FONTANA RESERVOIR CREEL SURVEY, 2006–2008

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Abstract.—A roving access point creel survey was conducted on Fontana Reservoir, Swain and Graham counties, North Carolina by the North Carolina Wildlife Resources Commission from August 2006 through July 2008. Boater angling effort was consistent among years and ranged from 48–52 angler hours/ha, which was considerably higher than that reported from a previous creel survey in 1984–1985 (mean, 13 angler hours/ha). Walleye and black bass accounted for 70–75% of the directed effort each year. Black bass were the dominant species caught each year representing 53–54% of the catch; however, Walleye, crappie, and catfish were the species most likely to be harvested. The majority of catch and harvest for all species occurred during Mar–Aug each year. Given the continued increase in angler interest in Fontana Reservoir, standardized angler creel surveys should be conducted at periodic intervals so managers can observe long-term trends and compare across systems and years.

Fontana Reservoir is a 4,318-ha impoundment of the Little Tennessee, Tuckasegee, and Nantahala rivers, constructed by the Tennessee Valley Authority (TVA) in 1944 in Swain and Graham counties, North Carolina. In addition to the main river arms, the reservoir impounds the lower portion of several large streams, creating a highly dendritic system of narrow, deep channels and long coves. Shoreline development is present only in the area between the Little Tennessee and Tuckasegee river arms of the upper end of the reservoir; the northern shorelines lie within the Great Smoky Mountains National Park, and the majority of the southern shoreline is managed by TVA or the U. S. Forest Service (USFS). Shorelines are typically forested and road access is limited mainly to locations with developed recreational facilities and

at highway bridges. Annual water level fluctuations de-water the upper portion of the reservoir and its tributary coves, limiting several access areas to warm-season use.

Fishery studies by North Carolina Wildlife Resources Commission (NCWRC) biologists (Tebo 1961; Messer 1966; Baker 1966; Davies 1981) and TVA monitoring crews (Hickman et al. 1985) described a typical mountain-reservoir fishery resource consisting of Largemouth Bass *Micropterus salmoides*, Smallmouth Bass *Micropterus dolomieu*, sunfish *Lepomis* spp., Black Crappie *Pomoxis nigromaculatus,* White Crappie *Pomoxis annularis*, Channel Catfish *Ictalurus punctatus*, Flathead Catfish *Pylodictis olivaris*, and stocked Walleye *Sander vitreus*. Gizzard Shad *Dorosoma cepedianum* and Threadfin Shad *D. petenense* have also been stocked to supplement the forage community (NCWRC, unpublished data) and both species persist in the reservoir. Muskellunge *Esox masquinongy* were stocked repeatedly in the Little Tennessee River between 1970 and 1983, in Fontana Reservoir in 1974, in the Tuckasegee River in 1976 (Monaghan 1985) and are occasionally harvested by anglers. Spotted Bass *Micropterus punctulatus*, White Bass *Morone chrysops*, Alabama Bass *Micropterus henshalli,* and Yellow Perch *Perca flavescens* have also appeared in Fontana Reservoir through angler introductions. Two previous creel surveys were conducted on Fontana Reservoir by the NCWRC in 1964–1965 (Baker 1966) and in 1984–1985 (Borawa 1986). Those previous creel surveys identified Smallmouth Bass, Largemouth Bass, Walleye, and crappie as the major sport fisheries in Fontana Reservoir.

Since its construction, Fontana Reservoir has provided recreational fishing to anglers; however, as the density and mobility of the human population in western North Carolina and surrounding states has increased, recreational pressure on the reservoir has increased. Objective and current information is needed on the recreational fishery as well as angler perceptions of the fishery.

Methods

Creel Survey Design and Field Data Collection

The Fontana creel survey covered the period from August 1, 2006 through July 31, 2008 and was generally divided into two reporting years to make reporting simpler. Year one is from August 1, 2006 through July 31, 2007 and year two is from August 1, 2007 through July 31, 2008. All Saturdays and Sundays were sampled as well as Good Friday, Memorial Day, Independence Day, and Labor Day (sampling probability = 1.00); other holidays falling on weekdays were assigned normal weekday probability (0.60) for sampling. Within each week, the remaining three sample days (two during holiday weeks) were allocated randomly and with equal probability to remaining weekdays.

Sample day lengths varied according to solar day length and expected reservoir use patterns. During the months of May through August, for both years, the sample day began at 0600 Eastern Daylight Time (EDT), concluded at 0100 EDT, and was divided into three 6.33-h work periods. From September 1–October 28, 2006, September 1–November 3, 2007, March 11–April 30, 2007, and from March 9–April 30, 2008, the sample day began at 0615 EDT, concluded at 0100 EDT, and was divided into three 6.25-h work periods. From October 29–November 30, 2006 and from November 4–30, 2007, the sample day began at 0715 Eastern Standard Time (EST), concluded at 2015 EST, and was divided into two 6.50-h work periods.

During the month of December of both years, the sample day began at 0730 EST, concluded at 2000 EST, and was divided into two 6.25-h work periods. During the month of January of both years, the sample day began at 0745 EST, concluded at 2015 EST, and was divided into two 6.25-h work periods. From February 1–March 10, 2007 and February 1–March 8, 2008, the sample day began at 0720 EST, concluded at 2020 EST, and was divided into two 6.50-h work periods.

Initial work periods in August 2006 were assigned to each sample day with uneven probabilities, reflecting the greater likelihood of fishing trips concluding in the afternoon based on patterns observed on other western North Carolina reservoirs (Yow and Grooms 2001; Yow et al. 2002; Yow 2005). For August 2006, the three work periods were assigned 0.10, 0.35, and 0.55 probabilities of sampling. As the creel survey progressed, temporal distribution of interviews observed during each month of creel survey were used to develop work period probabilities for subsequent months to more efficiently sample the fishery as angler use patterns changed through the year (Table 1).

Fontana Reservoir was divided into six zones (Figure 1): 1) Old 288 Boating Access Area (BAA) on the north side of the Tuckasegee River downstream of Bryson City; 2) small up-lake access facilities, including Flat Branch ("Wilderness") BAA on the south side of the Tuckasegee River and two privately-operated boat ramp facilities, Alarka Boat Dock and Greasy Branch Marina, on the Little Tennessee arm of the reservoir; 3) Almond Boat and RV Park at the confluence of the Little Tennessee and Nantahala river arms; 4) NCWRC facilities on the uplake portion of the Little Tennessee River, including Lemmons Branch and Tsali BAAs; 5) mid-lake facilities in the Panther Creek arm of the reservoir, including Prince Boat Dock and Crisp Boat Dock; and 6) down-lake facilities, including Cable Cove BAA and Fontana Village Marina.

Because of changing reservoir water levels and seasonal closure of marinas and access roads, not all access points were available to Fontana anglers at all times of the year. The Tuckasegee River near Bryson City was navigable by boat only when the reservoir was at or near full pond elevation; therefore, Zone 1 was unusable during low-water winter months. Most boating and fishing activities at the marina ramps in zones 2 and 5 were anticipated in the May–September period. All NCWRC BAAs, except Old 288 BAA, remained open throughout the year, although access was sometimes difficult during extreme mid-winter drawdowns. This dynamic pattern of ramp accessibility required contingent zone assignment zones, in which the creel clerk indexed a pre-set random zone probability with daily information on reservoir water levels to determine the reservoir zone sampled. As with work period probabilities, observed spatial distribution of interviews was used as the creel survey progressed to develop zone probabilities for subsequent months and improve survey efficiency (Table 1; Table 2); initial August counts were based on pilot trailer counts conducted August 2004–June 2005 (NCWRC unpublished data).

On each sample day, the clerk remained in the assigned reservoir zone, recorded exit times of anglers and hourly trailer counts, and interviewed anglers as they exited the reservoir. All anglers were asked for the start time of their fishing trip, the species or species group sought, the number and species of fish caught, and the number and species of fish harvested. When anglers mentioned multiple target species, reported effort was apportioned equally among species. Methods for intercepting exiting parties differed among zones as follows:

Zones 1 and 3.—In zones containing only one access point, the clerk remained at the area for the entire work period and interviewed exiting anglers.

Zone 2.—The public ramp at Flat Branch BAA and the two nearby marinas were sampled using a "bus route" direct expansion method (Robson and Jones 1989; Pollock et al. 1994), in which a portion of each work period was spent at each of the available access areas. Each Zone-2 work period included 42 min total travel time among the three access areas; in August 2006, the remaining work period was divided into a 203-min portion allocated to "wait time" for interviews at Flat Branch BAA and two 68-min portions allocated to interviews at each of the marinas. Observed frequency of interviews at the three access areas was used to apportion wait times for subsequent sample months. The start point of the route was randomly determined for each Zone-2 work period.

Zone 4.—The public ramps at Lemmons Branch BAA and Tsali Recreation Area BAA were accessible from the same road with a round-trip travel time of 12 min between the two ramps. Both areas were surveyed during each Zone-4 work period using a bus-route procedure, with an initial allocation of a 74-min interview wait time randomly allocated to the Tsali BAA within the work period. During sample days when no boating activity was present at Tsali, the clerk returned to Lemmons Branch BAA for the remainder of the work period; on such days, Lemmons Branch BAA was treated as the only Zone-4 access point, and field procedures were similar to those in zones 1 and 3.

Zone 5.—The Panther Creek arm of the reservoir was accessed by two marinas with a travel time of 3 min between them. The marinas were sampled using a bus route procedure, with 120 min initially allocated to an interview wait time at Crisp Boat Dock, beginning at a random time during each Zone-6 work period. The remainder of the work period was allocated to Prince Boat Dock. As with other zones with multi-ramp sampling, wait times at the two access points were allocated in subsequent months of the survey based on observed proportions of fishing activity.

Zone 6.—The public ramp at Cable Cove BAA and the marina at Fontana Village were sampled using a bus route procedure, with 148 min initially allocated to an interview wait time at the marina, beginning at a random time during each Zone-6 work period. As with other zones with multi-ramp sampling, wait times at the two access points were allocated in subsequent months of the survey based on observed proportions of fishing activity.

