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**Muskellunge Streams Investigation  
at Fox, Triplett, and North Fork Triplett Creeks  
by  
Albert F. Surmont**

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## ABSTRACT

Two muskellunge streams, Fox and Triplett creeks, were investigated during 1986 through 1988. This study was primarily designed to determine the existing muskellunge population, what management potential exists that may enhance the muskellunge fishery, and to evaluate previous muskellunge fingerling stockings. Additional data was also gathered regarding associated fish species. Selected water quality criteria were measured seasonally and pertinent physical features were recorded at each sample pool. Both streams are within the Licking River drainage; Triplett Creek (and North Fork Triplett Creek) was a well known muskellunge stream while Fox Creek was a relative new-comer. Forty-one muskellunge were captured from Fox Creek during the two years of sampling (1987-88), covering 4.2 miles of stream. The catch rate of muskellunge in Fox Creek was 4.3 fish per hour during both years. Twenty-one additional muskellunge were observed but eluded capture. Mean annual growth of muskellunge in Fox Creek was 11.3, 18.1, 24.2, 28.9, 32.1, and 34.5 inches long at ages 1-6, respectively. Triplett and North Fork Triplett creeks yielded 7 captured muskellunge during the two sample years (1986-87). A total of 2.6 miles were sampled during 1986, 3.2 miles during 1987. Catch per unit effort for muskellunge in Triplett Creek was 1.9 fish per hour during the sample period. An additional 10 muskellunge were observed but avoided capture. Mean annual growth of muskellunge in Triplett Creek was 10.7, 17.0, 24.1, 30.0, 34.2, and 37.1 inches long at ages 1-6, respectively. Three tagged fish were harvested from each stream, usually within a year of tagging. The largest muskellunge captured during this study was a 42.0 inch long fish weighing 21.0 lb that came out of North Fork Triplett Creek. There were a total of 55 species of fish identified from Fox Creek from various collectors; 50 species were collected during this study. In Triplett Creek, 48 species were collected during this study; a total of 74 species have been identified by various collectors. The five most frequently sampled species in Fox Creek were longear sunfish, bluegill, steelcolor shiner, gizzard shad, and spotfin shiner. In Triplett Creek, species most often sampled were golden redhorse, longear sunfish, common carp, bluegill, and gizzard shad. Spotted bass were the dominant black bass captured in Fox Creek, while in Triplett Creek the smallmouth bass and the spotted bass were co-dominant. Smallmouth bass were not taken in Fox Creek. Water quality sampling in both streams indicated the presence of good water quality. Both streams should be protected from any degradation that would alter the habitat or water quality. Development of oil shale mining should be closely monitored in case commercial oil extraction from shale ever becomes a reality. Illegal netting needs to be controlled to protect the adult muskellunge in both streams and in the Licking River. Muskellunge fingerlings should continue to be stocked in both of these streams on an annual basis. Riparian zones need to be maintained to assure stable banks, a quality canopy, and a continuing supply of fallen tree habitat as instream cover.

## INTRODUCTION

Muskellunge investigations in Fox Creek, North Fork Triplett and Triplett creeks represent the final streams studied as part of Kentucky's muskellunge streams investigation. The range of the muskellunge, *Esox masquinongy* Mitchell, is spotty in Kentucky. It is sporadically native to the Green, Kentucky, Licking, and Little Sandy River drainages, and Kinniconick and Tygarts creeks (Burr and Warren 1986). Native populations are found in streams throughout eastern Kentucky where stream habitat has not been severely altered by mining, logging, oil and gas exploration, and/or other land disturbances. Presently, there are about 700 mi of muskellunge habitat in 18 streams in Kentucky. The majority of these streams are in the eastern part of the state.

Initial muskellunge sampling in Kentucky began in 1967 as part of a D-J muskellunge project. Brewer (1980) evaluated 12 native muskellunge streams in eastern Kentucky (1967-71). Although muskellunge had been stocked and regulated prior to this time, very little management had taken place. Brewer's report was the basic (and only) life history study for Kentucky's native muskellunge population. Axon (1978, 1981) reported on the developing muskellunge fishery in Cave Run Lake, an 8,270-acre impoundment on the Licking River. This impoundment flooded 62 mi of muskellunge range and some of the best streams, in terms of recruitment, in the state. Additional studies which have been completed on native muskellunge streams include Kornman (1983) - Kinniconick and Tygarts creeks; Jones and Stephens (1984) - South Fork Kentucky River Drainage; Kornman (1985) - Red River, Station Camp, and Sturgeon creeks; Prather (1985) - Middle Fork and North Fork Kentucky River drainage and Upper Licking River; Kornman (1989) Lower Licking River; and Kornman (1998-in progress) Little Sandy River and Salt Lick Creek. Axon and Kornman (1986) summarized the characteristics of these studies through 1985. Bonny Laffin has been investigating the Green and Barren rivers drainage sporadically since 1984 (Kentucky Department of Fish and Wildlife Resources, Annual Performance Reports, Subsection II Streams Research and Management, 1984-1993 and District Fishery Management Section, 1994 and 1995).

Brewer (1980) recommended that most native muskellunge streams in the state should receive supplemental stockings of one large muskellunge fingerling per two surface acres of muskellunge pool habitat. His reasoning was to replace lost natural reproduction due to adverse environmental factors normally occurring during the spawning period. Stream stockings began in 1973, due mainly to Brewer's recommendations, and continue to the present. A listing of the number of muskellunge stocked into Triplett and North Fork Triplett creeks is presented in Table 1. Fox Creek was not thought to support muskellunge, and may not have, until the Licking River began receiving large muskellunge fingerlings stocked on an annual basis.

Muskellunge stream studies began in 1980 as part of D-J Project F-50. The muskellunge studies were designed around existing populations to determine: 1) the size and structure of the current muskellunge population and the general fish population in selected streams, 2) the relative success of muskellunge stockings, 3) age and growth of muskellunge, 4) certain physical and chemical characteristics of each study stream (and/or pool), and 5) the management potential for sustaining and improving the muskellunge fisheries in these streams.

Brewer (1980) investigated seven sites on North Fork Triplett and Triplett creeks. All sites sampled during this investigation were also sampled by Brewer. The other two sites he sampled appeared, by the author, to be too shallow for muskellunge to inhabit. Kornman (1989) sampled pools in the Licking River. His sample sites were in the vicinity of both Fox and Triplett creeks, but did not include the mouths of either. No other studies have dealt specifically with muskellunge populations, but several investigators have done survey work pertaining to the fishes within the Fox and Triplett creek drainages. Their findings will be discussed later in this paper. Field sampling for this study was initiated in 1986 and was completed in 1988.

## STUDY AREA

The two streams sampled during this study are both in the oil shale belt of Northeastern Kentucky (Figure 1). Both streams are tributaries to the Licking River, below Cave Run Lake. Fox Creek is entirely within Fleming County; North Fork Triplett and Triplett creeks are both within Rowan County.

### Fox Creek

Fox Creek arises in northeastern Fleming County and flows in a southwesterly direction for approximately 31.3 mi, where it joins the Licking River at river mi 140.1. The headwaters of Fox Creek are at an elevation of 1,060 ft msl, and the mouth of the stream where it flows into the Licking River is about 610 ft msl. The mean gradient of the stream is 14.4 ft/mi, the drainage area is 117 square mi (McClain et al. 1994). There are two primary tributaries to Fox Creek - Brushy Fork and Sand Lick. The Natural Resource Conservation Service (previously known as Soil Conservation Service) has constructed six impoundments within the Fox Creek drainage - Stockton, Big Run, Fox Valley, Park Lake, Twin Forks, and the most recent, Floodwater Retarding Dam #2. These impoundments range in size from 16 - 75 acres and are designed to hold water during periods of heavy precipitation, gradually releasing excess water to reduce downstream flooding. As a result, Fox Creek is often above minimum flows for extended periods after heavy rainfall. All impoundments are on or above the confluence of Sand Lick Creek.

The major land usage in the Fox Creek drainage is silviculture, especially on the steeper slopes. Agricultural lands are found in the floodplain and around the lower sections. Much of the land is in pasture, but row crops are also found throughout the drainage. Siltation is a major problem. Pools contained layers of silt, possibly due in part to NRCS impoundments reducing the scouring effect of high flows.

Fox Creek flows through the Knobstone escarpment and Knobs subsection into the outer Bluegrass Region (McGrain and Currens 1978). This area is characterized as containing large amounts of shale outcrops; Mississippian Age Shale of the Borden Formation, Sunbury Shale, and Bedford Shale are found at elevations above 880 ft, often exposed. Below this, broad Devonian Ohio Shale (New Albany Shale) outcrops occur. Clay Shale from the Silurian Age Crab Orchard Formation is found in the southern region where stream drainages have eroded the Ohio Shale. Silt, sand, shale, and gravel of Quaternary Age are found in the stream channel and flood plains (Hannan et al. 1984). Approximately 60% of the watershed contains exposed Bedford, Ohio, and Sunbury Shale deposits. Only the Ohio Shale is considered commercially valuable.

Fox Creek was not considered among Kentucky's historical muskellunge streams. The best muskellunge habitat is from the mouth up to the confluence of Sand Lick (mi 0-19).

### Triplett Creek

North Fork Triplett Creek starts in northern Rowan County and flows in a south-southwesterly direction approximately 26.5 mi to its junction with Triplett Creek at mi 5.8 near Freestone, KY. Triplett Creek continues in a more westerly direction to join the Licking River at mi 168.3. Only the upper portions of Triplett and North Fork Triplett creeks are within the Daniel Boone National Forest boundaries. The main stem of Triplett Creek, above the North Fork Triplett Creek confluence, has not been considered suitable for muskellunge due mainly to pollution problems from the City of Morehead's sewage treatment plant. These problems have been alleviated and muskellunge are now being introduced within this section. The headwaters of North Fork Triplett Creek are at an elevation of 1,140 ft msl and its mouth where it joins Triplett Creek is about 660 ft msl. Triplett Creek enters the Licking River at approximately 650 ft msl. The mean gradient for North Fork Triplett Creek is 18.1 ft/mi. The mean gradient is 1.7 ft/mi for Triplett Creek below the confluence of North Fork. The drainage area of North Fork Triplett Creek is 104 square mi, for Triplett Creek its 187 square mi (McClain et al. 1994). Major land usage in the North Fork Triplett Creek drainage is silviculture (70-80%). North Fork Triplett Creek watershed is characterized by steep, forest dominated hills. Lower Triplett Creek has a broad floodplain where the major land usage is agriculture; upper drainages are steep, tree covered hills. Siltation is not as much a problem as in Fox Creek, but urbanization and the lumber mill industry located along North Fork Triplett Creek could have caused problems. Major tributaries are Bull

Fork, Clear Fork, and Rock Fork.

North Fork Triplett Creek flows out of the Knobstone escarpment and Knobs subsection of the Bluegrass Section, of the Low Plateaus Province of Kentucky (Burr & Warren 1986). It also is characterized as containing shale, siltstones, and sandstones of Mississippian and Devonian Age. However, this drainage is not considered to be in the oil shale belt and does not contain the exposed shale deposits as are found in Fox Creek. The only land disturbance known to occur in the drainage, other than agriculture and silviculture, was quarrying for sandstone around the Bluestone area. Triplett Creek flows through an area known for its clay mining for the production of fire brick (Kentucky Department of Economic Development 1984), which shut down in the 1950's. Lower Triplett Creek lies within the oil shale belt where exposed shale deposits can be observed; this is the same strata as found within the Fox Creek drainage.

Triplett and North Fork Triplett creeks are well known muskellunge streams Clark (1941b) reported excellent muskellunge fishing in Triplett Creek. The largest muskellunge caught in the state at that time, 42 lb, was taken from this stream. Jones (1970) noted the quality of the sport fishery had declined since the 1940's, apparently due to pollution and possibly increased fishing pressure, but he still rated fishing for muskellunge as fair. The best muskellunge habitat is from the mouth of North Fork Triplett Creek upstream to its confluence with Rock Fork (mi 0.0-15.4).

## METHODS

Location of fish sampling stations are shown in tables 2 and 3 for Fox Creek and Triplett Creek, respectively. Station sites were chosen based on both accessibility and pool dimensions suitable for muskellunge. All pools sampled in North Fork Triplett and Triplett creeks were sites also sampled by Brewer (1980). Riffle-seine sampling was performed only in Fox Creek. Tim Slone (Fishery Technician with sampling crew) was working on a graduate paper for Morehead State University on fishes of North Fork Triplett Creek, his extensive sampling is shown (Table 22) instead of repeating this sampling. Riffle-seine sites in Fox Creek were usually those riffles that formed the upper or lower reaches of electrofished pools. Other riffle-seine sites were chosen based upon accessibility and often in conjunction with water quality sites. Fishes collected by seine were recorded by species with no attempt being made to record numbers collected. Seining was chosen to sample sites not accessible by electrofishing boat and to document species not normally associated with pool habitat.

Electrofishing was conducted for two consecutive years in both streams - 1987 and 1988 in Fox Creek, 1986 and 1987 in Triplett Creek. Five sites were sampled in each creek; one sample site in North Fork Triplett Creek (Station 2) was electrofished only once. Attempts were made to sample each stream during the same time of year.

Fish sampling in pools was performed with the use of a boat-mounted electrofishing unit. A new electrofishing boat was constructed and utilized beginning mid-summer 1987. Initially 8 to 10 amps output were used (in Fox Creek), which was often detrimental to larger muskellunge. Four to five amps were found to be sufficient to capture muskellunge without undo harm to the fish. Voltage was generally in the low range and usually 60 to 80% of the available output (300 to 400 volts).

In each of the sample pools, both shorelines were sampled from one riffle boundary to the other. During time subsamples within each pool, all muskellunge captured were measured to the nearest 0.1 in and weighed to the nearest 0.01 lb (except fish over 15 lb, which were weighted to the nearest 1.0 lb); all other fishes collected, except those mentioned below, were measured to the inch group. Fish that could not be identified in the field were preserved in 10% formalin for later identification in the laboratory. Other selected fish species (primarily game fishes) were weighed and measured using the same specifications as used for muskellunge. In order to determine age and growth, scale samples were taken from all muskellunge captured and a representative sample from other selected species (bluegill, gizzard shad, largemouth bass, longear sunfish, sauger, smallmouth bass, spotted bass, rock bass, and white crappie). Legal sized muskellunge ( $\geq 30$  in) were tagged on the anterior basal edge of the dorsal fin with a numbered, monel self-piercing, jaw tag identified as belonging to the Kentucky Department of Fish and Wildlife Resources

(KDFWR). Muskellunge under 30 in long were marked by clipping one of the paired fins to enable personnel to determine recaptured fish. Self-addressed postage-paid scale envelopes were made available to anglers by conservation officers and at tackle shops and general stores throughout the study area. Upon catching a tagged muskellunge, anglers were asked to provide the number along with general harvest questions and five scales taken from a designated location on the fish and return the envelope by mail. A certificate and clutch-back pin, depicting a muskellunge, were given to successful anglers by the department for information returned from the first muskellunge caught and reported, any subsequent returns were given a clutch-back pin. This program was discontinued in 1988.

Age and growth estimations were made by reading scales that were cleaned, dampened, and mounted between glass slides and projected by a Bausch and Lomb Tri-Simplex microprojector. Back-calculations of growth were determined utilizing a modification of the Lee Method (Lager, 1956; Everhart and Youngs, 1981), using a correction factor determined by Brewer (1980). This correction factor was obtained by extrapolation of the regression line represented by plotting the scale measurements against body length. The body-scale relationship determined by Brewer (1980) was based on 152 muskellunge collected from nine streams in eastern Kentucky. The relationship between body length and scale length, as determined by Brewer, was expressed in the equation  $L = 4.5 + 3.6S$ , which shows a correction factor of 4.5 in. Although this factor is high compared to Miles' (1978) correction of 2.5 in from West Virginia muskellunge or Erickson's (1967) 2.6 in proposed factor for Ohio River muskellunge, it is the correction factor used in all recent Kentucky Department of Fish and Wildlife muskellunge investigations. Brewer's correction factor was substituted into the formula:  $L' = C + S/S(L-C)$

where:

- L' = length of fish at annulus
- C = correction factor
- S' = length of scale radius at annulus
- S = length of total scale radius
- L = total length of fish at capture

The total fish population was sampled by electrofishing each shoreline in each pool during a subsample period. In some cases these timed samples covered the entire shoreline of the pool, when the length of the pool could be covered in 30 min or less. During this timed subsample period, attempts were made to collect all fish observed. After the subsample period, the remaining pool was electrofished, collecting mainly muskellunge, but game fish and certain other fishes were also collected. Any fish thought not to have been picked up previously or considered unusual was collected at this time. Fish captured during the subsample period were sorted to species, counted, measured to the nearest inch group, and released. Fish preserved in 10% formalin were identified in the laboratory using fish keys by Clay (1975), Pflieger (1975), and Trautman (1981). Scientific and common names of species were assigned according to Robins et al. (1991). Specimens have been deposited at one or more of the following institutions: Morehead State University, Morehead; Northeastern Fishery District Reference Collection, Morehead; Southern Illinois University, Carbondale, Illinois.

Pool dimensions were measured by using topographic maps and a cartometer to determine lengths, a 100 ft fiberglass tape to measure widths, and an Eagle Z-6100 portable LCD depth recorder to estimate depths except in areas where a metal yard stick could be used. General physical characteristics were recorded on stream survey forms for each pool sampled (fish shelter, bottom type, pool to riffle ratio, vegetation, pollution, land usage, etc.). Gradient was determined by measuring mileage and reading elevation from topographical maps.

Water quality parameters were taken during summer and fall in 1986 at both streams. Two sample sites were used in Fox Creek, essentially an upper and lower site within the muskellunge range. The same applies to Triplett Creek; one site was in the lower portion of the main stem and the other two sample sites were in North Fork Triplett Creek, one midway and one upstream of the known muskellunge range in the stream. Water quality determinations consisted of temperature, dissolved oxygen, total alkalinity, turbidity, pH, salinity, and specific conductivity.



