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Evaluation of a 20 - inch Minimum Length Limit on Largemouth Bass at Smoky Valley Lake

by

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ABSTRACT

Due to deteriorated access, Smoky Valley Lake was essentially inaccessible to boat angling from 1984-1989, at which time an increase in the largemouth bass population occurred that resulted in good length distribution of fish up to 22-inches long. In order to maintain this population structure, a largemouth bass regulation consisting of a 20-inch minimum size limit, 1 fish creel, and angling during daylight hours only was adopted in 1990. There has been no significant difference in catch rates of largemouth bass by size class within the lake compared to that found in 1989, indicating that the regulation is working. There has been a slight decline in catch rates of largemouth bass longer than 15 inches, however. Relative weight values for larger size bass have shown a decline. Growth rates for largemouth bass remained largely unchanged. Largemouth bass catch rates, for all years and size classes, were found to be significantly higher during post-regulation years as compared to pre-regulation years, except for ≥20-inch fish that had no significant difference. There has been no significant difference in bluegill catch rates by year and size class (total number, 3-5.9 in, and ≥6 in) since 1989. A significantly higher population was found in total number and 3-5.9 inch bluegill since 1989 compared to before, but there was no significant difference comparing pre-and post-regulation years regarding ≥6-inch bluegill catch rates. An opinion survey in 1990 showed that most anglers were in favor of the 20-inch size limit regulation for largemouth bass at Smoky Valley Lake.

INTRODUCTION

Smoky Valley Lake (36 acres) was sampled sporadically prior to 1978 due to poor access by vehicle. During 1984 sampling, the access road to the lake was almost impassable. Sampling was discontinued at this lake until 1989. On 16 May 1989, Kentucky Department of Fish and Wildlife Resources (KDFWR) personnel were able to get to the lake due to a new access road and ramp to electrofish at night for the first time since 1984. An impressive population of largemouth bass, 2-22 inches long, were found. Due to poor access, a relative unexploited bass fishery had developed.

Because of improved access in 1989, the KDFWR was concerned that the bass fishery would soon be exploited to levels found in earlier years that resulted in relatively few largemouth bass longer than 12 inches with the existing 12-inch limit. In order to prevent overharvest and to sustain this excellent population, a "trophy" largemouth bass regulation consisting of a 20-inch minimum length limit with a daily and possession limit of one bass, sunrise-to-sunset fishing only, was recommended. This regulation, after public input, was adopted and implemented beginning in 1990. From 1978 until 1990, there was a 12-inch minimum length limit. Prior to this, a 10-inch minimum size limit for largemouth bass at Smoky Valley Lake (10 creel and possession limit) corresponded to statewide regulations for black bass. Because larger bass had become established in the lake, the population would not need several years to expand with the new regulation and could immediately provide a high quality fishery with potential for catching trophy-size bass.

Fox (1975) stated that size limits appear to be the only method of regulation that have the potential to directly and predictably affect the population of largemouth bass and forage fish. As pointed out by Parsons (1957), Anderson (1975), Glass (1974), Champeau and Denson (1987), Gigliotti and Taylor (1990), and others, without compliance and understanding by the angling public, many of the expected benefits of restrictive regulations and/or catch-and-release fishing are lost and an unpredictable, inconsistent fishery may develop. Compliance is particularly important at a small lake such as Smoky Valley Lake where the largemouth bass population is relatively small and over exploitation could easily occur.

Among the purposes of increased size limits on largemouth bass are to enhance recruitment, reduce fishing mortality, and improve catch of quality-size ($\geq$12-in) bass; this conveniently occurred at Smoky Valley Lake because of poor access to the lake for several years. The primary goal of the new regulation at Smoky Valley Lake was to maintain an already protected population due to poor access. The catch-and-release aspect of a 20-inch minimum length limit for largemouth bass at Smoky Valley Lake should not show any adverse impacts to the overall bass population due to catch-and-release mortality. Results from studies by May (1972), Shramm, et al. (1978), Burkett, et al. (1986), and others have shown largemouth bass to be quite tolerant to multiple recapture if released immediately.

Kornman (1990) discussed studies dealing with size restrictions for managing predatory fishes, primarily largemouth bass. Although various regulations in several states exist that protect black bass up to or near trophy size (personal communication), to date, there are few published studies concerning $\geq$18-inch size limits or catch-and-release fishing regulations. Although Barnhart (1989)

noted the increased use of catch-and-release regulations in non-trout fisheries, particularly for black bass, only 5 of 23 papers at a 1987 symposium on catch-and-release fishing were devoted to black bass.

Powell (1975), discussing the results of a 5-lb minimum size limit on largemouth bass in an Alabama public lake (94 acres), only mentioned how well this type of regulation was received by the public, with no definite conclusions. An 18-inch minimum size limit (artificial lure only) regulation was imposed on four unproductive lakes harboring a delicately balanced virgin population of abundant smallmouth bass in Michigan (Clady et al. 1975). This regulation was imposed to minimize the high rate of exploitation that usually occurs once word gets out regarding an exceptional fishery. These authors were astounded by the disappearance of large fish in three of the four lakes the very first year the population was re-sampled. Van Horn et al. (1981) suggested that an 18-inch minimum size limit for largemouth bass may be useful in increasing PSD values for bass stocks which have been depressed due to angling pressure and for protecting a newly developed fishery from heavy initial exploitation. Reporting on a catch-and-release regulation for largemouth bass in a Florida lake, Champeau and Denson (1987) found a rapid decline in the largemouth bass fishery soon after public fishing was allowed. They determined that the high vulnerability of the largemouth bass population resulted in a fishery so fragile that even a low rate of non-compliance had a significant impact. After the decline in the bass population the first year of public fishing at this lake, the bass stocks recovered, but fishing success remained depressed even though the catch rates were still indicative of quality fishing.

This report is the culmination of several years of sampling since the 20-inch size limit regulation went into effect in 1990 at Smoky Valley Lake. The following goals and objectives were set:

Goals:

(1) Prevent overharvest of largemouth bass.
(2) Develop an exceptional, high quality, catch-and-release fishery for 12.0-19.9 inch largemouth bass.
(3) Provide a "trophy" largemouth bass fishery for ≥20-inch bass.

Objectives:

(1) Fishery success (no./hour) for catching ≥12-inch and ≥15-inch largemouth bass is expected to be among the best in the state.
(2) Harvest of "trophy" size (≥20-in) largemouth bass is expected to be among the best of all lakes on a per-acre basis.
(3) The length distribution of largemouth bass should be maintained to resemble the size structure of bass sampled in the spring of 1989; an improvement in the PSD value is expected by being within the desired range of 40-60%.
(4) Population density (fish/hour) of ≥15-inch largemouth bass should be similar to that at found in the spring of 1989.
(5) The density and length distribution of quality-size (≥6-in) bluegill are expected to increase.

Potential problems:

(1) Non-compliance by anglers.
(2) Angler dissatisfaction.
(3) Decline in the density of ≥12-inch bass due to non-compliance by anglers and possible increases in natural mortality and hooking mortality.

STUDY SITE

Smoky Valley Lake (Figure 1) is located within Carter Caves State Park in north-central Carter County. The Park lies in the northern portion of the Eastern Coal Field. The area surrounding Carter Caves State Park contains caves, cliffs, rocky gorges, natural bridges, overhanging ledges, sinking creeks, sink holes, springs, stream-less valleys, and other unique features. The hills and ridges within the Eastern Coal Field are capped by cliff forming sandstone known as Lee sandstone, formed during the Pennsylvanian Period. Elevations range from 700 ft in the valley of Tygarts Creek to ca 1,100 ft on the high ridges. Underlying these sandstone rocks, along the sides and bottoms of the valley, are layers of limestone belonging to the Mississippi Period. These limestones that formed Carter Caves, and nearby Cascade Caves, are among the same limestones that formed the main part of Mammoth Cave (McGrain 1966).

Smoky Valley Lake (36 acres) lies at 715 ft msl at normal pool. This lake was constructed down in a difficult to reach valley on Smoky Creek in 1953 and opened for fishing in 1955. The lake has 428 acre-ft capacity and its watershed is 8,297 acres, consisting of 35% agriculture and 65% silviculture. The lake has a maximum depth of 29 ft and a mean depth of 9.6 ft (DOW 1984). The mean Carlson TSI (Chlorophyll-a) value (DOW 1986, 1988, 1990, 1992) is 45, indicating mesotrophic conditions. The dam to Smoky Valley Lake is only a short distance upstream from Smoky Creek's confluence with Tygarts Creek (at ca Tygarts Creek mi 66, mi 0 being the mouth) in an area called "Devils Backbone".

The principal forage species in the lake are bluegill and longear sunfish. Brook silverside, although not in large numbers, are also found in the lake and are probably bass forage as well. In addition to largemouth bass and bluegill, Table 1 shows the other species of fish which inhabit Smoky Valley Lake that have been sampled over the years. The most abundant species in the lake, numerically, are bluegill, largemouth bass, longear sunfish, green sunfish, brook silverside, channel catfish (stocked annually), yellow bullhead, grass pickerel, and carp. The other species shown in Table 1 exist in relatively low numbers and are occasionally sampled.

The extreme upper end of the lake has filled in with detritus and sediments, forming "sediment islands". The shallows along the shoreline are vegetated with emergents such as cattail (*Typha latifolia*) and water willow (*Justicia americana*), with *Carex spp*, *Scirpus spp*, and *Sagittaria spp* intermixed. Submergent aquatic vegetation is composed of curly leaf pondweed (*Potamogeton crispus*), elodea (*Elodea canadensis*), and *Chara* spp. intermixed. Arising from the bottom, shallow areas are patches of water shield (*Brasenia schreberi*). Most of Smoky Valley Lake is steep sided and vegetation is confined mostly near the shore. Emergent vegetation, primarily water willow, rarely grows out more than 3-5 ft into the lake from the shore and is found growing nearly around the

entire shoreline. A colony of beaver resides at the lake, providing fish habitat in the form of fallen trees, submerged food caches, and an old beaver lodge.

The only access to the lake is a steep road to the boat ramp and a walkway down a flight of stairs to the old beach house, now a boat rental area. Bank fishing is extremely limited due to the steep terrain along the lake.

METHODS

Nocturnal electrofishing was carried out, when possible, once during mid-May to mid-June in 1980-1993; in 1978 and 1979, sampling was carried out in July. Prior to 1979, sampling was executed during daylight hours only and, generally, fewer fishes were found; data from these years will not be considered here. Up until 1984, fish collected were measured by inch group only. Exact measurements of largemouth bass were recorded in 1989 and thereafter. All other fishes sampled were measured by inch class after 1989, except for bluegill when scales were taken, at which time exact measurements were recorded.

Electrofishing was performed to assess trends in length frequency, relative abundance, and catch per effort (CPUE) for all species. Length-frequency information was used to determine proportional and relative stock density values (PSD and RSD_{15}) for largemouth bass and bluegill (RSD_8; Anderson 1976, Anderson and Gutreuter 1983). In 1990, the lake was sampled on May 16 and 17. The first night, all captured $\geq$12-inch largemouth bass were fin clipped; the second night was used for recapture information to perform a simple Petersen mark-and-recapture population estimate. From 1989-1993, all $\geq$20-inch largemouth bass, no matter when sampled, were tagged with a Floy spaghetti tag to obtain harvest rate information.