Effort, Catch, and Harvest Estimation

Boat-angling effort, catch, and harvest data were entered, sorted, and arrayed in a Microsoft Access database and exported to a Microsoft Excel spreadsheet to calculate estimates and standard errors. Effort, catch, and harvest estimates were stratified by day-type (weekday or weekend), and seasonal estimates and associated standard errors were computed. Effort (angler-hours), catch, and harvest estimation procedures differed by reservoir zone, but in all cases employed an access point design (Pollock et al. 1994).

For each work period in zones 1 and 3, the total hours of fishing effort and total number of each species caught and harvested were summed from interview data, adjusted for missed interviews, and divided by zone and work-period probabilities to obtain estimated daily totals. In zones 2, 4, 5, and 6, each daily estimate D was directly expanded from angler-supplied trip information d using the formula of Pollock et al. (1994):

$$\hat{D} = T \sum_{i=1}^{n} \frac{1}{w_i} \sum_{j=1}^{m} \frac{d_{ji}}{\pi_j},$$

where T = the total time of the route circuit (including travel time), w_i = the time spent waiting for interviews at site i, d_{ji} = trip information obtained from angling party j at site i, and π_j representing the total probability of the sample, including the probabilities of sampling the work period and zone within the day.

For each stratum (weekday or weekend/holiday), the mean of all daily estimates was multiplied by the number of available sample days to obtain a monthly estimate for each type of effort, catch, and harvest. Approximate standard error (SE) of each monthly estimate (e.g., effort or E) was computed as

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

where s^2 = variance of sample observations, n = number of days sampled, and N = number of days available for sampling. In addition to overall effort, catch, and harvest estimates, directed-effort estimates were calculated for black bass, Walleye, crappie, other sunfish (all centrarchids other than black bass and crappie), catfish, "other" species, and "no preference" (undirected effort). Length-frequency distributions were developed for major species harvested and were compared to recent electrofishing and gillnet data.

Characteristics of Recreational Fisheries

During the first year of the creel survey (August 1, 2006–July 31, 2007) harvested fish were counted, identified, and measured (TL, mm) by the clerk whenever possible. Also, during the first year of the creel survey, a suite of additional survey questions were included in the interview. Additional information was gathered on angler residency, perceptions regarding reservoir crowding, and frequency of fishing trips to the reservoir. County of origin for fishing trips was categorized by state residency and proximity to project reservoirs, using the same classification criteria used in the 1984–1985 creel survey (Borawa 1986); anglers residing in Graham, Swain, or Jackson counties were considered local, and other residencies were grouped as non-local (other North Carolina counties) or out-of-state. Percentages of angler responses to opinion questions were tabulated, and fishery resource quality responses were categorized by angler type. Total sample sizes were determined for all angler response categories. Anglers were also asked if their fishing trip involved an overnight stay and the type of lodging facilities used, and whether they engaged in any other recreational activities during their trip to fish Fontana Reservoir. In cases where parties consist of multiple adult anglers, separate residency and opinion responses were recorded for each party member. In addition, for both creel years, interviews of bank anglers occurred incidentally when these parties were encountered at BAAs

during scheduled survey of reservoir boat anglers. All data were recorded on standard survey forms (Appendix A).

Results and Discussion

A total of 1,703 interviews were conducted during the 24-month creel survey on Fontana Reservoir. Total estimated boat angling effort was consistent between years and ranged from 210,128 (SE = 27,364) angler hours in year one (Table 1) to 226,685 (SE = 24,889) angler hours in year two (Table 2). Effort expended by area was estimated at 48 angler hours/ha in year one and 52 angler hours/ha in year two, which were both substantial increases over the 13 angler hours/ha reported during the 1984–1985 creel survey (Borawa 1986); however, creel survey and data analysis methods between the two previous creel surveys varied substantially so any direct comparisons should be considered relative in nature and will not be compared statistically in this report. Angling effort during the current survey was highest during Mar–May each year and ranged between 43% (Table 1) and 46% (Table 2) of total boat angling effort. The lowest angling pressure occurred during Dec–Feb each year ranging between 5% (Table 1) and 7% (Table 2) of total boat angling effort. Similar temporal results in angling effort were found during the two previous Fontana Reservoir creel surveys (Baker 1966; Borawa 1986). Average total effort during the current survey was split evenly (50%) between weekdays and weekends during both years. Overall average trip length was 4.9 hours and varied between 5.1 hours for weekend trips and 4.9 hours for weekday trips.

The vast majority of the angler effort (83–91%) during the creel survey was directed at seven major species (Table 1; Table 2); however, Walleye and black bass (Largemouth Bass, Smallmouth Bass, and Spotted Bass) accounted for 70–75% of the directed effort each year. Black bass received between 34–38% and Walleye received between 35–37% of the directed effort indicating the importance of these two species groups to anglers on Fontana Reservoir. Walleye and black bass (combined species) also accounted for a significant amount of the directed effort (36% and 43%, respectively) in the 1980s Fontana Reservoir creel survey (Borawa 1986).

Similar total numbers of fish were caught in both year one (105,089; Table 3) and year two (119,073; Table 4) of the Fontana Reservoir creel survey. Both estimates were substantially higher than the 25,513 caught fish reported for the previous creel survey (Borawa 1986). Catch varied seasonally during the current creel survey but the majority of angler catch each year occurred March through May (range, 39–53%) and was somewhat variable by species within those seasonal periods (Table 3; Table 4). The general trend both years was for highest catches in the spring, moderate catches in summer through fall, followed by low catches during the coldest winter months.

Black bass were consistently the dominant species caught in Fontana Reservoir during both creel years representing between 53–54% of the yearly catch followed distantly by Walleye, Sunfish, White Bass, crappie, and catfish (Table3; Table 4). As expected, catch rates for these species followed similar trends (Table 5; Table 6). Catch rates for anglers that specifically targeted black bass and Walleye were substantially higher than the rate of all anglers, indicating the specialization of anglers committed to pursuing those popular species. Black bass were predominantly caught during Mar–May each year, while the catch of other species was more dispersed, except for the Dec–Feb period when catch was reduced considerably for all species.

The species captured during this creel survey were similar to the previous Fontana Reservoir creel surveys that showed Smallmouth Bass, crappie, and Walleye were also the predominate species captured (Baker 1966; Borawa 1986). Although trout received some directed effort each year (range 0.5–0.8% of all angler hours/year), recorded catch was too low to expand and report. Fontana Reservoir does not have a substantial wild trout population and is not stocked with trout by NCWRC; however, it is likely a portion of anglers assume it is because it is in the mountains and specifically target trout while fishing Fontana Reservoir.

Species harvest in Fontana Reservoir varied by year but over 50% of all Walleye, crappie, catfish, and Yellow Perch captured were harvested each year (Table 3; Table 4). Harvest occurred primarily during Mar–Aug each year. There were no size limits during the creel survey for these species and only Walleye had an 8-fish creel limit, so angler preference was likely the determinate factor for release. Not surprisingly, Walleye were harvested at a higher rate each year by anglers that targeted Walleye compared to all anglers (Table 5; Table 6). The previous Fontana Reservoir creel survey estimated a 94.4% harvest rate for Walleye (Borawa 1986), which was substantially higher than the current estimates (78–79%) even though regulations for Walleye were identical during the two creel surveys. Although black bass was the most captured species each year, they were harvested at a disproportionately low percentage (range, 34–37%) annually. Borawa (1986) reported a higher overall harvest rate for black bass (54.2%). Size and creel limits between the two creel periods became more conservative, going from a 305-mm Smallmouth Bass and Largemouth Bass minimum size limit with a 8-fish creel in 1984–1985 to a 356-mm minimum size limit with a 5-fish creel in 2006–2007, which could have influenced harvest rates in addition to the angling trend towards catch and release for black bass. Seasonality of black bass harvest was also more pronounced during Mar–May each year (Table 3; Table 4). Of note is that black bass were harvested at a higher rate by anglers that targeted black bass compared to all anglers each year (Table 5; Table 6) which seems contrary to the general “catch and release” trend among that specialty group.

The majority of black bass harvested from Fontana Reservoir during year one of the creel survey ranged from 250–450 mm TL (Figure 2). Approximately 25% of the black bass measured were below the 305-mm minimum size limit but would have been eligible for harvest using the 2-fish any size exemption (Figure 2). Anecdotally, sub-legal Smallmouth Bass were harvested proportionally at a higher rate (29%) under the two-fish length limit exemption than either Spotted Bass (8%) or Largemouth Bass (4%). It should be noted that significant hybridization occurs in Fontana Reservoir between Smallmouth Bass, Spotted Bass, and Alabama Bass which likely caused some mis-identifications by creel clerks and anglers during this study. The lengths of Walleye harvested during year one of the creel survey ranged from 275–550 mm, with an average length of 401 mm (Figure 3). The length distribution of Walleye harvested does not appear to be skewed towards any particular size class indicating anglers were willing to keep a wide size range of Walleye. Both Black Crappie and White Crappie, ranging generally from 200–325 mm, were harvested by anglers during year one of the Fontana Reservoir creel survey (Figure 4). On average, harvested Black Crappie were smaller (average TL, 260 mm) than White Crappie (average TL, 289 mm) which would be expected given their differences in growth rates (Ellison 1984). Harvest of sunfish was low and measured from 150–250 mm during the first year of the creel survey (Figure 5). There were no size or creel limits for any sunfish species during the creel, so the low harvest percentage likely indicated the relatively low importance of this

fishery to harvest-oriented anglers. Channel catfish were also harvested in relatively low numbers during the survey; however, there was a large variation in the sizes harvested by anglers (Figure 6). There were no size or creel limits for any catfish species in place during the creel survey. Of note is the willingness of anglers to harvest very small Channel Catfish during the survey (Figure 6). White Bass ranging from 300–425 mm were harvested and measured during the first year of the Fontana Reservoir creel survey (Figure 7). There was no size limit for White Bass but there was a 25-fish creel during the creel survey period.

Given the substantial time that elapsed between completion of the creel and report preparation, a subset of data is only included in the appendix section and is not discussed in the report. Information included in the appendix include creel sampling effort allocation (Table A1; Table A2) and angler responses to questions posed during the first year of the creel survey (Table A3; Table A4; Table A5; Table A6; and Table A7). Also included in the appendix are copies of the creel data and interview sheets used (Figure A1; Figure A2; and Figure A3).