## RESULTS AND DISCUSSION

### Muskellunge Population Characteristics

#### Fox Creek

Five pools, representing 4.2 mi of muskellunge habitat, were electrofished in Fox Creek during 1987 and 1988. During sampling in 1987, 17 muskellunge were captured at a rate of 3.7 fish/h and 4.0 fish/mi (Table 4). These fish ranged from 6.9 – 35.9 in long. Muskellunge of legal size or larger ( $\geq 30$  in) were collected at a rate of 2.0 fish/mi while sub-legal muskellunge were collected at a rate of 1.9 fish/mi. In 1988, 24 muskellunge were captured at a rate of 5.1 fish/h and 5.7 fish/mi. Their length varied from 7.1 – 35.8 in. Only six muskellunge were captured of legal size (1.4 fish/mi), although eight others were observed but not captured. Sub-legal muskellunge were captured at a rate of 4.3 fish/mi. A total of 41 muskellunge were captured and 21 additional muskellunge were observed but eluded capture during both sample years. The mean catch rate for both years was 5.0 fish/mi, representing 4.3 muskellunge/h. The catch per unit effort (fish/hour) was far above the mean of 0.6 muskellunge/h reported by Axon and Kornman (1986) within 14 streams sampled in eastern Kentucky and 3 times higher than the best stream, Tygarts Creek, which had a catch rate of 1.3 fish/h (Table 5).

Muskellunge were collected from each year class from 1981 through 1988 during the two sample years (Table 6). The largest number of muskellunge captured were from the 1988 year class and were captured during that year. Only one age 0 fish was captured during 1987. Muskellunge were captured in all pools sampled.

Pools sampled were based on availability of access. Pools found to be inhabited by muskellunge ran from creek mi 0.0 (mouth) to above the confluence of Sand Lick Creek (mi 18.7). All pools sampled appeared to have similar amounts of muskellunge habitat except for station five where lack of shade apparently reduced the numbers of muskellunge captured. Upstream of this site, the habitat returned to what was considered typical habitat - shaded pools and woody debris. The upper third of Fox Creek has undesirable muskellunge habitat. Sand Lick Creek, the larger of the two tributary streams to Fox Creek does not have deep pools as is found in Fox Creek.

The relative size of each pool in Fox Creek was advantageous for capture of muskellunge. The average width of each pool sampled was less than 45 ft (Table 7); this allowed the electrofishing boat to completely sample the entire pool during one pass. This, combined with the relatively shallow pools, limited muskellunge escape. Not all muskellunge observed were actually captured, but most muskellunge believed to be in the sample pools were either observed or captured. In only one pool (Station 3, 1988) did the observations outnumber the catch. Overall, however, 66% of all muskellunge observed were caught.

Twenty-eight muskellunge collected from Fox Creek were utilized for age and growth analysis. Mean back calculated lengths for ages 1-6 were 11.3, 18.1, 24.2, 28.9, 32.1, and 34.5 in (Table 8). These growth rates are slightly faster than those reported by Axon and Kornman (1986) from 12 streams in eastern Kentucky. Brewer (1980) showed average growth rates from nine Kentucky streams that were almost identical to those from Fox Creek. Muskellunge in Fox Creek exceed the minimum size limit of 30 in during their fifth year.

Of the 41 muskellunge captured during the two sampling years, 15 fish were harvestable size of  $\geq 30$  in and were tagged to determine the exploitation rate. Nine fish were tagged during 1987 and six muskellunge were tagged during 1988. Anglers have reportedly caught three fish. Two were caught the following summer within 12 months after tagging; the third was caught nearly 3 years following capture. The two fish caught in 1988 were 30.3 and 31.1 in long when tagged during September 1987. They were 32.3 and 33.8 in long, respectively, when caught during June the following year. One muskellunge was 35.8 in long when tagged in September 1988 and was reported as 38 inches long when caught in August 1991. No other tag returns have been reported since that time. There is some question as to how well these tags are retained. Several times during the second year of sampling, fish were observed with a split dorsal fin that

appeared to be the results of a tag. No fish tagged during 1987 were recaptured by electrofishing during the second sampling year, nor were any reported to have been caught by anglers.

No other muskellunge studies have been conducted on Fox Creek. This stream has not been recognized as a muskellunge stream until the late 1970's. Whether this was due to Cave Run Lake being impounded, improving habitat, flood control structures constructed on upper Fox Creek, or stocking the Licking River with muskellunge fingerlings since the construction of Minor Clark Fish Hatchery is unknown. Muskellunge were probably always present in Fox Creek. Muskellunge may have existed in this creek historically and the few anglers that knew of their presence remained secretive. However, no one has expressed knowledge of muskellunge being found in Fox Creek until recent years. Fox Creek does have a quality muskellunge fishery. Catch rates are the best of any stream sampled in the state. Growth rates are slightly above those found in streams elsewhere in Kentucky. Fox Creek, based on what limited sampling that has been done, must be considered good to excellent as a muskellunge fishery when compared to other muskellunge streams in Kentucky.

### Triplett Creek

Four pools, representing 2.6 mi of muskellunge habitat were electrofished in North Fork Triplett and Triplett creeks during 1986. An additional pool was sampled in North Fork Triplett Creek during 1987, bringing the total to five pools electrofished, representing 3.2 mi of stream habitat. Station one was the only site on main stem Triplett Creek, all others were in North Fork Triplett. During sampling in 1986, five muskellunge were captured that represented 1.4 fish/h, and 1.9 fish/mi (Table 9). Three harvestable-sized ( $\geq 30$  in) muskellunge were collected for a rate of 1.2 fish/mi, sublegal sized fish were captured at a rate of 0.8 muskellunge/mi. While sampling during 1987 only two muskellunge were captured (Table 10), catch rates were 0.6 fish/h and 0.6 fish/mi. Only one of the two fish captured during 1987 was of harvestable size, it was a 42 in, 21 lb muskellunge. Ten muskellunge were observed but not captured during the two year study; five each year. Three of the non-captured fish were estimated to be 30 in long or longer. A total of seven muskellunge were captured during the sample years. The mean catch rates for both years was 1.1 fish/h and 1.2 muskellunge/mi. In the main stem of Triplett Creek the catch per unit effort was 0.9 fish per hour and in North Fork Triplett Creek it was 1.1. In all cases, the catch rates exceeded the 0.6 muskellunge/h mean found in 14 eastern Kentucky streams as reported by Axon and Kornman (1986).

Brewer (1980) collected 16 muskellunge in North Fork Triplett and Triplett creeks during five sample years. His success rate of 1.9 fish/mi includes observed fish that were not collected. During this study, the success rate was 2.9 muskellunge/mi when including captured and observed fish. It is difficult to compare this study with Brewer's. He included pools not sampled during this study, his electrofishing boat was completely different, he used only one dipper, he extended much more effort per pool, his pool sizes were different, and he sampled for 5 years. Brewer (1980) only sampled one year at a station in the main stem of Triplett Creek. Two consecutive years were sampled at Triplett Creek during this study. In North Fork Triplett Creek, Brewer sampled 1.2 to 2.3 mi each year; in this study, 1.5 mi were sampled one year and 2.1 mi the next. Brewer sampled all the study sites listed in this report at least once. Based on the limited comparisons between the two reports, it does appear that muskellunge stocked since 1973 has increased the numbers of fish observed in this stream.

The Minor Clark Fish Hatchery was ask not to stock muskellunge during 1986 in order to evaluate possible natural reproduction. No muskellunge from the 1986 year class were captured or observed.

Lengths and weights of all muskellunge captured in each sample pool in North Fork Triplett and Triplett creek, along with sampling dates, are shown in Table 10. Muskellunge were captured or observed in all pools sampled.

Known muskellunge habitat runs from mi 0.0 (mouth) in Triplett Creek to mi 5.8 (the confluence of North Fork Triplett Creek) and from mi 0.0 in North Fork Triplett Creek to mi 15.4 (confluence of Rock Fork). All pools sampled had good muskellunge habitat that was mainly woody debris, excellent shade, and deep holes. The upper third of North Fork Triplett Creek is considered unsuitable for muskellunge due mainly to steep gradients and short, shallow pools.

The size of pools sampled in North Fork Triplett and Triplett creeks made capture of muskellunge easier. Brewer (1980) and Kornman (1985) both indicated how much easier it was to capture muskellunge, if they are present, in short and narrow pools. Except for station one, all sample sites were 0.6 mi in length or shorter (Table 11). Average pool width was less than 70 ft. Although not as narrow as Fox Creek, North Fork Triplett Creek was still narrow enough to limit escape of muskellunge. Not all muskellunge observed were captured; nearly 60% eluded capture. Capture rates were better during 1986; 50% of the fish were caught.

Five muskellunge captured in 1986 averaged 30.4 (18.9 - 39.0) in long and weighed 9.19 (1.09 - 15.25) lb. The following year only two muskellunge were captured, they were 29.3 and 42.0 in long and weighed 5.42 and 21.0 lb, respectively. The combined average lengths and weights of the seven muskellunge captured during the two sample years was 31.9 in and 10.77 lb. The average size of the 10 muskellunge observed but not captured was approximately 26 in long, only three fish equaled or exceeded the 30-in long size limit.

All seven muskellunge captured from North Fork Triplett and Triplett creeks were utilized for age and growth analysis. Mean back calculated lengths were 10.7, 17.0, 24.1, 30.0, 34.2, and 37.1 in long at ages 1-6, respectively (Table 12). Only three year classes (1980, 1981, 1984) were captured, with three fish each from both the 1980 and 1984 year classes. The growth rates observed exceeded those shown by both Axon and Kornman (1986) and Brewer (1980) for streams in eastern Kentucky. Four of these muskellunge were taken from pools the US Forest Service (USFS) routinely stocked with catchable sized (9 in long) rainbow trout. From March through June, over 3,000 rainbow trout provide ideal forage for muskellunge in essentially enclosed pools.

Of the seven muskellunge captured during the two sampling years, five fish were tagged to determine the exploitation rate. Three fish were tagged in 1986 and two others in 1987. Anglers have reportedly caught three of these tagged muskellunge. A 36.1 in long fish, tagged in September 1986, was caught in September 1987 and reported to be 36 in long at that time. Another was tagged on June 1987 at 29.3 in long, was caught in July 1988, and had grown to 31 in long. Finally, a 42 in (21 lb) muskellunge, tagged June 1987, was caught the following September; no length or weight was reported. No other tag returns from Triplett Creek have been reported. Tags that have been on fish for any period of time are often covered by a fleshy membrane that obscures the tag, thus making angler observation nearly impossible.

Brewer (1980) reported the general muskellunge range in North Fork Triplett Creek to be from mi 0-15. Although he didn't consider the lower portion of the creek to be main stem Triplett Creek, the range of muskellunge found in both studies was quite similar; the mileage is slightly different, however. His tagging studies also showed that about 33% of all tagged muskellunge were creel'd within a year after tagging. This study showed 40% of tagged fish were caught within a year. It was thought that the impounding of the Licking River forming Cave Run Lake would take some of the fishing pressure off of muskellunge in streams. This may not be the case based on the higher exploitation.

Access is fair to most portions of North Fork Triplett and Triplett creeks. Anglers can slide small boats and canoes into the stream along roadsides and bridges, and fish most of the muskellunge habitat; many anglers enjoy bank angling. The fishery is unique in these streams since all three species of black bass can be caught, as well as an occasional muskellunge, or a limit of rainbow trout. Other game fish, including rock bass, white crappie, and sauger are occasionally caught.

## **Fishes Collected and a Review of Fish Investigations**

### **Fox Creek**

During the course of this study, 50 species of fish were collected from Fox Creek. Fish collected during timed electrofishing are shown in tables 13-15. More emphasis was placed on collecting smaller fishes during the second sample year; as a result, several additional species were collected. They included the central stoneroller, rosyface shiner, mimic shiner, bullhead minnow, creek chub, white sucker,

smallmouth buffalo, yellow bullhead, brindled madtom, blackstripe topminnow, and redear sunfish.

During 1989, four sample sites were seined (Table 16) to look for additional species not found during electrofishing surveys in pools. Seventeen species (Table 17) were collected; three of which were not previously reported during this study. They were the stonecat, fantail darter, and banded darter. All seine sites were located at riffle areas.

Several investigators have sampled Fox Creek or its major tributary, Sand Lick Creek. The first published report on Fox Creek was by Welter (1938). Welter's sampling was limited to the Kentucky Route 32 bridge site at Fox Creek. He only reported six fish species taken, but his southern redbelly dace record is the only one known from Fox Creek. Jones' (1970) inventory of the Licking River streams included both Sand Lick and Fox creeks. He seined a 600-ft long area near Big Run on Fox Creek and rotenoned a pool on Sand Lick Creek. The only unusual species Jones reported was a rosefin shiner that was either misidentified or mistaken for a redbelly shiner. These two species are considered sister species, with rosefin shiner abundant in Kentucky from the lower Cumberland River eastward, avoiding the Licking, Little Sandy, and Big Sandy rivers where the redbelly shiner is found sporadically (Burr and Warren 1986). Finally, personnel from the Kentucky Nature Preserves Commissions (KNPC) sampled both Sand Lick and Fox creeks during their study of streams within the oil shale belt of Kentucky (Hannan et al. 1984). Fox Creek was sampled near Jones' (1970) sample location and Sand Lick Creek was sampled within the lower reach near its confluence with Fox Creek. The KNPC collected 19 species from Sand Lick Creek and 24 from Fox Creek, all species characteristic of small to medium-sized streams. All sampling up to this time had been in the uppermost portion of the stream. During KNPC's study, sites were sampled that had not previously been sampled, according to the literature. Table 18 lists all fishes collected from this study and compares these findings to those of other studies. Various collectors have identified a total of 55 species from Fox Creek. Species unique to this study include least brook lamprey (ammocetes in SIU collection, #16025), longnose gar, muskellunge, common carp, emerald shiner, silver shiner, rosyface shiner, spotfin shiner, steelcolor shiner, bullhead minnow, river carpsucker, smallmouth buffalo, bigmouth buffalo, silver redhorse, channel catfish, stonecat, flathead catfish, redear sunfish, sauger, and freshwater drum. Many of these fish are typical of larger streams and are considered common.

### **Triplett and North Fork Triplett creeks**

While sampling for muskellunge, a total of 48 species of fish were captured or observed in these two streams. Thirty-one species were sampled from Triplett Creek and 42 species were collected from North Fork Triplett Creek. Tables 19-21 provide a list of fishes collected, including relative numbers from subsample periods for each sample site by year and combined. Our sampling was primarily for muskellunge; however, attempts were made to document other species present within each study site. Tim Stone (1990) did extensive seining in North Fork Triplett Creek as part of graduate paper for Morehead State University. His sampling listed 16 species not captured by us while electrofishing. They included the least brook lamprey, silverjaw minnow, speckled chub, bigeye chub, emerald shiner, rosyface shiner, mimic shiner, southern redbelly dace, blacknose dace, creek chub, stonecat, brindled madtom, rainbow darter, variegated darter, banded darter, and mottled sculpin.

Several other investigators have reported findings from North Fork Triplett and Triplett creeks (Table 22). Most sampling occurred in North Fork Triplett Creek. The first published fish list was by Woolman (1892) who reported the results of Gilbert and Henshall's collecting in the Licking River and Triplett Creek during 1888 (Welter 1938). Woolman listed 27 fish from Triplett Creek. Other than his observation of the sand shiner and trout perch, his list is still valid today. The sand shiner has been reported in other investigations; however, recent records are only from the Licking River. Welter's paper on fishes of the Licking River listed 51 species of fish from Triplett and North Fork Triplett creeks. Five of these species reported by Welter are not presently found. They are mooneye, sand shiner, trout perch, brown bullhead, and blackstripe topminnow. He listed the brown bullhead as common in Triplett Creek during that time. Burr and Warren (1986) considered it as unsubstantiated without voucher specimens. The blackstripe topminnow has been collected by the author from several localities in North Fork Licking River and Fox Creek but it was not observed in Triplett Creek. Trout perch have not been sampled in Triplett Creek since Welter, nor in the Licking River drainage since Clark (1941a) despite extensive collecting. Minor Clark (1941 a & b) listed 45

species in his list of fish from Northeastern Kentucky. Some of the more unique species he collected were mooneye, sand shiner, blacknose dace, brown bullhead, and blackstripe topminnow. Clark noted that the mooneye were taken at Triplett Creek near Farmers and was rarely taken at present; it has been recently collected from the Licking River, however. In Clark's report, he explained that North Fork Triplett and Triplett creeks offer some of the best muskellunge, bass, catfish, and sucker fishing found in the state. The KNPC included North Fork Triplett in their survey of the Appalachian Province of Eastern Kentucky. Harker et al. (1979) reported 39 species from this stream. They were first to list records of redbelly shiner and southern redbelly dace. They noted that "North Fork Triplett Creek supports the most speciose ichthyofauna examined in the Licking River Drainage". Brewer (1980) did extensive sampling for muskellunge in North Fork Triplett and Triplett creeks during the late 1960's and early 1970's. Brewer sampled with boat mounted electrofishing rigs, sodium cyanide, and seining. Although mainly sampling for muskellunge, he collected 55 species from both streams. He added several new species records. They included the American eel, common carp, rosefin shiner, bullhead minnow, smallmouth buffalo, bigmouth buffalo, spotted sucker, river redhorse, warmouth, black crappie, and sauger. The rosefin shiner, bullhead minnow, river redhorse, and black crappie are reported only in his collection. Slone's (1990) paper also listed 55 species of fish. He included the mimic shiner, quillback carpsucker, and silver redhorse as new locality records (substantiated by the author). Other species he collected that had not been collected since Clark's 1941 report were speckled chub, bigeye chub, emerald shiner, steelcolor shiner and blacknose dace. This report includes river carpsucker and sharpnose darter as new locality records for the drainage. The river carpsucker is native to the Licking River drainage and would be expected. The sharpnose darter is also native to the Licking River drainage but has only been found in one other tributary, Slate Creek. Rainbow trout have been introduced into the drainage by KDFWR and the USFS; they were collected by Brewer (1980), Slone (1990), and during this study. The common carp is considered an exotic (Burr and Warren 1986). A total of 74 species have been identified from the Triplett Creek drainage in listed collections.

### Density and Relative Abundance of Fishes

Tables 23 and 24 illustrate the length distribution, catch rates (fish/hour), relative abundance (%) and, species composition of the fishes collected during the timed sub-sample periods from Fox Creek during 1987 and 1988, respectively. The same type of data is shown in tables 25 and 26 for Triplett and North Fork Triplett creeks during 1986 and 1987. Length distribution, catch rate, and total numbers of each species captured from each pool sampled within each stream during the timed sub-sample are shown in Appendices A-R.

Based on percent occurrence, the five most frequently sampled species in Fox Creek were longear sunfish (21.2%), bluegill (14.4%), steelcolor shiner (9.5%), gizzard shad (8.1%) and spotfin shiner (7.1%) (Table 27). In North Fork Triplett and Triplett creeks (Table 28), the five most often sampled fishes were golden redhorse (24.6%), longear sunfish (17.6%), common carp (9.9%), bluegill (7.5%) and gizzard shad (6.4%). Axon and Kornman (1986) looked at the three most abundant fish species found in 14 eastern Kentucky muskellunge streams. Golden redhorse were the most abundant fish in 11 of those streams; it was one of the top three in all streams. Longear sunfish was one of the three most numerous species in 10 of the streams. From 41 pools in the Green River, gizzard shad (33%), golden redhorse (12%), and carp (10%) were the three most commonly sampled species (Axon 1985). Kornman (1989) found the three most common species sampled in the Licking River below Cave Run Lake to be gizzard shad, longear sunfish, and golden redhorse. North Fork Triplett and Triplett creeks fit into Axon and Kornman's findings for fish species abundance in Kentucky's native muskellunge streams.

