To the Graduate Council:

I am submitting herewith a dissertation written by Bruce Michael Saul entitled "Utilization of Creel Survey Data to Evaluate Fish Harvest Trends in Tennessee Reservoirs." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Ecology.

J. Larry Wilson, Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Vice Provost
and Dean of the Graduate School

UTILIZATION OF CREEL SURVEY DATA TO EVALUATE FISH HARVEST TRENDS IN TENNESSEE RESERVOIRS

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Bruce Michael Saul

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ABSTRACT

A SAS program was written to process raw creel data from Tennessee Wildlife Resources Agency's (TWRA) annual reservoir surveys. This program summarized important harvest and pressure information in five-year blocks by utilizing results of the TWRA estimated fishing hours expansion program. Combinations of harvest, pressure-effort, and physical-chemical variables were used to determine annual fisheries trends in Tennessee's reservoirs. A multiple correlation matrix was used to determine collinearity among all variables used in this study. Biological variables (total harvest, and harvest of crappie, black bass, catfish, and sunfish in pounds per acre) were significantly correlated with the pressure-effort variables (total pounds harvested per hour and total hours fished per acre) and the physical-chemical variables (total suspended solids and total phosphorus). Mean annual total suspended solids, total phosphorus, total pounds harvested per acre, and total hours fished per acre were most related to sport fish harvests and may help predict potential harvests for any given reservoir in Tennessee.

Each major harvest classification was divided into four groups of similar reservoirs and ultimately combined into two groups. Statewide harvest and standing crop relationships were discussed as annual reservoir trends. In addition, harvest (pounds per acre) and pressure (hours fished per acre) trends for selected reservoirs were discussed. Kentucky, Normandy, and Fort Loudoun Reservoirs appeared in the highest harvest groups while Norris, Melton Hill, and Cordell Hull appeared in

the lowest harvest groups. In comparisons of total pounds per acre harvested and total pounds standing crop per acre, it was determined that between 10% and 40% of potential harvestable size fish were removed. It appeared that most Tennessee reservoirs have the capacity to withstand additional harvests of 25% to 50% above the present values.

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CHAPTER I

INTRODUCTION

The national system of freshwater reservoirs totals over 10 million acres and contains around 1650 impoundments of over 500 acres (Hall 1985). Since very few new reservoirs are planned for the next decade, they are considered a limited resource. Estimates of reservoir fishing pressure in 1960 were approximately 76 million angler-days, and in 1980, 150 million angler-days. If trends remain consistent in the next 15 years, predictions of fishing pressure for the year 2000 approach 300 million angler-days (Jenkins 1974). With the size of our reservoir system being limited, and the pressure predicted to double, innovative management techniques might be necessary in the next few years to help maintain our fish harvests. The first step in this process is to understand local reservoir harvest trends well enough to develop regional management plans.

To assess the harvestable population of fishes in our reservoirs and to involve the constituents who pay for the management of these fishes, proper use of creel surveys should be employed. According to Lambou (1963), a creel census is a "survey where a complete check of all sport fishing is made, that is, where a 100% sample is taken." He further proposed that "creel survey" should be a better term used to denote an intermittent checking of a random sampling of anglers in the process of fishing. These samples could be transformed later into an angling pattern for a particular body of water.

Often times, a creel census would be too costly a procedure because most larger bodies of water have many access points. Therefore, most state fisheries agencies have established creel surveys of many of their ponds, streams, lakes, and reservoirs. The majority of these are stratified, non-randomized surveys which are built on the early work of Dr. Don Hayne and the present work of the Southeastern Statistical Cooperative, both based at North Carolina State University.

There are much useful data that can be derived from creel surveys. They are generally based on details such as: the numbers, weights, and kinds of fish caught by fishermen; the catch per unit effort of selected fishes; the pressure exerted by fishermen on particular fish species; the percentages of the total yield made up of particular species; the characteristics of the primary fishery whether determined by intended fisheries or actual catches; the makeup of the fish population based on class strength and recruitment trends; and comparisons with results of mark-recapture studies, electrofishing surveys, and standing crop estimations.

Creel surveys are very useful to fishery managers in that variations of catches can be observed year to year and reservoir by reservoir. Population trends can be exposed by comparing yearly yields, and management plans can be formulated. The survey can give biologists a good handle on how well management plans are working and how fish populations are responding to various environmental and manmade influences. Estimates of fishing potential can be extrapolated from a good record of creel data. Fisherman interviews can also help

biologists detect fishery problems as soon as they surface. These trends can help structure new regulations that can remedy the problems at hand. Additionally, creel survey results can be a great asset to the fisherman, the one who pays for the surveys in the first place. They can help him decide when to fish and for which species to fish. They can tell a fisherman if he stands a good chance of catching a limit of bass or crappie or the chances of catching a lunker striped bass if he fishes all day.

The Tennessee Wildlife Resources Agency (TWRA) has been involved in the current creel data analysis program since 1963. Most of the data resulting from these surveys had been released in many small pieces instead of a few concise forms. The purpose of this study was twofold. The first was to create a creel survey data base and produce three summary forms which would reflect the most important management variables. Biologists could then access these statistics easily and make management decisions more quickly and efficiently. The second part of this study was to use the yield and pressure variables created in the creel summary program in conjunction with selected physical and chemical variables in evaluating fishery trends in Tennessee reservoirs.

The creel data collected by TWRA biologists have already been recorded in English units of measure. TWRA policy also dictates that future collections and management reports be discussed in English units. Based on this fact, this paper will be written exclusively in these units so conclusions will correspond with all levels of the creel data analysis.

CHAPTER II

LITERATURE REVIEW

There have been many creel studies conducted in the Southeast in the past few decades (Chance 1950, 1959; Fetterholf 1954; Carter 1957; Houser 1958; Stevens 1958, 1959; Byrd 1959; Lambou and Stern 1959a, 1959b; Bartley 1960; Cole 1960) and most were based on reservoir systems. In his 1961 paper, Lambou summed up his review of creel surveys in stating "there are as many different statistics collected, ways of calculating these statistics, and methods of reporting them, as there are creel surveys." Even with this variety of purpose and method, Harrell (1984) noted that these surveys had one objective: "the evaluation of the inherent sport fishery by examining its exploitation and utilization by the angling public. Creel surveys can provide managers and developers with timely feedback on major changes to the sport fishery, whether natural or man-induced."

In order to maximize fishermen's chances of catching fish (since fishing is a chance process), a fishery manager must maintain the population size and composition at optimum levels through stocking fish and regulating fishing catches (Robson 1961). These decisions must be based on objective information concerning the numbers, sizes, and age compositions of fishermen's catches through the creel survey. Various types of data can be collected in a creel survey, including numbers of fish caught, time expended on the catch, proportions of

marked or tagged fish in their catch, and morphometric data on captured fish (Robson 1960). Creel surveys are excellent methods to assess the fishing quality of impoundments and effects of new management programs on the fishery because they are direct measurements of the fisherman's catch. These surveys can also provide information on total use and yield, harvest of stocked fish, exploitation rates, migratory patterns, and habitat preferences (Van Geldern 1972).

A predictive capability for fish yield has been the subject of interest in many studies because fishery managers responsible for lakes and reservoirs need to determine what the potential yields of these water bodies might be. Examples include yield predictions as part of the planning of new impoundments as well as determination of what additional potential exists for under-harvested bodies of water (Oglesby 1982). The estimation of yield, based on results of the creel survey and relationships to fish production, has been used in comparisons with many environmental variables. Welsh (1935) was one of the first biologists to create individual aquatic productivity indices. He used average depth, rooted submerged vegetation, plankton, bottom fauna, turbidity, dissolved salts and gases, and dissolved organic matter as the bases for these indices. Moyle (1954) studied the relationship between standing crop and total alkalinity, salinity, phosphorus, and nitrogen. Other environmental factors such as surface acreage and maximum depths were related to standing crops by Carlander (1955). Later publications made use of a plethora of environmental variables. Rawson (1958) used surface area, mean depth, shoreline

development, storage ratio, water level fluctuation, highest mean temperature, average near bottom oxygen at midsummer, average Secchi disc depth visibility, total dissolved solids, average standing crop of plankton and bottom fauna per unit area, average catch of fish in a standard gill net, and a list of a few of the dominant plankters, bottom organisms, and fish as indices to reservoir productivity. Jenkins (1967) and Jenkins and Morais (1971) indicated that much of the variation in standing crop and sport fish harvest among reservoirs could be explained by differences in a few environmental variables such as surface area, mean depth, total dissolved solids, storage ratio, shore development, age, water level fluctuation, outlet depth, and growing season. Aggus and Lewis (1976) used the same variables but added outflow volume as another indicator for fish production.

Prior to the development of the multiple environmental variable indices, researchers concentrated only on a few variables. Thienemann (1927) developed the theory that basin shape is an important factor in limiting production in lakes. This was combined with Naumann's (1929) classification based on regional water types and effects on plankton development. Rounsefell (1946), inspired by earlier productivity indices, was the first to predict large reservoir standing crops and yields. He used pond and natural lake data to establish the relationship between sport and commercial harvest and lake area. Years later, another researcher tried to relate area and depth with limnetic production (Larkin 1964). As recently as 1982 surface area was again used as a predictor for fisheries yield (Youngs and Heimbuch 1982).

Many of these studies were restricted to small impoundments or natural lakes and were able to help predict production under these limited circumstances.

Turbidity or total suspended solids can have an effect on biotic production of impoundments. Marzolf and Osborne (1972) found that primary productivity was limited by light exclusion due to turbidity. Turbidity can also have an effect on reservoir temperatures. Melack (1976) and McConnell et al. (1977) used gross photosynthesis to help predict fish yield or biomass. Ryder and Kerr (1978) and Ryder (1981) found fish community production was affected by mean annual temperature variations.

Riley (1940), Lindermann (1942), Clark (1946), Riley et al. (1949), and Rawson (1952) discussed relationships between nutrient levels and fish production, while Hrbacek (1969) used phosphorus and nitrogen to predict fisheries yield and biomass. Schindler (1971) related productivity of lakes to levels of phosphorus inputs from runoff and atmospheric fallout which were considered functions of the area of catchment as modified by lake volume. Similarly, Oglesby (1977) noted that phosphorus supply is the principal determinant of phytoplankton standing crop and primary productivity in most lakes, a function modified by lake morphometry, light, and other influences. Earlier, in 1971, Taylor had found annual phytoplankton productivity was correlated with fish production. Increased nutrient loading was found to raise the level of primary productivity and this was related to fish production (Oglesby 1977; Jones and Hoyer 1982). Hanson and

Leggett (1982) concentrated on total phosphorus levels and determined that they helped predict potential fish harvest. Another fish yield predictor was based on the relationship between angler harvest and mean summer phytoplankton standing crop from chlorophyll a levels (Jones and Hoyer 1982). Earlier work by Brylinsky and Mann (1973) had already established a relationship between chlorophyll a and lake productivity.

Hydraulic retention time has been found to be related to phytoplankton concentrations in lakes (Dickman 1969; Herbert 1969; Dillon 1975). Brunskill and Schindler (1971) related productivity to flushing rates and water retention times. In addition to phytoplankton productivity, Kerekes (1973, 1975) found that chlorophyll a concentrations and total phosphorus were related to flushing rates. Vollenweider (1975) provided a theoretical basis for the influence of retention time on reservoir productivity.

Early work by Ball (1945) reflected a relationship between alkalinity and abundance of fish in reservoirs. Similarly, Rawson (1951, 1960) determined that standing crops of various communities reflected the influence of edaphic factors as represented by the total dissolved solids content of lakes. Other researchers found that increasing values of total dissolved solids were reflected in increased production of net plankton, benthic organisms, and fish (Northcote and Larkin 1956). Hayes and Anthony (1964) went one step further by developing an index of fish productivity from multiple regressions that included alkalinity (roughly proportional to total dissolved solids or

conductivity) as one of the independent variables. Shelton et al. (1972) also used a similar measurement, particle size, to predict fish yield or biomass.

Several studies during the 1950's by Canadian limnologists and fishery scientists attempted to relate mean lake depth to faunal productivity, especially fish (Rawson 1952, 1955, 1960; Northcote and Larkin 1956; Hayes 1957). Sakamoto (1966) related mean depth to summer phytoplankton standing crops and lake productivity. Other researchers related mean depth to lake flushing rates and trophic states resulting from nutrient loading (Vollenweider 1968, 1976; Vollenweider and Dillon 1974). Matuszek (1978) found that mean depth and total dissolved solids were the only abiotic factors that helped predict fish yield.

Moyle (1946), Rounsefell (1946), Hayes (1957), and Hayes and Anthony (1964) proposed that there was a relationship between morphological or edaphic factors and fish production in lakes. They laid some of the groundwork for the development of the morphoedaphic index (MEI) by Ryder (1965). In the course of his studies of natural lakes, he also noted trends of increasing productivity with increasing total dissolved solids and decreasing productivity with increasing depth. Based on these findings, Ryder (1965) and Ryder et al. (1974) created a simple straightforward method for estimating lake fish productivity, dividing total dissolved solids by mean depth. This morphoedaphic index was compared with annual sport and commercial harvest. Ryder (1982) related that the MEI has been the subject of over 100

publications with widely divergent results, including Jenkins (1967), Henderson and Welcomme (1974), Welcomme (1976), Oglesby (1977), Ryan and Harvey (1977), and Matuszek (1978). Dillon and Rigler (1975) developed techniques based on springtime total phosphorus concentrations which could be used in place of total dissolved solids in the MEI formula, which could help predict fisheries yields in lakes with substantial cultural eutrophication (1982). Later, Jenkins (1982) related hydraulic retention time and ionic composition to fish yield and production based on the MEI. At the same time, Schlesinger and Regier (1982) were modifying the MEI to a latitudinal type of classification where fish production and yields were related to morpho-edaphic factors and regional differences in climate. Ryder (1982) stated the main point that can be addressed by most of the studies relating the numerous environmental factors to lake productivity, that most of these discrete factors can also affect one another to collectively influence productivity and ultimately fish yield. In general, most of the indices discussed in this section had applicability in the geographic areas in which they were studied. An overall universal index was not found, but the MEI was found to be the best one available for reservoirs in the Southeast.

CHAPTER III

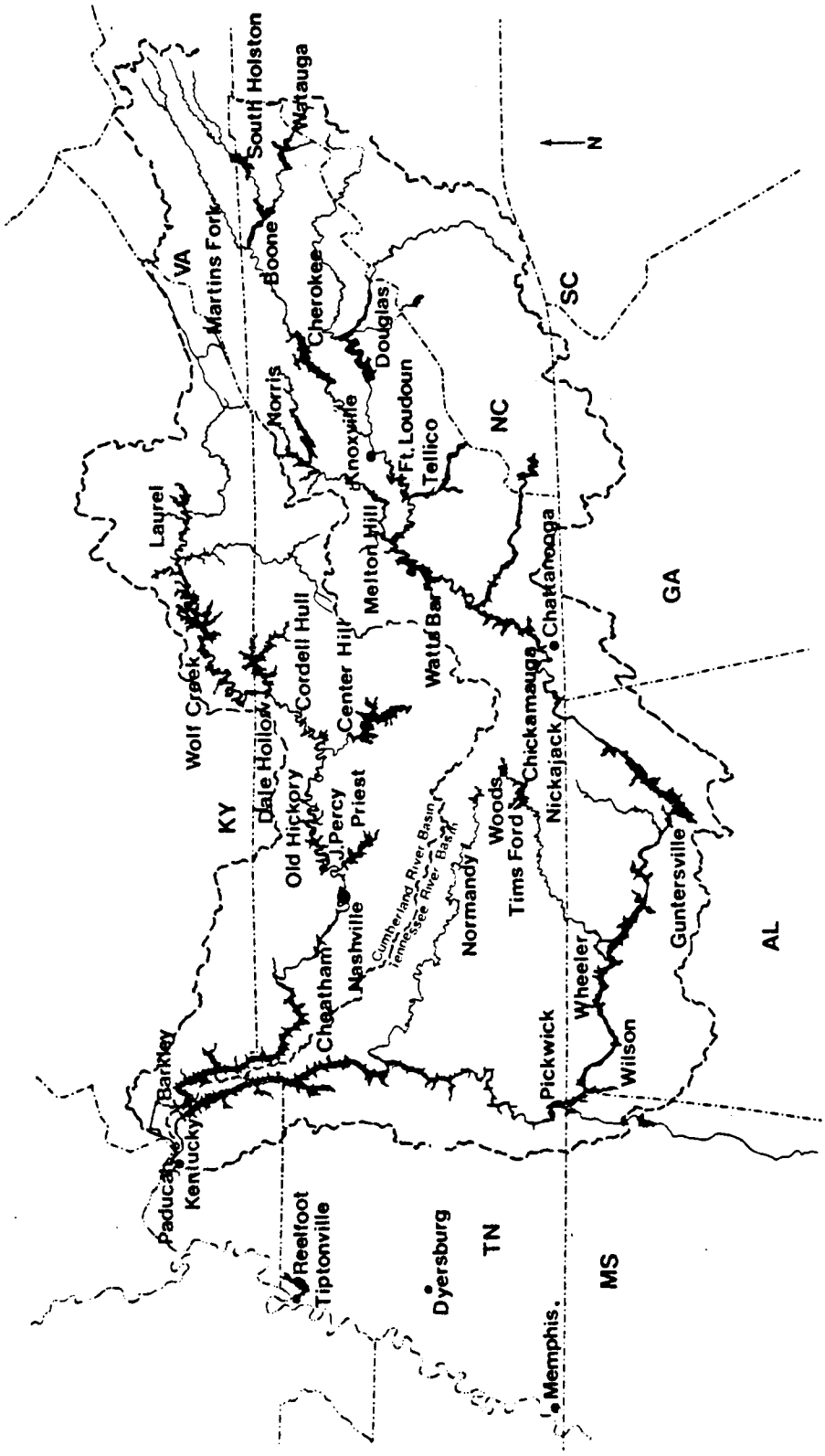
DESCRIPTION OF THE STUDY AREA

This study covers all of the reservoirs or lakes in Tennessee that had creel surveys in effect during the seven-year period (Figure 1). They extend from Watauga in upper East Tennessee to Reelfoot in extreme West Tennessee. Dale Hollow in Kentucky-Tennessee and Wheeler in Alabama-Tennessee were the northern and southern extremes of this study. All geographic and climatic regions in Tennessee along with the two major drainage systems were represented by the waters discussed in this paper.

Most of the reservoirs examined in this study are situated in the Tennessee River Valley. These impoundments, which include Kentucky, Wheeler, Nickajack, Chickamauga, Watts Bar, Fort Loudoun, Tellico, Normandy, Tims Ford, Melton Hill, Norris, Douglas, Cherokee, Boone, South Holston, and Watauga are all part of the Tennessee Valley Authority reservoir system which was designed to provide for navigation, flood control, and the production of hydroelectricity. Today, the system is also used to provide municipal and industrial water supplies, to regulate flows to minimize the effects of effluents including thermal discharges, fluctuating water levels for mosquito control and troublesome aquatic vegetation, and to control flows and levels for recreational uses (Barr 1978).

The Tennessee River and its tributaries drain over 30,906 square miles of area representing parts of Alabama, Georgia, Kentucky,

Figure 1. Map of Tennessee reservoirs creeled, 1977-1983.



-Courtesy U.S. Army Corps of Engineers, Nashville District.

Figure 1

Mississippi, North Carolina, Tennessee, and Virginia (Barr 1978). This river was formed by the confluence of the French Broad and Holston Rivers and has other tributary river systems contributing to its flow. These include the Little Tennessee, Hiwassee, Elk, Duck, Caney Fork, Flint, Paint Rock, Little, Sequatchie, French Broad, Clinch, and Powell. The Tennessee flows in a southwest direction winding through the Ridge and Valley Provinces, the Cumberland Plateau, the eastern highland rim, into the Nashville Basin, and then flows in a northwest direction through the western highland rim into the Ohio River north of Paducah, Kentucky (Miller 1974).

