



North Carolina Chapter
American Fisheries Society
Corpening Training Facility
Gill State Forest, Crossnore, NC
January 17-18, 1995



Tuesday

- ✓ 11:00-13:00 Registration
- ✓ 12:00-13:00 Lunch at Crossnore Facility
- ✓ 13:10-13:40 Welcome and Introductions
- ✓ 13:40-14:00 Fish health assessment of largemouth bass in the Catawba River, NC/SC. David J. Coughlan, B. Kim Baker, Donald G. Cloutman, and W. Mark Rash, Duke Power Company, Huntersville, NC.
- ✓ 14:00-14:20 Effects of flow and temperature on spawning migration behavior of Albemarle Sound-Roanoke River striped bass. John T. Carmichael*, Steven L. Haeseker, and Joseph E. Hightower, North Carolina State University, Department of Zoology, Raleigh, NC.
- ✓ 14:20-14:40 Assessment of Entrainment at the Bad Creek Pumped Storage Station. D. Hugh Barwick, Larry E. Miller, and Sandra S. Howie, Duke Power Company, Huntersville, NC.
- ✓ 14:40-15:00 Results from winter striped bass tagging off North Carolina and Virginia. Wilson Laney, South Atlantic Fisheries Resources Coordination Office, U. S. Fish and Wildlife Service, Raleigh, NC.
- ✓ 15:00-15:20 Break
- ✓ 15:20-15:40 Status of wetland mitigation from 1991-1994 based on a study by DEM and Federal Highway Administration review of the NCDOT mitigation sites, Owen Anderson, NCWRC, Falls Lake.
- ✓ 15:40-16:00 Instream flow protection in North Carolina. Steve Reid, NC Division of Water Resources.
- ✓ 16:00-16:20 Significance of storm flow sediment transport in trout streams. David Braatz, Duke Power Company, Huntersville, NC.
- ✓ 16:20-17:30 Volleyball/Basketball anyone???
- ✓ 17:30-18:30 Dinner
- ✓ 18:30-??? Raffle by Student Subsection of NC Chapter

* Student presenter eligible for paper competition

B 4.00
L 4.25
D 8.75
Pcm 15.00
Regist. 8.75

Wednesday

- ✓ 07:00-08:00 Breakfast
- ✓ 08:20-08:40 Streambank restoration and relocation projects in Northwestern North Carolina. Joseph Mickey, Jr., North Carolina Wildlife Resources Commission, State Road, NC.
- ✓ 08:40-09:00 Largemouth bass recruitment research in Puerto Rico: An overview. Julie E. Gran*, Richard L. Noble, Timothy N. Churchill, and Alexis R. Alicea, North Carolina State University, Department of Zoology, Raleigh, NC.
- ✓ 0900-09:20 1993 water temperature studies on Jacob's Fork, Burke County and East Prong Roaring River, Wilkes County. Bob Brown, North Carolina Wildlife Resources Commission, Morganton, NC.
- ✓ 09:20-09:40 Factors related to the abundance and growth of young-of-the-year black bass in nine Alabama reservoirs. Joseph B. Jernigan, North Carolina Wildlife Resources Commission, Morganton, NC.
- ✓ 09:40-10:00 Movement of trout in Shining Creek. Matt Rhea*, Western Carolina U., Cullowhee, NC.
- ✓ 10:00-10:20 Angler diary survey of flathead catfish in the Yadkin-Pee Dee River system, North Carolina. Marla J. Chambers, North Carolina Wildlife Resources Commission, Oakboro, NC.
- ✓ 10:20-10:40 Break
- ✓ 10:40-11:50 Business Meeting
 - ✓ Determination of Quorum - Shari Bryant
 - ✓ Secretary-Treasurer's Report - Shari Bryant
 - ✓ Reading of 1994 minutes
 - ✓ Financial Report
 - Committee Reports
 - ✓ Executive Committee - President's State of the Chapter
 - ✓ Arrangements Committee - Chris Goudreau
 - ✓ Program Committee - Don Degan, David Yow
 - ✓ Newsletter Committee - Bob Goldstein
 - ✓ Environmental Concerns Committee - Stephanie Goudreau
 - ✓ Nomination Committee - Scott Van Horn
 - ✓ Student Subunit Report - John Carmichael
 - ✓ Old Business - Wilson Laney
 - ✓ New Business - Wilson Laney
 - ✓ Installation of New President - Wilson Laney
 - President's Comments - Wilson Laney
- 12:00 Lunch at Crossnore

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Fish health assessment of largemouth bass in the Catawba River, NC/SC

David J. Coughlan, B. Kim Baker, Donald G. Cloutman*, and W. Mark Rash, Duke Power Company, Environmental Division, 13339 Hagers Ferry Road, Huntersville, NC 28078, USA

