

APES Report No. 90-25
October 1990

TEACHER TRAINING IN WATER QUALITY ISSUES

Melva Okun



THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

Institute for Environmental Studies

The University of North Carolina at Chapel Hill
CB# 7410, 315 Pittsboro Street
Chapel Hill, NC 27599-7410
(919) 966-2358

**ALBEMARLE PAMLICO ESTUARINE STUDY
FINAL REPORT
OCTOBER 31, 1990
TEACHER TRAINING IN WATER QUALITY ISSUES**

Submitted by
Melva Okun, Education Specialist
UNC-CH Environmental Resource Project
315 Pittsboro St., CB# 7410
Chapel Hill, North Carolina 27599-7410
(919) 966-3332
re- CE00470601

With funding from the Albemarle-Pamlico Estuarine Study, teacher training workshops on water quality issues were completed in the A/P area. During the summer of 1989, Melva Okun, Education Specialist with the UNC-CH Environmental Resource Project, worked with Dr. Donald Francisco of the UNC-CH Department of Environmental Sciences and Engineering, in the planning and coordination of a two-week teacher training workshop called, "The Science of Water Quality." Teachers from all over the greater Triangle area participated in the workshop. In the fall of 1989, plans began for a second two-week summer workshop, this time to take place in Greenville at East Carolina University. The second workshop, "Coastal Ecology and Water Quality," was intended for science teachers from the Albemarle Pamlico area (east of Raleigh) who taught on the 7-12th grade level. Ms. Okun, who was supported by funding from the A/P Study, made several trips to Greenville to meet with faculty from the ECU Biology Department to discuss the workshop. Dr. Mark Brinson agreed to be the primary faculty person to work with the teacher training workshop. He was assisted by Drs. William Ambrose, Robert Christian, and Donald Stanley. Other ECU faculty also agreed to participate in the workshop and make presentations. Ms. Leslie Brinson, an experienced local high school science teacher, agreed to be the lead teacher for the workshop. Dr. Brinson and Ms. Okun worked jointly on a proposal for an Eisenhower Grant administered through the ECU Science and Math Education Center to cover daily stipend money for the teachers, some money for the ECU faculty, and a graduate assistant position to help with the labs and field trips. During the winter we were notified that the project had been successfully funded by the Eisenhower Grant



Recycled paper

program in addition to the existing funding from the Albemarle-Pamlico Estuarine Study Project.

Ms. Okun served as the coordinator of the workshop and Dr. Brinson as the primary instructor. During several meetings in Greenville, Ms. Okun and pertinent ECU faculty planned the two-week workshop and assigned responsibilities. The ECU faculty agreed to oversee all local arrangements involving ECU faculty, meeting space, and field trips. Ms. Okun took responsibility for teacher recruitment, the identification of teacher classroom materials, the ordering of reference materials, and the coordination of non-ECU workshop speakers. Ms. Okun worked with the director of the ECU Science and Math Education Center who arranged for renewal credits for the teachers. Teachers were able to receive graduate level credits or renewal credits for the ten days of instruction.

During the fall as Ms. Okun was working on plans for the workshop for the summer of '90, she was also following up with the teachers who had participated in the water workshop during the summer of '89. She visited the teachers at their schools, met with several of their principals or science supervisors, and presented each school with over \$225 worth of science water quality testing kits. She additionally made a presentation to one of the teacher's science classes on wastewater treatment. Ms. Okun coordinated a meeting of Environmental Educators of North Carolina (EENC) on coastal issues with a special focus on water concerns. A resource guide on this topic was sent out to over 200 educators on the mailing list of EENC. Ms. Okun completed work on the A/P educational booklet, Where the Rivers Meet the Sea. The booklet was distributed to all school systems throughout the state. In addition to the booklet, other materials were ordered during this time for the summer workshop teachers. Materials included the book, Freshwater Ecology, and the A/P report, "Preliminary Technical Analysis of Status and Trends."

A teacher recruitment brochure for the summer workshop was developed by Ms. Okun for distribution to teachers in the total A/P area- from the Piedmont to the Coast. Through the ECU Science Math Education Center, over 300 copies of the brochure were sent to teachers and science supervisors throughout eastern North Carolina. In addition, Ms. Okun distributed the remaining 200 brochures at science fairs, exhibits, and at teacher meetings and training workshops she coordinated. Copies of the brochure were sent to newsletters for inclusion. They were also sent to members of the Water Quality Advisory Board which Ms. Okun had convened to advise her in the water training efforts.

During the Winter, Ms. Okun reconvened the teachers she had worked with the previous summer to provide more instruction

in water quality issues, including a second trip to a nearby wastewater treatment plant and to have the teachers share with each other water quality instructional successes or lack thereof. The teachers enthusiastically reported on what they had done to date and what their plans were for the remaining part of the year.