The entire sample period at each pool was utilized to estimate CPUE of muskellunge. Table 29 shows the length distribution, catch rates, and total numbers of muskellunge captured in each stream during the 2-year study. Axon and Kornman (1986) noted the CPUE for muskellunge in 14 east Kentucky streams ranged from 0.1 to 1.3 fish/h; the mean CPUE was 0.6 fish/h. Observations from the length frequency table support the contention that the numbers of small muskellunge in Fox Creek are probably from Licking River stockings.

## Black Bass Composition

Attempts were made to capture all black bass observed in all study pools while electrofishing. The black bass composition from timed sub-samples in both streams is shown in Table 30. No smallmouth bass were captured or observed in Fox Creek and none have been reported from here in the cited literature. Spotted bass was the dominant species of black bass captured in Fox Creek. Overall numbers and catch rates were low for both black bass species captured - 4.81 spotted bass and 3.66 largemouth bass/h of sampling. Of the black bass sampled in Fox Creek, 14.3% of the largemouth bass and none of the spotted bass were  $\geq 12$  in. In Triplett Creek, the single pool sampled revealed only 11 black bass - 10 spotted bass and 1 largemouth bass. Smallmouth bass are known to occur farther upstream in Triplett Creek, however. None of the spotted bass collected in Triplett Creek reached 12-in long; their catch rate was 4.57 fish/h.

In North Fork Triplett Creek smallmouth bass were nearly as abundant as spotted bass. However, smallmouth bass were only captured in the upper two pools and were the dominant black bass species at Station 4. The CPUE for black bass in this stream was 9.87 fish/h for spotted bass, 9.42 fish/h for smallmouth bass, and 4.71 fish/h for largemouth bass. Of all the bass captured in North Fork Triplett Creek, 19.0% of the largemouth bass, 4.5% of the spotted bass, and 24% of the smallmouth bass were  $\geq 12$  in. Black bass composition in Triplett and North Fork Triplett creeks, combined, was 48% spotted bass, 34% smallmouth bass and 18% largemouth bass.

Kornman (1989) reported that spotted bass were the dominant black bass species sampled in the Licking River below Cave Run Lake. Spotted bass were also the most abundant black bass captured in 9 of the 12 muskellunge streams reported on by Axon and Kornman (1986). The mean length at age for 28 spotted bass in North Fork Triplett Creek was 3.9, 5.4, 7.0, 8.4, 9.6, and 11.2 in for ages 1-6, respectively (Appendix Y).

## Physical Characteristics

Selected physical characteristics for Fox and Triplett creeks are shown in tables 31-35. A brief discussion of each characteristic found at both study streams is shown below.

**Length:** Stream length as measured with a cartometer on topographic maps is 26.3 mi for Fox Creek. Triplett Creek is 5.8 mi long from its confluence with the Licking River to North Fork Triplett Creek (Triplett Creek is 21.5 mi long). North Fork Triplett Creek is 26.5 mi in length. Average length of the study pools was 0.82 mi long in Fox Creek and 0.64 mi in Triplett and North Fork Triplett creeks.

**Width:** The average width of each study pool was 44.7 ft in Fox Creek and 68.4 ft in North Fork Triplett and Triplett creeks.

**Depth:** In Fox Creek the average depth was 2.8 ft; the maximum depth averaged 5.8 ft. Mean depth was 2.5 ft in North Fork Triplett and Triplett creeks; average maximum depth was 8.2 feet.

**Gradient:** The average gradient for the entire length of Fox Creek was 15.4 ft/mi; in those areas corresponding to muskellunge habitat, the gradient was 2.0 ft/mi. In Triplett Creek, the gradient averages 12.6 ft/mi, but is only 1.6 ft/mi in the sampled area. North Fork Triplett Creek has a gradient of 18.1 ft/mi; within the estimated muskellunge range, the gradient is 6.9 ft/mi.

**Fish Shelter:** In Fox Creek, fish shelter was considered medium in abundance in most locations, but abundant at Station 3. Fish shelter in this stream was mostly in the form of logs and brush; boulders were scattered in most pools. The one site in Triplett Creek was considered as having abundant fish shelter consisting mostly of ledges, logs, and brush. In North Fork Triplett Creek, fish shelter was considered abundant to very abundant, consisting mainly of undercut banks, ledges, logs, and brush. Fallen trees were common

in both streams. Kornman (1983 and 1985) and Axon and Kornman (1986) both indicated the importance of fallen tree habitat to stream muskellunge.

**Riparian Zone:** The riparian zone varied from station to station and from one bank to the other in each stream. Along Fox Creek, at all sites listed, the riparian zone was 0-10 yd. Extensive use of adjacent fields for crops or pasture in this drainage results in limited riparian corridors. Some steep hillsides and/or drainages were completely forested. Adjacent to Triplett and North Fork Triplett creeks, the riparian zones averaged 10-20 yd. Although less land along Triplett and North Fork Triplett creeks are farmed for row crops, pasture land is still abundant along these creeks.

**Shade:** Shade averaged 60-85% at all sample sites on Fox Creek; only the upper most station did not provide at least 50% coverage. On Triplett Creek the shade was estimated at 50-75%; while all sites in North Fork Triplett Creek were estimated to have 75-100% shade.

**Bottom Type:** In most cases in Fox Creek, bedrock was a common bottom type, and was often covered by boulders, rubble, silt, and detritus. The exception was at station three where the stream bottom was composed of silt, muck, and clay. In Triplett Creek, the substrate was mostly sand and clay. Upper areas in North Fork Triplett Creek had bottom types of bedrock with mixed rubble, gravel, silt, and detritus. The lower two stations were the same without the bedrock.

**Pool/Riffle Ratio:** During electrofishing, the habitat type sampled was basically pool habitat. In the areas sampled in Fox Creek, the pool ratio was 60, 90, or 95%; pool/riffle ratios were lowest at the upper two stations. In Triplett and North Fork Triplett creeks, pools made up 90-100% of the habitat sampled; at stations 3 and 4, riffles were few; instead, long shallow ( $\geq 1$ -ft) raceway areas were found.

**Aquatic Vegetation:** In Fox Creek, aquatic vegetation was considered sparse, with occasional small beds of water-willow (*Justicia americana*) being found. The same holds true for Triplett and North Fork Triplett creeks; at Station 4, a small stand of spatterdock (*Nuphar advena*) was seen. In-stream cover of fallen trees, brush, and logs for muskellunge is important due to the absence of aquatic vegetation.

**Aesthetic Value:** At Fox Creek, the aesthetic value was considered good to excellent. Very little human disturbance is observed in the lower portions of Fox Creek. Two covered bridges, Grange City and Ringos Mill are found within the sample areas. A third covered bridge, still being used, is on Sand Lick Creek. Several old mill sites can also be found along the creek.

The aesthetic values are considered good to excellent on Triplett and North Fork Triplett creeks as well. These streams are within the boundaries of the Daniel Boone National Forest. Although there are no impoundments, there are remnants of several old mill sites. Most pools are fairly isolated and very little human disturbance can be observed from the creek.

**Access:** Boat access is very limited on both streams; most access is through private property. These are small streams where small, portable boats are useful. A county road runs parallel to Fox Creek near the State Route 111 bridge; the next bridge is on State Route 158 at Ringos Mill. Three roads cross Triplett and North Fork Triplett creeks - State Routes 801, 799, and 32; however, access is poor; the best sites are low water fords on private property.

## Water Quality

Water quality site locations are shown in Table 36 for Fox Creek and in Table 37 for North Fork Triplett and Triplett creeks. Table 38 shows the water quality criteria for warmwater fish habitat. Water quality sampling was performed during July and October 1986 in both streams.

Results of water quality determinations from Fox Creek are shown in Table 39. Findings from these samples indicate water quality criteria set forth for warmwater fish were met for all parameters, except alkalinity, which was below accepted standards at one station in October. Overall, alkalinity values were barely above the minimum preferred level of  $\geq 100$  mg/l.

The results of water quality determinations from Triplett and North Fork Triplett creeks are shown in Table 40. Most of these parameters were considered suitable for warmwater fish except for total alkalinity at all samples but one and pH at one station in July. Total alkalinity values were low; only one site was at the preferred level on a single date. The pH values at stations 1 and 3 in July were near the minimum range.

The oil shale belt lies within drainages of both study streams. This horseshoe shaped belt is where the oil shale forms surface deposits up to 300-ft thick and is considered commercially valuable. The potential impacts, if and when commercial oil shale processing begins, will be detrimental to the streams in this area. Hannan et al. (1984) discussed some of the impacts on aquatic resources if oil shale is developed. Major stream impacts associated with this industry are thought to be water removal (for processing shale), hydrologic alterations, discharges from the processing facility, and runoff from exposed mine surfaces and spent shale. With the relatively low alkalinity values both Fox and Triplett creeks exhibit, there is limited buffering capacities to neutralize any pH changes. Potential impacts to both the water quality and the aquatic communities could result if oil shale development becomes a reality.

At Triplett Creek, several lumber mills are located along its bank and within the drainage. There has been one major fish kill due to the dumping of a vat of Permatox into the drainage. Other minor fish kills have also been documented, listing various lumber industries as the cause. There is the continuing potential problem of sawdust entering the stream, causing low dissolved oxygen problems. Triplett Creek presently receives runoff from residential septic fields; however, this problem is being corrected with the addition of hook-ups to the sewer system in many of these residential areas. Both Fox and Triplett creeks could, and do, receive potential sources of degradation from runoff from agricultural practices and timber operations. Kentucky Division of Water (1992) indicated both streams are impacted by nonpoint source pollution.

## RECOMMENDATIONS

Minor Clark (1941b) noted that North Fork Triplett Creek was one of the best fishing streams in Kentucky. He indicated the abundance of fine pools; often longer, wider, and deeper than one might expect in a stream of this size. Jones (1970) commented that the quality of fishing in this stream had declined considerably due to pollution and possibly increased fishing pressure. He rated fishing for muskellunge and black bass as only fair and good for rock bass and bullheads. He indicated that Triplett creek often had a bad odor caused by sewage. Triplett and North Fork Triplett creeks have obviously changed over the years. A sewage treatment plant was shut down and replaced with a modern version west of Morehead near Bluestone; effluent is now discharged into the Licking River. Harker et al. (1979) discussed the diverse flora and fauna found in North Fork Triplett Creek. They recommended that measures be taken to protect the integrity of this high quality resource because of its potential for aesthetic, recreational and sport fishery utilization and for the richness of the biota of this stream.

Fox Creek has not had fish sampling performed on it as at other streams. Based on the known literature it is still a relatively obscure stream. It is not easily accessible, it is unpolluted, and is somewhat unknown except to a few anglers. Fox Creek is a unique stream that needs to have proper recognition and the same protection afforded other streams as warmwater aquatic habitat.

Both Fox and Triplett creeks presently have excellent fish populations and good water quality. These qualities need to be maintained. All agencies involved (county, state, and federal) should strive to protect and/or enhance activities that have helped make these streams the high quality resources. It will be important to monitor any habitat alteration that has the potential to harm the aquatic life in these streams.

An adequate riparian zone should be protected on all streams. A buffer of vegetation at least 20-ft



wide on all stream banks would help provide shade, bank stabilization, and wildlife habitat. This would also provide fallen trees and other woody debris that are important for fish habitat. Habitat presently in the stream such as trees, logs, and brush should not be removed. Better agricultural practices should be pursued to protect against sedimentation. Logging operations should follow recommended procedures to avoid increased sedimentation.

Illegal harvest of muskellunge has the greatest impact on this species than any other problem observed. During late winter and early spring, especially during high or rising water, illegal gill and hoop nets have been documented in the Licking River and in Fox Creek. Large fish traps have been found in Triplett Creek. Further reports and physical evidence indicate that this might be a major harvest technique. Muskellunge are known to begin their spawning run in late winter, the same time most illegal netting is thought to occur. In most cases nets are fished from bank to bank, catching all fish moving through the area.

The removal of broodstock muskellunge may reduce the level of natural recruitment. This illegal harvest not only deprives muskellunge anglers of more fish to catch but may result in stocked fish having a greater role in maintaining the fishery. Kornman (1985) alluded to the impacts of unmanned fishing gear (jug fishing, limb lines, bank poles) being detrimental to the fishery. Particularly in view of this species being in low numbers as is natural for such a large predator. All these illegal activities indicate a need to protect our unique trophy muskellunge fishery. Laws are on the books making many of these activities illegal, so in order to protect this quality fishery, better enforcement is needed. A concerted effort needs to be established to cite and fine any illegal harvest, not merely removing the illegal equipment if it is found.

Triplett Creek, and North Fork Triplett Creek are well known for their muskellunge fishery. At one time the state record muskellunge was reported to have been caught from Triplett Creek (Clark 1941b). Sampling data from this study does not indicated any changes in the muskellunge population since Brewer's (1980) electrofishing during 1967-1971. As was recommended by Brewer, muskellunge fingerlings have been stocked into this stream as maintenance stockings to protect the resource. Since 1987 these stockings have been carried out on an annual basis. Two of the three year classes sampled at Triplett Creek and North Fork Triplett Creek the majority of the captured fish (4 of 7) were from years when muskellunge were not stocked. Therefore, reproduction from native muskellunge is occurring in this stream. However, Triplett Creek should continue to receive maintenance muskellunge stockings. The muskellunge stocking should be continued annually with 7 to 9 inch long fish at a rate of at least one per acre of muskellunge habitat. This would supply a consistent source of year classes to maintain the quality fishery in this stream.

Fox Creek muskellunge populations had never been studied prior to this study. It is unknown if there was a native population of muskellunge in this stream prior to being stocked. Based on the sampling performed during this study, there presently is an excellent muskellunge fishery in the lower 20 mi of the stream. Every age group from 1981 through 1988 was collected. Although no muskellunge were stocked into the Licking River during 1982 and 1983, 2 fish from 1982 year class and 3 from 1983 year class were collected from Fox Creek. This indicates there is reproduction taking place in Fox Creek, or that the Licking River and/or another nearby stream could be providing year classes of muskellunge. This stream has had a continuing problem with illegal gill nets set within the lower stream section. This problem needs to be addressed. Illegal netting activity in this stream may be more detrimental to the adult muskellunge population than any other factor.

Occasional electrofishing studies should be carried out in these streams to determine density, and age and size structure of the muskellunge population. A few selected pools should be sampled each year for two consecutive years, on a 5 year rotation, in all muskellunge streams. Marked muskellunge should be stocked into the Licking River before Fox Creek is sampled again to determine if these fish are actually migrating from the river.

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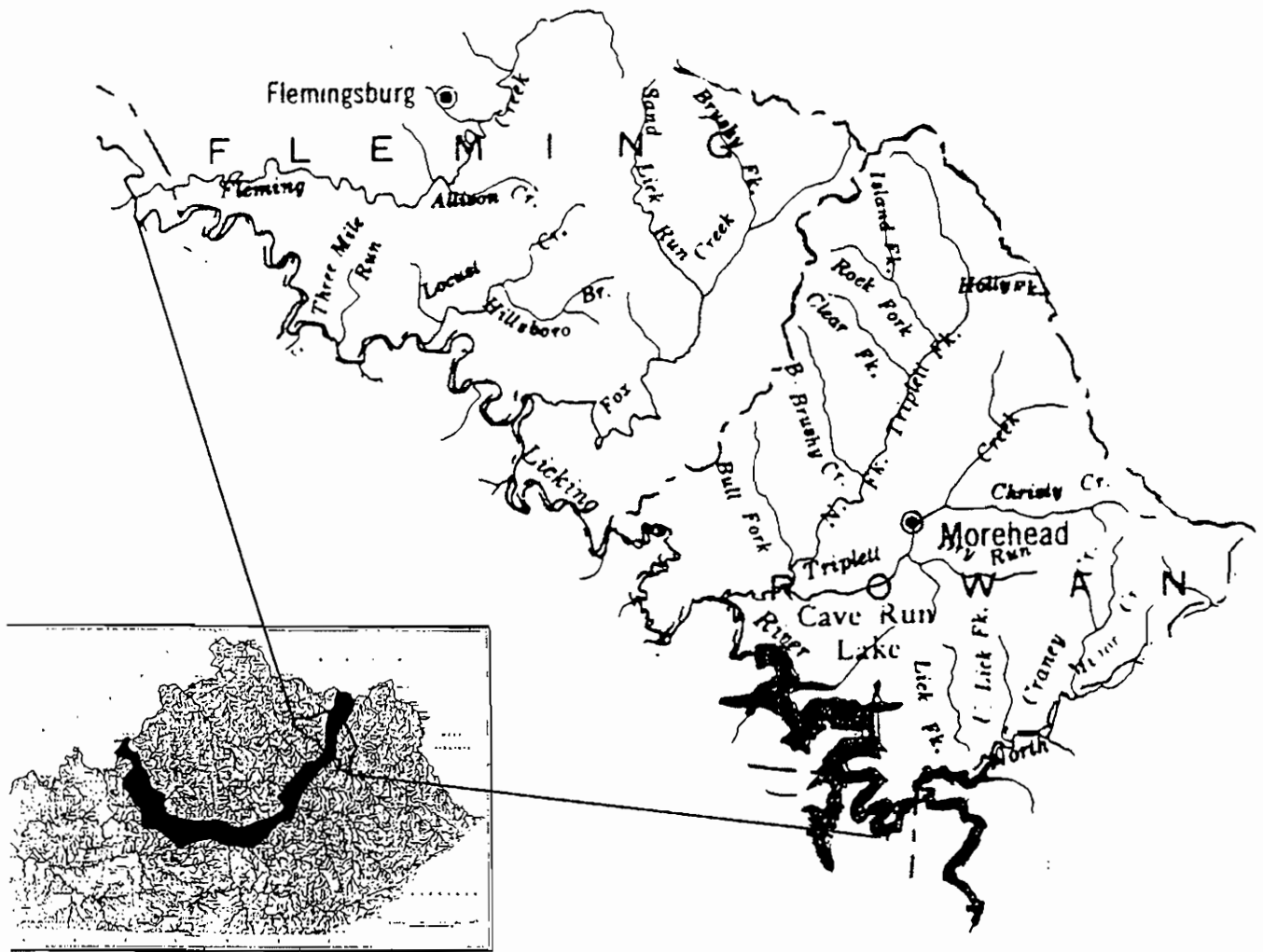


Figure 1. Stream map of Fox and Triplett creek drainages, including oil shale belt.