Management Recommendations

Fontana Reservoir continues to provide a popular sport fishery for a diverse species assemblage. Although the previous creel reports (Baker 1966; Borowa 1986) were not statistically comparable due to design differences, there likely was an actual increase in angling pressure between the surveys given the continued popularity of Fontana Reservoir. In addition, catch-and-release behavior appears to have increased over the most recent survey from the 1980s. The Walleye fishery is the most harvest-oriented in both surveys; however, impacts from recently introduced Blueback Herring *Alosa aestavalis* and Alabama Bass may jeopardize that historic fishery. Considering relatively high angler use and continued impacts to historic fisheries from non-native species introductions, similar angler surveys should be repeated on Fontana Reservoir. These creel surveys should be streamlined and designed to allow comparisons across years and reservoirs to maintain current data on angler pressure, catch, harvest, species preferences, invasive species impacts, and socioeconomic information.

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TABLE 1.—Estimated boat angling effort (angler hours) for first year of Fontana Reservoir creel survey, August 2006–July 2007. Total (for all days in survey year), day-type (WD = weekday, WE = weekend/summer holiday), and seasonal estimates are given by target species and for overall effort. June–August season includes August 2006 and June–July 2007. Undirected effort represents angling parties that were not targeting a particular species. Overall effort expansions included angler counts for all sample days, including days when no target species data were available. Approximate standard errors are given in parentheses.

Target species	All days	Day-type		Season			
		WD	WE	Jun–Aug	Sep–Nov	Dec–Feb	Mar–May
Black bass	80,835	42,858	37,976	15,429	14,435	5,175	45,795
	(13,136)	(11,929)	(5,500)	(3,540)	(3,622)	(1,190)	(12,062)
Walleye	77,113	41,233	35,879	30,664	14,220	3,885	28,342
	(13,401)	(6,212)	(11,874)	(12,063)	(2,753)	(877)	(5,072)
Crappie	15,065	1,694	13,370	11,253	1,537	812	1,461
	(10,356)	(488)	(10,344)	(10,299)	(684)	(678)	(497)
Sunfish	8,759	4,723	4,036	6,234	1,480	0	1,044
	(2,436)	(1,673)	(1,770)	(1,770)	(560)	(0)	(465)
Catfish	6,676	1,595	5,081	2,190	3,794	0	691
	(2,882)	(816)	(2,764)	(672)	(2,774)	(0)	(394)
White Bass	1,024	832	192	117	0	0	907
	(532)	(517)	(128)	(117)	(0)	(0)	(519)
Trout	1,106	238	868	1,023	66	0	17
	(608)	(238)	(560)	(606)	(47)	(0)	(17)
Undirected	16,887	8,280	8,607	5,113	2,117	873	8,782
	(2,751)	(1,913)	(1,977)	(1,165)	(705)	(473)	(2,343)
Overall effort	210,128	105,510	104,617	70,883	37,044	10,809	91,391
	(27,364)	(15,381)	(22,632)	(21,944)	(6,312)	(2,034)	(14,942)

TABLE 2.—Estimated boat angling effort (angler hours) for second year of Fontana Reservoir creel survey, August 2007–July 2008. Total (for all days in survey year), day-type (WD = weekday, WE = weekend/summer holiday), and seasonal estimates are given by target species and for overall effort. Undirected effort represents angling parties that were not targeting a particular species. Overall effort expansions included angler counts for all sample days, including days when no target species data were available. Approximate standard errors are given in parentheses.

Target species	All days	Day-type		Season			
		WD	WE	Jun–Aug	Sep–Nov	Dec–Feb	Mar–May
Black bass	77,474	40,263	37,210	16,568	20,263	5,219	35,422
	(10,982)	(6,276)	(9,046)	(3,277)	(8,155)	(1,401)	(6,433)
Walleye	80,401	42,230	38,171	15,088	15,776	4,872	44,670
	(17,644)	(11,505)	(13,377)	(4,641)	(6,911)	(1,461)	(15,488)
Crappie	3,543	2,614	928	1,160	273	129	1,980
	(1,426)	(1,384)	(345)	(694)	(209)	(110)	(1,224)
Sunfish	7,439	5,545	1,894	5,115	761	0	1,562
	(1,914)	(1,849)	(494)	(1,783)	(347)	(0)	(603)
Catfish	14,087	6,541	7,545	9,932	1,200	2,032	922
	4,308)	(2,647)	(3,399)	(3,649)	(767)	(2,032)	(724)
White Bass	3,691	215	3,476	102	121	0	3,468
	(2,873)	(152)	(2,869)	(102)	(113)	(0)	(2,869)
Trout	1,974	525	1,449	551	36	143	1,243
	(1,248)	(490)	(1,148)	(492)	(36)	(143)	(1,137)
Undirected	33,080	12,583	20,497	14,079	4,293	1,303	13,404
	(4,483)	(2,679)	(3,594)	(2,558)	(1,557)	(532)	(3,293)
Overall effort	226,685	113,694	112,990	62,692	43,823	16,921	103,247
	(24,889)	(15,523)	(19,455)	(8,855)	(10,919)	(3,671)	(20,208)

TABLE 3.—Estimated catch and harvest, by target species, for boat angling parties interviewed during first year of Fontana Reservoir creel survey, August 2006–July 2007. Totals (for all days in survey year) and seasonal estimates are given by target species and for overall effort. June-August season includes August 2006 and June–July 2007. Approximate standard errors are given in parentheses for annual values.

Estimates by target species	Entire survey year	Season			
		Jun–Aug	Sep–Nov	Dec–Feb	Mar–May
Catch					
Black Bass	55,628 (10,522)	5,797	11,982	2,610	35,237
Walleye	20,247 (3,455)	7,516	3,180	683	8,867
Crappie	4,488 (1,136)	982	1,459	100	1,947
Sunfish	11,565 (2,747)	6,486	3,422	23	1,633
Catfish	3,403 (715)	1,107	1,024	26	1,245
White Bass	8,755 (2,204)	996	1,138	217	6,403
Yellow Perch	209 (74)	33	109	20	46
Total	105,089 (12,906)	23,129	22,469	3,691	55,799
Harvest					
Black Bass	20,429 (6,876)	915	2,703	815	15,996
Walleye	15,767 (2,655)	5,571	2,156	420	7,619
Crappie	2,983 (918)	121	1,349	74	1,437
Sunfish	4,093 (1,257)	2,684	1,026	0	382
Catfish	2,137 (505)	687	610	0	839
White Bass	3,876 (1,462)	314	309	13	3,329
Yellow Perch	109 (48)	0	68	7	33
Total	49,678 (8,880)	10,411	8,343	1,330	29,593

TABLE 4.—Estimated catch and harvest, by target species, for boat angling parties interviewed during second year of Fontana Reservoir creel survey, August 2007–July 2008. Totals (for all days in survey year) and seasonal estimates are given by target species and for overall effort. Approximate standard errors are given in parentheses for annual values.

Estimates by target species	Entire survey year	Season			
		Jun–Aug	Sep–Nov	Dec–Feb	Mar–May
Catch					
Black Bass	63,926 (8,688)	8,311	17,231	9,172	29,210
Walleye	19,980 (4,045)	4,629	6,052	3,769	5,529
Crappie	4,435 (1,294)	1,174	594	93	2,572
Sunfish	12,005 (3,468)	8,358	2,433	0	1,214
Catfish	6,106 (1,260)	2,445	1,856	683	1,120
White Bass	10,093 (3,097)	833	1,643	1,907	5,709
Yellow Perch	491 (232)	162	294	30	4
Total	119,073 (13,871)	26,481	30,152	15,698	46,741
Harvest					
Black Bass	21,825 (5,081)	2,301	4,871	2,949	11,703
Walleye	15,733 (3,215)	4,174	4,512	2,550	4,496
Crappie	3,639 (1,137)	895	568	90	2,085
Sunfish	4,790 (1,672)	2,597	1,635	0	557
Catfish	3,534 (915)	1,512	610	508	353
White Bass	2,797 (1,132)	339	225	174	2,058
Yellow Perch	365 (222)	150	191	19	4
Total	53,278 (7,445)	12,106	13,174	6,331	21,665

TABLE 5.—Estimated catch and harvest rates (fish/h), by target species, for boat angling parties interviewed during first year of Fontana Reservoir creel survey, August 2006–July 2007. Directed-effort catch and harvest rates are given for bass and walleye angling parties. Totals (for all days in survey year) and seasonal estimates are given by target species and for overall effort. June-August season includes August 2006 and June–July 2007. Standard deviations for weighted mean catch and harvest rates are given in parentheses for annual values.

Estimates by target species	Entire survey year		Season			
			Jun–Aug	Sep–Nov	Dec–Feb	Mar–May
Black bass						
Catch rate, all anglers	0.29	(0.02)	0.13	0.39	0.29	0.34
Catch rate, bass anglers	0.60	(0.08)	0.30	0.96	0.45	0.68
Harvest rate, all anglers	0.08	(0.01)	0.07	0.08	0.08	0.10
Harvest rate, bass anglers	0.17	(0.04)	0.14	0.23	0.12	0.20
Walleye						
Catch rate, all anglers	0.13	(0.02)	0.24	0.11	0.07	0.09
Catch rate, walleye anglers	0.25	(0.03)	0.49	0.21	0.15	0.15
Harvest rate, all anglers	0.01	(0.01)	0.18	0.08	0.05	0.07
Harvest rate, walleye anglers	0.19	(0.02)	0.37	0.15	0.10	0.13
Crappie						
Catch rate, all anglers	0.04	(0.01)	0.01	0.13	0.01	0.04
Harvest rate, all anglers	0.04	(0.01)	0.01	0.13	0.01	0.03
Sunfish						
Catch rate, all anglers	0.07	(0.01)	0.18	0.09	0.01	0.01
Harvest rate, all anglers	0.02	(0.01)	0.06	0.02	0.00	0.01
Catfish						
Catch rate, all anglers	0.01	(0.01)	0.03	0.02	0.01	0.01
Harvest rate, all anglers	0.01	(0.01)	0.01	0.01	0.00	0.01
White Bass						
Catch rate, all anglers	0.05	(0.01)	0.03	0.04	0.01	0.12
Harvest rate, all anglers	0.02	(0.01)	0.02	0.01	0.01	0.08
Yellow Perch						
Catch rate, all anglers	0.01	(0.01)	0.01	0.02	0.01	0.01
Harvest rate, all anglers	0.01	(0.01)	0.00	0.02	0.01	0.01
All species						
Overall catch rate	0.63	(0.04)	0.65	0.83	0.40	0.63
Overall harvest rate	0.30	(0.03)	0.36	0.38	0.14	0.31

TABLE 6.—Estimated catch and harvest rates (fish/h), by target species, for boat angling parties interviewed during second year of Fontana Reservoir creel survey, August 2007–July 2008. Directed-effort catch and harvest rates are given for bass and walleye angling parties. Totals (for all days in survey year) and seasonal estimates are given by target species and for overall effort. Standard deviations for weighted mean catch and harvest rates are given in parentheses for annual values.