During the spring, teachers signed up for the workshop by registering with the ECU Science and Math Education Center. Registration was limited to fifteen for purposes of being able to take field trips and do lab work. A staff person with the United States Department of Agriculture's Soil Conservation Service was invited to join the workshop as a participant and resource person. Ms. Stevenson was granted permission to attend the workshop and was an invaluable member of the group. Additionally attempts were made to recruit an agricultural extension agent from the A/P area.

The workshop convened on July 9th and met through July 20th with a follow-up workshop in the fall. The two weeks of instruction were divided between intensive instruction in the morning with field trips and lab work in the afternoon. The instruction began with a lecture on the water cycle and the principals of ground water hydrology. This was followed by a field trip which included information about ground water movement, recharge and discharge areas, precipitation, the geomorphology of streams, and how to read a topographic and soil survey map. Leaf packs were placed in a near by stream and left for two weeks. They were retrieved at the end of the two-weeks and information was presented about weight loss and presence of benthic macroinvertebrates. Comparisons were made between topographic maps covering an eastern North Carolina area, the Piedmont, and one from western United States. Soil samples were taken and discussed. On Wednesday, July 11th, the teachers began a two-day instruction conducted by Drs. Don Stanley and Robert Christian. The first day was spent in on a field/water trip in the Pamlico Sound area. Water was sampled and tested for salinity, pH, dissolved oxygen, turbidity, and conductivity. The teachers surveyed a transect of submersed aquatic vascular plants in shallow waters. Information was presented on the study of photosynthesis and how the rate of oxygen production compares with the consumption of oxygen. The second day was spent studying water and plankton samples that had been collected the day before. An experiment was set up showing how the mixture of fresh and brackish waters is effected by water temperatures. Teachers were given handouts indicating how they could do the same experiment in their classroom. On Friday, George Norris with the State's Streamwatch Program presented information about his program and how school groups can become a part of the Streamwatch network. In the afternoon teachers had the opportunity to discuss questions and information about what had been

covered to date. The teachers were also prepared for the two-day field trip for the following week.

The second week began with a two-day field trip. Stops were made at Island Creed, Flanner Beach, relic dunes, pocosins, and at a salt marsh. At each one of the stops water and soil samples were taken and tested for pH. The water samples were tested for temperature, conductivity, salinity, and dissolved oxygen. That evening we stayed overnight at the Trinity Center on Bogue Sound. Teachers saw several videotapes and enjoyed participating in a role playing activity concerning what to do with the wild ponies on one of the barrier islands. The evening ended with a night walk on the beach. The next day began with a seven o'clock meeting on the beach. Teachers participated in several activities attempting to explore human relationship with nature and an appreciation of the diversity nature offers. The rest of the day was spent at the Division of Marine Fisheries office for a presentation on human impacts on coastal resources. Later representatives from Weyerhaeuser spent several hours with the teachers explaining the company's hydrology and water quality research work in Carteret County. Information about best management practices for silviculture activities was presented.

On Wednesday, Jess Hawkins, a biologist with the NC Division of Marine Fisheries showed a slide show concerning the decline of fisheries. In the afternoon a field trip was taken to the NCSU aquaculture projects and fish disease lab in Aurora. Again a slide show was shown to the teachers explaining the history of the research in aquaculture. The following day Tom Stroud with the Pamlico Tar River Foundation and Lena Ritter with the NC Coastal Federation presented information about their organizations and the important role that citizens and citizen groups can play in protecting the water resources. Information was also shared about wastewater treatment in preparation for the afternoon field trip to the water treatment and wastewater treatment plants in Greenville. Staff at the plants met us and gave us a tour of the facilities and answered any questions. On the final day of the workshop, teachers made presentations on concepts they had been assigned earlier, and made commitments to how they planned to incorporate the coastal ecology and water quality information into their teaching. Dr. Doug Rader, senior staff scientist with the NC Environmental Defense Fund, was the keynote speaker at a final luncheon for the teachers. The afternoon was spent in evaluating the course. In addition to the final evaluation, daily evaluations had been conducted throughout the two-week workshop. The gathered information was used to make fine tuning changes in the workshop and to respond to the needs of the teachers. This enabled us to understand if the pace of the instruction was appropriate. The teacher evaluations both during the workshop and upon completion were very

positive. The teachers stated they both learned a lot and enjoyed working together as a team. They felt the workshop was well organized and that the topics chosen were appropriate, timely, and well presented. Some even mentioned it was one of the best workshops they had ever attended.

