CAPE FEAR RIVER BASIN RECREATIONAL ANGLER CREEL SURVEY, 2003-2004

FINAL REPORT

COASTAL FISHERIES INVESTIGATIONS

Federal Aid in Fish Restoration Project F-22

Project Type: Survey

Period Covered: 1 July 2003 – 30 June 2004

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February 2005

This publication was funded under the Federal Aid in Sport Fish Restoration Program utilizing state fishing license money and federal grant funds derived from federal excise taxes on fishing tackle and other fishing related expenditures.

Funds from the Sport Fish Restoration Program are used for aquatic education, fisheries research and management, and boating access facilities. The program is administered cooperatively by the N. C. Wildlife Resources Commission and the U.S. Fish and Wildlife Service.

Abstract — A creel survey of Cape Fear River recreational anglers was conducted from 1 July 2003 to 30 June 2004. Project objectives were to characterize major components of this recreational fishery by estimating angling effort, catch, harvest, demographics, and trip-related expenditures. During 208 scheduled sample days, 387 interviews of 715 boat anglers were conducted; observed effort was 3,499 angler hours. Estimated total boat angler effort was 134,976 angler hours with an estimated total catch and harvest of 78,284 and 31,272 fish, respectively. Catfish were the most popular game fish sought after, receiving 32% of the total effort expended by Cape Fear River anglers during the creel period. While catfish received the most directed effort of all targeted species, the highest estimates for catch and harvest were for sunfish (*Lepomis* sp.). Angler effort, catch, and harvest estimates varied by species, month, and day type, but were generally highest on weekdays in the lower river from Elwell's Ferry downstream to Wilmington. The majority of anglers interviewed during the creel period rated their trip satisfaction as fair (47.5%), followed by poor (25.2%), good (24.2%), and excellent (3.1%). Estimated total expenditures by all anglers during the creel survey period were US$1,027,910, and anglers were willing to spend an additional $635,132 for another trip of equal or greater satisfaction.

The Cape Fear and Northeast Cape Fear rivers located in North Carolina's southern coastal plain have historically provided quality recreational angling opportunities. Below river km 219, the Cape Fear River is impounded during low and moderate flow stages by three navigation locks and dams that were constructed between 1913 and 1934 near Tarheel, Elizabethtown, and Riegelwood and are owned and operated by the U.S. Army Corps of Engineers (USACOE) (Figure 1). These structures have been shown to impede anadromous fish migrations, especially during periods of low flow (Louder 1963, Davis and Cheek 1966, Moser and Ross 1993). Before 1913 there were no obstructions restricting the upstream passage of anadromous fish in the Cape Fear River to their historical spawning grounds, located at Smiley Falls near Lillington. Flow in the Cape Fear River is largely regulated by water releases from the USACOE's B. Everett Jordan Lake, a water-supply impoundment on the Haw River.

Resident freshwater fish species of recreational importance found in these systems and their tributaries include largemouth bass *Micropterus salmoides*, bluegill *Lepomis macrochirus*, redear sunfish *L. microlophus*, redbreast sunfish *L. auritus*, pumpkinseed *L. gibbosus*, warmouth *L. gulosus*, black crappie *Pomoxis nigromaculatus*, channel catfish *Ictalurus punctatus*, blue catfish *I. furcatus*, chain pickerel *Esox niger*, redfin pickerel *E. americanus*, and yellow perch *Perca flavescens*. (Louder 1963). Two important sport fish that have been introduced into the Cape Fear River include spotted bass *M. punctulatus* (1977 stockings) and flathead catfish *Pylodictis olivaris* (released in the 1960s). The Cape Fear River has historically supported popular fisheries for largemouth bass and bluegill in the spring, with most of the effort concentrated immediately below each of the lock and dams on the mainstem river. There is also a considerable hook-and-line recreational fishery for blue and flathead catfish, with most of the effort concentrated from Buckhorn Dam at Carthage downstream to Fayetteville.

Anadromous species including striped bass *Morone saxatilis*, American shad *Alosa sapidissima*, hickory shad *A. mediocris*, blueback herring *A. aestivalis*, and alewife *A. pseudoharengus* support highly popular springtime fisheries as they migrate into freshwater reaches of the Cape Fear River to spawn. However, the extent of upstream migration in any given year is highly dependent on river flows. In most years, anadromous fish spawning is limited to areas downstream of Buckhorn dam, although striped bass spawning areas have not been formally defined. Hickory shad, blueback herring, and alewife are generally found downstream of Lock and Dam 1.

While the major factor limiting the potential of fisheries resources within the Cape Fear River Basin is the impedance to fish migrations by locks and dams, other concerns include poor water quality and excessive sediment loading, primarily from agricultural and forestry operations in the Cape Fear River Basin. Increased development and associated projects, unstable shorelines, and road construction adjacent to the Cape Fear River and its tributaries have also been identified as potential threats to fisheries resources. Excessive sedimentation and resultant turbidity is particularly damaging to spawning habitat and early life history stages of aquatic organisms. Additionally, losses of wetlands and riparian buffer zones, which help to filter pollutants and settle out sediments, can have a negative impact on water quality and fisheries resources in adjacent water bodies.

Fish tissue analyses conducted by North Carolina Division of Water Quality (NCDWQ) personnel have revealed high levels of mercury in largemouth bass, bowfin (*Amia calva*), and chain pickerel collected from several locations within the Cape Fear River Basin (NCDWQ 1995). The U.S. Food and Drug Administration's Action Level for mercury is 1.0 mg/kg body weight. This level has been exceeded in bass, bowfin, and chain pickerel collected from the Black and South rivers and for bass and bowfin collected from Black Lake (Bay Tree Lake). As a result, the State Health Director has issued a fish consumption advisory for largemouth bass, bowfin, and chain pickerel for the entire South River basin, including that portion of the Black River watershed downstream of its confluence with the South River. The fish consumption advisory recommends no consumption of largemouth bass, bowfin and chain pickerel by women of childbearing age and children, and no more than two meals per month by the general public. There is also a no-consumption fish advisory in affect for largemouth bass and bowfin in Black Lake.

In addition to fish tissue analysis in the Cape Fear River Basin, NCDWQ personnel have been using an Index of Biotic Integrity (IBI) to assess overall health of wadable streams based on fish assemblages, invertebrate sampling, and water quality data. Use-support ratings were determined for 90% (9,014 km) of the 9,984 km of freshwater streams and rivers within the basin. Approximately 72% were rated as supporting their uses, 18% were considered impaired, and the remaining 10% were not evaluated (NCDWQ 1995). Sediment was reported as the most widespread cause of use-support impairment throughout the basin, followed by turbidity, pH, metals, fecal coliform bacteria and ammonia. Additionally, 1,400 stream/river km were reported to be impaired by non-point sources (agriculture, urban runoff and construction) and 291 km were impaired by point sources (NCDWQ 1995).

Results from the NCDWQ surveys conclude that the lower Cape Fear River Basin is a highly stressed system, and the demands of continued growth and development will likely only increase over time. Environmental stressors that accompany this development could potentially limit the fisheries resources of the Cape Fear River Basin and thus adversely affect both the quality and quantity of recreational fishing opportunities. At the same time, continuing urbanization will likely elevate public demand for quality recreational experiences such as angling. To insure the continuation of viable recreational fisheries in the Cape Fear River it is essential that the North Carolina Wildlife Resources Commission (NCWRC) obtain periodic estimates of angler usage and fish harvest. However, the recreational angling opportunities provided by the Cape Fear and Northeast Cape Fear rivers have never been evaluated. The specific objectives of this study were to estimate and describe angling effort, catch and harvest, to collect trip-related information on angler residency, expenditures, and satisfaction, and to use information generated by this survey to assess the importance of boat angling in the Cape Fear River Basin.

Study Area

The Cape Fear River, the largest river system in the state, forms at the confluence of the Deep and Haw rivers in Piedmont North Carolina and flows southeasterly for approximately 274 km where it discharges into the Atlantic Ocean at Cape Fear, near Southport, North Carolina. The basin lies entirely within the state, includes portions of 27 counties and 114 municipalities, and encompasses 9,984 km of freshwater streams and rivers, 36 lakes and reservoirs, and 15,864 ha of estuarine waters (NCDWQ 1995). Major tributaries include the Upper and Lower Little rivers in Harnett County, the Black River in Bladen, Pender, and Sampson counties, and the Northeast Cape Fear River in Duplin, Pender and New Hanover counties.

The recreational angler creel survey was conducted on the Cape Fear River from Lillington downstream to Wilmington and on the Northeast Cape Fear River from Lane's Ferry (NC Highway 210) downstream to Castle Hayne (NC Highway 133). Creel survey sample areas extended from the NCWRC boating access area at Lillington downstream to the Castle Street Landing access area in Wilmington (Figure 1) and included Harnett, Cumberland, Bladen, Pender, Sampson, Columbus, Brunswick, and New Hanover counties. The survey area was located entirely within the Coastal Plain physiographic region. The river was stratified into two sample zones based on jurisdictional boundaries and observed fishing effort. The upper zone (Zone 1) included access areas from Lillington downstream to Lock and Dam 2 at Elizabethtown. Zone 2 included access areas from Elwell's Ferry downstream to Wilmington. Zone 2 also included the private boating access area located at Lane's Ferry as well as the NCWRC boating access area located at Castle Hayne.

Methods

Survey Design

A non-uniform probability stratified access-point creel survey (Pollock et al. 1994) was used to estimate effort, catch, and harvest of recreational boat anglers on the Cape Fear River from 1 July 2003–30 June 2004. Sampling periods were stratified by month, zone, and day type (weekday and weekend). The survey design consisted of two randomly chosen weekdays and both weekend days each week. Saturdays, Sundays and national holidays were considered weekend days. Interview sessions were held once daily at randomly selected boating access areas. The interview day was divided equally into either morning (AM) or afternoon (PM) periods and began 2 h after sunrise and ended 0.5 h after sunset. Interviews conducted in Zone 1 from July 2003 to March 2004, and in Zone 2 from July 2003 to February 2004 and June 2004, had an equal probability of being assigned to either the morning or afternoon period. In Zone 1 from April through June 2004, a probability of 0.7 was used to assign an interview session to the AM period while a probability of 0.3 was used to assign interview sessions to the PM period. These same probabilities were used to assign interview sessions in Zone 2 from March through May 2004. The probabilities for conducting interviews at specific access areas differed by season and were assigned based on prior knowledge of fishing pressure at each access area along with information provided by local wildlife enforcement officers (Table 1).

Data Collection

A creel clerk interviewed boat-angling parties as they exited the river. Information requested from all anglers included number in party, number of hours spent fishing (party effort), total number of fish caught and released, and number of fish harvested (Appendix 1). When possible, harvested fish were identified to species, enumerated, and measured (TL, mm; up to 20 fish total). To reduce errors of fish identification and/or nomenclature by either anglers or creel clerks, largemouth bass and spotted bass were categorized as black bass; bluegill, redear sunfish, redbreast sunfish, pumpkinseed, and warmouth were all categorized as sunfish; channel catfish, blue catfish, and flathead catfish were all categorized as catfish; and striped bass and hybrid striped bass were categorized as *Morone* species. Project personnel also sought information regarding angler residency (county and/or state), angler demographics (gender, age, and race), trip expenditures (gas, bait, food, lodging, etc.) including any additional amount of money anglers would be willing to spend for a similar experience, trip satisfaction (excellent, good, fair, or poor) and likely disposition of harvested fish.

Analytical Procedures

Anglers were divided into three groups based on their responses regarding which species they were specifically fishing for during their trip. Anglers targeting a specific freshwater species or group (i.e., largemouth bass, sunfish, striped bass, American shad, catfish, etc.) were classified as specialists; anglers targeting a specific combination of species including combinations of striped bass/largemouth bass, striped bass/crappie, striped bass/catfish, striped bass/shad, sunfish/catfish, largemouth bass/crappie, largemouth bass/sunfish, crappie/catfish, and shad/catfish were classified as specified generalists; while anglers targeting “anything that bites” were classified as non-specified generalists. Effort in angler hours was calculated for each of the three angling groups, and for all groups combined by month, zone, and day type. Catch (total number of fish caught) and harvest (number caught - number released) of each targeted species were also calculated by month, zone, and day type. Success rates for anglers targeting largemouth bass, striped bass, sunfish, crappie, American shad, and catfish were expressed as the total number of observed fish caught for each species divided by the total number of observed angler hours targeting that particular species. Size structure of commonly harvested species (species for which > 5 individuals were harvested during the creel period) was described using length-frequency distributions.

Total angling effort (in angler hours), catch and harvest were estimated for each month, zone, and day type for the 12-month survey period. For each month and zone, daily effort was determined by expanding the observed effort (from angler interviews) by the sample unit probability (product of access area probability and time of day probability). The means of the daily angling effort values (calculated separately for weekdays and weekend days) were applied to the total numbers of days of that type for the month and summed to estimate total effort for the month. Standard errors of the effort estimates (E) within strata were computed as:

$$\hat{SE}\left(\hat{E}\right) = \sqrt{N^2\left(\frac{s^2}{n}\right)}$$

where s^2 is the variance of the effort observations, n is the number of days sampled, and N is the number of days of that type available for sampling.

Angler demographics were tabulated for the creel period with age, gender, and race groups expressed as a percentage of the total number of anglers interviewed. Adults were classified as those anglers 16 years and older, while females between the ages of 16 and 44 were further classified as women of childbearing age. Angler origin was compiled according to county and state of residence and defined as local, regional, or nonresident. Local anglers resided in counties within the creel study area while regional anglers resided in other North Carolina counties. Nonresident anglers resided outside of North Carolina.

Mean expenditures per trip and additional "willingness to pay" expenditures were calculated and expressed by target species, angler origin, zone, and day type. An estimate of the overall annual economic value of the Cape Fear River recreational fishery was determined as the product of the total estimated angler hours and the overall average expense per angler hour. Standard errors for these estimates were approximated using the Taylor Expansion Series (Sheps and Menken 1973).

Results and Discussion

From 1 July 2003 to 30 June 2004, 715 boat anglers (387 party interviews) were interviewed on the Cape Fear River during 208 scheduled sample days; total observed effort was 3,499 angler hours. Scheduled sample days with no angler interviews (N = 59) generally occurred throughout the year and were closely associated with adverse weather conditions (rain, extreme high water, snow, etc.). Twenty-two species of fish were caught by Cape Fear River anglers during the creel survey period. Specialists accounted for the majority of total effort (67.3%), with anglers targeting catfish accounting for 32.2% of the total effort, followed by largemouth bass (16.2%), sunfish (11.9%), striped bass (4.4%), American shad (1.7%), and crappie (<0.6%). Specified generalist anglers comprised 21.3% of the remaining effort, with sunfish/catfish given as the most popular generalist combination (12.8% of the total effort). Non-specified generalist anglers comprised the remaining 11.4%. Other freshwater species harvested by anglers included common carp *Cyprinus carpio*, longnose gar *Lepisosteus osseus*, chain pickerel, yellow perch, white perch *Morone americana*, and bowfin. Estuarine species caught within the survey period included flounder *Paralichthys* sp., Atlantic croaker *Micropogonias undulatus*, spot *Leiostomus xanthurus*, striped mullet *Mugil cephalus*, and red drum *Sciaenops ocellata*.

Angling Effort

A total estimated effort of 134,976 angler hours (SE = 6,190) was expended by Cape Fear River boat anglers from 1 July 2003 to 30 June 2004. This effort estimate is markedly lower than those reported from other NC coastal rivers; anglers fishing the Chowan River from 1 July 2002 to 30 June 2002 expended a total estimated effort of 213,076 angler hours (SE = 29,003) (Dockendorf et al. 2004) while anglers fishing the Neuse River from 1 July 2002 to 30 June 2003 expended a total estimated effort of 292,243 angler hours (SE = 38,501) (Rundle et al. 2004). Mean number of anglers per party was 1.8 (SE = 0.1) and mean trip length was 4.9 h (SE = 0.3). Total effort expended in both zones was similar with a total of 63,364 angler hours (SE = 4,238) expended in Zone 1 and 71,612 angler hours (SE = 4,512) expended in Zone 2. Total weekday effort was slightly higher than total weekend effort in both zones (Table A2.1). Total effort was

highly variable between zones and day types and although angling effort varied by species and day type, overall fishing effort on the Cape Fear River was highest in Zone 2 on weekdays (40,814 angler hours; SE = 3,877). The complete breakdown of effort estimates can be found in Appendix 2.

Traditionally, the Cape Fear River has been a popular destination among catfish anglers. As expected, the greatest amount of directed effort targeted catfish (43,540 angler hours; SE = 3,791); catfish angling represented twice the effort expended by black bass anglers (21,825 angler hours; SE = 2,882). Seventy-six percent of the angling effort for catfish (33,266 angler hours; SE = 3,377) occurred in Zone 1 with more effort occurring on weekdays (20,594 angler hours; SE = 3,009) than weekend days (12,672 angler hours; SE = 1,533). Catfish angling effort peaked in August of 2004 (7,593 angler hours; SE = 1,757) (Figure 2). Other peak months included February through June 2004 (Figure 2). Mean trip length for catfish anglers was 5.8 h with an average party size of 2.0 anglers.