Table 1. Muskellunge stockings at Triplett Creek, including North Fork Triplett Creek, from 1966 – 1997.

Year	Number	Mean length (in)
1973	152	6.0-9.0
1978	76	5.0-9.0
1979	84	5.0-9.0
1984	118	7.9
1985	118	8.4
1987	80	8.4
1988	50	9.4
1989	55	8.8
1990	49,400	0.5
1990	50	8.9
1991	110	9.0
1993	66	8.7
1994	96	8.6
1995	80	9.1
1996	40	14.0
1997	155,000	0.5
1997	100	7.2

Table 2. Locations of Fox Creek fish sampling stations (1987 – 1988).

Station	Location
1	Fleming County, from confluence with Davis Branch, just below highway 111 bridge, upstream 0.6 mi to next unnamed tributary. Creek mi 2.6-3.2, 08 Sep 1987 and 21 Sep 1988. Hillsboro, KY Quad.
2	Fleming County, from confluence with an unnamed tributary 1.6 mi above highway 111 bridge, upstream 0.8 mi to a low water ford. Creek mi 4.3-5.1, 10 Sep 1987 and 21 Sep 1988. Colfax, KY Quad.
3	Fleming County, from confluence with Storey Branch, upstream 1.6 mi. Creek mi 6.1-7.7, 09 Sep 1987 and 22 Sep 1988. Colfax, KY and Farmers, KY Quads.
4	Fleming County, from confluence with Stone Lick Branch, upstream 0.7 mi to old Ringos Mill site (now a riffle), just downstream of highway 158 bridge. Creek mi 12.1- 12.8, 15 Sep 1987 and 23 Sep 1988. Plummers Landing, KY Quad.
5	Fleming County, from old Ringos Mill site/riffle just downstream of highway 158 bridge, upstream 0.5 mi to confluence of unnamed tributary. Creek mi 12.8-13.3, 15 Sep 1987 and 23 Sep 1988. Plummers Landing, KY Quad.

Table 3. Location of Triplett Creek fish sampling stations (1986 – 1987); station 1 is in main stem Triplett Creek, stations 2-5 are in North Fork Triplett Creek.

Station	Location <sup>a</sup>
1	Rowan County, from confluence with Licking River upstream 1.1 mi. Creek mi 0.0-1.1, 23 Jun 1986 and 10 Jun 1987. Farmers, KY Quad.
2	Rowan County, from confluence with unnamed tributary downstream of iron bridge on Bull Fork Road, upstream 0.6 mi. Locally known as Flannery's Hole. Creek mi 2.1-2.7, 09 Jun 1987. Farmers, KY Quad.
3	Rowan County, from confluence with unnamed tributary (junction Skaggs and Bluestone roads), upstream 0.5 mi (approximately 0.5 mi downstream of confluence with Bratton Branch). Locally known as Howard's Hole. Creek mi 3.6-4.1, 17 Sep 1986 and 09 Jun 1987. Morehead and Farmers, KY Quads.
4	Rowan County, from confluence with Weaver Branch upstream 0.5 mi (Caudill Cemetery Road bridge, off KY 377, 1.5 air mi south of Cranston, KY). Locally known as Weaver Hole. Creek mi 10.6-11.1, 16 Sep 1986 and 08 Jun 1987. Morehead, KY Quad.
5	Rowan County, from 0.2 mi below confluence with Harvy Branch, upstream 0.5 mi to confluence with Debord Branch. Creek mi 11.3-11.8, 14 Sep 1986 and 08 Jun 1987. Morehead and Cranston, KY Quads.

<sup>a</sup> Mile 0.0 of North Fork Triplett Creek begins with its confluence with Triplett Creek at Triplett Creek mi 5.8; mi 0.0 of Triplett Creek begins with its confluence with Licking River at Licking River mi 168.3.

Table 4. Sampling effort and muskellunge captured by electrofishing in Fox Creek during 1987 – 1988

Station	Date sampled	Total hours electro-fishing	Sub-sample time (hours)	Length of pool (mi)	Number of muskellunge captured	Number of muskellunge < 30 in	Additional muskellunge observed ≥30 in
1	08 Sep 87	0.83	0.50	0.6	3	0	2
	21 Sep 88	0.86	0.50	0.6	6	2	0
2	10 Sep 87	1.03	0.50	0.8	6	3	1
	21 Sep 88	1.17	0.50	0.8	4	0	2
3	09 Sep 87	1.48	0.72	1.6	3	1	1
	22 Sep 88	1.79	0.50	1.6	6	4	3
4	15 Sep 87	0.74	0.25	0.7	2	0	0
	23 Sep 88	0.61	0.50	0.7	7	1	0
5	15 Sep 87	0.56	0.25	0.5	3	0	0
	23 Sep 88	0.50	0.50	0.5	1	1	0
Total	1987	4.64	2.22	4.2	17	4	4
	1988	4.93	2.50	4.2	24	8	5

Table 5. Catch per unit effort for muskellunge captured from study streams within the Northeastern Fishery District.

Stream	Year sampled	CPUE (fish/hour) <sup>a</sup>
Kinniconick Creek	1980	0.5
	1981	0.5
Tygarts Creek	1980	1.0
	1981	1.7
Red River	1982	0.4
	1983	0.2
Station Camp Creek	1982	0.7
	1983	0.8
Sturgeon creek	1982	0.0
	1983	0.4
Licking River	1983-1986	0.2
Little Sandy River	1986	0.9
	1987	0.8
Salt Lick Creek	1986	1.2
	1987	0.0
Triplett Creek	1986	1.4
	1987	0.6
Fox Creek	1987	3.7
	1988	4.9

<sup>a</sup> Mean CPUE for 12 Kentucky muskellunge streams was 0.6 fish/h (Axon and Kornman 1986).



Table 6. Muskellunge captured and observed while electrofishing Fox Creek during 1987 and 1988.

Station	Date	Total sampling hours	Pool length (mi)	Muskellunge size		Estimated length (in) of observed muskellunge
				(in)	(lb)	
1	08 Sep 87	0.83	0.6	30.3	6.25 <sup>a</sup>	20
				33.2	7.80	26
				38.5	14.30	
1	21 Sep 88	0.86	0.6	9.2	0.18	26
				9.5	0.10	28
				9.6	0.14	
				9.9	0.18	
				25.7	3.42	
2	10 Sep 87	1.03	0.8	31.3	6.28	
				6.9	0.05	26
				29.2	4.92	28
				31.1	6.26 <sup>b</sup>	29
				34.1	8.78	36
2	21 Sep 88	1.17	0.8	34.7	10.02	
				35.9	10.16	
				7.1	0.06	30
				9.9	0.14	36
				30.2	6.30	
3	09 Sep 87	1.48	1.6	30.3	6.52	
				21.0	1.52	26
				23.2	2.22	30
3	22 Sep 88	1.79	1.6	25.4	3.02	
				20.7	1.58	8
				21.1	1.54	13
				28.7	5.02	28
				33.0	7.72	29
4	15 Sep 87	0.74	0.7	34.0	9.26	30
				35.8	11.52 <sup>c</sup>	31
						32
				25.6	2.96 <sup>d</sup>	
				35.0	10.80 <sup>c</sup>	
4	23 Sep 88	0.61	0.7	8.6	0.10	27
				9.0	0.10	
				9.0	0.10	
				9.2	0.10	
				9.6	0.14	
5	15 Sep 87	0.56	0.5	17.5	0.93	
				25.7	3.06	
				16.4	0.72	
				20.0	1.42	
				34.8	9.50	
5	23 Sep 88	0.50	0.5	25.1	3.05	26

<sup>a</sup> Tag no. 217 caught 29 June 1988 (32.3 in, 8.0 lb.).

<sup>b</sup> Tag no. 186 caught 26 June 1988 (33.8 in).

<sup>c</sup> Tag no. 258 caught ? Aug 1991 (38.0 in).

<sup>d,e</sup> Both fish died from electrofishing injuries; too much amperage.

Table 7. Physical characteristics of the fish sampling pools in fox Creek.

Station	Dates sampled	Length (mi)	Mean width (ft)	Mean depth (ft)	Maximum depth (ft)
1	08 Sep 1987, 21 Sep 1988	0.6	44.17	3.78	6.0
2	10 Sep 1987, 21 Sep 1988	0.8	44.71	3.30	6.0
3	09 Sep 1987, 22 Sep 1988	1.6	49.00	2.75	7.0
4	15 Sep 1987, 23 Sep 1988	0.4	40.00	1.64	5.0
5	15 Sep 1987, 23 Sep 1988	0.5	45.40	2.50	5.0
Total		4.2			
Mean		0.84	44.66	2.80	5.8

Table 8. Mean back calculated lengths (in) at each annulus for muskellunge collected from Fox Creek in 1987-1988, including the 95% confidence interval (CI) for each mean length per age group.

Year class	No.	Age					
		1	2	3	4	5	6
1988	1						
1987	1						
1986	1	11.18					
1986	4	10.67	16.53				
1985	5	11.91	18.86				
1985	3	10.26	17.10	22.09			
1984	3	12.07	19.46	26.56			
1984	3	11.51	17.36	23.02	27.45		
1983	1	11.16	19.25	26.06	30.66		
1983	2	10.77	18.34	23.26	28.51	31.49	
1982	2	11.82	18.05	24.44	29.21	32.37	
1981	4	11.19	18.83	24.61	29.69	32.18	34.45
Mean		11.29	18.13	24.16	28.93	32.06	34.45
Number	30	28	27	18	15	8	4
Smallest		9.19	14.23	19.70	25.50	31.10	33.50
Largest		13.15	20.96	27.05	31.16	33.12	35.82
Std error		0.17	0.35	0.53	0.45	0.30	0.50
95% CI (+)		0.34	0.69	1.04	0.89	0.59	0.98

Intercept value used = 4.5.

Table 9. Sampling effort and muskellunge captured by electrofishing in North Fork Triplett and Triplett creeks during 1986 and 1987.

Station	Date sampled	Total hours electrofishing	Subsample time (hours)	Length of sample pool (mi)	Number of muskellunge captured	Number of additional muskellunge observed	
						<30 in	≥30 in
1	23 Jun 86	1.30	1.30	1.1	2	2	0
	10 Jun 87	0.89	0.89	1.1	0	0	1
2	09 Jun 87	0.53	0.53	0.6	1	1	1
3	17 Sep 86	0.81	0.56	0.5	0	2	0
	09 Jun 87	0.59	0.59	0.5	0	0	0
4	16 Sep 86	0.78	0.78	0.5	1	1	0
	08 Jun 87	0.58	0.58	0.5	1	0	0
5	15 Sep 86	0.67	0.28	0.5	2	0	0
	08 Jun 87	0.50	0.50	0.5	0	1	1
Total	1986	3.56	2.92	2.6	5	5	0
	1987	3.09	3.09	3.2	2	2	3

Table 10. Total muskellunge captured and observed while electrofishing in North Fork Triplett and Triplett creeks during 1986 and 1987.

Station	Date	Total sampling hours	Pool length (mi)	Muskellunge		Estimated length(in) of observed fish
				Length (in)	Weight (lb)	
1	23 Jun 86	1.30	1.1	38.0	13.72	28
				39.0	14.50	25
1	10 Jun 87	0.89	1.1			30
2	09 Jun 87	0.53	0.6	29.3	5.42 <sup>a</sup>	26
						32
3	17 Sep 86	0.81	0.5			17
						28
3	09 Jun 87	0.59	0.5			
4	16 Sep 86	0.78	0.5	36.1	15.25 <sup>b</sup>	23
4	08 Jun 87	0.58	0.5	42.0	21.00 <sup>c</sup>	
5	15 Sep 86	0.67	0.5	18.9	1.09	
				20.1	1.41	
5	08 Jun 87	0.50	0.5			20
						32

<sup>a</sup> Tag no. 211 caught 27 Jul 1988 (31 in, 7.0 lb).

<sup>b</sup> Tag no. 179 caught 10 Sep 1987 (36 in, 13.5 lb).

<sup>c</sup> Tag no. 203 caught 30 Sep 1987.

Table 11. Some physical characteristics of the sample pools in North Fork Triplett and Triplett creeks.

Station	Date sampled	Length (mi)	Mean width (ft)	Mean depth (ft)	Maximum depth (ft)
1	23 Jun 86 10 Jun 87	1.1	65.2	3.0	8
2	09 Jun 87	0.6	49.3	2.9	8
3	17 Sep 86 09 Jun 87	0.5	57.0	2.3	7
4	16 Sep 86 08 Jun 87	0.5	91.6	2.6	13
5	15 Sep 86 08 Jun 87	0.5 3.2	78.8	1.9	5
Total		0.64			
Mean			68.38	2.54	8.2

Table 12. Mean back calculated length at age for muskellunge collected from North Fork Triplett and Triplett creeks in 1986 and 1987.

Year class	No.	Age					
		1	2	3	4	5	6
1984	2	10.48	17.15				
1984	1	10.76	20.21	25.99			
1981	1	12.95	18.94	26.33	33.20	37.07	39.54
1980	3	10.15	15.20	22.76	28.90	33.19	36.34
Number	7	7	7	5	4	4	4
Mean		10.73	17.01	24.12	29.98	34.16	37.14
Smallest		9.18	14.39	20.98	28.41	32.09	34.76
Largest		12.95	20.21	26.33	33.20	37.07	39.54
Std error		0.48	0.78	0.97	1.09	1.05	0.99
95% CI (+)		0.95	1.53	1.09	2.13	2.07	1.94

Intercept value used = 4.5.

Table 13. Fishes collected from Fox Creek during 1987. Species observed or not collected during timed period are noted with an "x".

Species	Station					No. of fish	Fish/hour
	1	2	3	4	5		
Least brook lamprey				1		1	0.5
Longnose gar			3			3	1.4
Gizzard shad	40	14	57	x	5	116	52.2
Grass pickerel			1	1	2	4	1.8
Muskellunge	5	5	2	1	3	16	7.2
Common carp	14	7	17	6	3	47	21.2
Emerald shiner	3	1		9		13	5.9
Striped shiner	4	1		5		10	4.5
Silver shiner	1			7		8	3.6
Spotfin shiner	6	1				7	3.2
Redfin shiner				2		2	0.9
Steelcolor shiner	5			4		9	4.1
Bluntnose minnow	4	10	1	23		38	17.1
River carpsucker			2			2	0.9
Northern hog sucker	2			5	2	9	4.1
Bigmouth buffalo	4	1	5	1	x	11	5.0
Spotted sucker	8	5	43	7	6	69	31.1
Silver redhorse	3	3	1	8	2	17	7.7
Golden redhorse	16	25	12	43	15	111	50.0
Channel catfish		2				2	0.9
Flathead catfish				x			
Brook silverside			1			1	0.5
Rock bass	3	2		3	x	8	3.6
Green sunfish			2	1	1	4	1.8
Warmouth	1		3			4	1.8
Bluegill	9	3	30	13	14	69	31.1
Longear sunfish	29	54	80	63	45	271	122.1
Hybrid sunfish		2	1	1	1	5	2.3
Spotted bass	2	5	2	6	5	20	9.0
Largemouth bass			3	x		3	1.4
White crappie		3	1	x		4	1.8
Johnny darter			1	2		3	1.4
Logperch				5		5	2.3
Blackside darter		5		2	3	10	4.5
Sauger	x	x	3			3	1.4
Freshwater drum	6	5	7	5	4	27	12.2

Table 14. Fishes collected from Fox Creek during 1988. Species observed or not collected during timed period are noted with an "x".

Species	Station					No. of fish	Fish/hour
	1	2	3	4	5		
Longnose gar		1	4			5	2.0
Gizzard shad	25	27	47	9	16	124	49.6
Grass pickerel				1	1	2	0.8
Muskellunge	5	2	2	6	1	16	6.4
Central stoneroller	1	1		1		3	1.2
Common carp	10	11	14	9	8	52	20.8
Emerald shiner	17	16	4	13		50	20.0
Striped shiner	5	1				7	2.8
Silver shiner			1	7	1	9	3.6
Rosyface shiner		1				1	0.4
Spotfin shiner	73	65	53	12	1	204	81.6
Mimic shiner	1	2				3	1.2
Steelcolor shiner	85	68	92	24	2	271	108.4
Bluntnose minnow	10	35		68	19	132	52.8
Bullhead minnow		3				3	1.2
Creek chub					1	1	0.4
River carpsucker				3		3	1.2
White sucker			1		3	4	1.6
Northern hog sucker	1	2				3	1.2
Smallmouth buffalo			x				
Bigmouth buffalo	1	1	6	8		16	6.4
Spotted sucker	15	22	26	11	42	116	46.4
Silver redhorse	5	5		5	4	19	7.6
Golden redhorse	18	16	19	15	26	94	37.6
Sucker sp.	3	1				4	1.6
Yellow bullhead				1	1	2	0.8
Channel catfish	1		1			2	0.8
Brindled madtom				1		1	0.4
Flathead catfish			x	2		2	0.8
Blackstripe topminnow	1	1	x	1		3	1.2
Brook silverside	9		4	2	3	18	7.2
Rock bass	3		1	3		7	2.8
Green sunfish	4				2	6	2.4
Warmouth			2	13	5	20	8.0
Bluegill	17	30	47	121	142	357	142.8
Longear sunfish	31	37	43	119	126	356	142.4
Redear sunfish		1				1	0.4
Hybrid sunfish	1		4	5	8	18	7.2
Spotted bass	4	5	1	4	6	20	8.0
Largemouth bass	5	3	9	1	3	21	8.4
White crappie		3	2	2	4	11	4.4
Johnny darter			1	5	2	8	3.2
Logperch		1		2		3	1.2
Blackside darter	3	1	2	7		13	5.2
Sauger	x						
Freshwater drum	7	5	2	2	3	19	7.6

Table 15. Fishes collected from Fox creek during 1987 and 1988. Species observed or not collected during timed period are noted with an "x".