The final test of the strength of the workshop was seen in the strong response to the follow-up workshop in the fall. All of the participants were able to attend except for our one teacher who had been called to Saudi Arabia. Before the weekend workshop, a letter was sent to all the principals of the teachers in recognition of the teachers' participation in the summer workshop and asking for the principal's support for the teachers to be able to attend the follow-up weekend. Since the teachers would be missing school on Friday in order to travel to Morehead City, the schools needed to provide the money for substitutes. All the schools cooperated with this. The follow-up weekend workshop was conducted by Dr. William Ambrose. Friday afternoon was spent on a field trip to the Tar Landing Bay salt marsh and mudflat area. Teachers had the opportunity to explore the mudflat and then perform a transect of the salt marsh. That night the teachers met at the UNC-CH Institute of Marine Sciences lab area where they studied the zoo plankton and phytoplankton that they had gathered in plankton nets they had made out of panty hose and hangers. The samples were examined under microscopes. A day sample of plankton was compared to the night samples drawn. On Saturday the teachers left on the UNC-CH boat, the Capricorn, and traveled into the sound and ocean area to perform trawling and dredging in the Newport River Estuary area. The catches were identified and then thrown back to the water. The afternoon was spent on Harkers Island to sample epibenthos and infauna inside and outside seagrass bed areas. The last morning was spent in discussing the weekend, lunar tides, and teachers' plans for incorporating the information learned in their teaching. During the weekend workshop the teachers received copies of the booklets: Where the Rivers Meet the Sea, and Project Estuary. Project Estuary is a curriculum guide for teachers on estuarine topics with information specific to the coast of North Carolina. During the workshop the teachers had the opportunity to participate in several of the activities described in the booklet. Where the Rivers Meet the Sea describes the history of the coastal area, the resources it provides, the need for protection, and how humans can and need to be involved in protecting the natural resource.

In the follow-up workshop it became clear that even under the best of circumstances it is difficult for teachers to incorporate new materials and activities into their teaching. The teachers are greatly constrained by the limitations of class size, lack of money for equipment or field trips, lack of support from supervisors, and

expectations of the end of the year test. One of my teachers had a brand new lab and no equipment. Others were under tremendous pressure to improve their students' performance on the end of the year test. This pressure was being met by incorporating in-school testing for the students on a quarterly basis. Additionally, in the fall, due to lack of rainfall, teachers couldn't do water testing activities because streams and ditches were dried up. The teacher training is still a vital activity but expectations should not be too high as to how much the teachers will bring back to the classroom. They do need support and encouragement to overcome the barriers they face.

In the remaining months of the grant I will continue to explore water quality curriculum ideas. I will be attending the annual meeting of the North American Association for Environmental Education. There I will share with others my experiences and review new ideas for water quality teacher training activities. Also during this fall I am supervising a student from the NC School of Math and Science. Together we are attempting to build a high school student network of students in North Carolina that are interested in water issues. Teachers who have been through the summer training workshops will be contacted and asked for names of students who might be interested in working with students from other schools and sharing information about river basins and the status of water quality. We will explore the possibility of a column in the Streamwatch newsletter for students.

ABSTRACT

**TEACHER TRAINING WORKSHOP
"Coastal Ecology and Water Quality"**

Melva Okun, Education Specialist
UNC-CH Environmental Resource Project
315 Pittsboro St., C.B. #7410
Chapel Hill, North Carolina 27599-7410
919 966-3332

With funding from the Albemarle Pamlico Estuarine Study, a two-week teacher training workshop was conducted during the summer of 1990. Fifteen teachers from eastern North Carolina gathered at East Carolina University. The days were divided between classroom instruction, lab work, and daily field trips. The workshop was coordinated by Melva Okun of the UNC-CH Environmental Resource Project. The primary instructor was Dr. Mark Brinson with the ECU Biology Department. Information was presented on such topics as: the water cycle, ground water hydrology, the relationship between ground water and surface water, evolution of stream channels and floodplain features, topography map reading skills, water quality testing, impact of nonpoint sources (such as from farming) of nutrients, natural features of the coastal plain, human impacts on coastal resources, and how humans can make a difference in improving the coastal resource. Besides instruction provided by ECU faculty, presentations were made by Dr. Doug Rader of the NC Environmental Defense Fund, George Norris with the state's StreamWatch Program, Tom Stroud of the Pamlico-Tar River Association, Lena Ritter of the NC Coastal Federation, representatives from Weyerhaeuser, and Jess Hawkins and Pattie Fowler with the NC Division of Marine Fisheries. Field trips were made to the Greenville water and wastewater treatment plants, streams and rivers throughout the area, a salt marsh, swamps, the sound and the ocean. Water quality tests were performed and analyzed. Measurements were made of submersed aquatic vascular plants. The teachers were given materials for the classroom. Water quality testing kits are available for classroom usage.

A follow-up weekend with the teachers will take place in Morehead City on October 5-7th. Teachers will learn more about salt marshes and mudflats and the critters that reside there. They will examine night zooplankton and trawl and dredge the Newport River Estuary. Additional funds were made available by an Eisenhower Grant from the UNC Math Science Education Network.



THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

Institute for Environm

rolina at Chapel Hill
ect

Teacher Training Workshop

*Coastal Ecology
and
Water Quality*



July 9-20, 1990

East Carolina University

Greenville, NC

Sponsored by:

The Albemarle Pamlico Estuarine Study

Eisenhower Grant from the UNC Math

Science Education Network

ECU Science & Math Education Center

ECU Biology Department

Department of Biology
East Carolina University
Greenville, North Carolina 23858

1 July 1990

Dear

In just a few days you will be attending the short course on "Environmental Quality in the Coastal Plain." The instructors have put the final touches on the the schedule (enclosed). We are very excited about this course and look forward to an intensive 2 weeks of working with you.

In addition to the schedule, there are a few items listed below that will supplement the schedule and better prepare you for the course.

Logistics

1. Normally you will be responsible for bringing your own lunch or eating nearby. However, box lunches will be provided on July 16 and 17. Coolers and ice will be provided. The last day (20 July) a luncheon will be provided.
2. On two days we will meet at 8:00 a.m. rather than 9:00. These times are underlined for July 11 and July 18.
3. Registration for graduate credit and certification renewal will occur promptly at 9:00 am on the first day. Bring your check book for tuition fees if you want to receive credit.
4. Please bring the campus parking form the first day so we can facilitate getting you a permit. There will be a \$3.00 charge for parking during the 2 weeks.
5. On the overnight trip to Trinity Center (July 16) no evening meal will be provided. Transportation will be provided to a group of restaurants, however.
6. Conditions can be very hot on field trips. It would be advisable to bring a water bottle. Also, be sure to dress appropriately for wading through mud, getting drenched by afternoon showers, and getting bitten by dipterans and ticks. Bring ample insect repellent, wear long pants, etc. You might routinely keep a change of clothes with you for a more comfortable ride home.

7. If you have any allergies that may cause problems (a) notify one of the instructors of this condition and limitations of your activity, and (b) bring medication for treatment of your condition, especially if you react severely to bee and wasp stings.

8. A stipend of \$35 for each full day of attendance will be provided to all teachers. This is to help defray costs incidental to taking the course.

Supplies

You will be provided with a large 3-ring binder to hold class handouts. Also you will be receiving several booklets, manuals, brochures, etc. as part of the course materials. However, we ask that you take care of the items listed below.

1. Bring a spiral notebook or some other appropriate booklet for keeping notes, recording data, and making comments. It will be needed both in the classroom and on field trips.

2. The second day (July 10), you will need a topographic map of your local area and stream where you are most likely to conduct field trips. These can be purchased in Greenville (Carolina Maps, 210 W 4th Street, Greenville 757-0279). There also may be sources for maps closer to you. These are called 7 1/2 minute quadrangle topographic maps (also orthophotoquads are useful).

3. If you have a life jacket, please bring it on July 11.

4. Bring one blank audio tape for copy of an interview on July 19. A 30 minute size would be adequate.

If you have any additional questions after reading all of this material, come by a little early on Monday or give us a call (757-6718).

Sincerely,



Mark Brinson
Melva Okun
Leslie Brinson
Will Ambrose

Enclosed: Schedule
Form for parking permit application
Map of campus

Schedule

"Environmental Quality in the Coastal Plain:
A Focus Where Rivers Meet the Sea"

(Two-week block, 9-20 July 1990)

July 9 (Monday)

- 9:00 Registration and Orientation: purpose and content (Okun and L. Brinson).
- 10:30 Lecture on water cycle and ground water hydrology, especially as groundwater relates to surface water. (R. Spruill, Geology).
- 1:00 Terrestrial Processes (M. Brinson and R. Spruill).
Field trip to Otter Creek Natural Area (Discuss measurements of groundwater movement and fluxes of water in other parts of ecosystem, including groundwater discharge, precipitation, interception, stemflow, and soil water in upland and forested wetland). Orientation to map reading. Placement of leaf packs in streams (Okun).

July 10 (Tuesday)

- 9:00 Geomorphology of Streams (J. Phillips, Geography).
Lecture on evolution of stream channels and floodplain features. (Include sources of information for acquiring maps, soil surveys, hydrologic and water quality data.)
- 1:00 Field trip to coastal plain-draining and piedmont-draining streams (Tar River at River Park North and Tranter's Creek near Washington).
Compare scales and structure of two stream types. Relate to topo maps. Sample sediments for physical and chemical properties in floodplain. Importance of riparian ecotone. Methods of teaching map skills.

July 11 (Wednesday)

- 8:00 Field trip in boats along downstream transect from fresh to brackish water in Tar and Pamlico Rivers. Collect samples and make field measurements for later use. (Stanley, Christian, Ambrose). Also measurement of submersed aquatic vascular plants (SAVs) in shallow littoral of Crystal Beach. Dissolved oxygen measurements applied to plankton metabolism.
- 1:00 Continuation of field trip.