According to reports from local NCWRC wildlife enforcement officers who patrol the area, as well as the lockmasters at each of the locks and dams, a fairly significant amount of fishing effort is expended by Cape Fear River catfish anglers immediately below these structures after dark. If so, effort estimates (as well as catch and harvest) obtained during this creel survey most likely underestimate the true values for this group. Future creel surveys on the Cape Fear River should consider expanding the creel day to include potential after-dark activity of catfish anglers.

Black bass were second only to catfish in directed effort by Cape Fear River anglers (21,825 angler hours; SE = 2,882). In contrast with catfish anglers who preferred to fish in Zone 1, the majority of this effort (18,839 angler hours; SE = 2,823) occurred in Zone 2. Peak fishing effort for bass occurred from March through June for both zones (Figure 3). Mean trip length for bass anglers was 5.3 h and average party size was 1.5 anglers.

Sunfish anglers exerted an estimated 16,077 angler hours (SE = 1,853) of total effort. Most of this fishing activity occurred in Zone 2, where sunfish effort was nearly twice as high on weekdays (8,834 angler hours; SE = 1,613) than on weekends (4,615 angler hours; SE = 797). Sunfish total effort was four times greater on weekends (2,110 angler hours; SE = 348) in Zone 1 than on weekdays (519 angler hours; SE = 273). Effort peaked during May and June in both zones (Figure 4). Mean trip length for sunfish anglers was 4.3 h with an average of 1.8 anglers per party.

Estimated total effort for striped bass and hybrid striped bass was 6,013 angler hours (SE = 784). While effort for these *Morone* sp. was almost equal between weekdays (2,432 angler hours; SE = 496) and weekends (2,038 angler hours; SE = 392) in Zone 2, effort was over three times greater on weekends (1,199 angler hours; SE = 443) than on weekdays (345 angler hours; SE = 141) in Zone 1. Most of the effort for *Morone* sp. occurred between September and March with most of the effort (67%) occurring in Zone 2 (Figure 5). Mean trip length for *Morone* sp. anglers was 4.1 h, with an average of 1.6 anglers per party.

American shad were fourth in importance among targeted species, receiving an estimated 2,283 angler hours (SE = 479) of total effort. In comparison, 19,839 angler hours (SE = 4,809) were expended by Cape Fear River shad anglers during a 10-week intensive creel survey of boat and bank anglers conducted on the river between 5 March 2002 and 19 May 2002 (NCWRC, unpublished data). The most probable explanation for the difference in angler effort between the two creels is that the 2002 creel was conducted only at the lock and dams, where the majority of shad fishing takes place, and included bank shad anglers. In addition, the boat ramp at Lock and Dam 2, located in Elizabethtown, was closed most of the 2004 creel year due to renovation,

thereby reducing the total number of potential interviews with shad anglers. As expected, given the timing of the spawning migration, all of the effort in the current survey occurred in March and April with the majority of effort (82%) being exerted in Zone 2 at Lock and Dam 1 (Figure 6). Mean trip length for American shad anglers was 5.1 h, with an average of 1.6 anglers per party.

Black crappie received the least amount of fishing effort by specialist anglers during the creel survey period (1,074 angler hours; SE = 313). Sixty percent of the total effort occurred in October (Figure 7). The majority of this effort occurred on weekends (955 angler hours; SE = 308) with 94% of the total effort occurring in Zone 2. Mean trip length for black crappie anglers was 3.0 h with an average of 1.5 anglers per party.

An estimated 21.3% of all recreational anglers fishing the Cape Fear River reported targeting more than one fish species during their trip. Estimated total effort for these specified generalist anglers was 28,824 angler hours (SE = 2,829). Of this total, 60% of the anglers fished specifically for sunfish/catfish, exerting 17,315 angler hours (SE = 2,569) of effort. It is significant to point out that most of these anglers stated during the interview that they were fishing for sunfish to catch and use as bait for catfish later in the fishing trip. While most of the effort by these sunfish/catfish anglers was equally divided within Zone 1 between weekdays (5,528 angler hours; SE = 1,626) and weekends (5,015 angler hours; SE = 724), the majority of the Zone-2 effort occurred on weekdays (5,688 angler hours; SE = 1,832). The remaining 40% of effort (11,509 angler hours; SE = 1,185) exerted by specified generalist anglers was directed at a specific combination of species including striped bass/largemouth bass, striped bass/crappie, striped bass/shad, crappie/largemouth bass, crappie/catfish, and shad catfish. The three most common combinations included sunfish/catfish, sunfish/largemouth bass, and striped bass/catfish. Mean trip length for specified generalist anglers was 4.8 h with an average of 2.0 anglers per party.

Non-specified generalist anglers who reported fishing for “anything that bites” were common during the Cape Fear River creel survey, and contributed an estimated 15,340 angler hours (SE = 1,806) of effort. Most of the effort put forth by this group was evenly distributed between weekdays (3,475 angler hours; SE = 1,315 for Zone 1; 4,551 angler hours; SE = 946 for Zone 2) and weekends (3,023 angler hours; SE = 536 for Zone 1; 4,291 angler hours; SE = 594 for Zone 2) within each zone with slightly greater effort occurring in Zone 2 than Zone 1. Mean trip length for non-specified generalist anglers was 4.2 h with an average of 1.9 anglers per party.

Angling Catch and Harvest

We estimated 78,284 fish (SE = 5,813) were caught from the Cape Fear River during the twelve-month survey period. The estimated number harvested was 31,272 fish (SE = 2,379). In contrast, total estimates of catch and harvest from the Chowan River and Neuse River creels were much higher. Chowan River anglers caught an estimated 354,650 fish (SE = 61,352) and harvested 195,565 fish (SE = 33,903) (Dockendorf et al. 2004), while Neuse River anglers caught an estimated 233,764 fish (SE = 38,591) and harvested 93,407 fish (SE = 18,434) (Rundle et al. 2004).

Estimates of catch and harvest were similar for each zone with more fish being caught and harvested on weekdays than on weekends (Table A3.1). Sunfish accounted for 60.4% of the total catch and 59.4% of the total harvest followed by catfish which accounted for 17.3% of the

total catch and 30.6% of the total harvest. The complete breakdown of catch and harvest estimates can be found in Appendix 3.

Although more angler effort was directed for catfish than any other targeted species during the sample period, estimates of catch and harvest ranked second among Cape Fear River anglers. Total estimated catch of catfish was 13,554 fish (SE = 1,287) with an estimated harvest of 9,561 fish (SE = 1,214). Estimates for catch and harvest of catfish were much greater in Zone 1 than in Zone 2. Catfish catch and harvest estimates peaked during the months of August and April in both zones (Figure 8). Creel clerks measured 223 catfish at the various access areas. Of this total, 45 were channel catfish (236-540 mm), 169 were blue catfish (161-1,113 mm), and 9 were flathead catfish (402-920 mm) (Figure 14). Anglers targeting catfish had a success rate of 0.3 fish caught per angler hour.

While sunfish ranked third in targeted effort during the creel period, catch (48,288 fish; SE = 5,490) and harvest (18,588 fish; SE = 1,991) were highest for this group. Total estimated catch and harvest of sunfish was slightly higher in Zone 1 than in Zone 2 and peaked during June in Zone 1 and May in Zone 2 (Figure 9). The sunfish measured during the survey (N = 403) ranged from 86-242 mm (Figure 15). Of this total, 379 were bluegill (range 86-242 mm) (Figure 16), 15 were warmouth (range 127-222 mm) (Figure 17), two were redbreast sunfish (140 mm, 168 mm), three were redear sunfish (range 150-174 mm), and four were spotted sunfish (range 138-169 mm). Sunfish anglers had a success rate of 3.0 fish caught per angler hour.

While directed effort for black bass ranked second, estimates of black bass catch ranked third and harvest ranked near the bottom among Cape Fear River anglers. Total estimated catch of black bass was 9,403 fish (SE = 1,182) with only 4.7% of these fish harvested (449 fish; SE = 131). Total catch of black bass was substantially higher in Zone 2 than Zone 1 but virtually all of the harvest (96.9%) occurred in Zone 1 (Figure 10). According to local NCWRC wildlife enforcement officers, a fair number of bass tournaments are held on the lower river (Zone 2) in the spring whereas very few bass tournaments are held on the upper river (Zone 1). No bass tournaments were encountered during the creel survey. Tournament bass anglers, however, often practice catch-and-release fishing while most of the anglers in Zone 1 tended to be consumptive anglers. This difference in angler behavior could explain why most of the bass caught in Zone 1 (upper river) are harvested while most of the bass caught in Zone 2 (lower river) are released. Monthly catch and harvest estimates for black bass concurred with effort and peaked from March through June in both zones. The success rate for anglers targeting black bass was 0.4 fish caught per angler hour. Only 13 black bass (320-480 mm) were measured at the access areas (Figure 18), and none were observed being harvested in violation of size or creel limits.

Fishery independent stock assessment surveys conducted by the NCWRC since 2002 indicate that the black bass population in the Cape Fear River is composed primarily of largemouth bass (3-year mean, 54%) and spotted bass (3-year mean, 46%) (Ashley and Rachels 2004a). To reduce errors of fish identification and/or nomenclature by either anglers or creel clerks, no attempt was made to distinguish between these two species during the creel interview. However, to better understand the dynamic interactions occurring between these species, it would be beneficial to fishery managers if future creel surveys could be designed to obtain the proportion that each of these species contributes to the different creel parameters (catch and harvest).

American shad catch and harvest estimates reflect seasonal abundance of this species in the Cape Fear River during their spawning migrations. Despite the large numbers of American shad in the Cape Fear River during the spring of the year, overall estimated catch and harvest for this species were low. Total catch of American shad was 3,440 fish (SE = 655) with an estimated

harvest of 2,141 fish (SE = 444) or 62.2% of the total catch. As expected, virtually all of the shad catch and harvest occurred from March through May with both estimates peaking in April in both zones (Figure 11). Zone-2 catch (2,552 fish; SE = 582) and harvest (1,282 fish; SE = 325) estimates were more than double the catch (888 fish; SE = 303) and harvest (859 fish; SE = 303) estimates for Zone 1. Creel clerks measured 77 American shad ranging from 283-560 mm, (Figure 19). No American shad angler was observed harvesting more than the 10-fish limit. Anglers targeting American shad had a success rate of 1.5 fish caught per angler hour.

Comparison of catch and harvest estimates generated during this creel with those of the 2002 American shad creel survey reveal much lower numbers of shad were caught and harvested in 2004 than in 2002 (catch = 25,995 fish, SE = 7,494; harvest = 12,879 fish, SE = 3,292. However, differences in design between the two creel surveys make direct comparisons difficult, especially considering bank anglers were not interviewed in the current survey. As mentioned previously, the boat ramp at Lock and Dam 2 was closed most of the creel year (opened in May 2004), resulting in the loss of potential interviews with shad anglers at this location. The closure of a popular ramp may have contributed to the reduction in total catch and harvest of this species.

Total estimated catch (2,034 fish; SE = 232) and harvest (155 fish; SE = 33) of *Morone* sp. reflects their relatively low abundance in the Cape Fear River. Only 7.6 % of the *Morone* sp. caught were harvested, with harvest distributed equally between zones. Approximately twice as many *Morone* sp. were caught in Zone 2 as were caught in Zone 1, which coincides with the upstream migration of striped bass in the spring (Figure 12). Fishery independent stock distribution data revealed 61% of all striped bass collected from the Cape Fear River in 2004 were collected below Lock and Dam 1 (Ashley and Rachels 2004b). Monthly *Morone* sp. catch and harvest estimates indicate *Morone* sp. may be present in the system throughout the year (Figure 12). Only five *Morone* sp. ranging from 360-537 mm were measured by the creel clerk, with none observed in violation of size or creel limits. Anglers targeting *Morone* sp. had a success rate of 0.3 fish caught per angler hour.

During the sample period, striped bass regulations included a minimum size limit of 457 mm, a protective slot limit of 559-686 mm, and a 3 fish/d creel limit. Of the five striped bass measured during the creel, four were of legal size but all were below the protected slot size. Estimates of effort, catch and harvest obtained during this creel, used in conjunction with fishery independent stock assessment survey data collected by NCWRC personnel over the past two years (Ashley and Rachels 2003, Ashley and Rachels 2004), support the conclusion that the Cape Fear River striped bass stock is currently diminished and may require additional restrictive measures for stock restoration.

The lowest total estimated catch (657 fish; SE = 115) of any targeted species was black crappie, and total estimated harvest (203 fish; SE = 74) ranked next to last. Total catch of black crappie was over four times higher in Zone 2 than in Zone 1 while total harvest was slightly higher in Zone 1 (Figure 13). Catch peaked in October and April in Zone 2 and in April in Zone 1. Only two black crappie were measured by the creel clerk (232 mm, 234 mm); anglers targeting black crappie had a success rate of 0.6 fish caught per angler hour.

Angler Demographics

Of the 712 Cape Fear River boat anglers responding to interview questions during the creel period, 93.1% resided in the local counties of Bladen, Brunswick, Columbus, Cumberland, Harnett, Pender, Robeson, and New Hanover. Regional boat anglers comprised an additional

6.0% of the remaining anglers and were from Duplin, Edgecombe, Greene, Hoke, Moore, Onslow, Orange, Sampson, and Wake counties. Out-of-state anglers accounted for the remaining 0.9% of all anglers interviewed and consisted of 6 anglers from Horry County, South Carolina.

Distribution of anglers between zones was fairly even with 55.8% percent fishing in Zone 2 and 44.2% fishing in Zone 1. Furthermore, the majority (68.0%) of Cape Fear River anglers fished on weekends while the remainder (32.0%) fished during the week.

The racial composition of Cape Fear River anglers interviewed during the creel survey included anglers of Caucasian (85.4%), African American (7.9%), Native American (6.0%), Hispanic (0.4%), and Asian (0.1%) descents. Adult males (age 16 +) comprised 80.6% of all anglers interviewed compared to just 5.2% for adult females (age 45 +). Women of child-bearing age (16-44 years of age) comprised an additional 6.4% with children (< 15 years of age) accounting for the remaining 7.8%.

Of the 265 Cape Fear River anglers harvesting fish (37.2% of all anglers interviewed) 86.0% indicated they planned to consume their catch. Anglers consuming their catch averaged 2.6 meals (SE = 0.6) of Cape Fear River fish per month. Additionally, 13.2% gave their harvest away for table fare, and 0.8% used their harvest for bait.

Angler Expenditures

The total combined average expenditure for gas, bait, and food, based on reported expenses from 386 boat fishing trips, was US$20.84 per trip. Reported expenditures for lodging and "other" expenses included only one response and were not expanded over the creel period. The average overall expense per angler hour, exclusive of willingness to spend, was $2.91 (SE = 0.13). Estimated total expenditures from all interviewed anglers during the Cape Fear River creel survey period was $392,777.25 (SE = $11,820.58). In contrast, estimated total expenditures by Chowan River anglers were almost twice as high ($885,333.59; SE = $53,318.84) while estimated total expenditures by Neuse River anglers were nearly four times higher ($1,835,287.00; SE = $101,890.00). The absence of overnight travel and associated lodging and miscellaneous expenditures during the Cape Fear creel survey likely resulted in lower overall expenditures. The total number of trips in each expenditure category, along with the complete breakdown of expenditures per trip, can be found in Appendix 5.

Although angler expenses varied by target species and angler point of origin, catfish anglers spent more money than any other angler group, accounting for 30.1% of the total expenditures during the creel period. Based on observed expenditures from 87 catfish angling trips, catfish anglers spent a combined average of $21.25 per trip on gas, bait, and food, or $2.72 per angler hour. Total estimated expenditures by catfish anglers during the creel period was $118,428.80 (SE = $7,061.25) (Table 2).

Largemouth bass anglers accounted for an additional $87,298.40 (SE = $5,604) of the total expenditures spent by Cape Fear River anglers during the creel period. While total estimated expenditures for largemouth bass anglers were not as high as for catfish anglers, their combined average expenditures per trip ($23.41; N = 66) and per angler hour ($4.00), on gas, bait, and food, were the highest for any angler group interviewed during the creel period (Table 2).

The majority of anglers interviewed during the creel period rated their trip satisfaction as fair (47.5%), followed by poor (25.2%), good (24.2%), and excellent (3.1%). The overall estimated average anglers reported that they would be willing to spend on a future fishing experience of

similar satisfaction was $29.97 per trip, or $4.71 (SE=0.23) per angler hour. When these figures were expanded to include the total angling effort observed during the creel survey period, Cape Fear River anglers were willing to spend an additional $635,132.48 (SE = $14,381.75) for a future trip of equal or greater satisfaction (Table 2). In contrast, Chowan River anglers were willing to spend an additional $1,386,107.01 (SE = $66,784.35) while Neuse River anglers were willing to spend an additional $2,236,818 (SE = $108,717.00).

