

**Program for NC AFS 1996 meeting
North Carolina Chapter-American Fisheries Society
White Lake, NC
January 16-17, 1996**

Tuesday

- 11:00-13:00 Registration
- 12:00 Lunch at White Lake Facility
- 13:10-13:20 Welcome and Introductions
- 13:20-13:40 Spring electrofishing surveys of reservoir fish populations. Hugh Barwick, Duke Power.
- 13:40-14:00 Trophic dynamics of juvenile largemouth bass (*Micropterus salmoides*) in two tropical reservoirs. Alexis Alicea*, NC State University.
- 14:00-14:20 ECU's Field Station for Coastal Studies at Mattamuskeet: Off-Campus Opportunities for Research and Environmental Education. Roger A. Rulifson. East Carolina University.
- 14:20-14:40 The role of habitat complexity in mediating predator/prey interactions: experimental tests of eelgrass (*Zostera marina*) as a refuge from piscivory. Braden McCollum*, NC State University.
- 14:40-15:00 **(CANCELLED)**The North Carolina commercial fishing license moratorium - an opportunity for major change. Michael W. Street, NC Division of Marine Fisheries.
- 15:00-15:20 Break
- 15:20-15:40 The effects of a tertiary-treated sewage effluent on growth and mortality rates in the tellinid clam *Macoma mitchelli* in the Neuse River estuary, North Carolina. Lynn M. Waller*, J. E. Hightower, and W. J. Fleming. NC State University.
- 15:40-16:00 Fish community sampling in the Albemarle-Pamlico drainage of North Carolina and Virginia as part of the U.S. Geological Survey's water-quality assessment program. Peter Ruhl, U.S. Geological Survey.
- 16:00-16:20 The 1995 Roanoke River fish kills. James W. Kornegay and T. Wayne Jones, NC Wildlife Resources Commission.
- 16:20-16:40 NC Rivers Assessment program. Steve Reed, NC Division of Water Resources.
- 16:40-17:00 Selected population characteristics of redbreast sunfish in the Black and Lumber rivers, North Carolina. Keith Ashley, NC Wildlife Resources Commission.
- 17:30-18:30 Dinner
- 18:30-??? Raffle by Student Subsection of NC Chapter

*Student presenter eligible for paper competition

Wednesday

07:00-08:00 Breakfast

Special session: status of aquatic resources in the Cape Fear basin

- 08:00-08:20** Habitat use and movements of anadromous fishes in the lower Cape Fear River. Mary L. Moser and Steve W. Ross, Center for Marine Science Research.
- 08:20-08:40** Basinwide biological monitoring by NCDDEM, with special emphasis on the Cape Fear River Basin. Trish Finn MacPherson, NC Division of Environmental Management.
- 08:40-09:00** Investigation of atmospheric mercury deposition in eastern North Carolina: an emerging source of mercury in the piscivorous fish. Mark T. Hale, NC Division of Environmental Management, Water Quality Section.
- 09:00-09:20** Management of American shad in southeastern North Carolina. Fritz Rohde, NC Division of Marine Fisheries.
- 09:20-09:40** Status of selected Cape Fear River basin endangered aquatic species. John Alderman, NC Wildlife Resources Commission.
- 09:40-10:00** A retrospective natural history of the lower Cape Fear River. William F. Adams, U.S. Army Corps of Engineers.
- 10:00-10:20** Small hydropower project development in the Cape Fear River basin. Steve Reed, NC Division of Water Resources.
- 10:20-10:40** Break
- 10:40-11:50** Business Meeting
- 12:00-13:00** Lunch at White Lake facility

Acknowledgements

The Program Committee for the 1996 Annual Meeting consisted of Stephanie Goodreau, Joe Hightower (chair), Mike Meador, and Mike Street. The Program Committee thanks those who volunteered (or otherwise agreed) to present a paper at the meeting. There were two objectives for the 1996 meeting: (1) to involve fishery biologists from a number of different agencies/groups, and (2) to develop a special session about the Cape Fear drainage, which includes our meeting site. We were successful in the first regard, in that we have presentations from Duke Power, NCSU, ECU, NCDMF, USGS, NCWRC, NCDWR, UNCW, NCDEM, and COE. This meeting should be a good opportunity to establish links with some of the folks from other agencies.