Schedule, Continued

July 12 (Thursday)

- 9:00 Discussion of metabolic processes in aquatic ecosystems: Tar River, Pamlico River, and Pamlico Sound (Stanley, Christian, Ambrose). Relevance of nonpoint sources of nutrients, nutrient limitation, and dynamics of phytoplankton and benthic communities.
- 10:30 Laboratory identification of samples and analysis of water samples for water chemistry constituents (Christian, Stanley, Ambrose). Lecture and handouts on plankton and benthos.
- 1:00 Analyze data, interpret results and discuss river and estuary trip. Group presentations on data sets. Interpretation and summary by staff.

July 13 (Friday)

- 9:00 Biological monitoring program of DEM (George Norris, Streamwatch Program). Laboratory: measuring pH, alkalinity, dissolved oxygen, and conductivity. (Includes analysis of samples from student's home area.) Further discussion of water physics and chemistry (M. Brinson)
- 1:00 Discussion of previous week's exercises. Preparation for field trip to Croatan National Forest (M. Brinson and L. Brinson). Basis for comparing ecosystems team organization, and weekend reading assignments.

WEEKEND BREAK

July 16 (Monday)

- 8:00 Field trip to Croatan National Forest (M. Brinson and L. Brinson). Natural features of coastal plain (Island Creek, Flanner Beach, relic dunes, pocosins, salt marsh, etc.). Tie in with all previous lecture and laboratory exercises on hydrology, geomorphology, ecosystem metabolism, and water chemistry. Box lunch provided. (Cost of overnight stay, dinner and breakfast at Trinity Center on Bogue Banks is paid by course.)

July 17 (Tuesday)

- 9:00 Division of Marine Fisheries, Morehead City (next to site of fall field trip). Human impacts on coastal resources. Lecture by Pattie Fowler on seafood sanitation, red tide, and protection of shellfish beds.

10:30 Visit Weyerhaeuser hydrology and water quality research sites in Carteret County. BMPs for silviculture in forested wetlands. (Bob Herrman, Joe Hughes, and Bob Campbell)

Box lunch compliments of Weyerhaeuser.
Continue forestry BMPs on Weyerhaeuser sites.

3:00 Return to Greenville.

July 18 (Wednesday)

8:00 Meet at ECU for drive to Division of Marine Fisheries office in Washington.
"Decline of fisheries: water quality or overfishing?"
(Jess Hawkins)

11:00 Question, answer, and discussion hour on applications in the classroom. Lunch in Washington on your own.

2:00 Depart to visit NCSU aquaculture projects and fish disease lab at Pamlico Estuarine Laboratory, Aurora.
(Dave Bova)

3:30 Depart for Greenville or home.

July 19 (Thursday)

9:00 Citizens action group activities for Albemarle-Pamlico Estuarine Study (D. McNaught of Pamlico-Tar River Foundation or Lena Ritter, N.C. Coastal Federation). Bring audio tape for a copy of interview. Prepare for wastewater treatment facility.

1:00 Field trips to wastewater treatment plant and water supply treatment plant in Greenville

1:30 Water treatment plant. (Plant operator)

2:30 Waste water treatment facility (Ed Andrews and Thomas Hardison)

July 20 (Friday)

9:00 Summary of potential student projects on environmental quality. Options for implementing information in the classroom (Okun, M. Brinson, Ambrose). Examine leaf packs.

12:00 Luncheon (Provided by Biology Department)
Speaker: Doug Rader, Environmental Defense Fund.
Environmental issues concerning water regulations and enforcement. Overview of environmental regulation and enforcement of surface water, ground water, and wetland issues.

1:00 Evaluation and critique of course (Okun).
Logistics and materials for fall weekend field trip to

"Coastal Ecology and Water Quality"
Teacher Training Workshop
East Carolina University
Summer 1990

Margaret Parrish
Rt. 1 Box 429
Newport, NC 28570
919-726-9128

Leslie Brinson
209 Pineview Dr.
Greenville, NC 27834
919-756-2658

Loretta Singleton
150 Windsor Circle
Chapel Hill, NC 27516
919-967-4708

Wanda Stevens
Rt. 6 Box 310-D
Goldsboro, NC 27530
919-689-3109

Nancy Evans
Rt. 13, Box 364
Greenville, NC 27858
919-756-3866

Nancy Bray
115 Lakeview Dr.
Greenville, NC 27858
919-758-1795

Nancy Wynne
1410 N. Overlook Dr.
Greenville, NC 27858
919-756-3207

Rhonda Cockrell
Rt. 2 Box 168
Kenly, NC 27542
919-284-3720

Sharon Langston
1336 River Rd.
Selma, NC
919 965-0069

Jesse Woodard
Rt. 4 Box 37 Lot 3
Kenly, NC 27542
919-284-1089

Claudia Stevenson
District Conservationist
3 Professional Drive
Snow Hill, NC 28580
919-747-3705