The total estimated economic value associated with boat angling on the Cape Fear River from 1 July 2003 through 30 June 2004 was approximately $1,027,909.73 (SE = $18,616.00). In contrast, the economic values associated with the Chowan and Neuse river creels ($2,271,440.60, SE = $85,457.90 and $4,072,105.00, SE = $149,000.00, respectively) were much higher. Several explanations can be offered for the lower Cape Fear expenditure values. Although all three rivers are found within the coastal plain ecoregion, the sport fisheries found within each system are quite different. Recreational angling opportunities afforded by the Cape Fear River are primarily for sunfish and catfish while the Chowan and Neuse rivers offer a wider variety of angling opportunities (i.e., striped bass, crappie, white perch, etc.). The Chowan and Neuse rivers are also popular tournament destinations for local and regional largemouth bass anglers. The low number of bass tournaments held on the Cape Fear River lessened the economic value of the recreational fishery; all three recent coastal creel surveys suggest largemouth bass anglers spend more money per angler hour than any of the other directed fisheries. Expenditure information from this survey should be disseminated to the public (including angling groups, local governments and civic organizations) to help influence protection and enhancement of recreational angling in the Cape Fear River Basin.

Management Implications

Noticeable differences in recreational angling opportunities between the Cape Fear River and other North Carolina coastal systems may require specialized management strategies in order to optimize angler satisfaction. For example, the striped bass stock in the Cape Fear is currently considered significantly diminished. A Fisheries Management Plan has been developed to identify critical issues affecting stock expansion and to provide strategies for stock recovery (NCDMF 2004). More information is needed to determine the locations and intensity of striped bass spawning within the Cape Fear River in order to protect and improve spawning habitats. Further restrictions on striped bass harvest, including temporary moratoriums, should be considered given the low numbers of striped bass collected during fisheries independent and dependent surveys.

Other regulations currently in place on the Cape Fear River appear to be functioning adequately at this time. As of July 1, 2004, immediately after conclusion of the creel survey, a new regulation for black bass was established for all coastal waters east of Interstate 95. This new regulation made it unlawful to possess any largemouth or spotted bass <14 inches (355 mm); the daily five fish creel limit remained in place. The conservation of smaller bass may eventually lead to an improvement in this fishery; however, a formal evaluation of the new regulation on black bass will need to be conducted on the Cape Fear River and adjoining tributaries within a few years. In addition, to better understand the dynamic interactions occurring between largemouth bass and spotted bass, future creel surveys should be designed to obtain the proportion that each of these species contributes to the creel (catch and harvest).

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TABLE 1. — Sample unit probabilities used to estimate effort, catch, and harvest of Cape Fear River boat anglers during the creel survey, 1 July 2003-30 June 2004.

Access area (ownership)	Sample unit probability AM	Sample unit probability PM	Sample unit probability AM	Sample unit probability PM
Zone 1	(July-March)		(April-June)	
Lillington BAA (WRC)	0.0125	0.0125	0.0350	0.0150
Riverside Sports (private)	0.1334	0.1334	0.1400	0.0600
Old NC 87 BAA (WRC)	0.1334	0.1334	0.1400	0.0600
Lock & Dam 3 (federal)	0.1334	0.1334	0.1400	0.0600
Tarheel BAA (WRC)	0.0375	0.0375	0.0875	0.0375
Tory Hole BAA (WRC)	0.0375	0.0375	0.0875	0.0375
Lock & Dam 2 (federal)	0.0125	0.0125	0.0700	0.0300
Zone 2	(July-February & June)		(March-May)	
Elwell's Ferry (WRC)	0.0500	0.0500	0.0175	0.0075
Lock & Dam 1 (federal)	0.1250	0.1250	0.1983	0.0850
Mitchell's Landing (private)	0.0250	0.0250	0.0175	0.0075
Lane's Ferry (private)	0.0500	0.0500	0.0700	0.0300
Castle Hayne BAA (WRC)	0.1250	0.1250	0.1983	0.0850
Castle Street Landing (municipal)	0.1250	0.1250	0.1983	0.0850

TABLE 2. — Taylor Expansion Series analysis of estimated expenditures for all angler trips, catfish angler trips and black bass angler trips, and estimated willingness to spend during the Cape Fear River creel survey from 1 July 2003 – 30 June 2004. Covariance values represent the relationship between estimated angler hours and mean expenditure.

Estimator	All angler trips	Catfish angler trips	Largemouth bass angler trips	Willingness to spend
Expenditure per angler hour				
Mean	$2.91	$2.72	$4.00	$4.71
Sample size	386	87	66	379
Variance	6.61	5.23	18.35	20.81
SE	$0.13	$0.25	$0.53	$0.23
Estimated total angler hours	134,975.00	43,540.00	21,824.60	134,975.00
SE	6,190.00	3,791.00	2,504.80	6,190.00
Variance	38,316,100.00	14,371,681.00	6,274,023.04	38,316,100.00
Covariance	34.80	44.51	33.82	18.68
Estimated total expenditures	$392,777.25	$118,428.80	$87,298.40	$635,132.48
Variance	139,726,190.13	49,861,279.86	31,401,437.35	206,834,680.02
Standard deviation (Approximate SE)	$11,820.58	$7,061.25	$5,603.70	14,381.75

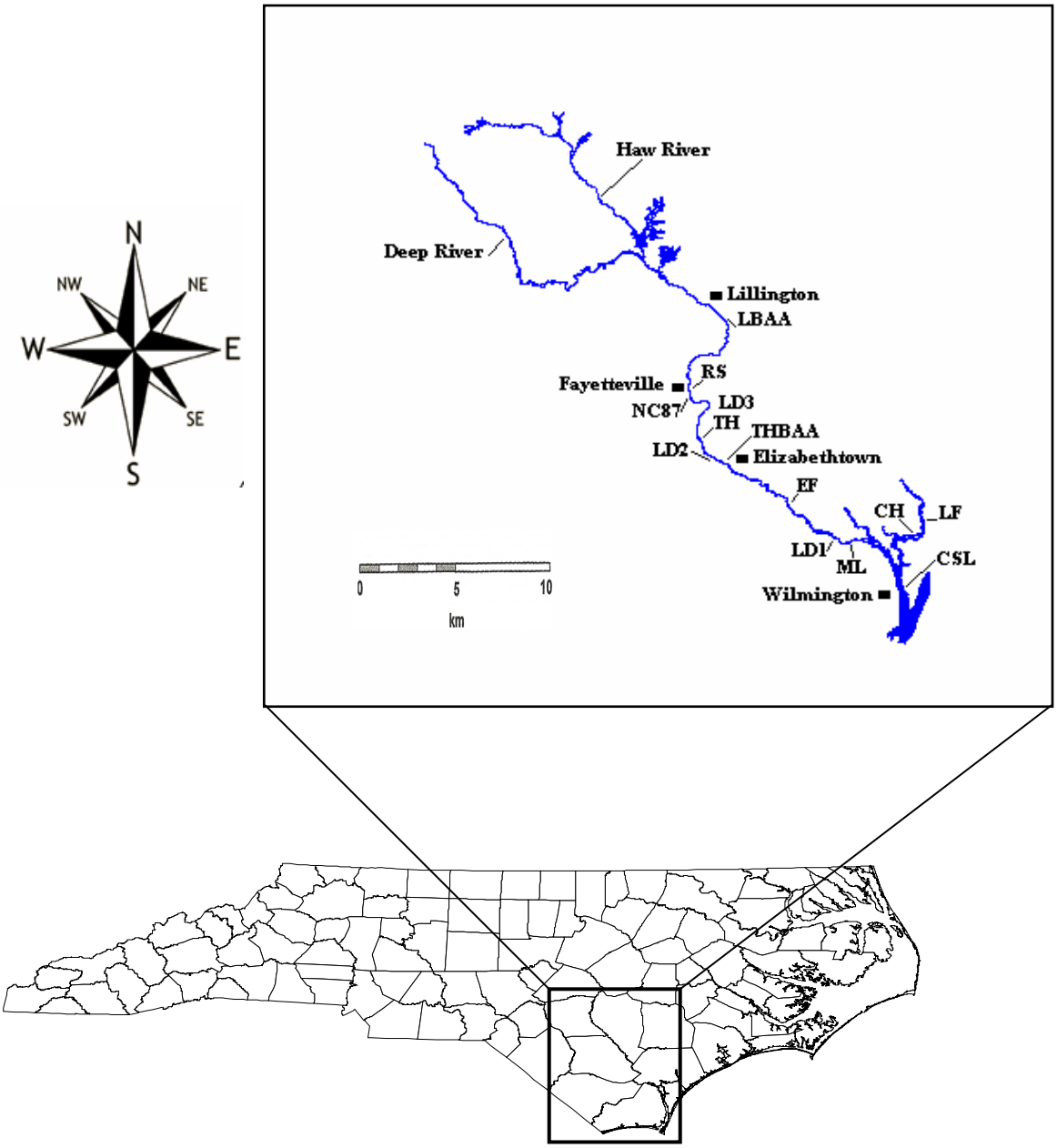

FIGURE 1.—Access areas sampled during the Cape Fear River creel survey, 1 July 2003-30 June 2004. Zone 1 access areas are labeled as follows: LBAA-Lillington Boating Access Area, RS-Riverside Sports, NC87-NC 87, LD3-Lock and Dam 3, TH-Tarheel, THBAA-Tory Hole Boating Access Area, and LD2-Lock and Dam 2. Zone 2 access areas are labeled as follows: EF-Elwell's Ferry, LD1-Lock and Dam 1, ML-Mitchell's Landing, LF-Lane's Ferry, CH-Castle Hayne, and CSL-Castle Street Landing.

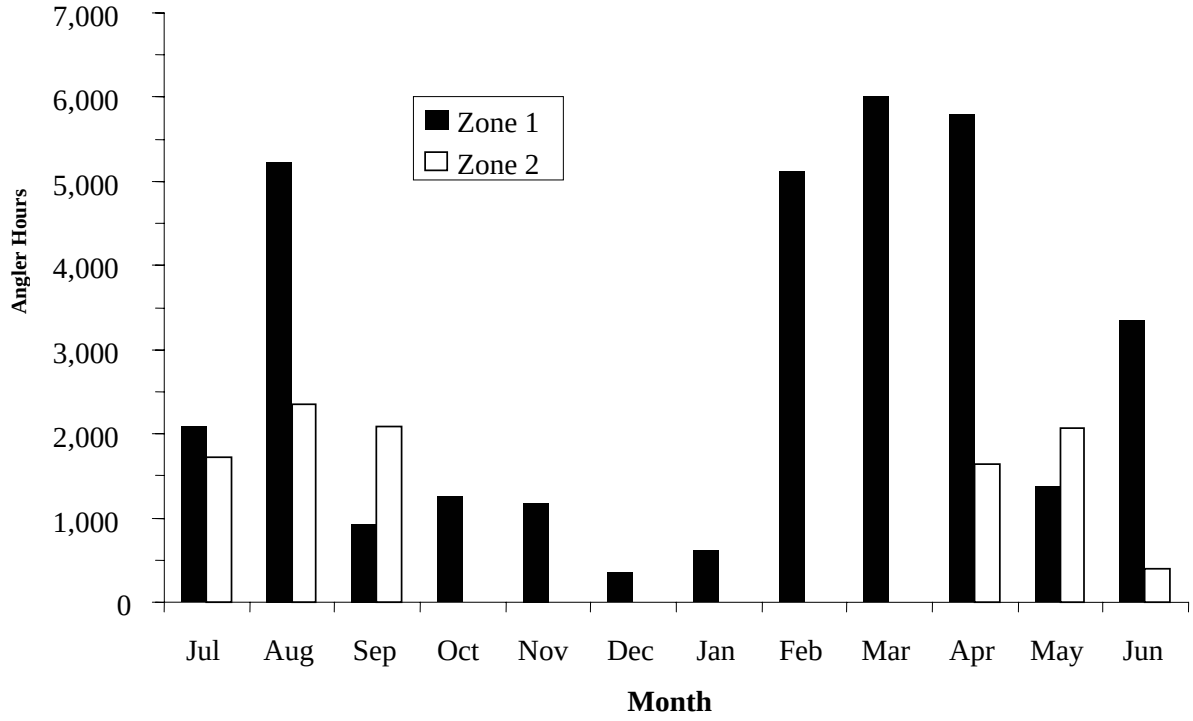

FIGURE 2.—Targeted effort (angler hours) for catfish by zone and month during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

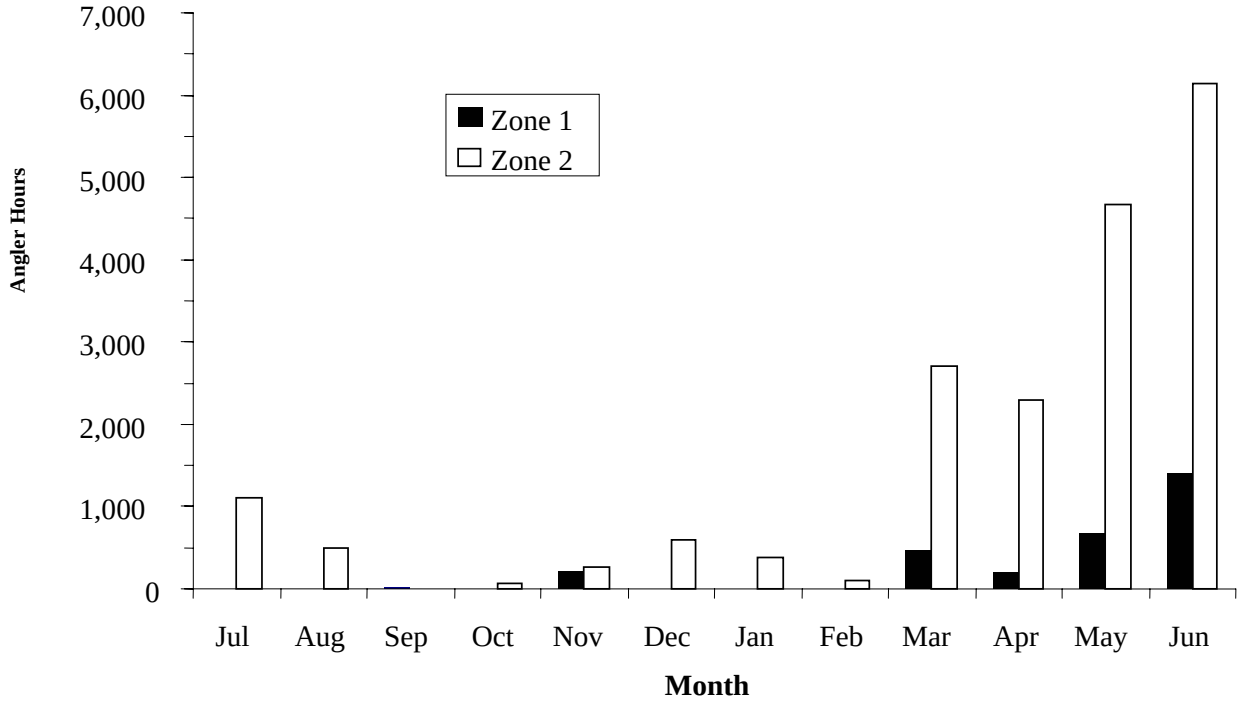

FIGURE 3.—Targeted effort (angler hours) for largemouth bass by zone and month during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

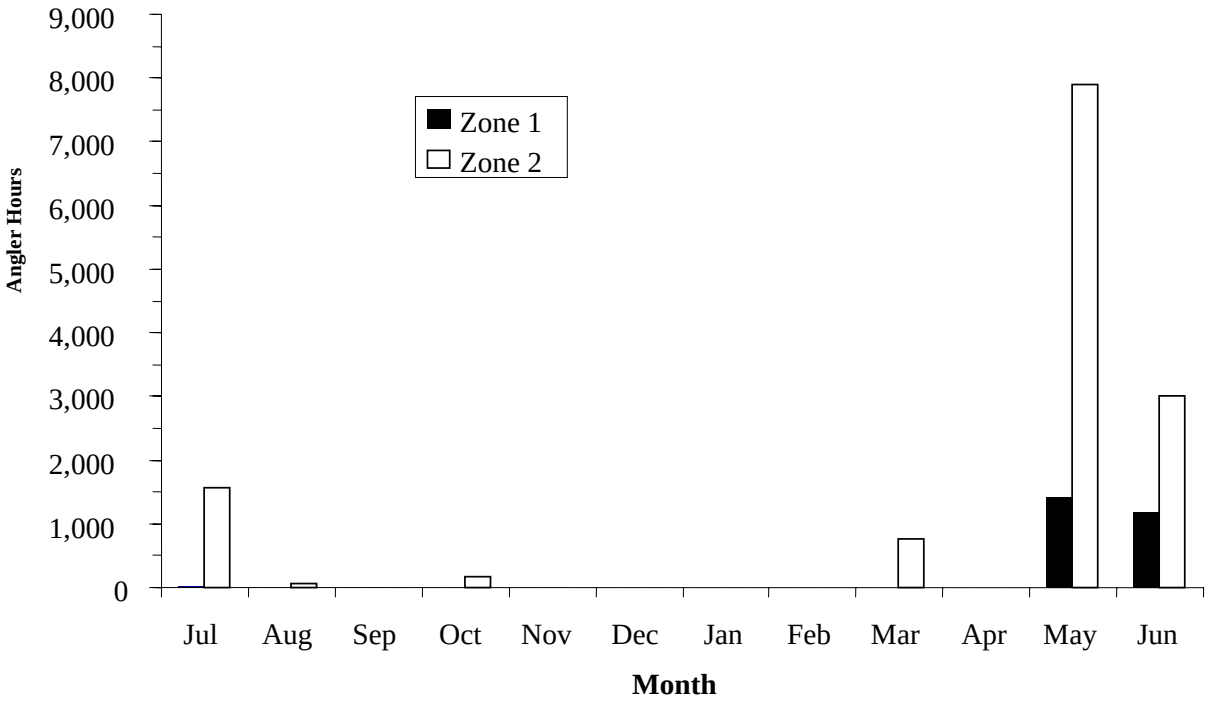

FIGURE 4.—Targeted effort (angler hours) for sunfish by zone and month during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