A non-parametric Mann-Whitney test was performed on pre- (1979-1984) and post- (1989-1994) 20-inch size limit sampling data for both largemouth bass and bluegill by size category. Largemouth bass size classes were total, $\leq$7.9, 8-11.9, 12-14.9, 15-19.9, and $\geq$20 inches; for bluegill, they were total, 3-5.9, and $\geq$6 inches. Spearman's rank correlation coefficient analysis was run (0.05 level of significance) for post-regulation data by year and CPUE by size class for largemouth bass and bluegill.

Age and growth were determined with scale samples (5-10/inch class) from largemouth bass and bluegill during either spring or fall electrofishing. The Frasier-Lee intercept method was utilized to ascertain age and growth. An intercept value of 1.84 was used for largemouth bass aged in 1981 and 1989; for those bass aged in 1990-1993, an intercept value of 1.62 was utilized. For aging bluegill, an intercept value of 1.32 was employed. Year classes were assigned to largemouth bass CPUE data using length at age relationships obtained from age and growth and electrofishing length-frequency data; regression models were determined by SAS. However, only mean lengths at age by year are shown in this report. Survival and mortality estimates were obtained form age composition data using the Robson-Chapman Method (Ricker 1975). Only 1990 and 1993 data could be used. The lake was electrofished during the fall in order to obtain length-weight relations for Relative Weight values (W_r-Wege and Anderson 1978) on largemouth bass.

During March-October of 1990 and 1991, a non-uniform probability creel survey conducted. The creel survey was performed during 4-hour periods, 4 days per week, during daylight hours only (fishing is only allowed during daylight hours). Anglers were interviewed when they had completed fishing. Boat access is limited to a single point; shoreline access is available at two locations. Instantaneous angler counts, during a randomly selected 0.5 hour period during that day's creel, was completed from these two sites. The entire lake can be observed by viewing from these two locations.

RESULTS AND DISCUSSION

Spring Electrofishing

Largemouth Bass

Low numbers of largemouth bass were collected in 1979 and 1980, likely due in part to sampling in July. There was a slow increase in CPUE of all largemouth bass in 1979-1984 (Figure 2). This may partially be attributed to the decline in fishing pressure because of poor access. A dramatic increase in CPUE was noted once the lake was sampled again in 1989 (Table 2).

The protection of virtually the entire largemouth bass population under the 20-inch minimum size limit in 1990-1994 is quite evident when comparing CPUE those years to 1984 and previous years' data (Figures 2-7). Comparing pre- (1984 and earlier) and post- (1989 to 1994) 20-inch regulation values for CPUE according to size classes (Mann-Whitney non parametric test), all size classes of largemouth bass were significantly higher during post-regulation years, except for ≥20-inch long largemouth bass. This size group showed no significant difference in CPUE.

When examining CPUE for post-regulation years 1989-1994 by size classes (Figures 2-7) using Spearman rank correlation coefficient (below), no significant (P=0.05) difference could be found. Thus, it can be presumed that the 20-inch

		Length class (in)				
	Total	≤7.9	8-11.9	12-14.9	15-19.9	≥20
r_s	0.71	0.54	0.09	0.72	-0.52	-0.79
P	0.11	0.27	0.89	0.10	0.29	0.06

r_s - Spearman coefficient.
P - Probability.

minimum size limit is working to maintain the largemouth bass population at similar levels from 1989-1994, with good numbers of ≥12-inch bass. Although the relative number of 15-19.9 inch bass declined after 1990, the decline is not significant. Due to the low numbers sampled from this size class range, largemouth bass over 15 inches in length may be illegally harvested. It will be important to monitor the density of 15-19.9 inch fish in the future to determine if there is any significant change. If this size fish is not protected, there will be few, or no, largemouth bass growing into the ≥20-inch size category.

A Petersen mark-and-recapture analysis was performed during two nights of electrofishing in May 1990 to obtain a population estimate of ≥12-inch

largemouth bass. The first night, all ≥12-inch bass captured (59) were fin clipped. The next night, 14 marked largemouth bass were recaptured and 17 unmarked ≥12-inch bass were collected. Petersen's population estimate was 128 largemouth bass ≥12 inches long (3.6/acre) and 37 largemouth bass ≥15 inches long (1/acre). In 1992 and 1994, the CPUE for ≥12-inch largemouth bass was slightly more than 100; in 1990 and 1993 it was 59 and 45, respectively. In 1979-1984, CPUE for ≥12-inch bass ranged from only 6-36 fish/hour. The CPUE for all sizes of largemouth bass was highest in 1990.

Table 3 shows the percent occurrence of largemouth bass by size class (≤7.9, 8-11.9, 12-14.9, 15-19.9 and ≥20 in). Looking at the mean and means of years in 1980-1984 and 1989-1994, there is relatively little difference except for the mean of 15-19.9 inch largemouth bass from 1989-1994. This value was more than twice the 1980-1984 mean due to the very high value in 1990. The mean percentage of ≥20-inch largemouth bass from the 1980-1984 period reflects only one year's capture of this size fish. Examining the mean number (CPUE) from these periods by size class, it becomes more apparent that the lake supported many more largemouth bass in 1989-1994 than years previous to this, as shown below.

	Length class (in)				
	<7.9	8-11.9	12-14.9	15-19.9	≥20
Mean fish/hour 1980-1984	14.5	34.2	13.4	1.6	0.8
Mean fish/hour 1989-1994	48.4	102.4	50.5	8.2	1.6

Figures 8 and 9 and Table 6 exhibit proportional stock density (PSD) and relative stock density (RSD) values determined for largemouth bass from spring electrofishing. The mean PSD in 1980-1984 was 32; PSD declined from 65 in 1981 to a low of 9 in 1984. When the lake was once again sampled in 1989, the PSD was 34. The mean PSD from 1989-1994 was 36, with a low of 16 recorded in 1991 and a high of 51 in 1992. The change in PSD values over the years has fluctuated, but the mean for all years (34) is similar to the mean from pre- and post- regulation years. Numbers of stock-size (≥8-in) largemouth bass has been good every year since 1989. There have been large fluctuations in numbers of 12-14.9 inch bass, particularly in the 12- and 13-inch classes. The mean RSD_{15} value from 1980-1984 was 5.4. The mean RSD_{15} for 1989-1994 was 6.4; the RSD_{15} for each of the last 4 years was similar, but the 4-year mean was only 3.9. A decline in ≥15-inch bass occurred in 1991-1994 compared to 1989-1990. A comparable trend was observed for RSD_{18} values (Table 6). The highest RSD values recorded at Smoky Valley Lake were in 1989, the year the lake was once again sampled after a 5-year absence. The CPUE values for ≥15- and ≥18-inch bass were highest, however, in 1990.

In 1990-1994, seven ≥20-inch largemouth bass were tagged during spring electrofishing. During that time, no bass of this size were captured during fall electrofishing. Three of the seven tagged bass have been reported creeled by anglers as shown below. Another tagged bass was recaptured electrofishing a year after it was tagged. Lengths of bass when harvested are provided by anglers and are shown in parentheses.

16 May 90 - 20.8 inches when tagged.
10 April 91 - harvested (21 in).

16 May 90 - 20.0 inches when tagged.
10 April 91 - harvested (20 in).

14 May 92 - 22.0 inches when tagged.
03 October 92 - harvested (23.5 in).

Bluegill

Bluegill are an important element of the fishery at Smoky Valley Lake; particularly now that the largemouth bass fishery is essentially catch-and-release. Catch rates and length frequencies of bluegill electrofished in the spring of 1979-1994 are shown in Table 4. An incredibly high CPUE (826 fish/hour) for bluegill occurred in 1990; there is no explanation as to why so many were captured this year compared to other years. This may indicate that the CPUE for this species was underestimated most years. Using the Mann-Whitney (non-parametric) test to compare pre-1989 to post-1989 data for bluegill, there is a significantly higher CPUE for the total population since 1989 (Figure 10). Figure 11 compares the CPUE of 3-5.9 inch bluegill over the years; their numbers were also significantly higher since 1989. No significant difference was found comparing pre-and post-1989 CPUE values for ≥6-inch bluegill (Figure 12). Mean CPUE for 1979-1984 was 50; from 1989-1994, the mean CPUE was 69 (w/o 1990; mean = 46). Comparing the post-1989 data using Spearman correlation coefficients, there was no significant difference by year when looking at the different size classes as shown below.

		Length class (in)	
	Total	3-5.9	≥6
r_s	-0.26	-0.26	-0.03
P	0.62	0.62	0.96

The proportion, by percent, of ≥6-inch bluegill to 3-5.9 inch bluegill was nearly 50:50 (53.1 to 46.9%) from 1979-1984 (Table 5), while a higher percentage of bluegill (73.5%) were within the 3-5.9 inch range (26.5% ≥6 in) during 1989-1994. This is reflected in the PSD and RSD_s values (Table 6 and Figures 13 and 14).

Proportional stock density values for bluegill were generally high from 1979-1984; the mean PSD was 47 for these years (Table 6), as seen in Figure 13. The mean PSD for bluegill from 1989-1994 was 27 (Table 6); all values were within the desired 20-40% range (Figure 13). When examining the RSD_s values, 1979 and 1981 stand out as years with a high percentage of ≥8-inch bluegill (Figure 14), but these values dropped significantly after 1981 to zero in 1984. Values for RSD_s (Table 6) remained low from 1989-1994, all below the desired 5-20% range, except for 1992 when the RSD_s was 5. The mean RSD_s value from 1989-1994 was 1.9; it was 7.1 in 1979-1984 (Table 6).

Fall Electrofishing

Largemouth Bass

Table 7 indicates the Wr values for several size classes of largemouth bass sampled during the fall in 1981-1993. The Wr values for 8-11.9 inch bass were

high and within the desirable range of 90-100 during 1981 and 1982, but remained at or near 90 from 1989-1991 (mean = 88.6). The Wr values for 12-14.9 inch bass steadily dropped from 91 in 1989 to 81 in 1992, but increased somewhat in 1993 to 86 (1989-1993, mean = 84.8).

Wege and Anderson (1978) stated that ≥15-inch bass often have high Wr values, and attributed this to food not being a limiting factor due to low relative numbers of this size fish in most systems. In Smoky Valley Lake, the sample size of ≥15-inch bass was generally too small to make an accurate determination of Wr. Obtaining an adequate sample size of ≥15-inch fish is difficult in this region of Kentucky, particularly in small lakes. Catch per effort for ≥15-inch bass tended to be greater from spring electrofishing compared to fall CPUE. No ≥20-inch bass were sampled during the fall since 1989.

Relative weight values for all size classes sampled in 1993 were higher than they had been in several years; hopefully this trend will continue in the future. Wege and Anderson (1978) suggest that a Wr of 95-100% indicated good productivity and habitat. The Wr values exceeded 95 at Smoky Valley Lake only in 1981 and 1982 for 8-11.9 inch bass, and in 1989 for ≥15-inch bass. Anderson and Gutreuter (1983) indicated when mean Wr values are well below 100 for a size group, problems exist in food and feeding relationships. With large numbers of bass being protected under the 20-inch size limit, very few of the bass sampled "appear" unhealthy. When comparing largemouth bass length-weight data for ≥15-inch bass from Smoky Valley Lake to the averages generated from all lakes in Kentucky, most of the larger bass tended to be above the average weight for that size in 1989-1990. In recent years, the weight for the majority of the bass was below the average given for that size, but well above the minimum.

