — the Lake Wylie area is already above a normal pollution stage. Yet Capt. Cesspool just approved another private sewage plant for Lake Wylie and will approve more if not stopped.

Southside Mecklenburg County residents will in the near future be drawing water out of Lake Wylie for drinking water from a new water treatment plant. The people of Mecklenburg, York and Gaston counties should be outraged at this lack of caring for our natural resources by Gov. Martin and his environmental staff.

No amount of hoped-for controls or cutbacks on the amount of sewage dumping by these and future approved private plants will save the lake from further pollution and future mishaps. Steve Tedder does not have the funding or the authority to properly monitor or correct the future disasters that he is now approving. Lake Wylie should be a protected lifestyle area for all the people in this area, not just a profit center for Crescent Land and Timber Co. and other private developers.

Crescent (alias Duke Power Co.) has thousands of acres of land it will be developing in the near future and will need sewage hookups. The area needs to hook into the present county systems or build a new public facility that will benefit all of the people and assure a safe, effective system for a very valuable natural resource — our drinking water.

W.H. HUMMEL  
Lake Wylie



Tennessee Department of Health and Environment  
Laboratory Services Aquatic Biology Section  
Middle Aged Mutant Ninja Biologists

"Your lips don't move but I still hear what you say"

M. Jagger

We are in the squeeze, the teeze, the budget freeze. We can't buy anything, or go anywhere. What we can buy, we can't (Perrier). Why all of a sudden? If you haven't guessed, we are slightly frustrated. But enough of that.

We've just rapped up an extensive biological and chemical survey on Cane Creek and its tributaries in order to document effects caused by two electroplaters in Ripley TN. Teamed up with WPC we were able to statistically link instream waste to biologics. Debbie Arnwine has more on that.

Also finished is our Ambient Biological Monitoring Report on 25 stations statewide. This year's benthic stations have good or improving water quality with only 3 or 4 in worse shape than in previous surveys. 1 or 2 stations we consider excellent enough for criteria streams.

We have completed 35 or so chronic toxicity tests this year for compliance and permitting. Also in our winter screening program we ran Microtox along side Ceriodaphnia. Depending on how one looks at the data comparisons, one could say this or one could say that. I'll let Leira Scott clarify the issue.

Salutations

A handwritten signature in cursive script, reading "Juan Dale Rector".

Juan Dale Rector

OAC  
(A new twist on an old technique)

Hey fellow biologists! Are you troubled by a general lack of E's, P's, or even T's in your upstream station? Are you plagued by engineers who want the data in nice neat little numbers even though it's obvious to a rookie biologist that there's something wrong? Well have we got news for you. Here's a method so easy even a manager can understand it. What you do is take what you've been observing all along and put it into percentage form. Here's the scoop.

Instead of using good bugs you use "bad" bugs or OAC (Oligochaetes, Air-breathers, and Chironomids). Yes, we know, not all Chironomids are bad. You add all these guys up, divide by the total number of bugs and multiply by 100. Basic third grade math (We told you engineers could understand it). This method is especially useful in semi-quantitative bank and grass bed samples where you get air-breathing beetles replacing odonates.

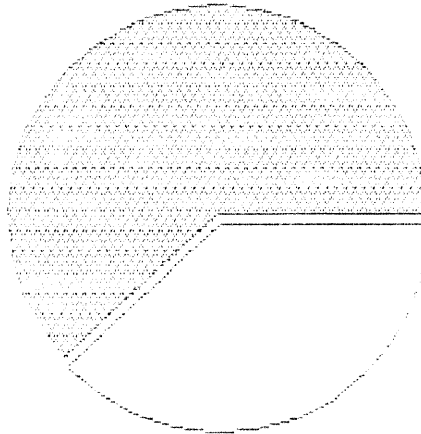
We recently used this method in conjunction with quantitative measures from surber and dandy samples on 13 stations in the same watershed. The OAC consistently backed up more established methods (remember you're taking what you have visually observed all along). The OAC also had a very strong positive correlation with the conductivity levels in the stream (i.e. high conductivity, high OAC). We were using conductivity as an indicator of waste concentration. The nice thing about it is even though the species lists for the illustrated stations were almost identical, this puts the diversity into perspective for the un-initiated (the people you hand all your hard work to).

