EXHIBIT 29

on march 6, 2017 i spoke with Joe Mickey at 336-366-2982
He said he was never involved in any Chattooga study.
Why would he say this if he had been involved in sampling on the Chattooga as suggested by Bryn Tracy?

NORTH CAROLINA WILDLIFE RESOURCES COMMISSION

originally received from Chief Christian Waters, NCWRC via email dated may 8, 2017

Division of Inland Fisheries

This report suggests that Monte Seehorn collected the data on the Chattooga. see page 3.

MOUNTAIN FISHERIES INVESTIGATIONS

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Final Report

EVALUATION OF A WILD TROUT REGULATION WITH A NATURAL BAIT ALLOWANCE

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Abstract: An experimental wild trout regulation allowing the use of natural bait (WBA) was put into effect on 14 North Carolina streams on 1 July 1994 following a controversial regulation change that eliminated the use of natural bait on many streams containing wild trout populations. The objectives of this study were to document changes in fish population characteristics, fishing effort, and harvest before and during the experimental regulation. Three-pass depletion sampling on representative reaches was conducted on 13 of the study streams; roving creel surveys were conducted on 3 streams where natural bait had not been allowed for at least 10 years. After 2 years of monitoring, no significant changes to the densities or length-frequency distributions of brown trout (*Salmo trutta*) or rainbow trout (*Oncorhynchus mykiss*) >178 mm could be attributed to the WBA regulation. Too few brook trout (*Salvelinus fontinalis*) were collected to make any inferences. In general, there was little change in fishing effort except immediately after the regulation change. The percentage of legal-length fish harvested increased from 42-77% to ≥88% pre- and post-regulation change date in 1994. Total numbers of fish harvested between 1994 and 1995 changed little. Natural bait use went from 0% to >50% immediately following WBA implementation. Most anglers rated fishing trips as fair or good both before and after the natural bait allowance was made. The majority of anglers interviewed during the creel surveys were local residents. Total catch rates of trout varied little over the 2-year study and were comparable to catch rates on North Carolina wild trout streams where natural bait is not allowed. The WBA regulation should be taken out of experimental status and monitoring continued on several streams to assess long-term population trends.

The use of liberal versus conservative regulations to manage southern Appalachian wild trout populations has been the subject of much discussion over recent years among biologists. This is because infertile southern Appalachian trout streams (Webster and Wallace 1975) produce trout that rarely exceed 3 years of age or 200 mm length (Durniak and England 1986, Masterson 1991). Habera and Strange (1993) found most studies of trout management in the southeast concluded regulations did little to affect wild trout population characteristics. However, this conclusion was reached mainly by inference from trout population sampling that compared streams under differing regulations (Wingate et al. 1984, Durniak and England 1986) and not studies designed specifically to examine pre- and post-regulation change data. Additional controversy surrounded the issues of whether southern Appalachian trout populations can be overfished and if fishing mortality, particularly where natural baits are allowed, results in significant changes to trout population length-frequency distributions.

In 1991, the North Carolina Wildlife Resources Commission (NCWRC) proposed making wild trout regulations (178-mm minimum length limit, 4-fish creel limit, and single-hook artificial lures) the default for 1,000 km of trout streams open to public fishing. The current regulation included no minimum length limit, no bait restrictions, and a 7-fish creel limit. Most of the waters where the new regulation would apply were located on the 405,000 ha of the Nantahala and Pisgah National Forests in western North Carolina. The proposal was intended to minimize effects on recreational angling opportunities while limiting the potential for overharvest of wild trout (Fatora 1975, Washington State Department of Game 1984). It was initiated as a resource conservation measure to protect fishing quality given continued increases in angling popularity across the U.S. (U.S. Dep. of Int. and U.S. Dep. of Commerce 1993*a*,

1997). This factor being more important in the southeastern U.S. where the number of anglers has increased at a rate faster than the general population (U.S. Dep. of Int. and U.S. Dep. of Commerce 1993*b*).

Some anglers of western North Carolina objected to the proposed regulation change because it discriminated against anglers desiring to fish for wild trout using natural bait. These anglers stated trout populations had not declined in the last 20 years and creel limits of 4 fish per day did not make it worthwhile to fish wild trout streams. However, most North Carolina trout anglers did not object to the proposed regulation. Such disparities in attitudes towards specific fishery management strategies by different user groups are not uncommon (Gigliotti and Peyton 1993) and public sentiment against changes in management strategies has influenced southern Appalachian trout management in the past (Fatora 1976). The reasons for this were aptly stated by Fatora (1976), "Trout management, more than any other fisheries program, has been clouded by the desires, demands, emotions, and ritualisms of trout fishermen."

In response to angler objections, NCWRC implemented an experimental regulation allowing the use of natural bait on 14 streams containing wild trout populations. This regulation, known as Wild with Natural Bait Allowance (WBA) retained the restrictive 178-mm length limit and 4-fish daily creel limit of the standard wild trout regulation, but allowed the use of natural bait, except live fish. The objective of this study was to evaluate changes in angling effort, trout harvest, and trout population characteristics following the implementation of the WBA regulation.

We thank Jeanne Riley, Monte Seehorn, and others of the U.S. Forest Service (USFS) and Steve Moore and others of the National Park Service for their assistance in the collection of the fish population data. Without their help, it would not have been possible to complete the data collections, particularly on the Chattooga River. A thanks also goes to Andy Dolloff of the USFS Coldwater Fisheries Research Unit for his independent collection, analysis, and reporting of fisheries data from the Overflow Creek drainage. Dr. Kevin O'Brien of East Carolina University and Mr. David Turner were consulted for statistical analyses and creel designs.

Methods

Study Streams and Regulations Background

Fourteen streams located in Jackson, Macon, Transylvania, and Graham counties North Carolina were included in the WBA study (Table 1). Fish population monitoring was conducted on all streams except North Fork French Broad River. On Kimsey, Park, and Buck creeks creel surveys were also conducted.

Kimsey, Park, and Buck creeks had been managed under standard wild trout regulations (or its predecessor known as native waters) for over 10 years. The previous native waters regulation further restricted the creel to include only 1 fish >254 mm. The remaining streams in the study were under a hatchery-supported regulation until 1 October 1992, but had not been

stocked in at least 7 years. These streams were also under the standard wild trout regulation from 1 October 1992 to 1 July 1994 when the WBA regulation went into effect. The portion of Buck Creek upstream of US 64 remained under the standard wild trout regulation.

Fish Population Monitoring

All study streams were scheduled for fish population monitoring (Table 1). Kimsey, Park, and Buck creeks were more intensively sampled because at least 2 years of baseline data under the standard wild trout regulation were available. Data collected for Park Creek prior to 1993 were provided by the USFS (M. Seehorn, pers. commun.); 1993-96 data were jointly collected.

At least 3 fish population samples were collected from representative reaches on all streams or stream systems, except for the Chattooga and Tellico rivers where poor access allowed only 2 samples to be taken. Sample sites on Kimsey Creek were randomly selected each year from 9 sites used as controls in a wild trout feeding experiment (Borawa et al. 1995). Sample site lengths ranged from 50-110 m. Mean width of each sample site was determined by averaging width measurements taken at 10-m intervals. One backpack electrofishing unit was used for each 3 m, or portion thereof, of mean width. Sample sites were isolated with block nets where necessary to prevent fish movement into or out of the sample areas. Three-pass depletion sampling (Armour et al. 1983) was conducted in an upstream direction on each sample site. All trout were measured to the nearest millimeter and weighed to the nearest gram except 1991 Park Creek fish, where total lengths were measured to the nearest centimeter. For Buck Creek, only the 3 sites where the WBA regulation was applied were used in statistical analyses. The USFS Coldwater Research Unit sampled Overflow Creek during 1990-92 and 1996 using basinwide survey techniques. These data were statistically analyzed and reported independently (Dolloff et al. 1993, 1997). Conclusions from that study are incorporated into this report.

Fish Population Data Analysis

Trout population numbers and biomass (kg) were estimated for each stream by sample site, species, and year using Microfish 3.0 (Van Deventer and Platts 1989) and then converted to density (number/ha) and standing crop (kg/ha) using sample site measurements. For Kimsey (1993 vs. 1996), Park (1993 vs. 1995), and lower Buck creeks (1993 vs. 1996) mean densities of brown trout and rainbow trout >178 mm were compared using t-tests; mean densities and standing crops of trout for all other streams were calculated and the results placed in tables.

Length-frequency distributions were calculated by year, area or stream, and species. Distributions of brown and rainbow trout >178 mm for Kimsey, Park, and lower Buck creeks were compared by species and stream using Kolmogorov-Smirnov (KS) tests. Individual fish length data for available pre- (1991-93) and post- (1994-96) WBA regulation years were combined and compared only after tests for differences between years in each group were determined to be nonsignificant. Two large rainbow trout were omitted from the 1993 Kimsey Creek data set because they were thought to be downstream migrants from a portion of stream where supplemental feeding was occurring.

The WBA regulation and associated fishing effort were considered to have a negative impact to trout resources in the intensively studied portions of Kimsey, Park, and lower Buck creeks if statistically significant decreases were found in the densities and size structures of trout >178 mm. Buck Creek data taken in June 1994 and Park Creek data from May 1992-1996 are also included in tables and figures, but were not statistically analyzed due to sample date differences. Because of the varied regulations on the 10 other streams in the study, pre- and post-regulation change statistical tests were not possible. Conclusions on the impact of the WBA regulation on these streams were inferred by examining trends over years in the trout density and length-frequency distributions. All statistical tests were conducted at $\alpha = 0.05$.

General Creel Survey Design Criteria

Roving creel surveys (Robson 1991) were conducted on Kimsey, Park, and Buck creeks from 1 April to 15 November 1994 and 1995. Two creel clerks were required to complete the surveys. One covered Buck Creek, while the second surveyed Kimsey and Park creeks. Fishing trip data were collected during instantaneous counts. Days were stratified into weekends and weekdays, with defined holidays included as weekend days. Holidays included Good Friday, Memorial Day, Independence Day, and Labor Day. Interviews were conducted on all weekend days and holidays and 3 weekdays of each week, except in weeks when holidays occurred. Interview periods within each work day were defined as sunrise + 0.5 hour to midday (AM) or midday to sunset + 0.5 hour (PM). Interview periods had a 0.5 probability of selection and, in general, only 1 work period was worked each work day. Workday times were adjusted approximately every 2 weeks to account for changing day length. Starting point for each day was randomly selected. In anticipation of expected high angling pressure due to the combination of Independence Day weekend and the 1 July 1994 effective date of the experimental WBA regulation, both AM and PM interview periods were included in the work schedule for 1-4 July 1994. These dates were treated as a separate period for which effort and harvest statistics were estimated. Creel data collected during interviews included time spent fishing, number, size group (≤178 mm or >178 mm), and species of all fish caught, types of bait used, residency, trip rating, and time of interview.

Specific Creel Survey Designs

Kimsey and Park Creek--.This survey covered 2 areas. Area 1 included Kimsey Creek from its mouth upstream to Little Lyman Prong and the lower 200 m of Devils Prong, while area 2 included Park Creek from its mouth to the trail crossing upstream of the intersection of USFS trails 33 and 32A. During the first half of the interview period the clerk walked a loop route starting at the USFS Standing Indian Campground that allowed both streams to be surveyed; the starting direction of the loop was randomly chosen. Upon completion of the loop, the clerk reversed direction to obtain additional interviews and a second instantaneous count.

Buck Creek Creel Survey--.This survey reach was also divided into 2 areas. Area 1, the portion of stream under the WBA experimental regulation, included Buck Creek from Barnards Creek upstream to US 64. Area 2, under the standard wild trout regulation, included 3.2 km of Buck

Creek. This portion extends from US 64 upstream to a point where USFS road 71D closely parallels the creek and includes Little Buck Creek from its confluence with Buck Creek to the pond outlet located above the uppermost USFS road 71 stream crossing. In the first half of the daily interview period the clerk traversed the length of the study area by vehicle beginning at either the upper or lower end of the defined survey area. The reverse route was completed during the second half of the daily interview period. The starting point for the route was randomly chosen.

Creel Survey Data Analysis

Expanded estimates of fishing effort, catch, and harvest of trout were made with instantaneous counts, creel survey interview data, and a creel analysis computer program designed at the N.C. State University Institute of Statistics. Fishing pressure (hours/km) for this study and from Borawa et al. (1995) was also calculated using estimated effort and total study reach length. Catch rates were calculated for each individual angler interview and averaged to obtain estimates by species and time period. Numbers of trout >178 mm captured in fish population samples were expanded to the entire study reach using proportional length of stream sampled and total length of stream in each study reach. Trends in fishing effort, pressure, and trout harvest during 1994 and 1995 were compared to fish population characteristics to determine relationships between them and to make conclusions regarding the impact of the WBA regulation.

Results

Fish Population Sampling

At least 1 set of fish population samples was collected from all but 1 study stream prior to 1 July 1994, the effective date of the WBA regulation (Table 1). The North Fork French Broad River could not be sampled because of high water levels at the scheduled sample times. Brown and rainbow trout dominated the fish populations in all streams, but were found in varying proportions among streams (Table 2, Append. Tables A1-A14). Brook trout were captured in only 5 study streams; most were taken at sites where few brown or rainbow trout existed. Few brook trout >178 mm were taken from any stream.

Pre- and post-WBA regulation comparisons of fall mean densities of brown and rainbow trout >178 mm from Kimsey, Park, and lower Buck creeks (Table 2; Append. Tables A1-A3) found only the density of rainbow trout in Buck Creek was significantly lower ($P < 0.05$) in the post-WBA regulation period. No consistent or conclusive trends in brown and rainbow trout >178 mm densities in the 9 streams previously under regulations allowing bait and surveyed by the NCWRC (Table 2, Append. Tables A5-A9 and A11-Al4) were apparent following implementation of the WBA regulation. Dolloff et al. (1997) found similar results for trout in the Overflow Creek drainage. Brook trout were not found in sufficient numbers in any study stream to make comparisons or conclusions.

No significant differences in pre- and post-WBA regulation length-frequency distributions of brown or rainbow trout >178 mm were found for Kimsey, Park, or lower Buck creeks (Figs. 1-6). Most *P*-values of KS tests exceeded 0.25, whereas the smallest was 0.14. These high *P*-values were consistent among tests even though sample sizes in the comparisons ranged from <10 to >140 fish. Similarly, little change occurred in the length-frequency distributions of brown or rainbow trout collected from Park Creek in spring (Figs. 7-8), Overflow Creek (Dolloff et al. 1997), the 9 streams where natural bait had been previously allowed under a hatchery supported regulation (Append. Tables B1-B9), or upper Buck Creek (Figs. 9-10) where natural bait was not allowed. Brook trout found in Fowler, Scotsman, Tellico, and Turtle Pond creeks also showed no evidence of change (Append. Tables B3, B6, B7, and B9).

Creel Surveys

Most angling effort occurred between 1 April and 15 September during both study years (Tables 3 and 4). The number of anglers interviewed in any area during a given period was low and exceeded 10 only 5 times. Three of those 5 occurrences were in the 2 periods immediately following the effective date of the WBA regulation. On lower Buck Creek during 1994, there was a sharp peak in fishing effort immediately following the 1 July effective date of the WBA regulation. The estimated 404 hours of effort expended in the 2 periods following that date accounted for almost 50% of the total seasonal effort. There was no similar peak in fishing effort on Kimsey, Park, or upper Buck creeks during this time. However, effort on Kimsey Creek was somewhat higher during July and August than during earlier and later months in both years. Effort was low throughout the study on Park Creek (Table 3). Estimated angling pressure on streams under the WBA regulation ranged from 74 to 234 hours per km in 1994 and 19 to 188 hours per km in 1995 (Table 5).