Species	Station					No. of fish	Fish/hour
	1	2	3	4	5		
Least brook lamprey				1		1	0.2
Longnose gar		1	7			8	1.7
Gizzard shad	65	41	104	9	21	240	50.8
Grass pickerel			1	2	3	6	1.3
Muskellunge	10	7	4	7	4	32	6.8
Central stoneroller	1	1		1		3	0.6
Common carp	24	18	31	15	11	99	21.0
Emerald shiner	20	17	4	22		63	13.3
Striped shiner	9	2		6		17	3.6
Silver shiner	1		1	14	1	17	3.6
Rosyface shiner		1				1	0.2
Spotfin shiner	79	66	53	12	1	211	44.7
Redfin shiner				2		2	0.4
Mimic shiner	1	2				3	0.6
Steelcolor shiner	90	68	92	28	2	280	59.3
Bluntnose minnow	14	45	1	91	19	170	36.0
Bullhead minnow		3				3	0.6
Creek chub					1	1	0.2
River carpsucker			2	3		5	1.1
White sucker			1		3	4	0.8
Northern hog sucker	3	2		5	2	12	2.5
Smallmouth buffalo			x				
Bigmouth buffalo	5	2	11	9	x	27	5.7
Spotted sucker	23	27	69	18	48	185	39.2
Silver redhorse	8	8	1	13	6	36	7.6
Golden redhorse	34	41	31	58	41	205	43.4
Sucker sp.	3	1				4	0.8
Yellow bullhead				1	1	2	0.4
Channel catfish	1	2	1			4	0.8
Brindled madtom				1		1	0.2
Flathead catfish			x	2		2	0.4
Blackstripe topminnow	1	1	x	1		3	0.6
Brook silverside	9		5	2	3	19	4.0
Rock bass	6	2	1	6	x	15	3.2
Green sunfish	4		2	1	3	10	2.1
Warmouth	1		5	13	5	24	5.1
Bluegill	26	33	77	134	156	426	90.3
Longear sunfish	60	91	123	182	171	627	132.8
Redear sunfish		1				1	0.2
Hybrid sunfish	1	2	5	6	9	23	4.9
Spotted bass	6	10	3	10	11	40	8.5
Largemouth bass	5	3	12	1	3	24	5.1
White crappie		6	3	2	4	15	3.2
Johnny darter			2	7	2	11	2.3
Logperch		1		7		8	1.7
Blackside darter	3	6	2	9	3	23	4.9
Sauger	x	x	3			3	0.6
Freshwater drum	13	10	9	7	7	46	9.7
<b>Total</b>						<b>2,962</b>	<b>627.5</b>

Table 16. Sample sites seined in Fox Creek.

Seine site	Location
1	First riffle upstream from Highway 111 crossing, approximately 3.0 air mi SSE of Hillsboro, KY. 17 July 1989, Hillsboro, KY Quad.
2	At confluence with Storey Branch, approximately 2.0 air mi N of Colfax, KY. 17 July 1989, Colfax, KY Quad.
3	At Markwell Road crossing, approximately 1.5 air mi S of Ringos Mill, KY. 17 July 1989, Farmers, KY Quad.
4	First riffle downstream of Highway 158 crossing at Ringos Mill, KY. 17 July 1989, Plummers Landing KY Quad.

Table 17. Fishes collected by seining riffles in Fox Creek during 1989.

Species	S1	S2	S3	S4
Central stoneroller	X	X	X	
Striped shiner	X	X	X	X
Spotfin shiner		X	X	
Steelcolor shiner	X	X	X	X
Bluntnose minnow	X	X	X	
Creek chub	X	X	X	
Northern hog sucker		X		
Stonecat			X	
Brook silverside	X			
Bluegill				X
Longear sunfish		X		
Spotted bass	X			
White crappie			X	
Fantail darter	X	X		
Banded darter	X		X	
Logperch	X	X		
Sauger		X		



Table 18. Fishes collected at Fox Creek from six studies

Species	Study					
	1	2	3	4	5	6
Least brook lamprey	X					
Longnose gar	X					
Gizzard shad	X				X	
Grass pickerel	X	X		X	X	X
Muskellunge	X					
Central stoneroller	X	X	X	X		
Common carp	X					
Silverjaw minnow		X	X	X		
Rosefin shiner				X <sup>a</sup>		
Emerald shiner	X					
Striped shiner	X	X	X	X	X	
Silver shiner	X					
Rosyface shiner	X					
Spotfin shiner	X					
Redfin shiner	X	X	X	X		
Mimic shiner	X					X
Steelcolor shiner	X					
Southern redbelly dace						X
Bluntnose minnow	X	X	X	X	X	
Bullhead minnow	X					
Creek chub	X	X	X	X		
River carpsucker	X					
White sucker	X		X		X	
Northern hog sucker	X	X	X	X		
Smallmouth buffalo	X					
Bigmouth buffalo	X					
Spotted sucker	X	X			X	
Silver redhorse	X					
Golden redhorse	X	X	X	X		
Yellow bullhead	X	X			X	
Channel catfish	X					
Stonecat	X					
Brindled madtom	X	X				
Flathead catfish	X					
Blackstripe topminnow	X	X				
Brook silverside	X	X	X	X	X	X
Rock bass	X	X	X	X		
Green sunfish	X				X	
Warmouth	X					
Bluegill	X	X	X	X	X	
Hybrid sunfish	X					
Longear sunfish	X	X	X	X	X	
Redear sunfish	X					
Spotted bass	X	X	X	X		
Largemouth bass	X				X	
White crappie	X		X		X	
Greenside darter		X				
Rainbow darter		X		X	X	
Fantail darter	X	X	X	X		
Johnny darter	X	X	X			
Banded darter	X	X				
Logperch	X		X		X	

Species	Study					
	1	2	3	4	5	6
Blackside darter	X	X	X	X		X
Sauger	X					
Freshwater drum	X					

1 – Study by Surmont for this report.

2 – Hannan et al. 1984 (Fox Creek).

3 – Hannan et al. 1984 (Sand Lick Creek).

4 – Jones 1970 (Fox Creek).

5 – Jones 1970 ( Sand Lick Creek).

6 – Welter 1938.

<sup>a</sup> – Probabily redfin shiner.

Table 19. Fishes collected from North Fork Triplett and Triplett creeks during 1986. Species observed or not collected during timed period are noted with an "x".

Species	Station <sup>a</sup>				No. of fish	Fish/hour
	1	3	4	5		
Longnose gar	1	x			1	0.3
American eel	1				1	0.3
Gizzard shad	36	6	1		43	13.0
Grass pickerel		3	2	x	5	1.5
Muskellunge	2	x	1	2	5	1.5
Common carp	27	47	10	6	90	27.3
River chub	2				2	0.6
Bigeye shiner			14	6	20	6.1
Striped shiner			10	5	15	4.5
Silver shiner			10	3	13	3.9
Spotfin shiner	1		4	2	7	2.1
Redfin shiner			2		2	0.6
Steelcolor shiner	2				2	0.6
Bluntnose minnow	1		12	19	32	9.7
River carpsucker		1	1		2	0.6
Quillback		2			2	0.6
White sucker		1		1	2	0.6
Northern hog sucker	3		5	7	15	4.5
Smallmouth buffalo	2	3	x		5	1.5
Bigmouth buffalo	12	6	3	x	21	6.4
Spotted sucker			7	x	7	2.1
Silver redhorse	4	4	3	3	14	4.2
Black redhorse			45	18	63	19.1
Golden redhorse	14	33	85	65	197	59.7
Yellow bullhead				x		
Channel catfish	x					
Brook silversides	2		6	8	16	4.8
Rock bass	5		4	3	12	3.6
Green sunfish			2		2	0.6
Bluegill	8	23	27	22	80	24.2
Hybrid sunfish	3	1	1	9	14	4.2
Longear sunfish	78	58	63	21	220	66.4
Smallmouth bass			25	x	25	7.6
Spotted bass	8	4	19	10	41	12.4
Largemouth bass		1	8	x	9	2.7
White crappie			3		3	0.9
Greenside darter			1		1	0.3
Johnny darter		1	2	1	4	1.2
Logperch	2	1	1	1	5	1.5
Blackside darter		2	3	4	9	2.7
Sharpnose darter	2				2	0.6
Sauger		1			1	0.3
Freshwater drum		2			2	0.6

<sup>a</sup> - Station 1 at main stem of Triplett Creek, stations 3-5 at North Fork Triplett Creek.

Table 20. Fishes collected from North Fork Triplett and Triplett creeks during 1987. Species observed or not collected during timed period are noted with an "x".

Species	Station <sup>a</sup>					No. of fish	Fish/hour
	1	2	3	4	5		
Longnose gar		2				2	0.7
Gizzard shad	21	3	9	33		66	21.6
Rainbow trout				4	1	5	1.6
Grass pickerel		1	1		x	2	0.7
Muskellunge	x	1		1	x	2	0.7
Central stoneroller	1					1	0.3
Common carp	17	21	30	6	5	79	28.8
Bigeye shiner					2	2	0.7
Striped shiner				1	8	9	2.9
Silver shiner				1	1	2	0.7
Spotfin shiner	2				2	4	1.3
Steelcolor shiner	5		1			6	2.0
Bluntnose minnow				1	5	6	2.0
River carpsucker	1					1	0.3
Quillback		5				5	1.6
Highfin carpsucker	1					1	0.3
White sucker					1	1	0.3
Northern hog sucker	2			2	8	12	3.9
Smallmouth buffalo	3	1	6	2		12	3.9
Bigmouth buffalo	3	5	8	6	3	25	8.2
Spotted sucker	1	5		10	1	17	5.6
Silver redhorse	6		2	6	5	19	6.2
Golden redhorse	9	19	29	90	75	222	72.6
Brook silverside	3					3	1.0
Rock bass	5			7	2	14	4.6
Green sunfish	3	3				6	2.0
Warmouth	2	1	1			4	1.3
Bluegill	12	4	12	13	6	47	15.4
Longear sunfish	34	11	4	14	16	79	28.8
Smallmouth bass				4	5	9	2.9
Spotted bass	2	1		2	3	8	2.6
Largemouth bass	1		5	3		9	2.9
White crappie		1				1	0.3
Fantail darter		1				1	0.3
Logperch			1			1	0.3
Blackside darter					1	1	0.3
Sauger	2	1	1			4	1.3
Freshwater drum			1			1	0.3

<sup>a</sup> - Station 1 in main stem of Triplett Creek, Stations 2-5 in North Fork Triplett Creek.

Table 21. fishes collected from North Fork Triplett and Triplett creeks during 1986 and 1987. Species observed or not collected during timed period are noted with an "x".

Species	Station <sup>a</sup>					No. of fish	Fish/hour
	1	2 <sup>b</sup>	3	4	5		
Longnose gar	1	2	x			3	0.5
American eel	1					1	0.2
Gizzard shad	57	3	15	34		109	18.1
Rainbow trout				4	1	5	0.8
Grass pickerel		1	4	2	x	7	1.2
Muskellunge	2	1	x	2	2	7	1.2
Central stoneroller	1					1	0.2
Common carp	44	21	77	16	11	169	28.1
River chub	2					2	0.3
Bigeye shiner				14	8	22	3.7
Striped shiner				11	13	24	4.0
Silver shiner				11	4	15	2.5
Spotfin shiner	3			4	4	11	1.8
Redfin shiner				2		2	0.3
Steelcolor shiner	7		1			8	1.3
Bluntnose minnow	1			13	24	38	6.3
River carpsucker	1		1	1		3	0.5
Quillback			7			7	1.2
Highfin carpsucker	1					1	0.2
White sucker			1		2	3	0.5
Northern hog sucker	5			7	15	27	4.5
Smallmouth buffalo	5	1	9	2		17	2.8
Bigmouth buffalo	15	5	14	9	3	46	7.7
Spotted sucker	1	5		17	1	24	4.0
Silver redhorse	10		6	9	8	33	5.5
Black redhorse				45	18	63	10.5
Golden redhorse	23	19	62	175	140	419	69.7
Yellow bullhead					x		
Channel catfish	x						
Brook silverside	5			6	8	19	3.2
Rock bass	10			11	5	26	4.3
Green sunfish	3	3		2		8	1.3
Warmouth	2	1	1			4	0.7
Bluegill	20	4	35	40	28	127	21.1
Hybrid sunfish	3		1	1	9	14	2.3
Longear sunfish	112	11	62	77	37	299	49.8
Smallmouth bass				29	5	34	5.7
Spotted bass	10	1	4	21	13	49	8.2
Largemouth bass	1		6	11	x	18	3.0
White crappie		1		3		4	0.7
Greenside darter				1		1	0.2
Johnny darter			1	2	1	4	0.7
Fantail darter		1				1	0.2
Logperch	2		2	1	1	6	1.0
Blackside darter			2	3	5	10	1.7
Sharpnose darter	2					2	0.3
Sauger	2	1	2			5	0.8
Freshwater drum			3			3	0.5
<b>Total</b>						<b>1,701</b>	<b>283.0</b>

<sup>a</sup> - Station 1 in main stem of Triplett Creek, stations 2-5 in North Fork Triplett creek.

<sup>b</sup> - Station 2 sampled only during 1987.

Table 22. Fishes collected at North Fork Triplett and Triplett creeks from six studies.

Species	Study						
	1	2	3	4	5	6	7
Least brook lamprey		X	X		X	X	
Longnose gar	X		X		X	X	
American eel	X		X				
Gizzard shad	X	X	X		X	X	
Mooneye					X	X	
Rainbow trout	X	X	X				
Grass pickerel	X	X	X	X	X	X	X
Muskellunge	X	X	X		X	X	
Central stoneroller	X	X	X	X	X	X	X
Common carp	X	X	X				
Silverjaw minnow		X	X		X	X	X
Speckled chub		X				X	X
Bigeye chub		X			X	X	X
River chub	X		X		X	X	X
Rosefin shiner			X				
Emerald shiner		X				X	X
River shiner			X				
Bigeye shiner	X	X	X	X	X	X	
Striped shiner	X	X	X	X	X	X	X
Silver shiner	X	X	X	X	X	X	
Rosyface shiner		X	X	X	X	X	X
Spotfin shiner	X	X	X		X	X	
Sand shiner					X	X	X
Redfin shiner	X	X		X			
Mimic shiner		X					
Steelcolor shiner	X	X			X	X	X
Southern redbelly dace		X		X			
Bluntnose minnow	X	X	X	X	X	X	X
Fathead minnow			X		X	X	
Bullhead minnow			X				
Blacknose dace		X			X		
Creek chub		X	X	X		X	
River carpsucker	X						
Quillback	X	X					
Highfin carpsucker	X						
White sucker	X	X	X	X		X	
Northern hog sucker	X	X	X	X		X	X
Smallmouth buffalo	X	X	X				
Bigmouth buffalo	X	X	X				
Spotted sucker	X	X	X				
Silver redhorse	X	X					
River redhorse			X				
Black redhorse	X			X	X		X <sup>a</sup>
Golden redhorse	X	X	X	X		X	
Black bullhead			X		X	X	
Yellow bullhead	X	X	X		X	X	
Brown bullhead						X	X
Channel catfish	X		X		X	X	X
Stonecat		X	X	X	X	X	X
Brindled madtom		X	X	X		X	
Trout-perch					X	X	
Blackstripe topminnow					X	X	

Species	Study						
	1	2	3	4	5	6	7
Brook silverside	X	X	X		X	X	X
Rock bass	X	X	X	X	X	X	
Green sunfish	X	X	X	X	X	X	X
Warmouth	X	X	X				
Bluegill	X	X	X		X	X	X
Hybrid sunfish	X						
Longear sunfish	X	X	X	X	X	X	X
Smallmouth bass	X	X	X	X	X	X	X
Spotted bass	X	X	X	X	X	X	
Largemouth bass	X	X	X		X	X	X
White crappie	X	X	X		X	X	
Black crappie			X				
Greenside darter	X	X	X	X	X	X	
Rainbow darter		X	X	X	X	X	X
Fantail darter	X	X	X	X	X	X	X
Johnny darter	X	X	X	X	X	X	X
Variegated darter		X	X		X	X	X
Banded darter		X		X	X	X	X
Logperch	X	X	X	X	X	X	
Blacksided darter	X	X	X	X		X	
Sharpnose darter	X						
Sauger	X	X	X				
Freshwater drum	X	X	X		X	X	
Mottled sculpin		X	X	X	X	X	

- 1) Study by Surmont for this report.
- 2) Slone 1990.
- 3) Brewer 1980.
- 4) Harker et al 1979.
- 5) Clark 1941(a).
- 6) Welter 1938.
- 7) Woolman 1892.

<sup>a</sup> – listed as *Moxostoma duquesnei* (Le Sueur), (white sucker?); not denoted as from Licking River or Triplett Creek but literature appears to confirm from Triplett Creek.

Table 23. Length distribution of species collected during 2.22 hours of electrofishing from all stations combined at Fox Creek in 1987.

Species	Inch class																																	No of fish	Fish/ hour	% of total			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	29	30	31	33	34	35				36	39	
Least brook lamprey						1																														1	0.5	0.1	
Longnose gar																									3											3	1.4	0.3	
Gizzard shad							3	18	53	27	11	2	1	1																						116	52.3	12.5	
Grass pickerel						1	1	2																												4	1.8	0.4	
Muskellunge						1										1			2			1		1	2			1	1	1	1	1	1	1	1	16	7.2	1.7	
Common carp																		1	1	3	6	9	14	3	5	2	2		1						47	21.2	5.1		
Emerald shiner				12	4																															13	5.9	1.4	
Striped shiner			6	1	1	2																														10	4.5	1.1	
Silver shiner				6	2																															8	3.6	0.9	
Spotfin shiner			3	4																																7	3.2	0.8	
Redfin shiner			2																																	2	0.9	0.2	
Steelcolor shiner			5	4																																9	4.1	1.0	
Bluntnose minnow	4	31	3																																	38	17.1	4.1	
River carpsucker																	1	1																		2	0.9	0.2	
Northern hog sucker			2	1	1	2	2				1																									9	4.1	1.0	
Bigmouth buffalo																			1	1	1	6	1	1												11	5.0	1.2	
Spotted sucker		1		5	14	5	3	5	12	5	3	11	4		1																					69	31.1	7.5	
Silver redhorse						2				1	1	1	1	1	1	3		5		1																17	7.7	1.8	
Golden redhorse					3	3	10	12	14	19	16	22	6	5																							110	49.6	11.9
Channel catfish																1	1																				2	0.9	0.2
Brook silverside			1																																		1	0.5	0.1
Rock bass				1	2	4	1																														8	3.6	0.9
Green sunfish				2	1	1																															4	1.8	0.4
Warmouth					1	2	1																														4	1.8	0.4
Bluegill	7	3	15	10	9	18	7																														69	31.1	7.5
Longear sunfish	4	61	90	81	32																																268	120.7	28.9
Hybrid sunfish				1	1	3																															5	2.3	0.5
Spotted bass			5	3	2		3	1	3		3																										20	9.0	2.2
Largemouth bass							1						1	1																							3	1.4	0.3
White crappie								1	2		1																										4	1.8	0.4
Johnny darter			3																																		3	1.4	0.3
Logperch			4	1																																	5	2.3	0.5
Blackside darter			4	6																																	10	4.5	1.1
Sauger									1		1					1																					3	1.4	0.3
Freshwater drum														2		1	2	5	3	3	4	3	2	2												27	12.2	2.9	



Table 24. Length distribution of species collected during 2.5 hours of electrofishing from all stations combined at Fox Creek in 1988.