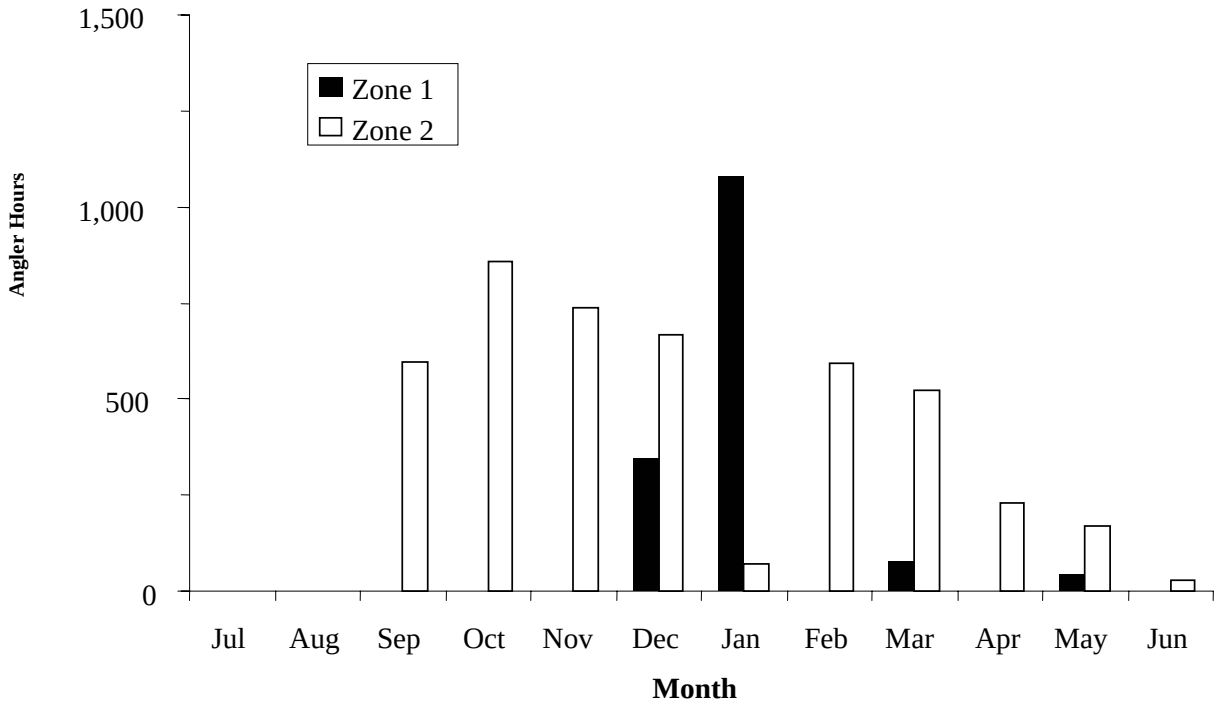

FIGURE 5.—Targeted effort (angler hours) for striped bass by zone and month during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

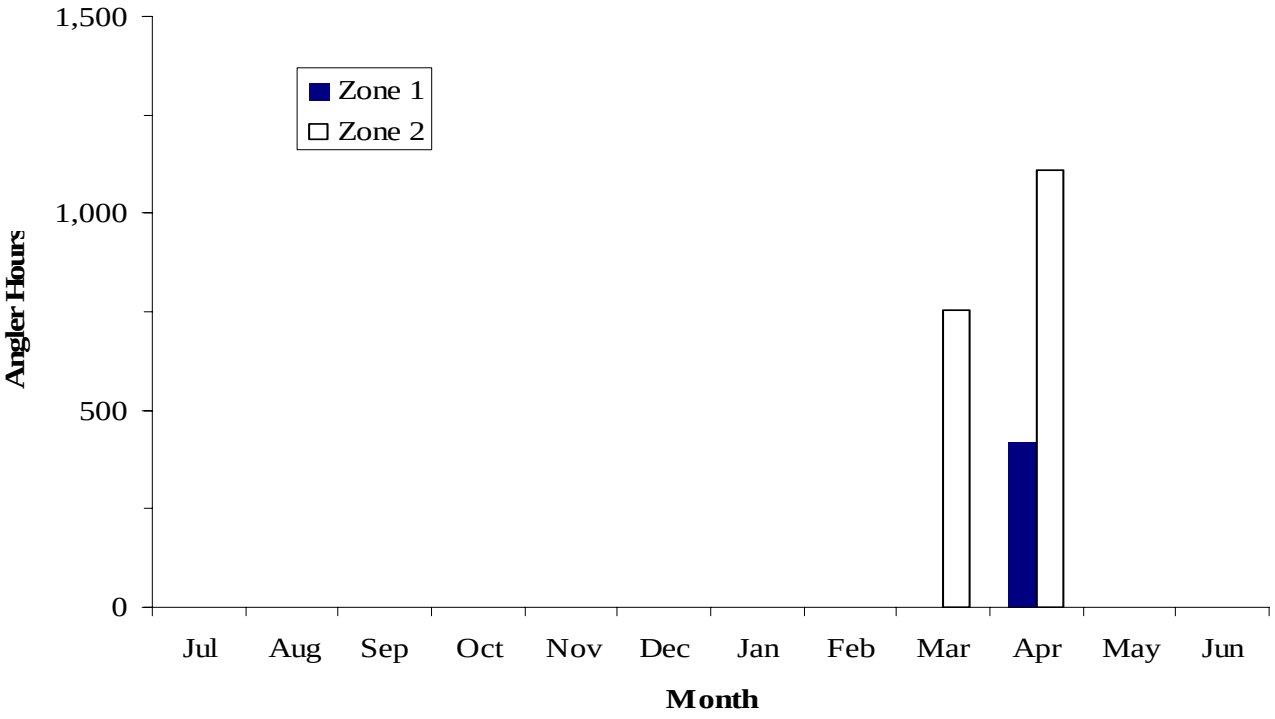

FIGURE 6.—Targeted effort (angler hours) for American shad by zone and month during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

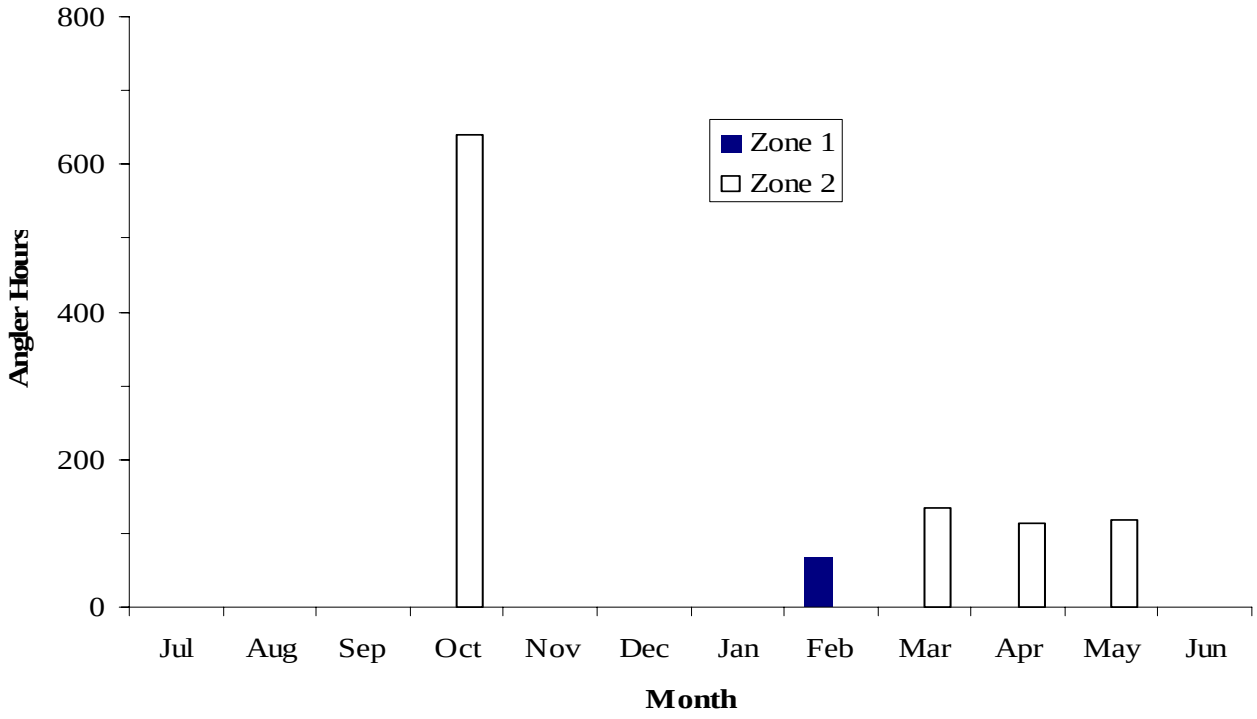

FIGURE 7.—Targeted effort (angler hours) for black crappie by zone and month during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

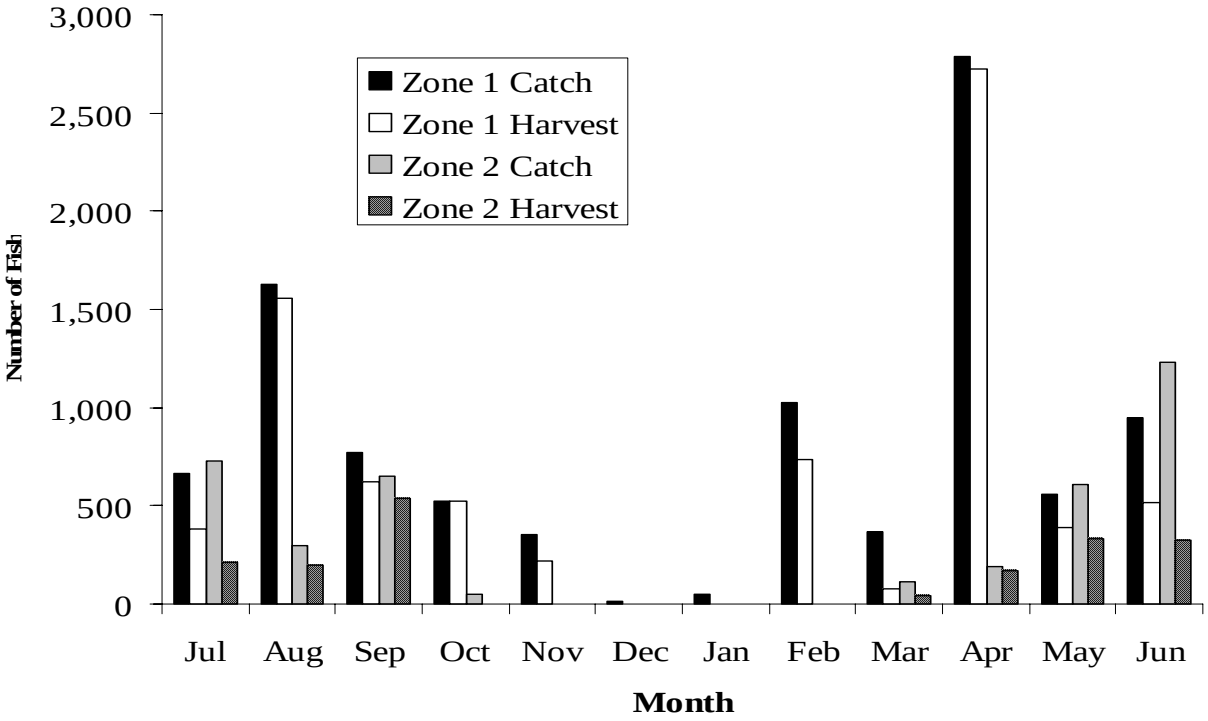

FIGURE 8.—Number of catfish caught and harvested by month in Zone 1 and Zone 2 during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

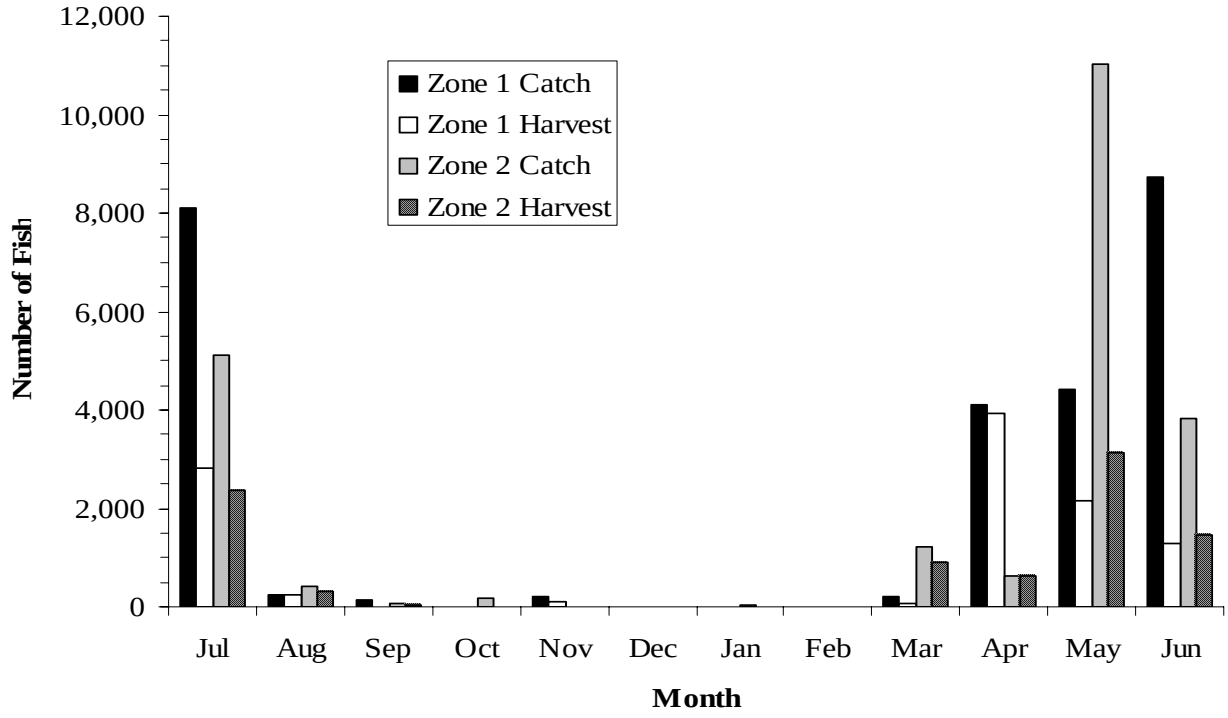

FIGURE 9.—Number of sunfish caught and harvested by month in Zone 1 and Zone 2 during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

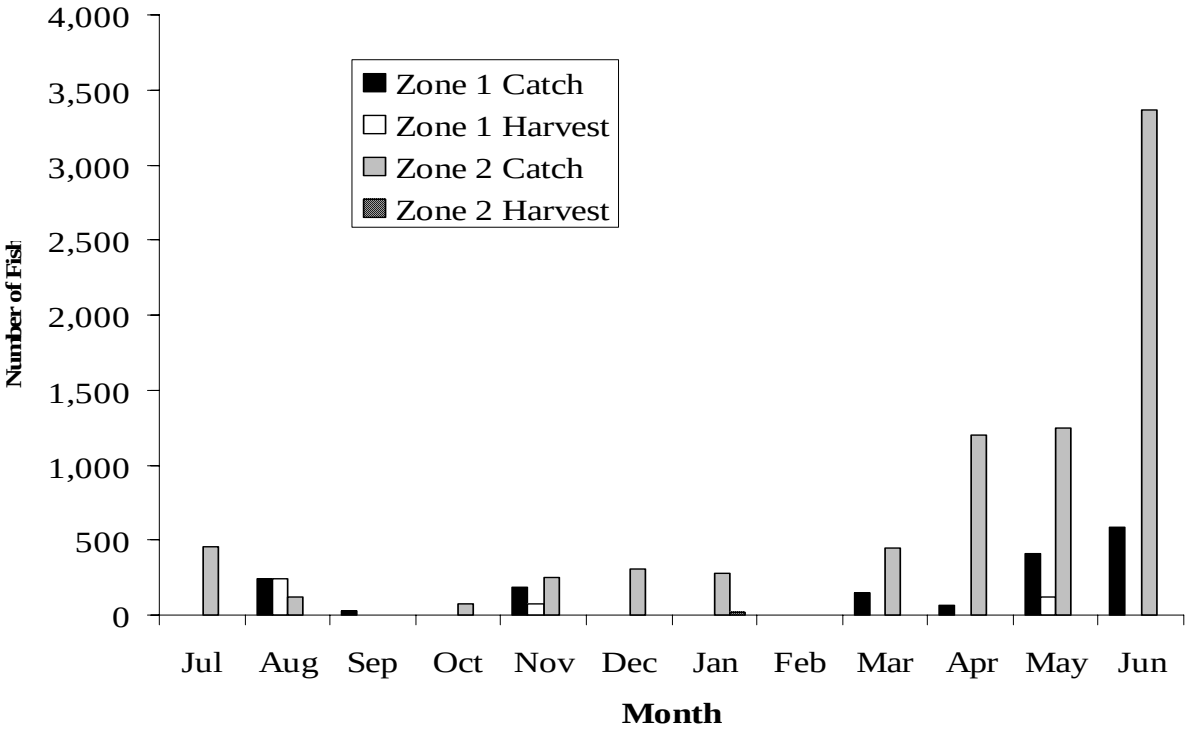

FIGURE 10.—Number of largemouth bass caught and harvested by month in Zone 1 and Zone 2 during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