Catch was dominated by trout ≤178 mm (Table 6) and was consistent with the small trout abundance found in the fish population samples (Figs. 1-10). Estimated annual catch of legal-length trout was highest for Kimsey Creek in 1995 at 339, while only 65 legal-length trout were caught from Park Creek in 1995 (Table 6). No brook trout were reported caught.

For streams under the WBA regulation, we estimated between 1 April-30 June 1994 and 1 April-1 July 1995 anglers harvested 65% and 80% of all legal-length brown and rainbow trout caught. During the 1 July-15 November and 2 July-15 November periods of those years, they harvested 93% and 59% of the legal-length trout caught (Table 6). The percentage of trout harvested in upper Buck Creek where natural bait was not allowed followed similar trends.

In 1994, 88-100% of legal-length trout caught were harvested from any given stream during the 4.5 months following the effective date of the WBA regulation, whereas during the same time period in 1995 that range was 47-80%. In comparison, on upper Buck Creek, where natural bait was not allowed, 55% and 63% of all legal-length trout were harvested between 1 or 2 July and 15 November of 1994 and 1995 (Table 6).

Although the number of legal-length trout harvested by anglers was small (Table 6), it did not reflect how harvest was related to the number of legal-length trout available for capture. We

found the number of legal-length trout harvested often equaled or exceeded the number present in fall samples (Table 7). The ratios of these estimates, by species, were not consistent among streams. For brown trout in Kimsey Creek it was about 1:4 in both years, whereas for brown trout in lower Buck Creek it was 2.2:1 in 1994 and 2.8:1 in 1995. There was no consistent pattern of these ratios for either brown or rainbow trout among streams or years.

The proportion of anglers using natural bait increased from 0% to >50% pre- and post-WBA regulation in 1994, whereas in 1995 this proportion ranged between 35% and 50% (Table 8). The proportion of local, non-local and non-resident anglers using these waters varied considerably between years with no consistent patterns discernible among waters. Depending on stream and period within year, 53% to 97% of anglers rated their trip as fair or good. There was no obvious pattern of improved trip rating between pre- and post-WBA regulation periods in 1994, however, the proportion of good ratings increased for all streams in 1995.

In the 2 years of this study, total catch rates varied from 0.92 to 3.73 trout/hour on Kimsey, Park, and lower Buck creeks (Table 9). Total catch rates were higher in 1995 than 1994 for all streams under the WBA regulation (Table 9). The only decrease in catch rate from 1994 to 1995 occurred for rainbow trout in lower Buck Creek, dropping from 0.86 to 0.77 trout/hour. Total catch rate for all trout in upper Buck Creek where natural bait was not allowed was 1.94 trout/hour in 1994 and 1.34 trout/hour in 1995. A decline in rainbow trout catch rates from 1.04 fish/hour in 1994 to 0.19 fish/hour in 1995 accounted for this change.

Discussion

Pre- and post-WBA regulation monitoring of fish population characteristics on 13 of 14 streams clarified the short-term impact of the WBA regulation. For all but 1 stream, both where natural baits were and were not previously allowed, there was little evidence of a significant change in the densities of brown or rainbow trout >178 mm. Only in lower Buck Creek was a statistically significant lower density of rainbow trout found and the decline cannot be conclusively linked to the WBA regulation. The mean density of rainbow trout >178 mm in lower Buck Creek was only marginally higher (49/ha) in June 1994 (Table 2), immediately before the WBA regulation was effective, than in fall 1996 (42/ha). High early season angling effort and associated harvest, regardless of bait type used, could account for the similar numbers. Fishing effort was higher during the 1 April - 30 June 1994 time period (Table 4) than during the same period in 1995 and the estimated harvest of rainbow trout was almost twice as high in early 1994 as in early 1995 (71 vs. 44 fish) (Table 6). However, fishing effort and harvest impacts would have occurred prior to the WBA regulation. While there was a large increase in fishing effort immediately following the effective date of the WBA regulation on lower Buck Creek, the numbers of rainbow trout harvested after 1 July 1994 or 2 July 1995 were similar (65 vs. 53 fish). The apparent decline in rainbow trout by fall 1996 was more likely a result of natural population variability than any effect of the WBA regulation. Similar patterns of change in rainbow trout densities were also seen in May samples from Park Creek (Table 2, Append. Table A10) and for both rainbow and brown trout densities in upper Buck Creek where natural bait was not allowed (Table 2, Append. Table A4). Thus, it appears that over the short-term, densities of brown and

rainbow trout were not impacted by the WBA regulation. Too few brook trout were observed to support any conclusions.

Although mean densities of trout >178 mm showed little change, it is possible length-frequency distributions could be altered if natural bait use resulted in increased harvest of larger fish from the populations (Mongillo 1984). We found no obvious evidence larger trout were absent under the WBA regulation even considering that the statistically nonsignificant results may be an artifact of low sample sizes. Rainbow trout >250 mm were rarely encountered in our samples before or after the WBA regulation. Sub-legal rainbow trout were more abundant and probably recruited to legal lengths quickly as other legal-length rainbows were removed. Legal-length brown trout were generally more abundant than rainbow trout (Table 2) and fish >250 mm were common (Figs. 1-10; Append. Tables B1-B9). However, even with their higher abundance, brown trout catch rates were often equal to or lower than rainbow trout catch rates (Table 9) indicating brown trout were more difficult to catch. We concluded that over the short-term, the WBA regulation had little effect on wild brown or rainbow trout length-frequency distributions.

The large increase in fishing effort on lower Buck Creek following the effective date of the WBA regulation (Table 4) suggests anglers' thought trout had been protected under the standard wild trout regulation and would be available for harvest with natural baits. However, anglers apparently quickly realized this was not the case and, after 3 weeks effort, returned pre-WBA levels. The absence of similar increases in fishing effort on Kimsey, Park, or upper Buck creeks (Tables 3 and 4) was indicative that lower Buck Creek was being targeted by local anglers interested in using natural bait in wild trout waters. This is partly substantiated by the 9% increase in local anglers using lower Buck Creek between early and late 1994 (Table 8). No similar changes were seen on Kimsey and Park creeks due to the presence of a large developed USFS campground that attracts non-local residents to the area.

The variability in total catch rates both pre- and post-WBA regulation and between streams in this study (0.92-3.73 trout/hour) are similar to those of streams under the standard wild trout regulation. Borawa et al. (1995) found catch rates of 3.25 and 1.06 trout per hour for Looking Glass Creek and South Toe River in 1993. They also found trout ≤178 mm dominated the catch as was found in this study (Table 6). Regardless of baits allowed, total catch rate does not appear to be affected.

The 19-234 hours/km angling pressure on streams surveyed in this study was comparable to pressure on other easily accessible wild trout streams where natural bait was not allowed. Borawa et al. (1995) found angling pressure was 187 hours/km on Looking Glass Creek and 923 hours/km on South Toe River in 1993 (Table 5). Except for the 3-week increase in pressure on lower Buck Creek immediately following implementation of the WBA regulation, we concluded that allowing the use of natural bait to catch wild trout did not increase total fishing pressure in the short term. However, expansion of recreational facilities in the vicinity of the streams under the WBA regulation could cause increased fishing pressure over the long term, ultimately resulting in impacts to the wild trout population (Ratledge 1967). While overall fishing pressure did not increase, 40-50% of anglers opted to use natural baits over artificial lures.

Although it appeared the number of trout harvested post-WBA regulation did not affect trout population characteristics, there was evidence that higher fishing effort by bait anglers may be related to the increased percentage of legal-length trout harvested. Between 1 July and 15 November 1994, when fishing pressure and percentage of bait anglers were highest, 88-100% of legal-length trout caught were harvested. During the same period in 1995, when the proportion of anglers using bait was 35-50%, only 47-80% were harvested. The overall estimated annual percentages of legal-length trout harvested in this study (53-77%) are high (Table 6) when compared to the 15% and 11% harvest of legal-length fish caught under standard wild trout regulations from Looking Glass Creek and South Toe River in 1993 (Borawa et al. 1995). This large difference may be explained by differences in anglers' motivations for fishing. Anglers using natural bait are more likely to harvest fish (Gigliotti and Peyton 1993).

The addition of a natural bait fishing option had little effect on how anglers rated their fishing trips. Less than 5% of anglers rated their trips as excellent both before and after the WBA regulation was effective, whereas 53-100% rated their trips as fair or good (Table 8). A higher proportion of anglers (73-91%) rated their trips as good or excellent (Borawa et al. 1995) on Looking Glass Creek and South Toe River. Generally, more local anglers (>50%) fished in this study than in the Looking Glass Creek (26%) and South Toe River (12%) studies. These differences are likely a reflection of anglers' motivation to fish, their expectations for their trip, the location of streams being fished, and the regulation in effect. Looking Glass Creek and South Toe River contain or are near wild trout streams managed under catch-and-release regulations attracting high numbers of non-local anglers interested in catch-and-release fishing. Differences among anglers in the 2 studies also reinforces the concept that anglers can be classified into different user types based on their reasons for fishing and that the proportions of these groups can vary greatly between streams.

Summary

Based on fish population monitoring and creel surveys, the initiation of the WBA regulation did not have any short-term impacts to the densities or length-frequency distributions of brown or rainbow trout >178 mm. Brook trout were collected at so few sites that no substantive conclusions regarding the impact of the WBA regulation on those populations could be made. Except for a rise in fishing effort on lower Buck Creek during the 3-week period immediately following the effective date of the WBA regulation in 1994, fishing pressure did not increase between 1994 and 1995. Furthermore, effort was comparable to levels found on streams managed under the standard wild trout regulation where natural bait was not allowed. The percentage of legal-length fish (>178 mm) harvested increased following the start of the WBA regulation in 1994, but in 1995 the percentage declined to approximately pre-WBA regulation levels. These levels were still much higher than found on streams managed under the standard wild trout regulation. Although fishing pressure did not increase over the study, the percentage of anglers using natural bait increased substantially immediately following its implementation in 1994, but fell in 1995. Most anglers rated fishing trips as fair or good both before and after being allowed to use natural bait in the study streams. The majority of anglers interviewed during the creel surveys were local residents (Macon and Clay counties). Total catch rates of trout varied

little over the 2 years of creel surveys and were essentially the same as catch rates on North Carolina wild trout streams where natural bait was not allowed.

The WBA regulation evaluation has shown the allowance of natural bait to harvest wild trout has no short-term impacts to rainbow or brown trout populations in low fertility waters where fishing pressure is average. Anglers preferring to use bait were provided additional fishing opportunities with little detectable effects to the fish populations. However, this study did not address the long-term effects of the WBA regulation and it contained insufficient data to assess the impacts to brook trout. Continued monitoring of trout populations under the WBA regulation will be necessary to determine if long-term changes occur.

Recommendations

1. Take the WBA regulation out of experimental status.

2. Monitor the trout populations of Kimsey and lower Buck creeks and Tellico River at 2-3 year intervals to determine the long-term trout population trends following implementation of the WBA regulation.

Literature Cited

Armour, C. L., K. P. Burnham, and W. S. Platts. 1983. Field methods and statistical analyses for monitoring small salmonid streams. U.S. Dep. Int., Fish and Wildl. Serv. Western Energy and Land Use Team Publ. FWS/OBS-83/33. 200pp.

Borawa, J. C., C. J. Goudreau, and M. M. Clemmons. 1995. Responses of wild trout populations to supplemental feeding. N.C. Wildl. Resour. Comm. Div. Boating and Inland Fish., Final Rep. Fed. Aid in Fish Restor. Proj. F-24, Raleigh. 48pp.

Dolloff, C. A., D. G. Hankin, and G. H. Reeves. 1993. Basinwide estimation of habitat and fish populations in streams. U. S. Dep. Agric., For. Serv. Southeast. For. Exper. Sta. Gen. Tech. Rep. SE-83. Asheville, N.C. 25pp.

Dolloff, C. A., K. N. Leftwich, and M. K. Underwood. 1997. The effects of fishing regulation changes on fish populations in Overflow Creek, North Carolina. U.S. Dep. of Agric., For. Serv. South. Res. Sta. Coldwater Fish. Unit and Center for Aqua. Tech. Transfer. Va. Poly. Instit. and State Univ., Blacksburg. 10pp.

Durniak, J. P. and R. H. England. 1986. Dynamics of rainbow trout populations in small headwater streams. Ga. Dep. Nat. Resour., Game and Fish Div., Atlanta. 56pp.

Fatora, J. R. 1975. The planning approach to trout management. Pages 107-110 *in* Anon., ed. Symposium on trout habitat research and management. U.S. Dep. Agric., For. Serv., Southeast For. Exp. Sta., Asheville, N.C.

Fatora, J. R. 1976. Stream trout fishery management in the southeastern United States. Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies. 30:280-284.

Gigliotti, L. M. and R. B. Peyton. 1993. Values and behaviors of trout anglers, and their attitudes toward fishery management, relative to membership in fishing organizations: a Michigan case study. North Am. J. Fish. Manage. 13:492-501.

Habera, J. W. and R. J. Strange. 1993. Wild trout resources and management in the southern Appalachian Mountains. Fish. 18(1):6-13.

Masterson, S. K. 1991. Age and growth characteristics of rainbow trout (*Oncorhynchus mykiss*) in Little River watershed, Great Smoky Mountains National Park. M.S. Thesis, Tenn. Tech. Univ., Cookeville. 82pp.

Mongillo, P. E. 1984. A summary of salmonid hooking mortality. Fish Manage. Div., Wash. Dep. of Game, Olympia. 46pp.

Ratledge, H. M. 1967. The impact of increasing fishing pressure upon wild and hatchery-reared trout populations. Proc. Annu. Conf. Southeast. Assoc. Game and Fish. Comm. 20:375-379.

Robson, D. S. 1991. The roving creel survey. Pages 19-24 *in* D. Guthrie et al., eds. Creel and angler surveys in fisheries management. Am. Fish. Soc. Symp. 12. Bethesda, Md.

U. S. Dep. of Int., Fish and Wildl. Serv. and U. S. Dep. of Commerce, Bur. of the Census. 1993*a*. 1991 National survey of fishing, hunting, and wildlife-associated recreation. U. S. Gov. Printing Off., Washington, D.C. 124pp+append.

_____. 1993*b*. 1991 National survey of fishing, hunting, and wildlife-associated recreation - North Carolina. U.S. Government Printing Off., Washington, D.C. 41pp+append.

_____. 1997. 1996 National survey of fishing, hunting, and wildlife-associated recreation. U. S. Gov. Printing Off., Washington, D.C. 115pp+append.

Van Deventer, J. A. and W. S. Platts. 1989. Microcomputer software system for generating population statistics from electrofishing data - user's guide for Microfish 3.0. U.S. Dep. Agric., For. Serv., Intermountain Res. Sta. Gen. Tech. Rep. INT-254. 29pp.

Washington State Department of Game. 1984. A basic fishery management strategy for resident and anadromous trout in the stream habitats of the state of Washington. Fish Manage. Div., Olympia. 60pp.

Webster, J. R. and J. B. Wallace. 1975. Productivity of southeastern stream ecosystems. Pages 64-77 *in* Symposium on trout habitat research and management. U.S. Dep. Agric. For. Serv., Southeast For. Exp. Sta. Asheville, N.C.