The other impoundments examined in this study lie in the Cumberland River basin. These include Center Hill, Cordell Hull, Dale Hollow, J. Percy Priest, and Old Hickory, which are monitored and controlled by the United States Corps of Engineers. The Cumberland River basin drains 17,913 square miles and flows southwest out of the Ridge and Valley Provinces in Kentucky (Barr 1978). The Cumberland is adjacent to and north of the Tennessee Basin and has similar flows and climatological patterns (Miller 1974).

The reservoirs used in this study range from 3160 surface acres (Normandy) to 160,300 surface acres (Kentucky) with an average of 26,100 surface acres. With the exception of Tims Ford, Tellico, Woods, and Reelfoot, these multipurpose reservoirs have hydroelectric generating capabilities. Based on hydrological and physical characteristics, the Tennessee Valley Authority and the Corps of Engineers categorize these systems as either mainstream or storage impoundments

(again with the exception of the only natural lake in Tennessee, Reelfoot). Mainstream reservoirs usually have short hydraulic retention times which help reduce thermal stratification, enhance mixing, and generally appear similar to large slow moving rivers. Storage impoundments have longer hydraulic retention times, which contribute to thermal and chemical stratification, and have extreme water level fluctuation (Barr 1978).

CHAPTER IV

METHODS

The raw data for this study were provided by the Tennessee Wildlife Resources Agency (TWRA) in the form of creel clerk daily summary forms (Table 1). Over 110,000 forms were categorized by reservoir and year and checked for format and content. The same data were provided on magnetic tape and printed out in order to inspect each record for input errors and extraneous values. Over 2000 man-hours were spent in the categorization and review of the creel records. These data, representing 22 bodies of water, covered a period from 1977 through 1983. Extensive use was made of SAS 82 and The University of Tennessee Computer Center IBM 3180 mainframe computer in order to facilitate the review of this large mass of data.

The first part of the study included the most time intensive aspect of the project. A screening program was written in order to correct or prevent errors noted in the data review procedure. The raw data were processed through the screening program as the first step of the project. The actual creel data were coded in two basic forms. The first was categorized as "one" or "1" cards which contained the 80-column input drawn from individual creel records. The second was categorized as "three" or "3" cards which represented the zoned decimal form of expanded fishing hours. This expansion time was based on the TWRA fishing expansion program that uses pressure counts and predetermined probabilities. The two types of cards were separated in

Table 1. Creel data form used by the Tennessee Wildlife Resources Agency for reservoir sport fishing surveys.

TENNESSEE WILDLIFE RESOURCES AGENCY SPORT FISHING SURVEY

Date: _____
Week Day of Week Year

Body of Water: 1 2 3 4 5 6 7 8 9 10

Area: 1 2 3 4 5 Sub-area: 1 2 3 4 5 6

Boat or Bank: 1. ___Boat 2. ___Bank

Time Started: _____ Time Checked: _____

Hrs. Fished: _____ Completed Trip: 1. ___yes 2. ___no

Boat Rented: 1. ___ (OR)

Owned & Launched At: 3. ___ WRA Access

4. ___ Commercial Dock 5. ___Public Access

6. ___ Private Access 7. ___Moored on Lake

No. of persons in party: 1 2 3 4 5 6 7 8 9

No. of successful fishermen: 0 1 2 3 4 5 6 7 8 9

Principal species fished for: 1. ___any species (Check only one)
2. ___crappie 3. ___black bass 4. ___sunfish
5. ___catfish 6. ___walleye or sauger
7. ___trout 8. ___rough fish 9. ___white bass
0. ___musky &. ___rockfish or hybrid -. ___ other

Specific Data about the Success of each Fisherman:
No. fish of principal species caught:

Fisherman #1: No. fish 1 2 3 4 5 6 7 8 9 ___,

Fisherman #2: No. fish 1 2 3 4 5 6 7 8 9 ___

Fisherman #3: No. fish 1 2 3 4 5 6 7 8 9 ___

Fisherman #4: No. fish 1 2 3 4 5 6 7 8 9 ___

Fisherman #5: No. fish 1 2 3 4 5 6 7 8 9 ___

Fisherman #6: No. fish 1 2 3 4 5 6 7 8 9 ___

To be filled in if trout caught:
Type of lure: 1. Live Bait___, 2. Corn ___,
3. Artificial ___, 4. Flies___, 5. Combination ___

Species	Mark	Length	Weight

F-52 Economic ___yes
6/16/75 WR - 0002

Code	Species	Number	Pounds
88	White Crappie		
89	Black Crappie		
81	L. M. Bass		
83	Spotted Bass		
82	S. M. Bass		
68	White Bass		
69	Yellow Bass		
95	Bluegill		
96	Redear		
99	Rock Bass		
90	Other Sunfish		
71	Sauger		
70	Walleye		
63	Rainbow Trout		
43	Channel Catfish		
41	Flathead Catfish		
42	Blue Catfish		
44	Bullheads		
52	Drum		
30	Carp		
79	Musky		
67	Rockfish		
66	Hybrid		

Remarks:

the first stages of the program in order to facilitate the cleaning of the raw data for input errors and extraneous values. Once the errors were screened out and the expansion times translated, the card sets were combined into one data set and arranged in a logical order. After this process was completed, the data were compiled into the final form that could be processed through the program.

A few important variables (yearly means) created in this program were used in analyzing fishery trends in Tennessee reservoirs. The following variables used in the data analysis were referred to as harvest variables and pressure-effort variables:

Harvest Variables

1. Pounds per acre - estimated total pounds of all sport fish harvested divided by surface acres.
   a. Crappie pounds per acre - combined weights of black and white crappie divided by surface acres.
   b. Black bass pounds per acre - combined weights of largemouth, smallmouth, and spotted bass divided by surface acres.
   c. Catfish pounds per acre - combined weights of flathead, channel, and blue catfish divided by surface acres.
   d. Sunfish pounds per acre - combined weights of all sunfish of the genus Lepomis divided by surface acres.
2. Number per acre - estimated total number of fish harvested divided by surface acres.
   a. Crappie per acre - total numbers of black and white crappie divided by surface acres.

b. Black bass per acre - total numbers of largemouth, smallmouth, and spotted bass divided by surface acres.

c. Catfish per acre - total numbers of flathead, channel, and blue catfish divided by surface acres.

d. Sunfish per acre - total numbers of all sunfish of the genus Lepomis divided by surface acres.

Pressure-Effort Variables

1. Estimated trips - estimated number of fishing trips based on estimated hours fished (TWRA expansion formula) divided by the average trip length.
2. Hours per acre - estimated hours spent fishing per surface acre based on estimated hours fished divided by surface acres.
3. Pounds per hour - estimated pounds of fish harvested per hour based on estimated pounds harvested divided by estimated hours fished.
4. Angler diversity - estimated fishing pressure variable based on estimated hours fished divided by estimated number of fishermen.

The next set of variables, representing standing crop estimates, were obtained from the Tennessee Valley Authority in the form of yearly mean values from cove rotenone reports.

Standing Crop Variables

1. Standing crop pounds per acre - standing crop in total pounds per acre of harvestable size sport fish (above 5.0 inches in length) of the four major species groups.

a. Crappie standing crop pounds of fish above 6.9 inches in length.

b. Black bass standing crop pounds of fish above 8.9 inches in length.

c. Catfish standing crop pounds of fish above 7.9 inches in length.

d. Sunfish standing crop pounds of fish above 5.0 inches in length.

2. Standing crop number per acre - standing crop in total numbers per acre of harvestable size sport fish (above 5.0 inches in length) of the four major species groups.

a. Crappie standing crop numbers of fish above 6.9 inches in length.

b. Black bass standing crop numbers of fish above 8.9 inches in length.

c. Catfish standing crop numbers of fish above 7.9 inches in length.

d. Sunfish standing crop numbers of fish above 5.0 inches in length.

The last set of data was provided by the Tennessee Department of Water Quality in the form of STORET (Environmental Protection Agency water quality data base) computer printouts. Variables provided as individual reservoir yearly means were referred to as physical-chemical variables. Additional variables were obtained from the Tennessee Valley Authority in the form of annual reports and manuscripts. The following list includes all physical-chemical variables used in this study:

Physical-Chemical Variables

1. Total hardness - $CaCO_3$ in ppm.
2. Total dissolved solids - residue on evaporation at 356°F in ppm.

3. Total phosphorus - all phosphates in ppm.
4. Total suspended solids - non-filterable residues in ppm.
5. Total potassium in ppm.
6. Dissolved oxygen - at surface in ppm.
7. Temperature - at surface in °F.
8. pH - at surface.
9. Flow - water flow rate out of dam in cubic feet per second.
10. Mean depth - in feet at full pool surface acreage.
11. Reservoir area - surface acres at full pool.
12. Fluctuation - mean annual vertical fluctuation of water level in feet.
13. Storage ratio - ratio of reservoir volume at full pool divided by annual discharge volume.
14. Drainage area - square miles above the dam.
15. Shore length - linear miles of shoreline.
16. Shoreline development - ratio of reservoir shore length at full pool divided by circumference of circle equal in area to that of reservoir.
17. Age - age of reservoir based on year impounded.
18. Morphoedaphic index (MEI) - total dissolved solids/mean depth.
19. Elevation - in feet above sea level.

All of the variables above were coded (Table 2) to facilitate their usage in summary tables used in other sections of this report. Due to the diverse nature of collections by several sources (Tennessee Water Quality Division, Tennessee Valley Authority, and United States Army Corps of Engineers) on varying routines, a complete set of data

Table 2. Harvest, pressure-effort, standing crop, and physical-chemical variables and associated codes used in creel data analysis.

Code	
Harvest Variables	
H1	Total pounds per acre
H2	Crappie pounds per acre
H3	Black bass pounds per acre
H4	Catfish pounds per acre
H5	Sunfish pounds per acre
H6	Total number per acre
H7	Crappie per acre
H8	Black bass per acre
H9	Catfish per acre
Pressure-Effort Variables	
PE1	Estimated trips
PE2	Hours per acre
PE3	Pounds per hour
PE4	Angler diversity
Standing Crop Variables	
S1	Standing crop pounds per acre
S2	Crappie standing crop pounds per acre
S3	Black bass standing crop pounds per acre
S4	Catfish standing crop pounds per acre
S5	Sunfish standing crop pounds per acre
S6	Standing crop number per acre
S7	Crappie standing crop per acre
S8	Black bass standing crop per acre
S9	Catfish standing crop per acre
S10	Sunfish standing crop per acre
Physical-Chemical Variables	
PC1	Total hardness
PC2	Total dissolved solids
PC3	Total phosphorus
PC4	Total suspended solids
PC5	Total potassium
PC6	Dissolved oxygen
PC7	Temperature
PC8	pH
PC9	Flow
PC10	Mean depth
PC11	Reservoir area
PC12	Fluctuation
PC13	Storage ratio
PC14	Drainage area
PC15	Shore length
PC16	Shoreline development
PC17	Age
PC18	MEI
PC19	Elevation

on all reservoirs was not obtained. The major drawback in discussing variables by reservoir was the small sample size within each reservoir grouping. The most samples contained in any reservoir was seven, a reflection of one mean for each yearly sample. Most reservoirs had three to five yearly records, but several had less than three; at least four reservoirs had no samples in some categories. Based on these facts, data were first pooled over all years and reservoirs. Yearly data were combined over the seven-year period to produce an average value for the study period. This was done to account for abnormally high or low annual variable values.

All analyses were performed on the IBM 3180 mainframe computer with SAS statistical routines. All variables (Table 2) were standardized via the Proc Standard (mean = 0, standard deviation = 1) routine before processing through simple correlation and stepwise regression procedures. After standardization, the entire data set was put into a multiple correlation matrix yielding simple correlation coefficients (Proc Corr) for all reservoirs and years combined. All years within reservoirs and all reservoirs were pooled in this analysis in order to increase the sample size and to aid in the detection of possible relationships among all of the variables shown in Table 2. This assumption was not supported statistically, especially since partial correlation coefficients were not obtained; however, the use of simple correlation coefficients was a useful method of detecting very generalized collinear trends. Only those variables (with r values above 0.70 and confidence levels above 0.01) that correlated with total,

crappie, black bass, catfish, and sunfish pounds per acre harvested were considered in the analysis. A few selected variables with r values between 0.50 and 0.70 were included in the discussion because they were judged important by other researchers and this author. Variables were judged to be collinear if they met the assumptions in the previous statement or were noted in the scientific literature.

After patterns of multicollinearity were established, the reservoirs were clustered (Proc Cluster and Proc Tree) by selected variables (non-collinear). All comparisons were made using annual mean values because of missing monthly data from some reservoirs. After running the data through these SAS routines, two levels of criteria were used to decide if a cluster was a realistic one. The first level was based on plotting the cubic clustering criterion by the number of clusters to detect where the most statistically accurate groups were. If a peak of clusters was noted at or above the one or two cubic cluster level, the cluster was best in this area (SAS Institute 1982). This procedure reinforces the tendency to visually inspect the data points in the analysis to detect noticeable changes in root mean squares. The second level used to determine a good cluster was based on common sense and logic. If a small upland storage reservoir like Watauga was grouped with a large mainstream reservoir like Watts Bar, a good cluster was not obtained. After cluster patterns were established, a stepwise multiple regression (Proc Stepwise) procedure was performed on all groups of reservoirs.

After grouping lakes by non-biological variables, all reservoirs and years were tested (Proc GLM) for differences among and between all

levels of biological (harvest) variables. Quadratic equations were then fitted to harvest variables by reservoir, by year, and by reservoir and year. The annual values of major variables (total, crappie, black bass, catfish, and sunfish pounds per acre) were then ranked as least squares and arithmetic means to assess the impact of missing data points. These annual harvest variables were plotted by reservoir (Proc GPlot) with a Tektronics 4662 plotter. These reservoir by year plots were visually grouped into clusters (total sport fish, crappie, black bass, catfish, and sunfish) of low harvest (Group 1), intermediate low harvest (Group 2), intermediate high harvest (Group 3) and high harvest (Group 4).

The major harvest classification variables were plotted by least square means in order to note annual trends. These variables were also plotted by annual arithmetic means so corresponding relationships could be discussed. The major harvest classification variables were then plotted along with their corresponding standing crop of harvestable fish pounds per acre variables in order to estimate overharvest potentials on an annual state-wide basis.

The next step was to note the differences in the four groups of reservoirs that made up the major harvest classifications. The confidence intervals ($\alpha = 0.05$) were inspected for each group in order to detect overlapping annual mean harvest values between the four groups. If groups were found to contain overlapping confidence limits, they were combined into a larger group. The subsequent groups were compared (Proc GLM) for differences at the 0.05 level in the

physical-chemical and pressure-effort variables used in this study to determine if any variables could have an effect on fish harvests. Again, seven-year means for all variables were utilized to account for abnormally high or low annual values.

CHAPTER V

RESULTS AND DISCUSSION

The three summary sheets produced by the program created in this study are presented in Tables 3, 4, and 5. The summary sheet for each reservoir (Table 3) can be produced on either an annual or monthly format. Five-year blocks of creel data in the form of daily keypunched creel cards with accompanying expansion cards can be automatically processed with this program once it has been transferred to tape. In addition to the three summary tables, graphics were performed on several important fish species and their respective numbers and weights in selected reservoirs. Documentation and explanation of each variable can be reviewed in Appendix A. All major calculations were first discussed with TWRA personnel before being included in the program. The final version of the program required two years to complete, 1072 kilobytes of memory, and 1 1/2 hours of time to analyze this large data set.

Correlation Analysis Over All Reservoirs

In this section, correlations between the most significant variables in the matrix are discussed. All years within reservoirs and all reservoirs were pooled in this analysis in order to increase the sample size and to detect relationships between all of the variables previously mentioned. References to "highly correlated" values refer to those with r values above 0.70. A few selected

Table 3. Creel summary sheet which provides catch and effort data for each reservoir on an annual basis.

LAKE SUMMARY

Lake _____ (Month _____) Year _____

Species[a]	Number Caught	Pounds Caught	Average Weight	Number Per Hour	Pounds Per Hour	Percent By Number	Percent By Weight	Estimated Total Number	Estimated Total Pounds
-									
-									
-									
-									
-									
Totals									

[a]Only species caught within the particular reservoir will be listed by the computer program.

Additional Summary Items:

1. Hours Sampled:
2. Men Sampled:
3. Estimated Hours:
4. Estimated Trips:
5. Average Trip (Hours) (Item 3 divided by Item 4):
6. Number Complete Trips:

Table 4. Creel summary sheet which provides five-year blocks of selected catch and effort data by individual reservoir.

	Combined Fisheries — Individual Reservoirs				
	1979	1980	1981	1982	1983
1. Total Trips					
2. Trips Per Acre					
3. Hours Per Acre					
4. Percent Succ. Comp. Trip					
5. Percent Boat Fishermen					
6. Percent Bank Fishermen					
7. Number Caught:					
a. Crappie 87					
b. Black bass 80					
c. Catfish 40					
d. Stripd/Hyb 65					
e. White bass 68					
f. Sunfish 90					
g. Wall/Saug 74					
h. Trout 62					
i. Other 00					
8. Pounds Caught:					
a. Crappie 87					
b. Black bass 80					
c. Catfish 40					
d. Stripd/Hyb 65					
e. White bass 68					
f. Sunfish 90					
g. Wall/Saug 74					
h. Trout 62					
i. Other 00					
9. Avg. Weight (8./7.):					
a. Crappie 87					
b. Black bass 80					
c. Catfish 40					
d. Stripd/Hyb 65					
e. White bass 68					
f. Sunfish 90					
g. Wall/Saug 74					
h. Trout 62					
i. Other					
10. Lbs. Per Acre (8./Acres):					
a. Crappie 87					
b. Black bass 80					
c. Catfish 40					
d. Stripd/Hyb 65					
e. White bass 68					
f. Sunfish 90					
g. Wall/Saug 74					
h. Trout 62					
i. Other					

Table 4 (continued)

	Combined Fisheries — Individual Reservoirs				
	1979	1980	1981	1982	1983
11. No. Per Hour (7./Est. Hrs.):					
a. Crappie 87					
b. Black bass 80					
c. Catfish 40					
d. Stripd/Hyb 65					
e. White bass 68					
f. Sunfish 90					
g. Wall/Saug 74					
h. Trout 62					
i. Other 00					
12. Lbs. Per Hour (8./Est. Hrs.):					
a. Crappie 87					
b. Black bass 80					
c. Catfish 40					
d. Stripd/Hyb 65					
e. White bass 68					
f. Sunfish 90					
g. Wall/Saug 74					
h. Trout 62					
i. Other 00					
13. Fishing Trips (%) For:					
a. Any 1					
b. Crappie 2					
c. Black bass 3					
d. Sunfish 4					
e. Catfish 5					
f. Wall/Saug 6					
g. Trout 7					
h. Rough 8					
i. White bass 9					
j. Stripd/Hyb &					
k. Musky 0					
14. Hours Fishing (%) For:					
a. Any 1					
b. Crappie 2					
c. Black bass 3					
d. Sunfish 4					
e. Catfish 5					
f. Wall/Saug 6					
g. Trout 7					
h. Rough 8					
i. White bass 9					
j. Stripd/Hyb &					
k. Musky 0					

Table 4 (continued)

	Combined Fisheries — Individual Reservoirs				
	1979	1980	1981	1982	1983
15. Trips Per Acre For:					
a. Any 1					
b. Crappie 2					
c. Black bass 3					
d. Sunfish 4					
e. Catfish 5					
f. Wall/Saug 6					
g. Trout 7					
h. Rough 8					
i. White bass 9					
j. Stripd/Hyb &					
k. Musky 0					
16. Hours Per Acre For:					
a. Any 1					
b. Crappie 2					
c. Black bass 3					
d. Sunfish 4					
e. Catfish 5					
f. Wall/Saug 6					
g. Trout 7					
h. Rough 8					
i. White bass 9					
j. Stripd/Hyb &					
k. Musky 0					

Table 5. Creel summary sheet which provides five-year blocks of selected catch and effort data for all reservoirs combined.