Local arrangements for the meeting were handled by the Arrangements Committee, consisting of Joe Hightower and Keith Ashley. We also acknowledge the efforts of Bob Goldstein to publish and distribute the Chapter newsletter. We also thank the Student SubChapter for putting together the evening raffle.

Thank you for coming to this year's meeting. We hope it is a fun and informative meeting.

Don Degan, President
Joe Hightower, President-Elect

ABSTRACTS

Spring electrofishing surveys of reservoir fish populations.

Hugh Barwick, Duke Power Company

Abstract: Estimates of taxa composition and fish abundance were obtained from 11 Catawba river reservoirs in 1993-1995 using a boat-mounted electrofisher. Shoreline electrofishing was generally conducted along ten 300-m transects in spring when water temperatures ranged from 15 C to 20 C. All stunned fish were collected and sorted by taxon. Total number and total weight of each taxon were obtained. Taxa composition and abundance varied greatly among these reservoirs. The number of taxa collected ranged from 19 in Lake Rhodhiss to 32 in Lake Wylie. Overall, 56 taxa were collected from the Catawba River reservoirs. Mean fish abundance range from 89 kg/3000 m to 452 kg/ 3000 m of sampled shoreline. Regression analyses indicated that the observed variations in fish biomass among the Catawba river reservoirs may be related to total phosphorus concentrations in these reservoirs.

Trophic dynamics of juvenile largemouth bass (*Micropterus salmoides*) in two tropical reservoirs.

Alexis R. Alicea, NC State University

Abstract: The feeding dynamics of juvenile largemouth bass were studied from March 1992, to December 1994. A total of 1272 stomachs from Lucchetti Reservoir and 389 from Guajataca Reservoir were analyzed. A high percent of identifiable fish prey in the stomachs of juvenile bass was obtained. Early piscivory by juvenile bass was observed in Lucchetti Reservoir, aided by constant availability of fish prey items (threadfin shad, tilapias and bluegills). Threadfin shad seems to be the primary food item for juvenile bass in both reservoirs. Fish diet is supplemented with bluegills and tilapias during periods of relative high abundance. A direct relationship between predator size to prey size was observed. Insectivory was high in situations of low fish prey abundance and was a reflection of the percent of empty stomachs. Juvenile bass from Guajataca Reservoir experienced periods of low prey availability, on which high insectivory was observed along with high percent of empty stomachs and cannibalism. The distinction of two sub-cohorts in Lucchetti Reservoir showed different feeding preferences among them. Different from what expected, insect consumption by early-hatched bass in Lucchetti Reservoir was constantly higher than for late-hatched bass. Piscivory was lower for early-hatched bass than for late-hatched bass. Regardless of sub-cohort an increasing predator-prey size relationship was observed. Despite the artificial predator-prey community comprised of exotics, juvenile largemouth bass generally experienced adequate food supplies. Supplemental stocking of juvenile largemouth bass may be desirable in some situations to utilize abundant prey.

ECU's Field Station for Coastal Studies at Mattamuskeet: Off-Campus Opportunities for Research and Environmental Education.

Roger A. Rullfson, East Carolina University

Abstract: The Albemarle-Pamlico peninsula in eastern North Carolina contains over one million acres of natural areas protected under federal and state programs. In 1994, ECU, in partnership with the U.S. Fish and Wildlife Service, established a field station at the Mattamuskeet National Wildlife Refuge. The Field Station is housed in the stately Mattamuskeet hunting lodge, a national landmark constructed in 1914-15 as the world's largest pumping station to drain Mattamuskeet Lake for farming. In 1937, the pumphouse was converted by the CCC into a world-famous hunting lodge. We envision a unique broad-based academic program at the facility involving research in areas of wetland ecology, archaeology, colonial and maritime history, geography, and anthropology.

The role of habitat complexity in mediating predator/prey interactions: experimental tests of eelgrass (*Zostera marina*) as a refuge from piscivory.