Wingate, P. J., R. J. Brown, J. H. Davies, J. H. Mickey, W. R. Bonner, and H. M. Ratledge. 1984. Effects of fishing regulation changes on lotic wild trout populations. Proc. Annu. Conf. Southeast. Assoc. Fish. Wildl. Agencies. 35:654-660.

Table 1. Number of sample sites and months sampled for streams included in an evaluation of a regulation allowing the use of natural baits in wild trout waters (WBA) of North Carolina. The WBA regulation was effective 1 Jul 1994.

Borawa and Clemmons 1998

Stream	No. of Sites	Sample Year					
		1991	1992	1993	1994	1995	1996
Buck Creek[a]	5			Oct	Jun,Oct	Sep	Sep
Chattooga River[b]	2		Aug	Aug	Aug	Aug	Aug
Deep Creek	3			Sep	Sep	Sep	Sep
Fowler Creek (lower)	3				May	Jun	Jul
Jarrett Creek	3				Jun	May	May
Kimsey Creek[c]	3	Aug	Aug	Jun, Aug	Aug	Aug	Aug
Long Creek	3				Jun	Jun	Jun
N. Fk. French Broad R.[d]	0						
Overflow Creek[e]							
Park Creek[f]	5	Nov	May, Nov	May, Nov	May, Nov	May, Nov	May
Scotsman Creek	3				May	Jul	Jul
Tellico River	2				Jun	Jun	Jun
Turtle Pond Creek	3				Jun	Jun	Jun
Tellico Creek	3				Jun	Jun	Jun

[a]Includes 3 sites under WBA regulation and 2 sites in upstream section that remained under a standard wild trout regulation.

[b]Includes 1 site under WBA regulation and 1 site in upstream section that remained under a standard wild trout regulation.

[c]Same study sites used as controls in a wild trout feeding research project (Borawa et al. 1995).

[d]No samples taken because of high water levels.

[e]The USFS Coldwater Research Unit sampled the Overflow Creek drainage using basinwide survey techniques to compare to data taken in 1990, 1991, and 1992 with that taken in 1996 (Dolloff et al. 1997).

[f]Same sample reaches used in USFS monitoring program and consisted of 5 approximately 100-m contiguous reaches.

7 inches

Table 2. Mean density (number/ha) of trout >178 mm by species, stream, and year taken during an evaluation of a regulation allowing the use of natural baits in wild trout waters of North Carolina.

Species / Stream	Year					
	1991	1992	1993	1994	1995	1996
Brook Trout						
Chattooga R. (lower) Site 1		5			23[a]	
Fowler Creek				44		59
Scotsman Creek					33	21
Tellico Creek				33	14	
Turtle Pond Creek				3	37	7
Brown Trout						
Buck Creek (lower)			37	28/15[b]	17	14
Buck Creek (upper)			129	87/109[b]	166	159
Chattooga R. (lower) Site 1		69	160	85[c]	125[a]	146
Chattooga R. (upper)		50	295	162[c]	[a]	316
Fowler Creek				157	229	81
Jarrett Creek				95	87	
Kimsey Creek	128	160	175	118/124[d]	162	111
Park Creek (spring)	[e]	188	125	128	153	84
Park Creek (fall)	176	145	122	130	71	[f]
Scotsman Creek				39	33	42
Tellico River						7
Turtle Pond Creek				45	71	59
Rainbow Trout						
Buck Creek (lower)			88	49/68[b]	58	42
Buck Creek (upper)			65	21/3[b]	36	44
Deep Creek			166	129	140	31
Jarrett Creek				53	87	30
Kimsey Creek	32	30	35	42/13[d]	11	13
Long Creek				29	88	42
Park Creek (spring)	[e]	5	29	10	19	11
Park Creek (fall)	5	48	39	19	29	[f]
Tellico Creek				28	17	15
Tellico River				136	102	105
Turtle Pond Creek				19	27	61

[a]Sample site 1 (lower) shortened because water levels very high; sample site 2 (upper) not sampled.
[b]Samples taken in June and October.
[c]Water levels above normal when sample taken.
[d]Samples taken in June and August.
[e]No samples taken in spring 1991.
[f]No samples taken in fall 1996.

Table 3. Estimated effort and interview numbers by period for creels conducted on Kimsey and Park creeks during 1 April-15 November 1994-95 to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina. Standard errors are in parentheses.

Year		Kimsey Creek		Park Creek	
Date	Period	Hours of effort	Number of Interviews	Hours of effort	Number of Interviews
1994					
1-15 Apr	1	31	4	12	1
16-30 Apr	2	73	9	27	4
1-15 May	3	42	5	7	1
16-31 May	4	28	4	7	1
1-15 Jun	5	0	0	19	2
16-30 June	6	46	4	23	2
1-4 Jul[a]	7	64	15	17	5
5-18 Jul	8	72	10	0	0
19 Jul-2 Aug	9	88	9	39	2
3-17 Aug	10	92	10	20	3
18 Aug-1 Sep	11	61	7	0	0
2-16 Sep	12	84	12	0	0
17 Sep-1 Oct	13	12	2	6	1
2-16 Oct	14	24	3	15	2
17-31 Oct	15	22	4	0	0
1-15 Nov	16	34	4	0	0
Totals (SE)		773 (88)	102	192 (46)	24
1995					
1-15 Apr	1	90	11	0	0
16-30 Apr	2	53	6	0	0
1-15 May	3	11	1	0	0
16-31 May	4	75	8	0	0
1-15 Jun	5	26	3	0	0
16 Jun-1 Jul	6	70	8	7	1
2-15 Jul	7	20	2	14	2
16-31 Jul	8	43	5	11	1
1-15 Aug	9	95	11	0	0
16-30 Aug	10	32	4	0	0
31 Aug-15 Sep	11	62	9	6	1
16-30 Sep	12	0	0	12	3
1-14 Oct	13	25	3	0	0
15-30 Oct	14	11	2	0	0
1-15 Nov	15	7	1	0	0
Totals (SE)		620 (119)	74	50 (15)	8

[a]Effective date of the regulation allowing the use of natural bait in wild trout waters was 1 July 1994.

Table 4. Estimated hours of effort and interview numbers by period for creels conducted on Buck Creek during 1 April-15 November 1994-95 to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina. Standard errors are in parentheses.

Year		Buck Creek (lower)		Buck Creek (upper)[a]	
Date	Period	Hours of effort	Number of Interviews	Hours of effort	Number of Interviews
1994					
1-15 Apr	1	30	3	0	0
16-30 Apr	2	38	5	26	4
1-15 May	3	0	0	0	0
16-31 May	4	40	5	0	0
1-15 Jun	5	36	5	30	3
16-30 June	6	28	3	13	1
1-4 Jul[b]	7	225	19	7	2
5-18 Jul	8	179	14	7	1
19 Jul-2 Aug	9	54	6	40	4
3-17 Aug	10	103	10	0	0
18 Aug-1 Sep	11	31	4	0	0
2-16 Sep	12	38	5	0	0
17 Sep-1 Oct	13	18	3	16	2
2-16 Oct	14	35	6	0	0
17-31 Oct	15	10	1	0	0
1-15 Nov	16	0	0	0	0
Totals (SE)		865 (130)	89	139 (57)	17
1995					
1-15 Apr	1	21	2	0	0
16-30 Apr	2	7	1	0	0
1-15 May	3	14	2	22	2
16-31 May	4	69	8	0	0
1-15 Jun	5	76	8	20	2
16 Jun-1 Jul	6	64	6	33	4
2-15 Jul	7	68	7	0	0
16-31 Jul	8	65	8	7	1
1-15 Aug	9	7	1	26	3
16-30 Aug	10	52	5	13	2
31 Aug-15 Sep	11	23	2	41	4
16-30 Sep	12	24	4	18	3
1-14 Oct	13	0	0	6	1
15-30 Oct	14	17	3	0	0
1-15 Nov	15	8	1	0	0
Totals (SE)		515 (78)	58	186 (45)	22

[a]This portion of stream was under standard wild trout regulations that did not allow the use of natural bait.
[b]Effective date of the regulation allowing the use of natural bait in wild trout waters was 1 July 1994.

Table 5. Comparison of fishing pressure (hours/km) for streams under a wild trout with natural bait allowance regulation and streams under a standard wild trout regulation North Carolina.

Stream	Year[a]	Hours per km
Kimsey Creek[b]	1994	234
	1995	188
Park Creek[b]	1994	74
	1995	19
Buck Creek (lower)[b]	1994	216
	1995	129
Buck Creek (upper)[c]	1994	39
	1995	53
South Toe River[d]	1993	923
Looking Glass Creek[d]	1993	187

[a]Creel surveys in the present study were conducted from 1 April-15 November, whereas creels in 1993 extended from 1 April - 31 October.

[b]Streams surveyed in the present study that were under the wild trout with natural bait allowance regulation.

[c]This portion of stream under the standard wild trout regulation where natural bait was not allowed.

[d]Data from Borawa et al. (1995) from portion of stream under standard wild trout regulation where natural bait was not allowed.

Table 6. Estimated numbers of trout caught and harvested by period within year, stream, and species for 1994 and 1995 obtained to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina. Standard errors are in parentheses.

Time period / Stream / Species	< 7 inches 1994				< 7 inches 1995			
	Total number ≤178 mm		Total number >178 mm		Total number ≤178 mm		Total number >178 mm	
	Caught	Harvested	Caught	Harvested	Caught	Harvested	Caught	Harvested
1 Apr-30 Jun					1 Apr-1 Jul			
Kimsey Creek								
Brown trout	67(59)		27(23)	20(22)	48(43)		61(25)	61(25)
Rainbow trout	120(47)		11(12)		113(76)	18(14)	19(13)	9(10)
Park Creek								
Brown trout	82(42)	3(4)	36(15)	15(10)	22(17)		15(11)	
Rainbow trout	59(38)	3(4)			22(17)		15(11)	
Buck Creek (lower)								
Brown trout	63(35)		11(9)	11(9)	23(25)		69(41)	69(41)
Rainbow trout	358(178)		96(53)	71(36)	228(166)		51(49)	44(48)
Buck Creek (upper)								
Brown trout			11(12)	11(12)	15(11)		44(16)	21(23)
Rainbow trout	104(40)		19(16)	6(6)	9(10)		7(8)	7(8)
1 Jul-15 Nov					2 Jul-15 Nov			
Kimsey Creek								
Brown trout	240(49)		95(35)	94(36)	155(61)	21(7)	209(82)	123(68)
Rainbow trout	114(14)		45(23)	40(21)	150(77)	8(9)	50(32)	
Park Creek								
Brown trout	155(163)		39(41)	39(41)	36(12)		20(18)	17(18)
Rainbow trout	27(17)		22(15)	22(15)	96(58)		15(16)	
Buck Creek (lower)								
Brown trout	59(23)		64(25)	64(25)	26(14)		89(43)	73(40)
Rainbow trout	141(41)		82(24)	65(21)	118(66)	51(45)	67(23)	53(17)
Buck Creek (upper)								
Brown trout	13(10)		40(28)	40(28)	35(24)		128(72)	94(72)
Rainbow trout	86(91)						22(14)	

Table 7. Comparison of estimated brown and rainbow trout >178 mm harvested during creel surveys and estimated total numbers of trout present in the entire study reaches as determined by fish population sampling conducted in association with a study to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina.

	Brown trout		Rainbow trout	
Stream Year	Number harvested	Number present	Number harvested	Number present
Kimsey Creek				
1991		264		66
1992		308		55
1993		264		77
1994 - Jun		176		33
1994 - Aug	59	231	22	22
1995	78	319	9	22
1996		154		22
Park Creek				
1991 - Nov		166		5
1992 - May		172		5
1992 - Nov		134		43
1993 - May		123		27
1993 - Nov		113		38
1994 - May		118		11
1994 - Nov	54	118	22	16
1995 - May		161		16
1995 - Nov	88	80	0	32
1996 - May		86		11
Buck Creek (lower)				
1993		68		204
1994 - Jun		85		153
1994 - Oct	75	34	136	170
1995	142	51	97	153
1996		34		102
Buck Creek (upper)				
1993		228		114
1994 - Jun		190		57
1994 - Oct	51	190	6	76
1995	115	323	7	76
1996		342		76

Table 8. Estimated percentage of bait types used and trip ratings of anglers interviewed in creel surveys conducted on Kimsey, Park, and Buck creeks to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina. The regulation was effective 1 July 1994. Upper Buck Creek remained under the standard wild trout regulation throughout the study where natural bait was not allowed.

Stream Characteristic	Year			
	1994		1995	
	1 Apr-30 Jun	1 Jul-15 Nov	1 Apr-1 Jul	2 Jul-15 Nov
Kimsey Creek				
Bait type used				
Natural bait	0	57	48	43
Artificial flies	65	28	30	43
Spinners/lures	23	8	5	14
Mixed types	12	7	16	0
Trip rating				
Excellent	0	0	3	16
Good	12	12	51	57
Fair	62	53	27	16
Poor	27	36	19	11
Macon, Clay Co.	54	55	32	43
Other N.C.	46	34	54	43
Non N.C.	0	11	14	14
Park Creek				
Bait type used				
Natural bait	0	62	0	50
Artificial flies	82	0	100	0
Spinners/lures	18	15	0	50
Mixed types	0	23	0	0
Trip rating				
Excellent	0	0	0	0
Good	18	31	100	83
Fair	73	62	0	17
Poor	9	8	0	0
Macon, Clay Co.	36	55	0	50
Other N.C.	64	34	100	50
Non N.C.	0	11	0	0

Table 8. Continued.

Stream Characteristic	Year 1994 1 Apr-30 Jun	1994 1 Jul-15 Nov	1995 1 Apr-1 Jul	1995 2 Jul-15 Nov
Buck Creek (lower)				
Bait type used				
Natural bait	0	66	37	35
Artificial flies	60	24	33	52
Spinners/lures	30	7	22	6
Mixed types	10	2	8	6
Trip rating				
Excellent	0	0	4	0
Good	10	9	33	42
Fair	43	60	41	55
Poor	48	31	22	3
Macon, Clay Co.	57	66	59	58
Other N.C.	33	32	41	39
Non N.C.	10	1	0	3
Buck Creek (upper)				
Bait type used				
Natural bait	0	0	0	7
Artificial flies	38	60	63	71
Spinners/lures	63	40	25	21
Mixed types	0	0	13	0
Trip rating				
Excellent	0	0	13	0
Good	13	30	25	71
Fair	50	40	63	14
Poor	38	30	0	14
Macon, Clay Co.	75	100	75	93
Other N.C.	25	0	25	7
Non N.C.	0	0	0	0

Table 9. Estimated mean catch rates in fish/hour, standard errors of the means (SE), and number of interviews (N) by time period, area, and species for Kimsey, Park and Buck creek creel surveys conducted to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina. Upper Buck Creek remained under the standard wild trout regulation throughout the study where natural bait was not allowed.