Age and Growth

Largemouth Bass

Largemouth bass reach 12 inches long by age 4, 15 inches by age 6, and 20 inches long by age 10 (Table 8). This holds true for both pre- and post- 20-inch size limit years. A 20.7-inch largemouth bass (tagged) was captured a year later at 21.5 inches in length for a growth of 0.8-inch during this time span. These are fairly typical growth rates for this region of Kentucky. Kornman (1990) found that largemouth bass reached 12 inches long at age 4 under a 12-inch minimum size limit and age 4 under a 15-inch minimum size limit at nearby Grayson Lake. Largemouth bass grew to 15 inches long at age 5 under both regulations. In one of the newer and more fertile reservoirs in the state, Taylorsville Lake, Buynak (1991) found largemouth bass to attain 12 inches at age 3 and 15 inches long at age 5. At one of the more fertile state managed lakes in the Northeastern Fishery District, Lake Wilgreen, largemouth bass growth rates were 12 inches long at age 3 and 15 inches at age 5.

Mortality rates could be determined for 2 of the years from which age and growth data were collected from spring sampling, 1990 and 1993. Sample sizes per age allowed mortality estimates to be determined only for ages 3-5 in 1990. For 1993, survival was estimated to be 51.9% (total mortality = 48.1%). For those age classes which mortality could be determined in 1990, survival rate was only 30.9% (total mortality = 69.1%).

Bluegill

Age and growth data were available from bluegill for 3 years - 1981, 1992, and 1993. Based on mean growth rates by year and for all 3 years, bluegill reached 6 inches long at age 3; by age 5, bluegill grew to 8 inches (Table 9). This is quite comparable to what was found in Lake Wilgreen, where bluegill grew to 6 inches by age 3 and 8 inches by age 5.

Creel Surveys

The results of a non-uniform probability creel survey conducted at Smoky Valley Lake from March-October 1990 and 1991 can be seen in Tables 10-15. Fishing trips (2,812 in 1990 and 3,007 in 1991) and fishing pressure (10,806 hours in 1990 and 10,879 hours in 1991) were similar both years. In both years, the majority of anglers were male residents of Kentucky, fishing from a boat. In 1990, most anglers indicated casting as the preferred method of fishing, with the majority of anglers fishing for largemouth bass (Tables 10 and 11). In 1991, still fishing was the preferred method and most anglers were fishing for anything (Tables 10 and 12). During 1990, 1,285 largemouth bass were caught; none were 20 inches long or longer (Table 11). In 1991, 1,151 largemouth bass were caught (Table 12). Twenty-nine ≥20-inch bass were estimated creeled; this was expanded from only 2 fish of this size that were recorded from interviews. This is an unrealistically high estimate. When a bass this size is caught, word generally gets out; the creel clerk did not hear of too many more largemouth bass being caught than the fish he recorded.

The majority of fishes caught and harvested both years were bluegill (Tables 11 and 12). The average size bluegill kept was 6.5 inches long in 1990 and 6.1 inches in 1991. Forty-eight percent of the fishing trips in 1990 (Table 11) were for largemouth bass, 22.7% of the trips were for bluegill, and 27.6% of the trips were for anything. Fishing for crappie and catfish made up the remainder. In 1991, 34.1% of the trips were for anything, 33.2% for largemouth bass, 26.8% for bluegill, and 4.1% for catfish (Table 12).

At Smoky Valley Lake, the catch-and-release aspect for largemouth bass is extremely important since bass harvest is going to be very limited. As discussed by Clark (1983), the voluntary release rate is an important element in obtaining the benefits of a catch-and-release fishery. With a 20-inch minimum length limit at Smoky Valley Lake, anglers have the opportunity to catch ≥12-inch bass in numbers that they previously could not when the size limit was 12 inches. Tables 13 and 14 show the large numbers of ≥12-inch bass that were caught and released. In other heavily fished small public lakes in Kentucky, there are not as many largemouth bass longer than 12 inches due to the 12-inch limit and harvest of ≥12-inch bass. Illegal harvest of largemouth bass could negate the unique opportunity provided by the catch and release aspect of the 20-inch limit as pointed out by Gigliotti and Taylor (1990), especially in a small lake such as Smoky Valley Lake.

The two ≥20-inch largemouth bass recorded from interviews in 1991 averaged 20.5 inches long; both of these bass had been tagged. One of these fish was tagged on 16 May 1990 and creeled 10 April 1991; the second was also tagged on 16 May 1990 (20.0 in long) and caught on 10 April 1991. Although no ≥20-inch largemouth bass were creeled in the 1990 survey, the creel clerk heard of three being harvested; one report was thought to be reliable.

The average length of the 1,285 largemouth bass caught and released in 1990 was 10.8 inches. In 1991, the average length for largemouth bass caught and released was 12.6 inches. There were 1,106 largemouth bass caught and released in 1991 (Table 15). In addition, 15 largemouth bass were caught and released that were ≥20 inches long; this number is expanded from only one fish that was recorded from interview data. Tables 16 and 17 compare largemouth bass angling success by month in 1990 and 1991.

While performing the creel survey at Smoky Valley Lake in 1990, the creel clerk asked anglers three questions: (1) Do you like the idea of a trophy largemouth bass regulation with a 20-inch minimum size, one creel limit? Sixty-seven percent of the anglers were in favor of this regulation, 19% replied no, and 14% had no opinion (Table 18). (2) Do you favor having such a trophy regulation at this lake? Seventy-three percent said yes, 14% said no, and 13% had no opinion. (3) Are you fishing this lake because you heard about the trophy bass regulation? Thirty-four percent of the anglers fished the lake because of the regulation. The most difficult thing about creel surveys is obtaining good data regarding fishing quality. Anderson (1975) and Fox (1975) do an excellent job of discussing this aspect of a fishery, except most qualitative factors cannot be measured. Anglers need to be asked their opinions in addition to what they caught. To measure success of fisheries management techniques, quantative, measurable responses on opinions are needed. As fishery managers, we tend to put too much emphasis on harvest.

Summary of Objectives

The following objectives were established for the 20-inch size limit when proposed for Smoky Valley Lake in 1989. With each objective is a summary of whether or not the objective was accomplished.

(1) Fishing success (no./hour) for catching quality size (≥12-in) and preferred-size (≥15-in) largemouth bass is expected to be among the best in Kentucky.

Since a creel survey was only conducted during 1990 and 1991, it is difficult to say what the current (1994) creel status is at Smoky Valley Lake; however, when comparing 1991 creel survey results from other lakes that have either a 12- or 15-inch size limit and were surveyed in Kentucky during 1991, the following catch rates by bass anglers for largemouth bass (included all largemouth bass harvested and caught and released by bass anglers) were reported:

Catch rate (fish/ hour)	Barren River Lake	Carpenter Lake	Carr Fork Lake	Green River Lake	Herrington Lake	Kincaid Lake	Mauzy Lake	Nolin River Lake	Taylorsville Lake	Smoky Valley Lake	Spurlington Lake
≥12 in	0.17	0.12		0.11	0.17	0.14	0.05	0.14		0.22	0.16
≥15 in			0.02						0.04	0.06	

The catch rates of ≥12-inch and ≥15-inch largemouth bass at Smoky Valley Lake in 1991 were better than all of the other lakes. This reaffirms, at

least on a per acre or per hour basis, that our smaller lakes can be very important from an angling standpoint.

(2) Harvest of trophy-size (≥20 in) largemouth bass is expected to be among the best of all lakes in Kentucky on a per acre basis.

No largemouth bass were harvested from Smoky Valley Lake during the 1990 creel survey. Expanded 1991 harvest for ≥20-inch largemouth bass from Smoky Valley Lake is compared to the 10 other lakes creeled in 1991. Only one lake had a better harvest per acre.

	Barkley Lake	Barren River Lake	Green River Lake	Herrington Lake	Kentucky Lake	Marion County Lake
Total harvested(≥20 in)	480	361	32	382	2,222	24
Per acre	0.011	0.036	0.004	0.130	0.046	1.143
Total lake acreage	45,600	10,000	8,210	2,940	48,100	21

	Mauzy Lake	Nolin Lake	Taylorsville Lake	Smoky Valley Lake	Spurlington Lake
Total harvested (≥20 in)	32	55	42	29	23
Per acre	0.376	0.009	0.014	0.806	0.639
Total lake acreage	85	5,790	3.050	36	36

(3) The length distribution of largemouth bass should be maintained to resemble the size structure of bass sampled in the spring of 1989; a slight improvement in PSD values is expected by being within the desired range of 40-60%.

Below is the CPUE (fish/hour) for various size classes of largemouth bass sampled during spring electrofishing, comparing 1989 CPUE to those in 1993 and 1994:

	Length class (in)					
Year	≤7.9	8-11.9	12-14.9	15-19.9	≥20	Total
1989	38	75	20	10	3	146
1993	52	88	37	6	0	183
1994	72	104	94	6	1	277

The length distribution of largemouth bass in 1993 and 1994, based on CPUE by length class, has generally been maintained or exceeded that found in 1989, except for 15-19.9 and ≥20-inch bass. Comparing the CPUE for all years (1989-1994) and all size classes, no significant differences were found, indicating that population density and length distribution have been maintained by the 20-inch minimum size limit. There was a slightly significant difference for the CPUE of ≥20-inch bass over the years at the 0.10 level of significance, but not at the 0.05 level. Proportional stock

density values were within the "desired" 40-60% range in 1992 and 1994, but were below the 40% value for all other years.

(4) The population density (CPUE) of ≥15-inch bass should be similar to that found in the spring of 1989.

The CPUE of ≥15-inch bass was lower in 1991-1994 (6-8 fish/hour) than in 1989 when CPUE was 13.

(5) The density and length distribution of quality-size bluegill (≥6 in) are expected to increase.

The CPUE (fish/hour) for ≥6-inch bluegill was not significantly different when comparing size classes (total, 3-5.9, and ≥6 in) by years (1989-1994). There also was no significant difference in CPUE of ≥6-inch bluegill when comparing pre- and post- regulation years.

Potential Problems

When the management plan was drafted in 1989, several potential problems were perceived as follow:

(1) Non-compliance by anglers.

This does not appear to be occurring at a significant level, although there definitely has been a decline in numbers of 15-19.9 inch largemouth bass since 1990. The CPUE has remained consistent since then, however. The success of any restrictive regulation is angler compliance. Angler understanding and education should be one of our more important goals in improving compliance. Without compliance, any expected benefits of the 20-inch size limit would be lost.

(2) Angler dissatisfaction.

According to questions asked during the 1990 creel, anglers were in favor of the regulation. It would be good to ask these questions once again. The only complaint that has been received is in regard to the closure of the lake to fishing from sunset to sunrise. This complaints is chiefly from local catfish anglers.

(3) Decline in the density of ≥12-inch bass due to non-compliance by anglers and possible increases in natural mortality.

This was discussed above for ≥15-inch largemouth bass. As for compliance regarding 12-14.9 inch largemouth bass, there was no significant decline in density for that size fish.

CONCLUSIONS AND RECOMMENDATIONS

The 20-inch minimum size limit accomplished all three goals. Four of the five objectives have been met. It is recommended that the current size and creel limit regulation remain in affect at Smoky Valley Lake. This is the only trophy largemouth bass lake in Kentucky. If the condition of the largemouth bass declines to the point that they look unhealthy, then the regulation may need to

be adjusted to allow an angler to harvest one bass less than 15 inches long and one bass ≥20 inches long. This would protect larger bass while still allowing the harvest of a "trophy" size bass and eliminate some of the competition among the bass.