Estimates by target species	Entire survey year		Season			
			Jun–Aug	Sep–Nov	Dec–Feb	Mar–May
Black bass						
Catch rate, all anglers	0.38	(0.02)	0.11	0.47	0.56	0.39
Catch rate, bass anglers	0.78	(0.06)	0.45	0.80	1.18	0.70
Harvest rate, all anglers	0.13	(0.01)	0.01	0.08	0.23	0.18
Harvest rate, bass anglers	0.23	(0.02)	0.04	0.16	0.50	0.02
Walleye						
Catch rate, all anglers	0.09	(0.01)	0.06	0.12	0.12	0.04
Catch rate, walleye anglers	0.28	(0.03)	0.25	0.46	0.28	0.12
Harvest rate, all anglers	0.07	(0.01)	0.05	0.09	0.10	0.03
Harvest rate, walleye anglers	0.23	(0.03)	0.21	0.38	0.23	0.09
Crappie						
Catch rate, all anglers	0.02	(0.01)	0.01	0.03	0.01	0.02
Harvest rate, all anglers	0.01	(0.01)	0.01	0.03	0.01	0.02
Sunfish						
Catch rate, all anglers	0.05	(0.01)	0.13	0.08	0.00	0.01
Harvest rate, all anglers	0.02	(0.01)	0.04	0.04	0.00	0.01
Catfish						
Catch rate, all anglers	0.02	(0.01)	0.04	0.03	0.01	0.01
Harvest rate, all anglers	0.01	(0.01)	0.02	0.01	0.00	0.00
White Bass						
Catch rate, all anglers	0.05	(0.01)	0.01	0.04	0.11	0.02
Harvest rate, all anglers	0.01	(0.01)	0.01	0.01	0.04	0.01
Yellow Perch						
Catch rate, all anglers	0.01	(0.01)	0.01	0.02	0.01	0.00
Harvest rate, all anglers	0.00	(0.00)	0.00	0.01	0.00	0.00
All species						
Overall catch rate	0.65	(0.03)	0.42	0.82	0.83	0.53
Overall harvest rate	0.29	(0.01)	0.17	0.30	0.40	0.27

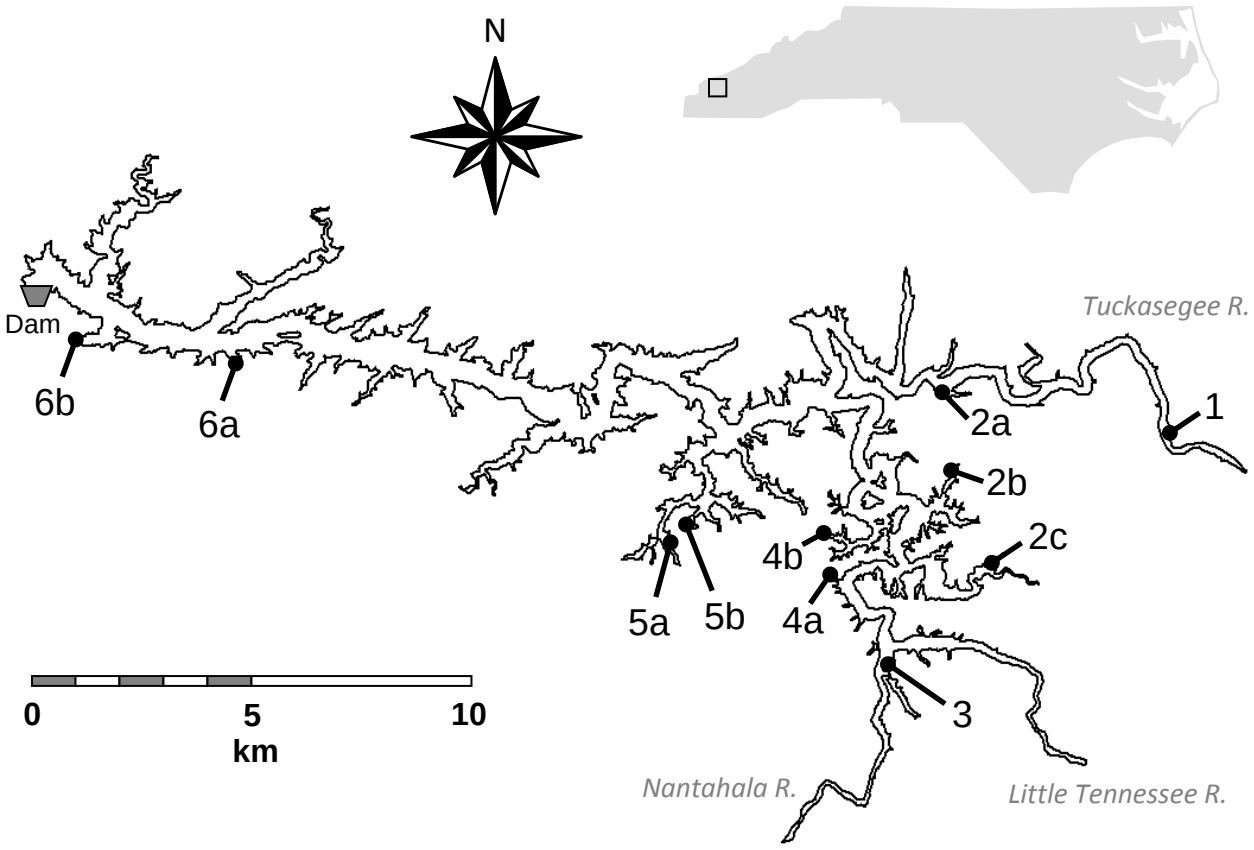


FIGURE 1.—Map of Fontana Reservoir, showing access areas sampled during creel survey, August 1, 2006–July 31, 2008. Zone 1 area is 1) Old 288 Boating Access Area (BAA). Zone 2 areas are 2a) Flat Branch (Wilderness) BAA, 2b) Greasy Branch Marina, and 2c) Alarka Boat Dock. Zone 3 area is 3) Almond Boat and RV Park. Zone 4 areas are 4a) Lemmons Branch BAA and 4b) Tsali BAA. Zone 5 areas are 5a) Prince Boat Dock and 5b) Crisp Boat Dock. Zone 6 areas are 6a) Cable Cove BAA and 6b) Fontana Village Marina.

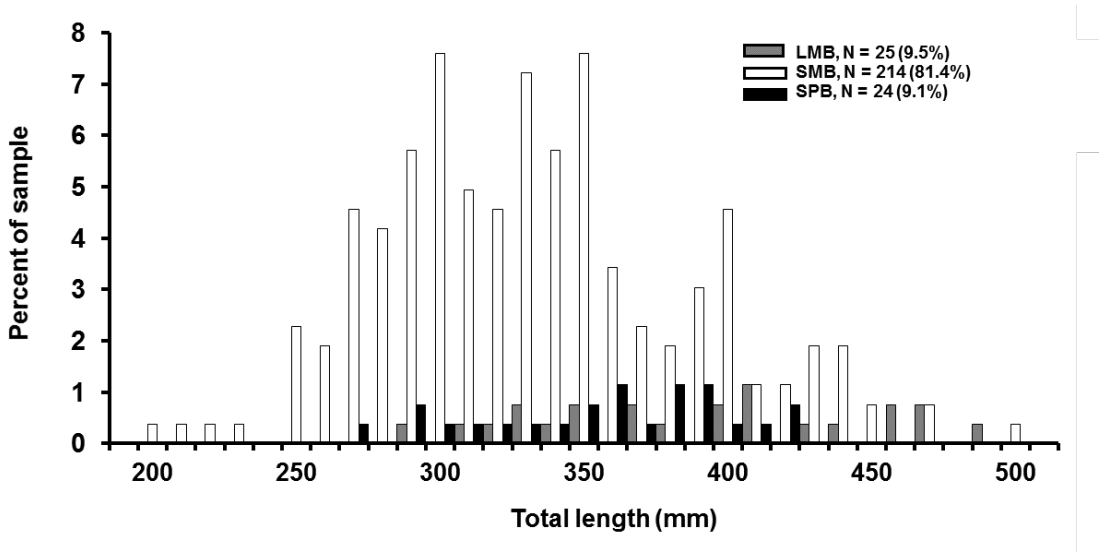


FIGURE 2.—Length frequency histogram for Largemouth Bass, Smallmouth Bass, and Spotted Bass harvested by anglers during the first year of a creel survey of Fontana Reservoir, Swain and Graham counties, NC. The first year of the Fontana Reservoir creel survey was conducted August 1, 2006–July 31, 2007.