Species	Inch class																															No of fish	Fish/hour	% of total				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
Longnose gar														1							1		1	1	1								5	2.0	0.2			
Gizzard shad		1	11	18	1	3	9	26	15	21	9	7	2	1																			124	49.6	6.1			
Grass pickerel							2																										2	0.8	0.1			
Muskellunge							1	3	3									1			1					1	3			1	1	1	16	6.4	0.8			
Central stoneroller		2	1																														3	1.2	0.2			
Common carp																																						
Emerald shiner		1	36	13																														52	20.8	2.6		
Striped shiner		2		1	3	1																												7	2.5	0.3		
Silver shiner		1	6	2																														9	3.6	0.4		
Rosyface shiner				1																														1	0.4	0.1		
Spotfin shiner		123	81																															204	81.6	10.0		
Mimic shiner		3																																3	1.2	0.2		
Steelcolor shiner		156	108	7																														271	108.4	13.3		
Bluntnose minnow	26	82	24																															132	52.8	6.5		
Bullhead minnow		3																																3	1.2	0.2		
Creek chub		1																																1	0.4	0.1		
River carpsucker																2			1															3	1.2	0.2		
White sucker			1				2	1																										4	1.8	0.2		
Northern hog sucker		2																																	3	1.2	0.2	
Bigmouth buffalo																				1	1		2	3	4			1	1	3			16	6.4	0.8			
Spotted sucker		13	16		6	11	14	11	10	10	6	12	4	2	1																			116	46.4	5.7		
Silver redhorse		1	1					1				1	1	1	2	4	3	4																19	7.6	0.9		
Golden redhorse				1	1		4	5	6	13	26	16	10	9	2	1																		94	37.6	4.6		
Sucker sp.		1	3																															4	1.6	0.2		
Yellow bullhead								1	1																										2	0.8	0.1	
Channel catfish																		1																	2	0.8	0.1	
Brindled madtom			1																																1	0.4	0.1	
Flathead catfish																		1			1														2	0.8	0.1	
Blackstripe topminnow		2	1																																3	1.2	0.2	
Brook silverside		8	10																																18	7.2	0.9	
Rock bass			1			1	4	1																											7	2.8	0.3	
Green sunfish					4	1	1																												6	2.4	0.3	
Warmouth		4	13		2		1																												20	8.0	1.0	
Bluegill	45	34	206	32	19	11	10																												357	142.8	17.6	
Longear sunfish	29	60	137	92	38																														358	142.4	17.5	
Redear sunfish							1																												1	0.4	0.1	
Hybrid sunfish	4	4			1	5	2	2																											18	7.2	0.9	
Spotted bass		3	1	2	3	2	2	2	2	3																									20	8.0	1.0	
Largemouth bass		4	10	2				1		1	2	1																							21	8.4	1.0	
White crappie		2				1	1	3	1	1	1	1																							11	4.4	0.5	
Johnny darter		8																																	8	3.2	0.4	
Logperch		3																																	3	1.2	0.2	
Blackside darter		7	6																																	13	5.2	0.6
Freshwater drum												1		1	1	2			2		8		2	1	1									19	7.6	0.9		

Table 25. Length distribution of species collected during 3.56 hour of electrofishing from all stations combined at Triplett and North Fork Triplett creeks during 1986.

Species	Inch class																														No. of fish	Fish/hour	% of total				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	28	36	38	39							
Longnose gar																					1											1	0.3	0.1			
American eel																										1							1	0.3	0.1		
Gizzard shad					6	18	8	4	4	1	1	1																					43	14.7	4.3		
Grass pickerel					1	1		2		1																							5	1.7	0.5		
Muskellunge																			1	1								1	1	1			5	1.7	0.5		
Common Carp											1	4	4	5	11	13	11	12	4	9	6	3	3	3			1						90	30.8	8.9		
River chub			1	1																														2	0.7	0.2	
Bigeye shiner	2	18																																20	6.9	2.0	
Striped shiner		12	2	1																														15	5.1	1.5	
Silver shiner		3	3	7																														13	4.5	1.3	
Spotfin shiner		5	2																															7	2.4	0.7	
Redfin shiner	1	1																																2	0.7	0.2	
Steelcolor shiner				2																														2	0.7	0.2	
Bluntnose minnow	6	22	4																															32	11.0	3.2	
River carpsucker													1						1															2	0.7	0.2	
Quillback												1			1																			2	0.7	0.2	
White sucker				1		1																													2	0.7	0.2
Northern hog sucker		1	1	7	2	2		1		1																									15	5.1	1.5
Smallmouth buffalo																		1	1	1															5	1.7	0.5
Bigmouth buffalo														6	6	3	1	1		2	1	1													21	7.2	2.1
Spotted sucker								1	1	1	1	1	1	1																					7	2.4	0.7
Silver redhorse							1		1		1	1	1	1	2	2		2	1	1															14	4.8	1.4
Black redhorse						2	10	22	8	10	9	1	3																						63	21.6	6.2
Golden redhorse					2	4	15	40	17	26	47	31	7	6	1	1																			197	67.5	19.5
Brook silverside	2	9	5																																16	5.5	1.6
Rock bass				1	2	4	2	3																											12	4.1	1.2
Green sunfish				1		1																													2	0.7	0.2
Bluegill	1	12	16	10	19	14	8																												80	27.4	7.9
Hybrid sunfish			4	4	3	3																													14	4.8	1.4
Longear sunfish	2	22	67	74	47	7																													219	75.0	21.7
Smallmouth bass		2	8		2	1	1	4	4	3																									25	8.6	2.5
Spotted bass		2	9	3	8	4	3	1	5	3	1	1	1																						41	14.0	4.1
Largemouth bass		1		2				1	1		1	1	1							1															9	3.1	0.9
White crappie												1	2																						3	1.0	0.3
Greenside darter		1																																	1	0.3	0.1
Johnny darter	1	3																																	4	1.4	0.4
Logperch			1	3	1																														5	1.7	0.5
Blackside darter		3	6																																9	3.1	0.9
Sharpnose darter			2																																2	0.7	0.2
Sauger														1																					1	0.3	0.1
Freshwater drum															1																				2	0.7	0.2

Table 26. Length distribution of species collected during 3.09 hours of electrofishing from all stations combined at Triplett and North Fork Triplett creeks in 1987.

Species	Inch class																											No of fish	Fish/hour	% of total	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	27	29	42				
Longnose gar																				1							1	2	0.6	0.3	
Gizzard shad					1	2	29	20	7	3	3	1																	66	21.4	9.6
Rainbow trout									3	2																			5	1.6	0.7
Grass pickerel					2																								2	0.6	0.3
Muskellunge																										1	1	2	0.6	0.3	
Central stoneroller		1																											1	0.3	0.2
Common carp													3	8	9	16	11	6	2	8	5	7	2	2				79	25.6	11.5	
Bigeye shiner	1	1																											2	0.6	0.3
Striped shiner	2	2	4	1																									9	2.9	1.3
Silver shiner			2																										2	0.6	0.3
Spotfin shiner	2		2																										4	1.3	0.6
Steelcolor shiner	3	3																											6	1.9	0.9
Bluntnose minnow	4	2																											6	1.9	0.9
River carpsucker															1														1	0.3	0.2
Quillback											1	1	2	1															5	1.6	0.7
Highfin carpsucker															1														1	0.3	0.2
White sucker											1																		1	0.3	0.2
Northern hog sucker		3	3	4	2																								12	3.9	1.8
Smallmouth buffalo																		1	1	3	1	1		1				9	2.9	1.3	
Bigmouth buffalo												1	3	13	6	1	1												25	8.1	3.6
Spotted sucker		1	1						2	5	3	1		3	1														17	5.5	2.5
Silver redhorse							1			1		1	2	3	3	4	1	1	2										19	6.1	2.8
Golden redhorse		1	1		1	13	51	49	16	36	45	7	2																222	71.8	32.4
Brook silverside		1	2																										3	1.0	0.4
Rock bass				2	7	3	2																						14	4.5	2.0
Green sunfish		1	1	1	2	1																							6	1.9	0.9
Warmouth				2	2																								4	1.3	0.6
Bluegill	2	5	9	16	11	4																							47	15.2	6.9
Longear sunfish	3	18	26	21	11																								79	25.6	11.5
Smallmouth bass				2	1	4		1			1																		9	2.9	1.3
Spotted bass				2	1	1	1	2	1																				8	2.6	1.2
Largemouth bass				1				1			1	2		2	1	1													9	2.9	1.3
White crappie								1																					1	0.3	0.2
Fantail darter	1																												1	0.3	0.2
Logperch				1																									1	0.3	0.2
Blackside darter				1																									1	0.3	0.2
Sauger								1	1				1	1															4	1.3	0.6
Freshwater drum											1																		1	0.3	0.2

Table 27. Five most frequently sampled fish species captured while electrofishing at Fox Creek by year and combined.

Year	Species	Number of fish	Fish/hour	% occurrence
1987	Longear sunfish	268	120.7	28.9
	Gizzard shad	116	52.3	12.5
	Golden redbhorse	110	49.6	11.9
	Bluegill	69	31.1	7.5
	Spotted sucker	69	31.1	7.5
1988	Bluegill	357	142.8	17.6
	Longear sunfish	356	142.4	17.5
	Steelcolor shiner	271	108.4	13.3
	Spotfin shiner	204	81.6	10.0
	Bluntnose minnow	132	52.8	6.5
1987 - 1988	Longear sunfish	624	132.2	21.2
	Bluegill	426	90.3	14.4
	Steelcolor shiner	280	59.3	9.5
	Gizzard shad	240	50.8	8.1
	Spotfin shiner	211	44.7	7.1

Table 28. Five most frequently sampled fish species captured while electrofishing at North Fork Triplett and Triplett creeks by year and combined.

Year	Species	Number of fish	Fish/hour	% occurrence
1986	Longear sunfish	219	75.0	21.7
	Golden redhorse	197	67.5	19.5
	Common carp	90	30.8	8.9
	Bluegill	80	27.4	7.9
	Black redhorse	63	21.6	6.2
1987	Golden redhorse	222	71.8	32.4
	Longear sunfish	79	25.6	11.5
	Common carp	79	25.6	11.5
	Gizzard shad	66	21.4	9.6
	Bluegill	47	15.2	6.9
1986 - 1987	Golden redhorse	419	69.7	24.6
	Longear sunfish	298	49.6	17.6
	Common carp	169	28.1	9.9
	Bluegill	127	21.1	7.5
	Gizzard shad	109	18.1	6.4

Table 29. Length frequency and catch rate of muskellunge captured from two years of electrofishing at Fox and Triplett creeks.

Stream	Inch group											No. of fish	Fish /hr.	
	< 10	10-12	13-14	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39			42
Fox	7	5		2	4	1	5	5	4	7	1		41	4.3
Triplett and N F Triplett					2			1		1	2	1	7	1.1
Total	7	5		2	6	1	5	6	4	8	3	1	48	

Table 30. Black bass composition at Fox Triplett, and North Fork Triplett creeks in 1986 – 1988.

Species	Fox Creek		North Fork Triplett Creek		Triplett Creek	
	% of all fish	% of black bass	% of all fish	% of black bass	% of all fish	% of black bass
Spotted bass	1.4	62.5	2.9	43.3	2.8	90.9
Largemouth bass	0.8	37.5	1.3	18.9	0.3	9.1
Smallmouth bass	0.0	0.0	2.5	37.8	0.0	0.0

Table 31. Selected physical characteristics from each pool sampled in Fox Creek during 1987 and 1988.

Station	No. of Muskellunge <sup>a</sup>	Stream miles <sup>b</sup>	Pool length (miles)	Average pool width (feet)	Acreage	Mean depth (feet)	Maximum depth (feet)	% shade	Pool-riffle ratio
1	13	2.6-3.2	0.6	44.17	3.21	3.78	6.0	75-100	90-10
2	16	4.3-5.1	0.8	44.71	4.34	3.30	6.0	50-75	90-10
3	18	6.1-7.7	1.6	49.00	9.50	2.75	7.0	75-100	95-05
4	10	12.1-12.8	0.6	40.00	2.91	1.65	5.0	75-100	60-40
5	5	12.8-13.3	0.5	45.40	2.75	2.50	5.0	25-50	60-40
Total	62	26.3 <sup>c</sup>	4.1		22.71				

<sup>a</sup> includes muskellunge captured and observed

<sup>b</sup> stream mile 0.0 starts at confluence of Licking River at mile 140.1

<sup>c</sup> length of stream

Table 32. Mileage and corresponding gradients from Fox Creek.

Mile	Elevation (ft/msl)	Gradient (ft/mi)	Corresponding sample sites within this range	No. of muskellunge <sup>a</sup>	
				< 30 in	≥ 30 in
0-5	614-624	2.0	1, 2	16	13
5-10	624-636	2.4	3	11	7
10-15	636-644	1.6	4, 5	13	2
15-20	644-660	3.2			
20-25	660-719	11.8			
25-29	719-1060	68.2			
0-29	614-1060	15.4	5	40	22

<sup>a</sup> includes those captured and observed

Table 33. Selected physical characteristics from each pool sampled in North Fork Triplett and Triplett creeks during 1986 and 1987.

Station	No. of Muskellunge <sup>a</sup>	Stream miles <sup>b</sup>	Pool length (miles)	Average pool width (feet)	Acreage	Mean depth (feet)	Maximum depth (feet)	% shade	Pool-riffle ratio
1	5	0.0-1.1	1.1	65.2	8.69	3.0	8.0	50-75	95-05
2 <sup>c</sup>	3	2.1-2.7	0.6	49.3	3.59	2.9	8.0	75-100	90-10
3	2	3.6-4.1	0.5	57.0	3.46	2.3	7.0	75-100	100-0
4	3	10.6-11.1	0.5	91.6	5.55	2.6	13.0	75-100	100-0
5	4	11.3-11.8	0.5	78.8	4.78	1.9	5.0	75-100	95-05
Total	17		3.2		26.07				

<sup>a</sup> includes muskellunge captured and observed

<sup>b</sup> North Fork Triplett Creek mile 0.0 begins with its confluence with Triplett Creek at mi 5.8, Triplett Creek mi 0.0 begins with its confluence with Licking River at mi 168.3.

<sup>c</sup> station 2 was sampled only in 1987.

Table 34. Mileage and corresponding gradients from Triplett Creek.

Mile	Elevation (ft/msl)	Gradient (ft/mi)	Corresponding sample sites within this range	No. of muskellunge <sup>a</sup>	
				< 30 in	≥ 30 in
0-5	650-658	2.0	1	2	3
5-10	658-687	2.4			
10-15	687-734	1.6			
15-20	734-868	3.2			
20-21.5	868-920	11.8			
0-21.5	650-920	12.6	1	2	3

<sup>a</sup> includes those captured and observed



Table 35. Mileage and corresponding gradients from North Fork Triplett Creek.

Mile	Elevation (ft/msl)	Gradient (ft/mi)	Corresponding sample sites within this range	No. of muskellunge <sup>a</sup>	
				< 30 in	≥ 30 in
0 <sup>b</sup> -5	659-680	4.2	2 <sup>c</sup> , 3	4	1
5-10	650-713	6.6	4 <sup>d</sup> , 5	4	3
10-15	713-760	9.4			
15-20	760-850	18.0			
20-25	850-1000	30.0			
25-26.5	1000-1140	93.3			
0-26.5	659-1140	18.1	4	8	4

<sup>a</sup> includes those captured and observed

<sup>b</sup> mile 0.0 at confluence with Triplett Creek at Triplett Creek mi 5.8.

<sup>c</sup> actual gradient between elevations at sample 2 is 5.6 ft/mi.

<sup>d</sup> actual gradient between elevations at sample 3 and 4 is 4.2 ft/mi.

Table 36. Location of water quality sites in Fox Creek.

Site	Location
1	0.4 mi upstream from Highway 111 bridge, 2.7 air mi SSE of Hillsboro, KY. Hillsboro, KY Quad.
2	Near old mill structure just downstream of Highway 158 bridge at Ringos Mill, KY. Plummers Landing, KY Quad.

Table 37. Location of water quality sites in Triplett Creek.

Site	Location
1	Below Highway 801 bridge over Triplett Creek 0.5 mi N of Farmers, KY. Farmers, KY Quad.
2	End of first riffle downstream of Highway 32 bridge over North Fork Triplett Creek 0.6 mi N of I-64 junction. Morehead, KY Quad.
3	Below Highway 799 bridge over North Fork Triplett Creek, downstream of confluence with Holly Fork, 3.0 mi NE of Cranston, KY. Cranston, KY Quad.

Table 38. Water Quality criteria for warmwater fish habitat.

Parameter	Preferred	Harmful
Temperature ( $^{\circ}\text{F}/^{\circ}\text{C}$ , summer)	>68/20 and <89/31.7	>95/35
Dissolved oxygen (mg/l)	$\geq 5$	<3
Total alkalinity (mg/l)	$\geq 100$	
Turbidity (NTU)	$\leq 200$	$\geq 20,000$
pH	6.5 – 8.2	<4.7 and >9.0
Salinity (mg/l)	$\leq 400$ (0.4 ppt)	$\geq 2,000$ (2ppt)
Conductivity ( $\mu\text{mhos}/\text{cm}$ )	$\leq 1,000$	$\geq 4,000$

Table 39. Water quality determinations from Fox Creek during 1986.

Parameters	Water quality station	
	1	2
Temperature ( $^{\circ}\text{C}$ )		
24 Jul	24.0	24.0
17 Oct	14.0	14.8
Dissolved oxygen (mg/l)		
25 Jul	4.4	5.4
17 Oct	6.4	7.6
Total alkalinity (mg/l)		
25 Jul	103	103
17 Oct	68	103
Turbidity (NTU)		
25 Jul	29	31
17 Oct	19	24
pH		
25 Jul	6.8	6.6
17 Oct	7.1	7.1
Salinity (ppt)		
25 Jul	0	0
17 Oct	0	0
Conductivity ( $\mu\text{mhos}/\text{cm}$ )		
25 Jul	220	209
17 Oct	148	160

Table 40. Water quality determinations from Triplett Creek during 1986.