Rita Elliott
1607 S. Elm St.
Greenville, NC 27858
919-355-2434

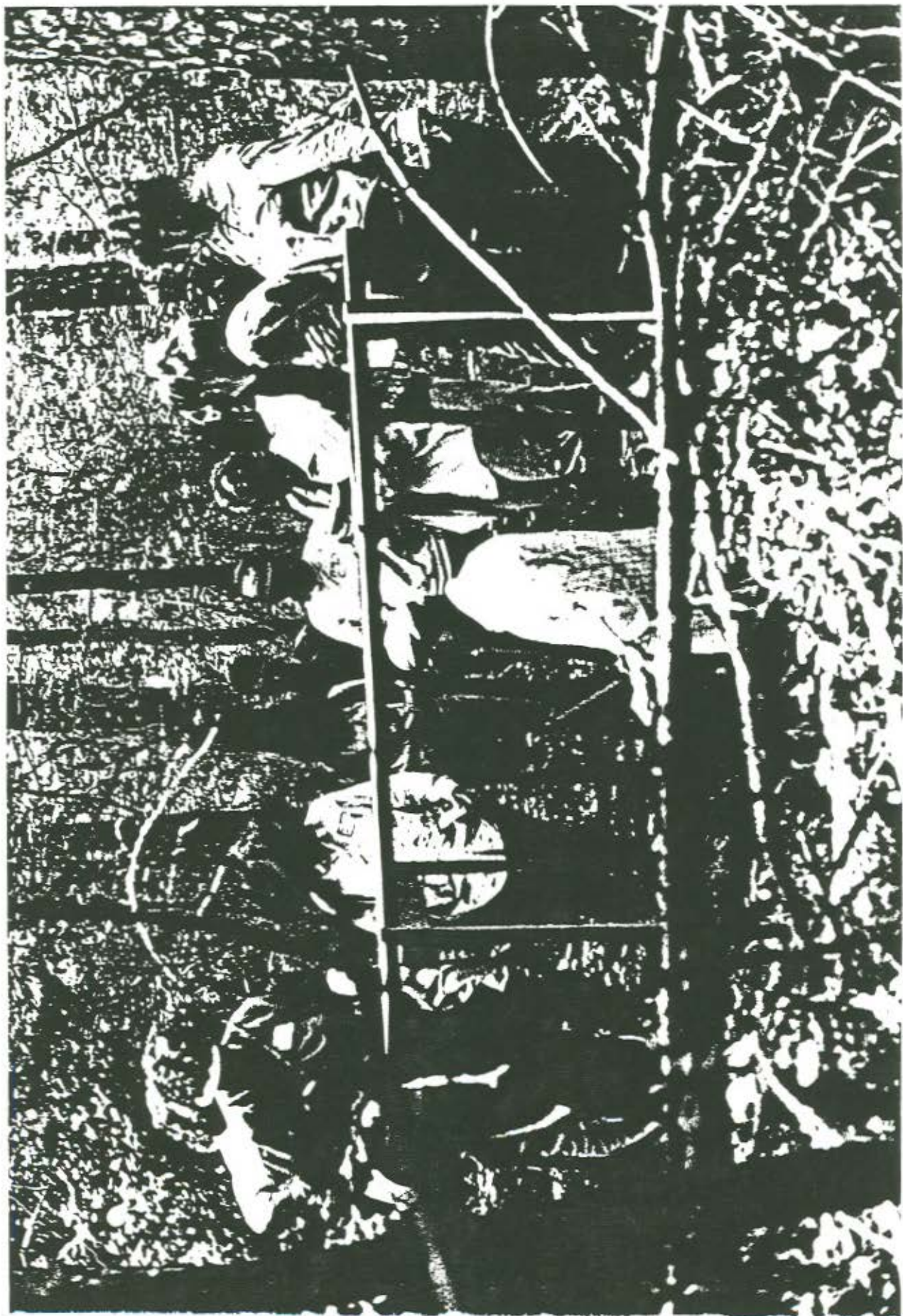
Roy Whichard
P.O. Box 1506
Washington, NC 27889
919-946-6905