Stream Time period	Brown trout Mean (SE)	Rainbow trout Mean (SE)	Overall Mean (SE)	N
Kimsey Creek				
1 Apr-30 Jun 94	0.40 (0.20)	0.52 (0.23)	0.93 (0.40)	26
1 Jul-15 Nov 94	0.62 (0.14)	0.30 (0.07)	0.91 (0.20)	76
1994 totals	0.56 (0.12)	0.36 (0.08)	0.92 (0.18)	102
1 Apr-1 Jul 95	0.25 (0.12)	0.51 (0.24)	0.76 (0.28)	37
2 Jul-15 Nov 95	0.96 (0.25)	0.63 (0.20)	1.58 (0.39)	37
1995 totals	0.60 (0.15)	0.57 (0.15)	1.17 (0.24)	74
Park Creek				
1 Apr-30 Jun 94	1.18 (0.36)	0.72 (0.31)	1.90 (0.59)	11
1 Jul-15 Nov 94	0.77 (0.77)	0.82 (0.58)	1.59 (0.90)	11
1994 totals	0.96 (0.44)	0.77 (0.34)	1.73 (0.56)	24
1 Apr-1 Jul 95	5.00 (-)	5.00 (-)	10.00 (-)	1
2 Jul-15 Nov 95	0.93 (0.49)	1.91 (0.77)	2.84 (1.05)	7
1995 totals	1.44 (0.66)	2.29 (0.77)	3.73 (1.28)	8
Buck Creek (lower)				
1 Apr-30 Jun 94	0.49 (0.32)	2.38 (0.71)	2.86 (0.78)	21
1 Jul-15 Nov 94	0.22 (0.08)	0.40 (0.12)	0.61 (0.17)	68
1994 totals	0.28 (0.10)	0.86 (0.21)	1.14 (0.25)	89
1 Apr-1 Jul 95	0.38 (0.24)	0.89 (0.33)	1.27 (0.39)	27
2 Jul-15 Nov 95	0.47 (0.20)	0.66 (0.23)	1.13 (0.34)	31
1995 totals	0.42 (0.16)	0.77 (0.20)	1.19 (0.25)	58
Buck Creek (upper)				
1 Apr-30 Jun 94	0.13 (0.08)	1.38 (0.57)	1.50 (0.61)	8
1 Jul-15 Nov 94	1.59 (1.02)	0.74 (0.50)	2.33 (1.00)	9
1994 totals	0.90 (0.56)	1.04 (0.37)	1.94 (0.59)	17
1 Apr-1 Jul 95	0.70 (0.30)	0.23 (0.15)	0.93 (0.26)	8
2 Jul-15 Nov 95	1.41 (0.40)	0.17 (0.10)	1.58 (0.42)	14
1995 totals	1.16 (0.28)	0.19 (0.08)	1.34 (0.29)	22

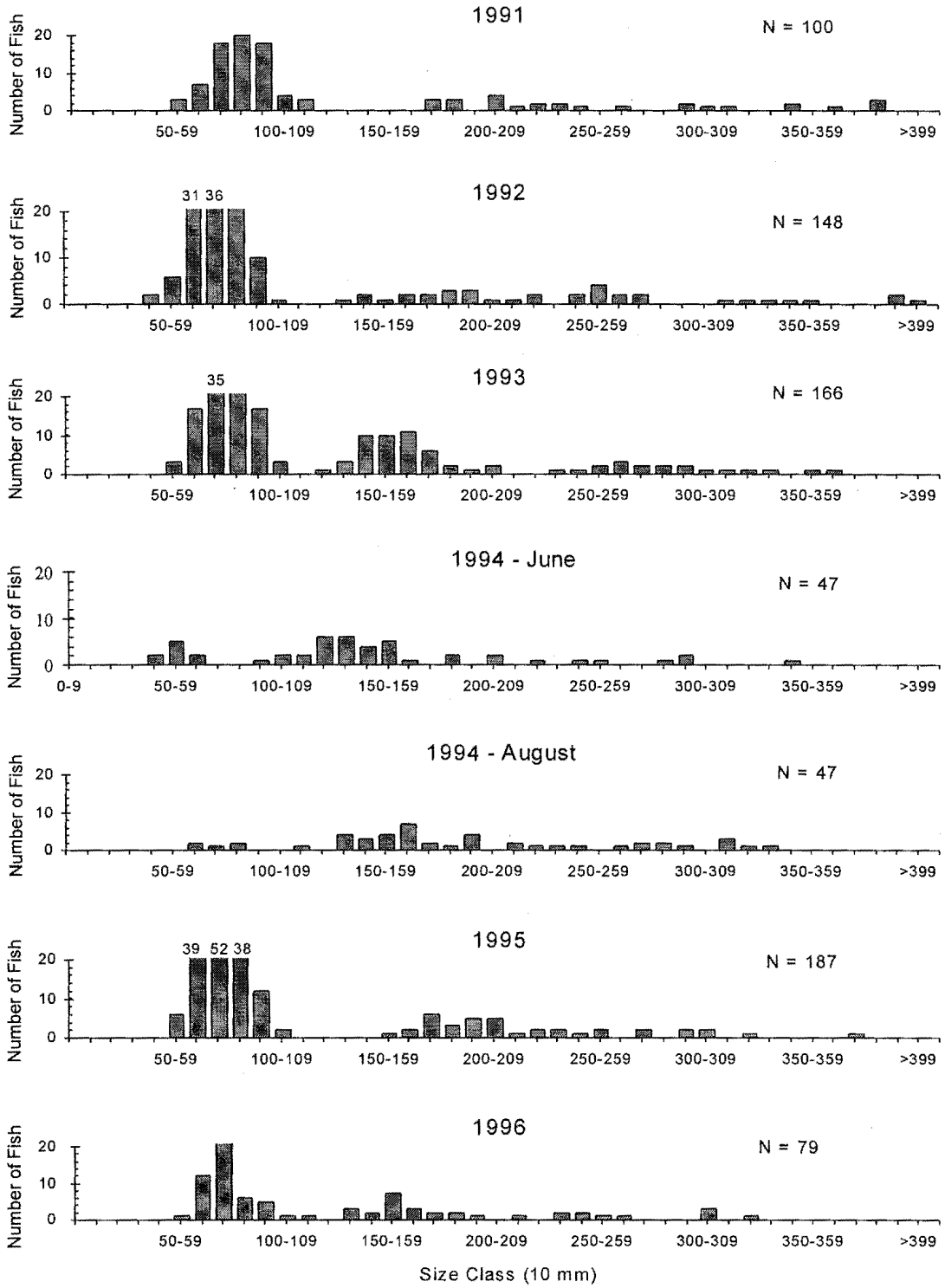

Figure 1. Length-frequency distributions of brown trout collected from Kimsey Creek, by year, and used, in part, to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina. Data for 1991-93 are from Borawa et al. (1995).

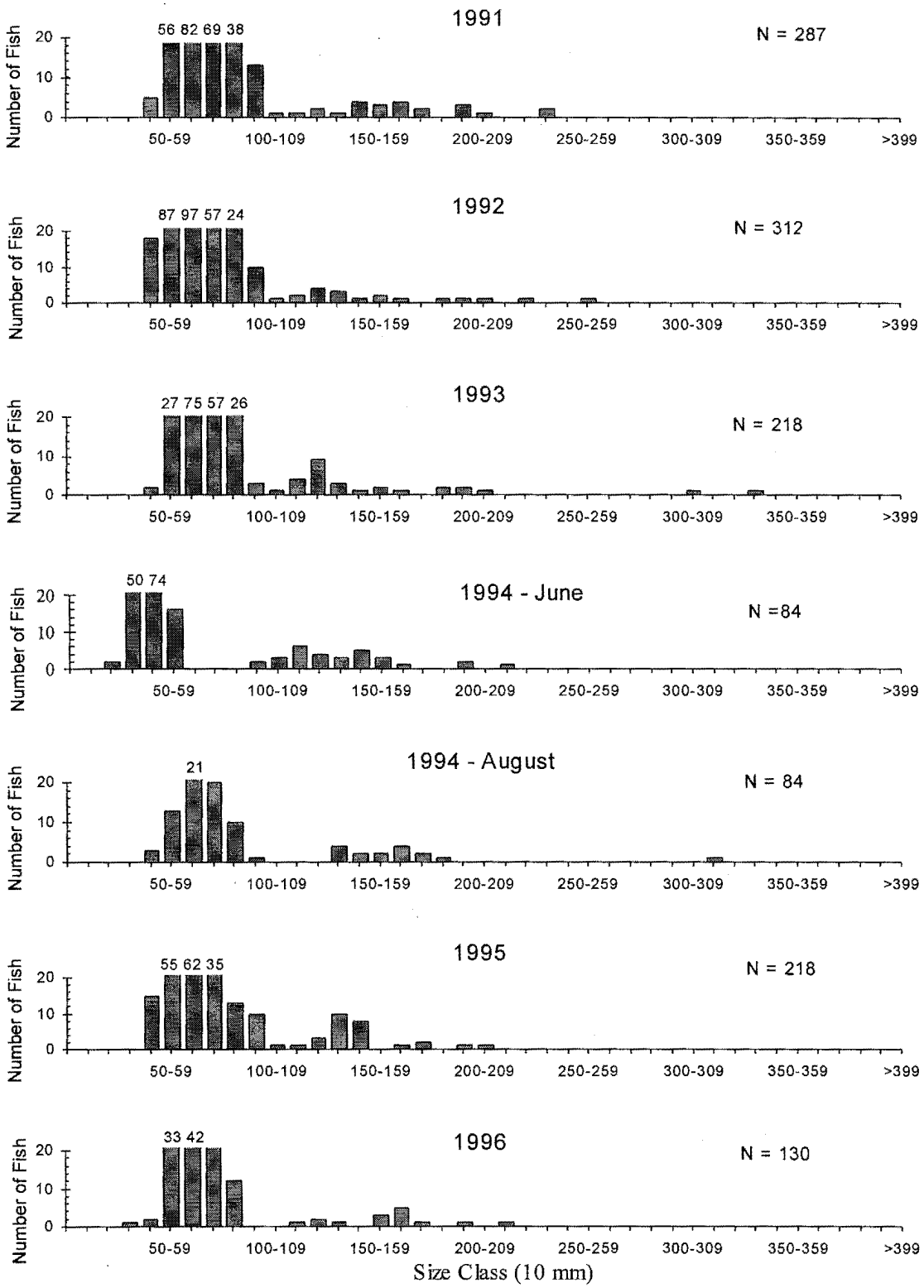

Figure 2. Length-frequency distributions of rainbow trout collected from Kimsey Creek, by year, and used, in part, to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina. Data for 1991-93 are from Borawa et al. (1995).

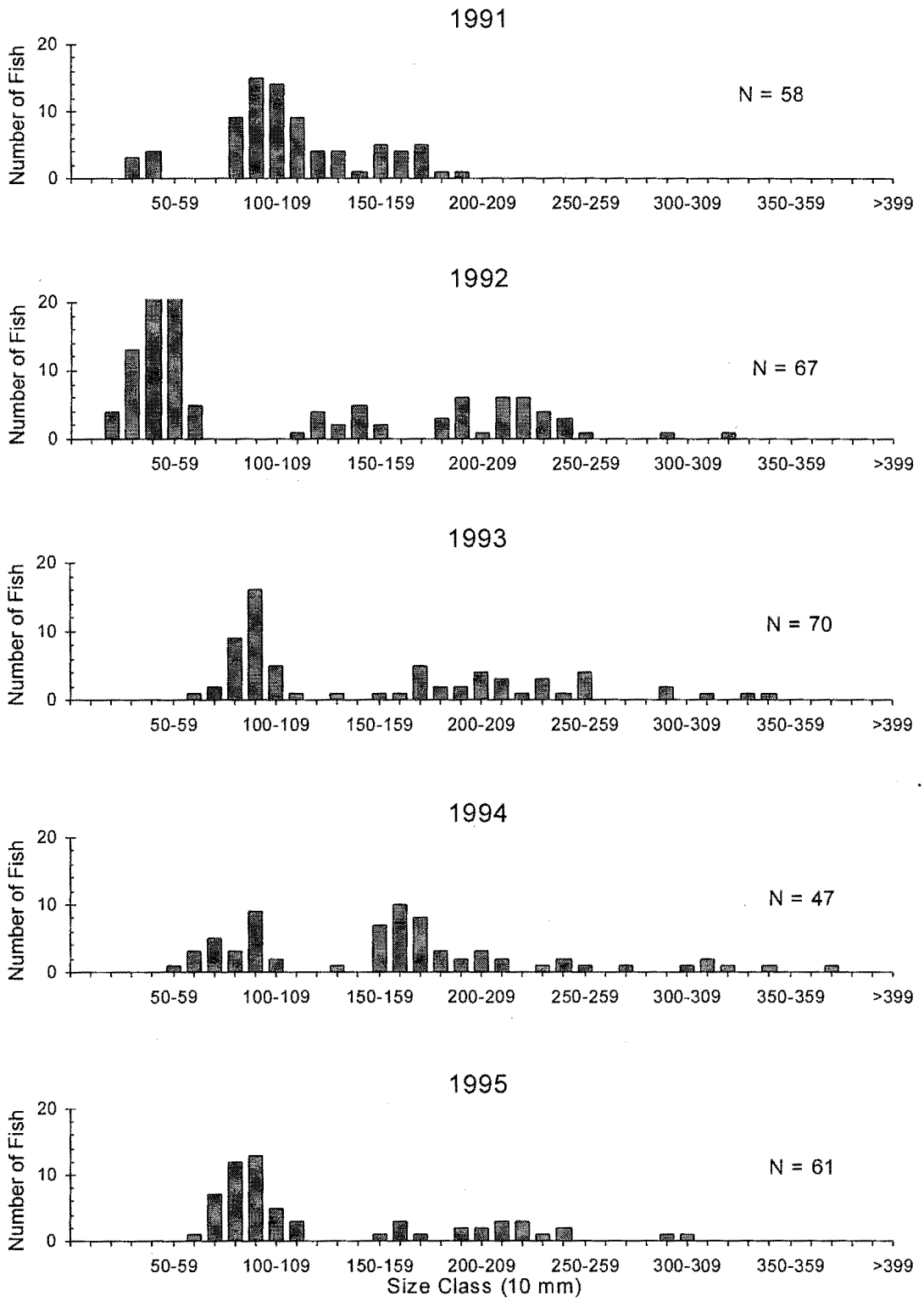

Figure 3. Length-frequency distributions of brown trout collected in fall from Park Creek, by year, and used, in part, to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina. Data for 1991-93 were provided by the U.S. Forest Service (M. Seehorn, person. commun.).