In response to the petition to open the lake to night fishing by some anglers, this should not be allowed. This petition is primarily from catfish anglers. There are other nearby lakes to night fish. From a largemouth bass management standpoint, night fishing would likely result in increased illegal harvest of largemouth bass. There is some evidence to indicate that some degree of illegal harvest is going on during the current regulation. The Department of Parks would not like to see the lake opened to night angling because, in the past, when it was open at night, there were problems with rowdiness and littering.

A final recommendation is to conduct a creel survey for two years to compare to past surveys. It would be interesting to see if the catch rate is similar to that found in the past surveys. As Burkett, et al. (1986) alluded to, one problem with more restrictive regulations was reduced vulnerability to being caught by bass anglers due to learning and avoidance over time. When the creel survey is run again at Smoky Valley Lake, the design should be altered in order to better creel the anglers. Problems arose regarding the scheduled times for the survey in 1990 and 1991. Counts were generally higher than interviews any given day, indicating few anglers quit fishing during the interview period. This resulted in a relatively low sample of interviewed anglers.

ACKNOWLEDGEMENTS

Over the years I've been sampling Smoky Valley Lake, two persons figure prominently in this endeavor. They are: early years - Albert Surmont, Jr. and in recent years - Frederick Howes, either of whom I would be lost without. Fred also has spent a great deal of time entering data into the computer, generating tables for annual reports, and aging largemouth bass and bluegill for this report. Al Surmont, Jr. and Gerry Buynak also provided statistical information used within this report. For those mentioned above, I especially thank you. Others that deserve acknowledgement for assisting in sampling the lake at one time or another (since 1989) are (in alphabetical order) Reed Fields, Danny Fraley, Mike Hearn, Bill Leitz, and Tim Slone. I also wish to thank Ken Aronhalt for running the creel survey in 1990 and 1991, and assisting in sampling during 1991. I also wish to thank Jim Axon and Benjy Kinman for editing this report, Steve Czajkowski for preparing the figures, Karen Hukill for preparing the tables, and both Karen and Debbie Mann for typing this report.

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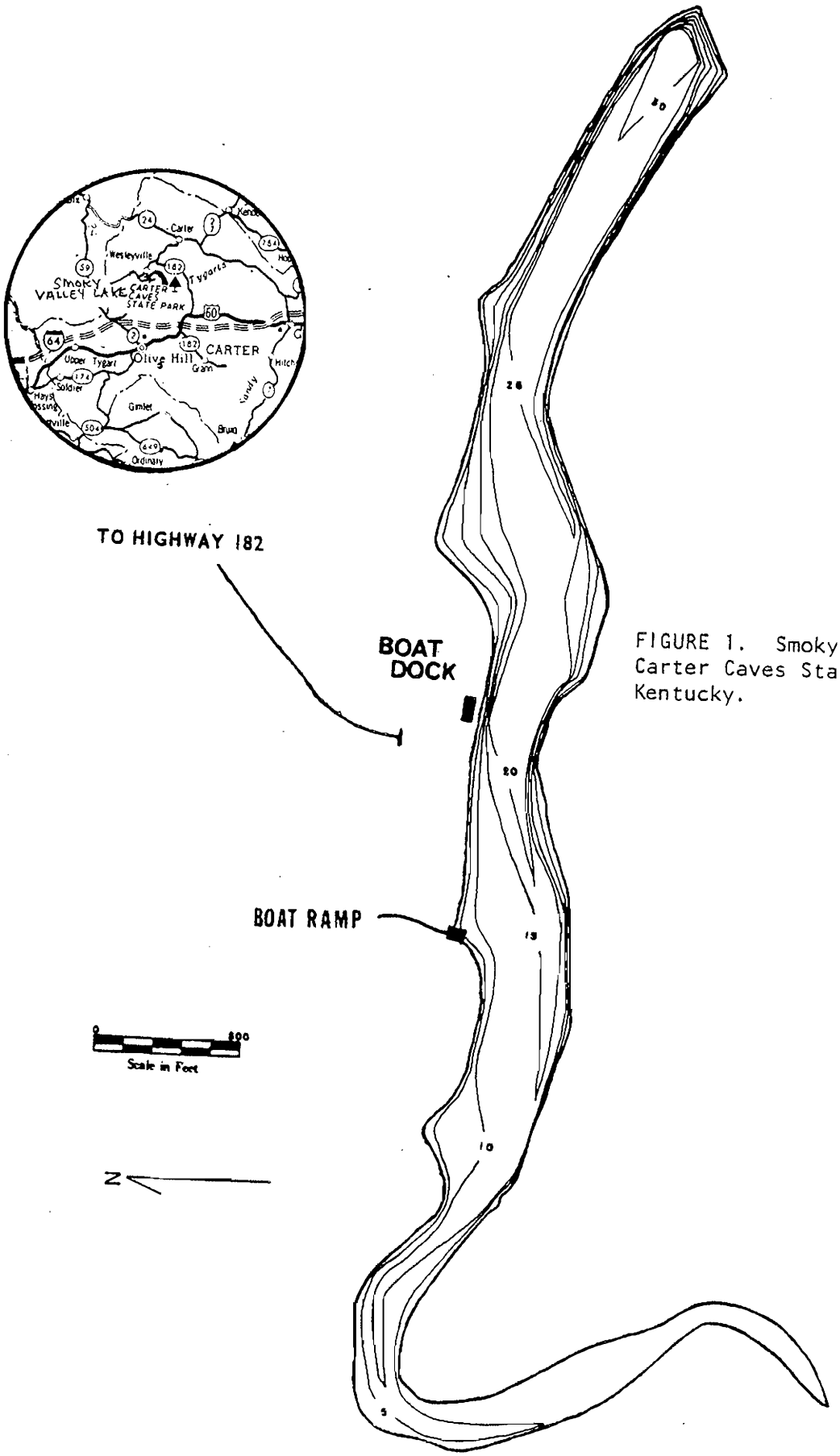

FIGURE 1. Smoky Valley Lake (36 acres) Carter Caves State Park, Carter County, Kentucky.

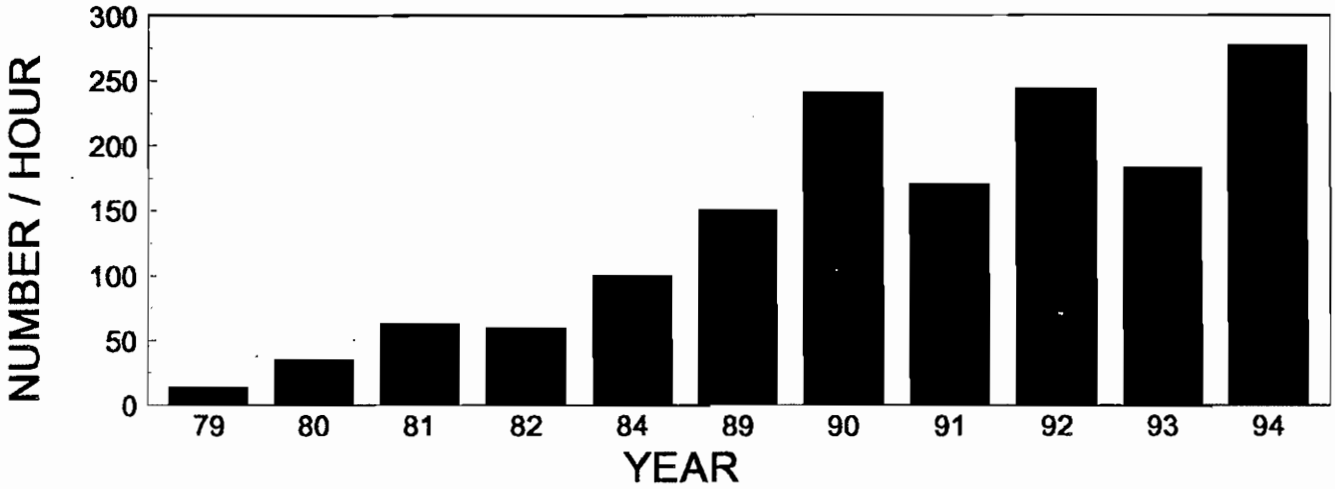

FIGURE 2. Catch per hour of largemouth bass during spring nocturnal electrofishing at Smoky Valley Lake.

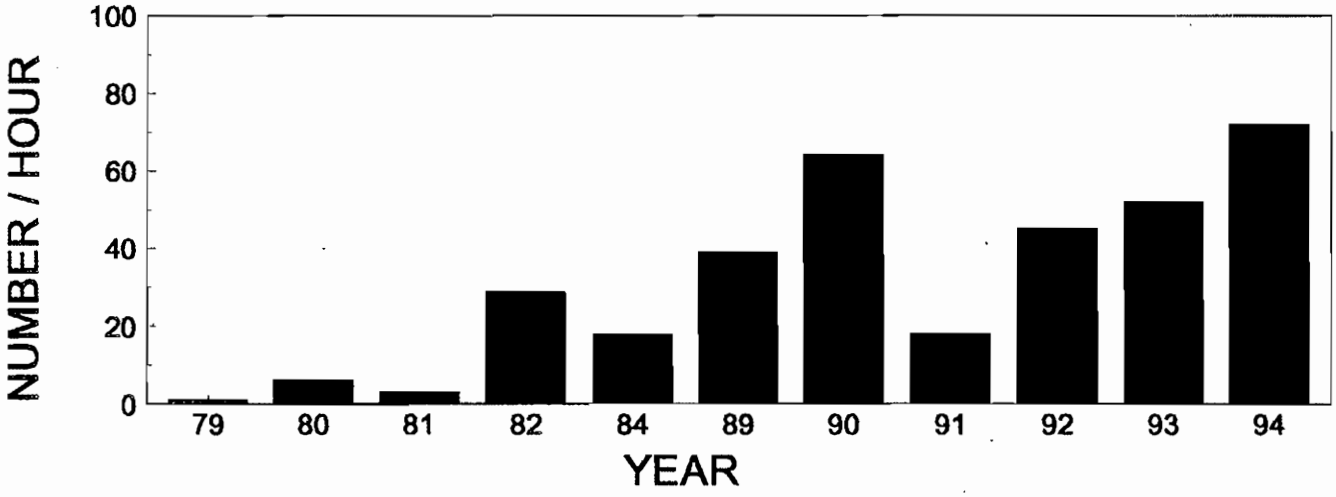

FIGURE 3. Catch per hour of < 8 inch largemouth bass during spring nocturnal electrofishing at Smoky Valley Lake.