Parameter	Water quality station		
	1	2	3
Temperature			
25 Jul	24.0	25.0	24.0
17 Oct	13.5	13.5	15.0
Dissolved oxygen (mg/l)			
25 Jul	5.9	6.1	9.2
17 Oct	6.9	10.6	11.8
Total Alkalinity (mg/l)			
25 Jul	103	51	51
17 Oct	94	51	43
Turbidity (NTU)			
25 Jul	20	10	1
17 Oct	15	10	1
pH			
25 Jul	6.4	7.0	6.7
17 Oct	6.9	7.2	7.2
Salinity (ppt)			
25 Jul	0	0	0
17 Oct	0	0	0
Conductivity (umhos/cm)			
25 Jul	200	145	130
17 Oct	190	105	90

Appendix A. Fishes collected and length distribution from 1.30 hours of electrofishing in Triplett Creek at station 1(mouth) during 1986.

Species	Inch class																												No of fish	Fish/hour
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	23	24	25	26	38	39				
Longnose gar																				1								1	0.8	
American eel																								1					1	0.8
Gizzard shad				6	18	6	3	3																					36	27.7
Muskellunge																										1	1		2	1.5
Common carp											1	4	3	4	7	1	2	2		1	1		1						27	20.8
River chub		1	1																										2	1.5
Spotfin shiner	1																												1	0.8
Steelcolor shiner			2																										2	1.5
Bluntnose minnow	1																												1	0.8
Northern hog sucker				1	2																								3	2.3
Smallmouth buffalo																1							1						2	1.5
Bigmouth buffalo													4	3	2					2	1								12	9.2
Silver redhorse							1		1		1	1																	4	3.1
Golden redhorse					1	3	2	5	1		1				1														14	10.8
Brook silverside		2																											2	1.5
Rock bass				1	1	1	2																						5	3.8
Bluegill			4	1	2	1																							8	6.2
Hybrid sunfish		2	1																										3	2.3
Longear sunfish	14	31	29	4																									78	60.0
Spotted bass	1	1		1				2	2	1																			8	6.2
Logperch			1	1																									2	1.5
Sharpnose darter		2																											2	1.5

Appendix B. Fishes collected and length distribution during 0.56 hours of electrofishing in Triplett Creek at station 3 in 1986.

Species	Inch class																												No of fish	Fish/hour
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	28					
Gizzard shad						2	1	1	1		1															6	10.7			
Grass pickerel				1			2																			3	5.4			
Common carp												1	1	4	12	8	2	4	4	1	1				1	47	83.9			
River carpsucker												1														1	1.8			
Quillback												1	1												2	3.6				
White sucker				1																					1	1.8				
Smallmouth buffalo															1	1					1				3	5.4				
Bigmouth buffalo													2	2	1					1					6	10.7				
Silver redhorse												1			1	1									4	7.1				
Golden redhorse						2	7	3	1	3	11	4	1	1											33	58.9				
Bluegill	4	10		6	3																				23	41.1				
Hybrid sunfish				1																					1	1.8				
Longear sunfish	12	28	16	2																					58	103.6				
Spotted bass	2	1									1														4	7.1				
Largemouth bass																									1	1.8				
Johnny darter																									1	1.8				
Loggerch				1																					1	1.8				
Blackside darter	2																								2	3.6				
Sauger													1												1	1.8				
Freshwater drum														1										1	2	3.6				

Appendix C. Fishes collected and length distribution during 0.78 hours of electrofishing in North Fork Triplett Creek at station 4 in 1986.

Species	Inch class																												No of fish	Fish/hour
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	24	25	36					
Gizzard shad											1																	1	1.3	
Grass pickerel						1				1																			2	2.6
Muskellunge																										1			1	1.3
Common carp																					1	3	2	2	2				10	12.8
Bigeye shiner	2	12																											14	17.9
Striped shiner		7	2	1																									10	12.8
Silver shiner		2	2	6																									10	12.8
Spotfin shiner		2	2																										4	5.1
Redfin shiner	1	1																											2	2.6
Bluntnose minnow	5	5	2																										12	15.4
River carpsucker																													1	1.3
Northern hog sucker			1	3	1																								5	6.4
Bigmouth buffalo															1			1	1										3	3.8
Spotted sucker								1	1	1	1	1	1	1															7	9.0
Silver redhorse															1					1	1								3	3.8
Black redhorse						2	10	19	3	6	4		1																45	57.7
Golden redhorse					2	1	5	23	8	16	16	8	2	3	1														85	109.0
Brook silverside		6																											6	7.7
Rock bass				1	1	2																							4	5.1
Green sunfish				1	1																								2	2.6
Bluegill	2	3	4	10	5	3																							27	34.6
Hybrid sunfish					1																								1	1.3
Longear sunfish	2	5	19	22	14	1																							63	80.8
Smallmouth bass	2	7		2	2	1	4	4	2	1																			25	32.1
Spotted bass			4	1	5	3	3	1	2																				19	24.4
Largemouth bass				1				1	1		2	1	1																8	10.3
White crappie												1	2																3	3.8
Greenside darter	1																												1	1.3
Johnny darter	2																												2	2.6
Logperch				1																									1	1.3
Blackside darter			3																										3	3.8

Appendix D. Fishes collected and length distribution during 0.28 hours of electrofishing in North Fork Triplett Creek at station 5 during 1986.

Species	Inch class																							No of fish	Fish/hour
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	23			
Muskellunge																			1	1			2	7.1	
Common carp																			1	2	1	1	1	6	21.4
Bigeye shiner		6																						6	21.4
Striped shiner		5																						5	17.9
Silver shiner		1	1	1																				3	10.7
Spotfin shiner		2																						2	7.1
Bluntnose minnow	1	16	2																					19	67.9
White sucker						1																		1	3.6
Northern hog sucker		1		4				1		1														7	25.0
Silver redhorse															2	1								3	10.7
Black redhorse								5	2	4	4	1	2											18	64.3
Golden redhorse								12	3	6	20	18	4	2										65	232.1
Brook silverside	2	3	3																					8	28.6
Rock bass						1	1	1																3	10.7
Bluegill	1	6	3	2	2	4	4																	22	78.6
Hybrid sunfish			2	3	2	2																		9	32.1
Longear sunfish		5	6	6	2	2																		21	75.0
Spotted bass			3	1	3				1	1			1											10	35.7
Johnny darter		1																						1	3.6
Logperch				1																				1	3.6
Blackside darter		1	3																					4	14.3

Appendix E. Fishes collected and length distribution during 0.89 hours of electrofishing in Triplett Creek at station 1(mouth) in 1987.

Species	Inch class																								No of fish	Fish/hour
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
Gizzard shad					1	1	12	5	1	1														21	23.6	
Central stoneroller		1																						1	1.1	
Common carp													3	5	4		1			2		2		17	19.1	
Spotfin shiner	2																							2	2.2	
Steelcolor shiner	3	2																						5	5.6	
River carpsucker														1										1	1.1	
Highfin carpsucker																1								1	1.1	
Northern hog sucker				1		1																		2	2.2	
Smallmouth buffalo																1			1				1	3	3.4	
Bigmouth buffalo													1	2										3	3.4	
Spotted sucker				1																				1	1.1	
Silver redhorse										1							2		1	1			1	6	6.7	
Golden redhorse				1					3	2	2	1												9	10.1	
Brook silverside		1	2																					3	3.4	
Rock bass					1	3	1																	5	5.6	
Green sunfish				1	1	1																		3	3.4	
Warmouth					1	1																		2	2.2	
Bluegill	1	3	3	2	2	1																		12	13.5	
Longear sunfish	1	4	10	15	4																			34	38.2	
Spotted bass							1	1																2	2.2	
Largemouth bass																	1							1	1.1	
Sauger									1						1									2	2.2	



Appendix F. Fishes collected and length distribution during 0.53 hours of electrofishing in North Fork Triplett Creek at station 2 in 1987.

Species	Inch class																	No of fish	Fish/hour								
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18			19	20	21	22	25	29		
Longnose gar																					1			1	2	3.8	
Gizzard shad							2		1																	3	5.7
Grass pickerel						1																				1	1.9
Muskellunge																								1		1	1.9
Common carp															3	9	5	2				1	1			21	39.6
Smallmouth buffalo																1										1	1.9
Bigmouth buffalo														2	3											5	9.4
Spotted sucker		1						1	2		1															5	9.4
Golden redhorse						1	7	4	2	1	3		1													19	35.8
Green sunfish		1				1	1																			3	5.7
Warmouth						1																				1	1.9
Bluegill			1	2	1																					4	7.5
Longear sunfish	1	5	5																							11	20.8
Spotted bass			1																							1	1.9
White crappie								1																		1	1.9
Fantail darter	1																									1	1.9
Sauger									1																	1	1.9

Appendix G. Fishes collected and length distribution during 0.59 hours of electrofishing in North Fork Triplett Creek at station 3 in 1987.

Species	Inch class																										No of fish	Fish/hour
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	27			
Gizzard shad							1	1	2	3	1	1														9	15.3	
Grass pickerel						1																				1	1.7	
Common carp														3	2	7	5	2	2	2	4	1	1	1		30	50.8	
Steelcolor shiner		1																								1	1.7	
Quillback											1	1	2	1												5	8.5	
Smallmouth buffalo																	1	2		1		1			1	6	10.2	
Bigmouth buffalo													1	6		1										8	13.6	
Silver redhorse												1			1											2	3.4	
Golden redhorse							6	10	4	1	4	2	2													29	49.2	
Warmouth					1																					1	1.7	
Bluegill	1	1	4	4	1	1																				12	20.3	
Longear sunfish		2	1	1																						4	6.8	
Largemouth bass				1										2	1		1									5	8.5	
Logperch			1																							1	1.7	
Sauger														1												1	1.7	
Freshwater drum											1															1	1.7	

Appendix H. Fishes collected and length distribution during 0.58 hours of electrofishing in North Fork Triplett Creek at station 4 in 1987.

Species	Inch class																		No of fish	Fish/hour					
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			21	22	23	24	42
Gizzard shad					1	14	14	3																33	56.9
Rainbow trout								3	1															4	6.9
Muskellunge																							1	1	1.7
Common carp																	1		2		2	1		6	10.3
Striped shiner				1																				1	1.7
Silver shiner		1																						1	1.7
Bluntnose minnow	1																							1	1.7
Northern hog sucker		1		1																				2	3.4
Smallmouth buffalo																	1	1						2	3.4
Bigmouth buffalo											1		2	2		1								6	10.3
Spotted sucker							1	3	2		3		1											10	17.2
Silver redhorse					1							2	1	2										6	10.3
Golden redhorse				1	6	25	25	2	17	12	2													90	155.2
Rock bass			1	3	2	1																		7	12.1
Bluegill	1	1	4	5	2																			13	22.4
Longear sunfish	1	6	3	4																				14	24.1
Smallmouth bass		1		2			1																	4	6.9
Spotted bass						1	1																	2	3.4
Largemouth bass							1			1	1													3	5.2

Appendix I. Fishes collected and length distribution during 0.50 hours of electrofishing in North Fork Triplett Creek at station 5 in 1987.

Species	Inch class												No of fish	Fish/hour											
	2	3	4	5	6	7	8	9	10	11	12	13													
Rainbow trout										1													1	2.0	
Common carp																			1	2	2			5	10.0
Bigeye shiner	1	1																						2	4.0
Striped shiner	2	2	4																					8	16.0
Silver shiner			1																					1	2.0
Spotfin shiner			2																					2	4.0
Bluntnose minnow	4	1																						5	10.0
White sucker										1														1	2.0
Northern hog sucker		3	1	4																				8	16.0
Bigmouth buffalo													1	1	1									3	6.0
Spotted sucker										1														1	2.0
Silver redhorse													1	1		1	1	1						5	10.0
Golden redhorse							9	13	9	12	27	3	1											75	150.0
Rock bass					1		1																	2	4.0
Bluegill				4	2																			6	12.0
Longear sunfish	1	6	4	2	3																			16	32.0
Smallmouth bass			1	1	2						1													5	10.0
Spotted bass			1	1	1																			3	6.0
Blackside darter			1																					1	2.0

Appendix J. Fishes collected and length distribution during 0.50 hours of electrofishing in Fox Creek at station 1 in 1987.

Species	Inch class																												No. of fish	Fish/hour		
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	30	33			39	
Gizzard shad						2	11	19	6	2																				40	80.0	
Muskellunge																			1						1		1	1	1	5	10.0	
Common carp																			1	1	3	5	1	1	1	1			14	28.0		
Emerald shiner			3																											3	6.0	
Striped shiner	1	1		2																										4	8.0	
Silver shiner				1																										1	2.0	
Spotfin shiner	3	3																												6	12.0	
Steelcolor shiner	2	3																												5	10.0	
Bluntnose minnow	3	1																												4	8.0	
Northern hog sucker				1							1																			2	4.0	
Bigmouth buffalo																														4	8.0	
Spotted sucker				1	3					1	1		1	1																8	16.0	
Silver redhorse						2										1															3	6.0
Golden redhorse								2	3	2	3	1	3	2																	16	32.0
Rock bass				1	1	1																									3	6.0
Warmouth					1																										1	2.0
Bluegill			1	2	3	3																									9	18.0
Longear sunfish	6	5	15	3																											29	58.0
Spotted bass	1								1																						2	4.0
Freshwater drum													1			1		1	1	1				1							6	12.0

Appendix K. Fishes collected and length distribution during 0.50 hours of electrofishing in Fox Creek at station 2 in 1987.

Species	Inch class																												No of fish	Fish/hour	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	25	29	31	34	36			
Gizzard shad								1	9	4																			14	28.0	
Muskellunge							1																			1	1	1	1	5	10.0
Common carp																						2	1	2	2					7	14.0
Emerald shiner			1																											1	2.0
Striped shiner		1																												1	2.0
Spotfin shiner			1																											1	2.0
Bluntnose minnow	3	7																												10	20.0
Bigmouth buffalo																														1	2.0
Spotted sucker					3					1					1															5	10.0
Silver redhorse															1		1													3	6.0
Golden redhorse					3		2	3	6	4	2	1	3		1															25	50.0
Channel catfish																	1	1												2	4.0
Rock bass					1	1																								2	4.0
Bluegill	1		1			1																								3	6.0
Longear sunfish	3	11	19	8	13																									54	108.0
Hybrid sunfish					1		1																							2	4.0
Spotted bass		1				1	1			2																				5	10.0
White crappie								1	2																					3	6.0
Blackside darter		2	3																											5	10.0
Freshwater drum																					2	1	1	1						5	10.0

Appendix L. Fishes collected and length distribution during 0.72 hours of electrofishing in Fox Creek at station 3 in 1987.

Species	Inch class																								No of fish	Fish /hour		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			25	29
Longnose gar																								3	3	4.2		
Gizzard shad							1	5	25	14	8	2	1	1												57	79.2	
Grass pickerel						1																				1	1.4	
Muskellunge																							1		1	2	2.8	
Common carp																			1	1	3	4	5	2		1	17	23.6
Bluntnose minnow	1																										1	1.4
River carpsucker																	1	1									2	2.8
Bigmouth buffalo																	1				3		1				5	6.9
Spotted sucker		1		3	4	5	2	4	9	1	2	10	2														43	59.7
Silver redhorse										1																	1	1.4
Golden redhorse								3	1	2	4	1	1														12	16.7
Brook silverside			1																							1	1.4	
Green sunfish				1		1																				2	2.8	
Warmouth						2	1																			3	4.2	
Bluegill	2	2	7	7		8	4																			30	41.7	
Longear sunfish	1	15	37	23	4																					80	111.1	
Hybrid sunfish							1																			1	1.4	
Spotted bass		1		1																						2	2.8	
Largemouth bass							1						1	1													3	4.2
White crappie											1															1	1.4	
Johnny darter		1																								1	1.4	
Sauger									1		1						1									3	4.2	
Freshwater drum															1		2		1	2			1			7	9.7	

Appendix M. Fishes collected and length distribution during 0.25 hours of electrofishing in Fox Creek at station 4 in 1987.

Species	Inch class																											No of fish	Fish/hour
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	22	23	25	26	27				
Least brook lamprey						1																					1	4.0	
Grass pickerel								1																			1	4.0	
Muskellunge																								1			1	4.0	
Common carp																						1	2	2		1	6	24.0	
Emerald shiner				8	1																						9	36.0	
Striped shiner		4		1																							5	20.0	
Silver shiner			6	1																							7	28.0	
Redfin shiner		2																									2	8.0	
Steelcolor shiner		3	1																								4	16.0	
Bluntnose minnow	1	20	2																								23	92.0	
Northern hog sucker			2			2		1																			5	20.0	
Bigmouth buffalo																											1	4.0	
Spotted sucker				1	4			1			1																7	28.0	
Silver redhorse												1	1	1						5							8	32.0	
Golden redhorse							1	1	1	5	6	12	9	4	3												42	128.0	
Rock bass						2		1																			3	12.0	
Green sunfish				1																							1	4.0	
Bluegill	2	1	1	1	5	2	1																				13	52.0	
Longear sunfish	3	16	21	18	5																						63	252.0	
Hybrid sunfish							1																				1	4.0	
Spotted bass		1	1	1		2				1																	6	24.0	
Johnny darter		2																									2	8.0	
Logperch		4	1																								5	20.0	
Blackside darter		1	1																								2	8.0	
Freshwater drum														1					1			2	1				5	20.0	



Appendix N. Fishes collected and length distribution during 0.25 hours of electrofishing in Fox Creek at station 5 in 1987.

Species	Inch class																																			No of fish	Fish/hour
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	22	23	24	35													
Gizzard shad							1		3	1																								5	20.0		
Grass pickerel							1	1																											2	8.0	
Muskellunge																1					1												1	3	12.0		
Common carp																			1		1		1											3	12.0		
Northern hog sucker					1			1																											2	8.0	
Spotted sucker							1		2	2			1																						6	24.0	
Silver redhorse																		2																	2	8.0	
Golden redhorse								1	1	1	4	1	6		1																				15	60.0	
Green sunfish					1																														1	4.0	
Bluegill	2		5		1	4	2																												14	56.0	
Longear sunfish		13	8	17	7																														45	180.0	
Hybrid sunfish				1																															1	4.0	
Spotted bass		1	2					2																											5	20.0	
Blackside darter		1	2																																3	12.0	
Freshwater drum																		1			1		1												4	16.0	

Appendix O. Fishes collected and length distribution during 0.50 hours of electrofishing in Fox Creek at station 1 in 1988.