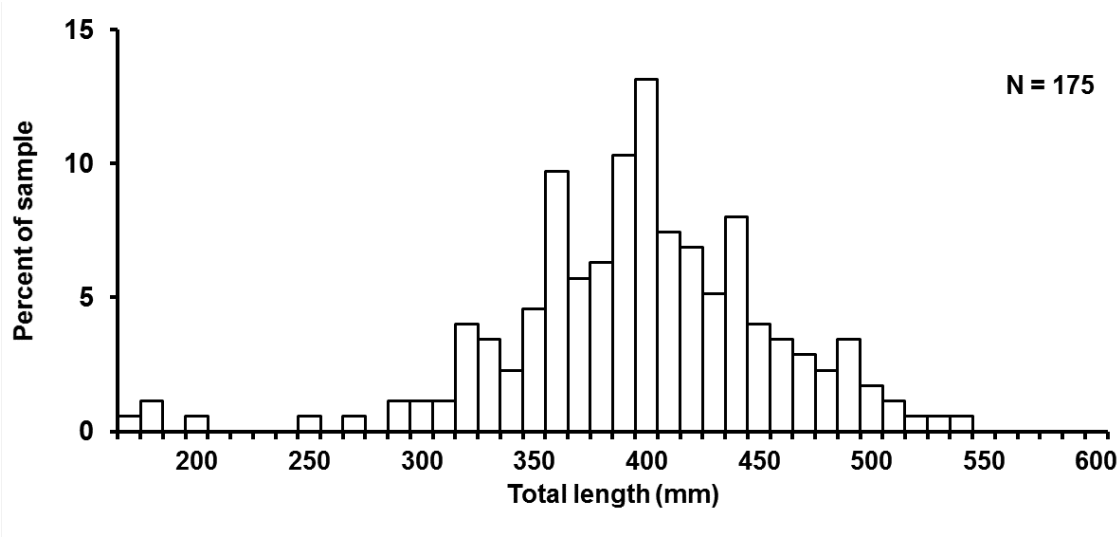


FIGURE 3.—Length frequency histogram for Walleye harvested by anglers during the first year of a creel survey of Fontana Reservoir, Swain and Graham counties, NC. The first year of the Fontana Reservoir creel survey was conducted from August 1, 2006–July 31, 2007.

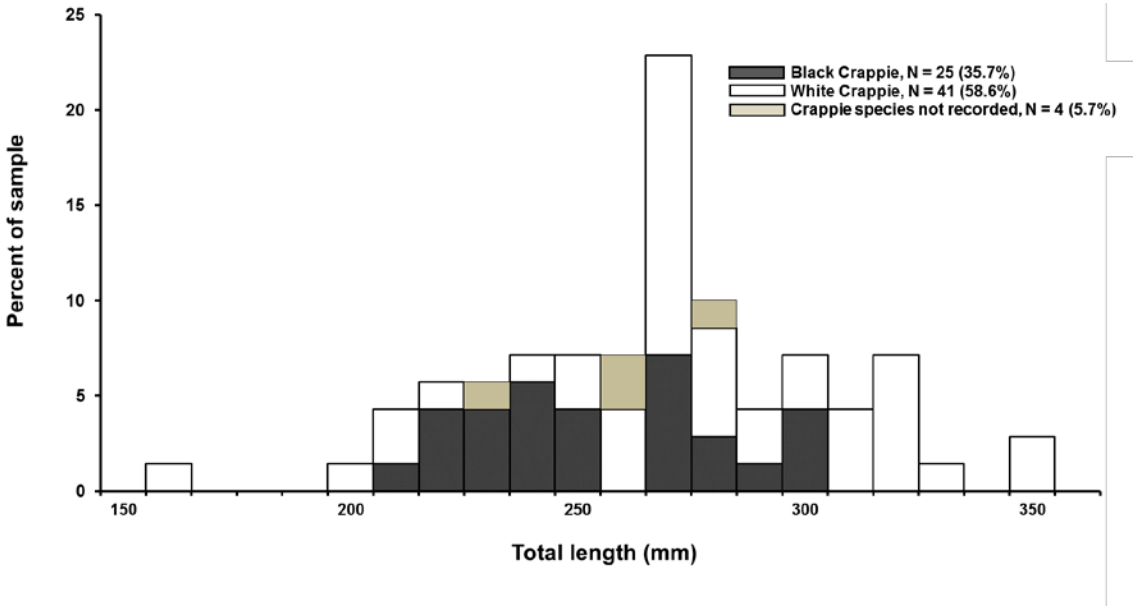


FIGURE 4.—Length frequency histogram for Black Crappie, White Crappie, and unidentified crappie harvested by anglers during the first year of a creel survey of Fontana Reservoir, Swain and Graham counties, NC. The first year of the Fontana Reservoir creel survey was conducted from August 1, 2006–July 31, 2007.

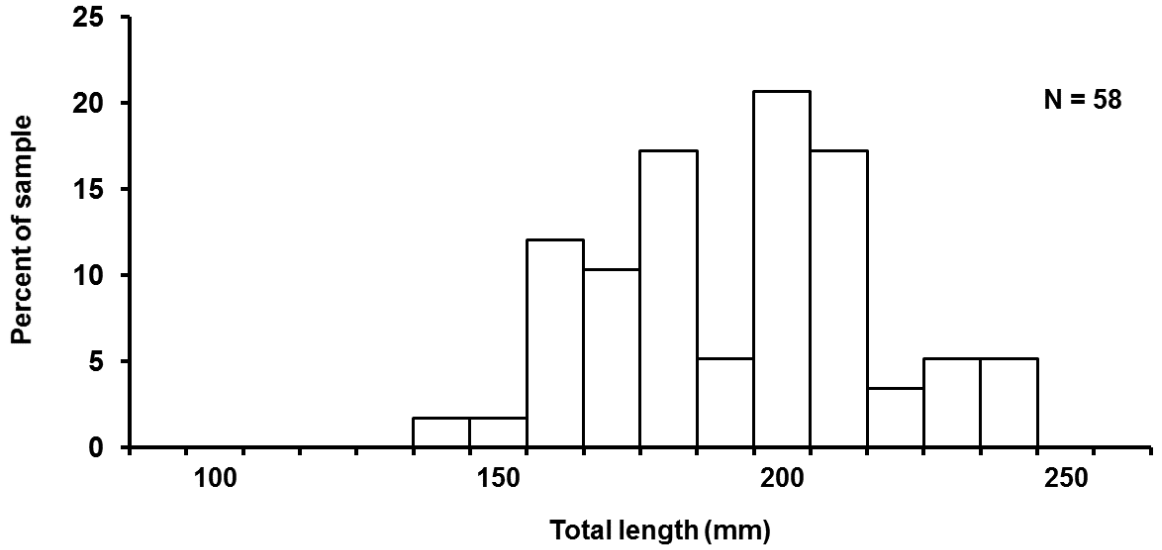


FIGURE 5.—Length frequency histogram for sunfish (combined species) harvested by anglers during the first year of a creel survey of Fontana Reservoir, Swain and Graham counties, NC. The first year of the Fontana Reservoir creel survey was conducted from August 1, 2006–July 31, 2007.

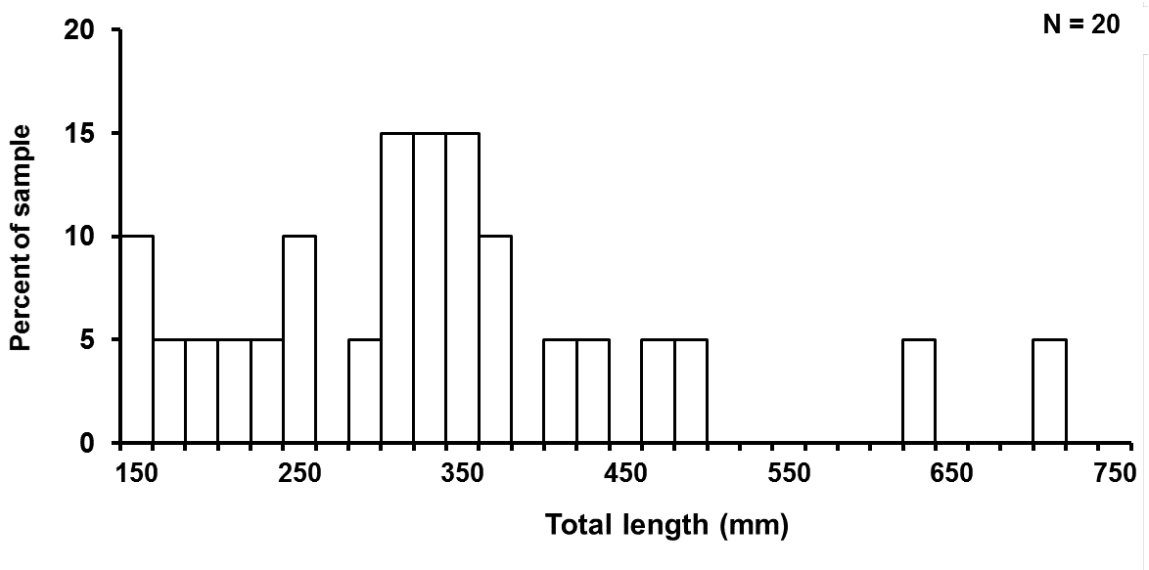


FIGURE 6.—Length frequency histogram for Channel Catfish harvested by anglers during the first year of a creel survey of Fontana Reservoir, Swain and Graham counties, NC. The first year of the Fontana Reservoir creel survey was conducted from August 1, 2006–July 31, 2007.