	Combined Fisheries — All Reservoirs Creeled				
	1979	1980	1981	1982	1983
1. Sample No. of Reservoirs					
2. Total Number of Acres					
3. Total Trips					
4. Trips Per Acre					
5. Hours Per Acre					
6. Percent Succ. Comp. Trip					
7. Percent Boat Fishermen					
8. Percent Bank Fishermen					
9. Number Caught:					
a. Crappie 87					
b. Black bass 80					
c. Catfish 40					
d. Stripd/Hyb 65					
e. White bass 68					
f. Sunfish 90					
g. Wall/Saug 74					
h. Trout 62					
i. Other 00					
10. Pounds Caught:					
a. Crappie 87					
b. Black bass 80					
c. Catfish 40					
d. Stripd/Hyb 65					
e. White bass 68					
f. Sunfish 90					
g. Wall/Saug 74					
h. Trout 62					
i. Other 00					
11. Avg. Weight (10./9.)					
a. Crappie 87					
b. Black bass 80					
c. Catfish 40					
d. Stripd/Hyb 65					
e. White bass 68					
f. Sunfish 90					
g. Wall/Saug 74					
h. Trout 62					
i. Other 00					
12. Lbs. Per Acre (10./Acres)					
a. Crappie 87					
b. Black bass 80					
c. Catfish 40					

Table 5 (continued)

	Combined Fisheries — All Reservoirs Creeled				
	1979	1980	1981	1982	1983
d. Stripd/Hyb 65					
e. White bass 68					
f. Sunfish 90					
g. Wall/Saug 74					
h. Trout 62					
i. Other 00					
13. No. Per Hour (9./Est. Hrs.)					
a. Crappie 87					
b. Black bass 80					
c. Catfish 40					
d. Stripd/Hyb 65					
e. White bass 68					
f. Sunfish 90					
g. Wall/Saug 74					
h. Trout 62					
i. Other 00					
14. Lbs. Per Hour (10./Est. Hrs.)					
a. Crappie 87					
b. Black bass 80					
c. Catfish 40					
d. Stripd/Hyb 65					
e. White bass 68					
f. Sunfish 90					
g. Wall/Saug 74					
h. Trout 62					
i. Other 00					
15. Fishing Trips (%) For:					
a. Any 1					
b. Crappie 2					
c. Black bass 3					
d. Sunfish 4					
e. Catfish 5					
f. Wall/Saug 6					
g. Trout 7					
h. Rough 8					
i. White bass 9					
j. Stripd/Hyb &					
k. Musky 0					
16. Hours Fishing (%) For:					
a. Any 1					
b. Crappie 2					
c. Black bass 3					
d. Sunfish 4					

Table 5 (continued)

	Combined Fisheries — All Reservoirs Creeled				
	1979	1980	1981	1982	1983
e. Catfish 5					
f. Wall/Saug 6					
g. Trout 7					
h. Rough 8					
i. White bass 9					
j. Stripd/Hyb &					
k. Musky 0					
17. Trips Per Acre For:					
a. Any 1					
b. Crappie 2					
c. Black bass 3					
d. Sunfish 4					
e. Catfish 5					
f. Wall/Saug 6					
g. Trout 7					
h. Rough 8					
i. White bass 9					
j. Stripd/Hyb &					
k. Musky 0					
18. Hours Per Acre For:					
a. Any 1					
b. Crappie 2					
c. Black bass 3					
d. Sunfish 4					
e. Catfish 5					
f. Wall/Saug 6					
g. Trout 7					
h. Rough 8					
i. White bass 9					
j. Stripd/Hyb &					
k. Musky 0					

variables with values between 0.50 and 0.70 will be discussed and referred to as "correlated." The most important part of this matrix is listed in Table 6 and the remainder in Appendix B. Many variables that were not important in this analysis were not discussed. Some sample size problems caused several correlations to be found highly significant, but were still left in the matrix. To reduce inclusion of any of these misleading correlations, significance levels were set at 0.01. This discussion deals with the pounds per acre harvested variables (total, crappie, black bass, catfish, and sunfish).

A multiple correlation matrix for each reservoir was not obtained. The problem of small sample sizes prevented the use of this procedure. Very few reservoirs contained a full seven-year set of data.

Harvest Variable Correlations

Total Pounds Per Acre

The total pounds of fish harvested per acre was highly correlated with total hours fished per acre, total pounds harvested per hour, and pounds of crappie and black bass harvested per acre. The fishing pressure variable, hours per acre, was related to pounds per acre harvests because more effort produces larger yields, specifically in systems that had adequate stocks of the target species. This fishing effort-harvest relationship was noted in studies by Campbell et al. (1976) and Schlesinger and Regier (1982). Another variable, pounds per hour, was found to be directly influenced by

Table 6. Correlation coefficients and significance levels (0.05) for harvest variables (pounds per acre) for all reservoirs creeled. Coded variables are defined in Table 2, page 22.

	Pounds Per Acre				
	Total	Crappie	Black Bass	Catfish	Sunfish
PE1	.53 .0099			.79 .0001	
PE2	.73 .0001	.70 .0003	.79 .0001		.46 .0286
PE3	.80 .0001	.58 .0039	.45 .0322	.66 .0007	.44 .0340
H1		.91 .0001	.78 .0001		.61 .0019
H2	.91 .0001		.72 .0001		.55 .0064
H3	.78 .0001	.72 .0001			
H5	.61 .0019	.55 .0064			
H6	.86 .0001	.85 .0001	.61 .0021		.89 .0001
H7	.84 .0001	.92 .0001	.61 .0019		.80 .0001
H8			.71 .0001		
H9	.42 .0449			.98 .0001	
H10	.66 .0007	.60 .0026	.41 .0490		.97 .0001
S10					.54 .0359
PC3	.56 .0058	.58 .0038			.55 .0068
PC4	.58 .0041	.54 .0081			.59 .0034
PC6			.48 .0260		
PC9				.67 .0058	
PC11				.68 .0005	
PC14				.56 .0069	
PC15				.84 .0001	
PC16				.68 .0038	
PC17			-.45 .0414		

pounds per acre because of their common use of the pounds harvested variable. It was logical to consider that large harvest weights were directly related to larger weights per unit time. The reason crappie and black bass pounds per acre were so highly correlated with total pounds per acre was due to the fact that these two species make up a substantial portion of the total weight.

Total pounds per acre harvested was correlated with two physical-chemical variables, total suspended solids and total phosphorus. The significant relationship with total suspended solids could have been due to sampling technique bias. In many cases, collecting agencies would monitor areas with known water quality problems, and total suspended solids were often sampled. Another possible relationship could have been due to the presence of plankton organisms in the total suspended sample. After collection, the sample is usually processed through a 1.2-micron standard glass fiber filter and weighed after drying. This method could include these organisms which are indicators of primary productivity.

The correlation of pounds per acre harvested and total phosphorus was an easier relationship to review. Since phosphorus is a necessary element in the primary productivity cycle and the base of the aquatic food chain, higher concentrations were necessary to produce more pounds of fish per acre. Jones and Hager (1982) found a significant correlation between fish yields and total phosphorus.

Crappie Pounds Per Acre

The total pounds of crappie harvested per acre was highly correlated with total hours fished per acre and total pounds of black

bass harvested. Crappie was the most sought after and harvested sport fish in Tennessee during this study. The correlation between hours per acre and crappie pounds harvested per acre was the direct result of the fishing pressure applied on that species. Black bass pounds per acre was also highly correlated with crappie pounds per acre because of their dual contributions to the total pounds per acre harvested and they were collinear variables.

Crappie pounds per acre harvested was correlated with two physical-chemical variables, total suspended solids and total phosphorus. These relationships were traced directly to the high correlations between crappie and total pounds per acre. Since total pounds per acre was correlated with these two physical-chemical variables, it follows that crappie was also correlated with them.

Black Bass Pounds Per Acre

The total pounds of black bass harvested per acre was highly correlated with total hours fished per acre, total pounds harvested per acre, and total crappie pounds harvested per acre. Black bass weights made up a large percentage of the total pounds harvested per acre, a factor substantiated by the high r value. Since the total pressure per acre variable determined the harvest, black bass pounds per acre and hours per acre values were interrelated. The correspondence between black bass and crappie pounds per acre was noted in the previous section.

Catfish Pounds Per Acre

The only highly correlated relationship discussed in this section was between catfish pounds per acre harvested and total estimated number of fishing trips. The higher number of trips produced higher harvests of catfish according to this relationship. It was apparent that more trips taken on a reservoir, Kentucky for instance, meant more trips were directed towards catfishing. It was possible that these catfish fishermen were more skilled at harvesting their target species than other types of fishermen, or that catfish fishermen had more catfish in their possession than other types of fishermen.

Sunfish Pounds Per Acre

It was noted that none of the pressure-effort variables were highly correlated with sunfish pounds per acre harvested. However, this variable was correlated with two physical-chemical variables, total suspended solids and total phosphorus. Sunfish pounds per acre harvested could have been related to total suspended solids because it was the best indicator of reservoir productivity. It was also possible that collinearity between sunfish and crappie pounds per acre could have caused the significant relationship. Total phosphorus was correlated because impoundments with higher phosphorus had higher productivity and constituted good sunfish harvest reservoirs.

Cluster Analyses

After running the data through the SAS cluster routines on all non-collinear variables, no combination of variables was considered

to be a statistical or logical cluster. The single variable, elevation, was found to provide a good cluster, but biological trends were masked by many factors embedded within its value. Due to sample size restrictions within and among clusters, stepwise linear regression techniques proved to be an unacceptable method of predicting differences among this cluster.

Another type of clustering technique was employed to allow the biological variables to group the reservoirs. The classification variables (total, crappie, black bass, catfish, and sunfish pounds per acre harvested) were used to help delineate reservoir groups. Results of the SAS routine indicated there were significant differences among and between mean annual variables and all reservoirs at the 0.0001 level.

Upon examination of quadratic regressions for each reservoir for the seven-year study period, trends in the harvests of each of the five classification variables were noted (Appendixes C-G). On close scrutiny of each variable group, it was found that the reservoirs could be logically arranged into four subsets. The subset with the lowest harvests was classified as Group 1, and the subset with the highest harvests, Group 4. After arranging the classification variable clusters into four groups each, least squares means for each reservoir were obtained in order to confirm the original four group subsets. The resulting clusters are summarized in Table 7. Due to results of SAS routines which listed groups from highest to lowest values, this discussion will maintain the trend by discussing results of Group 4 before those of Groups 3, 2, and 1.

Table 7. Reservoir clusters based on fish harvests in pounds per acre. Rankings are as follows: Group 1 = low harvest, Group 2 = intermediate low harvest, Group 3 = intermediate high harvest, Group 4 = high harvest.

Total Pounds Per Acre Harvested

Group 1	Group 2	Group 3	Group 4
Cordell Hull	Boone	Center Hill	Fort Loudoun
Melton Hill	Chickamauga	Cherokee	Kentucky
Norris	South Holston	Douglas	Normandy
Old Hickory	Watauga	J. Percy Priest	Reelfoot
	Woods	Nickajack	Tims Ford
		Tellico	
		Watts Bar	

Crappie Pounds Per Acre Harvested

Group 1	Group 2	Group 3	Group 4
Center Hill	Boone	Douglas	Fort Loudoun
Cordell Hull	Cherokee	Tims Ford	J. Percy Priest
Melton Hill	Chickamauga	Watts Bar	Kentucky
Norris	Nickajack		Normandy
Watauga	Old Hickory		Reelfoot
	South Holston		
	Tellico		
	Woods		

Bass Pounds Per Acre Harvested

Group 1	Group 2	Group 3	Group 4
Norris	Chickamauga	Boone	Center Hill
Old Hickory	Cordell Hull	Cherokee	Fort Loudoun
Woods	Douglas	J. Percy Priest	Kentucky
	Melton Hill	Nickajack	Normandy
	Watts Bar	Reelfoot	Tellico
		South Holston	Tims Ford
		Watauga	

Catfish Pounds Per Acre Harvested

Group 1	Group 2	Group 3	Group 4
Boone	Cordell Hull	Center Hill	Kentucky
Melton Hill	Douglas	Cherokee	Woods
Normandy	J. Percy Priest	Chickamauga	
Norris	Old Hickory	Fort Loudoun	
Reelfoot	Tims Ford	Nickajack	
South Holston		Watts Bar	
Tellico			
Watauga			

Table 7 (continued)

Sunfish Pounds Per Acre Harvested			
Group 1	Group 2	Group 3	Group 4
J. Percy Priest Woods	Cherokee	Boone	Center Hill
	Chickamauga	Melton Hill	Fort Loudoun
	Cordell Hull	Nickajack	Kentucky
	Douglas	Tellico	Normandy
	Norris		Reelfoot
	Old Hickory		
	South Holston		
	Tims Ford		
	Watauga		
	Watts Bar		

Fishery Trends Over All Reservoirs

Total Pounds Per Acre Harvested

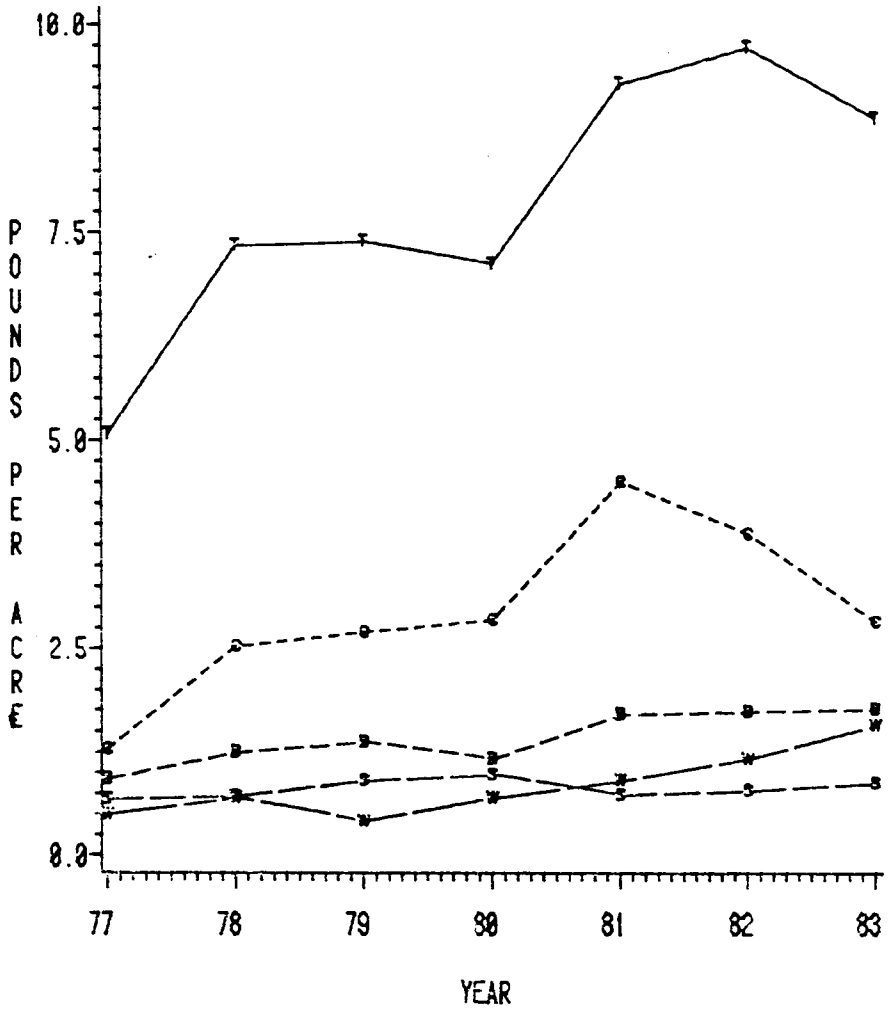
The yearly trends of least square mean pounds per acre for all reservoirs combined were plotted on Figure 2. The variable, total pounds per acre, was at its lowest point in 1977 and reached a high in 1982. These values appeared to increase throughout the seven-year period, with the exception of 1980 and 1983, where values were slightly lower. The main reason for these lower values was a decrease in harvests in these reservoirs that contributed a large percentage to the total harvest.

A similar increasing trend was noted in annual mean fishing pressure in hours per acre. In 1977 the value was 7.70 hours per acre and rose to over 13.0 hours per acre before 1983. As might be expected, more pressure on a fishery could produce increased harvests, a trend noted by Thompson and Hutson in 1950. This trend cannot totally be explained without noting comparisons of mean annual standing crops and fish harvests (Figure 3).

Standing crops of selected harvestable sport fish (crappie, black bass, catfish, and sunfish) varied between 23.67 pounds per acre and 46.37 pounds per acre over the seven-year sample. Some of the variation in the magnitude of standing crop was probably due to the differences in the number of samples taken in each reservoir and the number of reservoirs sampled in a particular year. In some cases the magnitude of variation was quite substantial.

Figure 2. Annual least squares mean harvest in pounds per acre of the major classification variables (total, crappie, black bass, catfish, and sunfish) for 1977-1983.

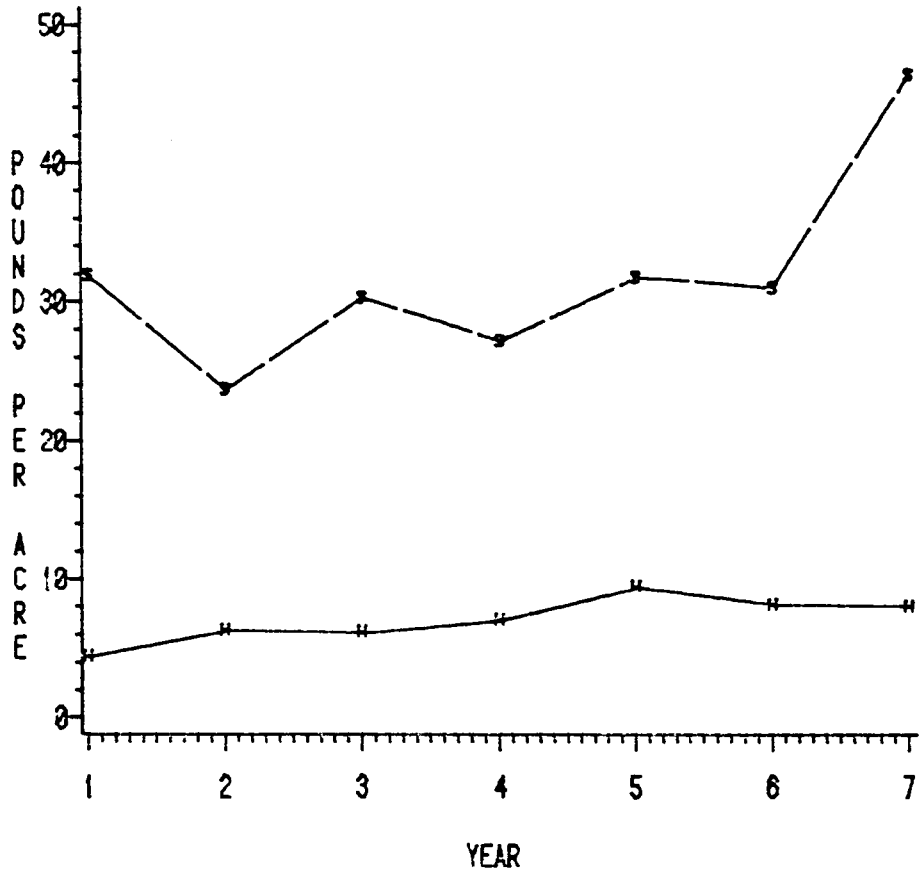
TOTAL AND SPECIES POUNDS PER ACRE BY YEAR
(FOR ALL LAKES COMBINED)



T=TOTAL C=CRAPPIE B=BASS S=SUNFISH W=CATFISH

Figure 3. Annual mean harvest and standing crop of total pounds per acre for all reservoirs combined. The seven years in the period 1977-1983 are coded year 1 through year 7.