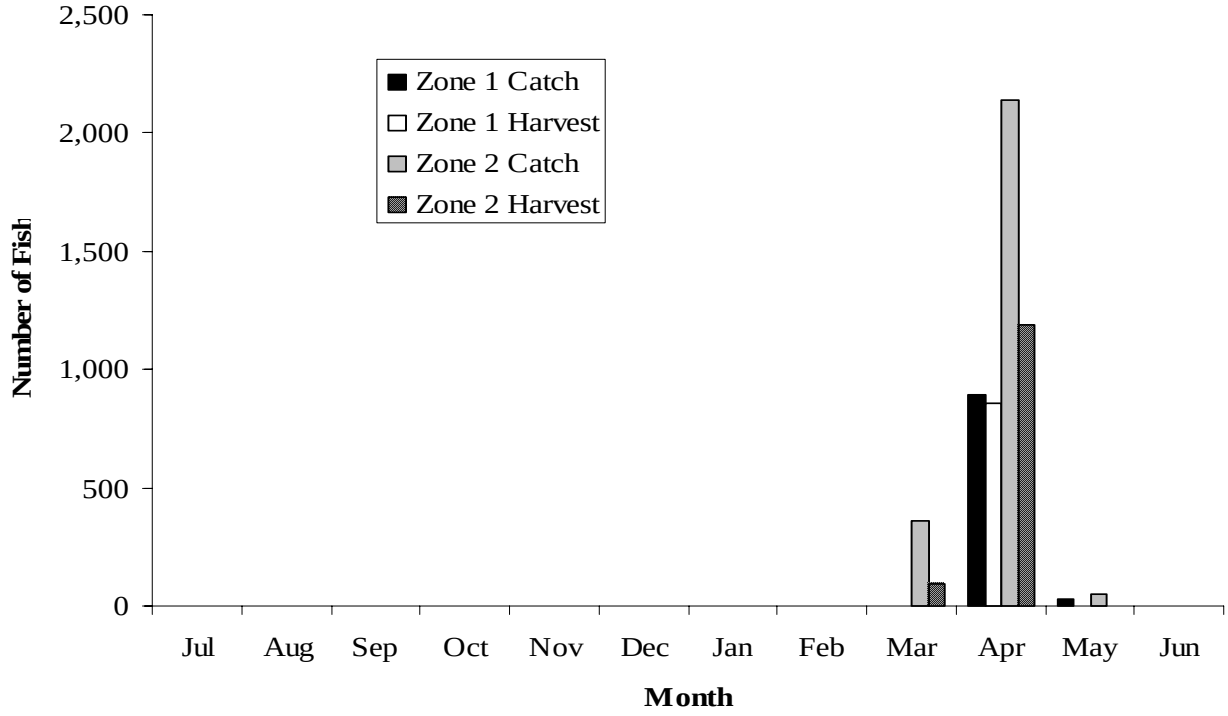

FIGURE 11.—Number of American shad caught and harvested by month in Zone 1 and Zone 2 during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

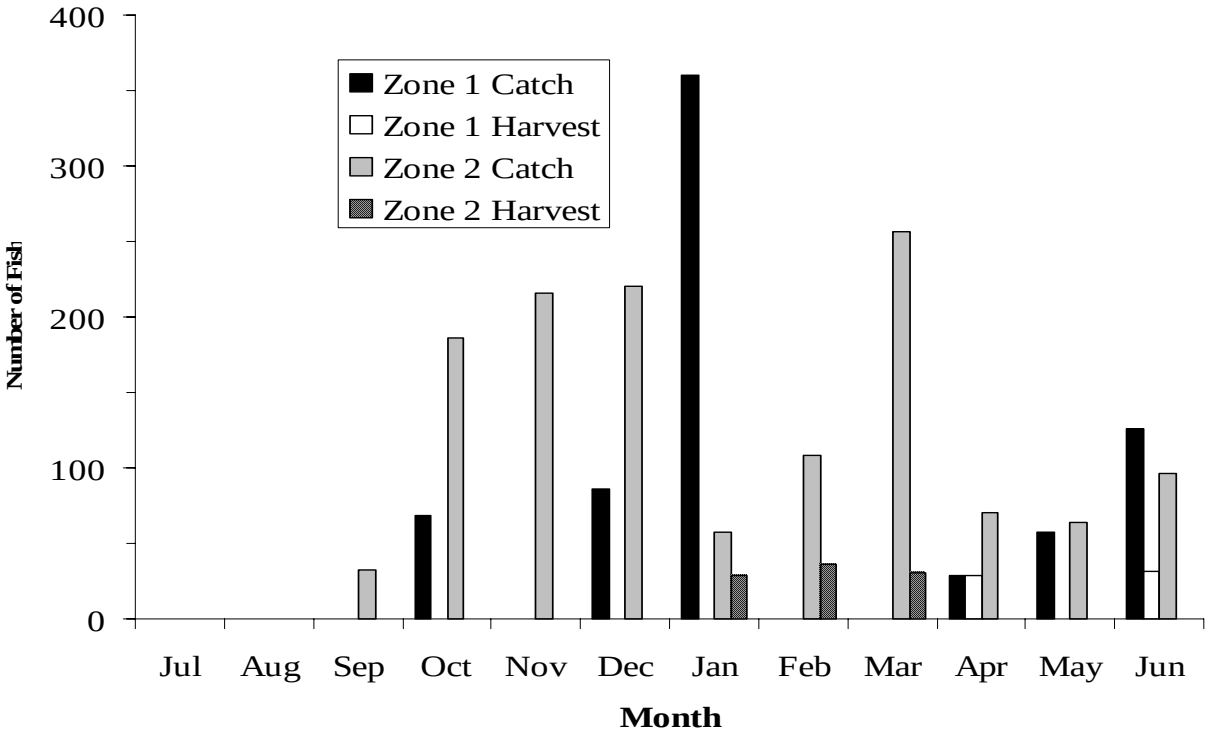

FIGURE 12.—Number of striped bass caught and harvested by month in Zone 1 and Zone 2 during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

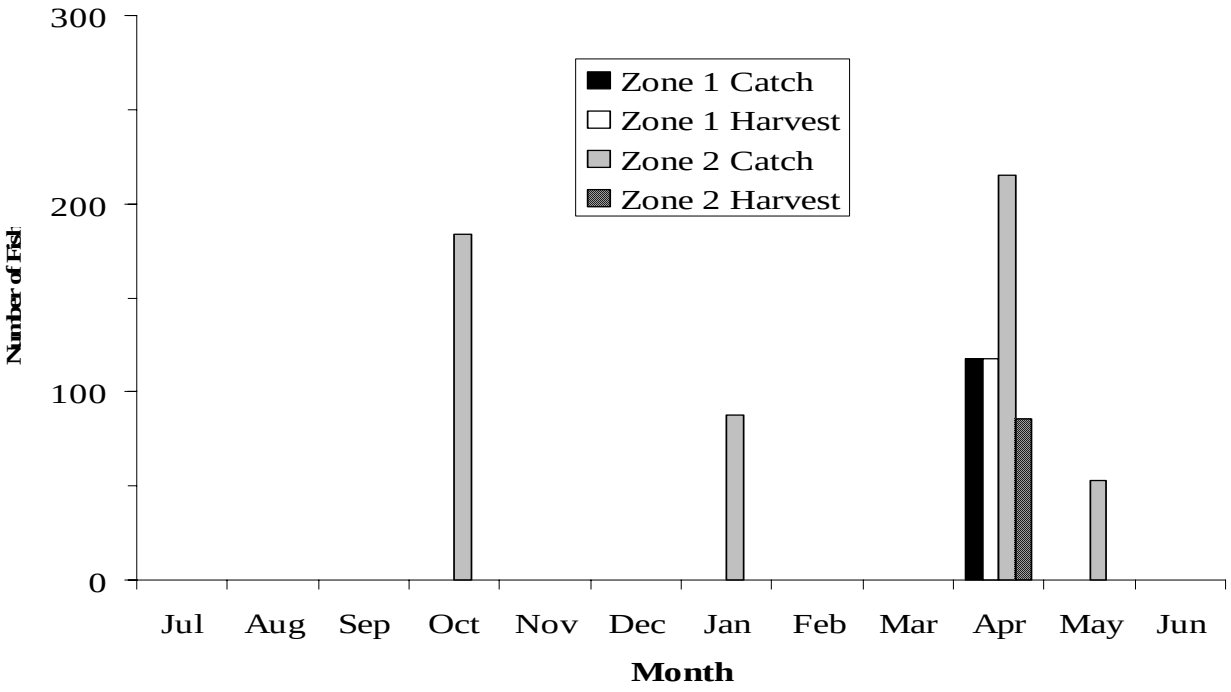

FIGURE 13.—Number of black crappie caught and harvested by month in Zone 1 and Zone 2 during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

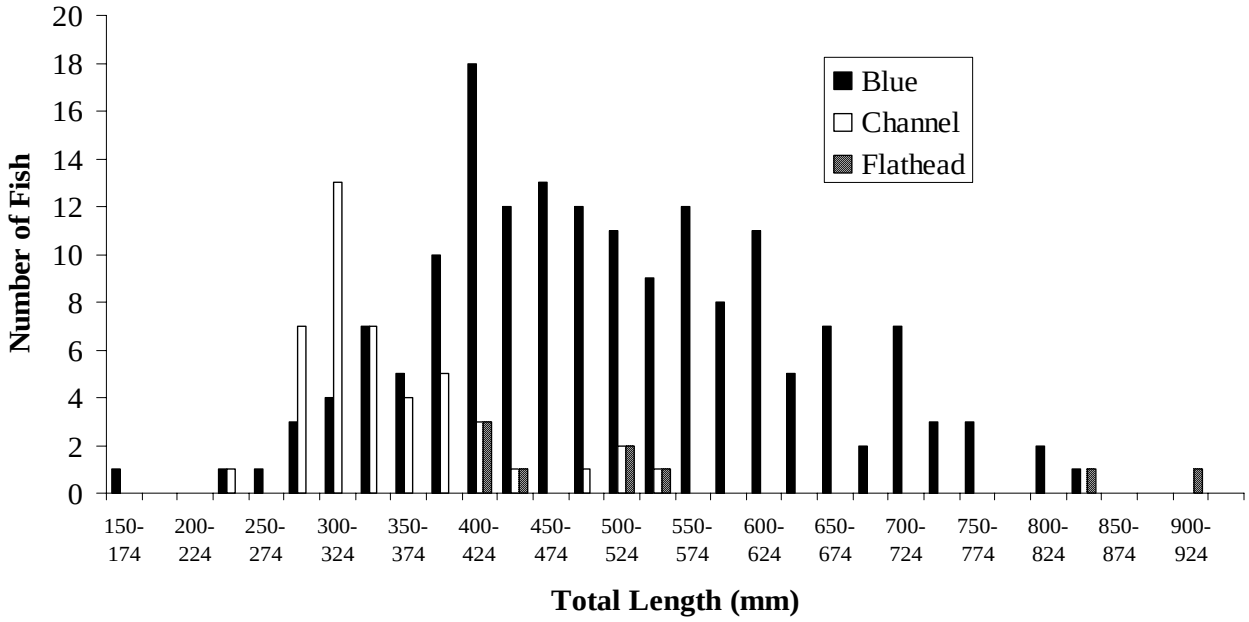

FIGURE 14.—Length-frequency distribution of catfish, by 25 mm size group, harvested during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

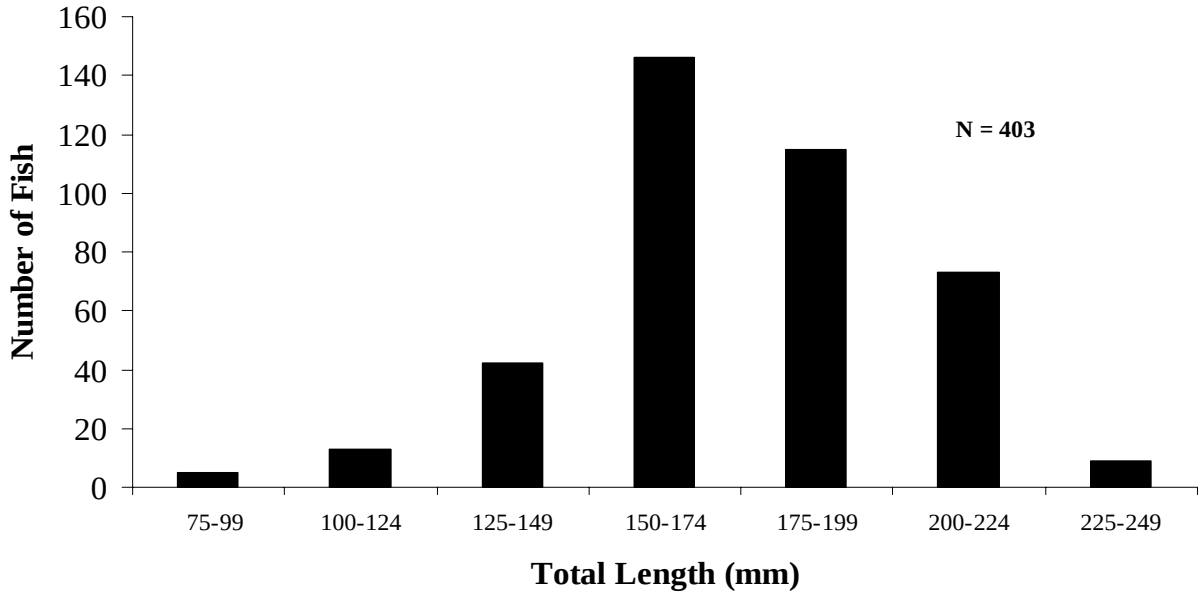

FIGURE 15.—Length-frequency distribution of sunfish, by 25 mm size group, harvested during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

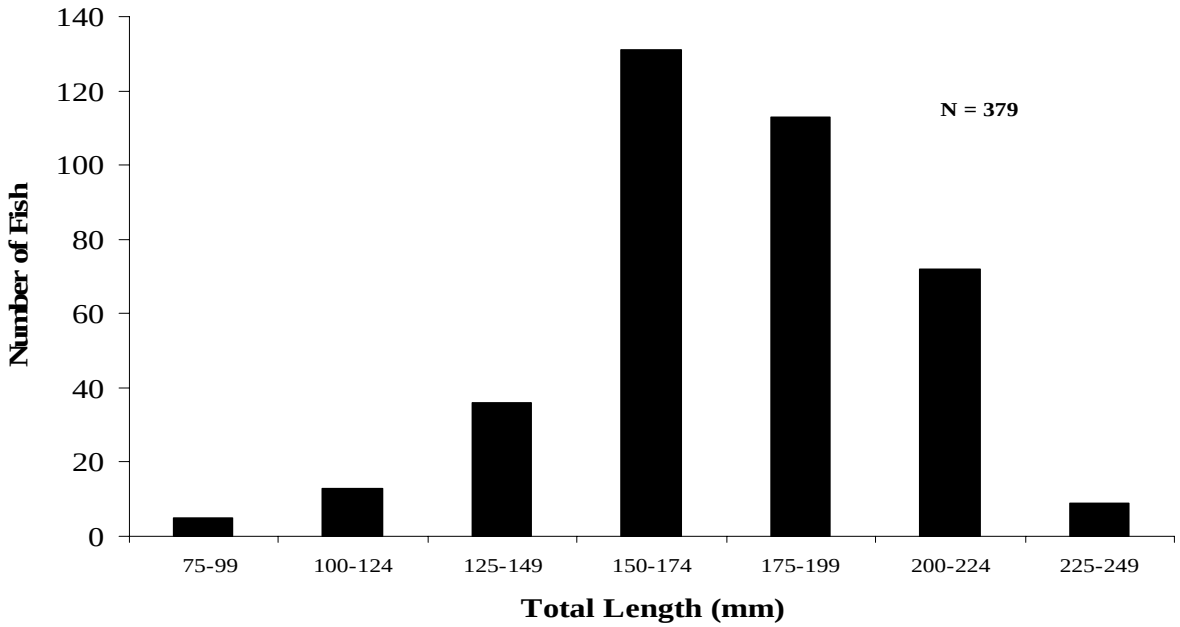

FIGURE 16.—Length-frequency distribution of bluegill, by 25 mm size group, harvested during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