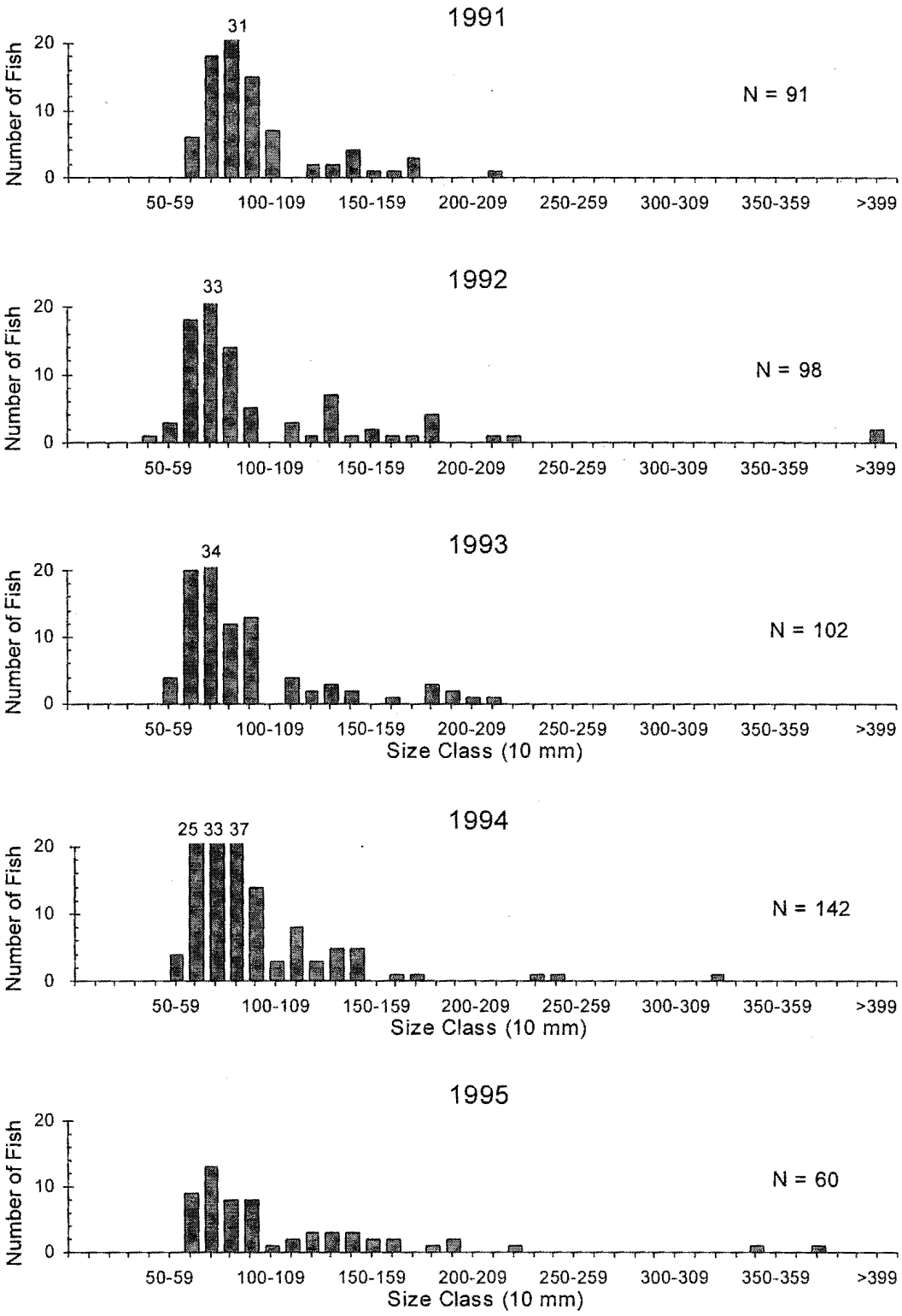

Figure 4. Length-frequency distributions of rainbow trout collected in fall from Park Creek, by year, and used, in part, to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina. Data for 1991-93 were provided by the U.S. Forest Service (M. Seehorn, person. commun.).

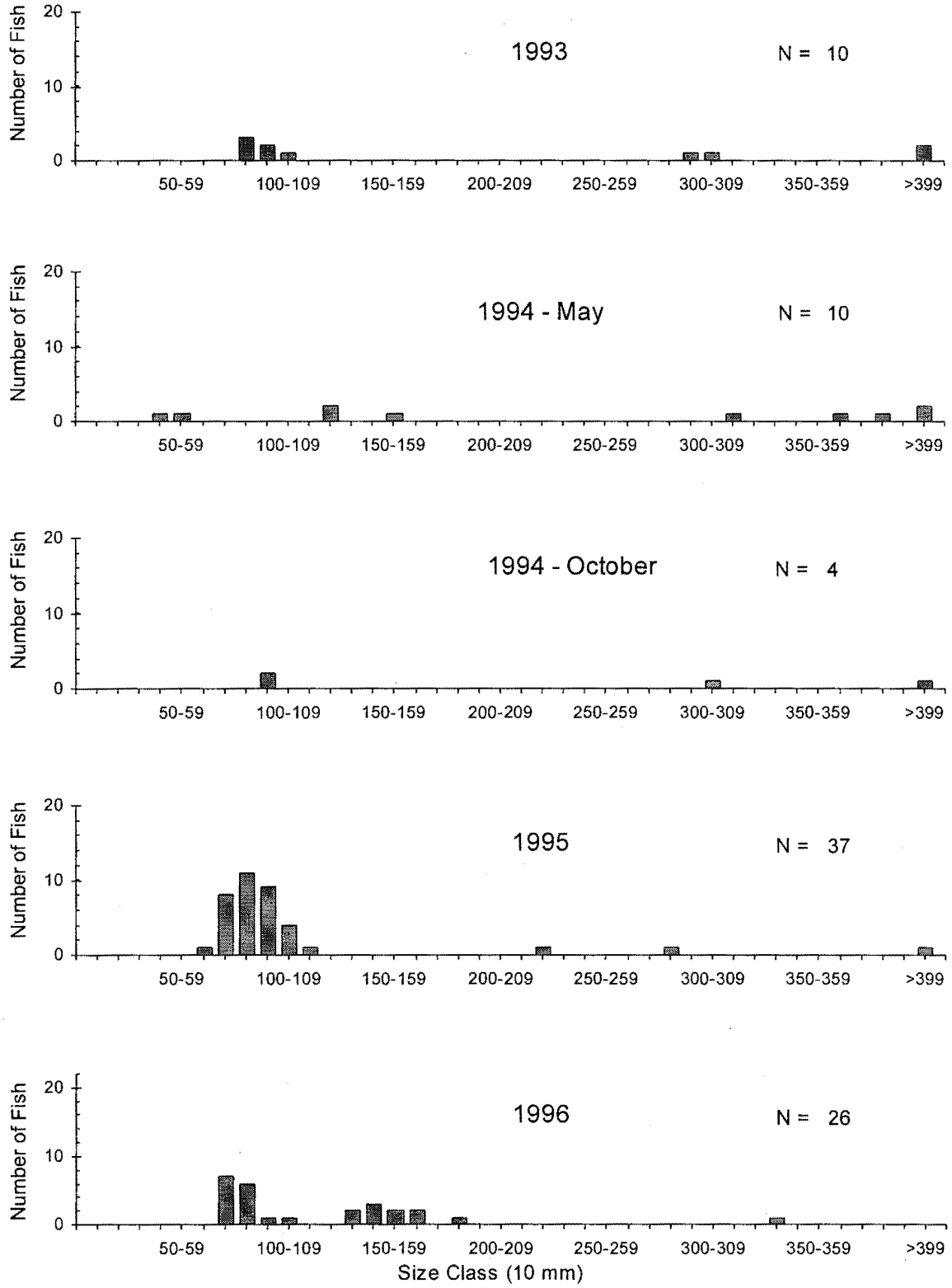

Figure 5. Length-frequency distributions of brown trout collected from Buck Creek downstream of US 64, by year, and used, in part, to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina.

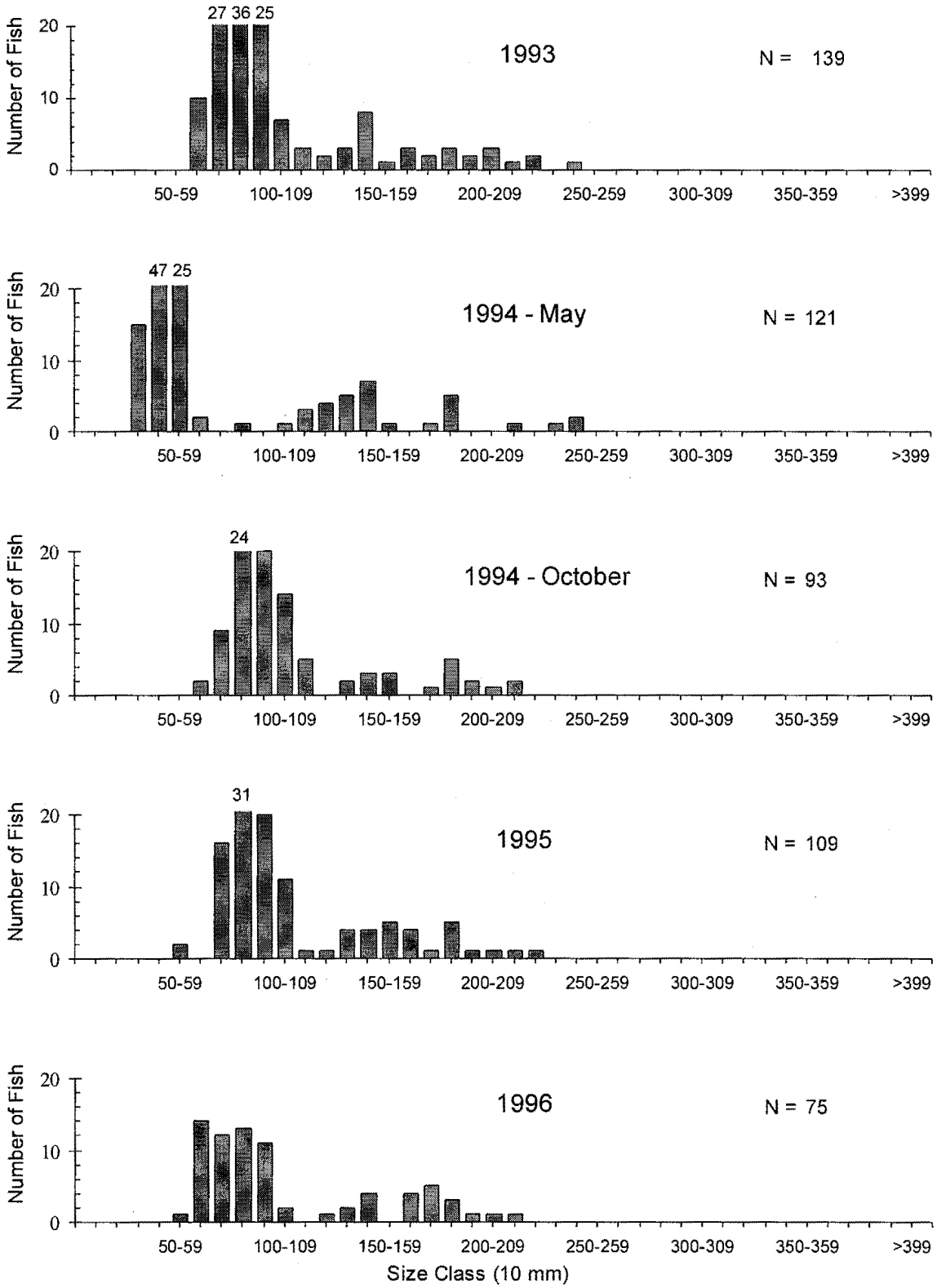

Figure 6. Length-frequency distributions of rainbow trout collected from Buck Creek downstream of US 64, by year, and used, in part, to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina.

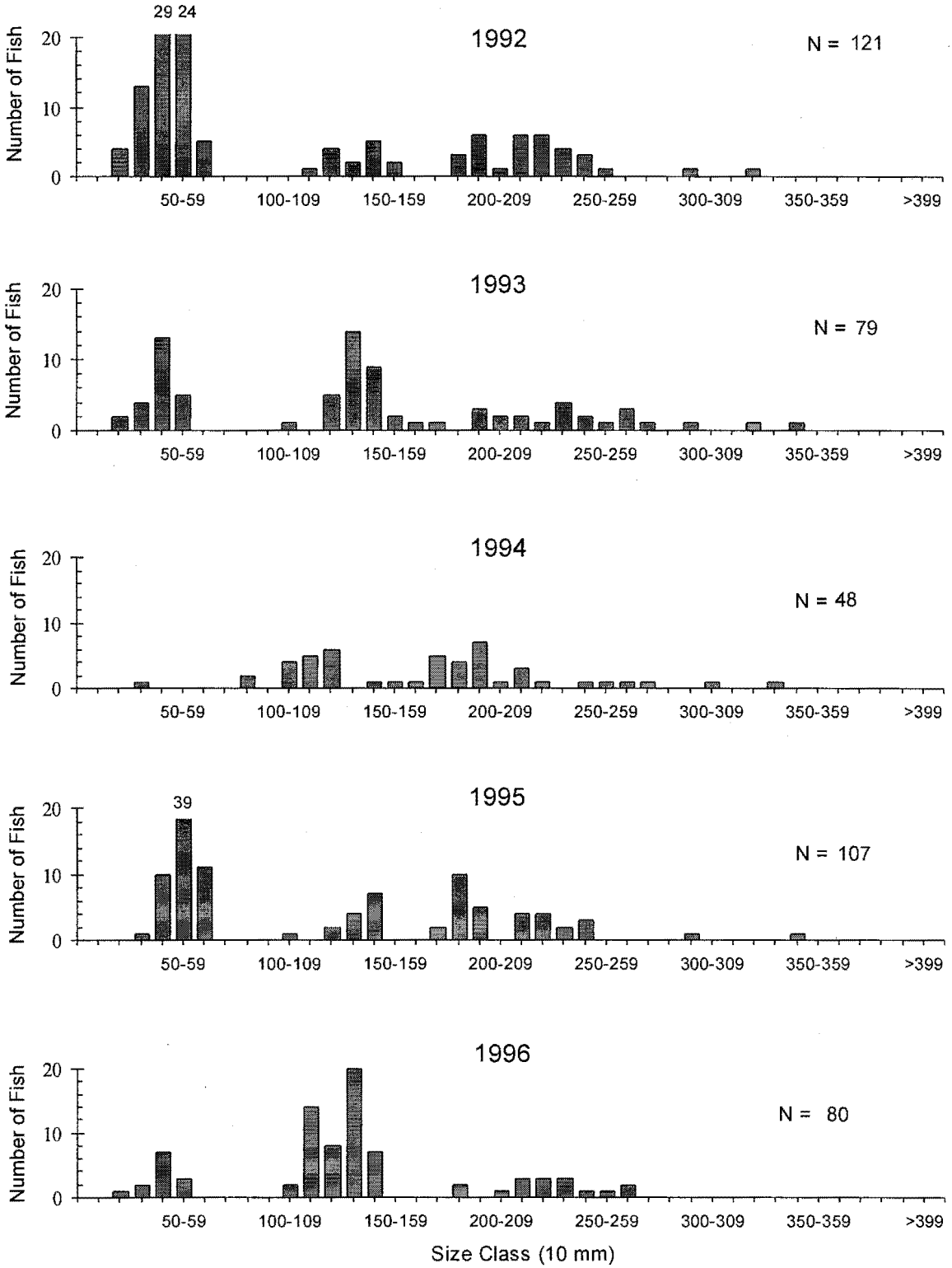

Figure 7. Length-frequency distributions of brown trout collected in spring from Park Creek, by year, and used, in part to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina. Data for 1992-93 were provided by the U.S. Forest Service (M. Seehorn, person. commun.).