Compliments of  
Aquatic Biology  
Tennessee

Questions, Comments, or general kabitzing contact Debbie  
Arnwine (615) 262-6328

002 CONTROL STATION  
Percent Oligochaetes, Air Breathers,  
and Chironomids, (CAC)  
Proportion of Community

tolerant 62.0%  
CAC

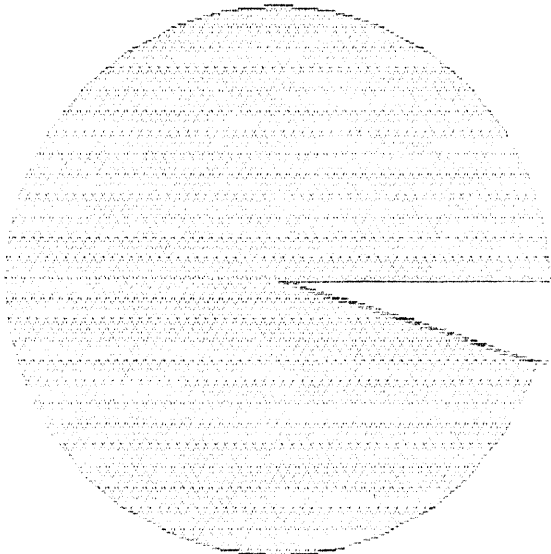


38.0% all others

BANK HABITAT

003 Test Station - D/S Discharger  
CAC  
Proportion of Community

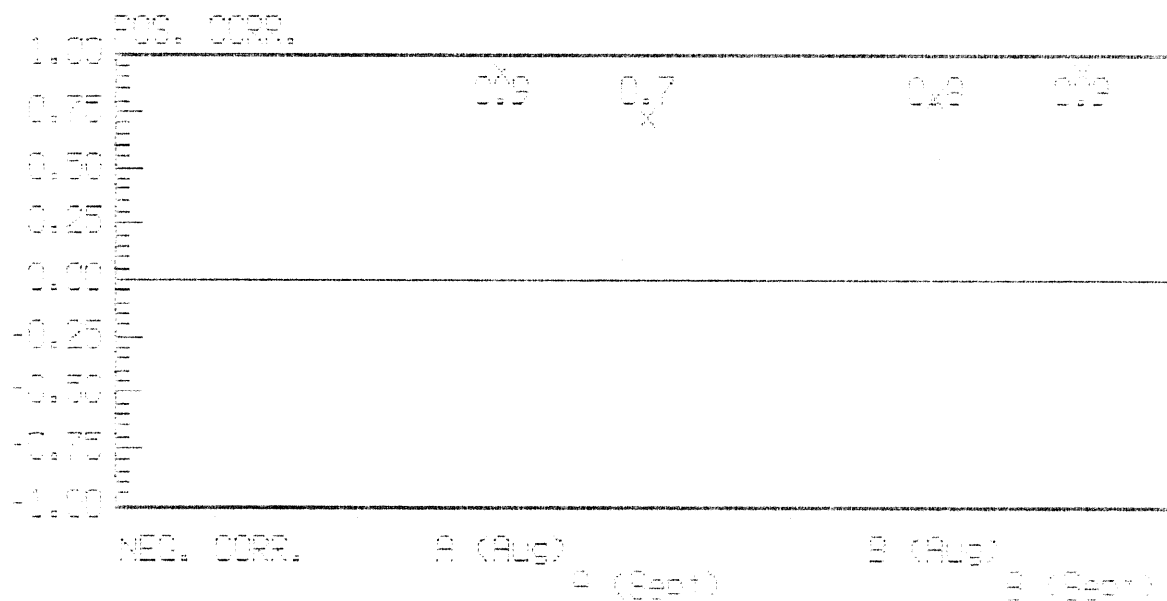
tolerant 25.0%  
CAC



75.0% all others

BANK SAMPLES

CONDUCTIVITY (K) VS. CACK (K)  
 AUGUST AND SEPTEMBER 1989  
 CORRELATION COEFFICIENTS  
 BANK SAMPLES



Electroplater A (5 stations)  
 Electroplater B (5 stations)

## Microtox

Our 1990 static screening program was conducted in January and February using Ceriodaphnia dubia and the marine bacteria Photobacterium phosphoreum as test organisms. Ceriodaphnia is ordinarily used as the test organism in the program, but this year the Microtox procedure using Photobacterium was introduced so that the results from both could be correlated. Approximately 56 samples from different industries and municipalities across the state were collected and tested.