TOTAL FISH HARVESTED (LB/ACRE) AND TOTAL STANDING CROP (LB/ACRE) BY YEAR (1977–1983)



HARVEST=H STANDING CROP=S

Harvest of all sport fish varied between 4.19 and 8.95 pounds per acre over the sample period. A general increasing trend in pounds harvested per acre was noted and may have been related to the additional harvest resulting from several new impoundments (Tims Ford in 1970, Normandy in 1976, and Tellico in 1979). If the highest harvest year level of 8.95 pounds per acre was compared with the lowest standing crop level of 23.67 pounds per acre, less than 40% of the potential sport fish were harvested. In another comparison of the lowest annual harvest of 4.19 pounds per acre and the highest standing crop of 46.37 pounds per acre, less than 10% of the potential sport fish were harvested. Jenkins and Morais (1971) found that 37% of the sport fish were harvested in their sample of 103 reservoirs, indicating this estimate was within the range of their study. It appeared that total standing crop was sufficiently high to withstand the fishing pressure applied during the sample period; in fact, more pressure in some reservoirs could have been applied without significantly reducing the populations of game fish.

Crappie Pounds Per Acre Harvested

The yearly trends of least squares mean crappie harvest appeared similar to total pounds per acre harvest (Figure 2). Crappie, being the number one sport fish in Tennessee in terms of popularity and harvest, contributed as high as 45% of the total harvest during the sample period. Crappie harvests were at their lowest in 1977 and peaked in 1981. The subsequent levels of harvest maintained themselves near the 1980 values. It was probable that the contribution of one or

two newer reservoirs (Normandy and Tims Ford) caused the peak in 1981.

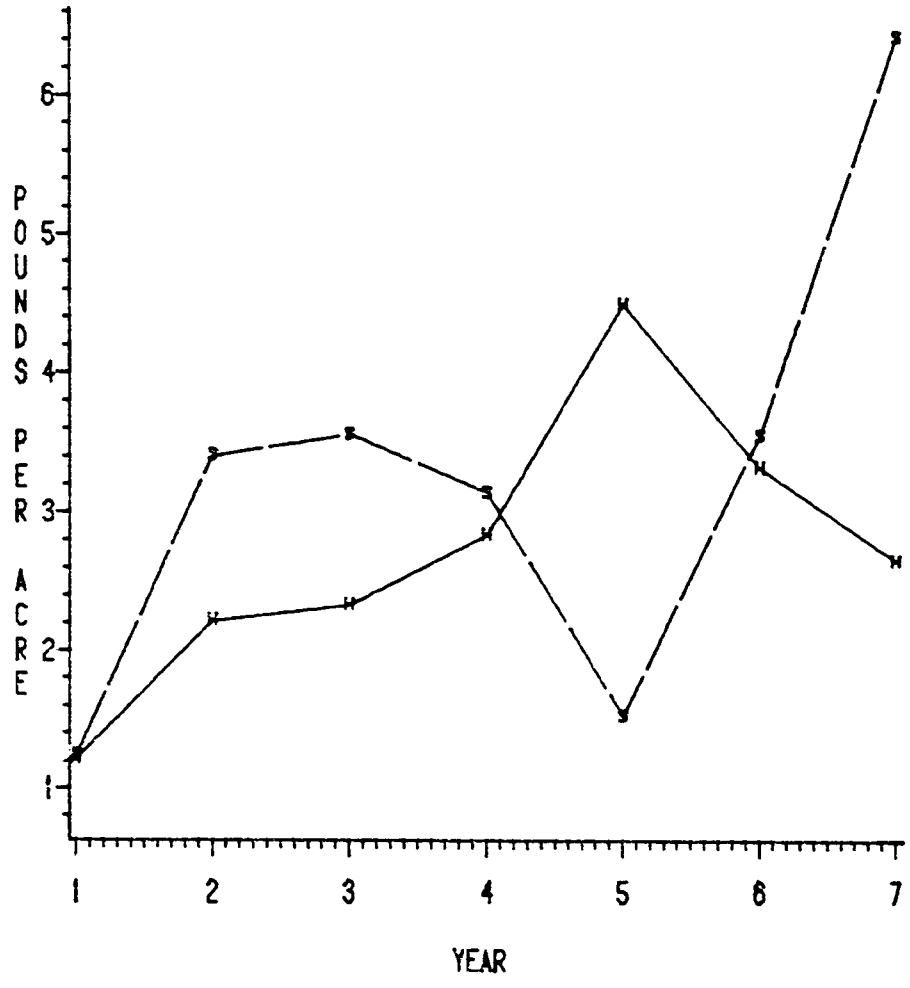
In reviewing mean total standing crop pounds per acre of crappie (Figure 4), values ranged from a low of 1.24 pounds per acre in 1977 to a high of 6.42 pounds per acre in 1983. Due to a restricted number of samples in 1981, a decrease in harvest was observed. If calculated without this standing crop mean, the overall standing crop of crappie increased over the sample period. The estimates relayed here were probably lower than they should have been because crappie are often deeper or open-water species. Thus, standing crop may have been underestimated by the cove rotenone methods.

The mean annual harvest of crappie followed a trend similar to that of total pounds per acre harvested (Figure 2). Mean annual values began at a low of 1.16 pounds per acre in 1977 and peaked at 4.29 pounds per acre in 1971. The number of crappie fishermen (as a percentage of all fishermen) generally increased during the same period.

The values of crappie standing crop and crappie harvest were more similar than those within the totals category. The pounds harvested and standing crop per acre relationships indicated that over 100% of the potential game fish were often removed. These values were not very realistic due to the inherent problem of sample sizes of standing crop data. The most typical years, 1978-1979, revealed approximately 60% harvest of potential sport fishes. Without detailed tagging and recapture studies on crappie, these values were, at most, simple estimates of harvest.

Figure 4. Annual mean harvest and standing crop of crappie pounds per acre for all reservoirs combined. The seven years in the period 1977-1983 are coded year 1 through year 7.

TOTAL CRAPPIE HARVESTED (LB/ACRE) AND
TOTAL CRAPPIE STANDING CROP (LB/ACRE) BY YEAR
(1977–1983)



HARVEST=H STANDING CROP=S

Black Bass Pounds Per Acre Harvested

The annual least squares mean black bass harvests (Figure 2) increased over the period of this study. The lowest value appeared in 1977 and the highest in 1983 with only a slight drop occurring in 1980. These higher harvests generally followed the increase in amount of total fishing pressure. In a year with optimal harvests, black bass made up 20% of the total sport fish harvest, a trend that will probably not increase due to the expanding popularity of catch-and-release bass fishing.

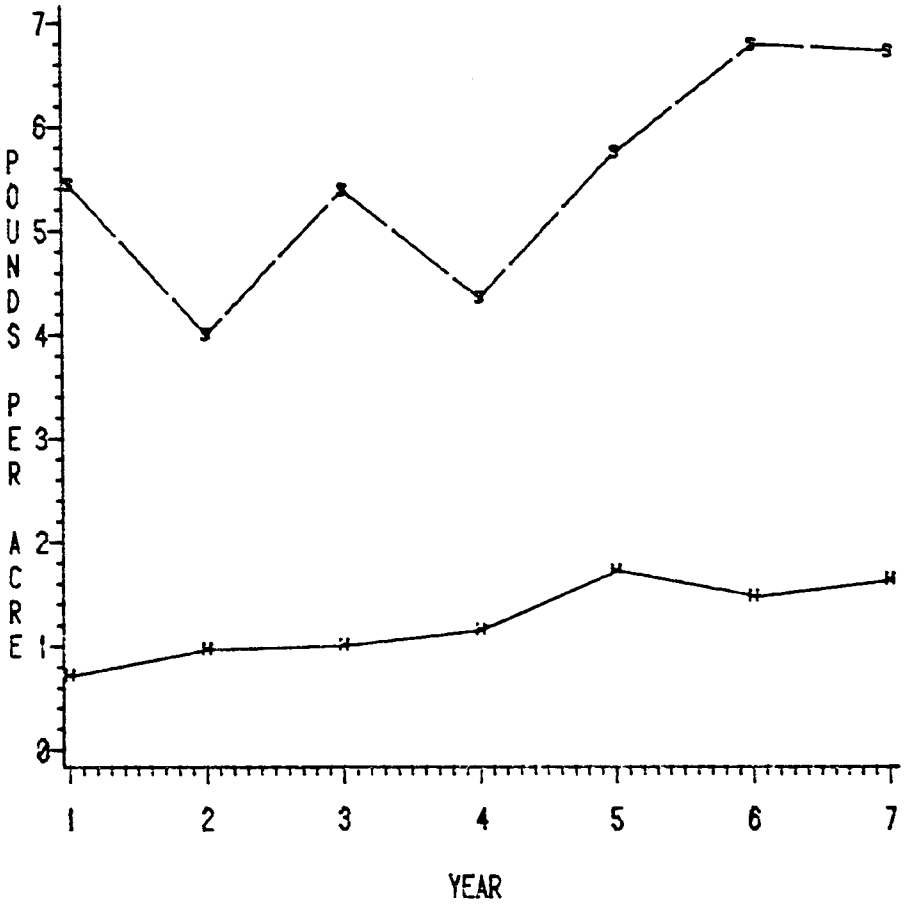
Mean standing crops of black bass (Figure 5) ranged from a low of 4.00 pounds per acre in 1978 to a high of 6.71 pounds per acre in 1983. Both values were lower than Jenkins' (1973) estimate of 9.8 pounds per acre for 156 southern reservoirs. Slight reductions in standing crop occurred in 1978 and 1980, but these can be attributed to smaller sample sizes. These estimates were deemed relatively accurate because of the nature of black bass to inhabit shallower waters during the time when cove rotenone methods were employed.

The mean harvest of black bass increased during the study period with a slight peak in 1981. Annual means ranged from a low of 0.68 pounds per acre in 1977 to a high of 1.64 pounds per acre in 1981, a value slightly more than the weight in 1983 (1.58 pounds per acre). There was also a trend in the increase of the percentage of bass fishermen to total fishermen during the study period.

The relationship between harvest and standing crop of black bass was more realistic than those of crappie. In a hypothetical year containing the highest mean harvest of black bass at 1.64 pounds

Figure 5. Annual mean harvest and standing crop of black bass pounds per acre for all reservoirs combined. The seven years in the period 1977-1983 are coded year 1 through year 7.

TOTAL BLACK BASS HARVESTED (LB/ACRE) AND
TOTAL BLACK BASS STANDING CROP (LB/ACRE) BY YEAR
(1977–1983)



HARVEST=H STANDING CROP=S

per acre and the lowest mean standing crop of 4.0 pounds per acre, 40% of the harvestable bass were taken. In considering the lowest harvest of 0.68 pounds per acre and the highest standing crop of 6.71 pounds per acre, 10% of the harvestable bass were removed. Jenkins and Morais (1971) and Jenkins (1973) found 60 and 45% harvests of estimated black bass weights in their samples of 103 and 156 reservoirs, respectively. Very limited black bass tag recovery data in Tennessee reflected a state-wide harvest of 18 to 40% and an East Tennessee harvest of less than 25% (Doug Peterson, TWRA, personal communication).

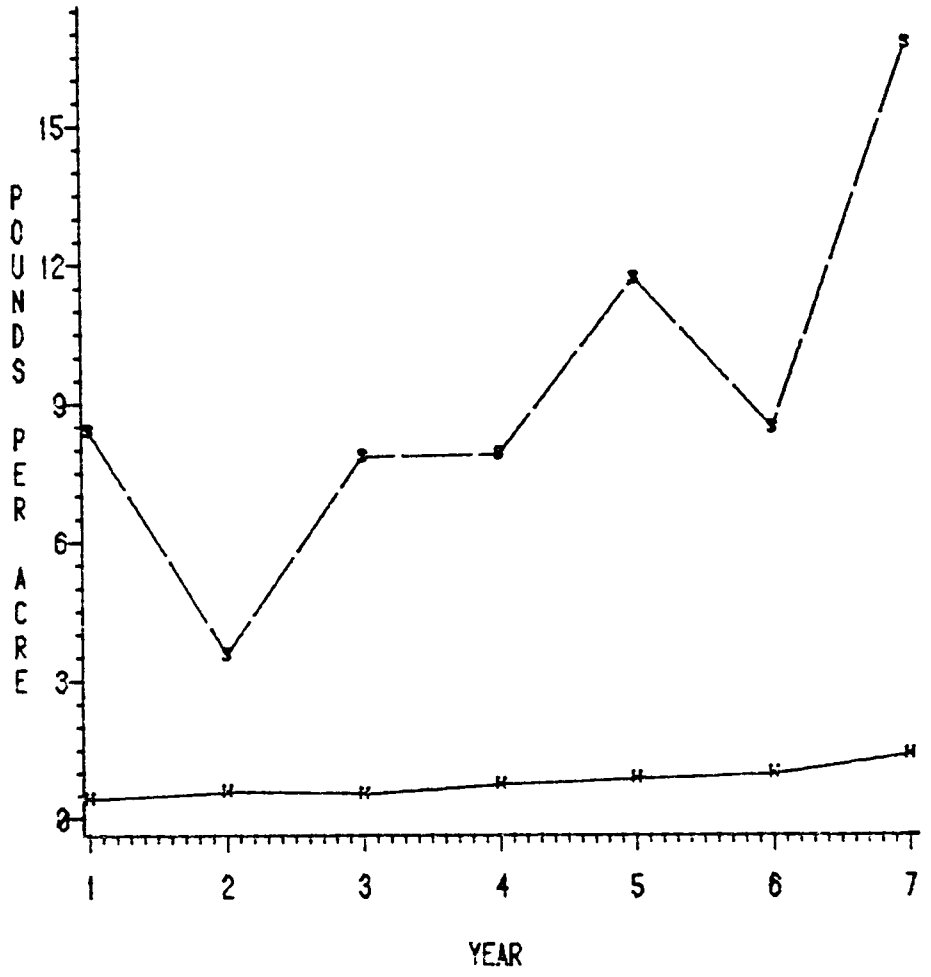
Catfish Pounds Per Acre Harvested

The annual least squares mean catfish harvested dropped slightly from 1977 to 1979 where it began to increase to 1983 levels (Figure 2). This trend of increased harvests followed the overall trend of total increase in fishing pressure for all species. The reason for the decrease in the first three years was that Woods Reservoir was not sampled in the first two years and this reduced the initial level of the overall total harvest. In a year of highest harvests, catfish comprised 18% of the total weight harvested; however, harvest in most years approximated 10% of the total.

Mean standing crop ranged from 7.85 pounds per acre in 1978 to 16.77 pounds per acre in 1983 (Figure 6). There appeared to be a year-to-year variation in sample size, but a general increasing trend was noted for the study period. The standing crop estimates for catfish were probably too low due to the tendency of the species to select

Figure 6. Annual mean harvest and standing crop of catfish pounds per acre for all reservoirs combined. The seven years in the period 1977-1983 are coded year 1 through year 7.

TOTAL CATFISH HARVESTED (LB/ACRE) AND
TOTAL CATFISH STANDING CROP (LB/ACRE) BY YEAR
(1977–1983)



HARVEST=H STANDING CROP=S

deeper waters. Thus, standing crop estimates using cove rotenone methods were biased and catfish were less likely to be sampled with this collection method.

The mean annual harvest of catfish increased during the seven-year sample period. The lowest mean values of 0.40 pounds per acre were noted in 1979 and the highest of 1.32 in 1983. This tripling of harvests was attributed to an increase of one-third in the number of trips; in addition a gradual increase in the percentage of catfish fishermen was also noted during this time.

In comparisons of the mean standing crop and harvest values, it appeared that the catfish resource was under-utilized. In a hypothetical year with the highest harvest of 1.32 pounds per acre and the lowest standing crop of 7.85 pounds per acre, only 17% of the available harvest was utilized. In an instance where the lowest harvest was 0.40 pounds per acre and the highest standing crop was 6.77 pounds per acre, only 2% of the harvestable catfish were removed. Jenkins and Morais (1971) found that 22% of the catfish were removed from their sample of 103 reservoirs. In most Tennessee reservoirs, more catfish could be removed by liberalized creel methods such as increasing commercial harvests.

Sunfish Pounds Per Acre Harvested

The annual least squares mean sunfish harvests indicated relatively consistent values from 1977 to 1983 (Figure 2). The harvests of sunfish never dropped below 1978 levels, but also never rose above 1980 levels. This indicated a state-wide "equilibrium" in

the levels of sunfish harvests in most reservoirs. At best, sunfish made up 14% of the total sport fish harvest, although in most years its level was closer to 10%.

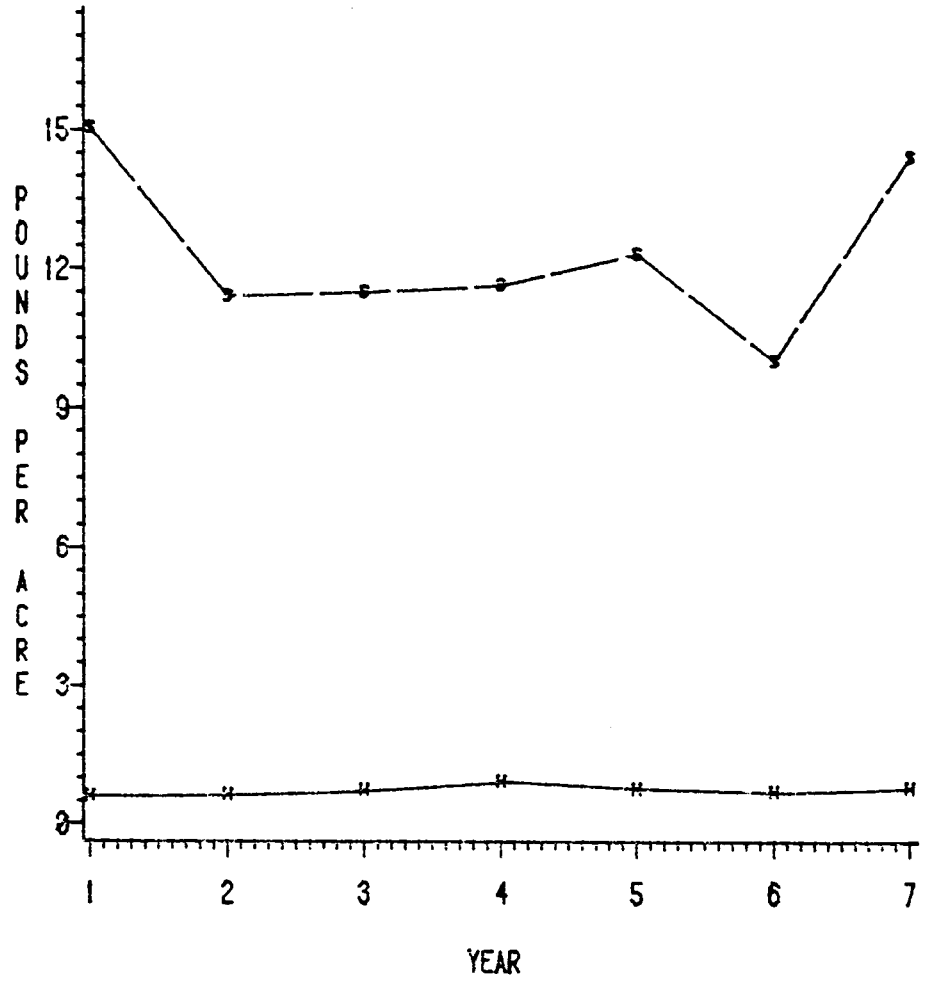
The mean annual standing crop pounds per acre of sunfish ranged from a low of 10.0 pounds per acre in 1982 to a high of 15.04 pounds per acre in 1977 (Figure 7). The variation in sample size of standing crop data could have distorted the expected trend of increased sunfish harvests. Although these values were lower than if a larger sample of reservoirs was utilized, they were probably more accurate than crappie and catfish standing crops. The reason for this was the tendency for sunfish to inhabit areas commonly utilized for cove rotenone methods.

The mean values of pounds of sunfish harvested appeared to be at a steady level during the years of this study. Means ranged from a low of 0.56 pounds per acre in 1977 to a high of 0.87 pounds per acre in 1980. The proportion of sunfish fishermen to total fishermen remained consistent during the sample period. Isolated increases in individual reservoir harvests of target species were reflected by increases in the percentages of sunfish fishermen.