Melva Okun
315 Pittsboro St. CB 7410
Chapel Hill, NC 27599
919 966-3332

William Ambrose
Dept. Biology
ECU
Greenville, NC 27858
919 757-6304

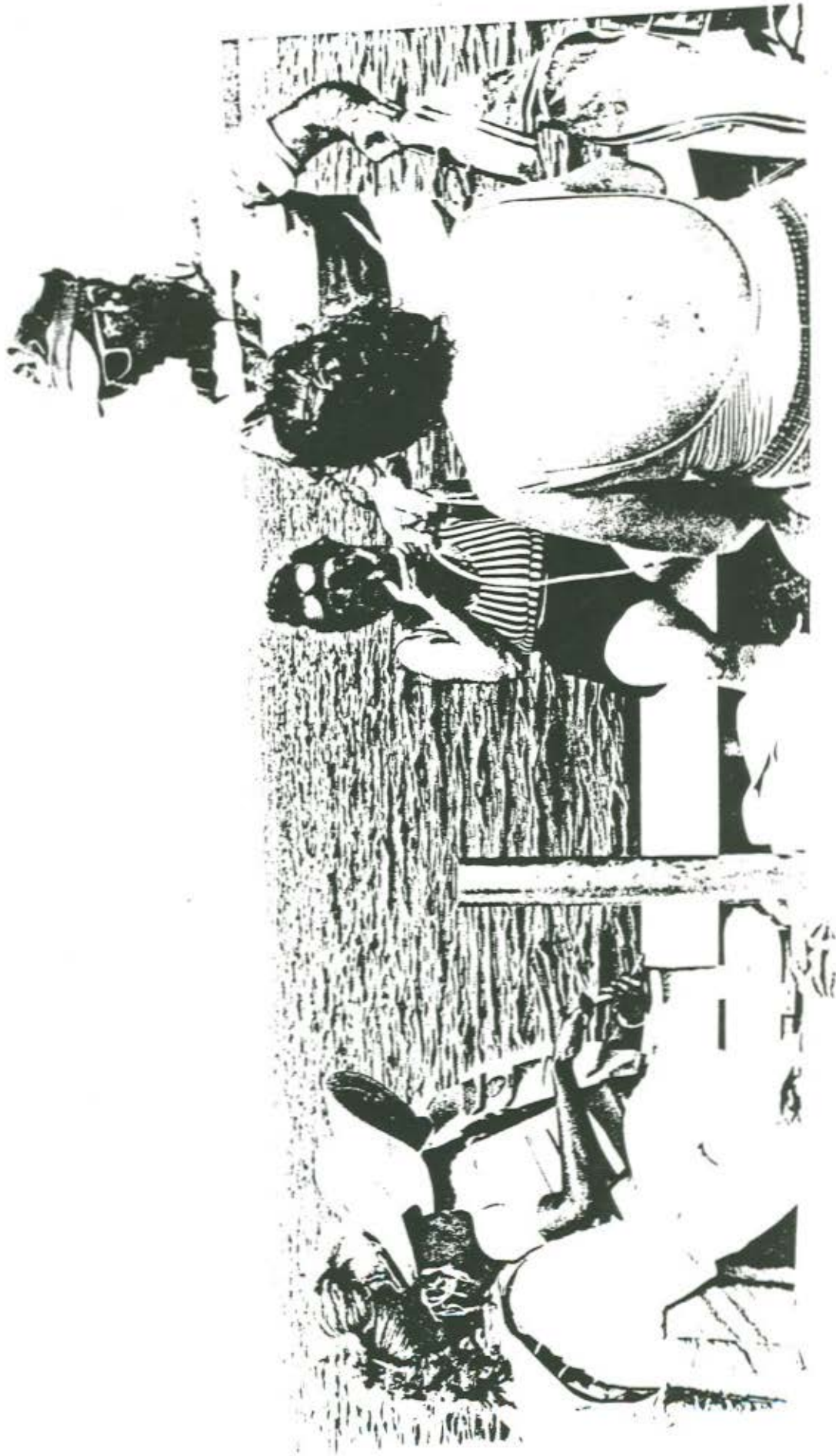
Mark Brinson
Dept. Biology
ECU
Greenville, NC 27858
919 757-6307