Braden R. McCollum, NC State University

Abstract: Marine seagrasses provide an almost ideal model system in which to test the functional value of structural complexity. With this in mind, I performed an outdoor laboratory experiment to examine two main questions. First, does dense seagrass effect the foraging efficiency of two different kinds of piscivores: an active predator, bluefish (*Pomatomus saltatrix*) and an ambush predator, southern flounder (*Paralichthys lethostigma*), feeding on juvenile spot (*Leiostomus xanthurus*)? Within this first question, I also explored whether structure affects ambush and active predators differently. Second, if the foraging efficiency of active and/or ambush predators is effected by dense seagrass, what component of this structure causes the effect(s)? i.e. The physical barrier of the blades or the visual barrier. In addition to these initial feeding trials, I also performed a series of videotaped behavioral trials to determine if habitat complexity affected the behavior of either predator.

(CANCELLED) The North Carolina Commercial Fishing License Moratorium - An Opportunity for Major Change.

Michael W. Street, NC Division of Marine Fisheries

Abstract: Based on increased conflicts, declining resources, declining catches, increasing conflict, and increasing media attention, the North Carolina General Assembly enacted a moratorium on the sale of new commercial fishing licenses, effective 1 July 1994. A high level committee was appointed to thoroughly evaluate the existing coastal fisheries management system and recommend changes in licensing, define users, consider management policies and plans, and examine any other relevant issue. Funds were allocated to the North Carolina Sea Grant College Program to support needed research. The Fisheries Moratorium Steering Committee and its five subcommittees (license, enforcement, gear, organization, habitat) have been meeting monthly to debate the issues and develop recommendations. Preliminary recommendations address the size, composition, and authority of the Marine Fisheries Commission; license categories; limited entry; enforcement jurisdiction; and many other topics. The Moratorium Study presents a unique opportunity to address coastal fisheries management issues in a comprehensive manner..

The 1995 Roanoke River Fish Kills

James W. Kornegay and T. Wayne Jones, NC Wildlife Resources Commission

Abstract: Two extensive fish kills occurred in Roanoke River between 25 July and 2 August 1995. Moribund fish were initially observed in the bypassed reach of the river below Roanoke Rapids Lake dam and later in the river between Norfleet and Jamesville. Mortality of an estimated 2,350 striped bass (*Morone saxatilis*) occurred directly below the dam after spillway gates were closed on 24 July leaving fish stranded in isolated pools where water temperature increased rapidly. A second fish kill began after water release rates from Roanoke Rapids Lake dam were rapidly curtailed on July 29, causing waters which had inundated thousands of acres of wetlands adjacent Roanoke River, and which had become anoxic, to empty into Roanoke River. This fish kill occurred over approximately 76 river miles and killed an estimated 7,000 striped bass as well as approximately 16,000 fish of other species. Dissolved oxygen levels in the kill area ranged from 0.4 to 2.0 mg/l. The total value for dead striped bass and lost recreational fishing opportunities associated with these dead fish is estimated at \$412,839.

North Carolina Rivers Assessment Program.

Steven E. Reed, NC Division of Water Resources

Abstract: The North Carolina Rivers Assessment (NCRA) is just beginning. It is a three year effort to evaluate a number of the most important characteristics of major North Carolina rivers and streams. The characteristics or river values to be studied are being determined from input received at public workshops across the state. Technical work teams composed of people with expertise in specific areas will develop criteria for individual river values. River reaches will be assessed by team members, agencies, and the public based on the criteria established for each river value.

The information produced by the NCRA will be used to develop a GIS (Geographic Information System) data base. This data base will be available through the INTERNET to provide access to all users.

The North Carolina Department of Environment, Health, and Natural Resources has been designated by Governor James B. Hunt, Jr. as the lead state agency to coordinate the NCRA. A coalition of all groups including: municipalities, utilities, agricultural interests, conservation groups, agencies, industries, and recreationalists will be needed to complete the ASSESSMENT. A status report on the progress of the NCRA will be provided.