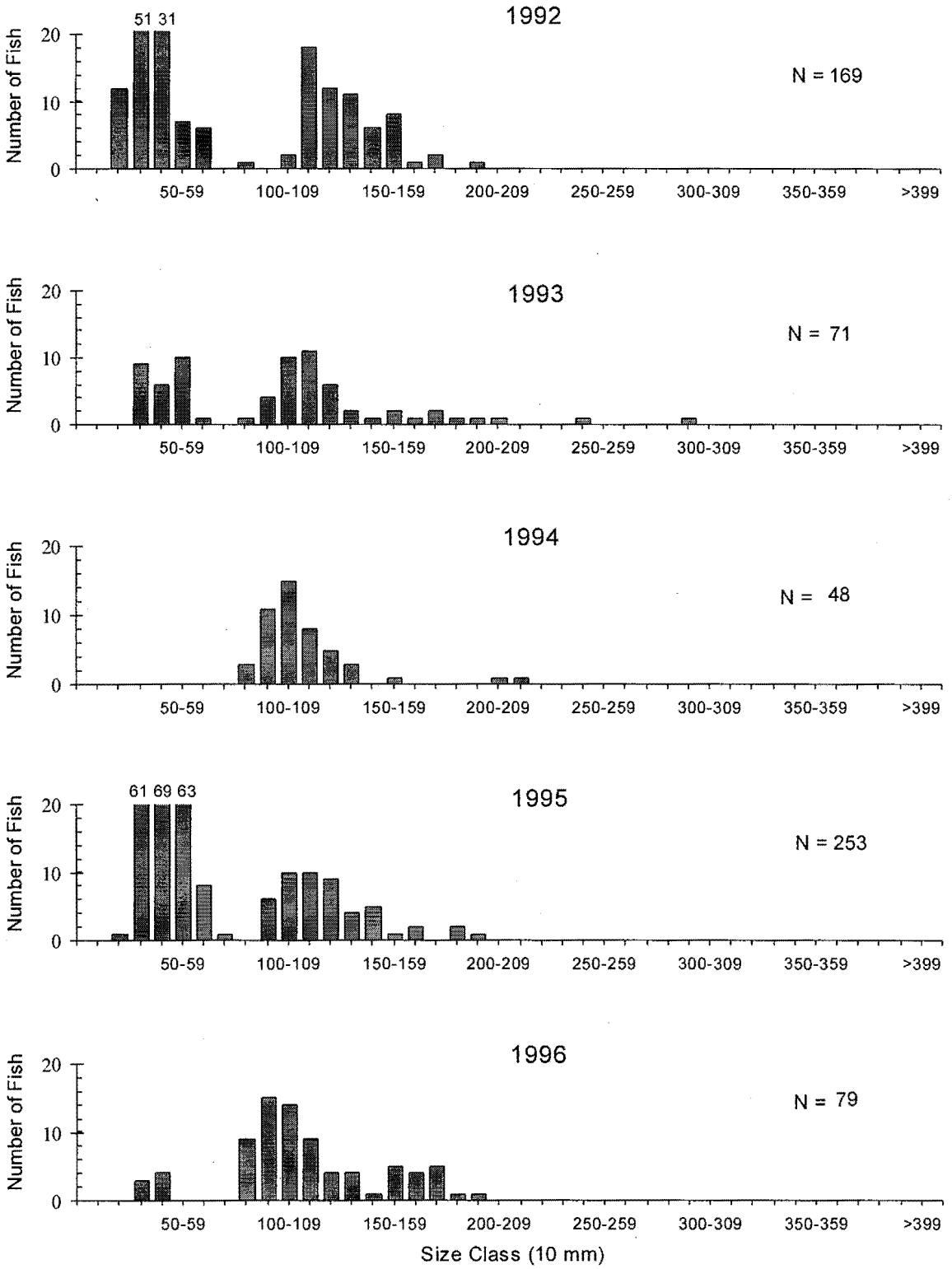

Figure 8. Length-frequency distributions of rainbow trout collected in spring from Park Creek, by year, and used, in part, to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina. Data for 1992-93 were provided by the U.S. Forest Service (M. Seehorn, person. commun.).

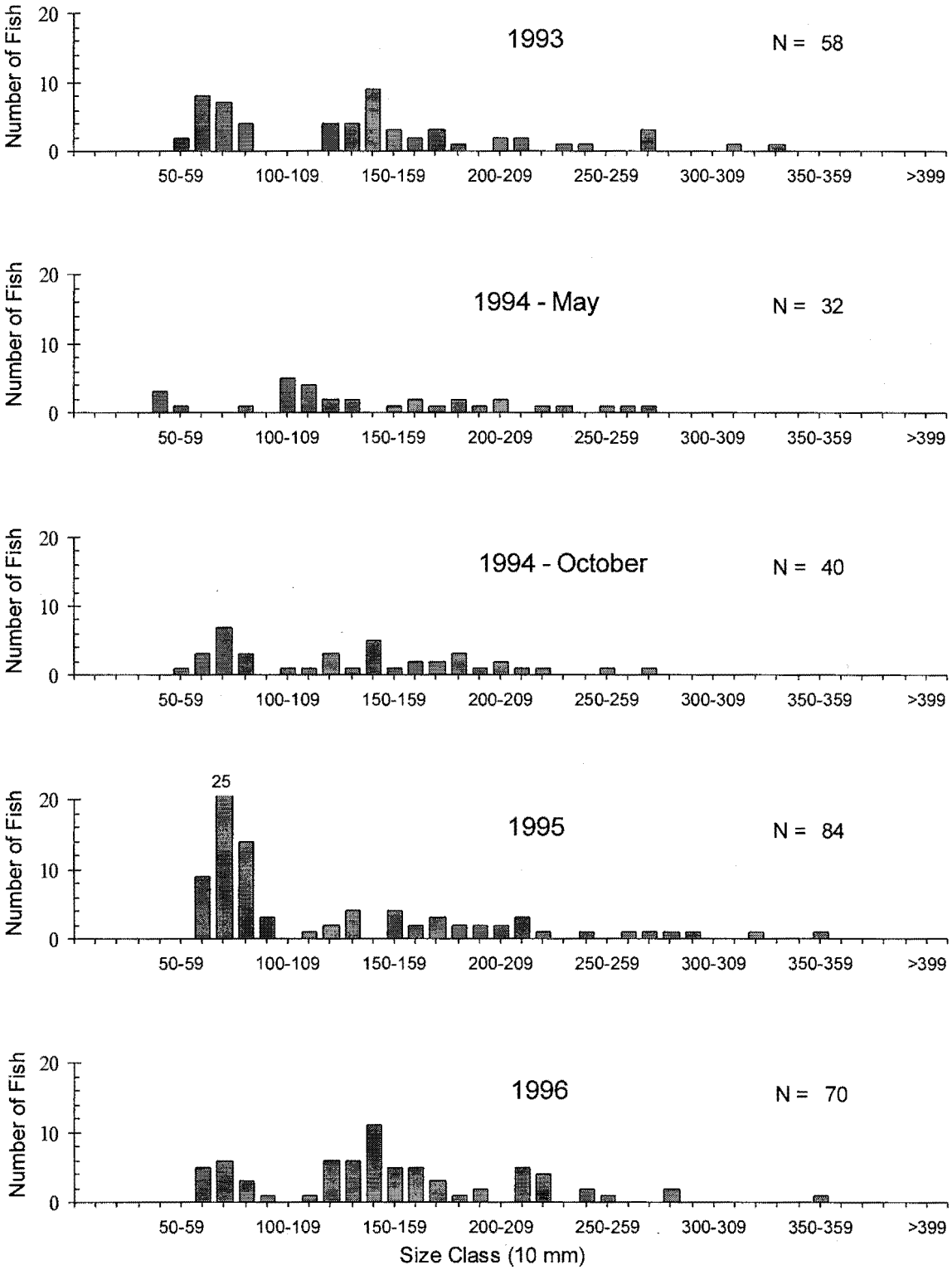

Figure 9. Length-frequency distributions of brown trout collected from Buck Creek upstream of US 64, by year, and used, in part, to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina.

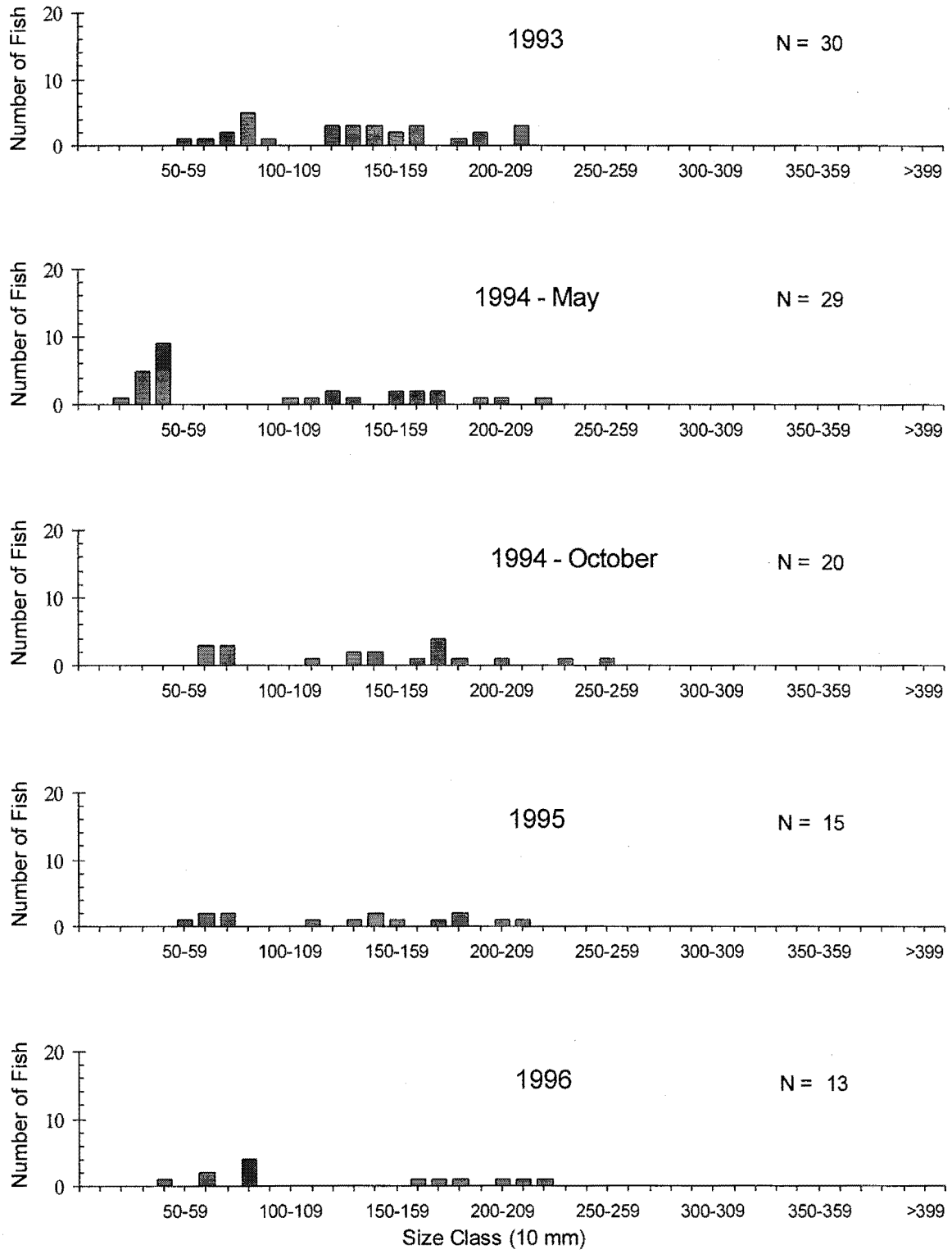

Figure 10. Length-frequency distributions of brown trout collected from Buck Creek upstream of US 64, by year, and used, in part, to evaluate a regulation allowing the use of natural baits in wild trout waters of North Carolina.

Appendix A

Density and Standing Crop Data Summaries

Appendix Table A1. Kimsey Creek mean trout densities (number/ha) and standing crops (kg/ha) by species, year, and size group. Samples (N = 3) were taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. All data was taken from the control reach defined in the wild trout feeding experiment of Borawa et al. (1995). Standard errors are in parentheses.

	Brown Trout							Rainbow Trout						
	1991	1992	1993	1994[a]	1994[b]	1995	1996	1991	1992	1993	1994[a]	1994[b]	1995	1996
Density														
<101 mm	330	659	570	37	44	580	317	1333	1561	1065	1019	477	983	643
< 7 inche	(90)	(66)	(120)	(16)	(14)	(137)	(61)	(356)	(431)	(415)	(237)	(64)	(153)	(81)
101-178 mm	53	44	271	216	147	72	79	93	73	133	181	83	187	88
	(20)	(14)	(40)	(57)	(39)	(14)	(21)	(<1)	(26)	(34)	(45)	(7)	(28)	(14)
179-305 mm	91	112	138	86	98	144	100	32	30	35	33	11	11	13
	(51)	(44)	(62)	(20)	(15)	(44)	(24)	(10)	(16)	(18)	(13)	(5)	(6)	(3)
306-406 mm	37	48	37	26	26	18	11				3	2		
	(6)	(32)	(27)	(10)	(7)	(10)	(4)				(3)	(2)		
>406 mm				6							6[a]			
				(4)							(4)			
Standing Crop														
<101 mm	1.9	2.9	3.0	0.1	0.2	2.6	1.5	4.9	4.7	4.1	1.3	1.6	3.2	2.1
	(0.4)	(0.2)	(0.7)	(<0.1)	(0.1)	(0.6)	(0.3)	(1.3)	(1.3)	(1.6)	(0.3)	(0.2)	(0.5)	(0.3)
101-178 mm	1.4	1.7	9.3	6.3	5.1	2.6	3.0	3.0	1.8	2.7	4.3	2.4	4.8	2.7
	(0.6)	(0.6)	(1.5)	(1.8)	(1.4)	(0.5)	(0.7)	(0.3)	(0.3)	(0.8)	(1.2)	(0.1)	(0.8)	(0.5)
179-305 mm	12.2	15.0	23.8	12.7	12.8	15.6	14.7	3.2	2.8	2.5	3.1	0.7	1.0	1.2
	(8.6)	(8.8)	(11.4)	(3.8)	(1.3)	(4.7)	(3.8)	(1.8)	(1.4)	(1.3)	(1.2)	(0.4)	(0.5)	(0.3)
306-406 mm	17.3	20.9	14.0	11.5	10.0	6.8	4.2				1.2	0.4		
	(3.7)	(12.1)	(10.7)	(3.7)	(3.3)	(3.6)	(1.4)				(1.2)	(0.4)		
>406 mm				5.6							4.4			
				(3.6)							(2.8)			

[a]Samples taken in June; rainbow trout >406 mm were excluded from data analysis because they were presumed to be downstream migrants from a section of stream where supplemental feed was being applied (Borawa et al. 1995).
[b]Samples taken in August.

Appendix Table A2. Park Creek mean trout densities (number/ha) and standing crops (kg/ha) by species, year, and size group during November sampling. Samples (N = 5) were taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. Sample data taken in portion of creek also under long term monitoring of fish habitat improvement evaluation; last structures installed during 1988 (M. Seehorn, pers. commun.). Standard errors are in parentheses.