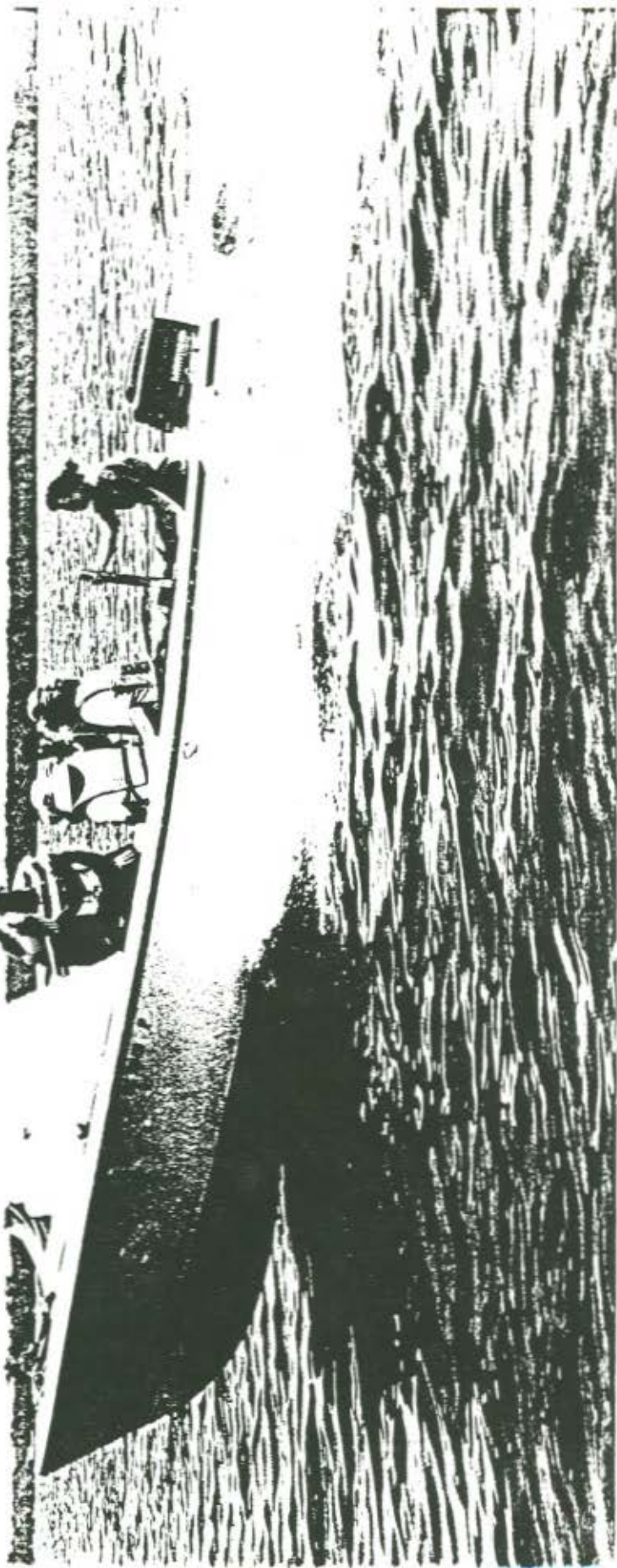
John Callaway
103 Hampton Lee Court, Apt. 2-B
Cary, NC 27513
919 460-7245

















THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

Institute for Environmental Studies

The University of North Carolina at Chapel Hill
CB# 7410, 311 Pittsboro Street
Chapel Hill, NC 27599-7410
(919) 966-2358

Melva Okun
Education Specialist
UNC-CH Environmental Resource Project
Institute for Environmental Studies
315 Pittsboro St. CB# 7410
Chapel Hill, North Carolina 27599-7410
(919) 966-3332

For six years Melva Okun has worked with the Environmental Resource Project (ERP), located at the University of North Carolina at Chapel Hill. The Environmental Resource Project's goal is to promote environmental protection and public health through informed decisionmaking by citizens at the local level. Two years ago Ms. Okun initiated a new program for the Environmental Resource Project, ERP in the Schools. Since then she has organized and conducted numerous teacher training workshops for teachers throughout North Carolina.

Ms. Okun earned a Master's in Education degree from the University of North Carolina at Chapel Hill in Educational Media and Instructional Design. In 1989 she founded and was elected the first president of the new statewide organization, Environmental Educators of North Carolina, which formed to encourage and enhance the teaching of environmental education in the state. Ms. Okun edited and produced a booklet entitled, Where the Rivers Meet the Sea. For three years she has been the science reporter for the NPR radio station, WUNC, where her pieces have primarily focused on environmental issues. Through her work with the Environmental Resource Project she has led workshops for teachers throughout the state on Energy Issues, Water Quality, Solid Waste, Low-Level Radioactive Waste and Household Hazardous Waste. During the summers of '89 and '90, Ms. Okun coordinated two-week summer teacher training sessions.

"The Science of Water Quality," University of North Carolina at Chapel Hill, sponsored by the UNC-CH Center for Math Science Education, summer of 1989.

Ms. Okun worked with Dr. Don Francisco with the UNC-CH Department of Environmental Sciences and Engineering in presenting information about water quality to teachers from the Piedmont area. The two-weeks were divided between classroom instruction, lab work, and field trips. Teachers learned about biological and chemical water quality tests,

how to properly perform these tests, and what can be learned from the data collected. Field trips were made to rivers throughout the Triangle Area, plus to water treatment and wastewater treatment plants. Presentations on water quality topics were made by numerous faculty from UNC-CH, state resource people, local elected officials, and environmental leaders.

"Coastal Ecology and Water Quality," East Carolina University, sponsored by the Albemarle Pamlico Estuarine Study and an Eisenhower Grant from the UNC Math Science Education Network, summer of 1990.

Ms. Okun worked with Dr. Mark Brinson with the ECU Biology Department in presenting information about streams, estuaries, and the surrounding landscape of terrestrial and wetland ecosystems. The two-weeks of instruction were divided between classroom presentation, follow-up field trips, and lab work. Field trips were made to different types of eco-systems located in the coastal plain, and water treatment and wastewater treatment plants. Teachers learned to perform basic water quality tests. Instructors included faculty from ECU. Presentations were made by state resource people, industry representatives, and environmental leaders.

In order for Ms. Okun to conduct teacher training workshops, funding must be obtained to cover her time and basic expenses.