Selected population characteristics of redbreast sunfish in the Black and Lumber rivers, North Carolina

Keith W. Ashley, NC Wildlife Resources Commission

Abstract: The objective of this study was to evaluate a 12-fish daily creel limit on redbreast sunfish by comparing changes in abundance, length frequency distributions, age and growth, and PSD and RSD20cm over a 4 year period. Utilizing standard boat mounted electrofishing gear, a total of 123 redbreast sunfish were collected from the Black River during 1994 while 122 were collected during 1995. A total of 257 redbreast sunfish were collected from the Lumber River during 1994 while 252 were collected during 1995. Redbreast sunfish accounted for 20% by number and 5% by weight of the Black River centrarchid population collected during 1994 and 17% by number and 7% by weight during 1995. Lumber River redbreast sunfish accounted for 41% by number and 32% by weight of the centrarchid population collected during 1994 and 35% by number and 36% by weight during 1995. Black River redbreast sunfish had a mean CPUE of 18 fish/hour during 1994 and 19 fish/hour during 1995, while Lumber River redbreast sunfish were captured at a rate of 35 fish/hour during 1994 and 33 fish/hour during 1995. PSD values for redbreast sunfish in the Black River exceeded 30 both years of the study while PSD values exceeded 45 for Lumber River redbreast. Based on these values, the redbreast sunfish populations in both systems would be categorized as high quality fisheries. RSD20cm values for Lumber River redbreast of 13 (1994) and 28 (1995) would suggest an exceptional redbreast fishery in this system.

Special session: Status of Aquatic Resources within the Cape Fear River basin

Habitat use and movements of anadromous fishes in the lower Cape Fear River.

Mary L. Moser and Steve W. Ross, Center for Marine Science Research

Abstract: We conducted a fishery-independent gillnet survey and sonic tracking study from May 1990 -September 1992 to establish the distribution and movement patterns of shortnose sturgeon *Acipenser brevirostrum* and other anadromous fishes in the Cape Fear system. In spite of intensive gillnet sampling (893 net days), only seven shortnose sturgeon were captured. Three of seven fish we tagged were recaptured, further indicating that shortnose sturgeon are very rare in this drainage. We also documented high fishing pressure on other anadromous species: juvenile Atlantic sturgeon, *A. oxyrinchus*; adult striped bass, *Morone saxatilis*; adult American shad, *Alosa sapidissima*. Atlantic sturgeon juveniles occupied deep holes (> 10 m) in the upper estuary in summer and moved to the lower estuary and nearshore ocean in fall and winter. From December-April, striped bass stayed in very small territories in shallow, shoreline habitat located in the estuary. In April they initiated upstream migrations. Tag returns and tracking data indicated that some striped bass negotiated Lock and Dam #1 during spawning migrations. In contrast, American shad and shortnose sturgeon migrations were interrupted by capture in gillnets and blocked by Lock and Dam #1. The N.C. Division of Marine Fisheries has banned all sturgeon fishing in the state and has placed a season on shad fishing at Lock and Dam #1. Further study is needed to determine how locking procedures can be modified to enhance upstream passage of anadromous species.

Basinwide biological monitoring by NCDEM, with special emphasis on the Cape Fear River Basin.

Trish Finn MacPherson, NC Division of Environmental Management

Abstract: NCDEM collects benthic macroinvertebrates and fish community samples throughout North Carolina in order to assign water quality ratings to wadeable streams and rivers. The collections are now being made on a five year basin rotation schedule, in which each of the 17 river basins is sampled once every five years. Emphasis is placed on mainstem river sites, large tributaries, unassessed areas, problem areas and potential High Quality Waters areas. The Cape Fear River basin was sampled in 1993, when 96 benthos samples were collected. A total of 295 benthos sites have been sampled from 1983 through 1993. A total of 47 fish community structure analysis sites have been evaluated in the basin. A brief review of benthos and fish sampling methodologies and analysis metrics will be given. A comparison of fish and benthos data will be made, where possible, and overall water quality assessments will be presented.

Investigation of atmospheric mercury deposition in eastern North Carolina: an emerging source of mercury in the piscivorous fish.