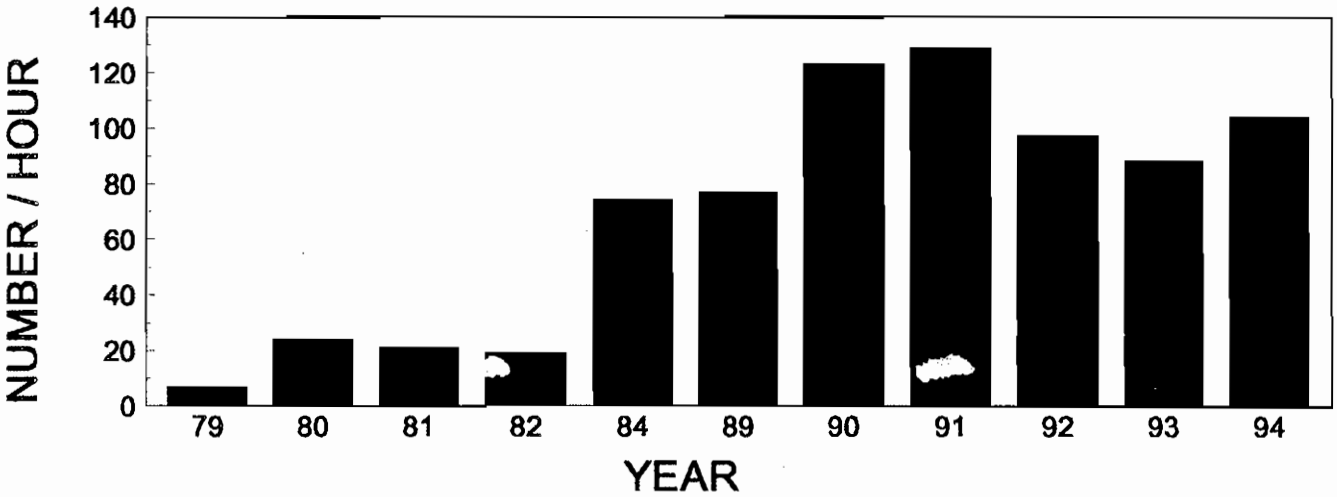

FIGURE 4. Catch per hour of 8-11.9 inch largemouth bass during spring nocturnal electrofishing at Smoky Valley Lake.

* 1979-1984 - Inch Group; 1989-1994 - Inch Class

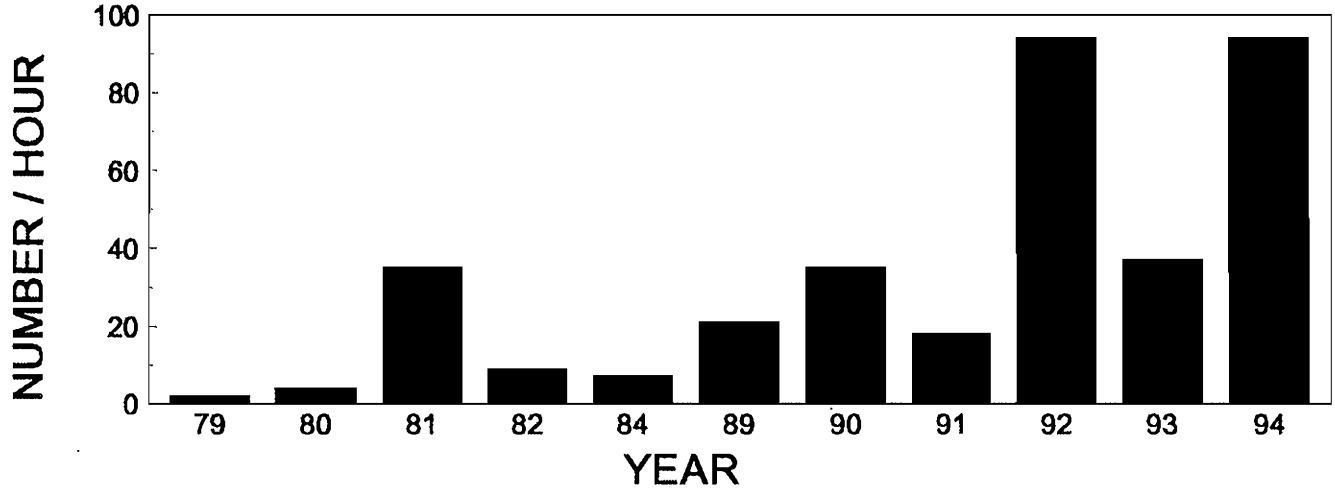

FIGURE 5 . Catch per hour of 12-14.9 inch largemouth bass during spring nocturnal electrofishing at Smoky Valley Lake..

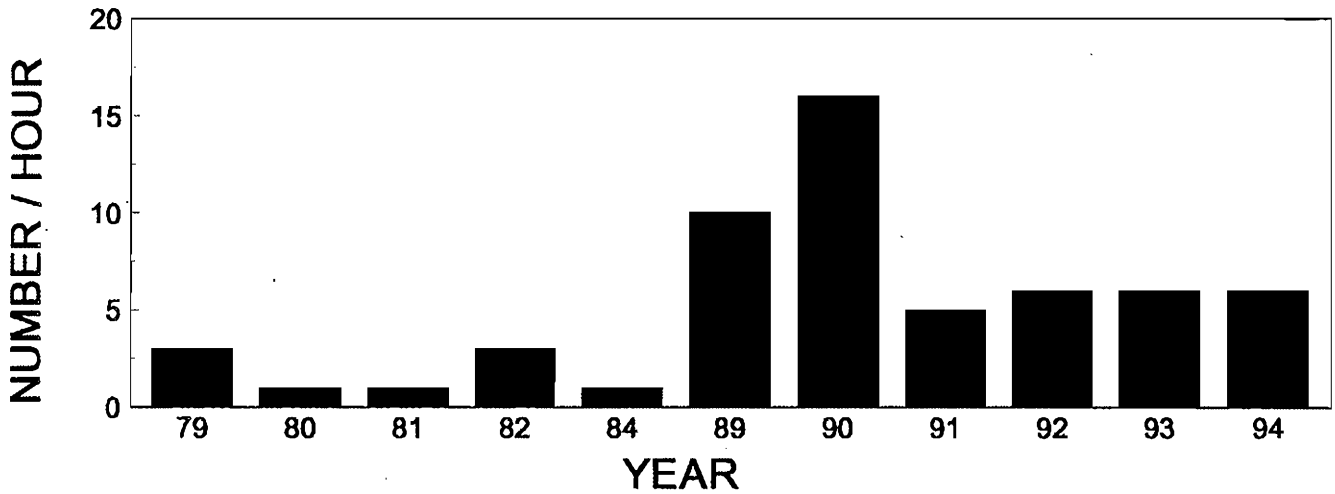

FIGURE 6. Catch per hour of 15-19.9 inch largemouth bass during spring nocturnal electrofishing at Smoky Valley Lake..

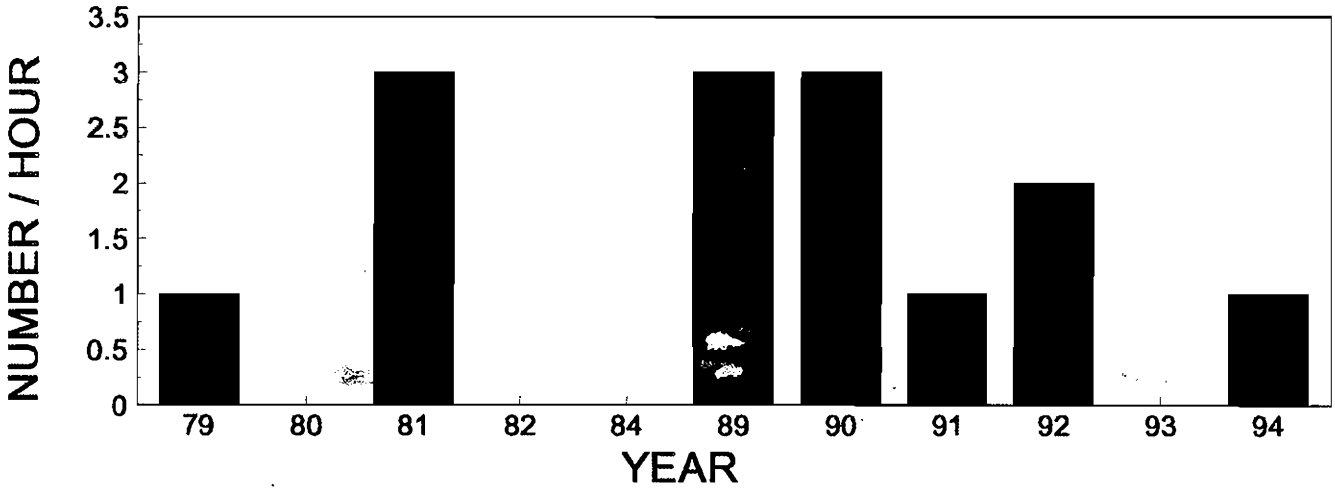

FIGURE 7. Catch per hour of $\geq$20 inch largemouth bass during spring nocturnal electrofishing at Smoky Valley Lake.

* 1979-1984 - Inch Group; 1989-1994 - Inch Class

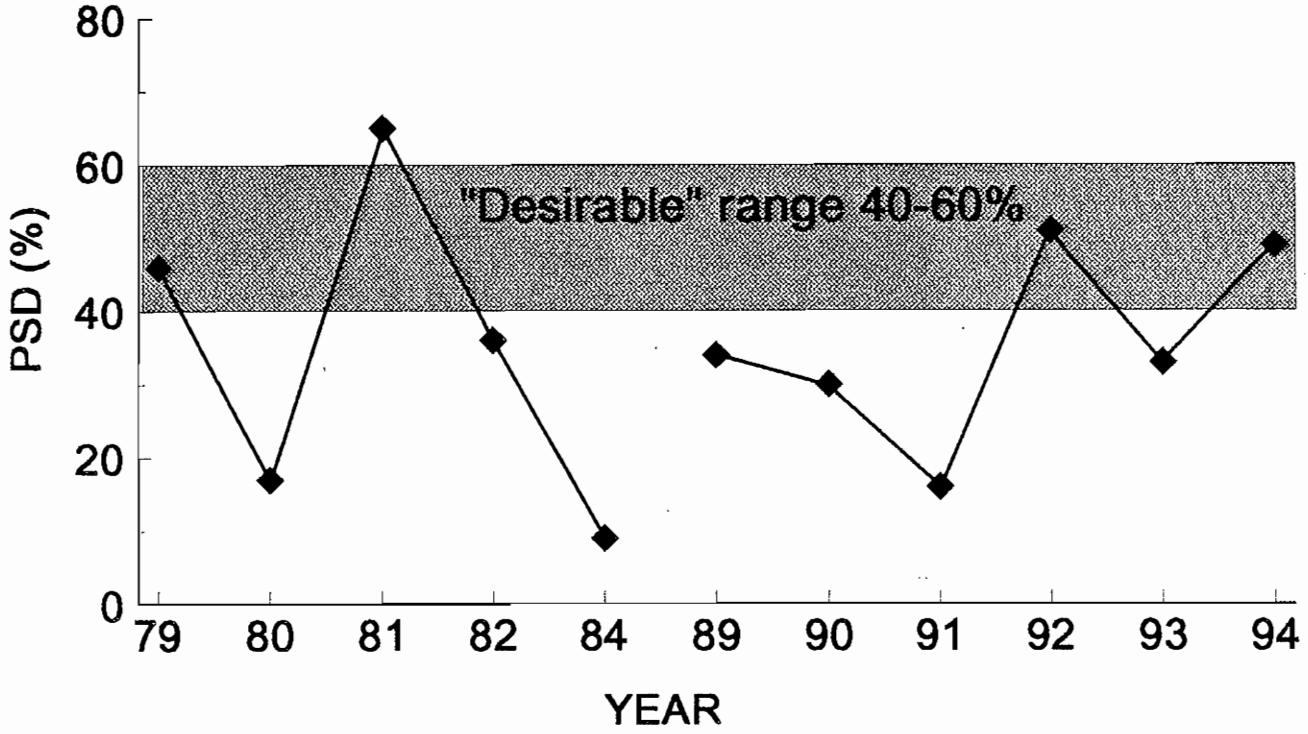

FIGURE 8. Largemouth bass proportional stock density (PSD) from nocturnal electrofishing (during spring) at Smoky Valley Lake. (small sample size 1979-81; inch group used 1979-84; inch class other years)