Species	Inch class																															No of fish	Fish/hour	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	31						
Gizzard shad			3			2	2	7	1	7	3																					25	50.0	
Muskellunge									1	2																	1		1			5	10.0	
Central stoneroller			1																													1	2.0	
Common carp																					1	4	1	1	2	1						10	20.0	
Emerald shiner		1	12	4																												17	34.0	
Striped shiner		1		1	3																											5	10.0	
Spotfin shiner		43	30																													73	146.0	
Mimic shiner		1																														1	2.0	
Steelcolor shiner		59	23	3																												85	170.0	
Bluntnose minnow	1	4	5																													10	20.0	
Northern hog sucker						1																										1	2.0	
Bigmouth buffalo																																1	2.0	
Spotted sucker		3	1			2		3		2	1	2	1																			15	30.0	
Silver redhorse								1								1	1		2													5	10.0	
Golden redhorse				1				2		4	6	3	1	1																			18	36.0
Sucker spp.		3																															3	6.0
Channel catfish																																	1	2.0
Blackside topminnow		1																															1	2.0
Brook silverside		1	8																														9	18.0
Rock bass						2	1																										3	6.0
Green sunfish					3		1																										4	8.0
Bluegill	2		8	2	2	3																											17	34.0
Longear sunfish		7	7	11	6																												31	62.0
Hybrid sunfish					1																												1	2.0
Spotted bass		1	1					1		1																							4	8.0
Largemouth bass		2		1								1	1																				5	10.0
Blackside darter		3																															3	6.0
Freshwater drum																1	1	1															7	14.0

Appendix P. Fishes collected and length distribution during 0.50 hours of electrofishing in Fox Creek at station 2 in 1988.

Species	Inch class																															No of fish	Fish/hour	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	28	30	31							
Longnose gar														1																		1	2.0	
Gizzard shad				4			4	9	6		1	2		1																		27	54.0	
Muskellunge										1																		1				2	4.0	
Central stoneroller		1																														1	2.0	
Common carp																						2	1	5	1	1			1			11	22.0	
Emerald shiner			9	7																												16	32.0	
Striped shiner		1																														1	2.0	
Rosyface shiner			1																													1	2.0	
Spotfin shiner		37	28																													65	130.0	
Mimic shiner		2																														2	4.0	
Steelcolor shiner		30	36	2																												68	136.0	
Bluntnose minnow	2	20	13																													35	70.0	
Bullhead minnow			3																													3	6.0	
Northern hog sucker		2																														2	4.0	
Bigmouth buffalo																																	1	2.0
Spotted sucker		9	5		1		3	1		1		1		1																		22	44.0	
Silver redhorse		1														1	1	2														5	10.0	
Golden redhorse									4	4	3	2	2	1																			16	32.0
Sucker spp.		1																															1	2.0
Blackstripe topminnow			1																														1	2.0
Bluegill	1	2	16	3	5	2	1																										30	60.0
Longear sunfish	1	8	15	11	2																												37	74.0
Redear sunfish						1																											1	2.0
Spotted bass		2		1		1	1																										5	10.0
Largemouth bass			2	1																													3	6.0
White crappie									1	1	1																						3	6.0
Logperch		1																															1	2.0
Blackside darter		1																															1	2.0
Freshwater drum																						1	3										5	10.0



Appendix R. Fishes collected and length distribution during 0.50 hours of electrofishing in Fox Creek at station 4 in 1988.

Species	Inch class																										No of fish	Fish/hour
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		
Gizzard shad			3	2	1					1	1	1															9	18.0
Grass pickerel								1																			1	2.0
Muskellunge									2	1								1								1	6	12.0
Central stoneroller		1																									1	2.0
Common carp																				2	2		1	2	2		9	18.0
Emerald shiner			13																								13	26.0
Striped shiner						1																					1	2.0
Silver shiner			6	1																							7	14.0
Spotfin shiner			12																								12	24.0
Steelcolor shiner			5	19																							24	48.0
Bluntnose minnow	19	43	6																								68	136.0
River carpsucker																2			1								3	6.0
Bigmouth buffalo																					2	2		1		3	8	16.0
Spotted sucker			2		1		2		1	3		1		1													11	22.0
Silver redhorse			1									1	1					1	1								5	10.0
Golden redhorse					1			1		2	1	3	3	3	1												15	30.0
Yellow bullhead								1																			1	2.0
Brindled madtom			1																								1	2.0
Flathead catfish																		1		1							2	4.0
Blackstripe topminnow		1																									1	2.0
Brook silverside		2																									2	4.0
Rock bass					1	2																					3	6.0
Warmouth	2	10		1																							13	26.0
Bluegill	17	12	73	9	5	3	2																				121	242.0
Longear sunfish	5	15	58	31	10																						119	238.0
Hybrid sunfish	1	1					1	2																			5	10.0
Spotted bass				1				1	2																		4	8.0
Largemouth bass		1																									1	2.0
White crappie							1					1															2	4.0
Johnny darter		5																									5	10.0
Logperch		1		1																							2	4.0
Blackside darter		3	4																								7	14.0
Freshwater drum																				1						1	2	4.0

Appendix S. Fishes collected and length distribution during 0.50 hours of electrofishing in Fox Creek at station 5 in 1888.

Species	Inch class																									No of fish	Fish/hour
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		
Gizzard shad			1	11								3	1													16	32.0
Grass pickerel								1																		1	2.0
Muskellunge																									1	1	2.0
Common carp																				1		1	2	4		8	16.0
Silver shiner				1																						1	2.0
Spotfin shiner			1																							1	2.0
Steelcolor shiner				1																						2	4.0
Bluntnose minnow	4	15																								19	38.0
Creek chub		1																								1	2.0
White sucker							2	1																		3	6.0
Spotted sucker		1	1		2	7	7	5	4	1	4	6	3		1											42	84.0
Silver redhorse														1		2			1							4	8.0
Golden redhorse							1	2		1	12	5	2	3												26	52.0
Yellow bullhead									1																	1	2.0
Brook silverside		1	2																							3	6.0
Green sunfish					1	1																				2	4.0
Warmouth	2	2				1																				5	10.0
Bluegill	14	9	93	14	4	2	6																			142	284.0
Longear sunfish	13	19	47	34	13																					126	252.0
Hybrid sunfish	3	3				1		1																		8	16.0
Spotted bass					3	1	1			1																6	12.0
Largemouth bass			1					1			1															3	6.0
White crappie		1						3																		4	8.0
Johnny darter		2																								2	4.0
Freshwater drum																	1			1		1				3	6.0

Appendix T. Mean back calculated lengths (in) at each annulus for bluegill collected from North Fork Triplett and Triplett creeks in 1986 and 1987, including the 95% confidence interval (CI) for each mean length per age group.

Year	No.	Age			
		1	2	3	4
1986	1	2.5			
1985	5	2.9			
1984	6	3.0	4.1		
1983	7	3.1	4.3	5.4	
1982	2	3.5	4.4	5.5	6.2
Mean	21	3.1	4.2	5.4	6.2
Smallest		2.5	3.5	5.1	6.0
Largest		3.7	4.7	5.8	6.4
Std error		0.1	0.1	0.1	0.2
95% ConLo		2.9	4.0	5.3	5.8
95% ConHi		3.2	4.4	5.6	6.7

Intercept = 1.32

Appendix U. Mean back calculated lengths (in) at each annulus for gizzard shad collected from North Fork Triplett and Triplett creeks in 1986 and 1987, including the 95% confidence level for each mean length per age group.

Year	No	Age				
		1	2	3	4	5
1986	1	4.6				
1985	8	5.5	6.9			
1984	8	5.1	6.7	7.7		
1983	5	5.4	7.1	8.6	9.9	
1982	3	5.0	7.2	8.5	10.0	10.9
Mean	25	5.3	6.9	8.1	10.0	10.9
Smallest		4.4	5.2	6.3	8.4	10.5
Largest		6.7	8.1	9.2	11.9	11.5
Std error		0.1	0.2	0.2	0.3	0.3
95% ConLo		5.0	6.6	7.7	9.3	10.3
95% ConHi		5.5	7.2	8.5	10.6	11.5

Intercept = 1.83

Appendix V. Mean back calculated lengths (in) at each annulus for largemouth bass collected from North Fork Triplett and Triplett creeks in 1986 and 1987, including the 95% confidence level for each mean length per age group.

Year	No	Age							
		1	2	3	4	5	6	7	8
1985	1	3.0	4.3						
1984	1	3.8	5.8	7.8					
1983	1	4.8	7.4	9.5	11.1				
1982	2	3.7	6.8	9.0	10.9	12.3			
1981	1	3.5	6.9	9.2	10.8	12.9	14.3		
1980	1	3.5	6.6	8.5	10.4	12.2	13.7	14.6	
1979	2	4.1	6.8	8.9	10.9	11.5	13.9	14.9	15.9
Mean	9	3.8	6.5	8.8	10.8	12.1	14.0	14.8	15.9
Smallest		3.0	4.3	7.8	9.7	10.3	12.2	14.1	14.9
Largest		4.8	7.4	9.5	12.1	12.9	15.6	15.8	16.9
Std error		0.2	0.3	0.2	0.3	0.4	0.7	0.5	1.0
95% ConLo		3.4	5.9	8.4	10.3	11.4	12.6	13.8	13.9
95% ConHi		4.2	7.1	9.3	11.4	12.9	15.4	15.9	17.9

Intercept = 1.62

Appendix W. Mean back calculated lengths (in) at each annulus for sauger collected from North Fork Triplett and Triplett creeks in 1986 and 1987, including the 95% confidence level for each mean length per age group.

Year	No	Age			
		1	2	3	4
1985	2	6.1	8.9		
1983	2	8.1	10.3	12.2	13.8
1982	1	5.1	6.5	8.7	11.9
Mean	5	6.7	9.0	11.0	13.2
Smallest		5.1	6.5	8.7	11.9
Largest		8.7	10.9	13.0	15.0
Std error		0.7	0.7	1.3	1.0
95% ConLo		5.3	7.6	8.6	11.3
95% Con Hi		8.1	10.4	13.5	15.1

Intercept = 3.09



Appendix X. Mean back calculated lengths (in) at each annulus for smallmouth bass collected from North Fork Triplett and Triplett creeks in 1986 and 1987, including the 95% confidence level for each mean length per age group.

Year	No	Age				
		1	2	3	4	5
1986	1	3.6				
1985	9	3.8	4.8			
1984	3	4.2	5.6			
1983	10	4.3	5.9	7.4	10.2	
1982	3	4.0	5.9	7.1	8.9	
1981	1	4.1	5.7	8.1	10.1	12.4
Mean	27	4.1	5.6	7.5	9.5	12.4
Smallest		3.4	3.7	6.5	8.4	12.4
Largest		5.3	7.4	9.1	11.3	12.4
Std error		0.1	0.2	0.2	0.4	
95% ConLo		3.9	5.3	7.1	8.7	
95% ConHi		4.3	5.9	7.9	10.3	

Intercept = 2.56

Appendix Y. Mean back calculated lengths (in) at each annulus for spotted bass collected from North Fork Triplett Creek in 1986 and 1987, including the 95% confidence level for each mean length per age group.

Year	No	Age					
		1	2	3	4	5	6
1986	3	3.5					
1985	5	3.9	6.0				
1984	8	3.8	4.8	7.2			
1983	6	4.2	5.6	7.0	8.4		
1981	5	4.2	5.8	7.1	8.4	9.6	10.9
1980	1	3.6	5.1	6.7	8.3	9.6	11.6
Mean	28	3.9	5.4	7.0	8.4	9.6	11.2
Smallest		3.2	4.2	5.5	7.6	8.7	10.9
Largest		4.7	6.5	7.8	9.5	10.2	11.6
Std error		0.1	0.2	0.2	0.2	0.2	0.4
95% ConLo		3.8	5.1	6.7	7.9	9.2	10.5
95% ConHi		4.1	5.7	7.4	8.9	10.1	11.9

Intercept = 2.52

Appendix Z. Mean back calculated lengths (in) at each annulus for rock bass collected from North Fork Triplett and Triplett creeks in 1986 and 1987, including the 95% confidence level for each mean length per age group.

Year	No	Age			
		1	2	3	4
1985	2	3.0	4.1		
1984	4	2.7	3.6	4.6	
1983	7	3.2	4.3	5.4	6.3
1982	2	4.1	5.4	6.5	7.5
Mean	15	3.1	4.2	5.4	6.7
Smallest		2.6	3.3	4.2	5.4
Largest		4.5	5.9	6.8	7.6
Std error		0.1	0.2	0.2	0.3
95% ConLo		2.9	3.9	4.9	6.1
95% ConHi		3.4	4.6	5.8	7.3

Intercept = 1.92

Appendix AA. Mean back calculated lengths (in) at each annulus for white crappie collected from North Fork Triplett and Triplett creeks in 1986 and 1987, including the 95% confidence level for each mean length per age group.

Year	No	Age					
		1	2	3	4	5	6
1982	1	2.7	4.3	5.5	6.9	8.0	
1981	3	3.4	5.4	7.1	8.6	10.1	11.5
Mean	4	3.2	5.1	6.7	8.2	9.6	11.5
Smallest		2.7	4.3	5.5	6.9	8.0	11.0
Largest		3.7	5.6	7.3	8.8	10.6	12.0
Std error		0.2	0.3	0.4	0.4	0.6	0.3
95% ConLo		2.9	4.5	5.9	7.3	8.4	10.9
95% ConHi		3.6	5.7	7.5	9.0	10.7	12.1

Intercept = 1.21

Appendix BB. Scientific names of fish listed in this report, from Robins et al (1991).

Scientific name	Family name	Common name
LAMPREY FAMILY - PETROMYZONTIDAE		
<i>Lampetra aepyptera</i>		least brook lamprey
PADDLEFISH FAMILY - POLYODONTIDAE		
<i>Polyodon spathula</i>		paddlefish
GAR FAMILY - LEPISOSTEIDAE		
<i>Lepisosteus osseus</i>		longnose gar
MOONEYE FAMILY - HIODONTIDAE		
<i>Hiodon tergisus</i>		mooneye
FRESHWATER EEL FAMILY - ANGUILLIDAE		
<i>Anguilla rostrata</i>		American eel
HERRING FAMILY - CLUPEIDAE		
<i>Dorosoma cepedianum</i>		gizzard shad
CARP AND MINNOW FAMILY - CYPRINIDAE		
<i>Campostoma anomalum</i>		central stoneroller
<i>Cyprinella spiloptera</i>		spotfin shiner
<i>Cyprinella whipplei</i>		steelcolor shiner
<i>Cyprinus carpio</i>		common carp
<i>Luxilus chrysocephalus</i>		striped shiner
<i>Lythrurus ardens</i>		rosefin shiner
<i>Lythrurus umbratilis</i>		redfin shiner
<i>Macrhybopsis aestivalis</i>		speckled chub
<i>Nocomis micropogon</i>		river chub
<i>Notropis amblops</i>		bigeye chub
<i>Notropis atherinoides</i>		emerald shiner
<i>Notropis blennioides</i>		river shiner
<i>Notropis boops</i>		bigeye shiner
<i>Notropus buccatus</i>		silverjaw minnow

Scientific name	Family name	Common name
<i>Notropis photogenis</i>		silver shiner
<i>Notropis rubellus</i>		rosyface shiner
<i>Notropis stramineus</i>		sand shiner
<i>Notropis volucellus</i>		mimic shiner
<i>Phoxinus erythrogaster</i>		southern redbelly dace
<i>Pimephales notatus</i>		bluntnose minnow
<i>Pimephales promelas</i>		fathead minnow
<i>Pimephales vigilax</i>		bullhead minnow
<i>Rhinichthys atratulus</i>		blacknose dace
<i>Semotilus atromaculatus</i>		creek chub

#### SUCKER FAMILY - CATOSTOMIDAE

<i>Carpionodes carpio</i>	river carpsucker
<i>Carpionodes cyprinus</i>	quillback
<i>Catostomus commersoni</i>	white sucker
<i>Hypentelium nigricans</i>	northern hog sucker
<i>Ictiobus bubalus</i>	smallmouth buffalo
<i>Ictiobus cyprinellus</i>	bigmouth buffalo
<i>Minytrema melanops</i>	spotted sucker
<i>Moxostoma anisurum</i>	silver redhorse
<i>Moxostoma carinatum</i>	river redhorse
<i>Moxostoma duquesnei</i>	black redhorse
<i>Moxostoma erythrurum</i>	golden redhorse

#### BULLHEAD CATFISH FAMILY - ICTALURIDAE

<i>Ameiurus melas</i>	black bullhead
<i>Ameiurus natalis</i>	yellow bullhead
<i>Ameiurus nebulosus</i>	brown bullhead
<i>Ictalurus punctatus</i>	channel catfish
<i>Noturus flavus</i>	stonecat
<i>Noturus miurus</i>	brindled madtom
<i>Pylodictis olivaris</i>	flathead catfish

#### PIKE FAMILY - ESOCIDAE

<i>Esox americanus vermiculatus</i>	grass pickerel
<i>Esox masquinongy</i>	muskellunge

#### TROUT FAMILY - SALMONIDAE

<i>Oncorhynchus mykiss</i>	rainbow trout
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Scientific name	Family name	Common name
TROUT-PERCH FAMILY - PERCOPSIDAE		
<i>Percopsis omiscomaycus</i>		trout-perch
KILLIFISH FAMILY - FUNDULIDAE		
<i>Fundulus notatus</i>		blackstripe topminnow
SILVERSIDE FAMILY - ATHERINIDAE		
<i>Labidesthes sicculus</i>		brook silverside
SCULPIN FAMILY - COTTIDAE		
<i>Cottus bairdi</i>		mottled sculpin
TEMPERATE BASS FAMILY - PERCICHTHYIDAE		
<i>Morone chrysops</i>		white bass
SUNFISH FAMILY - CENTRARCHIDAE		
<i>Ambloplites rupestris</i>		rock bass
<i>Lepomis cyanellus</i>		green sunfish
<i>Lepomis gulosus</i>		warmouth
<i>Lepomis macrochirus</i>		bluegill
<i>Lepomis megalotis</i>		longear sunfish
<i>Lepomis microlophus</i>		redeer sunfish
<i>Micropterus dolomieu</i>		smallmouth bass
<i>Micropterus punctulatus</i>		spotted bass
<i>Micropterus salmoides</i>		largemouth bass
<i>Pomoxis annularis</i>		white crappie
<i>Pomoxis nigromaculatus</i>		black crappie
PERCH FAMILY - PERCIDAE		
<i>Etheostoma blennioides</i>		greenside darter
<i>Etheostoma caeruleum</i>		rainbow darter
<i>Etheostoma flabellare</i>		fantail darter
<i>Etheostoma nigrum</i>		johnny darter
<i>Etheostoma variatum</i>		variegate darter
<i>Etheostoma zonale</i>		banded darter

Family name	
Scientific name	Common name
<i>Percina caprodes</i>	logperch
<i>Percina maculata</i>	blackside darter
<i>Percina oxyrhynchus</i>	sharpnose darter
<i>Stizostedion canadense</i>	sauger
DRUM FAMILY - SCIAENIDAE	
<i>Aplodinotus grunniens</i>	freshwater drum