Modified EPA screening procedures for acute toxicity were followed during the Ceriodaphnia test. LC50 readings after 24 and 48 hours were recorded for each sample. The 100% assay procedures in the Microtox manual for testing Photobacterium were followed.

Photobacterium emits a certain amount of measureable light during its normal metabolism. Toxicity alters their metabolism so that the amount of light they emit decreases. The change in light readings after 5 and 15 minute increments was recorded and the EC20 values were calculated. These EC20 values after 5 and 15 minutes were compared with the LC50 values of the Ceriodaphnia after 24 and 48 hours. The results are as follows:

### Pros and Cons of the Microtox procedure

#### Pros:

1. As many as 18 samples per vial of reagent containing the bacteria can be tested, making the procedure cost efficient.
2. The test is done in less than 24 hours.
3. Only a small amount of sample is needed.

#### Cons:

1. The samples have to be adjusted to a 2% NaCl solution before testing.
2. The vial of reagent containing the bacteria is good only for 2 hours.
3. Our samples do not come in large numbers except during the static screening program, so it would not be cost efficient.

Comparisons of Microtox and Ceriodaphnia dubia sensitivity to various NPDES discharges during January and February 1990. Type discharge 1= Municipal, 2= Electroplater, 3= Chemical, 0= other or unknown.

Log #	Type Discharge	MTX I-5		MTX I-15		C.d.	
		EC20	EC50	EC20	EC50	24 hrs	48 hrs
	1	87.6	NAT	64.1	NAT	NAT	NAT
	0	13.8	51.7	12.3	57.3	80.3	39.5
	0	94.7	NAT	NAT	NAT	NAT	NAT
	0	18.8	NAT	12.0	NAT	NAT	NAT
	0	NAT	NAT	6.0	NAT	26.1	17.3
	1	56.2	NAT	87.3	NAT	74.9	10.0
	0	1.7	NAT	NAT	1.0	NAT	NAT
	1	NAT	NAT	NAT	NAT	NAT	NAT
	1	NAT	NAT	NAT	NAT	NAT	NAT
	1	VOID	VOID	NAT	NAT	NAT	NAT
	1	NAT	NAT	NAT	NAT	17.2	17.2
	0	70.9	NAT	10.3	NAT	NAT	NAT
	1	37.1	NAT	12.0	NAT	NAT	NAT
	1	31.3	NAT	VOID	VOID	NAT	NAT
	0	52.2	NAT	5.2	NAT	NAT	NAT
	1	41.6	NAT	49.1	NAT	48.2	48.2
	0	NAT	NAT	NAT	NAT	NAT	NAT
	1	NAT	NAT	21.6	NAT	NAT	NAT
	0	6.5	46.7	3.4	30.2	NAT	68.5
	0	53.3	NAT	49.0	NAT	54.8	54.8
	0	36.5	NAT	8.7	NAT	NAT	NAT
	1	62.2	NAT	10.9	NAT	NAT	NAT
	0	NAT	NAT	NAT	NAT	5.4	4.5
	1	74.7	NAT	37.7	NAT	NAT	NAT
	0	20.9	NAT	7.4	NAT	17.3	3.6
	1	NAT	NAT	17.4	48.4	NAT	NAT
	0	VOID	VOID	46.6	NAT	NAT	NAT
	1	32.4	NAT	5.7	NAT	NAT	NAT
	0	17.3	NAT	5.4	NAT	54.8	54.8
	1	25.9	NAT	2.9	NAT	NAT	NAT
	1	19.2	NAT	6.6	NAT	NAT	NAT
	1	10.9	NAT	5.0	94.7	NAT	NAT
	0	50.6	NAT	30.3	NAT	NAT	NAT
	1	3.8	NAT	28.4	NAT	NAT	NAT
	0	12.2	99.9	10.2	67.6	54.8	54.8
	1	62.3	NAT	45.2	NAT	NAT	NAT
	0	21.4	NAT	14.0	NAT	54.8	54.8
	0	29.5	NAT	17.4	62.1	NAT	NAT
	1	NAT	NAT	72.9	NAT	NAT	NAT
	1	28.5	74.1	VOID	VOID	NAT	NAT
	0	17.6	41.4	70.7	NAT	3.6	3.6
	0	41.8	NAT	31.5	NAT	NAT	NAT
	0	12.6	NAT	VOID	VOID	NAT	NAT
	0	10.9	NAT	VOID	VOID	NAT	NAT
	0	2.2	47.5	VOID	VOID	NAT	NAT
	0	NAT	NAT	VOID	VOID	54.8	54.8
	0	30.3	89.8	NAT	NAT	NAT	NAT
	0	72.4	NAT	36.0	NAT	NAT	NAT
	0	9.4	59.0	VOID	VOID	17.3	17.3