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The health of fifteen largemouth bass was assessed at various locations along the Catawba River, NC/SC, in 1993 and 1994 by the Fish Health Assessment procedure (FHA). Tissues, organs, and blood were evaluated and scored for deviations from their normal appearance/value to derive a FHA score for each location. Headwaters, minimally impacted locations, and thermal discharges had the lowest scores. High FHA scores, denoting relatively poorer fish health, characterized locations influenced by urbanization, industrialization, hydroelectric activities, and various combinations of these activities and were generally found in both years. Use of the procedure has led us to propose and test modifications to some parameters and scoring methods. We would only use fish between 250-450 mm; incorporate a relative weight metric; delete the scoring of parasites; develop graded scales to score liver, eyes, and gills; and establish metrics to score gross abnormalities and gill raker deformities. The procedure is easy to learn and use and appears to indicate trends over time that correspond to impaired water quality.

Effects of Flow and temperature on Spawning Migration Behavior of Albemarle Sound-Roanoke River Striped Bass

John T. Carmichael, Steven L. Haeseker and Joseph E. Hightower, North Carolina Cooperative Fish and Wildlife Research Unit, Box 7617, North Carolina State University, Raleigh, North Carolina 27695-7617, 919-515-2631

The Albemarle Sound-Roanoke River striped bass stock declined sharply during the 1970's. One proposed reason for the decline is that changes in water temperature and flow due to construction of hydroelectric dams adversely affected recruitment. Our objectives were to describe the timing and duration of the spawning migration and determine whether fluctuations in temperature and flow related to operation of the dams alter the distribution of spawning individuals. We used ultrasonic telemetry to monitor migratory and spawning behavior. Telemetered fish were relocated by manual searching and by using a series of fixed data-logging receivers located along the river. We typically noted a pronounced downstream flight response immediately after release in fish captured both during the upstream migration and in Albemarle Sound several months prior to migrating. Migration was initiated in mid to late April when water temperature reached about 20 degrees C. Differences in migration rates between the sexes were not significant. Males traveled the 208 kilometers between the river mouth and the spawning grounds in 8 days, compared to 11 days for females. Arrival on the spawning grounds occurred at an average water temperature of 19 C for females and 17 C for males. Length of time on the spawning grounds differed significantly for males (22 days) and females (8 days), and fish of both sexes that arrived earlier stayed significantly longer. Departure from the spawning grounds occurred when the water temperature reached about 20 degrees C. Following spawning, telemetered fish moved from the spawning grounds to Albemarle Sound in 2 to 7 days. Both upstream and downstream migration rates appeared to be unaffected by changes in flow and temperature. Short-term fluctuations in flow did not appear to affect the distribution of spawning striped bass.

Assessment of Entertainment at the Bad Creek Pumped Storage Station

D. H. Barwick, L. E. Miller, and S. S. Howie, Duke Power Company, Environmental Division, Huntersville, NC

Fish entertainment resulting from pumping at Duke Power Company's 1,065-MW Bad Creek Pumped Storage Station (BCPSS) was a major environmental concern for the South Carolina Department of Natural Resources and the United States Fish and Wildlife Service. To address these concerns, a multi-year study was developed in cooperation with these agencies and implemented. This study combined fixed hydroacoustics and full recovery netting techniques to estimate the number of fish entrained during the first three years of plant operation. In addition, standard reservoir fish sampling techniques were used prior to and during BCPSS operations to evaluate the response of fish in the lower reservoir (Jocassee Reservoir) to entrainment.

Overall, 391,327 fish were estimated entrained at the BCPSS during 14,244 hours of pumping in 1991-1993. A total of 300,406 of these fish were threadfin shad and most were entrained in late 1993. Blueback herring, white catfish, redbreast sunfish, and bluegills were the only other taxa entrained in significant numbers. The rate of entrainment was generally low (5 fish/hour) during most of the study (October 1991-August 1993). However, a major increase in entrainment was associated with decreasing water levels (due to drought conditions) in late 1993. Entrainment appeared to have little or no impact on fish populations in Jocassee Reservoir or on the effort and harvest of fish by anglers fishing this reservoir.