	Brown Trout						Rainbow Trout					
	1991[a]	1992[b]	1993	1994	1995	1996[c]	1991[a]	1992[b]	1993	1994	1995	1996[c]
Density												
<101 mm	66 (20)	162 (23)	144 (22)	55 (17)	335 (180)		428 (89)	403 (56)	500 (81)	671 (117)	208 (66)	
101-178 mm	93 (37)	76 (20)	150 (45)	88 (21)	65 (19)		71 (20)	87 (24)	72 (26)	146 (28)	81 (19)	
179-305 mm	153 (36)	127 (41)	95 (34)	94 (35)	71 (14)		5 (5)	35 (10)	39 (14)	12 (7)	20 (10)	
306-406 mm	23 (10)	18 (7)	27 (17)	24 (12)				13 (13)		7 (7)	9 (6)	
>406 mm				12 (8)								
Standing Crop												
<101 mm	0.4 (0.2)	1.2 (0.2)	0.8 (0.2)	0.4 (0.1)	2.1 (1.1)		2.3 (0.7)	2.0 (0.3)	1.8 (0.3)	3.6 (0.8)	1.0 (0.3)	
101-178 mm	3.1 (1.2)	1.9 (0.6)	5.7 (1.7)	3.2 (0.6)	1.5 (0.4)		2.3 (1.0)	2.0 (0.5)	1.3 (0.5)	3.3 (0.8)	2.1 (0.5)	
179-305 mm	13.5 (5.3)	12.5 (4.6)	9.4 (2.8)	12.3 (4.7)	8.5 (1.9)		0.5 (0.5)	2.1 (0.8)	2.5 (0.9)	1.7 (1.0)	1.5 (0.8)	
306-406 mm	8.8 (4.6)	5.4 (2.3)	9.2 (5.8)	9.4 (4.9)				17.5 (17.5)		2.2 (2.2)	3.8 (2.4)	
>406 mm				10.0 (6.2)								

[a]Data based on only 2 passes at sites 2-5.
[b]Data based on only 2 passes at sites 1-2.
[c]No samples taken in November 1996.

Appendix Table A3. Buck Creek (lower; downstream of US 64) mean trout densities (number/ha) and standing crops (kg/ha) by species, year, and size group. Samples (N = 3) were taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. Standard errors are in parentheses.

	Brown Trout					Rainbow Trout				
	1993	1994[a]	1994[b]	1995	1996	1993	1994[a]	1994[b]	1995	1996
Density										
<101 mm	28 (28)	9 (9)	10 (10)	186 (27)	78 (27)	691 (92)	528 (118)	360 (51)	428 (136)	258 (164)
101-178 mm		14 (8)		26 (26)	53 (14)	208 (105)	130 (35)	129 (82)	198 (70)	90 (40)
179-305 mm	13 (7)		6 (6)	11 (6)	5 (5)	88 (9)	49 (4)	68 (16)	58 (12)	42 (13)
306-406 mm		15 (9)			9 (9)					
>406 mm	24 (14)	13 (7)	9 (3)	6 (6)						
Standing Crop										
<101 mm	0.2 (0.2)	<0.1 (<0.1)	0.1 (0.1)	1.2 (0.2)	0.5 (0.2)	4.8 (0.2)	0.7 (0.2)	2.7 (0.4)	2.6 (0.8)	1.4 (0.9)
101-178 mm		0.4 (0.2)		0.3 (0.3)	1.9 (0.5)	4.9 (2.4)	3.3 (1.0)	2.5 (1.3)	4.9 (1.4)	3.3 (0.9)
179-305 mm	3.9 (2.2)		1.7 (1.7)	2.0 (1.3)	0.3 (0.3)	7.0 (0.7)	4.8 (1.0)	4.7 (1.2)	4.4 (0.7)	2.8 (1.0)
306-406 mm		7.4 (5.3)			3.1 (3.1)					
>406 mm	11.3 (11.3)	10.9 (5.5)	7.0 (7.0)	4.9 (4.9)						

[a]Samples taken in May.
[b]Samples taken in October.

Appendix Table A4. Buck Creek (upper; upstream of US 64) mean trout densities (number/ha) and standing crops (kg/ha) by species, year, and size group. Samples (N = 2) were taken in a stream section under a wild trout regulation where natural baits were prohibited. Standard errors are in parentheses.

	Brown Trout					Rainbow Trout				
	1993	1994[a]	1994[b]	1995	1996	1993	1994[a]	1994[b]	1995	1996
Density										
<101 mm	224 (36)	46 (32)	148 (9)	606 (36)	137 (42)	95 (43)	138 (1)	59 (58)	39 (39)	60 (20)
101-178 mm	284 (130)	159 (76)	202 (123)	51 (27)	378 (141)	151 (31)	88 (10)	49 (44)	68 (52)	8 (8)
179-305 mm	107 (22)	87 (32)	109 (78)	150 (40)	151 (9)	65 (14)	21 (21)	3 (3)	36 (12)	44 (4)
306-406 mm	22 (5)			16 (16)	8 (8)					
>406 mm										
Standing Crop										
<101 mm	0.9 (0.2)	0.8 (0.8)	0.7 (0.2)	3.1 (0.2)	0.6 (0.3)	0.5 (0.3)	0.6 (0.5)	0.2 (0.2)	0.1 (0.1)	0.3 (0.1)
101-178 mm	9.3 (3.9)	1.5 (0.3)	6.5 (4.1)	5.7 (2.4)	12.1 (4.6)	4.7 (1.0)	3.3 (0.2)	3.1 (0.4)	2.0 (1.7)	0.3 (0.3)
179-305 mm	14.6 (3.7)	4.1 (3.0)	11.0 (8.3)	20.0 (4.7)	18.3 (1.0)	5.6 (1.8)	5.7 (2.0)	3.7 (3.7)	2.5 (0.4)	3.4 (1.0)
306-406 mm	7.7 (1.2)			6.1 (6.1)	3.8 (3.8)					
>406 mm										

[a]Samples taken in May.
[b]Samples taken in October.

Appendix Table A5. Chattooga River brown trout mean densities (number/ha) and standing crops (kg/ha) by site, year, and size group. Samples were taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. Standard errors are in parentheses.

	Site 1[a] downstream of bridge					Site 2[b] upstream of bridge				
	1992[c]	1993	1994	1995[d]	1996[c,d]	1992[c]	1993	1994	1995[e]	1996[c,d]
Density										
<101 mm	372 (9)	254 (39)	51 (7)	242 (14)	158 (31)	123 (29)	45 (13)	18 (4)		113 (24)
101-178 mm	96 (3)	106 (7)	68 (3)	94 (50)	164 (38)	328 (13)	105 (4)	22 (2)		253 (7)
179-305 mm	64 (0)	148 (2)	68 (3)	125 (7)	140 (5)	18 (2)	280 (4)	158 (4)		298 (13)
306-406 mm	5 (0)	12 (0)	17 (2)	242/219 110%	6 (0)	32 (1)	15 (1)	18/184 9.8%		18 (2)
>406 mm	372/165 225%	254/266 95.5%	51/153 33.33%		158/310 51%	123/378 32.5% YOY	45/400 11.3%	4 (0)		113/569 19.9% YOY/Other
Standing Crop										
<101 mm	2.7 (0.7)	2.0 (0.6)	0.2 (0.1)	1.7 (0.4)	1.2 (0.4)	1.1 (0.4)	0.4 (0.1)	0.1 (0.0)		0.9 (0.2)
101-178 mm	1.4 (0.5)	3.9 (2.3)	3.0 (0.7)	2.3 (2.2)	3.8 (3.0)	4.9 (1.2)	2.0 (1.5)	0.3 (0.1)		3.6 (1.3)
179-305 mm	11.1 (3.8)	14.9 (9.5)	7.4 (3.0)	15.5 (8.2)	13.1 (5.6)	3.1 (1.9)	26.3 (6.0)	20.4 (7.3)		32.7 (15.5)
306-406 mm	1.8 (0.0)	3.9 (0.5)	5.2 (0.7)		2.0 (0.0)	13.2 (4.2)	6.6 (2.5)			6.0 (0.9)
>406 mm	17	24.7	15.8	19.5	20.1	22.3	35.3	3.4 (0.0)		43.2

[a]Site 1 under wild/natural bait regulation beginning 1 July 1994. 19.4 avg 5 yrs
[b]Site 2 under wild trout waters regulation.
[c]One brook trout <101 mm also take at this site during this year (1992, 5/ha, <0.1 kg/ha; 1996, 23/ha, <0.1 kg/ha).
[d]Site sample site shortened due to high water.
[e]Site 2 not sampled due to high water.

24.6 kg/ha
31.35 avg for 4 years

Appendix Table A6. Deep Creek trout mean densities (number/ha) and mean standing crops (kg/ha) by year and size group. Samples (N = 3, except in 1996 when N = 2) were taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. Standard errors are in parentheses.

	Brown Trout				Rainbow Trout			
Parameter Size Group	1993	1994	1995	1996	1993	1994	1995	1996
Density								
<101 mm					308 (82)	198 (133)	505 (128)	234 (41)
101-178 mm					677 (133)	398 (79)	225 (161)	323 (227)
179-305 mm					166 (61)	129 (12)	140 (44)	31 (10)
306-406 mm								
>406 mm								
Standing Crop								
<101 mm					1.6 (0.2)	1.3 (1.0)	2.4 (0.8)	1.7 (0.5)
101-178 mm					19.5 (4.3)	15.2 (3.1)	8.4 (5.5)	10.3 (6.7)
179-305 mm					15.0 (5.4)	10.0 (0.3)	11.2 (3.4)	2.4 (0.6)
306-406 mm								
>406 mm								

Appendix Table A7. Fowler Creek trout mean densities (number/ha) and mean standing crops (kg/ha) by species, year, and size group. Samples (N = 3) were taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. Standard errors are in parentheses.

	Brook Trout				Brown Trout			
Parameter Size Group	1993[a]	1994	1995	1996	1993[a]	1994	1995	1996
Density								
<101 mm		258 (258)	207 (198)	176 (117)		6 (6)	458 (71)	684 (124)
101-178 mm		129 (129)	92 (83)	6 (6)		79 (45)	61 (61)	100 (54)
179-305 mm		44 (28)		59 (50)		157 (52)	200 (69)	81 (56)
306-406 mm							29 (29)	
>406 mm								
Standing Crop								
<101 mm		0.5 (0.5)	1.0 (1.0)	0.7 (0.5)		<0.1 (<0.1)	2.8 (0.2)	3.1 (0.3)
101-178 mm		3.5 (3.5)	2.4 (2.2)	0.3 (0.3)		2.8 (1.4)	3.0 (3.0)	4.6 (2.5)
179-305 mm		3.1 (2.9)		4.6 (3.9)		13.5 (4.7)	24.1 (8.8)	9.7 (6.4)
306-406 mm							8.8 (8.8)	
>406 mm								

[a]No samples taken in 1993.

Appendix Table A8. Jarrett Creek trout mean densities (number/ha) and mean standing crops (kg/ha) by species, year, and size group. Samples (N=3) were taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. Standard errors are in parentheses.

	Brown Trout				Rainbow Trout			
Parameter Size Group	1993[a]	1994	1995	1996[a]	1993[a]	1994	1995	1996[a]
Density								
<101 mm		34 (34)	230 (125)	131 (53)		137 (77)	61 (31)	16 (8)
101-178 mm		75 (65)	60 (42)	41 (16)		236 (57)	213 (61)	133 (87)
179-305 mm		81 (54)	80 (80)			53 (19)	87 (36)	30 (18)
306-406 mm		14 (14)	7 (7)					
>406 mm								
Standing Crop								
<101 mm		<0.1 (<0.1)	0.4 (0.2)	3.9 (1.6)		0.9 (0.5)	0.2 (0.1)	0.1 (<0.1)
101-178 mm		2.0 (1.8)	2.0 (1.3)	4.8 (3.0)		6.6 (1.1)	5.2 (0.8)	3.1 (1.7)
179-305 mm		8.7 (6.2)	10.8 (10.8)			3.6 (1.3)	7.8 (3.6)	2.4 (1.4)
306-406 mm		5.8 (5.8)	3.4 (3.4)					
>406 mm								

[a]No samples taken in 1993.

Appendix Table A9. Long Creek trout mean densities (number/ha) and mean standing crops (kg/ha) by year, species, and size group. Samples (N = 2) were taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. Standard errors are in parentheses.

Parameter Size Group	Brown Trout				Rainbow Trout			
	1993[a]	1994	1995	1996[a]	1993[a]	1994	1995	1996[a]
Density								
<101 mm						85 (35)	313 (4)	421 (54)
101-178 mm		9 (9)				444 (38)	434 (12)	783 (87)
179-305 mm						29 (5)	88 (9)	42 (16)
306-406 mm								
>406 mm								
Standing Crop								
<101 mm						0.2 (0.2)	0.3 (<0.1)	0.9 (0.1)
101-178 mm		0.3 (0.3)				11.3 (1.8)	14.0 (0.4)	16.8 (2.5)
179-305 mm						2.4 (0.3)	6.5 (1.6)	2.9 (0.8)
306-406 mm								
>406 mm								

[a]No samples taken in 1993.

Appendix Table A10. Park Creek mean trout densities (number/ha) and standing crops (kg/ha) by species, year, and size group during May sampling. Samples (N = 5) were taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. Sample data taken in portion of creek also under long term monitoring of fish habitat improvement evaluation (M. Seehorn, pers. commun.). Standard errors are in parentheses.

	Brown Trout						Rainbow Trout					
	1991[a]	1992[b]	1993	1994	1995	1996	1991[a]	1992[b]	1993	1994	1995	1996
Density												
<101 mm		428 (107)	138 (35)	23 (10)	332 (108)	80 (45)		913 (321)	178 (36)	99 (26)	1328 (129)	179 (41)
101-178 mm		82 (41)	184 (17)	126 (12)	85 (38)	271 (58)		335 (60)	191 (38)	157 (51)	230 (36)	241 (16)
179-305 mm		183 (91)	114 (49)	117 (41)	146 (41)	84 (18)		5 (5)	29 (15)	10 (6)	19 (8)	11 (7)
306-406 mm		5 (5)	11 (7)	11 (11)	7 (7)							
>406 mm												
Standing Crop												
<101 mm		0.5 (0.1)	0.1 (<0.1)	0.2 (0.1)	0.6 (0.1)	0.1 (0.1)		0.6 (0.2)	0.4 (0.1)	1.4 (0.6)	1.9 (0.4)	1.3 (0.2)
101-178 mm		2.1 (1.1)	5.2 (0.5)	3.2 (0.7)	2.7 (1.0)	6.0 (1.2)		8.1 (1.5)	3.7 (0.5)	2.8 (1.0)	4.7 (0.6)	7.4 (0.9)
179-305 mm		19.2 (9.3)	12.2 (5.2)	11.0 (4.8)	16.4 (3.2)	10.0 (2.4)		0.3 (0.3)	2.7 (1.4)	0.4 (0.4)	1.2 (0.5)	3.9 (3.5)
306-406 mm		1.8 (1.8)	3.6 (2.3)	3.7 (3.7)	2.5 (2.5)							
>406 mm												

[a]No samples taken in May 1991.
[b]Only 2 passes made at sites 2 and 3.

Appendix Table A11. Scotsman Creek trout mean densities (number/ha) and mean standing crops (kg/ha) by species, year, and size group. Samples (N = 3) were taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. Standard errors are in parentheses.