1	18.3	NAT	VOID	VOID	62.2	54.8
0	VOID	VOID	NAT	NAT	20.0	20.0
0	VOID	VOID	11.6	84.1	NAT	NAT
0	NAT	NAT	NAT	NAT	NAT	NAT
0	VOID	VOID	5.5	17.3	17.0	12.0
1	VOID	VOID	11.3	13.5	NAT	NAT
0	3.8	NAT	5.1	NAT	44.0	44.0

NAT = No acute toxicity



+ + as determined by vs.

Comparisons of Microtox and Ceriodaphnia dubia sensitivity to various NPDES discharges during January and February 1990. Type discharge 1= Municipal, 2= Electroplater, 3= Chemical, 0= other or unknown.

Type Discharge	MTX I-5		MTX I-15		C.d.	
	EC20	EC50	EC20	EC50	24 hrs	48 hrs
0	13.8	51.7	12.3	57.3	80.3	39.5
1	56.2	NAT	87.3	NAT	74.9	10.0
1	41.6	NAT	49.1	NAT	48.2	48.2
0	53.3	NAT	49.0	NAT	54.8	54.8
0	20.9	NAT	7.4	NAT	17.3	3.6
0	17.3	NAT	5.4	NAT	54.8	54.8
0	12.2	99.9	10.2	67.6	54.8	54.8
0	21.4	NAT	14.0	NAT	54.8	54.8
0	17.6	41.4	70.7	NAT	3.6	3.6
0	3.8	NAT	5.1	NAT	44.0	44.0

EC20 I-15 vs EC20 I-5

Regression Output:

Constant -1.2  
 Std Err of Y Est 21.8  
 R Squared 0.5  
 No. of Observations 10.0  
 Degrees of Freedom 8.0

X Coefficient 1.2  
 Std Err of Co 0.4

EC20 I-5 vs Cd 24 hrs

Regression Output:

Constant 39.6  
 Std Err of Y Est 23.7  
 R Squared 0.1  
 No. of Observations 10.0  
 Degrees of Freedom 8.0

X Coefficient 0.4  
 Std Err of Co 0.4

EC20 I-5 vs Cd 48hrs

Regression Output:

Constant 40.1  
 Std Err of Y Est 23.3  
 R Squared 0.0  
 No. of Observations 10.0  
 Degrees of Freedom 8.0

X Coefficient -0.1  
 Std Err of Co 0.4

EC20 I-15 vs Cd 24hrs

Regression Output:

Constant	50.0
Std Err of Y Est	24.7
R Squared	0.0
No. of Observations	10.0
Degrees of Freedom	8.0

X Coefficient	0.0
Std Err of Co	0.3

EC20 I-15 vs Cd 48hrs

Regression Output:

Constant	47.6
Std Err of Y Est	20.6
R Squared	0.2
No. of Observations	10.0
Degrees of Freedom	8.0

X Coefficient	-0.3
Std Err of Co	0.2

# MICROBICS CORPORATION

2232 Rutherford Road / Carlsbad, CA 92008  
(619) 438-8282 FAX (619) 438-2980  
TELEX 5106003386

March 19, 1990

Mr. Dale Rector  
Lab Services  
TN Dept of Environ & Health  
630 Ben Allen Rd.  
Nashville, TN 37219

Dear Dale,

I'd like to thank you for your interest in Microtox and your diligence in completing your evaluation of Microtox as a supplemental bioassay method to Ceriodaphnia in the State of Tennessee's Biomonitoring Program.