Mark T. Hale, NC Division of Environmental Management

Abstract: NCDEM fish tissue surveys conducted in eastern North Carolina have revealed a pattern of mercury contamination in piscivorous fish comparable across multiple drainage basins, often in areas far removed from human activity. Data from these surveys suggest that atmospheric mobilization and deposition of mercury may contribute substantially to burdens in aquatic ecosystems throughout the coastal plain. The role of atmospheric mercury deposition is currently being assessed by the DEM Air Quality Lab in conjunction with Water Quality Section fish studies. Atmospheric investigations may prove to be a new tool in DEM efforts to better understand routes of mercury contamination in the states aquatic ecosystems.

Management of American shad in southeastern North Carolina.

Fred C. Rohde, NC Division of Marine Fisheries

Abstract: American shad stocks are characterized as either stressed or depressed along the Atlantic coast. Landings in North Carolina have fallen from 950,000 lbs in 1970 to a record low of 110,986 lbs in 1994. In response the North Carolina Division of Marine Fisheries established a season from January 2 to April 14, effective in 1995, for the taking of shad and river herrings. This rule led to conflicts with fishermen and with the Wildlife Resources Commission. Other management options being considered are net lift days, bag limits, no fishing zones, and quotas. Also more effective methods of passing fish through the locks on the Cape Fear River are being explored.

Status of selected Cape Fear River Basin endangered aquatic species

**John M. Alderman, Nongame & Endangered Wildlife Program
NC Wildlife Resources Commission**

Abstract: The Cape Fear shiner (*Notropis mekistocholas*) is a federally listed endangered species endemic to the Cape Fear River Basin. Extant populations exist in the Deep River from Coleridge in Randolph County to above US 1. Two isolated populations also exist in the Haw River, one above the reservoir at Bynum and one below the reservoir. Most extant populations should be considered viable under present conditions. No extant populations have been found recently in the Cape Fear River below the Haw/Deep river confluence.

Rare mussels found in the Cape Fear River Basin include the squawfoot (*Strophitus undulatus*), brook floater (*Alasmidonta varicosa*), Roanoke slabshell (*Elliptio roanokensis*), triangle floater (*Alasmidonta undulata*), Atlantic pigtoe (*Fusconaia masoni*), yellow lampmussel (*Lampsilis cariosa*), pod lance (*Elliptio folliculata*), eastern lampmussel (*Lampsilis radiata*), eastern pondmussel (*Ligumia nasuta*), and Savannah lilliput (*Toxolasma pullus*). Most of these species are state listed threatened and are species of concern for the federal government. Areas with significant populations include the Deep River, Rocky River, Cape Fear River above Fayetteville, the Black River, Town Creek, and Rices Creek.

A retrospective natural history of the lower Cape Fear River.

William F. Adams, U.S. Army Corps of Engineers

Abstract: The first European colonists encountered a Cape Fear River which was strikingly different from the one we know and manage today. Water depths, substrates, salinity, snag density and many other physical and chemical variables have been altered by two centuries of navigation improvements and economic development. When combined with intensive resource exploitation by an ever-expanding human population during this period, many commercially valuable and ecologically important aquatic species suffered extraordinary population declines. Without a clear understanding of the historic productivity and diversity of the river, we manage surrounded by a clouded horizon, with no clear perspective of where we could, or should, be directing our efforts to reacquire its full biotic potential. This retrospective natural history of the Lower Cape Fear River synthesizes many different sources of information; accounts of explorers, folk histories, old newspaper clippings, journal articles, and engineering reports on river conditions to provide a window on the river life of the past.

Small hydropower project development in the Cape Fear River basin.

Steven E. Reed, NC Division of Water Resources

Abstract: Since the early 1980's the majority of the old hydro electric projects in the basin have been retro-fitted and are once again producing electricity. There are ten projects on the Deep River and four small hydros on the Haw River. Prior to going back into operation each project went through the licensing process of the Federal Energy Regulatory Commission (FERC). State and Federal agencies provided comments during the licensing process to minimize environmental impacts.

Major environmental concerns include run-of-river operation rather than peak power production. Provision of adequate minimum flow in the by-pass reach between the dam and powerhouse is also a concern. Measures to prevent entrainment and impingement of fishes have typically been part of the agencies recommendations.

Compliance monitoring is an important part of project operations and is primarily the responsibility of the licensee and the FERC. State and Federal agencies have frequently brought problems dealing with minimum flow and run- of-river operations to the attention of FERC and the hydro operators.