The overall relationship of mean annual standing crop and harvest indicated an under-utilization of the sunfish resource. In a hypothetical year with the highest harvest of 0.87 pounds per acre and the lowest standing crop of 10.0 pounds per acre, only 9% of the resource was utilized. In a year with the lowest harvest of 0.56 pounds per acre and the highest standing crop of 15.04 pounds per acre, a total of 4% of the resource was removed. Jenkins and Morais (1971)

Figure 7. Annual mean harvest and standing crop of sunfish pounds per acre for all reservoirs combined. The seven years in the period 1977-1983 are coded year 1 through year 7.

TOTAL SUNFISH HARVESTED (LB/ACRE) AND
TOTAL SUNFISH STANDING CROP (LB/ACRE) BY YEAR
(1977–1983)



HARVEST=H STANDING CROP=S

indicated that 23% of the sunfish were removed from the reservoirs in their study. Although high populations of sunfish were important as a forage source for black bass, more fish could have been removed without impacting predator populations.

Fishery Trends Over Groups of Reservoirs

In this section fishery trends for all groups within each major classification (total pounds per acre, and harvests for crappie, black bass, catfish, and sunfish) will be discussed. The reservoirs that make up each group were listed in Table 7 and will be references in this discussion. The major classifications contained a total of four groups, each of which represent a cluster of reservoirs with similar harvests. It must be noted that each subset of groups contains reservoirs specific to the major classification variable. It was found that Kentucky Reservoir was present in each of the highest groups (Group 4) in all major categories. This large (160,300 acre) reservoir with its shallow waters (17.7 feet) received substantial fishing pressure (11.92 hours per acre) and had the highest overall harvests of any reservoir in Tennessee. The fact that this reservoir stretched from Kentucky to the southern border of Tennessee with Alabama (a distance of approximately 135 miles), contributed to the overall pressure that it received.

Two other excellent reservoirs (from the standpoint of fish harvests) worthy of note were Normandy and Fort Loudoun. Their values were present in the reservoir groups containing the highest harvests in each classification with the exception of catfish pounds per acre.

Normandy was a young reservoir during the sample period, with a growing fishery and extremely high fishing pressure. Fort Loudoun was also among the top Tennessee reservoirs with the highest sport fish harvests. One of the main reasons was attributed to increased levels of cultural eutrophication or the release of untreated sewage directly into the lake. This coupled with a lower mean depth (24.9 feet) contributed to this impoundment's higher productivity. Another contributing factor was extremely high mean annual fishing pressure of 23.11 hours per acre, the second highest in the state. Its location within a large metropolitan area, Knox and Blount counties, and its size of 14,600 acres, allowed easier exploitation.

Total Pounds Per Acre Harvested

The clusters or groups of reservoirs that comprise total pounds per acre harvested of all sport fish are depicted in Figure 8. Group 4 was higher than the other groups in total harvest with a mean of 14.31 pounds per acre over all years sampled. The lower three groups had mean values ranging from 2.34 pounds per acre in Group 1 to 6.36 pounds per acre in Group 3. Group 4 also had the most fishing pressure with 17.89 hours per acre while Group 1 had the lowest with 5.31 hours per acre. Groups 2 and 3 had total fishing pressures between the previous groups at 11.16 and 11.75 hours per acre, respectively. It was found that the confidence intervals of the lower three groups overlapped to some degree, but remained separate from Group 4. Due to this occurrence, the rest of this section will deal with only two groups (Figure 9), Group 4 and Group 1C (Groups 1, 2, and 3 combined).

Figure 8. Annual mean total harvest (pounds per acre) with reservoirs clustered into low harvest (Group 1), intermediate low harvest (Group 2), intermediate high harvest (Group 3), and high harvest (Group 4) groups. The seven years in the period 1977-1983 are coded year 1 through year 7.

TOTAL FISH HARVESTED (LB/ACRE) BY YEAR
(1977–1983)

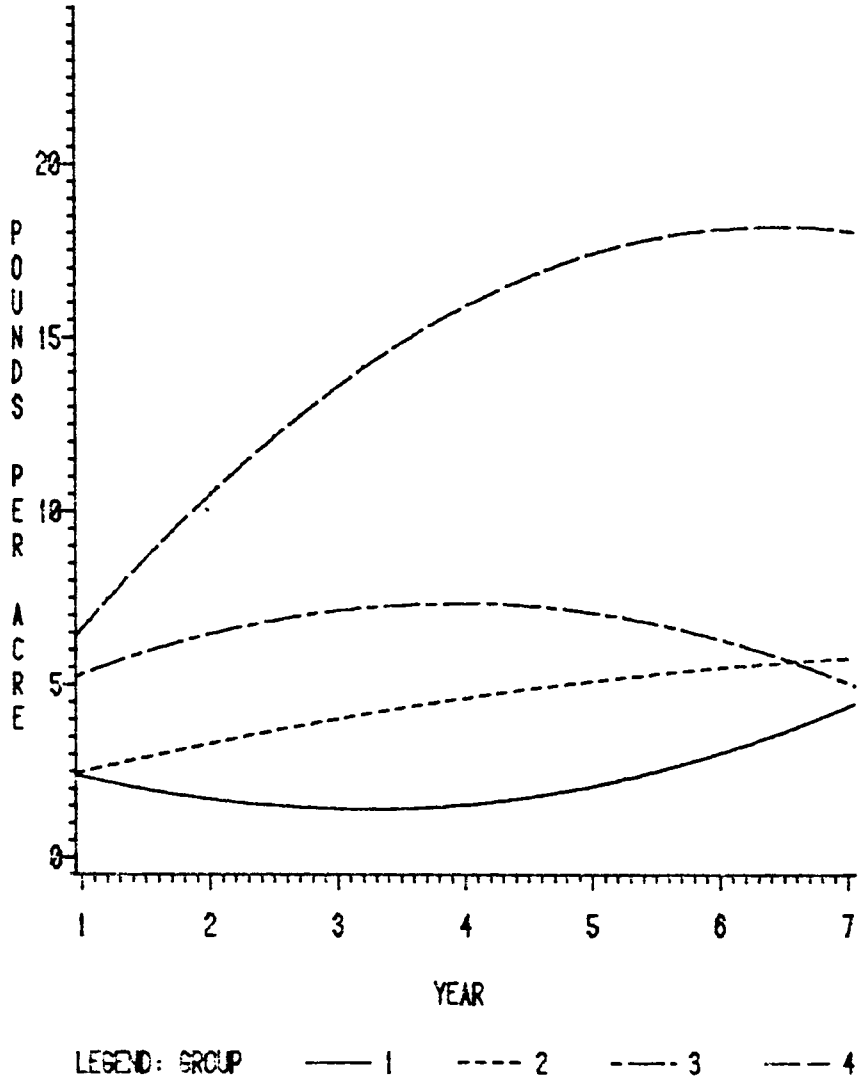
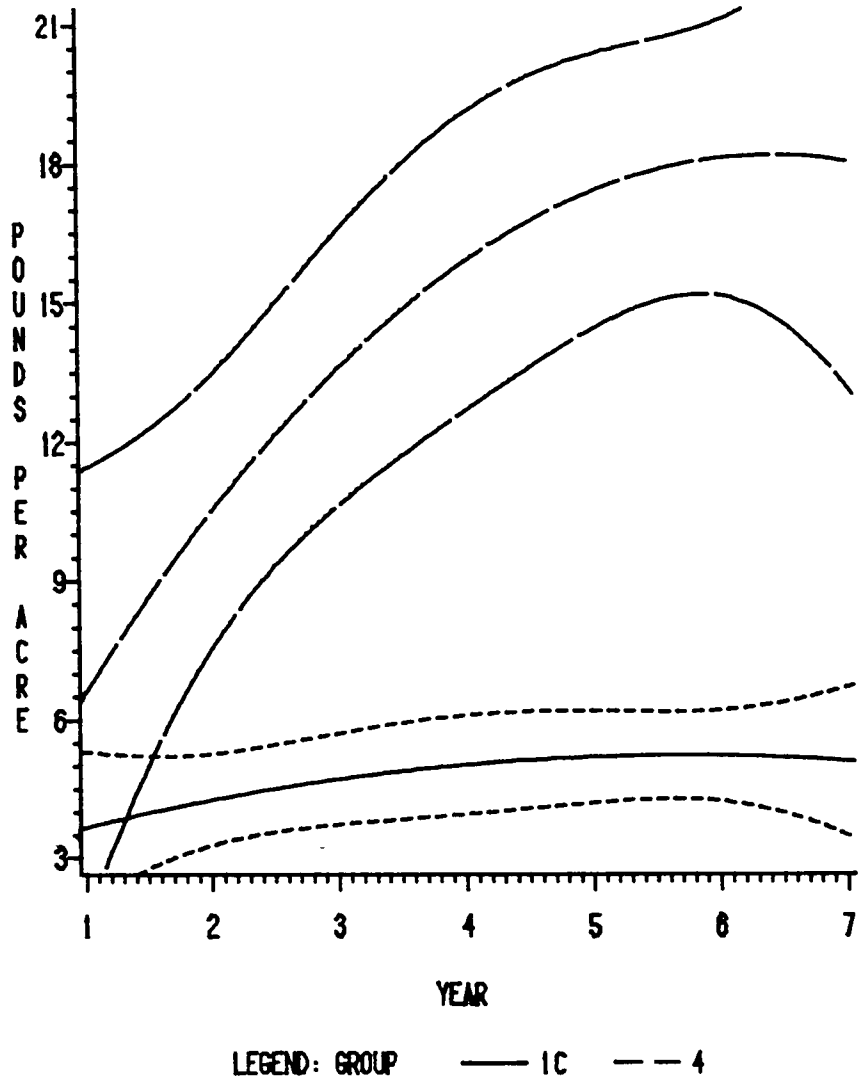


Figure 9. Annual mean total fish harvest (pounds per acre) and confidence intervals (95%) for low harvest (Group 1C) and high harvest (Group 4) groups. Group 1C includes low, intermediate low, and intermediate high harvest group values. The seven years in the period 1977-1983 are coded year 1 through year 7.

TOTAL FISH HARVESTED (LB/ACRE) BY YEAR
(1977–1983)



One variable that appeared to be quite different in each of the two groups was mean reservoir age. Group 4 was made up of younger reservoirs with a mean age of 19.96 years, while Group 1C had reservoirs with a mean age of 27.20 years. Group 4 represented a cluster of reservoirs with an increasing harvest of sport fish while Group 1C manifested a cluster of reservoirs with a steady harvest of sport fishes. Tims Ford and Normandy, two of the newer impoundments in the state, contributed significantly to the overall distribution of values in this group. Both appeared to be small enough and have pressure enough to allow them to be harvested more efficiently. In other words, small bodies of water can be exploited more efficiently than large bodies.

Normandy appeared to represent the classic example of a newly-created fishery. Its individual curve (Appendix C) illustrated that the rate of harvest peaked four to six years following impoundment. The new nutrients from inundated soils and the rapidly expanding food chain aided high production of fish which allowed excellent catches of sport fishes. The small size (3160 acres) and location near a major metropolitan area (within 45 miles of Nashville, TN, and Huntsville, AL) contributed to its fishing intensity of 23.34 hours per acre and its optimum harvests of 20.14 pounds per acre.

The lowest harvests in Group 1C were represented by two pairs of reservoirs. The first pair, Norris and Melton Hill, were the only impoundments located in the Clinch River basin. Their harvests were almost identical at 2.6 pounds per acre and both received relatively light pressure at 7.00 hours per acre. This drainage basin appeared

to be unique to East Tennessee with its mountainous terrain, paucity of metropolitan areas, and lack of agricultural development. These factors were the primary reasons for the low levels of production and harvest of fish in this drainage area.

The other pair, Cordell Hull and Old Hickory, were located in the upper part (in Tennessee) of the Cumberland River basin, upstream from Barkley Reservoir. Both produced approximately 2.00 pounds per acre total harvest and received approximately 3.5 hours per acre fishing pressure. Their location in the upper Cumberland River basin may have indicated a scarcity of nutrient inputs necessary for optimum fishery growth. However, these two reservoirs had a higher fish harvest potential with an increase in fishing pressure. This conclusion was based on the premise that since these reservoirs received one-half the pressure of the last two impoundments (Norris and Melton Hill) and produced similar harvests, increased pressure could have conceivably doubled the harvest in Cordell Hull and Old Hickory.

There was considerable variation in the least square means of total fish harvested in Tennessee. The highest harvests came from Normandy and the lowest from Melton Hill. Since least squares analysis takes into account missing values, Melton Hill harvests proved to be smaller than Old Hickory and Cordell Hull. It was found that the five reservoirs producing the highest harvests were Normandy, Kentucky, Reelfoot, Fort Loudoun, and Tims Ford. The five with the lowest harvests were Melton Hill, Cordell Hull, Norris, Old Hickory, and Watauga.

Crappie Pounds Per Acre Harvested

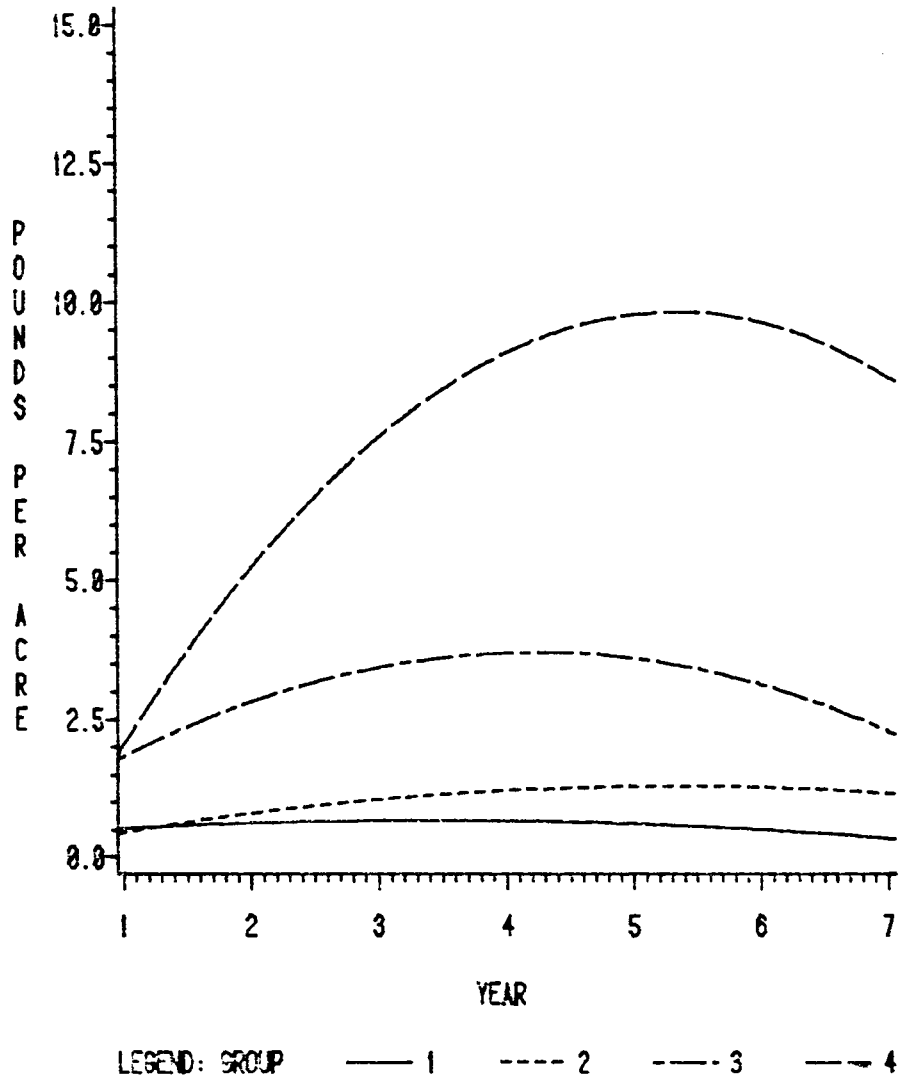
The clusters or groups of reservoirs that make up the crappie pounds per acre harvested are presented in Figure 10. Group 4 harvests increased from 1977 to 1981 where they decreased to 1983 levels. This could have been attributed to decreases in harvests in four of the five reservoirs in this group. Group 3 reservoirs exhibited a slight increase in harvests until 1980 followed by a decline. Harvests of Groups 2 and 1 appeared to be at a steady state or in a slight decline. The three groups with the lowest harvests appeared to have steady levels of harvest during the study period.

The mean crappie harvest in Group 4 was 7.14 pounds per acre, a value greatly influenced by the presence of Normandy creel records. Without that added influence, the harvest value would have been 20% lower. The mean values of Group 3 at 2.66 pounds per acre, Group 2 at 1.02 pounds per acre, and Group 1 at 0.52 pounds per acre were more similar to each other than the mean value for Group 4. Since crappie was the most popular species harvested (as intended fishery targets) during the study period, total pressure was used to assess crappie pressure. The values for pressure on individual species were not available from the creel data. As expected, Group 4 had the highest total fishing pressure with 18.31 hours per acre, while Group 3 had 11.08 hours per acre, and both Groups 2 and 1 had 9.50 hours per acre.

A trend that emerged in the total pounds per acre groups was also apparent in this cluster, i.e., the confidence limits of the lowest three groups had some degree of overlap. Mean reservoir ages were similar to those of the groups in total pounds per acre. In

Figure 10. Annual mean crappie harvest (pounds per acre) with reservoirs clustered into low harvest (Group 1), intermediate low harvest (Group 2), intermediate high harvest (Group 3), and high harvest (Group 4) groups. The seven years in the period 1977-1983 are coded year 1 through year 7.

CRAPPIE HARVESTED (LB/ACRE) BY YEAR
(1977–1983)



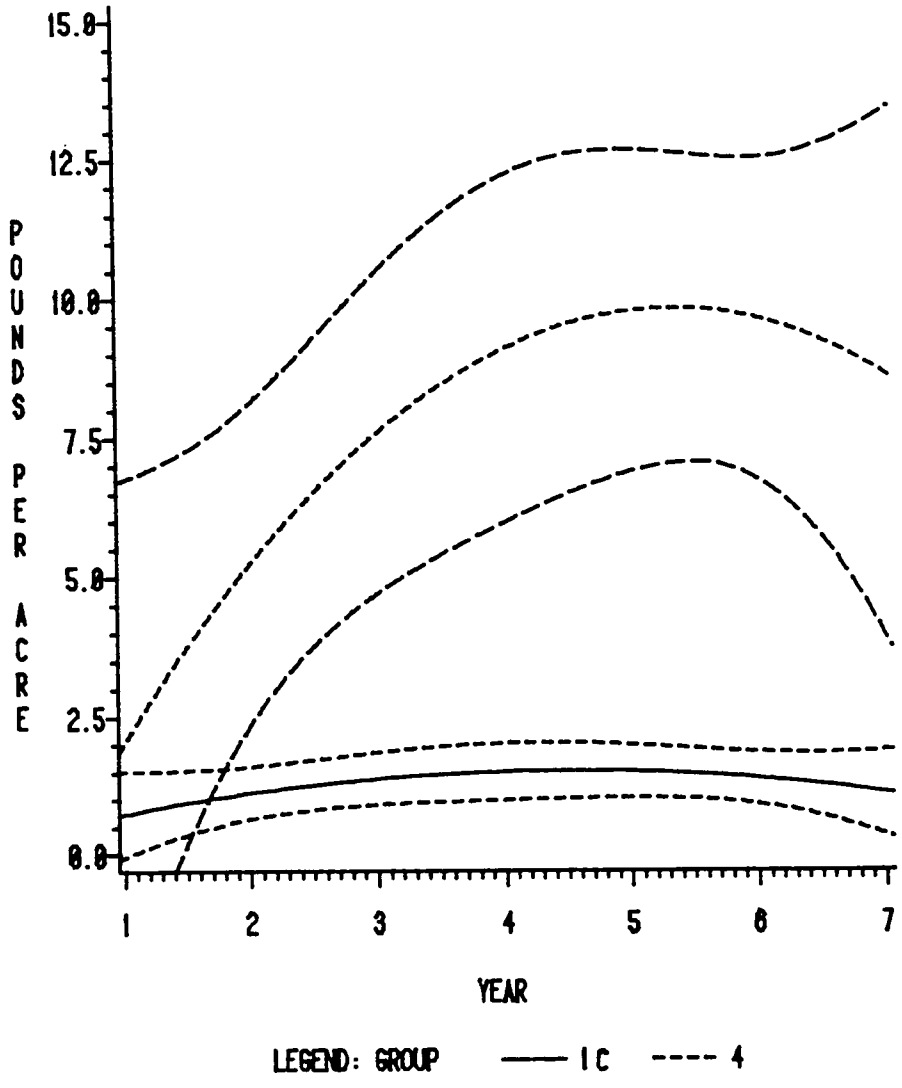
this case, crappie Group 4 had a mean age of 20.16 years, while Group 1C (Figure 11) had a mean age of 27.50 years. The constituents of Group 1C had mean ages ranging from 26.0 to 29.6 years, a very narrow subset. As noted in the total groups, younger reservoirs had higher mean harvests of crappie.