The comparative data you generated with Microtox and Ceriodaphnia on the 56 effluents that were tested coincides very closely with similar data generated by other state agencies. If you consider a) any EC50 value or b) any EC20 value less than 20% to be a positive response, then your data yielded the following results:

# OF EFFLUENTS	MICROTOX	CERIODAPHNIA	%
12	+	+	22%
31	-	-	55%
6	+	-	11%
7	-	+	12%

RESULTS: 77% AGREEMENT BETWEEN MICROTOX AND CERIODAPHNIA

11% MICROTOX MORE SENSITIVE

12% CERIODAPHNIA MORE SENSITIVE

This is in close agreement with data from the State of Illinois which found a 72% agreement on 85 effluents they tested. It is also virtually identical to the agreement you'd expect between fathead minnows and ceriodaphnia (70% - 80%).

*As Calculated by  
John Razzo (Microtox)*

## ACTIVITIES OF ECOLOGICAL SUPPORT BRANCH, SEPTEMBER 1989

### Marine/Wetland & Water Quality Section

1. Bruce Pruitt travelled to western Kentucky with Bill Ainsley (Wetlands Planning Unit) to conduct advance identification of wetlands in the western Kentucky coal fields.
2. Several Branch staff travelled to Jacksonville, Florida to conduct an impact assessment survey at the Fernandina Beach Ocean Dredged Material Disposal Site aboard the Peter W. Anderson. Work consisted of water, sediment and benthic sampling at site in and around the disposal site.
3. Bruce Pruitt and Linda Anderson-Carnahan travelled to Plant City, Florida to collect samples from the Schuylkill Metals superfund site for toxicity testings and chemical analysis.
4. Staff continued the water quality sampling for DO/salinity/temperature in the Savannah River.
5. Staff travelled to Boca Grande, Florida to exchange current meters and service sea buoys marking the current meter locations. All the equipment including current meters, lighted buoys, pingers and anchors were missing. Probable cause for disappearance of the equipment lies with shrimp trawling activity in the area.
6. Staff continued work on sediment sizing of samples from the Charlotte Harbor ODMDS study.
7. Dave Smith and Hoke Howard prepared field study sites for the Rapid Bioassessment Workshop conducted in Athens September 26-28.
8. Dave Smith continued work on updating the midge reference list.
9. Russ Todd reviewed information on the Pensacola Navy Base, Skuylkill Metals and Mobile Superfund sites in preparation of September ETAG meeting.
10. Don Schultz completed the algal chronic tests on the Peak Oil superfund site and completed the written report on algal nutrient and algal chronic tests on the Munisport superfund site.
11. Ron Raschke met with Water Management Division and GA EPD personnel to discuss "clean-up" of West Point Reservoir. Future discussions will revolve around an acceptable chlorophyll a level in the upper reaches.

**MACROINVERTEBRATE STUDIES IN WETLANDS** -- I have received several responses to my letter to all Region IV states concerning the acquisition of a data base relative to macroinvertebrate fauna of wetlands and development of assessment methodology for wetland macroinvertebrate studies. In addition, I have initiated a literature search through the Information Management Branch concerning wetland macroinvertebrate communities. This search has just been completed (2/7/90) and hopefully will provide a starting point for addressing the need to devise methods for wetland macroinvertebrate studies. Your input is appreciated and has provided several good contacts with individuals who have participated in wetland studies which included the macroinvertebrate community. Hoke Howard, 404/546-2405.

**CONSTRUCTED WETLANDS STUDY** -- Staff of the Ecological Support Branch, Water Quality Unit, are involved in a monitoring effort known as WADE (Wetland Assimilation of Dairy Effluent) in the Piedmont area of Georgia. This study will assess the efficiency of constructed wetlands in assimilating dairy effluent and characterize the pre- and post-project biology and water chemistry of receiving waters. The pilot project is a joint effort between EPA, SCS, Cooperative Extension Services, and the Piedmont Soil and Water Conservation District. Contact Hoke Howard at 404/5/46-2405 for details.