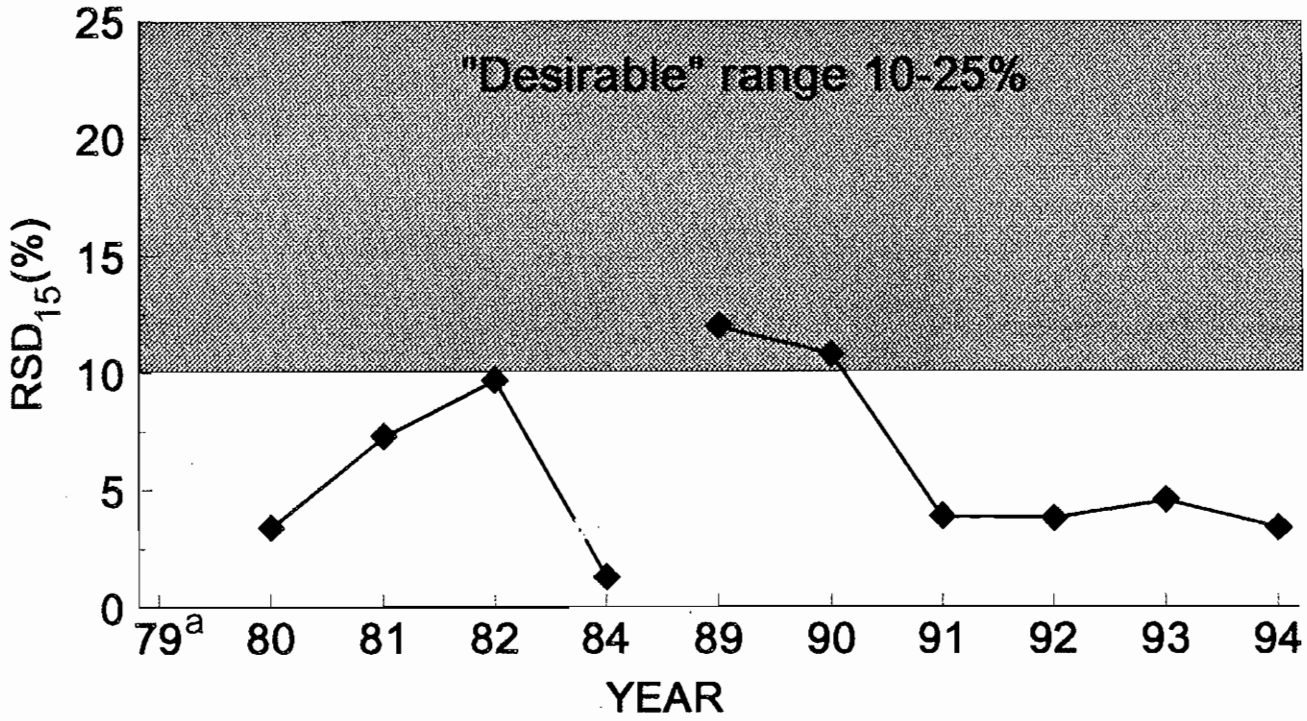

FIGURE 9. Largemouth bass relative stock density (RSD_{15}) from nocturnal electrofishing (during spring) at Smoky Valley Lake.

[a]Sample size too small.

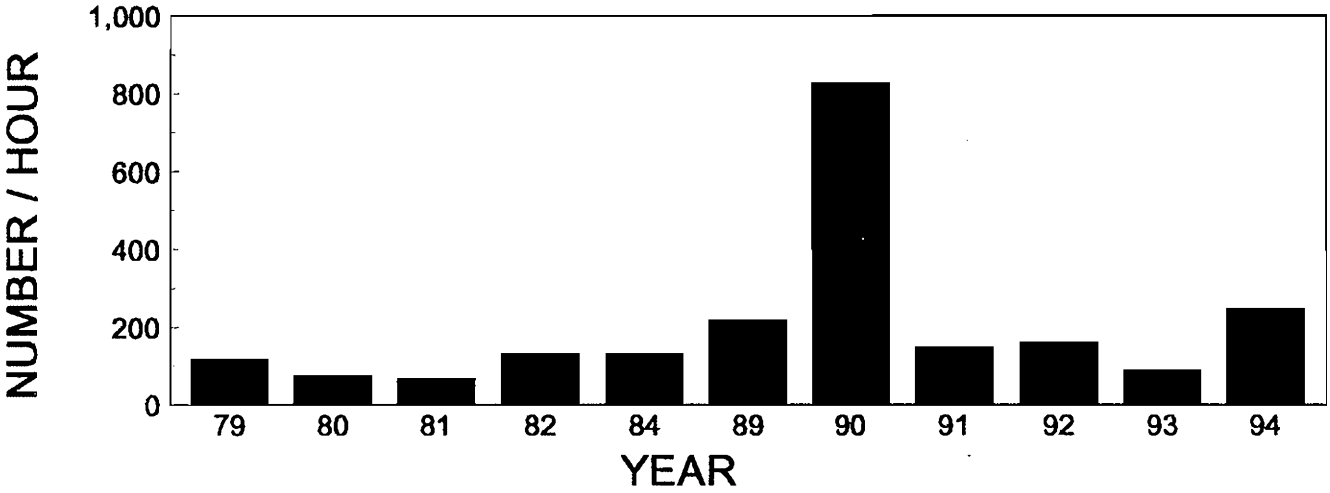

FIGURE 10 . Catch per hour for all bluegill during spring nocturnal electrofishing at Smoky Valley Lake.

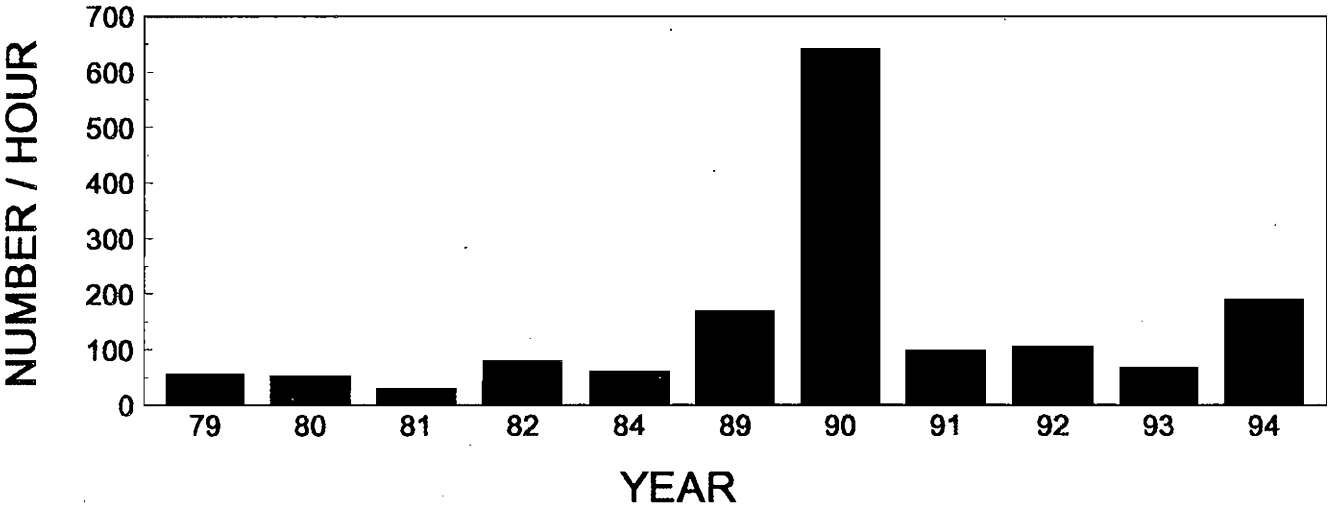

FIGURE 11. Catch per hour for 3-5.9 inch bluegill during spring nocturnal electrofishing at Smoky Valley Lake.

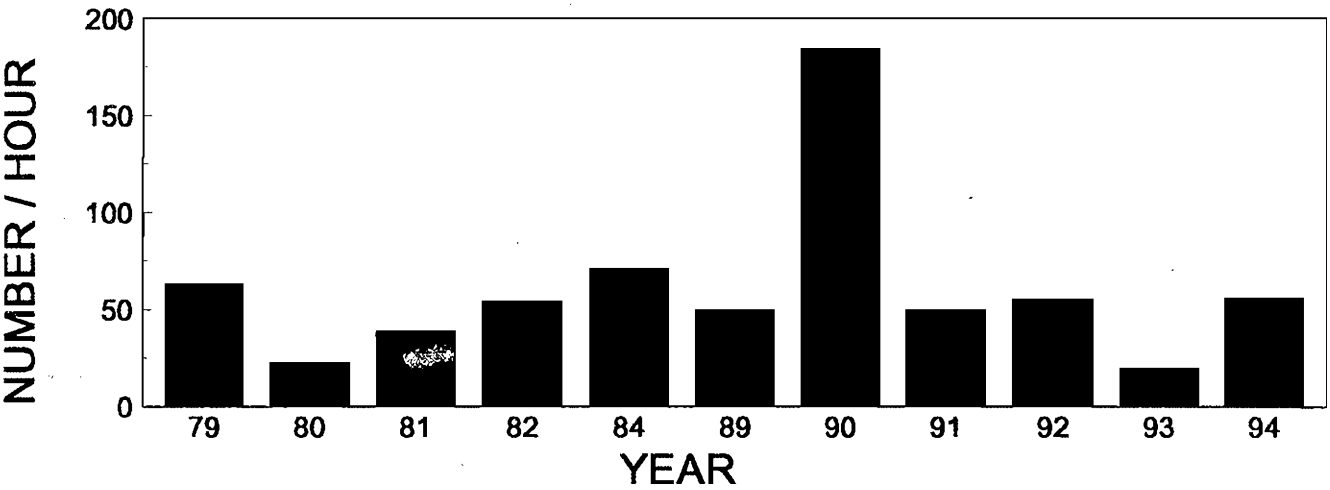

FIGURE 12. Catch per hour for $\geq$ 6 inch bluegill during spring nocturnal electrofishing at Smoky Valley Lake.