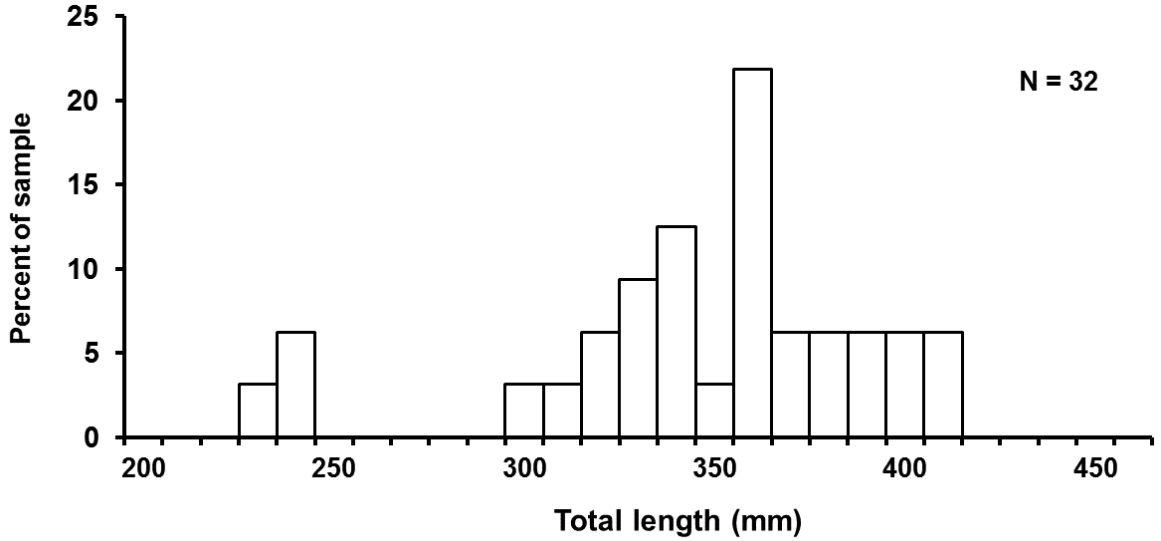


FIGURE 7.—Length frequency histogram for White Bass harvested by anglers during the first year of a creel survey of Fontana Reservoir, Swain and Graham counties, NC. The first year of the Fontana Reservoir creel survey was conducted from August 1, 2006–July 31, 2007.

Appendix

TABLE A1.—Sampling effort allocation by month for work periods, reservoir zones, and bus route access points for the first year of the Fontana Reservoir creel survey, August1, 2006–July 31, 2007.

	Month											
Sampling effort allocation	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Work period probabilities:												
Morning	0.10	0.10	0.30	0.10	0.10	0.05	0.05	0.10	0.10	0.10	0.10	0.10
Midday*	0.35	0.50	0.40					0.55	0.40	0.50	0.50	0.50
Evening	0.55	0.40	0.30	0.90	0.90	0.95	0.95	0.35	0.50	0.40	0.40	0.40
Reservoir zone probabilities:												
Zone 1**	0.10	0.10								0.10	0.10	
Zone 2	0.10	0.10	0.12	0.10	0.10	0.10	0.10	0.10	0.20	0.10	0.10	0.10
Zone 3	0.25	0.40	0.37	0.25	0.15	0.10	0.10	0.30	0.20	0.30	0.30	0.30
Zone 4	0.25	0.15	0.22	0.33	0.35	0.45	0.60	0.30	0.30	0.30	0.25	0.30
Zone 5	0.10	0.10	0.17	0.10	0.10	0.15	0.10	0.10	0.10	0.10	0.10	0.15
Zone 6	0.20	0.15	0.12	0.22	0.30	0.20	0.10	0.20	0.20	0.10	0.15	0.15
Zone-2 bus route weightings:												
Alarka Boat Dock	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.19	0.30
Greasy Br Marina	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.27	0.12	0.43
Flat Branch BAA	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.56	0.69	0.27
Zone-4 bus route weightings:												
Lemmons Branch BAA	0.83	0.45	0.65	0.83	0.83	0.83	0.83	0.83	0.83	0.75	0.83	0.44
Tsali BAA	0.17	0.55	0.35	0.17	0.17	0.17	0.17	0.17	0.17	0.25	0.17	0.56
Zone-5 bus route weightings:												
Prince Boat Dock	0.70	0.70	0.30	0.85	0.85	0.85	0.85	0.85	0.50	0.50	0.90	0.44
Crisp Boat Dock	0.30	0.30	0.70	0.15	0.15	0.15	0.15	0.15	0.50	0.50	0.10	0.56
Zone-6 bus route weightings:												
Cable Cove BAA	0.50	0.50	0.80	0.50	0.55	0.55	0.55	0.83	0.83	0.50	0.50	0.25
Fontana Village Marina	0.50	0.50	0.20	0.50	0.45	0.45	0.45	0.17	0.17	0.50	0.50	0.75

* Sample days were divided into three work periods from August 1 through October 28, 2006 and from March 11 through July 31, 2007, and into two work periods during the remainder of the creel survey. Work periods for October 29–31 were allocated using November probabilities, and work periods for March 1–10 were allocated at probabilities of 0.02 for morning and 0.80 for afternoon.

** Zone 1 had no boating access from October 3, 2006 through May 6, 2007 and after June 15, 2007, and its initial 0.10 zone weighting for those months was allocated among the remaining five zones. Zones 2 and 3 were sampled on October 1–2, 2006 at zone probabilities of 0.10 and 0.35 respectively, and zones 2, 3, 4, and 6 were sampled on May 1–6, 2007 at zone probabilities of 0.12, 0.32, 0.32, and 0.12 respectively. Zones 2, 3, 4, 5, and 6 were sampled on June 16–30, 2007 at zone probabilities of 0.12, 0.32, 0.27, 0.12, and 0.17 respectively.

TABLE A2.—Sampling effort allocation by month for work periods, reservoir zones, and bus route access points for the second year of the Fontana Reservoir creel survey, August 1, 2007–July 31, 2008.

	Month											
Sampling effort allocation	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Work period probabilities:												
Morning	0.10	0.10	0.30	0.10	0.20	0.25	0.10	0.10	0.10	0.10	0.20	0.20
Midday*	0.45	0.50	0.40					0.45	0.50	0.40	0.40	0.45
Evening	0.45	0.40	0.30	0.90	0.80	0.75	0.90	0.45	0.40	0.50	0.40	0.35
Reservoir zone probabilities:												
Zone 1**									0.10	0.10	0.20	0.20
Zone 2	0.10	0.10	0.15	0.20	0.10	0.20	0.10	0.10	0.10	0.10	0.10	0.10
Zone 3	0.25	0.35	0.40	0.20	0.35	0.20	0.25	0.22	0.25	0.20	0.25	0.20
Zone 4	0.25	0.23	0.20	0.20	0.10	0.20	0.35	0.35	0.30	0.20	0.20	0.20
Zone 5	0.20	0.10	0.10	0.20	0.20	0.20	0.10	0.10	0.10	0.15	0.10	0.10
Zone 6	0.20	0.22	0.15	0.20	0.25	0.20	0.20	0.23	0.15	0.25	0.15	0.20
Zone-2 bus route weightings:												
Alarka Boat Dock***	0.17	0.17	0.17						0.20	0.25	0.25	0.17
Greasy Br Marina***	0.17	0.27	0.17									
Flat Branch BAA	0.66	0.56	0.66	1.00	1.00	1.00	1.00	1.00	0.80	0.75	0.75	0.83
Zone-4 bus route weightings:												
Lemmons Branch BAA	0.83	0.83	0.75	0.50	0.50	0.65	0.70	0.65	0.80	0.55	0.50	0.85
Tsali BAA	0.17	0.17	0.25	0.50	0.50	0.35	0.30	0.35	0.20	0.45	0.50	0.15
Zone-5 bus route weightings:												
Prince Boat Dock	0.85	0.50	0.85	1.00	1.00	1.00	1.00	1.00	0.85	0.50	0.50	0.70
Crisp Boat Dock	0.15	0.50	0.15						0.15	0.50	0.50	0.30
Zone-6 bus route weightings:												
Cable Cove BAA	0.45	0.45	0.75	0.50	0.40	0.40	0.60	0.60	0.50	0.35	0.50	0.65
Fontana Village Marina	0.55	0.55	0.25	0.50	0.60	0.60	0.40	0.40	0.50	0.65	0.50	0.35

* Sample days were divided into three work periods from August 1 through November 4, 2007 and from March 9 through July 31, 2008, and into two work periods during the remainder of the creel survey. Work periods for November 1–3 were allocated using October probabilities, and work periods for March 1–9 were allocated at February probabilities.

** Zone 1 had no boating access from August 1, 2007 through April 18, 2008. For April 1–18, 2008, zones 2, 3, 4, 5, and 6 were sampled at zone probabilities of 0.12, 0.27, 0.32, 0.12, and 0.17 respectively.

*** Both marinas in Zone 2 closed after October 2007. Greasy Branch Marina remained closed through the end of the creel survey in 2008.

TABLE A3.—Response percentages for repeated interviews, trip frequency, and activities associated with fishing trips reported by angling parties interviewed during Fontana Reservoir creel survey, August 1, 2006–July 31, 2007. Sample sizes are given for each category.

Response, by category	Response frequency (%) or sample size	
	Boat	Bank
First time interviewed (% of responses)		
Yes	68.4	84.0
No	31.6	16.0
Number of responses	738	25
Fishing trips/month (% of responses)		
One or fewer	14.0	25.0
Two to three	30.1	25.0
Four to six	23.6	4.2
Seven to ten	18.2	25.0
Ten or more	14.1	20.8
Number of responses	771	24
Overnight stay during trip (% of responses)		
No overnight stay	67.5	60.0
Motel	9.9	
Campsite	8.8	20.0
Bed and breakfast	0.3	
Friends or relatives	0.4	
Cabin	6.3	20.0
Other	6.9	
Number of responses	788	25
Other recreational activities (% of responses)		
None, only fished	85.5	62.5
Sightseeing	1.8	12.5
Camping	1.7	8.3
Swimming	3.9	4.2
Other	7.0	12.5
Number of responses	711	24

TABLE A4.—Percentages of boat angler responses (primary and additional party members) to incidences of crowding and resulting changes in fishing habits, obtained during Fontana Reservoir creel survey, August 1, 2006–July 31, 2007. Where possible, changes in fishing habits are categorized as spatial or temporal modifications. Sample sizes are given for each category.

Response, by category	Primary	Additional
Perception of reservoir crowding on the day interviewed (% of responses)		
Crowded	14.6	12.5
Not crowded	85.4	87.5
Number of responses	734	8
Fishing habits ever changed by reservoir crowding (% of responses)		
Changed	36.1	20.5
Never changed	64.9	79.5
Number of responses	485	73
Method to avoid crowding (% of responses)		
Spatial		
Fish coves	22.7	5.9
Go to other lakes	1.8	5.9
Go home	6.7	5.9
Other spatial	8.6	5.9
All spatial	39.9	23.5
Temporal		
Avoid weekends	13.5	23.5
Fish at night	14.7	11.8
Avoid busy season	23.3	41.2
Other temporal	2.5	
All temporal	54.0	76.5
Other, or no method given	6.1	
Number of responses	163	17

TABLE A5.—Percentages of angler responses regarding opinion of quality of fishery resources and recommended improvements, obtained during creel survey of Fontana Reservoir, August 1, 2006–July 31, 2007. Sample sizes are given for each category.