12. Ron Raschke visited Cove Lake and Cherokee chain of lakes to review clean lakes projects. As a result of the trip, study plans were modified to meet 314 objectives.
13. Staff members in conjunction with WMD personnel conducted a "recon" survey of the Fenholloway River near Perry, Florida. The river which receives effluent from the Buckeye Cellulose Pulp & Paper mill is severely stressed. Survey data indicate approximately 20 miles of the stream has dissolved oxygen levels below 2.0 mg/L.

#### Toxics Evaluation Section

1. Mr. Brian Goodno, EPA contractor from ERL-Duluth, met with staff members from the Toxics Evaluation Section to discuss the CETIS database. The CETIS database is being renovated for use in the NPDES permit program.
2. Mr. Peltier conducted a Toxics Evaluation Inspection of the Kentucky Department for Environmental Protection's toxicity program.
3. Mr. Peltier met with Dr. Weber (EMSL-Cincinnati) the week of September 24th to work on the 4th revision of the EPA Acute Toxicity Testing Manual.
4. Mr. Peltier reviewed the ORNL's Gaseous Diffusion Plant annual report containing results from toxicity tests conducted during FY88 and 89.
5. Acute toxicity screening tests were conducted on samples from Union Carbide, Columbia, TN.
6. Chronic toxicity tests were conducted on effluent samples from Wiggins POTW and Columbus POTW (MS), as well as on ash pond and cooling water samples from Gulf Power Plant-Sholty (Sneads, FL).
7. Jerry Stober organized a workshop on the Fish Health/Condition Assessment Profile which was held at the Cohutta fish hatchery. The workshop had participants from each of the Region's states including both water quality and fisheries management agencies.
8. Jerry Stober and Linda Anderson-Carnahan participated in preparing response to comments for the Champion permit on the Pigeon River.
9. Jerry Stober reviewed a Section 316a demonstration for an alternative winter thermal discharge limit for Sequoyah nuclear plant, Chickamouga Reservoir.

10. Dann White aided Mr. Ted Coopwood from EPA, Washington, DC in preparing a toxicology seminar that he will present to engineers in Regions I, II, III.
11. Linda Anderson-Carnahan, Bill Peltier and Hoke Howard met with Water Management Division staff and SR of Tennessee and Tennessee Electroplating on the proposed water quality based provisions permits.
12. Linda Anderson-Carnahan traveled to Raleigh, NC to assist with EPA's RCRA program withdrawal proceedings.
13. Linda Anderson-Carnahan reviewed and commented on the draft ROD for the Cabot Carbon-Koppers superfund site.

#### **ACTIVITIES OF ECOLOGICAL SUPPORT BRANCH, OCTOBER 1989**

##### Toxics Evaluation Section

1. Chronic tests were conducted on 17 samples from Village, Valley, Five Mile and Opossum Creeks in the Birmingham, Alabama area.
2. Weldon, Peltier and Stober conducted training at Inspectors Compliance Training Course for new inspectors.
3. Stober participated in ETAG review and commented on Wrigley Charcoal Site (TN), Mobile Oil Corp (NC), Schuylkill Metals Site (FL), National Southwire Aluminum (KY), and NAS Pensacola (FL).
4. Stober continued analysis of Pigeon River data for National Water Quality Symposium and final report.
5. Stober coordinated the Fish Health Condition Workshop held in Region IV.
6. Stober conducted a QA/QC evaluation of APES biological projects with Ron Raschke and Ted Bisterfeld.
7. Stober attended National Water Quality Symposium in Fort Collins, Co. and presented talk entitled "Sediment and Fish Tissue Contamination in the Pigeon River".
8. Stober reviewed and commented on the Bioindicator Research Strategy under development by the Gulf Breeze ERL.
9. Stober reviewed the relationship of phosphorus versus fish production in support of a P limit for West Point Reservoir.
10. Linda Anderson-Carnahan and Bill Peltier conducted a TRE on effluent shipped to the Athens lab from personnel at the Cross Creek POTW Fayetteville, North Carolina.