* 1979-1984 - Inch Group; 1989-1994 - Inch Class

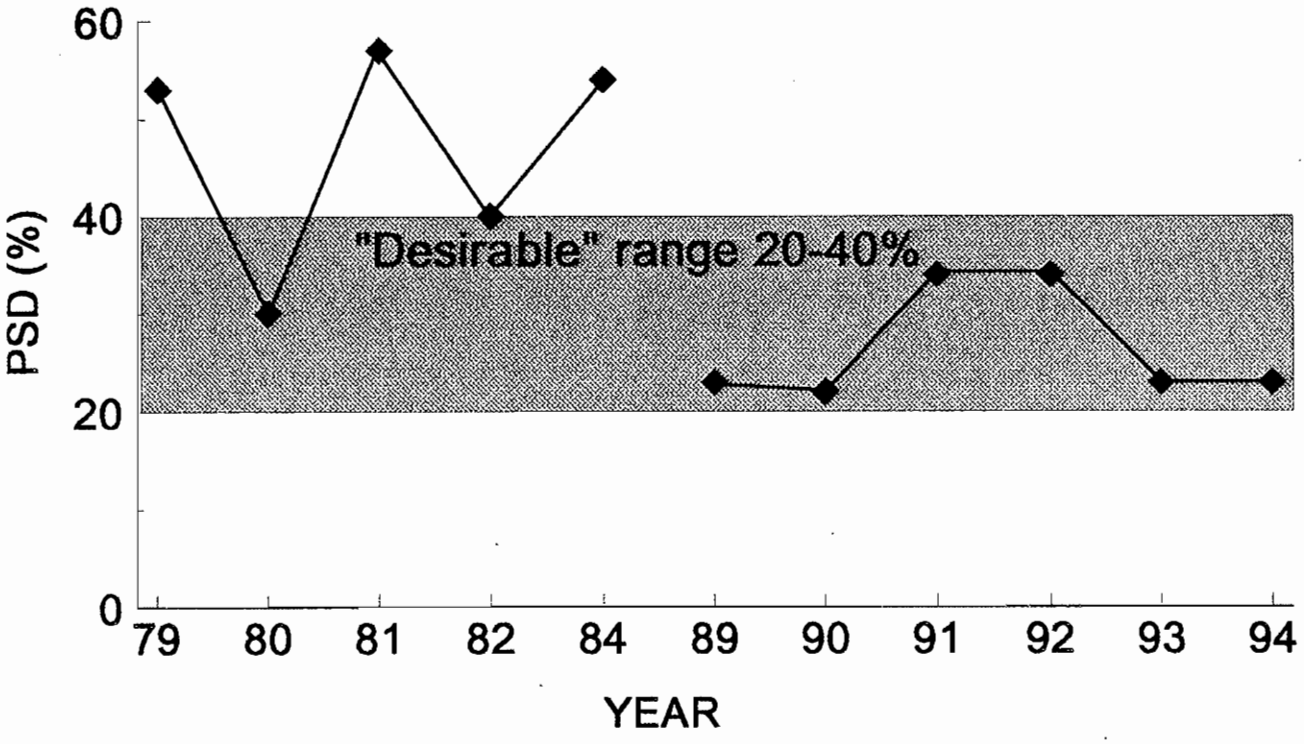

FIGURE 13. Bluegill proportional stock density (PSD) from nocturnal electrofishing (during spring) at Smoky Valley Lake.

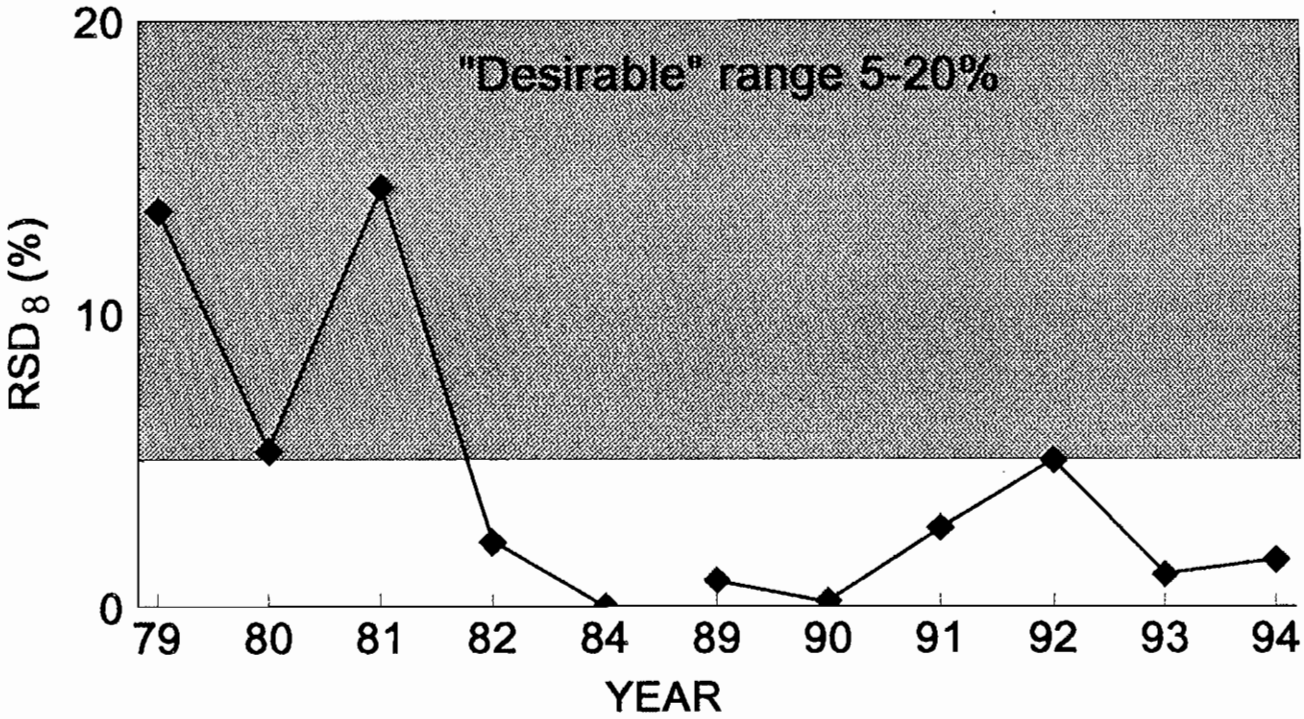

FIGURE 14. Bluegill relative stock density (RSD_8) from nocturnal electrofishing (during spring) at Smoky Valley Lake.

Table 1. A list of fish species other than largemouth bass and bluegill, sampled by year, while nocturnal electrofishing at Smoky Valley Lake.

Species	Year										
	79	80	81	82	84	89	90	91	92	93	94
White crappie			X	X		X			X		
Black crappie											X
Rock bass		X	X	X						X	
Longear sunfish	X	X	X	X	X	X	X	X	X	X	X
Green sunfish	X	X	X	X	X	X	X	X	X	X	
Hybrid sunfish	X									X	
Grass pickerel	X	X	X	X		X	X			X	X
Channel catfish[a]	X	X			X	X	X	X		X	X
Yellow bullhead		X	X	X	X	X	X	X	X	X	X
White sucker	X	X	X	X		0	X	X			X
Carp	X	X	X	X	X	X	X			X	X
Striped shiner		X	X	X			X				
Bluntnose minnow		X				0	X				
Gizzard shad					X	0					
Brook silverside	X	X	X	X	X	X	X	X	X	X	X

[a]Stocked annually.
0 = observed, but not collected.

Table 2. Length frequency of largemouth bass sampled at Smoky Valley Lake in 1979-1994 by nocturnal electrofishing.

Date	Inch group[a]																					Total no.	Total hours sampled
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		
26 Jul 79						1	1	3	3		2			1				2		1		14	1.0
10 Jul 80				2	1	3	4	9	7	4	1	2	1			1						35	1.0
11 Jun 81		1	1			1	2	4	6	7	17	8	7	1					1	1	1	58	0.9
25 May 82		3	2	2	11	11	6	3	3	7	7	2		2	1							60	1.0
11 Jun 84			4	8	2	3	31	7	15	15	4	2			1							92	0.9
	Inch class[b]																						
18 May 89		1	10	3	3	21	23	13	16	23	8	5	7	3	1	2	2	2	1	1	1	146	1.0
16 May 90		1	1	5	34	29	29	46	38	22	20	8	10	4	7	3	2	2	3			264	1.1
21 May 91	3	1		2		12	15	37	35	42	13	3	2	2	2			1		1		171	1.0
14 May 92		6	6	3	9	24	26	12	19	47	67	32	2	1	3	1		1			2	261	1.1
01 Jun 93	3	10	4		10	25	15	23	24	26	17	13	7	2	2	1		1				183	1.0
26 May 94	1	4	11	5	9	42	19	18	31	36	59	28	7	4			1	1		1		277	1.0

[a]1.5-2.4 inches = 2 inch group.
[b]2.0-2.9 inches = 2 inch class.

Table 3. Percent occurrence of largemouth bass by size category (1980-1984 in inch groups; 1989-1994 inch classes) collected during spring nocturnal electrofishing at Smoky Valley Lake.

Year	Size group (in) ≤7	8-11	12-14	15-19	≥20
1980	17.1	68.6	11.4	2.9	
1981	4.8	33.3	55.6	1.6	4.8
1982	48.3	31.7	15.0	5.0	
1984	18.0	74.0	7.0	1.0	
1989	26.0	51.3	14.0	6.7	2.0
1990	26.6	51.0	14.5	16.6	1.2
1991	10.5	75.4	10.5	2.9	0.6
1992	18.4	39.8	38.5	2.5	0.8
1993	28.4	48.1	20.2	3.3	
1994	26.0	37.6	33.9	2.2	0.4
Mean	22.4	51.1	22.1	4.5	1.0
Mean (1980-1984)	22.1	51.9	22.3	2.6	1.2
Mean (1989-1994)	22.6	50.5	21.9	5.7[a]	0.8

[a]The mean value was 2.7 during the last 4 years, similar to the 1980-1984 mean value.

Table 4. Length frequency of bluegill sampled at Smoky Valley Lake in 1979-1994 by nocturnal electrofishing.

Date	Inch group 3	4	5	6	7	8	9	Total number	Total hours sampled
26 Jul 79	17	24	15	18	29	16		119	1.0
10 Jul 80	12	25	16	13	6	4		76	1.0
11 Jun 81	3	6	18	12	15	8	1	63	0.9
25 May 82	35	28	17	22	29	2	1	134	1.0
11 Jun 84	17	16	23	40	25			121	0.9
18 May 89	36	24	24	18	6	1		109	0.5
	Inch class								
16 May 90	47	130	144	74	17	1		413	0.5
21 May 91	7	22	20	17	6	2		74	0.5
14 May 92	59	9	11	22	13	5	1	120	0.8
01 Jun 93	49	9	10	8	11		1	88	1.0
26 May 94	24	33	38	14	12	2		123	0.5

Table 5. Percent occurrence and CPUE (no./hour) of bluegill by size category (1979-1989 in inch groups; 1990-1994 in inch classes) collected during spring nocturnal electrofishing at Smoky Valley Lake.

Year	Size group (in) 3-5	≥6
1979	47.1	52.9
1980	69.7	30.3
1981	42.6	57.4
1982	59.7	40.3
1984	46.2	53.8
1989	77.1	22.9
1990	77.7	22.3
1991	66.2	33.8
1992	65.6	34.4
1993	77.3	22.7
1994	77.2	22.8
Mean	64.2	35.8
Mean (1979-1984)	53.1	46.9
Mean (1989-1994)	73.5	26.5

Table 6. Proportional and relative stock densities (PSD and RSD) for largemouth bass and bluegill at Smoky Valley Lake from nocturnal spring electrofishing in 1980–1994.

Year	Largemouth bass			Bluegill	
	PSD	RSD_{15}	RSD_{18}	PSD	RSD_{8}
1979[a]				53	13.5
1980	17	3.4	0	30	5.3
1981	65	7.3	5.5	57	14.3
1982	36	9.7	0	40	2.2
1984	9	1.3	0	54	0
1989	34	12.0	6.5	23	0.9
1990	30	10.8	3.6	22	0.2
1991	16	3.9	1.3	34	2.7
1992	51	3.8	1.4	34	5.0
1993	33	4.6	0.8	23	1.1
1994	49	3.4	1.5	23	1.6
Mean	34	6.0	2.1	36	4.3
Mean (1980-1984)	32	5.4	1.4	47	7.1
Mean (1989-1994)	36	6.4[b]	2.5[c]	27	1.9

[a]Sample size for largemouth bass too small in 1979.
[b]Mean was 3.9 for the last 4 years.
[c]Mean was 1.2 for the last 4 years.

Table 7. Relative weight (Wr) values of various size groups of largemouth bass sampled during the fall of 1981–1993 from Smoky Valley Lake. Sample size is in parentheses.