Group 4 contained reservoirs with the five highest crappie harvests in the state. The best harvests recorded were from Normandy (also noted in the total pounds per acre groups), with a mean value of 13.33 pounds per acre of crappie. This value was over 40% higher than the next best reservoir, Reelfoot, and 300% higher than the lowest reservoir in this group, Fort Loudoun. Normandy's crappie harvest peaked in 1981 with a mean weight of 33.15 pounds per acre and a total fishing pressure of 33.85 hours per acre. This year coincided with a peak in pressure for crappie, as over one-half of all fishing trips were targeted for crappie harvested. This was an increase of over 800% since 1977.

The next highest harvests came from Reelfoot, historically an excellent crappie producer, with a mean harvest of 7.37 pounds per acre. This lake had a peak harvest of 9.19 pounds per acre in 1977 with decline to the low of 4.41 pounds per acre in 1982. The harvest in 1983 revealed an increase to 8.05 pounds per acre, very similar to 1977 levels. Total fishing pressure seemed to follow the lows and highs in harvest weights. High pressure of 29.05 and 25.09 hours per acre occurred in 1977 and 1983, respectively, while the low pressure of 9.47 hours per acre occurred in 1982. It was noted that crappie

Figure 11. Annual mean crappie harvest (pounds per acre) and confidence intervals (95%) for low harvest (Group 1C) and high harvest (Group 4) groups. Group 1C includes low, intermediate low, and intermediate high harvest group values. The seven years in the period 1977-1983 are coded year 1 through year 7.

CRAPPIE HARVESTED (LB/ACRE) BY YEAR
(1977–1983)



fishermen comprised almost one-half of all fisherman sampled during this study.

The second lowest producing crappie reservoir in the state was Watauga. This upland storage cool-water impoundment received limited nutrient inputs and had high water level fluctuations, both of which were detrimental to crappie production. Watauga did receive a high total fishing intensity level of 15.92 hours per acre, but crappie harvests were never above 0.40 pounds per acre. This indicated that increased total fishing pressure did not increase crappie harvests in a reservoir that was not ideally suited to crappie production. Very few fishermen indicated crappie as their target species during the study period.

Two other reservoirs, Norris and Melton Hill, represented the third lowest and lowest crappie producers, respectively, in the state. With mean annual harvests of 0.48 and 0.42 pounds per acre and total fishing pressures of 6.00 and 8.27 hours per acre, respectively, it was evident that these reservoirs had sufficient pressure to indicate whether or not a good crappie population existed; in fact, over 10% of the fishermen sampled indicated crappie as their target species. The Clinch River basin with its steep terrain and low allochthonous inputs does not have the habitats for ideal crappie production.

A wide range exists between the largest and smallest crappie harvests in the state. Normandy and Watauga were both small impoundments (3160 acres and 6430 acres, respectively) that received high levels of fishing intensity (23.34 and 15.92 hours per acre, respectively). The differences were evident in their total harvests

of 20.14 and 4.55 pounds per acre and their mean crappie harvests of 13.33 and 0.40 pounds per acre. As noted before, Watauga's location and the variables dictated by its geography, contributed to its lack of ideal crappie habitat. Normandy, Reelfoot, Fort Loudoun, J. Percy Priest, and Kentucky had the state's highest crappie harvests while Center Hill, Cordell Hull, Norris, Melton Hill, and Watauga produced the lowest.

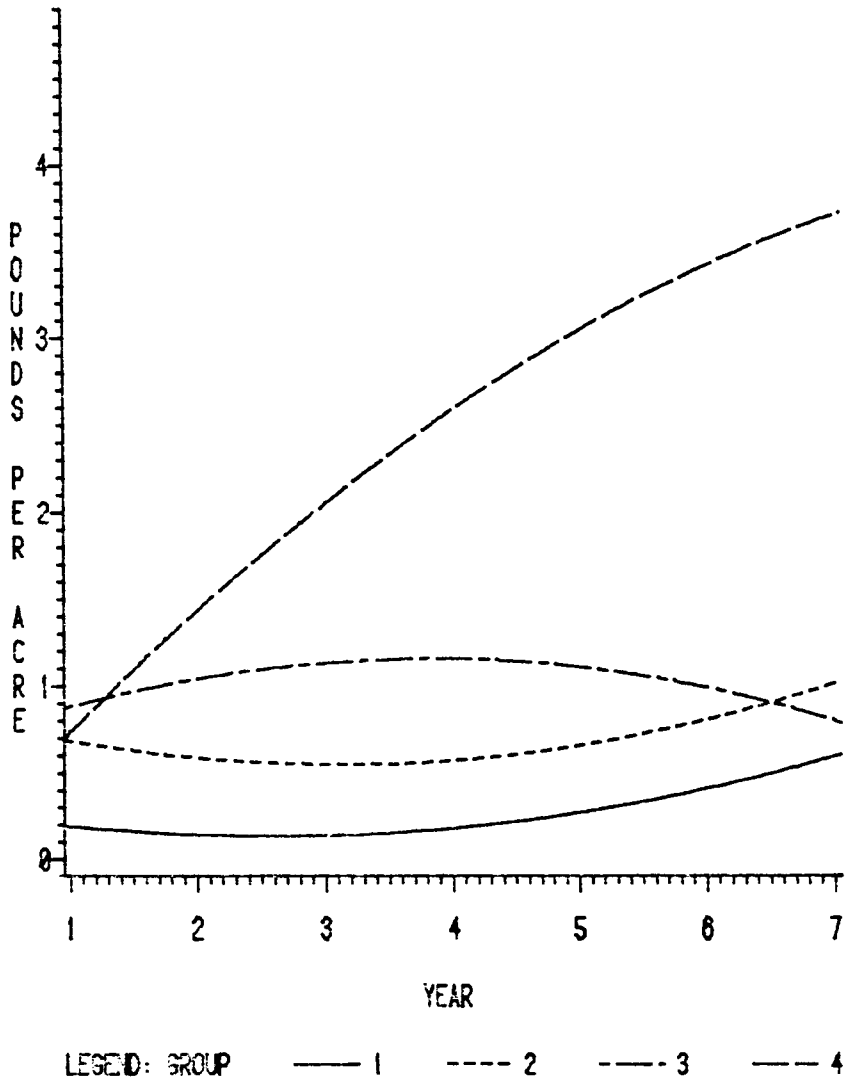
Black Bass Pounds Per Acre Harvested

The four groups of reservoirs that comprise the black bass pounds per acre harvest cluster are depicted in Figure 12. Groups 4, 2, and 1 appeared to have steadily increasing slopes of black bass harvests. Only Group 3 showed steadily decreasing harvests because most of the reservoirs in this group had reduced black bass harvests during the last three years of the study.

The mean harvest of black bass in Group 4 was 2.26 pounds per acre which was influenced by the contribution of Normandy. Without the contribution of this reservoir, the mean value would have been 15% smaller. The mean annual black bass harvests of Group 3 at 1.00 pounds per acre, Group 2 at 0.66 pounds per acre, and Group 1 at 0.29 pounds per acre, appeared consistent with the levels on the graph (a trend of reduced variation about the mean as noted in earlier sections). Since hours spent fishing for black bass were not recorded on creel forms, total hours for all species were examined. There was a notable progression in total hours per acre from 4.90 in Group 1 to 8.66 in Group 2 to 12.62 in Group 3 to 17.06 in Group 4. Since black bass

Figure 12. Annual mean black bass harvest (pounds per acre) with reservoirs clustered into low harvest (Group 1), intermediate low harvest (Group 2), intermediate high harvest (Group 3), and high harvest (Group 4) groups. The seven years in the period 1977-1983 are coded year 1 through year 7.

BLACK BASS HARVESTED (LB/ACRE) BY YEAR
(1977–1983)



appeared to be second in popularity to crappie, increases in total pressure produced increases in black bass harvests.

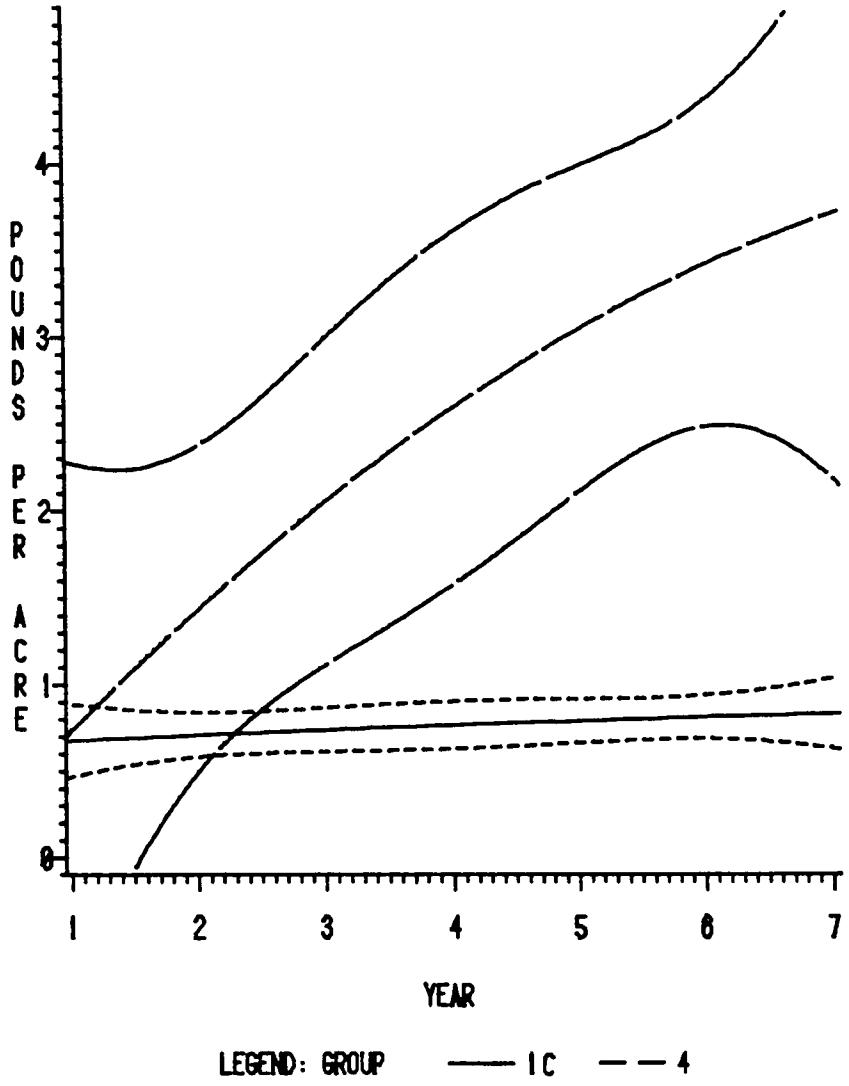
It was found that the confidence limits of the three groups with lower harvests overlapped to some degree, so these groups were combined into one large group, Group 1C (Figure 13). Age trends of reservoirs were similar to clusters in previous sections with Group 4 having a mean age of 19.97 years and Group 1C having a mean age of 28.81 years (Group 3 at 25.75, Group 2 at 27.80, and Group 1 at 32.89). Again it was noted that younger reservoirs produced better harvests.

Group 4 contained six reservoirs with the best black bass harvests in Tennessee. Normandy had the highest bass harvest with a mean value of 4.14 pounds per acre, over 30% higher than Tims Ford, and over 100% higher than the lowest harvest reservoir in this group, Tellico. Normandy's black bass harvests had steadily increased since impoundment until its highest level of 7.19 pounds per acre in 1983. Total fishing pressure also increased to a peak of 37.96 hours per acre in 1982. Over one-half of the fishermen sampled in that year indicated black bass as their target species.

The next best black bass producer was Tims Ford with a mean harvest of 2.62 pounds per acre. This reservoir, approximately five years older than Normandy, had a peak harvest of 4.24 pounds per acre in 1982 which declined to 2.03 in 1983. Between these two years, however, total fishing pressure decreased from 13.83 hours per acre to 9.40, a factor critically linked to the drop in harvest.

Figure 13. Annual mean black bass harvest (pounds per acre) and confidence intervals (95%) for low harvest (Group 1C) and high harvest (Group 4) groups. Group 1C includes low, intermediate low, and intermediate high harvest group values. The seven years in the period 1977-1983 are coded year 1 through year 7.

BLACK BASS HARVESTED (LB/ACRE) BY YEAR
(1977–1983)



Norris and Woods had the two lowest black bass harvests of all reservoirs sampled. Norris had harvests of 0.30 pounds per acre in conjunction with a total fishing pressure of 6.00 hours per acre, while Woods' black bass harvest of 0.35 hours per acre was coupled to a total pressure of 7.17 hours per acre. This indicated very similar pressure and harvest results, although the two reservoirs were very different. As noted previously, Norris was not a very nutrient-rich reservoir which would be necessary to produce higher weights of black bass. On the other hand, Woods was 15 years younger, 9 times smaller, and richer in nutrients than Norris and would be expected to produce quality black bass harvests. However, since 1975, Woods has had fish production problems which were probably attributed to a drastic die-off of most aquatic vegetation (Wayne Pollock, TWRA, personal communication).

There was a large difference in the harvests of the best and worst black bass reservoirs in this cluster. Normandy had mean total harvest of 20.13 pounds per acre and mean black bass harvests of 4.14 pounds per acre, while Norris had totals of 2.60 pounds per acre and bass harvests of 0.30 pounds per acre. Normandy received almost four times the fishing pressure that Norris had and was over 10 times smaller. These reservoirs also represent the second youngest and oldest impoundments in Tennessee. These differences were primarily accounted for in noting fishing intensity versus size and nutrient level inputs. The top bass producing reservoirs in the state were Normandy, Tims Ford, Center Hill, Kentucky, Tellico, and Fort Loudoun, while the lowest harvests came from Old Hickory, Woods, and Norris.

Catfish Pounds Per Acre Harvested

The four groups of reservoirs that illustrate total catfish harvests are presented in Figure 14. Group 4 had minimum catfish harvests at levels much higher than the maximum harvest levels of the other three groups. Group 3 showed a steadily increasing harvest of catfish while Group 2 revealed a decreasing and subsequent increasing trend. Harvest values in Group 1 reservoirs remained at a relatively constant level. The three groups with the lowest harvests appeared to have steady levels of harvest from year to year.

The mean harvest of catfish in Group 4 was 3.35 pounds per acre, a value influenced by the contribution of Woods Reservoir. The means of the other groups were less than 1.0 pounds per acre, with Group 3 at 0.87 pounds per acre, Group 2 at 0.39 pounds per acre, and Group 1 at 0.18 pounds per acre. Total fishing pressures for all species were 9.55 hours per acre in Group 4, 12.57 hours per acre in Group 3, 8.43 hours per acre in Group 2, and 14.01 hours per acre in Group 1, which indicated that catfish fishing pressure was quite different from the levels of total fishing pressure. Catfish fishermen often employ passive fishing methods such as night fishing, trotline fishing, or cove baiting, or a combination of methods which may not be recorded by standard day-light creel surveys. It was also probable that there were fewer catfish fishermen than other types of fishermen in these samples.

Due to overlap in the confidence limits of the three groups of reservoirs with the lowest harvests, they will be combined and discussed as one large group, Group 1C (Figure 15). Age trends were not

Figure 14. Annual mean catfish harvest (pounds per acre) with reservoirs clustered into low harvest (Group 1), intermediate low harvest (Group 2), intermediate high harvest (Group 3), and high harvest (Group 4) groups. The seven years in the period 1977-1983 are coded year 1 through year 7.

CATFISH HARVESTED (LB/ACRE) BY YEAR
(1977-1983)

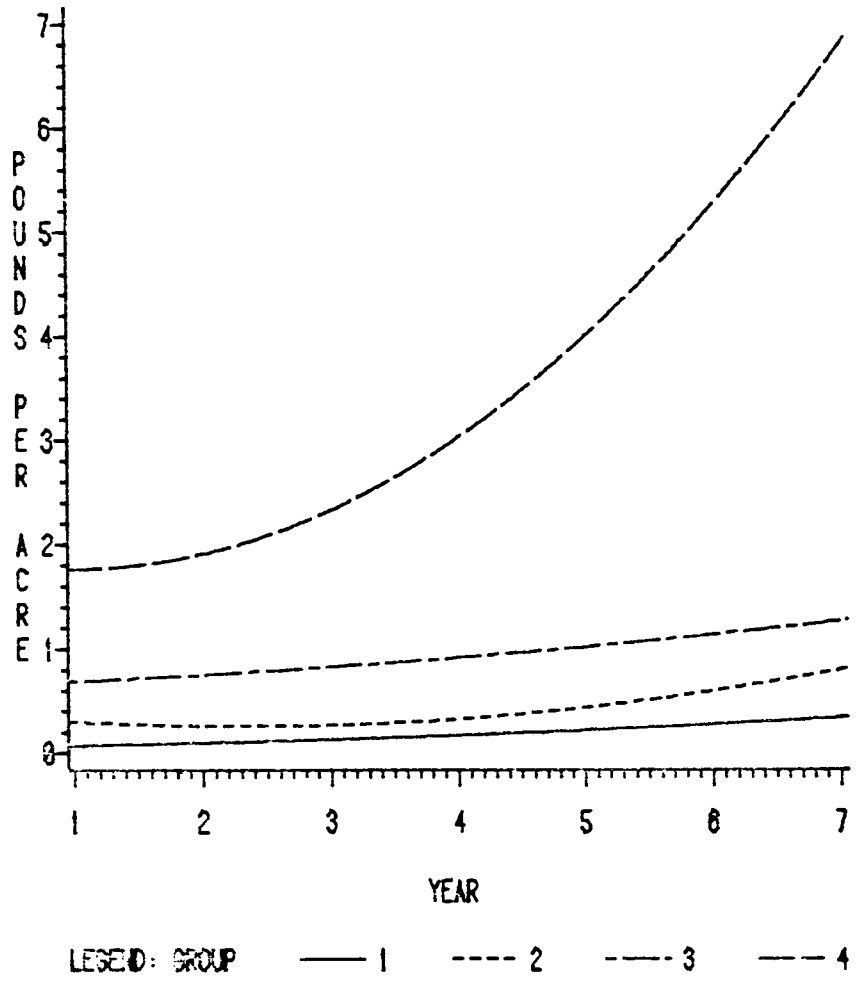
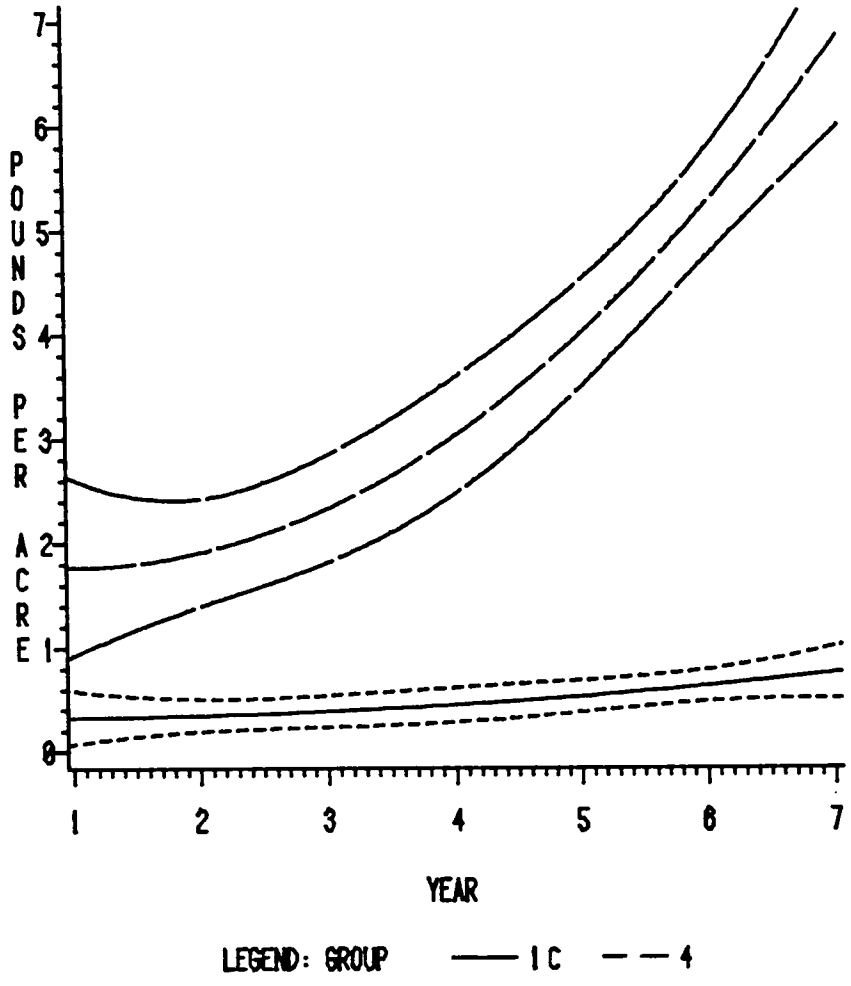


Figure 15. Annual mean catfish harvest (pounds per acre) and confidence intervals (95%) for low harvest (Group 1C) and high harvest (Group 4) groups. Group 1C includes low, intermediate low, and intermediate high harvest group values. The seven years in the period 1977-1983 are coded year 1 through year 7.