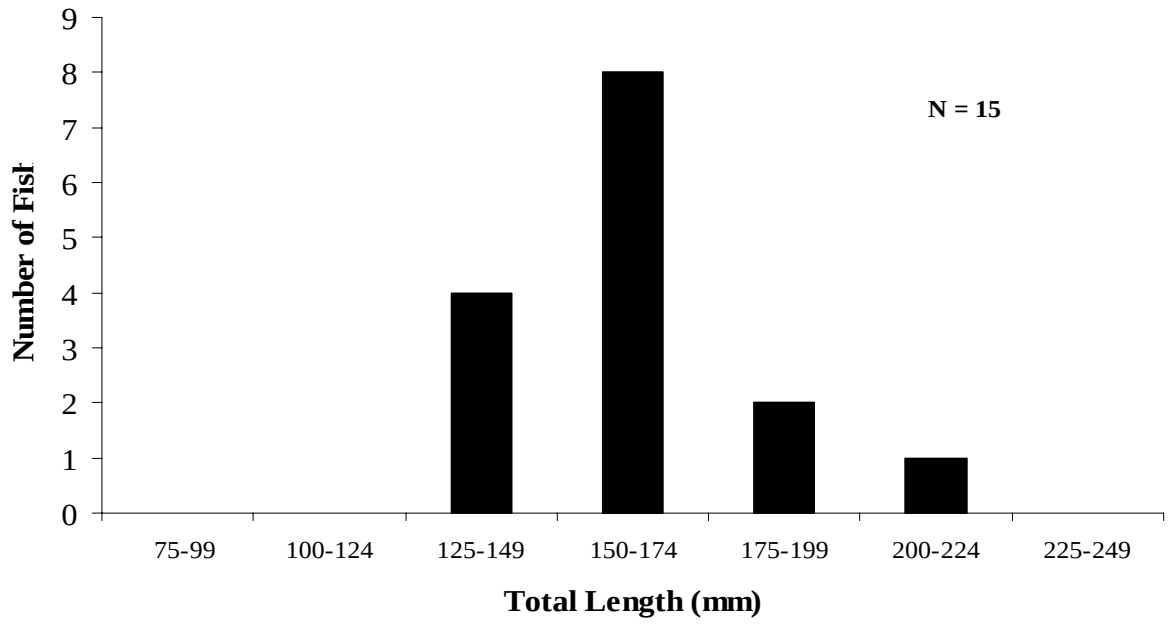

FIGURE 17.—Length-frequency distribution of warmouth, by 25 mm size group, harvested during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

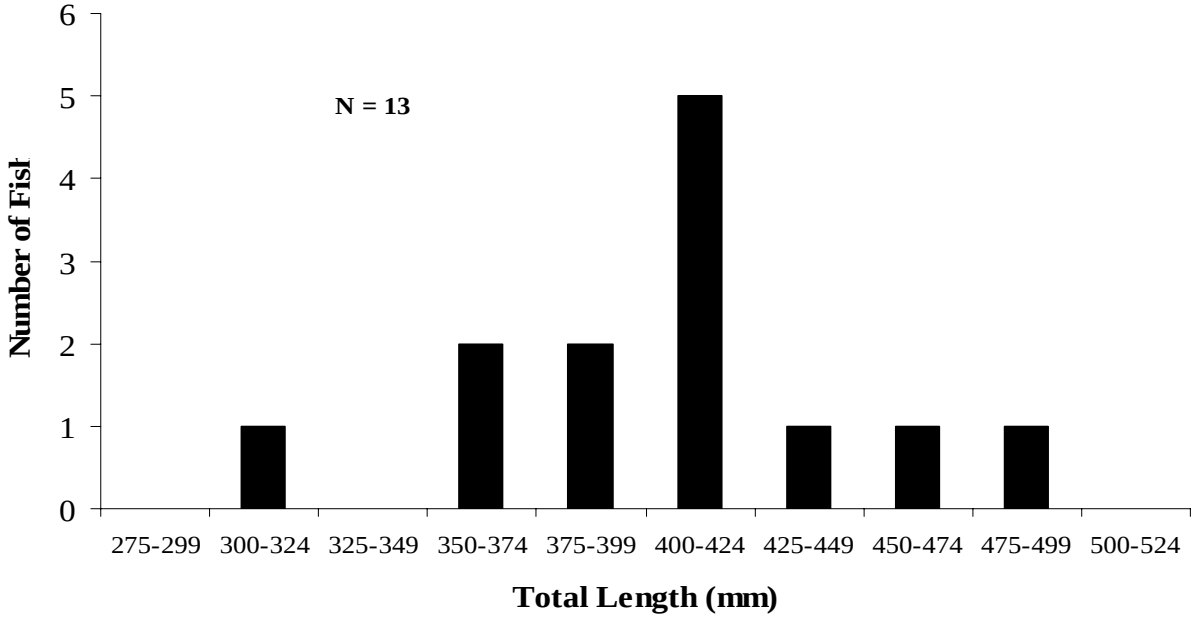

FIGURE 18.—Length-frequency distribution of largemouth bass, by 25 mm size group, harvested during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

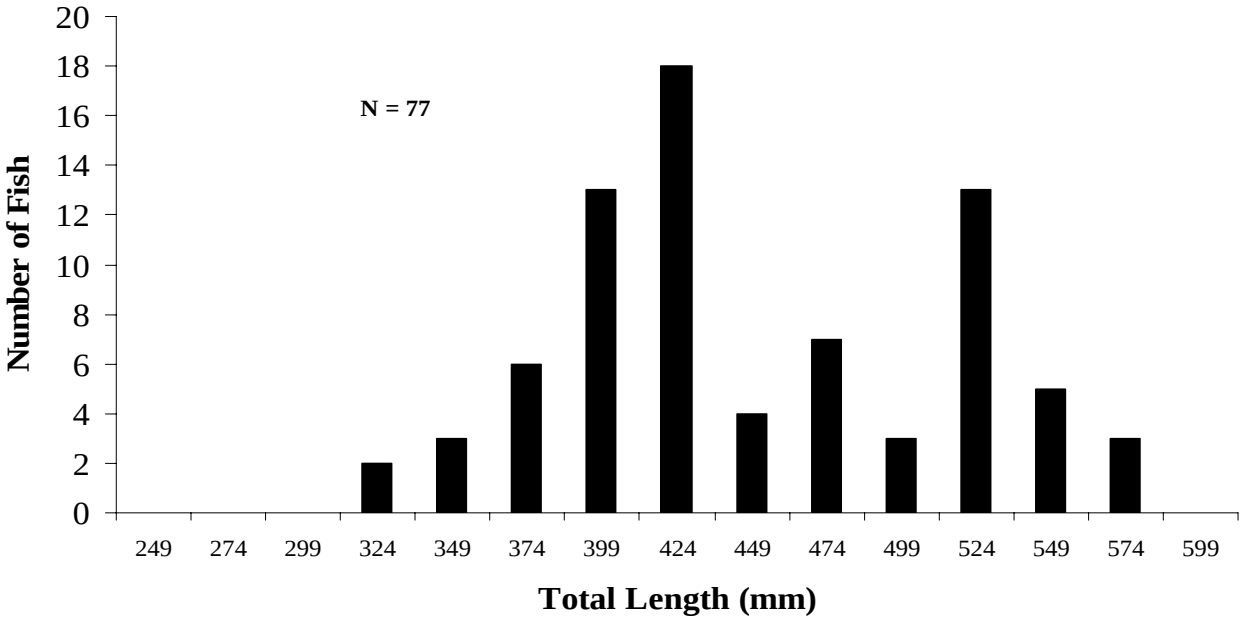

FIGURE 19.—Length-frequency distribution of American shad, by 25 mm size group, harvested during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

Appendix 1: Interview sheet used for the Cape Fear River creel survey, 1 July 2003-30 June 2004.

SAMPLE INFORMATION Interview Date ___ ___/___ ___/___ ___ _____ Boat _____ Bank
Month Day Year

Period: __ __ Zone: __ __ Sample #: __ __ Interview #: __ __ __ Kind of Day: __ __ Access Area: __ __ __

PARTY FISHING EFFORT

Time of Interview: __ __ __ __ Time Party Began Fishing: __ __ __ __ Time Fished: __ __Hrs. __ __Mins.

Number in Party: __ __ Age: C<15____ F15-44____ F45+____ M16+____ Race:_____

SPECIES TARGETED

Species Fished For: Striped bass___ Shad___ Largemouth bass___ Crappie___

Sunfish___ Catfish___ Other(specify)_____

HARVEST & RELEASE INFORMATION

	#Kept	#Released	Total Lengths (mm)
Striped bass	_____	_____	_____
Shad	_____	_____	_____
Largemouth bass	_____	_____	_____
Crappie	_____	_____	_____
Sunfish	_____	_____	_____
Catfish	_____	_____	_____ ☐ E/F__
Other (_____)	_____	_____	_____

MISCELLANEOUS INFORMATION

Do you plan to eat the fish that you kept? _____ *If **no**, will someone else be eating the fish?*_____
*If **yes**, how many meals of fish from the Cape Fear do you eat per month?*_____

Origin: Bladen ____ Columbus ____ Cumberland ____ Harnett ____ Pender ____ Robeson ____

New Hanover ____ Other N.C. (specify) _____ Non-N.C. (specify) _____

For this trip, how much did you spend on: Gas $_____ Bait $_____ Food $_____ Lodging $_____ Other $_____

How much more would you be willing to pay: $10___ $20___ $30___ $40___ $50___ $60___ $70___ $80___
$90___ $100___ Other amount (specify) $_____

……

How would you rate your overall trip satisfaction: Poor___ Fair___ Good___ Excellent___

Reasons given for this rating (if any):

Appendix 2: Effort estimates by angler type, month, zone, and day type, Cape Fear River creel survey, 2003–2004

TABLE A2.1.—Estimated total effort (angler hours) expended by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	3,680.0 (1,502.4)	2,751.7 (664.6)	5,732.3 (1,055.7)	2,701.3 (478.1)	14,865.3 (2,010.5)
Aug	2,986.2 (1,219.1)	2,526.2 (492.2)	2,805.4 (1,186.6)	1,048.0 (224.7)	9,365.9 (1,785.2)
Sep	652.7 (206.4)	975.9 (331.7)	748.0 (219.2)	2,253.3 (515.3)	4,629.8 (682.8)
Oct	1,689.7 (458.2)	499.9 (143.7)	674.8 (275.5)	1,120.0 (320.2)	3,984.4 (639.5)
Nov	1,382.6 (347.9)	1,229.2 (267.7)	403.2 (137.4)	1,053.3 (270.5)	3,968.3 (533.6)
Dec	495.7 (153.7)	344.8 (159.6)	840.1 (268.1)	592.0 (210.7)	2,272.7 (406.7)
Jan	428.3 (198.2)	1,260.0 (447.0)	189.2 (87.6)	935.9 (194.9)	2,813.3 (533.6)
Feb	2,981.0 (647.7)	2,270.5 (870.5)	0.0 (0.0)	693.0 (245.8)	5,944.5 (1,112.5)
Mar	5,217.3 (2,007.7)	1,969.0 (227.2)	2,681.3 (635.8)	4,559.6 (968.3)	14,427.1 (2,329.0)
Apr	8,381.7 (2,094.2)	5,194.3 (1,031.8)	2,431.3 (466.2)	6,533.5 (1,325.6)	22,540.8 (2,724.8)
May	3,377.1 (620.3)	4,748.6 (618.5)	14,067.1 (3,061.1)	6,467.0 (1,239.1)	28,659.8 (3,376.3)
Jun	4,576.8 (869.2)	3,845.4 (659.9)	10,241.7 (1,603.0)	2,840.2 (479.1)	21,504.0 (1,997.5)
Total	35,849.0 (3,762.4)	27,515.4 (1,950.3)	40,814.5 (3,877.3)	30,797.0 (2,307.1)	134,975.9 (6,189.9)

TABLE A2.2.—Estimated effort (angler hours) expended by catfish anglers by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	0.0 (0.0)	2,077.0 (638.4)	1,196.0 (431.0)	529.3 (146.0)	3,802.3 (784.0)
Aug	2,986.2 (1,219.1)	2,251.1 (485.8)	2,211.7 (1,165.7)	144.0 (67.9)	7,593.0 (1,756.0)
Sep	131.9 (69.5)	794.6 (323.2)	440.0 (179.6)	1,645.3 (475.2)	3,011.8 (606.1)
Oct	758.6 (270.5)	499.9 (143.7)	0.0 (0.0)	0.0 (0.0)	1,258.5 (306.3)
Nov	1,120.2 (326.0)	62.5 (29.5)	0.0 (0.0)	0.0 (0.0)	1,182.7 (327.4)
Dec	0.0 (0.0)	344.8 (159.6)	0.0 (0.0)	0.0 (0.0)	344.8 (159.6)
Jan	428.3 (198.2)	180.0 (73.5)	0.0 (0.0)	0.0 (0.0)	608.2 (211.4)
Feb	2,981.0 (647.7)	2,130.0 (869.6)	0.0 (0.0)	0.0 (0.0)	5,111.0 (1,084.3)
Mar	4,908.2 (2,003.8)	1,100.7 (103.2)	0.0 (0.0)	0.0 (0.0)	6,008.9 (2,006.2)
Apr	4,014.5 (1,531.9)	1,778.6 (805.8)	929.1 (379.3)	714.3 (330.7)	7,436.5 (1,802.6)
May	481.3 (222.8)	886.2 (255.8)	0.0 (0.0)	2,060.5 (936.1)	3,427.9 (995.7)
Jun	2,783.4 (715.1)	566.7 (262.3)	187.0 (76.3)	217.4 (46.8)	3,754.5 (767.0)
Total	20,593.6 (3,008.7)	12,672.1 (1,5332)	4,963.9 (1,314.0)	5,310.8 (1,113.3)	43,540.4 (3,790.7)

TABLE A2.3.—Estimated effort (angler hours) expended by largemouth bass anglers by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	0.0 (0.0)	0.0 (0.0)	404.8 (106.9)	704.0 (325.9)	1,108.8 (343.0)
Aug	0.0 (0.0)	0.0 (0.0)	274.5 (144.7)	226.7 (106.9)	501.2 (179.9)
Sep	0.0 (0.0)	21.3 (9.9)	0.0 (0.0)	0.0 (0.0)	21.3 (9.9)
Oct	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	72.0 (33.3)	72.0 (33.3)
Nov	0.0 (0.0)	213.3(100.6)	143.2 (66.3)	120.0 (56.6)	476.5 (133.1)
Dec	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	592.0 (210.7)	592.0 (210.7)
Jan	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	379.2 (101.6)	379.2 (101.6)
Feb	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	99.0 (40.4)	99.0 (40.4)
Mar	309.1 (126.2)	157.4 (72.9)	793.9 (418.4)	1,908.1 (793.7)	3,168.5 (909.0)
Apr	0.0 (0.0)	202.4 (75.8)	0.0 (0.0)	2,300.6 (1,015.8)	2,503.0 (1,018.6)
May	670.2 (227.3)	0.0 (0.0)	4,449.1 (1,968.0)	223.8 (105.5)	5,343.1 (1,983.9)
Jun	489.1 (257.8)	922.3 (427.0)	5,364.5 (1,378.0)	784.0 (362.9)	7,559.9 (1,509.8)
Total	1,468.4 (366.1)	1,516.8 (451.2)	11,430.0 (2,446.2)	7,409.4 (1,408.2)	21,824.6 (2,881.7)

TABLE A2.4.—Estimated effort (angler hours) expended by sunfish anglers by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	0.0 (0.0)	30.0 (13.9)	1,214.4 (349.5)	360.0 (166.6)	1,604.4 (387.4)
Aug	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	56.0 (26.4)	56.0 (26.4)
Sep	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Oct	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	160.0 (74.1)	160.0 (74.1)
Nov	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Dec	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Jan	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Feb	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Mar	0.0 (0.0)	0.0 (0.0)	164.3 (86.6)	588.2 (238.3)	752.5 (253.5)
Apr	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
May	0.0 (0.0)	1,421.4 (274.8)	5,547.9 (1,531.4)	2,341.2 (684.9)	9,310.5 (1,700.0)
Jun	518.6 (273.3)	659.0 (212.8)	1,907.0 (356.2)	1,109.3 (274.5)	4,193.8 (567.6)
Total	518.6 (273.3)	2,110.4 (347.9)	8,833.5 (1,613.0)	4,614.7 (796.9)	16,077.2 (1,852.7)