Year	Size category (in)		
	8–11.9	12–14.9	≥15
13 Oct 81	102 (8)	91 (25)	90 (2)
27 Sep 82	101 (50)	92 (8)	89 (2)
23 Oct 89	90 (104)	91 (17)	100 (8)
08 Oct 90	89 (150)	85 (33)	92 (11)
03 Oct 91	86 (85)	81 (58)	76 (3)
14 Sep 92	87 (83)	81 (54)	72 (3)
23 Sep 93	91 (81)	86 (67)	93 (5)
Mean	92	87	87

Table 8. Mean length (in) at age for largemouth bass collected from Smoky Valley Lake in 1981 and 1989-1993.

	Age												
Year	1	2	3	4	5	6	7	8	9	10	11	12	13
1981	4.7	8.0	10.4	12.5	14.5	17.6	19.1	19.7	20.9	21.6			
1989	4.7	8.1	10.3	12.4	14.1	15.0	17.1	18.5	19.7	20.3	20.9	21.6	22.1
1990	3.9	7.6	9.9	12.1	13.4	14.6	15.3	16.7	18.1	19.0	19.2		
1991	4.4	7.2	9.7	12.5	14.9								
1992	4.2	8.0	10.5	12.4	13.8	15.1	17.0	18.6	19.9	20.9	21.6		
1993	4.0	7.6	9.9	11.9	13.2	15.1	16.8	18.5					
Mean of means	4.3	7.8	10.1	12.3	14.0	15.5	17.1	18.4	19.7	20.5	20.6		

Table 9. Mean length (in) at age for bluegill collected from Smoky Valley Lake in 1981 and 1992-1993.

	Age						
Year	1	2	3	4	5	6	7
1981	3.1	4.5	5.9	6.7	7.5		
1992	2.9	4.3	5.9	7.3	8.2	8.7	
1993	2.7	4.3	6.0	6.4	7.9	8.3	8.9
Mean of means	2.9	4.4	5.9	6.8	7.9	8.5	8.9

Table 10. Fishery statistics derived from a daytime creel survey at Smoky Valley Lake (36 acres) during March-October 1990 and 1991.

	1990	1991
Fishing trips		
No. of fishing trips (per acre)	2,812 (78)	3,007 (84)
Fishing pressure		
Total man-hours (S.E.)	10,806 (1,608)	10,879 (1,226)
Man-hours/acre	300	302
Catch/harvest		
No. of fish caught (S.E.)	11,945 (3,049)	7,970 (2,182)
No. of fish harvested (S.E.)	10,002 (2,541)	5,141 (1,889)
Lb of fish harvested	1,762	957
Harvest rates		
Fish/hour	0.93	0.47
Fish/acre	277.83	142.81
Lb/acre	48.94	26.57
Catch rates		
Fish/hour	1.11	0.73
Fish/acre	382	221
Miscellaneous characteristics (%)		
Male	90	88
Female	10	12
Resident	92	86
Non-resident	8	14
Method (%)		
Still Fishing	33	51
Casting	66	49
Fly fishing	t	t
Trolling	-	t
Mode (%)		
Boat	75	67
Bank	25	33

S.E. = standard error
t = <0.5%

Table 11. Fish harvest statistics derived from a creel survey at Smoky Valley Lake from 01 March - 31 October 1990.

	Largemouth bass	White crappie	Bluegill	Channel catfish	Bullhead	Anything
No. caught	1,285	36	9,361	686	126	
(per acre)	(35.7)	(1.0)	(267.5)	(19.1)	(3.5)	
No. harvested	0	36	9,037	645	107	
(per acre)		(1.0)	(251.0)	(17.9)	(3.0)	
% of total no. harvested		0.4	92.0	6.6	1.1	
Lb harvested		5	1,287	430	42	
(per acre)		(0.1)	(35.8)	(12.0)	(1.2)	
% of total lb harvested		0.3	73.0	24.4	2.4	
Mean length (in)		6.5	5.9	13.9	9.4	
Mean weight (lb)		0.10	0.13	0.87	0.39	
No. of fishing trips for that species	1,359	6	642	42		763
% of all trips	48.0	0.2	22.7	1.5		27.6
Hours fished for that species (per acre)	5,223 (145.1)	23 (0.6)	2,468 (68.5)	162 (4.5)		2,931 (81.4)
No. harvested fishing for that species	0	4	6,401	577		2,171
Lb harvested fishing for that species		2	1,063	348		337
No./hour harvested fishing for that species		0.60	2.59	0.70		0.86
% success fishing for that species	0	0	76.3	25.0		30.3

Table 12. Fish harvest statistics derived from a creel survey at Smoky Valley Lake from 05 March - 31 October 1991.

	Largemouth bass	Bluegill	Grass pickerel	Channel catfish	Bullhead	Anything
No. caught	1,151	6,474	12	213	120	
(per acre)	(32.0)	(179.8)	(0.3)	(5.9)	(3.3)	
No. harvested	29	4,825	0	186	101	
(per acre)	(0.8)	(134.0)		(5.2)	(2.8)	
% of total no. harvested	0.6	93.9		3.6	1.9	
Lb harvested	133	626		146	52	
(per acre)	(3.7)	(17.4)		(4.1)	(1.4)	
% of total lb harvested	13.9	65.4		15.3	5.4	
Mean length (in)	20.5	6.1		12.8	10.6	
Mean weight (lb)	4.59	0.14		0.69	0.51	
No. of fishing trips for that species	999	858	0	124		1,026
% of all trips	33.2	28.6		4.1		34.1
Hours fished for that species (per acre)	3,615 (100.4)	3,102 (86.2)		448 (12.4)		3,713 (103.1)
No. harvested fishing for that species	29	4,246		207		613
Lb harvested fishing for that species	133	533		158		84
No./hour harvested fishing for that species	0.01	1.51		0.50		0.18
% success fishing for that species	2.8	72.4		75.0		20.0

Table 13. Length distribution (length of released fish are estimated) for each fish species creeled from 01 March - 31 October 1990 at Smoky Valley Lake.

Species	Inch class															
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	23
Largemouth bass																
Released	19	19	95	57		76	28	293	37	246	189	104	95	19	8	
White crappie																
Harvested				16	16		4									
Bluegill																
Harvested	1,177	668	848	2,444	3,152	738	10									
Released	128	245	105	70	23	23										
Channel catfish																
Harvested								46	184	138	138	46	46			47
Released							21								20	
Bullhead																
Harvested					10	19	78									
Released							10	9								

Table 14. Length distribution (length of released fish are estimated) for each fish species creeled from 05 March - 31 October 1991 at Smoky Valley Lake.

Species	Inch class																
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	20	21
Largemouth bass																		
Harvested																	15	14
Released						66		133	93	305	66	212	119	66	27	13	15	
Bluegill																		
Harvested	149	410	846	1,691	1,057	522	150											
Released	726	578	148	98	86	13												
Channel catfish																		
Harvested							5	10	26	52	31	31	16	5	5	5		
Released					5	5	11					6						
Bullhead																		
Harvested								43	58									
Released						13		6										
Rock bass																		
Released	1																	
Grass pickerel																		
Released											12							

Table 15. Largemouth bass catch and harvest by all anglers derived from creel surveys at Smoky Valley Lake from March - October in 1990 and 1991.

	Harvest		Catch and release		
			8.0-19.9 in		≥20 in
	1990	1991	1990	1991	1991
Total no. of bass	0	29	1,285	1,106	15
Total weight of bass (lb)		133	808	1,144	64
Mean length (in)		20.5	10.8	12.6	20.0
Mean weight (lb)		4.59	0.62	1.01	4.25

Table 16. Monthly largemouth bass angling success at Smoky Valley Lake during the 1990 creel survey period; data does not include <8.0 inch bass that were caught and released. No bass were harvested during this period.

	Total no. of bass caught	No. of of bass fishing trips	Hours fished by bass anglers	Bass caught by bass anglers	Bass caught/hour by bass anglers
Mar	0	0			
Apr	171	179	687	141	0.10
May	351	261	1,004	176	0.15
Jun	436	403	1,547	400	0.29
Jul	146	171	657	54	0.10
Aug	131	109	419	100	0.21
Sep	14	47	181	14	0.13
Oct	18	141	541	18	0.17
Total	1,267	1,311	5,036	903	
Mean					0.16

Table 17. Monthly largemouth bass angling success at Smoky Valley Lake during the 1991 creel survey data does not include <8.0 inch bass that were caught and released.

Month	Total no. of bass caught	Total no. of bass harvested	No. of trips for bass	Hours fished by bass anglers	Bass caught by bass anglers	Bass caught/hour by bass anglers	Bass harvested by bass anglers	Bass harvested/hour by bass anglers
Mar*								
Apr	203	29	185	668	203	0.33	29	0.05
May	138	0	207	747	89	0.22	0	
Jun	3	0	109	394	3	0.05	0	
Jul	65	0	41	149	64	0.14	0	
Aug	189	0	172	623	189	0.38	0	
Sep	324	0	173	627	324	0.33	0	
Oct	228	0	75	237	228	0.41	0	
Total	1,150	29	999	3,615	1,100		29	
Mean						0.26		0.01

*No complete fishing trips during survey period in March.

Table 18. Angler opinion survey from 260 anglers at Smoky Valley Lake during the 1990 creel survey.

1. Do you like the idea of a trophy largemouth bass regulation with a 20-inch minimum size, one creel limit?

	% of total response
Yes	67
No	19
No opinion	14

	% male response			% female response		
Preference	Yes	No	No Opinion	Yes	No	No Opinion
Anything group	58	25	17	35	18	47
Bass group	83	11	6	80	0	20
Catfish group	50	0	50	0	0	0
Panfish group	55	32	13	25	25	50
Crappie group	100	0	0	0	0	0

2. Do you favor having such a trophy regulation at this lake?

	% of total response
Yes	73
No	14
No opinion	13

	% male response			% female response		
Preference	Yes	No	No Opinion	Yes	No	No Opinion
Anything group	64	19	17	35	12	53
Bass group	88	6	6	80	0	20
Catfish group	75	0	25	0	0	0
Panfish group	64	29	7	50	25	25
Crappie group	100	0	0	0	0	0

3. Are you fishing this lake because you heard about the trophy bass regulation?

	% of total response
Yes	34
No	66

	% male response		% female response	
Preference	Yes	No	Yes	No
Anything group	12	88	6	94
Bass group	58	42	20	80
Catfish group		100	0	0
Panfish group	19	81	25	75
Crappie group	0	0	0	0

Appendix 1. Scientific names of the fishes mentioned in this report.

Common name	Scientific name
Gizzard shad	*Dorosoma cepedianum*
Carp	*Cyprinus carpio*
Striped shiner	*Luxilus chrysocephalus*
Bluntnose minnow	*Pimephales notatus*
White sucker	*Catostomus commersoni*
Yellow bullhead	*Ameiurus natalis*
Channel catfish	*Ictalurus punctatus*
Grass pickerel	*Esox americanus vermiculatus*
Brook silverside	*Labidesthes sicculus*
Rock bass	*Ambloplites rupestris*
Green sunfish	*Lepomis cyanellus*
Bluegill	*Lepomis macrochirus*
Longear sunfish	*Lepomis megalotis*
Hybrid sunfish	*Lepomis spp.*
Largemouth bass	*Micropterus salmoides*
White crappie	*Pomoxis annularis*
Black crappie	*Pomoxis nigromaculatus*