CATFISH HARVESTED (LB/ACRE) BY YEAR
(1977–1983)



apparent in these clusters of reservoirs as in the past discussions. Group 4 had a mean age of 33.08 years while Group 1C had a mean age of 24.78 years (Group 3 at 33.59, Group 2 at 17.20, and Group 1 at 23.55). As an overall difference between these two groups, age was different, but the age of subset Group 3 indicated that age was not a critical factor.

Group 4 contained the two reservoirs with the highest catfish harvests in the state. The reservoir with the highest mean harvest was Kentucky with 4.42 pounds per acre, 40% higher than Woods with its mean of 2.74 pounds per acre. These figures may have been slightly deceiving because harvests from Kentucky had increased slightly from 3.34 pounds per acre in 1977 to 5.58 pounds per acre in 1982, while Woods had increased more rapidly from a low of 0.67 pounds per acre in 1979 to a high of 8.67 pounds per acre in 1983. Total fishing pressures did increase in these two reservoirs, from 10.68 hours per acre in 1977 to 15.45 hours per acre in 1983 in Kentucky and from 3.47 hours per acre in 1979 to 14.64 hours per acre in 1983 in Woods. Catfish pressure was related to total pressure in these two cases because catfishing was very popular in Kentucky and Woods Reservoirs during the seven-year period (this trend was verified in high percentages of catfish fishermen).

The lowest harvests in the state came from Tellico and Melton Hill Reservoirs. Melton Hill had a mean harvest of 0.07 pounds per acre while Tellico was somewhat lower at 0.04 pounds per acre. Both reservoirs received cooler waters from nutrient-poor upland impoundments which were not conducive to optimum catfish production. The mean

total fishing pressures at 8.27 hours per acre in Melton Hill and 17.41 hours per acre in Tellico had no relationship to the catfish pressures in these reservoirs. Catfish fishing was not very popular in these impoundments, probably because fishermen have other reservoirs nearby with more productive catfish habitats.

A large difference existed between the mean total harvest of 17.29 pounds per acre in Kentucky and the mean total harvest of 4.69 pounds per acre in Tellico. An even larger differences was noted between Kentucky's mean catfish harvest of 4.12 pounds per acre and Tellico's mean harvest of 0.04 pounds per acre. Total fishing pressure had little influence on this comparison because Kentucky received 25% less fishing pressure than Tellico. It was assumed that this was due to size, age, and a combination of physical-chemical differences. As noted earlier, the highest catfish harvests came from Kentucky and Woods Reservoirs, while the lowest came from South Holston, Watauga, Norris, Reelfoot, Boone, Normandy, Tellico, and Melton Hill.

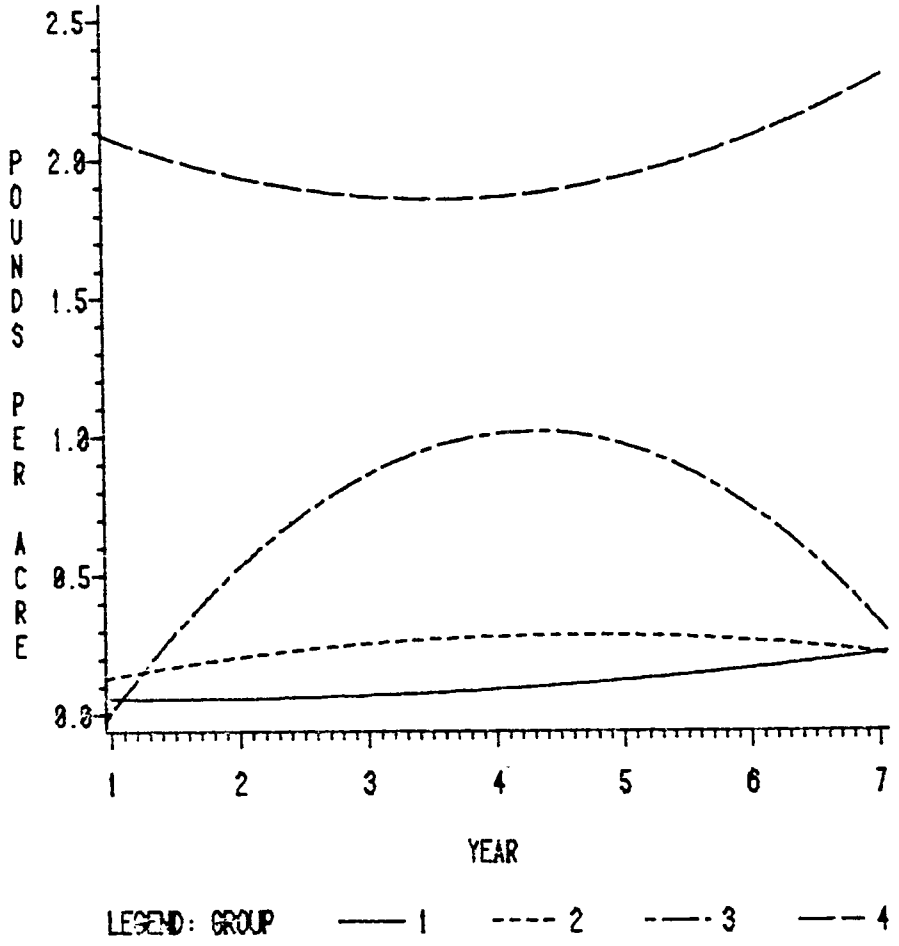
Sunfish Pounds Per Acre Harvested

The four groups of reservoirs as clustered by total pounds per acre of sunfish were presented in Figure 16. Group 4 showed a gradually increasing harvest of sunfish that peaked at approximately 2.1 pounds per acre in 1983. Groups 3, 2, and 1 had slightly increasing harvests, but were more likely showing harvests at equilibrium.

The mean harvest of Group 4 was 1.95 pounds per acre, a value perhaps slightly influenced by Reelfoot's values. The other groups

Figure 16. Annual mean sunfish harvest (pounds per acre) with reservoirs clustered into low harvest (Group 1), intermediate low harvest (Group 2), intermediate high harvest (Group 3), and high harvest (Group 4) groups. The seven years in the period 1977-1983 are coded year 1 through year 7.

SUNFISH HARVESTED (LB/ACRE) BY YEAR
(1977-1983)



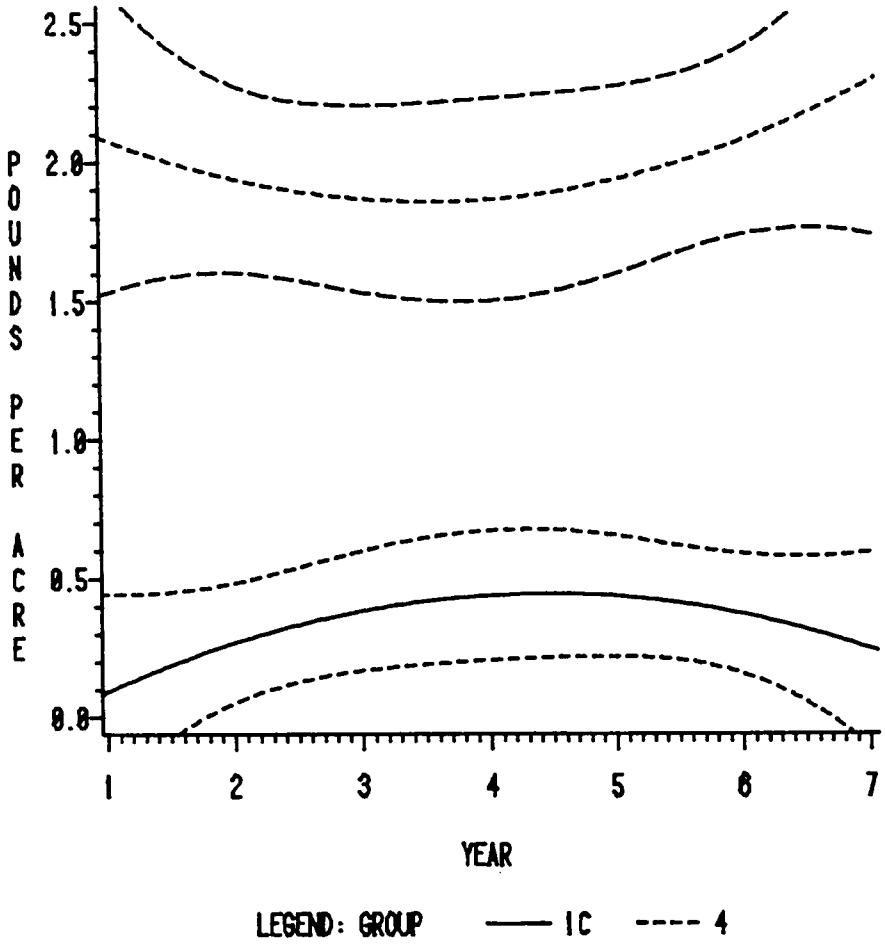
had values well under 1.00 pound per acre with Group 3 at 0.56, Group 2 at 0.22, and Group 1 at 0.13. Total fishing pressures of 17.94 hours per acre in Group 4, 10.90 hours per acre in Group 3, 9.30 hours per acre in Group 2, and 11.23 hours per acre in Group 1, revealed a general trend towards increasing sunfish harvests with increasing total pressure. It was noted that the higher value for Group 1 was probably due to its small sample size.

The overlapping confidence limits of the three groups of reservoirs with the lowest sunfish harvests led to their being combined into one large group, Group 1C (Figure 17). Mean ages of groups did not appear to be an important difference between clusters of reservoirs in this case. Group 4 had a mean age of 25.76 years while Group 1C had a value of 20.83 years (Group 3 at 14.68, Group 2 at 29.90, Group 1 at 17.42). This was probably due to the fact that high sunfish populations were established in the new reservoirs in less time than with the other species in this discussion and were targeted as favored sport fish earlier.

Group 4 contained five of the best sunfish producing reservoirs in Tennessee. Reelfoot produced the highest mean harvests of sunfish at a mean of 5.26 pounds per acre. This value was over 300% higher than the next best sunfish producer, Normandy, and over 60% higher than the lowest producer in this group, Fort Loudoun. Reelfoot's harvests dropped from 6.82 pounds per acre in 1977 to 3.38 in 1980, before it increased to 8.04 pounds per acre in 1983. As noted in a previous section, total pressure increased in 1977 and 1983, and decreased in 1980. It was found that the proportion of sunfish

Figure 17. Annual mean sunfish harvest (pounds per acre) and confidence intervals (95%) for low harvest (Group 1C) and high harvest (Group 4) groups. Group 1C includes low, intermediate low, and intermediate high harvest group values. The seven years in the period 1977-1983 are coded year 1 through year 7.

SUNFISH HARVESTED (LB/ACRE) BY YEAR
(1977–1983)



fishermen to total fishermen also increased and decreased at similar times during the study period, the key factor in these sunfish harvests. Since Reelfoot was the only lake in the state, it was the only body of water sampled that had no net flow rates that would flush out incoming nutrients, and related water fluctuations that may have exposed sunfish nests to environmental perturbations.

The next best sunfish harvests came from Normandy with a mean annual value of 1.81 pounds per acre. The sunfish fishery in this reservoir had been declining since its peak in 1979 at 3.11 pounds per acre to lows of 0.65 and 0.86 pounds per acre in 1981 and 1983. At the same time, total fishing pressure had been intense, rising from 10.39 hours per acre in 1977 to 37.96 in 1982. In this case sunfish pressure was not associated with total pressure after the first few years, because as the reservoir aged, the target species shifted away from sunfish to crappie and black bass.

Woods and J. Percy Priest had the two lowest sunfish harvests in Tennessee during the study period. Their mean annual harvests of 0.10 pounds per acre and 0.14 pounds per acre represented the lowest estimates in the state. Total fishing pressures of 7.17 hours per acre in Woods and 15.30 hours per acre in J. Percy Priest did not indicate a relationship between sunfish harvest and pressure. In fact, the percentage of sunfish fishermen to total fishermen was very small in these two reservoirs. Rather than stating either of these reservoirs had sunfish habitat problems, it was more likely that there were very few fishermen with sunfish as their target species.

A large difference existed between the mean total and sunfish harvests of Reelfoot and Woods Reservoirs. Reelfoot had mean total harvests of 15.33 pounds per acre and mean sunfish harvests of 5.26 pounds per acre, values 3 and 50 times higher, respectively, than those of Woods. Total pressures of 17.88 hours per acre on Reelfoot and 7.17 on Woods were very different, and may be associated with the major differences found in these two reservoirs. The major factor determining the differences in these impoundments, as noted earlier, was the higher percentage of sunfish fishermen to total fishermen in Reelfoot than in Woods.

Relationships Between Important Pressure-Effort and Physical-Chemical Variables in Groups

Since the main classification clusters of reservoirs were divided into two groups each (Groups 4 and 1C), it was hypothesized that there may have been a difference in either a pressure-effort variable or a physical-chemical variable between these two groups or a combination of both. Each group within major classifications (total, crappie, black bass, catfish, and sunfish pounds per acre) was compared for relationships between total dissolved solids, total hardness, total suspended solids, total phosphorus, surface temperature, surface dissolved oxygen, pH, mean depth, elevation, age, estimated trips, hours per acre, and pounds per hour. If there was a significant difference at the 0.05 level between the two groups, they were discussed in this section. All variable means discussed in this section refer to grand means over the seven-year period.

Total Pounds Per Acre

The two groups (Groups 4 and 1C) comprising total pounds per acre harvested were significantly different in total suspended solids, pounds per hour, and hours per acre. The only physical-chemical variable, total suspended solids, revealed differences at the 0.05 level. The two pressure-effort variables, pounds per hour and hours per acre, were significant at the 0.01 level.

Group 4 had a mean annual total suspended solids reading of 23.73 ppm, while Group 1C had a reading (10.37 ppm) less than one-half of Group 4. The mean annual suspended solids for the top three reservoirs in this group were 32.60 ppm in Kentucky, 30.27 ppm in Reelfoot, and 20.96 ppm in Normandy. These values were somewhat different from the readings of the three reservoirs with the lowest total harvests which were Old Hickory at 18.29 ppm, Cordell Hull at 12.33 ppm, and Melton Hill at 18.27 ppm. There may be a point where suspended solids become better or worse for production of fish, but in this case, the "high" value of Normandy and the "low" value of Melton Hill were not very different. It was also possible that the methods used to determine total suspended solids could have measured plankton densities if they were not filtered out of the sample. This entire comparison could be biased because the collecting agencies often target problem areas of a reservoir or feeder streams for sampling. In this case, this tendency was noted because of extremely high values from specific reservoir sites.

The mean annual pounds per hour harvested from Group 4 was 0.81, while the mean from Group 1C was 0.40, a value one-half the magnitude

of Group 4. This variable may not be as independent from pounds per acre as hours per acre and may reflect the inherent differences in total harvests between the two groups. In addition the following results seemed to support this contention. The three reservoirs with the highest harvests in Group 4 had readings of 1.43 pounds per hour in Kentucky, 0.91 pounds per hour in Reelfoot, and 0.71 pounds per hour in Normandy, while the three reservoirs with lowest harvests in Group 1 had values of less than one-half the magnitude of Group 4 (Old Hickory at 0.32, Cordell Hull at 0.55, and Melton Hill at 0.31). Essentially, pounds per hour reflected the value of pounds per acre.

The final pressure-effort variable, hours per acre, was better to use in differentiating between Groups 4 and 1C within the total pounds per acre classification. Group 4 had a mean value of 17.88 hours per acre while Group 1 had a value of 9.40 hours per acre, almost one-half the magnitude of Group 4. The values for the three Group 4 reservoirs with highest harvests were 11.92 hours per acre in Kentucky, 17.88 hours per acre in Reelfoot, and 23.34 hours per acre in Normandy. These were over twice the magnitude of the low harvest values for the three reservoirs in Group 1C with 1.54 hours per acre in Old Hickory, 5.45 hours per acre in Cordell Hull, and 8.27 hours per acre in Melton Hill. In noting these subsets and reviewing the differences previously discussed in reservoir groups within the total pounds per acre category, it was evident that in this case fishing pressure was statistically different. Reservoirs with the highest fishing pressures produced the best harvests of all species of fish sampled.

Crappie Pounds Per Acre

In comparing the two groups of crappie pounds per acre reservoirs, total suspended solids, total phosphorus, pounds per hour, and hours per acre were significantly different. The two physical-chemical variables were significant at the 0.01 level. The two pressure-effort variables were significant at the 0.05 and 0.01 levels, respectively.

Group 4 had a mean annual total suspended solids reading of 23.27 ppm, while Group 1C had a reading of under one-half the magnitude of Group 4 (8.92 ppm). The average readings for the three highest crappie producing reservoirs in Group 4 were 20.96 ppm in Normandy, 30.27 ppm in Reelfoot, and 16.49 ppm in J. Percy Priest. These values were generally higher than the readings for the lowest three crappie producing reservoirs, Norris at 8.91 ppm, Watauga at 4.86 ppm, and Melton Hill at 18.27 ppm. It was noted again that Melton Hill had site specific high readings during the sampling period which resulted from a problem stream feeding the reservoir. The significant levels obtained between the two groups could have been due to the inherent differences between the productivity of these subsets. It was possible that total suspended solids did reflect higher levels of plankton which would have indicated the level of reservoir primary productivity.

Group 4 had a mean annual total phosphorus reading of 0.14 ppm, while Group 1C had a reading less than one-half that of Group 4 (0.05 ppm). The mean annual readings for Group 4 reservoirs with the

highest readings were 0.15 ppm in J. Percy Priest, 0.19 ppm in Reelfoot, and 0.12 ppm in Normandy. These values were over twice those of the reservoirs with the lowest harvests with 0.02 ppm in Watauga, 0.02 ppm in Norris, and 0.05 ppm in Melton Hill. Since the multiple correlation matrix determined total suspended solids and total phosphorus were collinear, total phosphorus could have been considered the better of the two variables for detecting the major differences in these crappie groups. Several researchers (Taylor 1971; Ryder et al. 1974; and Oglesby 1977) have noted that phosphorus was the limiting nutrient in fish productivity, so this variable was considered best to explain why the reservoirs in Group 4 had the highest levels of crappie harvests. High levels of phosphorus were necessary to allow optimum phytoplankton concentrations.