Response, by category	Angler group			
	Boat			Bank
	All	Bass	Walleye	
Quality of fishery (% of responses)				
Best in region	27.4	31.5	28.5	13.8
Good/better than most others	34.4	35.6	31.0	10.3
Average for region	19.7	16.8	21.3	31.0
Poor/worse than most others	7.8	8.0	8.2	6.9
Worst in region	1.5	0.5	0.9	
Don't know / no opinion	9.1	7.6	10.0	37.9
Number of responses	778	410	319	29
Recommended improvement (% of responses)				
Water quality protection	3.8	3.1	2.1	4.0
Fish habitat structures	10.2	12.6	6.2	12.0
Lake level stabilization	26.0	23.6	24.5	32.0
Shoreline protection	2.6	2.2	4.6	4.0
Forage fish stocking	0.6	0.3	0.8	
Game fish stocking	16.0	14.9	21.2	16.0
More law enforcement	4.9	5.3	5.8	4.0
New fishing regulations	8.5	8.1	11.2	
No improvements needed	20.1	22.2	14.9	8.0
Other / don't know	7.4	7.6	8.7	20.0
Number of responses	693	356	241	25

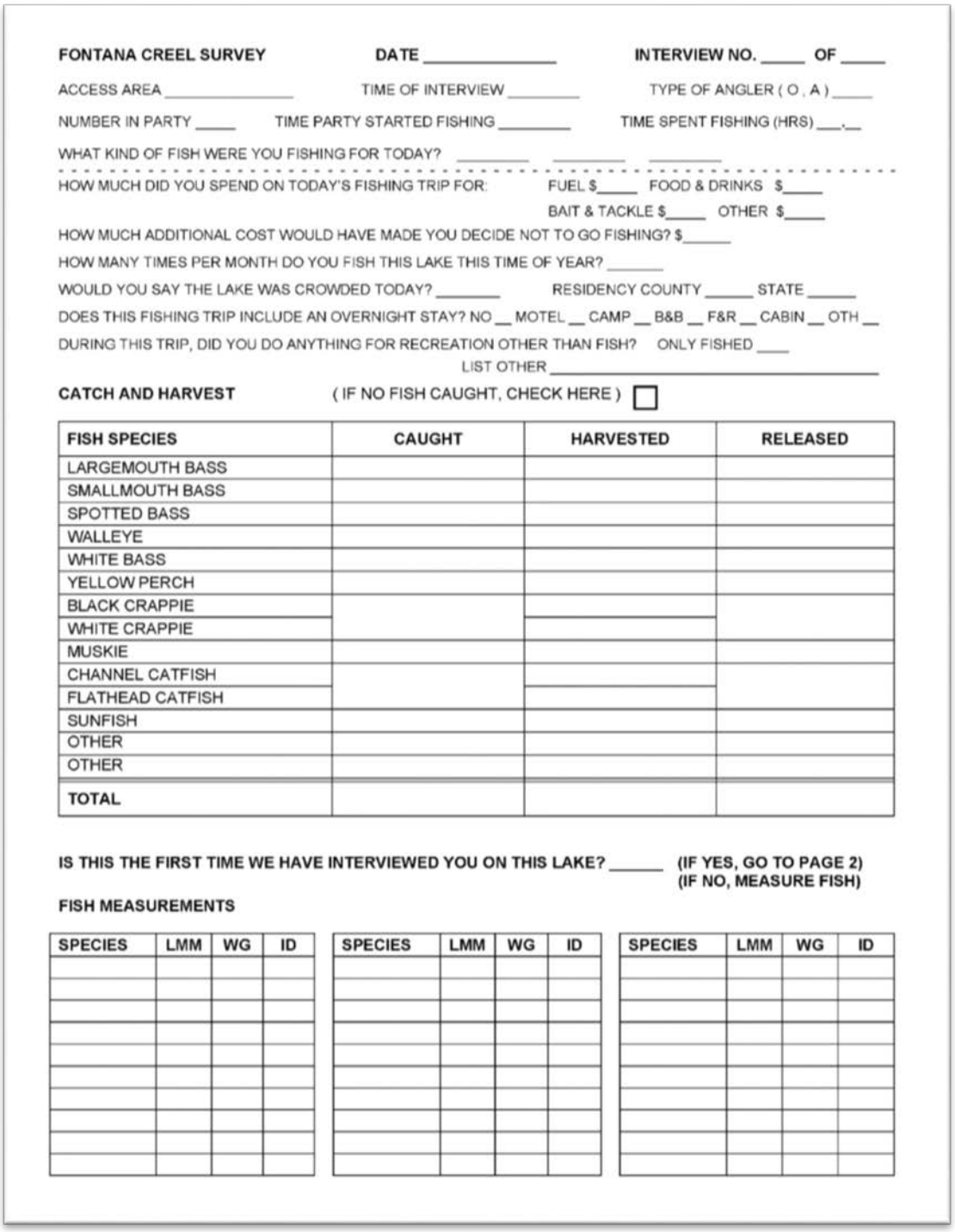
TABLE A6.—Percentages of angler responses regarding night fishing and boat/bank fishing, Fontana Reservoir creel survey, 1 August 1, 2006–July 31, 2007. Sample sizes are given for each category.

Response, by category	Angler group			
	Boat			Bank
	All	Bass	Walleye	
Ever fished at night?				
Yes	72.5	70.2	76.8	57.7
No	27.5	29.8	23.2	42.3
Number of responses	692	352	285	26
Ever bank fished? (boat fished for bank anglers)				
Yes	31.5	28.0	26.5	72.4
No	68.5	72.0	73.5	27.6
Number of responses*	679	353	279	145

* Responses regarding boat fishing by bank anglers include bank anglers encountered during separate survey of tributary anglers in March–April 2007 (not reported here).

TABLE A7.—Percentages of boat angler responses (primary and additional party members) regarding need for additional boating access and needed improvements to existing access, obtained during Fontana Reservoir creel survey, August 1, 2006–July 31, 2007. Uplake locations for improvements include river arms above Tuckasegee-Little Tennessee confluence. Midlake locations include Panther Creek, Sawyer Creek, Yellow Branch, and other locations between the river confluence and the Hazel Creek confluence. Downlake locations include all locations downstream of the Hazel Creek confluence. Sample sizes are given for each category.

Response, by category	Primary	Additional
Is there enough boat ramp access on Fontana Reservoir? (% of responses)		
Yes	75.0	93.5
No	25.0	6.5
Number of responses	488	46
Recommended access improvement (% of responses)		
New ramp		
Uplake	15.5	33.3
Midlake	33.8	33.3
Downlake	3.4	
Unspecified	2.0	
Improve/extend existing access		
Cable Cove	10.1	
Flat Branch	4.7	
Other or multiple ramps	12.8	
Other improvements		
Law enforcement	2.7	33.3
Lighting	3.4	
Floating docks	4.1	
General maintenance	1.4	
Reduce number of BAAs	1.4	
Other	4.7	
Number of responses	148	3