Stream Bank Restoration and Relocation Projects in Northwestern North Carolina

Joe Mickey, Jr., District 7 Fisheries Biologist, NCWRC

Stream bank erosion and loss of riparian vegetation along mountain trout streams is a growing problem to both fishermen and landowners in northwestern North Carolina. Unprotected stream banks erode into farmlands after each flood, causing loss of productive farmlands. Trout habitat and populations are impacted by increased sediment loads, loss of riparian vegetation, stream warming, and stream widening. Stream bank restoration projects on the North Fork New River, Ashe County, and Little Glade Creek, Allegheny County, were completed in 1992 and 1993. Goals of these projects were to improve water quality and trout habitat by stabilizing eroding stream banks. Stream bank restoration consisted of installing an erosion resistant foundation of root wads, rip-rap or logs at the base of eroding stream banks. Banks were sloped to this foundation at a 2:1 to 3:1 grade, smoothed, seeded, fertilized and mulched. Three sites totaling 225 meters (743 feet) were repaired on the North Fork New River while 23 sites totaling 292 meters (963 feet) were repaired on Little Glade Creek. Livestock were excluded by fencing and livestock crossings were established at each stream. Channel relocation projects further degrade trout streams by severely altering habitat, often resulting in a straight, rip-rapped channel. In July, 1994 the NCWRC and NC Department of Transportation worked together to relocate 126 meters (413 feet) of Little Glade Creek in Allegheny County. Goals of this project were to demonstrate that relocation projects can be done in an environmentally sound manner that simulate and accentuate natural stream characteristics that favor fish.

Largemouth Bass Recruitment Research in Puerto Rico: An Overview

Julie E. Gran*, Richard L. Noble, Timothy N. Churchill, and Alexis R. Alicea North Carolina State University, Department of Zoology, Box 7617, Raleigh, North Carolina, 27695

*Student

The largemouth bass population of Lucchetti reservoir, Puerto Rico, was studied over three years. Study objectives include determining factors affecting juvenile recruitment, impacts of supplemental stocking, and adult reproductive characteristics. Juvenile fish and environmental data were collected every three weeks. Length frequency, catch rate, and otolith analysis indicated multiple cohorts, low mortality, and rapid growth. Microtagged largemouth bass were stocked on five occasions. Subsequent recaptures provided information on movement, contribution to the natural

cohort, and growth. Largemouth bass are recruited to the fishery in less than one year. The reproductive cycle was studied to determine gonadal development, spawning time, and response to environmental variables. Bass exhibited an extended spawning season lasting six months. Gonadal development appears to be initiated by slight increases in photoperiod and temperature, but spawning may occur in response to increases in reservoir water level.

1993 Water Temperature Studies on Jacobs Fork, Burke County and the East Prong Roaring River, Wilkes County

Robert J. Brown and Joseph H. Mickey, Jr., Fishery Biologists, NCWRC

Continuous recording thermometers were placed in Jacobs Fork and the East Prong Roaring River to obtain summer water temperatures. These two hatchery supported trout streams are located in North Carolina State Parks and managed under delayed harvest regulations. Summer water temperatures reached a maximum of 77.4 degrees F in Jacobs Fork and 74.5 degree F in East Prong during July. At the temperatures found in June, trout can tolerate light handling stress with moderate to heavy handling mortality expected with catch and release fishing. In the period July 1 - September 10, daily high water temperatures approached lethal with little relief at night. Trout can not tolerate handling under these conditions. After mid-September, water temperatures had cooled. These results indicate that the current timing of the delayed harvest season (1 March - 1st Saturday in June) is about right. The change from delayed harvest to hatchery supported trout waters occurs at the critical time when increasing water temperatures do not favor the survival of hooked and released trout. The extension of delayed harvest season into the summer months is not recommended.

Factors related to the abundance and growth of young-of-the-year black bass in nine Alabama reservoirs.

Joseph B. Jernigan, NCWRC

A total of 960 young-of-the-year black bass (*Micropterus* spp.) ranging in size from 27 to 126 mm total length were collected in nine reservoirs throughout Alabama in summer 1992. Higher densities of juvenile black bass were found in eutrophic reservoirs than in oligotrophic reservoirs. Juvenile black bass density was positively correlated to adult gizzard shad (*Dorosoma cepedianum*) catch in gillnets, adult gizzard shad and threadfin shad (*D. pentenense*) collected with rotenone. Positive relationships were also computed between juvenile black bass density and mean larval threadfin shad, mean larval gizzard shad, larval shad abundances (pooled), and mean chlorophyll *a* concentrations. Abundances of all other fish species were also positively related to trophic state.

Successful black bass swim-up as indicated by survivors occurred from March 14-June 7, 1992. Water level regimes appeared to influence black bass swim-up time distribution as successful swim-up did not occur until water levels stabilized and water temperature exceeded 14°C. Fluctuations in mean daily air temperatures and maximum mean daily wind speeds to 23 kilometers/hour did not appear to affect successful black bass swim-up as swim-up distributions were unimodal and continuous. However, swim-up distribution patterns were not related to subsequent length-frequency distributions.

Age-0 black bass mean daily growth rates varied among reservoirs, but density-dependent growth depression did not occur as black bass density was positively related to growth. Faster growth rates were related to trophic status and peak larval shad abundance. Although significant differences in growth were observed in the first twenty to thirty days of life, most of these differences appeared to be attributed to earlier spawning fish utilizing available young-of-the-year shad present in these systems as a food source. More productive reservoirs in Alabama have the potential to produce greater year-class abundances of black bass, but the time of spawning was also an important determinant of cohort characteristics.