11. Bill Peltier presented two talks at a "Toxicity and Biomonitoring Seminar" in Montgomery, Alabama sponsored by the Mississippi and Alabama Associations for Water Pollution Control and the Alabama Department of Environmental Management.
12. A 40-minute video was made by Bill Peltier on NPDES Biological Compliance Inspections. The video was to be presented at the Region IV's Compliance Section retreat to be held at Stone Mountain, Georgia.

#### Marine/Wetland and Water Quality Section

1. Dave Smith, Don Lawhorn and Mel Parsons conducted sediment oxygen demand studies on the Warrior River in Alabama. The study was coordinated with the COE to coincide with minimum barge traffic due to lock maintenance.
2. Dave Smith and Phil Murphy conducted SOD studies on the Pearl River in Mississippi during the week of October 23, 1989.
3. Staff conducted a water quality, toxicity, and biological assessment of Five-Mile, Village, and Opossum Creeks in Birmingham, Alabama. The overall study objective was to assess if the streams are capable of attaining a higher water quality standard. Preliminary results show significant improvements over prior ESD investigations of the streams.
4. Staff are completing the lake mapping of area lakes used in the FLAP study.
5. Staff assisted in collecting samples (water, sediment and "bug") from the Kassouf-Kimerling and Schuylkill hazardous waste sites for biological toxicity tests.
6. Russ Todd, Bruce Pruitt and Mel Parsons conducted an ADID on West Broward County wetlands.

#### **ACTIVITIES OF ECOLOGICAL SUPPORT BRANCH, NOVEMBER 1989**

#### Marine/Wetlands and Water Quality Section

1. Don Lawhorn met with on-scene coordinators of the Emergency Response Section regarding the use and approval of divers in potentially contaminated waters.
2. Bruce Pruitt, Tom Cavinder and Mark Koenig presented a briefing of the Munisport findings to Mr. Tidwell



3. Phil Murphy and Don Lawhorn travelled to lake Chilhowee, Tennessee. They conducted an underwater video survey using a remote operated vehicle (ROV) to determine the success of a drum removal effort recently completed at two locations in Lake Chilhowee. No drums were located. The work was conducted at the request of the Regional Superfund Branch.
4. Phil Murphy travelled to Charleston, SC to meet with Regional Coastal Programs Unit personnel, Charleston District Corps of Engineers and the South Carolina Wildlife and Marine Resource Dept. Discussion topics included 1) dredging, testing, and ocean disposal of material from the "Sea Wolf" submarine base, 2) field studies for site characterization and designation of a new ocean dredged material disposal site (ODMDS) at Port Royal, SC and 3) live bottom surveys and monitoring of disposal of material at the Charleston ODMDS.
5. Staff travelled to Charlotte Harbor, FL to conduct the fall season water quality sampling at the Charlotte Harbor ODMDS. During the survey, continuously recording meters were installed for a 24-hour period at three locations along the coast to obtain information for subsequent placement of a permanent (6-month) array near the site.
6. Russ Todd participated in an advisory board meeting for the Center for the Management, Utilization and Protection of Water Resources at Tennessee Tech University, Cookeville, Tennessee.
7. Russ Todd met with NUS on the LS1 study plan for Blackberry landfill in SC.
8. Russ Todd chaired the ETAG meeting to discuss the proposed study plans (Blackberry Landfill, NC, National Southwire Aluminum, KY, and Naval Air Station, Pensacola, FL) for superfund sites.
9. Ron Raschke attended the NALMS conference and symposium in Austin, Texas.
10. Ron Raschke reviewed a draft "Surface Water Improvement and Management Plan for the Everglades," Vol. III and IV in preparation of an upcoming meeting.
11. Ron Raschke and staff continued to analyze data from the FLAP project. Chemistry results from three sites delay completion and finalization of a report on this project.
12. Staff members travelled to Mississippi to participate in the annual meeting of the SEWPBA.