FONTANA CREEL SURVEY **DATE** _____ **INTERVIEW NO.** ____ **OF** ____

ACCESS AREA _____ TIME OF INTERVIEW _____ TYPE OF ANGLER (O , A) ____

NUMBER IN PARTY ____ TIME PARTY STARTED FISHING _____ TIME SPENT FISHING (HRS) ___.__

WHAT KIND OF FISH WERE YOU FISHING FOR TODAY? _____ _____ _____

HOW MUCH DID YOU SPEND ON TODAY'S FISHING TRIP FOR: FUEL $____ FOOD & DRINKS $____

BAIT & TACKLE $____ OTHER $____

HOW MUCH ADDITIONAL COST WOULD HAVE MADE YOU DECIDE NOT TO GO FISHING? $_____

HOW MANY TIMES PER MONTH DO YOU FISH THIS LAKE THIS TIME OF YEAR? _____

WOULD YOU SAY THE LAKE WAS CROWDED TODAY? _____ RESIDENCY COUNTY _____ STATE _____

DOES THIS FISHING TRIP INCLUDE AN OVERNIGHT STAY? NO __ MOTEL __ CAMP __ B&B __ F&R __ CABIN __ OTH __

DURING THIS TRIP, DID YOU DO ANYTHING FOR RECREATION OTHER THAN FISH? ONLY FISHED ____

LIST OTHER _____

CATCH AND HARVEST (IF NO FISH CAUGHT, CHECK HERE) ☐

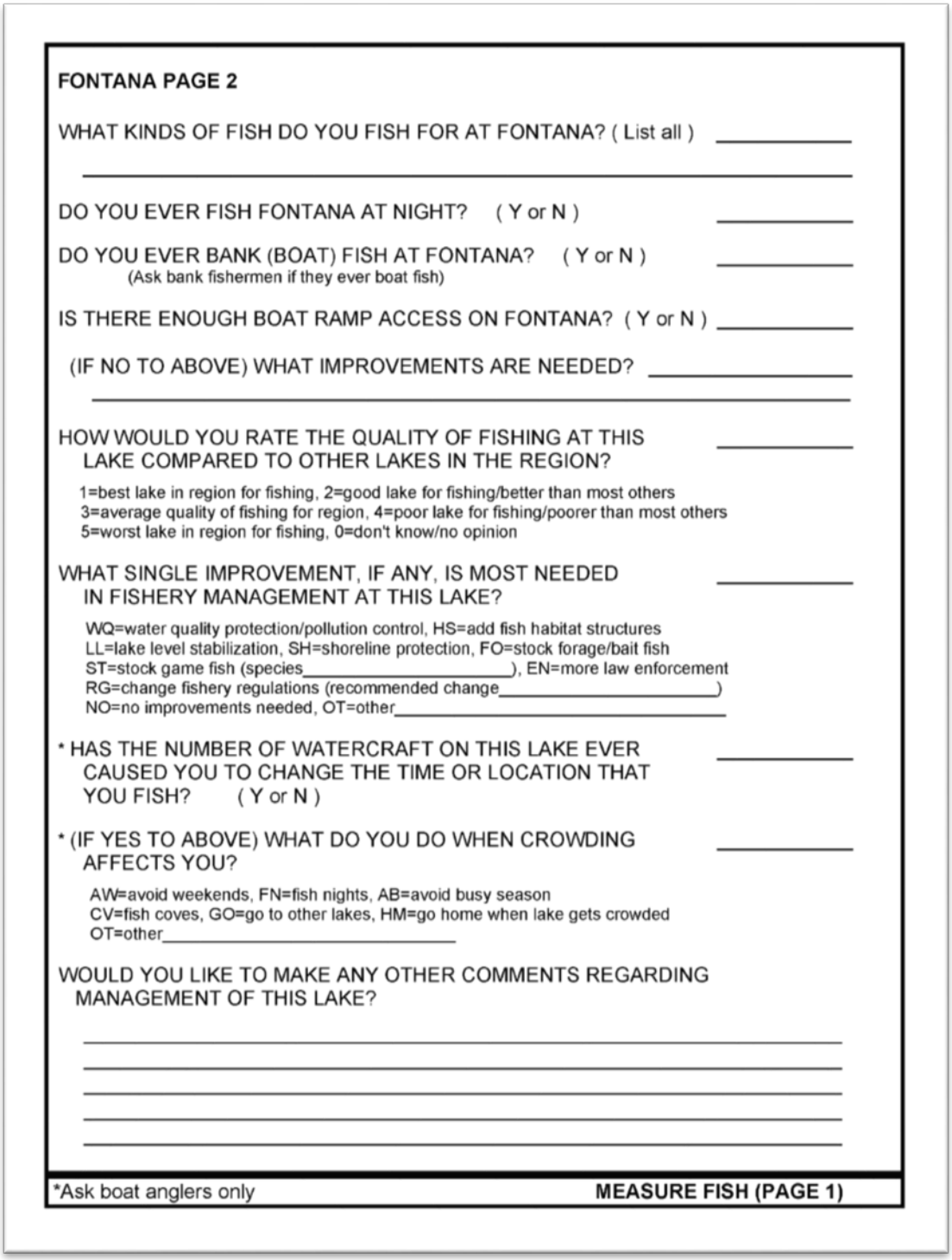
FISH SPECIES	CAUGHT	HARVESTED	RELEASED
LARGEMOUTH BASS			
SMALLMOUTH BASS			
SPOTTED BASS			
WALLEYE			
WHITE BASS			
YELLOW PERCH			
BLACK CRAPPIE			
WHITE CRAPPIE			
MUSKIE			
CHANNEL CATFISH			
FLATHEAD CATFISH			
SUNFISH			
OTHER			
OTHER			
TOTAL			

IS THIS THE FIRST TIME WE HAVE INTERVIEWED YOU ON THIS LAKE? _____ **(IF YES, GO TO PAGE 2)**
(IF NO, MEASURE FISH)

FISH MEASUREMENTS

SPECIES	LMM	WG	ID	SPECIES	LMM	WG	ID	SPECIES	LMM	WG	ID

FIGURE A1.—Page 1 of interview sheet used during the first year of the Fontana Reservoir creel survey, August 1, 2006–July 31, 2007. Page-1 information was obtained from all exiting angling parties. In cases where parties consist of multiple adult anglers, separate residency and opinion responses were recorded for each party member.



FONTANA PAGE 2

WHAT KINDS OF FISH DO YOU FISH FOR AT FONTANA? (List all) _____

_____

DO YOU EVER FISH FONTANA AT NIGHT? (Y or N) _____

DO YOU EVER BANK (BOAT) FISH AT FONTANA? (Y or N) _____
(Ask bank fishermen if they ever boat fish)

IS THERE ENOUGH BOAT RAMP ACCESS ON FONTANA? (Y or N) _____

(IF NO TO ABOVE) WHAT IMPROVEMENTS ARE NEEDED? _____

_____

HOW WOULD YOU RATE THE QUALITY OF FISHING AT THIS LAKE COMPARED TO OTHER LAKES IN THE REGION? _____

1=best lake in region for fishing, 2=good lake for fishing/better than most others
3=average quality of fishing for region, 4=poor lake for fishing/poorer than most others
5=worst lake in region for fishing, 0=don't know/no opinion

WHAT SINGLE IMPROVEMENT, IF ANY, IS MOST NEEDED IN FISHERY MANAGEMENT AT THIS LAKE? _____

WQ=water quality protection/pollution control, HS=add fish habitat structures
LL=lake level stabilization, SH=shoreline protection, FO=stock forage/bait fish
ST=stock game fish (species_____), EN=more law enforcement
RG=change fishery regulations (recommended change_____)
NO=no improvements needed, OT=other_____

* HAS THE NUMBER OF WATERCRAFT ON THIS LAKE EVER CAUSED YOU TO CHANGE THE TIME OR LOCATION THAT YOU FISH? (Y or N) _____

* (IF YES TO ABOVE) WHAT DO YOU DO WHEN CROWDING AFFECTS YOU? _____

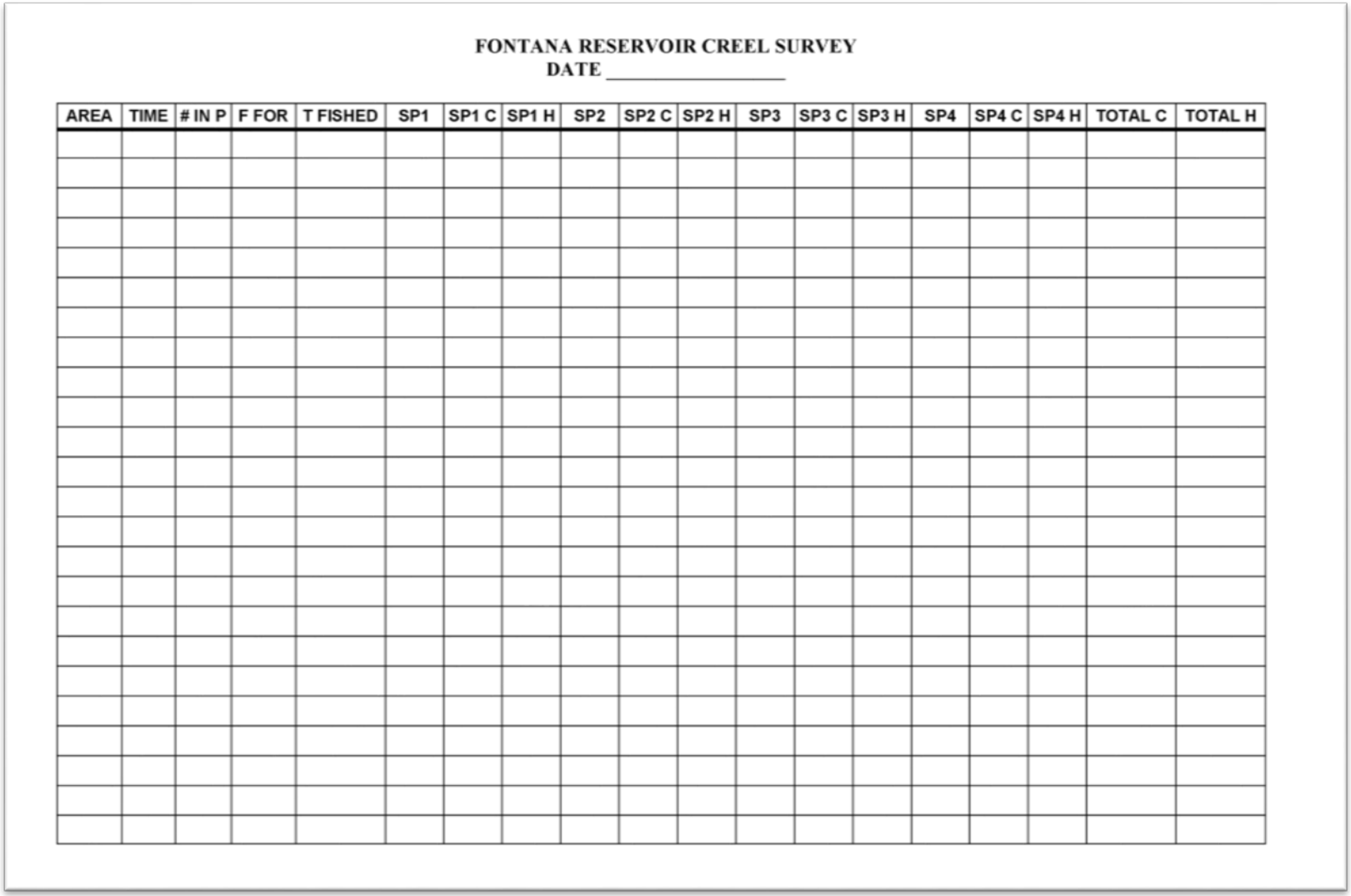
AW=avoid weekends, FN=fish nights, AB=avoid busy season
CV=fish coves, GO=go to other lakes, HM=go home when lake gets crowded
OT=other_____

WOULD YOU LIKE TO MAKE ANY OTHER COMMENTS REGARDING MANAGEMENT OF THIS LAKE?

_____
_____
_____
_____
_____

*Ask boat anglers only **MEASURE FISH (PAGE 1)**

FIGURE A2.—Page 2 of interview sheet used during the first year of the Fontana Reservoir creel survey, August 1, 2006–July 31, 2007. Page-2 information was obtained from each angling party member during his or her first interview during the creel survey.



FONTANA RESERVOIR CREEL SURVEY
DATE _____

AREA	TIME	# IN P	F FOR	T FISHED	SP1	SP1 C	SP1 H	SP2	SP2 C	SP2 H	SP3	SP3 C	SP3 H	SP4	SP4 C	SP4 H	TOTAL C	TOTAL H

FIGURE A3.—Interview sheet used during second year of Fontana Reservoir creel survey, August 1, 2007–July 31, 2008.