Movement Patterns of Brown, Rainbow and Brook Trout within Shining Creek, Shining Rock Wilderness Area

Matt Rhea, Department of Biology, Western Carolina University, Cullowhee, North Carolina 28723

One aspect of a study being conducted on a trout population in Shining Creek located in Shining Rock Wilderness, Haywood County, is to determine movement patterns of rainbow, Onchoryncus mykiss; brown Salmo trutta, and brook trout Salvelinus fontinalis. Movement of individual fish is being determined by tagging each fish with visible implant tags, from a known section of stream and then movement is being recorded upon their subsequent recapture. In July 1994, a 2.3 km reach of Shining Creek was divided into forty-six 50m sections. Each section was sampled using backpack electrofishing equipment. A total of 337 trout were tagged. From July to January 1995, 85 tagged recaptures have been obtained. 74% of the recaptures were taken from their original section. Of the fish that moved, 59% moved only one section and 73% of all recorded movement was upstream. The greatest movement was upstream 700m.

To determine tag retention rates, the adipose fin was clipped on all tagged fish. 141 clipped fish have been recaptured of which 85 retained the tag for an overall retention rate of 60%. Retention rates were 43% for trout less than 150mm total length (TL), and rose to 82% for trout greater than 200mm TL. Trout greater than 300mm TL had tag retention of 100%.

Angler Diary Survey of Flathead Catfish in the Yadkin-Pee Dee River System, North Carolina

Marla J. Chambers, North Carolina Wildlife Resources Commission, 12275 Swift Road, Oakboro, NC 28129

An angler diary survey of the flathead catfish (Pylodictis olivaris) sport fishery in the Yadkin-Pee Dee River system, North Carolina, was conducted (1989-1991) to examine the current fishery and provide a baseline for future comparisons. The objective of the study was to describe the quality of the fishery in terms of fish caught per hour (CPUE), size distribution, and condition (K) of the catch. Forty-four volunteer anglers were recruited to keep records of their fishing trips. Twenty cooperators reported 348 trips. Anglers fished 1,530 hours and caught 338 flathead catfish, a catch rate of 0.22 fish per hour. Eighty-seven percent of the fishing effort was directed at reservoirs, while tailraces received 10% and rivers received 3%. Participants were more successful, however, in tailraces (CPUE = 0.54), than in reservoirs (CPUE = 0.19) or rivers (CPUE = 0.14). Total lengths of captured flatheads ranged from 152 to 1219 mm. Condition factors (K) averaged 1.32.

Results from Winter Striped Bass Tagging Off North Carolina and Virginia. R. Wilson Laney, South Atlantic Fisheries Resources Coordination Office, U.S. Fish and Wildlife Service, Raleigh, NC.

For each year beginning in 1988, the U.S. Fish and Wildlife Service, South Atlantic Fisheries Resources Coordination Office, has coordinated an annual cooperative winter tagging cruise in the Atlantic Ocean off North Carolina and Virginia. The cruise is funded through the auspices of the SouthEast Atlantic Mapping and Assessment Program (SEAMAP). Cooperating agencies have included the American Littoral Society, Atlantic States Marine Fisheries Commission (ASMFC), National Marine Fisheries Service, Maryland Tidewater Administration, New York Department of Environmental Coordination, North Carolina Division of Marine Fisheries, and Virginia Marine Resources Commission. Vessels used as sampling platforms were the National Oceanic and Atmospheric Administration (NOAA) vessels ALBATROSS IV, CHAPMAN and OREGON II. The primary objective of the cruise is to capture, tag and release striped bass, Atlantic sturgeon and summer flounder on the wintering grounds located between Cape Charles, Virginia and Cape Hatteras, North Carolina. All three species are managed by the Atlantic Coast coastal states through the Atlantic States Marine Fisheries Commission. Secondary objectives include sampling the catch for striped bass which contain coded wire tags (CWT) and were released as part of the striped bass restoration program, determining length frequency of all species to assess the effectiveness of size limits, and evaluating the age structure of striped bass through aging a subsample of the fish captured. Based on the number of fish captured, tagged, released and recaptured, the cruises have been very successful. The goal of 1,000 fish tagged annually has been achieved in all but one year. To date, a total of 12,461 striped bass, 49 Atlantic sturgeon and 947 summer flounder have been tagged and released. Data for the striped bass and sturgeon are entered into a database maintained in Annapolis, Maryland by the U.S. Fish and Wildlife Service's Maryland Fisheries Resources Office. Data are available to all member states of the ASMFC. Initial efforts to analyze the data are just beginning. Through 1992, 789 recaptures, representing 12.6 percent of the fish released, had been reported from North Carolina to as far north as Nova Scotia.