TABLE A2.5.—Estimated effort (angler hours) expended by striped bass anglers by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Aug	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Sep	0.0 (0.0)	0.0 (0.0)	308.0 (125.7)	288.0 (133.3)	596.0 (183.2)
Oct	0.0 (0.0)	0.0 (0.0)	674.8 (275.5)	184.0 (85.2)	858.8 (288.4)
Nov	0.0 (0.0)	0.0 (0.0)	260.0 (120.4)	477.3 (225.0)	737.2 (255.2)
Dec	344.8 (140.8)	0.0 (0.0)	665.3 (251.8)	0.0 (0.0)	1,010.2 (288.5)
Jan	0.0 (0.0)	1,080.0 (440.9)	0.0 (0.0)	72.0 (37.9)	1,152.0 (442.5)
Feb	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	594.0 (242.5)	594.0 (242.5)
Mar	0.0 (0.0)	76.2 (35.3)	523.3 (275.8)	0.0 (0.0)	599.5 (278.0)
Apr	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	227.8 (105.4)	227.8 (105.4)
May	0.0 (0.0)	42.9 (20.2)	0.0 (0.0)	168.1 79.3)	211.0 (81.8)
Jun	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	26.7 (12.4)	26.7 (12.4)
Total	344.8 (140.8)	1,199.0 (442.8)	2,431.5 (495.7)	2,037.9 (391.7)	6,013.3 (784.2)

TABLE A2.6.—Estimated effort (angler hours) expended by American shad anglers by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

Period	Zone 1		Zone 2		
	Weekday	Weeken	Weekday	Weekend	Total
Jul	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Aug	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Sep	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Oct	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Nov	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Dec	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Jan	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Feb	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Mar	0.0 (0.0)	0.0 (0.0)	631.6 (332.9)	121.0 (56.0)	752.6 (337.6)
Apr	421.7 (222.2)	0.0 (0.0)	762.7 (200.1)	345.6 (160.0)	1,530.0 (339.1)
May	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Jun	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Total	421.7 (222.2)	0.0 (0.0)	1,394.3 (388.4)	466.6 (169.5)	2,282.6 (478.5)

TABLE A2.7.—Estimated effort (angler hours) expended by crappie anglers by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Aug	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Sep	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Oct	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	640.0 (296.3)	640.0 (296.3)
Nov	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Dec	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Jan	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Feb	0.0 (0.0)	67.5 (27.5)	0.0 (0.0)	0.0 (0.0)	67.5 (27.5)
Mar	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	133.4 (61.8)	133.4 (61.8)
Apr	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	114.3 (52.9)	114.3 (52.9)
May	0.0 (0.0)	0.0 (0.0)	119.1 (55.2)	0.0 (0.0)	119.1 (55.2)
Jun	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Total	0.0 (0.0)	67.5 (27.5)	119.1 (55.2)	887.7 (307.2)	1,074.3 (313.3)

TABLE A2.8.—Estimated effort (angler hours) expended by specified generalist anglers by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Aug	0.0 (0.0)	128.9 (60.8)	0.0 (0.0)	0.0 (0.0)	128.9 (60.8)
Sep	273.4 (144.1)	160.0 (74.1)	0.0 (0.0)	0.0 (0.0)	433.4 (162.0)
Oct	931.0 (369.8)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	931.0 (369.8)
Nov	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Dec	150.9 (61.6)	0.0 (0.0)	174.8 (92.1)	0.0 (0.0)	325.7 (110.8)
Jan	0.0 (0.0)	0.0 (0.0)	189.2 (87.6)	484.7 (162.0)	673.9 (184.2)
Feb	0.0 (0.0)	73.0 (29.8)	0.0 (0.0)	0.0 (0.0)	73.0 (29.8)
Mar	0.0 (0.0)	359.8 (166.6)	0.0 (0.0)	369.8 (171.2)	729.7 (238.9)
Apr	234.8 (123.8)	952.3 (271.8)	739.5 (182.9)	2,831.0 (759.3)	4,757.5 (836.2)
May	1,123.1 (417.3)	238.1 (91.5)	300.0 (138.9)	749.8 (353.5)	2,411.1 (571.6)
Jun	785.7 (320.8)	0.0 (0.0)	0.0 (0.0)	258.7 (71.2)	1,044.1 (328.6)
Total	3,499 (673.5)	1,912.2 (346.5)	1,403.4 (262.5)	4,694.1 (873.0)	11,508.6 (1,185.2)

TABLE A2.9.—Estimated effort (angler hours) expended by sunfish/catfish anglers by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	3,680.0 (1,502.4)	359.8 (166.6)	368.0 (194.0)	0.0 (0.0)	4,407.8 (1,524.0)
Aug	0.0 (0.0)	90.0 (42.4)	0.0 (0.0)	0.0 (0.0)	90.0 (42.4)
Sep	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Oct	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Nov	0.0 (0.0)	853.3 (246.3)	0.0 (0.0)	0.0 (0.0)	853.3 (246.3)
Dec	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Jan	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Feb	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Mar	0.0 (0.0)	319.8 (73.1)	189.4 (99.8)	558.5 (219.9)	1,067.7 (252.3)
Apr	1,285.5 (583.2)	961.0 (444.9)	0.0 (0.0)	0.0 (0.0)	2,246.5 (733.5)
May	562.5 (216.6)	1,070.0 (329.4)	3,651.0 (1,690.1)	318.0 (149.9)	5,601.5 (1,741.9)
Jun	0.0 (0.0)	1,405.7 (347.5)	1,668.7 (681.2)	208.0 (55.9)	3,282.4 (766.8)
Total	5,528.0 (1,626.1)	5,014.6 (724.0)	5,687.7 (1,832.5)	1,084.5 (272.0)	17,314.8 (2,569.1)

TABLE A2.10.—Estimated effort (angler hours) expended by non-specified generalist anglers by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	0.0 (0.0	284.9 (78.9)	2,549.1 (870.5)	1,108.0 (270.7)	3,942.0 (915.0)
Aug	0.0 (0.0)	56.2 (26.5)	319.2 (168.2)	621.3 (183.9)	996.7 (250.7)
Sep	247.4 (130.4)	0.0 (0.0)	0.0 (0.0)	320.0 (148.1)	567.4 (197.3)
Oct	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	64.0 (29.6)	64.0 (29.6)
Nov	262.4 (121.5)	0.0 (0.0)	0.0 (0.0)	456.0 (139.0)	718.4 (184.6)
Dec	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Jan	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Feb	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Mar	0.0 (0.0)	0.0 (0.0)	568.2 (186.5)	880.5 (407.6)	1,448.7 (448.2)
Apr	2,425.3 (1,278.2)	1,300.0 (371.2)	0.0 (0.0)	0.0 (0.0)	3,725.3 (1,331.0)
May	540.0 (250.0)	1,090.0 (352.5)	0.0 (0.0)	605.5 (158.6)	2,235.5 (460.3)
Jun	0.0 (0.0)	291.7 (135.0)	1,114.5 (271.5)	236.0 (109.2)	1,642.2 (322.3)
Total	3,475.0 (1,314.6)	3,022.7 (535.9)	4,551.1 (945.8)	4,291.3 (593.7)	15,340.2 (1,806.2)

Appendix 3: Catch and harvest estimates by angler type, month, zone, and day type, Cape Fear River creel survey, 2003–2004

TABLE A3.1.—Estimated catch (top) and harvest (bottom) of all fish by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	6,900.0 (2,816.9) 2,300.0 (939.0)	1,699.3 (218.3) 904.7 (191.3)	5,630.4 (1,963.9) 2,392.0 (819.3)	640.0 (179.5) 176.0 (81.5)	14,869.7 (3,445.5) 5,772.7 (1,263.4)
Aug	1,120.0 (404.1) 1,120.0 (404.1)	1,004.5 (196.6) 938.5 (204.9)	420.0 (114.4) 319.2 (101.3)	400.0 (124.4) 192.0 (71.6)	2,944.5 (480.2) 2,569.7 (469.8)
Sep	428.8 (226.0) 428.8 (226.0)	509.7 (119.1) 194.9 (65.5)	374.0 (135.9) 330.0 (134.7)	416.0 (86.8) 208.0 (69.9)	1,728.5 (302.1) 1,161.7 (280.0)
Oct	482.8 (179.9) 413.8 (176.2)	106.7 (49.4) 106.7 (49.4)	368.0 (109.5) 0.0 (0.0)	512.0 (98.6) 0.0 (0.0)	1,469.4 (237.7) 520.5 (183.0)
Nov	187.4 (62.6) 187.4 (62.6)	563.3 (126.2) 213.3 (71.1)	240.0 (78.6) 0.0 (0.0)	512.0 (127.1) 0.0 (0.0)	1,502.7 (205.3) 400.7 (94.7)
Dec	86.2 (35.2) 0.0 (0.0)	15.0 (16.9) 0.0 (0.0)	294.4 (86.7) 0.0 (0.0)	232.0 (88.8) 0.0 (0.0)	627.6 (129.2) 0.0 (0.0)
Jan	0.0 (0.0) 0.0 (0.0)	410.6 (148.5) 0.0 (0.0)	176.0 (57.6) 0.0 (0.0)	273.6 (81.1) 43.2 (17.0)	860.2 (178.7) 43.2 (17.0)
Feb	399.8 (130.9) 399.8 (130.9)	624.0 (328.9) 336.0 (177.1)	0.0 (0.0) 0.0 (0.0)	108.0 (44.1) 36.0 (14.7)	1,131.8 (356.7) 771.8 (220.7)
Mar	172.4 (49.8) 0.0 (0.0)	554.7 (111.5) 134.9 (38.2)	858.2 (222.0) 262.9 (138.5)	1,317.7 (269.3) 426.9 (115.6)	2,903.0 (369.8) 824.7 (184.4)
Apr	5,971.4 (1,654.2) 5,971.4 (1,654.2)	1,699.0 (254.3) 1,392.4 (277.3)	1,710.3 (451.0) 554.7 (132.0)	2,637.5 (606.3) 1,421.5 (391.4)	12,018.3 (1,836.3) 9,340.0 (1,727.4)
May	1,932.5 (418.9) 687.5 (120.2)	3,558.1 (728.3) 1,985.7 (372.5)	8,003.3 (1,712.7) 1,526.6 (157.2)	5,637.8 (1,417.1) 2,031.1 (492.0)	19,131.7 (2,376.4) 6,231.0 (648.0)
Jun	7,354.3 (3,316.8) 324.8 (91.4)	3,112.4 (314.5) 1,519.0 (378.2)	6,710.0 (976.4) 880.0 (198.5)	1,920.0 (340.6) 912.0 (213.9)	19,096.7 (3,488.5) 3,635.8 (486.6)
Total	25,035.6 (4,703.1) 11,833.5 (1,976.7)	13,857.4 (977.5) 7,726.2 (694.2)	24,784.6 (2,838.4) 6,265.4 (894.8)	14,606.6 (1,631.5) 5,446.8 (686.7)	78,284.2 (5,813.2) 31,271.8 (2,379.4)

TABLE A3.2.—Estimated catch (top) and harvest (bottom) of sunfish by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	6,900.0 (2,816.9) 2,300.0 (939.0)	1,034.5 (187.7) 524.7 (130.9)	5,004.8 (1,960.1) 2,355.2 (819.1)	80.0 (37.0) 0.0 (0.0)	13,019.3 (3,437.1) 5,179.9 (1,252.9)
Aug	140.0 (57.2) 140.0 (57.2)	119.9 (34.6) 119.9 (34.6)	168.0 (88.5) 168.0 (88.5)	240.0 (113.1) 144.0 (67.9)	667.9 (158.4) 571.9 (130.0)
Sep	0.0 (0.0) 0.0 (0.0)	134.9 (39.9) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	32.0 (14.8) 0.0 (0.0)	166.9 (42.6) 0.0 (0.0)
Oct	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	160.0 (74.1) 0.0 (0.0)	160.0 (74.1) 0.0 (0.0)
Nov	0.0 (0.0) 0.0 (0.0)	213.3 (100.6) 106.7 (50.3)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	213.3 (100.6) 106.7 (50.3)
Dec	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Jan	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	28.8 (15.2) 0.0 (0.0)	28.8 (15.2) 0.0 (0.0)
Feb	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Mar	0.0 (0.0) 0.0 (0.0)	209.9 (97.2) 60.0 (27.8)	209.9 (97.2) 262.9 (138.5)	262.9 (138.5) 265.6 (105.1)	1,050.9 (287.0) 588.4 (176.1)
Apr	2,665.1 (1,276.3) 2,665.1 (1,276.3)	1,142.9 (232.6) 971.4 (267.6)	0.0 (0.0) 0.0 (0.0)	533.3 (246.9) 533.3 (246.9)	4,341.3 (1,320.6) 4,169.9 (1,327.2)
May	1,335.0(396.1) 345.0 (100.4)	3,068.6(724.2) 1,820.0 (367.2)	6,159.2 (1,645.1) 1,526.6 (157.2)	4,586.3 (1,391.3) 1,596.9 (463.8)	15,149.1 (2,307.3) 5,288.6 (620.3)
Jun	6,285.7 (3,312.9) 0.0 (0.0)	2,377.1 (229.7) 1,219.0 (351.8)	2,772.0 (179.3) 792.0 (195.7)	1,056.0(277.5) 672.0 (188.3)	12,490.9 (3,337.2) 2,683.0 (444.4)
Total	17,325.9 (4,549.6) 5,450.1 (1,588.7)	8,301.2 (830.0) 4,821.8 (593.1)	14,366.8 (2,570.5) 5,104.7 (872.3)	7,294.6 (1,465.4) 3,211.8 (572.0)	47,288.5 (5,490.3) 18,588.4 (1,990.9)

TABLE A3.3.—Estimated catch (top) and harvest (bottom) of catfish by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are in parentheses.

Period	Zone 1		Zone 2		
	Weekday	Weekend	Weekday	Weekend	Total
Jul	0.0 (0.0)	664.8 (111.3)	184.0 (43.4)	544.0 (175.5)	1,392.8 (212.3)
	0.0 (0.0)	380.0 (139.5)	36.8 (19.4)	176.0 (81.5)	592.8 (162.7)
Aug	980.0 (400.1)	644.7 (157.1)	151.2 (49.3)	144.0 (51.2)	1,919.9 (435.6)
	980.0 (400.1)	578.7 (167.3)	151.2 (49.3)	48.0 (22.6)	1,757.9 (437.0)
Sep	428.8 (226.0)	344.8 (111.3)	330.0 (134.7)	320.0 (82.9)	1,423.6 (297.4)
	428.8 (226.0)	194.9 (65.5)	330.0 (134.7)	208.0 (69.9)	1,161.7 (280.0)
Oct	413.8 (176.2)	106.7 (49.4)	0.0 (0.0)	48.0 (22.2)	568.5 (184.3)
	413.8 (176.2)	106.7 (49.4)	0.0 (0.0)	0.0 (0.0)	520.5 (183.0)
Nov	112.4 (52.1)	243.3 (57.3)	0.0 (0.0)	0.0 (0.0)	355.8 (77.4)
	112.4 (52.1)	106.7 (50.3)	0.0 (0.0)	0.0 (0.0)	219.1 (72.4)
Dec	0.0 (0.0)	15.0 (6.9)	0.0 (0.0)	0.0 (0.0)	15.0 (6.9)
	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Jan	0.0 (0.0)	50.6 (20.7)	0.0 (0.0)	0.0 (0.0)	50.6 (20.7)
	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Feb	399.8 (130.9)	624.0 (328.9)	0.0 (0.0)	0.0 (0.0)	1,023.8 (354.0)
	399.8 (130.9)	336.0 (177.1)	0.0 (0.0)	0.0 (0.0)	735.8 (220.2)
Mar	86.2 (35.2)	384.9 (47.2)	0.0 (0.0)	110.9 (31.8)	482.0 (70.6)
	0.0 (0.0)	75.0 (26.3)	0.0 (0.0)	40.3 (18.7)	115.3 (32.2)
Apr	2,401.1 (1,006.6)	387.6 (90.9)	0.0 (0.0)	190.0 (62.3)	2,978.7 (1,012.6)
	2,401.1 (1,006.6)	321.0 (63.4)	0.0 (0.0)	166.4 (63.3)	2,888.5 (1,010.6)
May	222.5 (35.9)	337.1 (66.8)	26.5 (12.3)	580.4 (246.8)	1,166.6 (258.5)
	222.5 (35.9)	165.7 (62.7)	0.0 (0.0)	333.3 (157.1)	721.5 (172.9)
Jun	576.2 (77.1)	368.6 (131.7)	704.0 (140.7)	528.0 (164.2)	2,176.8 (264.7)
	220.0 (81.1)	300.0 (138.9)	88.0 (35.9)	240.0 (101.5)	848.0 (193.5)
Total	5,620.9 (1,133.0)	4,072.1 (442.9)	1,395.7 (205.9)	2,465.4 (365.5)	13,554.0 (1,286.8)
	5,178.5 (1,132.8)	2,564.5 (340.6)	606.0 (149.2)	1,212.1 (226.7)	9,561.1 (1,213.6)