13. Hoke Howard and Archie Lee travelled to Madison, GA to meet with SCS and EAD regarding a non-point source pilot study. ESB will be assisting SCS and EPD to study and monitor the results of utilizing a created wetland area to treat waste from a dairy operation.
14. Hoke Howard and Archie Lee travelled to Savannah, GA to conduct the final sampling run on the Savannah River DO study.
15. Hoke Howard travel to Asheville, NC to present a discussion on Rapid Biological Survey techniques at the Region IV/State Water Managers meeting.
16. A summary judgment was reached on the Victor trial in favor of EPA. In the Victor project, a silviculture operator was draining and filling a wetlands area and contended it was a normal part of the operation.
17. Dave Smith and Candace Halbrook travelled to Alabama to conduct an SOD study on the Cahaba River.

#### Toxics Evaluation Section

1. Alan Auwarter assisted the Environmental Compliance Branch in the collection of bioassay samples for the Bay Drum property and adjacent wetlands.
2. Dann White worked on cross checking ETAG work for incorporation in a DBase tracking system.
3. Staff conducted toxicity tests on effluent samples from Almond Branch POTW, Conyers, GA.
4. Acute toxicity tests were conducted with daphnids and minnows on secondary and final effluent samples from Cross Creek POTW, Fayetteville, NC.
5. Ron Weldon and Kay LaMotte provided technical assistance on Ceriodaphnia culturing methods to personnel from Duke Power Company.
6. Bill Peltier, Linda Anderson-Carnahan and Alan Auwarter attended the 10th annual meeting of the Society of Environmental Toxicology and Chemistry.
7. Linda Anderson-Carnahan attended a meeting of State and Regional Water Quality based Permit Specialists in Washington, DC.

8. Linda Anderson-Carnahan and Charlie Kaplan met with representatives from Region V, and ERL-Duluth Great Lakes Chemical and EPRI to discuss bromine toxicity and water quality-based permit limits for discharges containing bromine.
9. Jerry Stober presented a talk on Fish Health Assessment at the SEWPBA Meeting in Biloxi, November 7-9.
10. Jerry Stober presented a talk on Region IV's Toxics Control Program at a workshop of the Toxics Substances and Pesticides Subcommittee of the Gulf of Mexico Program's Technical Steering Committee, November 14-16.
11. Jerry Stober met with Lee DeHihns, Federal Activities, and the Navy staff on the potential issuance of NPDES permits for ship shock testing off Key West, FL by the Navy.

#### ECOLOGICAL SUPPORT BRANCH, DECEMBER 1989

##### Marine/Wetland & Water Quality Section

1. Tom Cavinder and Hoke Howard met with SCS representatives to finalize design specifications for the upcoming project of monitoring impact of constructed wetlands for dairy runoff.
2. Delbert Hicks, Mark Koenig and Bill Peltier travelled to Miami, FL to attend a DER public meeting of interested parties to explain the technical results of our sampling study at the Munisport superfund site.
3. Archie Lee and Russ Todd met with Leonard Nowak, Jim Greenfield and Sally Turner to discuss the first quarter work plan activities for water monitoring.
4. Don Lawhorn, Mel Parsons and Gary Collins of Atlanta travelled to Charlotte Harbor, FL to deploy current meters as part of our on-going study in the area.
5. Bruce Pruitt continued work on the W. Broward County advance identification report. Draft of report was given to program staff for review with final expected by end of January.

##### Toxics Evaluation Section

1. Acute toxicity tests were conducted with daphnids and minnows on effluent samples collected from Union Camp Corporation, Jacksonville, Florida and Lexington Fabric, Lexington, Alabama.

2. A draft of the Kassouf-Kimerling Wetland Study (FL) was completed and forwarded to the Superfund Branch for comment.
3. Bill Peltier and Linda Anderson-Carnahan attended a meeting on December 13, 1989 in the Atlanta EPA office with the Florida Department of Environmental Regulation (DER). The Florida DER presented their rationale for the water quality standards settlement with the Florida Pulp and Paper Association.
4. Linda Anderson-Carnahan attended a meeting of North Carolina's Blue Ribbon Panel on Environmental Indicators. Environmental indicators will play an integral role in the Region's Strategic Planning Process.
5. Jerry Stober traveled to Key West N.A.D.C., NAS Trumbo, at the request of the Federal Facility's coordinator, to observe the biological effects of a ship shock test on marine life.
6. Jerry Stober traveled to Headquarters to participate in the Aquatic Population Workgroup meeting under the Risk Assessment Forum to develop ecological risk assessment guidelines for aquatic populations.