	Brook Trout			Brown Trout			Rainbow Trout		
	1994	1995	1996	1994	1995	1996	1994	1995	1996
Density									
<101 mm	202 (202)	547 (527)	546 (546)	12 (6)	167 (113)	308 (227)			20 (11)
101-178 mm	141 (142)	285 (275)	318 (307)	5 (5)	20 (12)	53 (53)	20 (20)		
179-305 mm		33 (33)	21 (21)	39 (30)	33 (18)	35 (19)			
306-406 mm						7 (7)			
>406 mm									
Standing Crop									
<101 mm	0.7 (0.7)	1.8 (1.7)	1.8 (1.8)	<0.1 (<0.1)	1.1 (0.7)	1.3 (0.9)			0.1 (0.1)
101-178 mm	3.3 (3.3)	6.6 (6.3)	6.8 (6.5)	0.3 (0.3)	0.4 (0.3)	2.5 (2.5)	0.4 (0.4)		
179-305 mm		2.4 (2.4)	1.4 (1.4)	4.0 (3.4)	4.6 (2.8)	2.7 (1.5)			
306-406 mm						2.6 (2.6)			
>406 mm									

Appendix Table A12. Tellico Creek drainage trout mean densities (number/ha) and mean standing crops (kg/ha) by year, species, and size group. Sample sites were actually located on tributaries of Tellico Creek; sites 1 and 2 on Rhinehart Creek and site 3 on Sugar Cove Creek. Samples (N = 3) were taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. Standard errors are in parentheses.

	Brook Trout				Rainbow Trout			
Parameter Size Group	1993[a]	1994	1995	1996	1993[a]	1994	1995	1996
Density								
<101 mm		326 (326)	322 (322)	373 (373)		62 (32)	87 (87)	62 (62)
101-178 mm		277 (277)	266 (266)	264 (264)		326 (164)	197 (107)	158 (83)
179-305 mm		33 (33)	14 (14)			28 (28)	17 (17)	15 (15)
306-406 mm								
>406 mm								
Standing Crop								
<101 mm		2.5 (2.5)	0.6 (0.6)	1.4 (1.4)		0.6 (0.3)	0.1 (0.1)	0.1 (0.1)
101-178 mm		4.9 (4.9)	5.5 (5.5)	5.1 (5.1)		6.5 (3.3)	7.0 (3.9)	4.1 (2.1)
179-305 mm		1.8 (1.8)	0.7 (0.7)			1.8 (1.8)	1.3 (1.3)	1.4 (1.4)
306-406 mm								
>406 mm								

[a]No samples taken in 1993.

Appendix Table A13. Tellico River trout mean densities (number/ha) and mean standing crops (kg/ha) by year, species, and size group. Samples (N = 2) taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. Standard errors are in parentheses.

	Brook Trout			Brown Trout			Rainbow Trout		
	1994	1995	1996	1994	1995	1996	1994	1995	1996
Density									
<101 mm		49 (10)	55 (48)				26 (10)	141 (82)	25 (12)
101-178 mm			4 (4)				360 (27)	567 (49)	445 (155)
179-305 mm						7 (7)	136 (33)	102 (43)	105 (23)
306-406 mm									
>406 mm									
Standing Crop									
<101 mm		0.1 (<0.1)	0.1 (0.1)				<0.1 (<0.1)	0.2 (0.1)	<0.1 (<0.1)
101-178 mm			0.1 (0.1)				17.9 (8.5)	17.1 (1.0)	13.6 (3.8)
179-305 mm						0.4 (0.4)	16.6 (8.3)	7.7 (2.6)	9.2 (1.6)
306-406 mm									
>406 mm									

Appendix Table A14. Turtle Pond Creek trout mean densities (number/ha) and mean standing crops (kg/ha) by year, species, and size group. Sample site 3 was actually located on Piney Knob Branch, a tributary of Turtle Pond Creek and contained only brook trout. Samples (N = 3) were taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. Standard errors are in parentheses.

	Brook Trout			Brown Trout			Rainbow Trout		
	1994	1995	1996	1994	1995	1996	1994	1995	1996
Density									
<101 mm	80 (80)	352 (347)	150 (137)	9 (5)	93 (48)	41 (21)	16 (16)	13 (6)	
101-178 mm	168 (155)	141 (141)	79 (67)	70 (42)	28 (15)	129 (71)	76 (66)	150 (112)	58 (30)
179-305 mm	3 (3)	37 (37)	7 (7)	45 (31)	71 (41)	59 (30)	19 (15)	27 (22)	61 (52)
306-406 mm									
>406 mm									
Standing Crop									
<101 mm	0.5 (0.5)	0.8 (0.8)	0.5 (0.5)	<0.1 (<0.1)	0.3 (0.2)	0.1 (<0.1)	<0.1 (<0.1)	<0.1 (<0.1)	
101-178 mm	3.6 (3.5)	4.0 (4.0)	1.8 (1.6)	2.7 (1.5)	1.3 (0.7)	5.7 (3.2)	2.7 (2.3)	4.2 (3.0)	2.0 (1.2)
179-305 mm	0.3 (0.3)	2.7 (2.7)	0.6 (0.6)	4.4 (2.8)	9.2 (4.9)	10.4 (5.2)	1.5 (1.0)	1.9 (1.4)	4.8 (4.2)
306-406 mm									
>406 mm									

Appendix B

Trout Length-Frequency Tables

Appendix Table B1. Length-frequency distributions of trout by species and year for Deep Creek samples (N = 3, except in 1996 when N = 2) taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. This stream was previously under hatchery supported regulations.

Size Class (mm)	Brook Trout				Brown Trout				Rainbow Trout			
	1993	1994	1995	1996	1993	1994	1995	1996	1993	1994	1995	1996[a]
<50											1	
50-59									2		6	
60-69									10		16	1
70-79									14	8	21	6
80-89									6	8	12	9
90-99									2	5	5	11
100-109									1			2
110-119									4			
120-129									14	4	1	6
130-139									18	4	4	4
140-149									11	13	3	5
150-159									12	9	4	11
160-169									6	14	5	2
170-179									6	9	6	3
180-189									2	7	7	2
190-199									3	2	3	
200-209									6	5	1	2
210-219									3		2	
220-229									2	1	2	
230-239												
240-249									1			
250-259										1	1	
260-269											1	
270-279												
280-289												
290-299												
300-309												
310-319												
320-329												
330-339												
340-349												
350-359												
360-369												
370-379												
380-389												
390-399												
>399												
Totals									123	90	101	64

Appendix Table B2. Length-frequency distributions of trout by species, site, and year for Chattooga River samples taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulations. The regulation on site 1 was changed to wild with a natural bait allowance, whereas site 2 remained under a wild trout regulation where natural bait was not allowed.

Size Class (mm)	Brown Trout - Site 1					Brown Trout - Site 2				
	1992	1993	1994	1995[a]	1996[a]	1992	1993	1994	1995[b]	1996
<50										
50-59										
60-69	3		1							
70-79	10	3	4	5	1					
80-89	25	10	4	12	7	7	1	1		4
90-99	30	23		12	12	13	7	3		15
100-109	12	6	1	7	12	31	6	4		21
110-119	4	1			6	29	6	1		25
120-129	2					11	7			8
130-139	1									2
140-149										
150-159										
160-169		2	3	2	2		1			
170-179		10	8	1	5		1			1
180-189	1	4	1	4	8		5	2		5
190-199		9	2	1	4		10	3		10
200-209	1	5	1	1	1		17	6		13
210-219			1	1		1	9	2		12
220-229	2	2	3	3	2		6	2		8
230-239				1	2	1	7	1		4
240-249		1	2	1	2	1	2	6		2
250-259	3		1		2			8		1
260-269		1			1			1		1
270-279	3			1				3		3
280-289	2			2				2		2
290-299		1	1			1				1
300-309	1	1	1	1		1				2
310-319		1	1			1				1
320-329			1		1	2	1			2
330-339		1								
340-349						1	1			
350-359										
360-369						1				
370-379										
380-389						1				
390-399										
>399							1	1		
Totals	100	81	36	55	68	102	88	46		143

[a]Sample site shortened due to high water.
[b]Site 2 not sampled due to high water.

Appendix Table B3. Length-frequency distributions of trout by species and year for lower Fowler Creek samples (N = 3) taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. This stream was previously under a hatchery supported regulation.

Size Class (mm)	Brook Trout			Brown Trout			Rainbow Trout		
	1994	1995	1996	1994	1995	1996	1994	1995	1996
<50				1					
50-59	3		1			3			
60-69	3	1	4		4	24			
70-79	1	2	4		17	31			
80-89		5	3		13	17			
90-99					10				
100-109									
110-119	2								
120-129	2	2		1					
130-139	1			4	1				
140-149				2	2				
150-159		1		4		6			
160-169		1	1		2	2			
170-179	1			1	5	5			
180-189				5	1	3			
190-199			1	6	3				
200-209	1		2	2		1			
210-219				1	6				
220-229				2	5	2			
230-239					1	1			
240-249					3	3			
250-259				1	1	1			
260-269					3				
270-279					1	1			
280-289									
290-299									
300-309									
310-319					1				
320-329									
330-339									
340-349									
350-359									
360-369									
370-379									
380-389									
390-399									
>399									
Totals	14	12	16	30	79	100			

Appendix Table B4. Length-frequency distributions of trout by species and year for Jarrett Creek samples (N = 3) taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation.

Size Class (mm)	Brook Trout			Brown Trout			Rainbow Trout		
	1994	1995	1996	1994	1995	1996	1994	1995	1996
<50				1	4		7	4	8
50-59				4	24			3	
60-69					4				
70-79							1		
80-89							6	1	
90-99							8	2	1
100-109							9	5	6
110-119				3		2	5	3	10
120-129				4	1	5	6	12	6
130-139				2	3	4	5	4	4
140-149					2	5	2	5	3
150-159					1	2	3		3
160-169					1	1	6	4	1
170-179				3	1		3	1	3
180-189				3	1	3	3	3	2
190-199				3	2		4	5	3
200-209				1	2	1	1	1	2
210-219					1			1	1
220-229				1				2	
230-239				2	2	1			
240-249					1				
250-259					1			1	
260-269					1				
270-279						1			
280-289									
290-299					1				
300-309				1					
310-319									
320-329									
330-339				2					
340-349									
350-359					1				
360-369									
370-379									
380-389									
390-399									
>399									
Totals				30	54	25	69	57	53

Appendix Table B5. Length-frequency distributions of trout by species and year for Long Creek samples (N = 2) taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation.

Size Class (mm)	Brook Trout			Brown Trout			Rainbow Trout		
	1994	1995	1996	1994	1995	1996	1994	1995	1996
<50							7	23	29
50-59								5	3
60-69									
70-79									
80-89									
90-99									2
100-109							8		13
110-119							12		17
120-129							8	5	17
130-139							5	9	11
140-149							2	9	8
150-159							7	9	1
160-169							3	4	2
170-179							2	3	3
180-189							1	4	1
190-199								1	2
200-209							1		
210-219							1	3	
220-229									
230-239									
240-249									
250-259									
260-269									
270-279									
280-289									
290-299									
300-309									
310-319									
320-329									
330-339									
340-349									
350-359									
360-369									
370-379									
380-389									
390-399									
>399									
Totals							57	75	109

Appendix Table B6. Length-frequency distributions of trout by species and year for Scotsman Creek samples (N = 3) taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation.

Size Class (mm)	Brook Trout			Brown Trout			Rainbow Trout		
	1994	1995	1996	1994	1995	1996	1994	1995	1996
<50	7			1					
50-59	7	4	6			2			
60-69	1	17	22		1	14			
70-79		15	16	1	4	16			2
80-89		3			11	11			
90-99	5	1	1		5				1
100-109	4	1	4		2				
110-119	3	7	10		1				
120-129	4	6	2				2		
130-139	1	3	5						
140-149		2	3		1				
150-159		4	1			1			
160-169	2	3		1		4			
170-179			2			3			
180-189		1	2	1	2	1			
190-199		2		1	1	1			
200-209				2		3			
210-219									
220-229				2					
230-239				1					
240-249									
250-259									
260-269									
270-279									
280-289					2				
290-299									
300-309									
310-319									
320-329									
330-339									
340-349						1			
350-359									
360-369									
370-379									
380-389									
390-399									
>399									
Totals	34	69	74	10	30	57	2		3

Appendix Table B7. Length-frequency distributions of trout by species and year for Tellico Creek samples (N = 3) taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation. The representative reaches sampled for this drainage were actually located on tributaries, 1 on Sugar Cove Creek and 2 on Rhinehart Creek.

Size Class (mm)	Brook Trout			Brown Trout			Rainbow Trout		
	1994	1995	1996	1994	1995	1996	1994	1995	1996
<50	1	6	5					2	4
50-59		12	9					3	
60-69			1						
70-79	1								
80-89	8	1	2						
90-99	8		7				3		
100-109	6	3	6				5		1
110-119	2	4					8		5
120-129	5	3	2				4	2	2
130-139	2	8	7				1	1	
140-149	1	1	1				3	4	
150-159			1					2	
160-169							1		2
170-179								3	1
180-189	2	1					2		
190-199								1	
200-209									1
210-219									
220-229									
230-239									
240-249									
250-259									
260-269									
270-279									
280-289									
290-299									
300-309									
310-319									
320-329									
330-339									
340-349									
350-359									
360-369									
370-379									
380-389									
390-399									
>399									
Totals	36	39	41				27	18	16

Appendix Table B8. Length-frequency distributions of trout by species and year for Tellico River samples (N = 2) taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation.

Size Class (mm)	Species and Year								
	Brook Trout			Brown Trout			Rainbow Trout		
	1994[a]	1995	1996	1994[a]	1995	1996	1994[a]	1995	1996
<50			1				4	10	5
50-59		3	3				1	3	1
60-69		1	1					3	
70-79		3							
80-89									
90-99									
100-109							2	3	3
110-119							6	5	6
120-129							13	16	12
130-139			1				14	17	16
140-149							11	17	9
150-159							14	16	9
160-169							7	12	13
170-179							4	9	9
180-189						1	9	8	5
190-199							5	2	3
200-209							5	2	3
210-219							1	2	3
220-229							3	3	4
230-239								1	2
240-249								1	
250-259									
260-269									
270-279									
280-289									1
290-299									
300-309									
310-319									
320-329									
330-339									
340-349									
350-359									
360-369									
370-379									
380-389									
390-399									
>399									
Totals		7	6			1	99	130	104

[a]In 1994 turbid water, inexperienced help, and electrofisher malfunction resulted in less than optimum sampling efficiency for both sites.

Appendix Table B9. Length-frequency distributions of trout by species and year for Turtle Pond Creek[a] samples (N = 3) taken as part of a study to evaluate the effect of using natural baits in waters under a wild trout regulation.

Size Class (mm)	Species and Year								
	Brook Trout			Brown Trout			Rainbow Trout		
	1994	1995	1996	1994	1995	1996	1994	1995	1996
<50	3	2	5	1		1	2	2	
50-59	1	19	4	1	4	5		1	
60-69		14	3		8	4			
70-79		3			7				
80-89		1			2				
90-99	6	1	4				1		
100-109	8	4	2						
110-119	5	2	4						
120-129	1	2	2				3	2	2
130-139	2	2		2	1	2		7	2
140-149	1	1	2	9		3	1	10	
150-159	3	2	1	2	2	8	5	5	1
160-169	2	3		3	1	13	2	2	2
170-179		3	1	1	3	4	3	2	3
180-189		4			1	1			2
190-199	1			3	1	1	3	1	5
200-209			1	4	4	1		2	3
210-219		1		4	2	2			2
220-229				1	1	1	1	1	
230-239					2	1			
240-249					3	1			
250-259					2				
260-269					1	2			
270-279						1			
280-289						1			
290-299						2			
300-309						1			
310-319									
320-329									
330-339									
340-349									
350-359									
360-369									
370-379									
380-389									
390-399									
>399									
Totals	33	64	29	31	45	55	21	35	22

[a]One sample site was located on Piney Knob Branch, a tributary of Turtle Pond Creek. Only brook trout were captured at that site.