TABLE A3.4.—Estimated catch (top) and harvest (bottom) of largemouth bass by zone, month, and day type on the Cape Fear River River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	441.6 (113.1) 0.0 (0.0)	16.0 (7.4) 0.0 (0.0)	457.6 (114.4) 0.0 (0.0)
Aug	0.0 (0.0) 0.0 (0.0)	239.9 (113.1) 239.9 (113.1)	100.8 (53.1) 0.0 (0.0)	16.0 (7.5) 0.0 (0.0)	356.7 (125.2) 239.9 (113.1)
Sep	0.0 (0.0) 0.0 (0.0)	30.0 (13.9) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	30.0 (13.9) 0.0 (0.0)
Oct	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	72.0 (19.5) 0.0 (0.0)	72.0 (19.5) 0.0 (0.0)
Nov	75.0 (34.7) 75.0 (34.7)	106.7 (50.3) 0.0 (0.0)	120.0 (55.5) 0.0 (0.0)	128.0 (60.3) 0.0 (0.0)	429.6 (102.2) 75.0 (34.7)
Dec	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	73.6 (38.8) 0.0 (0.0)	232.0 (88.8) 0.0 (0.0)	305.6 (96.9) 0.0 (0.0)
Jan	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	88.0 (40.7) 0.0 (0.0)	187.2 (73.6) 14.4 (7.6)	275.2 (84.1) 14.4 (7.6)
Feb	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Mar	86.2 (35.2) 0.0 (0.0)	60.0 (27.8) 0.0 (0.0)	108.2 (57.0) 0.0 (0.0)	342.9 (121.6) 0.0 (0.0)	597.3 (141.1) 0.0 (0.0)
Apr	0.0 (0.0) 0.0 (0.0)	68.6 (31.7) 0.0 (0.0)	194.1 (79.2) 0.0 (0.0)	1,004.0 (422.3) 0.0 (0.0)	1,266.7 (430.8) 0.0 (0.0)
May	375.0 (131.4) 120.0 (55.5)	33.3 (15.7) 0.0 (0.0)	1,058.9 (393.6) 0.0 (0.0)	188.5 (88.8) 0.0 (0.0)	1,655.6 (424.6) 120.0 (55.5)
Jun	220.0 (116.0) 0.0 (0.0)	366.7 (169.7) 0.0 (0.0)	3,146.0 (949.2) 0.0 (0.0)	224.0 (103.7) 0.0 (0.0)	3,956.7 (976.7) 0.0 (0.0)
Total	756.2 (182.1) 195.0 (65.5)	905.1 (215.3) 239.9 (113.1)	5,331.2 (1,042.7) 0.0 (0.0)	2,410.5 (478.7) 14.4 (7.6)	9,403.0 (1,181.5) 449.2 (130.9)

TABLE A3.5.—Estimated catch (top) and harvest (bottom) of American shad by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Aug	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Sep	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Oct	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Nov	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Dec	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Jan	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Feb	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Mar	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	270.6 (142.6) 0.0 (0.0)	90.8 (42.0) 90.8 (42.0)	361.4 (148.7) 90.8 (42.0)
Apr	787.8 (300.8) 787.8 (300.8)	71.4 (33.1) 71.4 (33.1)	1,386.8 (440.9) 554.7 (132.0)	753.8 (349.0) 636.0 (292.4)	2,999.9 (638.6) 2,050.0 (760.3)
May	0.0 (0.0) 0.0 (0.0)	28.6 (13.5) 0.0 (0.0)	26.5 (12.3) 0.0 (0.0)	23.6 (11.1) 0.0 (0.0)	78.6 (21.4) 0.0 (0.0)
Jun	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Total	787.8 (300.8) 787.8 (300.8)	100.0 (35.7) 71.4 (33.1)	1,683.9 (463.5) 554.7 (132.0)	868.2 (351.7) 726.8 (297.4)	3,439.8 (655.0) 2,140.8 (444.3)

TABLE A3.6.—Estimated catch (top) and harvest (bottom) of striped bass by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Aug	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Sep	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	32.0 (14.8) 0.0 (0.0)	32.0 (14.8) 0.0 (0.0)
Oct	69.0 (36.3) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	138.0 (56.3) 0.0 (0.0)	48.0 (22.2) 0.0 (0.0)	255.0 (70.6) 0.0 (0.0)
Nov	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	120.0 (55.5) 0.0 (0.0)	96.0 (45.3) 0.0 (0.0)	216.0 (71.6) 0.0 (0.0)
Dec	86.2 (35.2) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	220.8 (77.6) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	307.0 (85.2) 0.0 (0.0)
Jan	0.0 (0.0) 0.0 (0.0)	360.0 (147.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	57.6 (30.4) 28.8 (15.2)	417.6 (143.9) 28.8 (15.2)
Feb	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	108.0 (44.1) 36.0 (14.7)	108.0 (44.1) 36.0 (14.7)
Mar	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	108.2 (57.0) 0.0 (0.0)	147.9 (27.5) 30.3 (14.0)	256.2 (63.3) 30.3 (14.0)
Apr	0.0 (0.0) 0.0 (0.0)	28.6 (13.2) 28.6 (13.2)	0.0 (0.0) 0.0 (0.0)	70.7 (32.7) 0.0 (0.0)	99.2 (35.3) 28.6 (13.2)
May	0.0 (0.0) 0.0 (0.0)	57.1 (26.9) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	63.9 (19.5) 0.0 (0.0)	121.0 (33.2) 0.0 (0.0)
Jun	125.7 (66.3) 31.4 (16.6)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	96.0 (35.3) 0.0 (0.0)	221.7 (75.1) 31.4 (16.6)
Total	280.9 (83.4) 31.4 (16.6)	445.7 (150.0) 28.6 (13.2)	587.0 (124.6) 0.0 (0.0)	720.1 (95.3) 95.1 (25.3)	2,033.7 (232.5) 155.1 (33.0)

TABLE A3.7.—Estimated catch (top) and harvest (bottom) of black crappie by zone, month, and day type on the Cape Fear River, 1 July 2003-30 June 2004. Standard errors are given in parentheses.

	Zone 1		Zone 2		
Period	Weekday	Weekend	Weekday	Weekend	Total
Jul	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Aug	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Sep	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Oct	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	184.0 (53.5) 0.0 (0.0)	184.0 (53.5) 0.0 (0.0)
Nov	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Dec	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Jan	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	88.0 (40.7) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	88.0 (40.7) 0.0 (0.0)
Feb	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Mar	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Apr	117.3 (61.8) 117.3 (61.8)	0.0 (0.0) 0.0 (0.0)	129.4 (52.8) 0.0 (0.0)	85.7 (39.7) 85.7 (39.7)	332.5 (90.5) 203.0 (73.5)
May	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	53.0 (24.5) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	53.0 (24.5) 0.0 (0.0)
Jun	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)	0.0 (0.0) 0.0 (0.0)
Total	117.3 (61.8) 117.3 (61.8)	0.0 (0.0) 0.0 (0.0)	270.4 (71.1) 0.0 (0.0)	269.7 (66.6) 85.7 (39.7)	657.5 (115.4) 203.0 (73.5)

Appendix 4: Observed trips by target species, angler origin, zone, and day type, Cape Fear River creel survey, 2003–2004

TABLE A4.1.—Total number of observed trips by target species, angler origin, zone, and day type during the Cape Fear River creel survey, 1 July 2003-30 June 2004. Local anglers resided in counties within the creel study area, regional anglers resided in other North Carolina counties, and nonresident anglers resided outside of North Carolina.

		Zone 1		Zone 2		
Target Species	Origin	Weekday	Weekend	Weekday	Weekend	Total
Striped bass	Local	1	3	10	16	30
	Regional	0	0	0	1	1
	Non-state	0	0	0	0	0
Shad	Local	1	0	4	3	8
	Regional	0	0	1	0	1
	Non-state	0	0	0	0	0
Largemouth bass	Local	3	8	18	34	63
	Regional	1	0	2	0	3
	Non-state	0	0	0	0	0
Crappie	Local	0	1	2	1	4
	Regional	0	0	0	0	0
	Non-state	0	0	0	0	0
Sunfish	Local	1	8	20	24	53
	Regional	0	1	0	1	2
	Non-state	0	0	0	1	1
Catfish	Local	23	37	3	13	76
	Regional	2	3	2	4	11
	Non-state	0	0	0	0	0
Other	Local	5	11	14	24	54
	Regional	0	1	0	0	1
	Non-state	0	0	0	0	0
Sunfish/Catfish	Local	5	18	3	5	31
	Regional	0	1	0	1	1
	Non-state	0	0	0	0	0
Group	Local	10	12	5	16	43
	Regional	0	1	0	0	1
	Non-state	0	0	0	2	2
Total	Local	49	98	79	136	362
	Regional	3	8	5	5	21
	Non-state	0	0	0	3	3

Appendix 5: Angler expenditures by target species, angler origin, zone, and day type, Cape Fear River creel survey, 2003–2004

TABLE A5.1.—Average dollar amount spent per trip on gas by target species, angler origin, zone, and day type during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

		Zone 1		Zone 2		
Target Species	Origin	Weekday	Weekend	Weekday	Weekend	Total
Striped bass	Local	$8.00	$5.67	$8.80	$10.81	$9.87
	Regional	$0.00[a]	$8.00[b]	$0.00[a]	$0.00[a]	$8.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Shad	Local	$10.00[b]	$0.00	$6.25	$21.00	$12.25
	Regional	$0.00	$0.00	$10.00[b]	$0.00	$10.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Largemouth bass	Local	$14.33	$11.50	$14.17	$18.26	$16.05
	Regional	$15.00[b]	$0.00	$50.00	$0.00	$38.33
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Crappie	Local	$0.00	$7.00[b]	$5.00	$8.00[b]	$6.25
	Regional	$0.00	$0.00	$0.00	$0.00	$0.00
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Sunfish	Local	$30.00[b]	$10.50	$7.30	$7.25	$8.19
	Regional	$0.00	$14.00[b]	$0.00	$20.00[b]	$17.00
	Non-state	$0.00	$0.00	$0.00	$35.00[b]	$35.00
Catfish	Local	$8.70	$7.76	$9.67	$7.77	$8.12
	Regional	$15.00	$10.00	$6.50	$10.00	$10.27
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Other	Local	$9.00	$9.45	$10.57	$7.21	$8.70
	Regional	$0.00	$20.00[b]	$0.00	$0.00	$20.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Sunfish/Catfish	Local	$8.40	$10.06	$9.67	$5.40	$9.00
	Regional	$0.00	$8.00[b]	$0.00	$0.00	$8.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Group	Local	$9.60	$10.17	$6.00	$9.20	$9.19
	Regional	$0.00	$8.00[b]	$0.00	$0.00	$8.00[b]
	Non-state	$0.00	$0.00	$0.00	$32.50	$32.50
Total	Local	$10.89	$8.01	$8.60	$10.55	$9.74
	Regional	$3.33	$7.56	$7.39	$3.33	$13.29
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$7.50	$7.50

[a]Indicates no anglers for this particular category.
[b]Indicates only one observation for this particular category.

TABLE A5.2.—Average dollar amount spent per trip on bait by target species, angler origin, zone, and day type during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

Target Species	Origin	Zone 1		Zone 2		Total
		Weekday	Weekend	Weekday	Weekend	
Striped bass	Local	$10.00	$1.67	$2.90	$4.38	$3.97
	Regional	$0.00[a]	$8.00[b]	$0.00[a]	$0.00[a]	$8.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Shad	Local	$0.00[b]	$0.00[a]	$4.50	$0.00	$2.25
	Regional	$0.00[a]	$0.00[a]	$0.00[b]	$0.00[a]	$0.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Largemouth bass	Local	$5.00	$2.50	$0.00	$0.32	$0.73
	Regional	$0.00[b]	$0.00[a]	$0.00[a]	$0.00	$0.00
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Crappie	Local	$0.00[a]	$5.00[b]	$0.00	$0.00[b]	$1.25
	Regional	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Sunfish	Local	$10.00[b]	$4.38	$4.03	$4.33	$4.33
	Regional	$0.00[a]	$6.00[b]	$0.00[a]	$10.00[b]	$8.00
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$10.00[b]	$10.00
Catfish	Local	$7.04	$7.19	$9.33	$6.15	$7.05
	Regional	$8.00	$5.33	$2.50	$9.00	$6.64
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Other	Local	$4.50	$6.18	$4.36	$6.00	$5.47
	Regional	$0.00[a]	$10.00[b]	$0.00[a]	$0.00[a]	$10.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Sunfish/Catfish	Local	$5.60	$6.50	$6.33	$5.60	$6.19
	Regional	$0.00[a]	$5.00[b]	$0.00[a]	$0.00[a]	$5.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Group	Local	$3.10	$3.75	$1.60	$4.47	$3.60
	Regional	$0.00[a]	$15.00[b]	$0.00[a]	$0.00[a]	$15.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$6.50	$6.50
Total	Local	$5.03	$4.13	$3.67	$3.47	$3.87
	Regional	$0.89	$5.48	$0.28	$2.11	$5.85
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$1.83	$1.83

[a]Indicates no anglers for this particular category.
[b]Indicates only one observation for this particular category.

TABLE A5.3.—Average dollar amount spent per trip on food by target species, angler origin, zone, and day type during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

Target Species	Origin	Zone 1 Weekday	Zone 1 Weekend	Zone 2 Weekday	Zone 2 Weekend	Total
Striped bass	Local	$10.00	$1.67	$5.50	$6.31	$5.87
	Regional	$0.00[a]	$0.00[b]	$0.00[a]	$0.00[a]	$0.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Shad	Local	$5.00	$0.00[b]	$5.00	$15.67	$9.00
	Regional	$0.00[a]	$0.00[a]	$0.00[b]	$0.00[a]	$0.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Largemouth bass	Local	$9.00	$4.88	$4.67	$6.56	$5.92
	Regional	$0.00[b]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Crappie	Local	$0.00	$5.00[b]	$2.50	$6.00[b]	$4.00
	Regional	$0.00[a]I	$0.00[a]I	$0.00[a]I	$0.00[a]I	$0.00[a]I
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Sunfish	Local	$10.00[b]	$6.63	$3.20	$4.25	$4.32
	Regional	$0.00[a]	$0.00[b]	$0.00[a]	$10.00[b]	$5.00
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$20.00[b]	$20.00[b]
Catfish	Local	$5.22	$5.43	$2.67	$4.15	$5.04
	Regional	$12.50	$23.33	$1.00	$7.50	$11.55
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Other	Local	$5.20	$5.82	$2.79	$5.17	$4.69
	Regional	$0.00[a]	$10.00[b]	$0.00[a]	$0.00[a]	$10.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Sunfish/Catfish	Local	$5.00	$5.89	$6.67	$7.00	$6.00
	Regional	$0.00[a]	$5.00[b]	$0.00[a]	$0.00[a]	$5.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Group	Local	$6.50	$8.67	$3.60	$7.47	$7.12
	Regional	$0.00[a]	$5.00[b]	$0.00[a]	$0.00[a]	$5.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$17.50	$17.50
Total	Local	$6.21	$4.89	$4.07	$6.95	$5.77
	Regional	$1.39	$4.81	$0.11	$1.94	$4.06
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$4.17	$4.17

[a]Indicates no anglers for this particular category.
[b]Indicates only one observation for this particular category.

TABLE A5.4.—Average additional dollar amount per trip anglers would be willing to spend on a trip of similar satisfaction by target species, angler origin, zone, and day type during the Cape Fear River creel survey, 1 July 2003-30 June 2004.

		Zone 1		Zone 2		
Target Species	Origin	Weekday	Weekend	Weekday	Weekend	Total
Striped bass	Local	$50.00	$23.33	$31.00	$30.00	$32.00
	Regional	$0.00[a]	$100.00[b]	$0.00[a]	$0.00[a]	$100.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Shad	Local	$20.00[b]	$0.00[a]	$40.00	$26.67	$32.50
	Regional	$0.00[a]	$0.00[a]	$0.00[b]	$0.00[a]	$0.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Largemouth bass	Local	$36.67	$28.75	$35.00	$44.71	$39.52
	Regional	$0.00[b]	$0.00[a]	$0.00[a]	$100.00	$50.00
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Crappie	Local	$0.00[a]	$20.00[b]	$25.00	$20.00[b]	$22.50
	Regional	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Sunfish	Local	$50.00[b]	$16.25	$18.00	$18.70	$18.65
	Regional	$0.00[a]	$30.00[b]	$0.00[a]	$50.00[b]	$40.00
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$20.00[b]	$20.00[b]
Catfish	Local	$36.82	$25.95	$70.00	$19.23	$29.73
	Regional	$55.00	$36.67	$60.00	$17.50	$37.27
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Other	Local	$18.00	$34.00	$22.86	$22.50	$24.34
	Regional	$0.00	$20.00[b]	$0.00	$0.00	$20.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]	$0.00[a]
Sunfish/Catfish	Local	$24.00	$26.11	$25.00	$22.00	$25.00
	Regional	$0.00[a]	$20.00[b]	$0.00[a]	$0.00[a]	$20.00[b]
	Non-state	$0.00[a]	$0.0[a]0	$0.00[a]	$0.00[a]	$0.00[a]
Group	Local	$44.00	$31.82	$26.00	$30.77	$33.85
	Regional	$0.00[a]	$30.00[b]	$0.00[a]	$0.00[a]	$30.00[b]
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$75.00	$75.00
Total	Local	$31.05	$22.91	$32.54	$26.06	$28.68
	Regional	$6.11	$26.30	$6.67	$18.61	$33.03
	Non-state	$0.00[a]	$0.00[a]	$0.00[a]	$10.56	$10.56

[a]Indicates no anglers for this particular category.
[b]Indicates only one observation for this particular category.