The mean annual total pounds per hour harvested of all fish species of Group 4 was 0.78 while that of Group 1C was 0.45, a value slightly less than one-half the magnitude of Group 4. The top three crappie producing reservoirs in Group 4 had mean harvests per hour of 0.71 for Normandy, 0.91 for Reelfoot, and 0.62 for J. Percy Priest. Mean total pounds per hour for the lowest crappie harvest reservoirs were 0.37 for Norris, 0.28 for Watauga, and 0.31 for Melton Hill. Since pounds per hour may not be totally independent from total pounds per acre, these estimates may not be as accurate as hours per acre, a trend noted in the previous section. Crappie did make up a large percentage of the total weight of all fish harvested, so given the above cautions, mean total pounds per hour harvested of all fish was

a good method to differentiate between crappie groups. It had been mentioned that total pounds per hour did reflect levels of total pounds per acre.

The last variable discussed in this section was mean total hours per acre spent fishing for all game fish species. Group 4 had a mean value of 18.31 hours per acre while that of Group 1C was slightly more than one-half that of Group 4 (10.08 hours per acre). Pressure readings for the three highest crappie producing reservoirs in Group 4 were 23.34 hours per acre for Normandy, 17.88 hours per acre for Reelfoot, and 15.30 hours per acre for J. Percy Priest. Group 1C reservoirs with the lowest crappie harvests had total hours per acre readings of 6.00 for Norris, 15.92 for Watauga, and 8.27 for Melton Hill. The large value for Watauga resulted from extremely high pressure on black bass and walleye and its location near a metropolitan area (Tri-Cities) of upper East Tennessee. With this in mind, this section furnished statistical confirmation that fishing pressure for all species could have been the major factor differentiating the two crappie groups from each other. Noting total hours fished for all species was an excellent way to differentiate between these reservoirs as long as crappie made up a large percentage of the total harvest.

Black Bass Pounds Per Acre

In the comparison between the two groups that make up black bass pounds per acre harvested, only hours per acre were significantly different (0.01 level) between the two groups. Total fishing pressure for Group 4 was 17.06 hours per acre while pressure for Group 1C was 8.73, around one-half that of Group 4. Values for the three highest

black bass harvest reservoirs were 23.34 hours per acre for Normandy, 13.17 hours per acre for Tims Ford, and 13.42 hours per acre for Center Hill. Total pressure for Group 1C reservoirs was 1.54 hours per acre in Old Hickory, 7.17 hours per acre in Woods, and 6.00 hours per acre in Norris. Since black bass made up a large part of the total weight harvested, it was assumed that total pressure would give a consistent clue to the pressure on black bass. This discussion lends statistical verification that the above conclusion was correct as long as black bass fishermen constituted a large percentage of total fishermen.

Catfish Pounds Per Acre

In the two groups of reservoirs that make up the catfish pounds per acre harvested cluster, total suspended solids and pounds per hour were significantly different at the 0.05 level. It was noted that these two values were much larger than in any of the other sections and were reasons for cautious interpretation of these results.

Before noting differences in the mean levels of Group 4 and Group 1C reservoirs, it was found that only Kentucky, the highest catfish harvest reservoir, had a complete set of readings. The value for Kentucky (32.60 ppm) was higher than any other reservoir sampled. It would be logical to assume that this was the reason there was a significant difference between the two groups of reservoirs, and was an improper method to differentiate between the two groups.

Pounds per hour was probably not the best value to use in comparing the two catfish pounds per acre groups because both were based on the same harvest variable. Given the sample size of Group 4

and the above reasoning, caution would have dictated not using pounds per hour as a variable to differentiate between the two groups. In past sections, catfish pounds per acre harvest was considered a factor of pressure, but at lower levels than could have been recognized from the observation of the total pressure variable. Catfish pounds per acre harvests were closely linked to the percentage of pressure applied by catfish fishermen, as opposed to total pressure relationships.

Sunfish Pounds Per Acre

In the two groups of reservoirs comprising the sunfish pounds per acre harvested cluster, total suspended solids, pounds per hour, and hours per acre were significantly different. Total suspended solids was significant at the 0.05 level. The two pressure-effort variables were significant at the 0.05 and 0.01 levels, respectively. Except for hours per acre significance levels, the other levels appeared large enough to cause them to be considered cautiously.

Total suspended solids mean values were 21.43 ppm for Group 4 and 12.02 for Group 1C reservoirs. These values appear more similar in magnitude than in any other section. It was probably significant that Kentucky and Reelfoot contained the two highest suspended solids readings of all samples. Given those facts, and the higher significance levels of this comparison, total suspended solids was not a good variable to use to differentiate between sunfish groups.

In consideration of the values for total pounds per hour as variables to use in comparing sunfish pounds per acre groups, it was

found that Group 4 values of 0.77 pounds per hour and Group 1C values of 0.41 pounds per hour were very close to those found for crappie pounds per acre groups. Given this fact and the tendency for this variable to follow total pounds per acre values, it was not statistically valid to use this variable to differentiate between the two sunfish groups. It was suspected that the significance level reading here was echoing that of crappie groups.

It was found that the hours per acre readings for sunfish Group 4 was 17.94 and Group 1C was 10.48. These values were again found to be similar to those of the crappie groups. It was uncertain as to whether the significance level here was in response to the overlap in crappie and sunfish group values or due to actual differences in the two sunfish groups. Earlier in discussion of sunfish groups, it was determined that fishing pressure did play a large role in detecting the magnitude of sunfish pounds per acre; however, it was found to be at levels smaller than total hours per acre. In other words, it was necessary to determine the percentages of sunfish fishermen to total fishermen before pressure relationships could be observed. Based on these facts, this particular statistic was not used to differentiate between sunfish pounds per acre groups.

CHAPTER VI

CONCLUSION

1. The SAS program created in this study can be modified to fit most creel surveys if similar variables are collected and if SAS-82 is available. The summaries produced can be valuable management tools for fish and wildlife agencies with a great deal of creel data and few personnel to devote to analysis.

2. Multiple correlations revealed that harvest variables were related to both pressure-effort and physical-chemical values. The most frequently observed pressure-effort variables which correlated with the major harvest classifications (total, crappie, black bass, catfish, and sunfish pounds per acre) were total pounds harvested per hour and total hours fished per acre. The most frequently observed physical-chemical variables included total suspended solids and total phosphorus.

3. When reservoirs were clustered by biological variables (harvest), four major groupings were apparent.

4. In comparisons of total pounds per acre harvested and total pounds standing crop per acre, it was determined that between 10% and 40% of potential harvestable size fish were removed. Between 10% and 40% of potential black bass were harvested while between 4% and 9% of sunfish were removed. The potential harvest values of catfish removed from state-wide reservoirs, between 2% and 17%, were probably low because of cove rotenone collection weaknesses for this species.

Similarly, cove rotenone methods were not ideally suited for estimating crappie populations, so their potential harvests of 60% to over 100% were biased.

5. Kentucky Reservoir ranked in the highest category (Group 4) in all five major classifications (total, crappie, black bass, catfish, and sunfish pounds per acre). Normandy and Fort Loudoun Reservoirs ranked in the highest harvest category in the crappie, black bass, and sunfish classifications.

6. With regard to harvests of individual species (pounds per acre), Normandy Reservoir produced the highest catches of crappie and black bass, Kentucky Reservoir produced the highest catfish harvests, and Reelfoot Lake produced the highest sunfish harvests.

7. The pressure-effort variable which was most related to harvest of all species creeled was total hours fished per acre. It was particularly important in determining crappie and black bass catches. Catfish and sunfish harvests were best determined by analysis of the proportion of catfish and sunfish fishermen to the total number of fishermen.

8. The physical-chemical variables that were most related to harvests of all species were total suspended solids and total phosphorus. Total phosphorus was the best of the two in determining total fish harvests, specifically, crappie catches. If sampling biases for sites with water quality problems were disregarded, total suspended solids was a good method to use since it could have been a reflection of primary productivity levels.

9. Combined analyses of both hours per acre fished and total phosphorus concentration may help determine potential harvests of sport fish for any given reservoir in Tennessee. Generally, reservoirs with the highest primary productivity and a corresponding high level of fishing pressure produce the largest harvests.

10. Most sport fish in Tennessee were under-utilized during the seven-year study period. Based on values of harvests from large data sets of southeastern reservoirs, Tennessee impoundments have the potential to withstand the additional harvest of 25% to 50% more fish.

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APPENDIXES

APPENDIX A

TENNESSEE WILDLIFE RESOURCES AGENCY CREEL DATA SUMMARY PROGRAM WITH DOCUMENTATION

```
//TWRA JOB ,SAUL,GROUP=J582,USER=P77368,TIME=(79,59),
//     MSGCLASS=H,CLASS=T,MSGLEVEL=(1,1),
//     PASSWORD=?
/*JOBPARM  LINES=25
/*ROUTE CMSRJO USERID=PB77368
/*ROUTE    PRINT RMT17
//S1 EXEC SAS82,REGION=1024K,SORT=25
//WORK DD SPACE=(CYL,(50,10)),UNIT=SYSDA
//*SORTWK01 DD UNIT=NORLSE
//*SORTWK02 DD UNIT=(NORLSE,,SEP=(SORTWK01))
//*SORTWK03 DD UNIT=(NORLSE,,SEP=(SORTWK01,SORTWK02))
//IN1 DD UNIT=TAPE,VOL=SER=010088,
// DSN=ORIG.DATA3,DISP=SHR,LABEL=1
//* NEXT JCL ALLOCATES A SCRATCH TAPE FOR CARD 1 ONLY DATA
//OUT1 DD UNIT=TAPE,DSN=CRD1ONLY.ORIG.DATA3A,LABEL=(1,SL,RETPD=0),
//  DISP=(NEW,KEEP),DCB=(RECFM=FB,LRECL=80,BLKSIZE=32000)
//SYSIN DD *
*************************************************************************
*  THIS PROGRAM SELECTS THE "ONE" CARDS THAT CONTAIN THE RAW DATA AS    *
* INPUT FROM THE CREEL SHEETS.                                          *
*************************************************************************;
OPTIONS ERRORS=0;
DATA CARD1;INFILE IN1 ;
INPUT A $CHAR78. @79 CARD $CHAR2.;
IF (CARD=' 3' OR CARD='03' OR CARD='3 ' OR CARD='30') THEN DELETE;
DATA OUT; SET CARD1;
FILE OUT1;
PUT A $CHAR78. @79 CARD $CHAR2. ;
//S2 EXEC SAS82,REGION=1024K,SORT=25
//WORK DD SPACE=(CYL,(10,10)),UNIT=SYSDA
//IN1 DD UNIT=TAPE,VOL=REF=*.S1.GO.OUT1,
// DSN=CRD1ONLY.ORIG.DATA3A,DISP=SHR,LABEL=1
//* NEXT JCL ALLOCATES A SCRATCH TAPE FOR CARD 1 ONLY DATA
//OUT1 DD UNIT=TAPE,DSN=CRD1ONLY.CLN.DATA3A,LABEL=(1,SL,RETPD=0),
//  DISP=(NEW,KEEP),DCB=(RECFM=FB,LRECL=80,BLKSIZE=32000)
//SYSIN DD *
*************************************************************************
* THIS PROGRAM SETS UP A DATA SET WHICH IS MADE UP OF THE "ONE" CARD    *
* DATA THAT HAS BEEN CLEANED OF INPUT ERRORS.                           *
*************************************************************************;
OPTIONS ERRORS=0;
DATA CARD1;INFILE IN1 ;
INPUT WK $ 1-2 DY $ 3-4 YR $ 5-6 DT $ 1-6 LAKE $ 7-8
      AREA $ 9 SUB $ 10 BOBA $ 11 TIME $ 12-15
      AP $ 16 HRFI 17-18 TN 19 COMP $ 20
      RENT $ 21 NOHU 22 NOSU 23 SPFI $ 24
      SP1 25-26 SP2 27-28 SP3 29-30 SP4 31-32
      SP5 33-34 SP6 35-36 CODE1 $ 37-38
      NO1 39-40 LBS1 41-42 TN1 43
      CODE2 $ 44-45 NO2 46-47 LBS2 48-49 TN2 50
      CODE3 $ 51-52 NO3 53-54 LBS3 55-56
      TN3 57 CODE4 $ 58-59 NO4 60-61 LBS4 62-63
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      TN4 64 CODE5 $ 65-66 NO5 67-68 LBS5 69-70
      TN5 71 CODE6 $ 72-73 NO6 74-75
      LBS6 76-77 TN6 78 CARD $ 79-80;
IF WK='/*' THEN DELETE;
IF (COMP='0' OR COMP='3' OR COMP='4' OR COMP='5' OR COMP='6')THEN COMP='1';
IF (SPFI='0' OR SPFI='1' OR SPFI='2' OR SPFI='3' OR SPFI='4' OR SPFI='5' OR
    SPFI='6' OR SPFI='7' OR SPFI='8' OR SPFI='9' OR SPFI='-' OR SPFI='&' OR
     SPFI=' ') THEN FSPFI='OK';
IF FSPFI NE 'OK' THEN DELETE;
IF (BOBA='1' OR BOBA='2' OR BOBA=' ') THEN FBOBA='OK';
IF FBOBA NE 'OK' THEN DELETE;
IF (COMP='1' OR COMP='2' OR COMP=' ') THEN FCOMP='OK';
IF FCOMP NE 'OK' THEN DELETE;
IF (RENT='1' OR RENT='2' OR RENT='3' OR RENT='4' OR RENT='5' OR RENT='6' OR
    RENT='7' OR RENT=' ') THEN FRENT='OK';
IF FRENT NE 'OK' THEN DELETE;
IF (TN1 LE 9 OR TN1=.) THEN FTN1='OK';
IF FTN1 NE 'OK' THEN DELETE;
IF (TN2 LE 9 OR TN2 =.) THEN FTN2='OK';
IF FTN2 NE 'OK' THEN DELETE;
IF (TN3 LE 9 OR TN3=.) THEN FTN3='OK';
IF FTN3 NE 'OK' THEN DELETE;
IF (TN4 LE 9 OR TN4=.) THEN FTN4='OK';
IF FTN4 NE 'OK' THEN DELETE;
IF (TN5 LE 9 OR TN5=.) THEN FTN5='OK';
IF FTN5 NE 'OK' THEN DELETE;
IF (TN6 LE 9 OR TN6=.) THEN FTN6='OK';
IF FTN6 NE 'OK' THEN DELETE;
DATA CARD1OUT; SET CARD1; FILE OUT1;
PUT WK $ 1-2 DY $ 3-4 YR $ 5-6 DT $ 1-6 LAKE $ 7-8
      AREA $ 9 SUB $ 10 BOBA $ 11 TIME $ 12-15
      AP $ 16 HRFI 17-18 TN 19 COMP $ 20
      RENT $ 21 NOHU 22 NOSU 23 SPFI $ 24
      SP1 25-26 SP2 27-28 SP3 29-30 SP4 31-32
      SP5 33-34 SP6 35-36 CODE1 $ 37-38
      NO1 39-40 LBS1 41-42 TN1 43
      CODE2 $ 44-45 NO2 46-47 LBS2 48-49 TN2 50
      CODE3 $ 51-52 NO3 53-54 LBS3 55-56
      TN3 57 CODE4 $ 58-59 NO4 60-61 LBS4 62-63
      TN4 64 CODE5 $ 65-66 NO5 67-68 LBS5 69-70
      TN5 71 CODE6 $ 72-73 NO6 74-75
      LBS6 76-77 TN6 78 CARD $ 79-80;
//S3 EXEC SAS82,REGION=1024K,SORT=25
//WORK DD SPACE=(CYL,(50,10)),UNIT=SYSDA
//*SORTWK01 DD UNIT=NORLSE
//*SORTWK02 DD UNIT=(NORLSE,,SEP=(SORTWK01))
//*SORTWK03 DD UNIT=(NORLSE,,SEP=(SORTWK01,SORTWK02))
//IN1 DD UNIT=TAPE,VOL=SER=010088,
// DSN=ORIG.DATA3,DISP=SHR,LABEL=1
//* NEXT JCL ALLOCATES A SCRATCH TAPE FOR CARD 3 ONLY DATA
//OUT1 DD UNIT=TAPE,DSN=CRD3ONLY.ORIG.DATA3A,LABEL=(1,SL,RETPD=0),
//  DISP=(NEW,KEEP),DCB=(RECFM=FB,LRECL=90,BLKSIZE=9000)
```

```
//SYSIN DD *
*************************************************************************
*  THIS PROGRAM SETS UP A DATA SET CONTAINING ONLY THE "THREE" CARDS    *
* WHICH CONTAIN THE EXPANSION TIMES FROM BILL TURNER'S PROGRAM.         *
*************************************************************************;
OPTIONS ERRORS=0;
DATA CARD3;INFILE IN1 ;
    INPUT A $CHAR69. @70 EXPTIME ZD9.0  @79 CARD $CHAR2.;
IF (CARD=' 3' OR CARD='03' OR CARD='3 ' OR CARD='30') THEN OUTPUT;
PROC PRINT; VAR A EXPTIME CARD;
DATA OUT; SET CARD3;
FILE OUT1;
PUT A $CHAR69. @71 EXPTIME 15. CARD $ 89-90;
//S4 EXEC SAS82,REGION=1024K,SORT=25
//WORK DD SPACE=(CYL,(50,10)),UNIT=SYSDA
//*SORTWK01 DD UNIT=NORLSE
//*SORTWK02 DD UNIT=(NORLSE,,SEP=(SORTWK01))
//*SORTWK03 DD UNIT=(NORLSE,,SEP=(SORTWK01,SORTWK02))
//IN1 DD UNIT=TAPE,VOL=REF=*.S2.GO.OUT1,
// DSN=CRD1ONLY.CLN.DATA3A,DISP=SHR,LABEL=1
//IN3 DD UNIT=TAPE,VOL=REF=*.S3.GO.OUT1,
// DSN=CRD3ONLY.ORIG.DATA3A,DISP=SHR,LABEL=1
//TAPE DD DSN=ALLMRG,DISP=(NEW,KEEP),LABEL=(1,SL,RETPD=0),
// UNIT=TAPE
//SYSIN DD *
*************************************************************************
*  THIS PROGRAM COMBINES THE "ONE" CARDS AND THE "THREE" CARDS INTO A   *
* SAS DATA SET WHICH CAN BE USED FOR THE FOLLOWING SUMMARY PROGRAMS.    *
* AT THIS STEP A GLOBAL CHANGE MUST BE INSTITUTED EACH YEAR TO SELECT   *
* THE YEAR SPAN IN THE FOLLOWING STATEMENT: IF (YR GE 79 AND YR LE 83); *
*************************************************************************;
DATA ONE;
INFILE IN1;
INPUT (WK DY YR LAKE) (@1 4*2.)
      AREA $ 9 SUB $ 10 BOBA $ 11 TIME $ 12-15
      AP $ 16 HRFI 17-18 TN 19 COMP $ 20
      RENT $ 21 NOHU 22 NOSU 23 SPFI $ 24
      SP1 25-26 SP2 27-28 SP3 29-30 SP4 31-32
      SP5 33-34 SP6 35-36 CODE1 $ 37-38
      NO1 39-40 LBS1 41-42 TN1 43
      CODE2 $ 44-45 NO2 46-47 LBS2 48-49 TN2 50
      CODE3 $ 51-52 NO3 53-54 LBS3 55-56
      TN3 57 CODE4 $ 58-59 NO4 60-61 LBS4 62-63
      TN4 64 CODE5 $ 65-66 NO5 67-68 LBS5 69-70
      TN5 71 CODE6 $ 72-73 NO6 74-75
      LBS6 76-77 TN6 78 CARD1 $ 79-80;
IF (YR GE 79 AND YR LE 83);
LENGTH WK--LAKE HRFI TN NOHU NOSU SP1-SP6  NO1 NO2 NO3 NO4 NO5 NO6 2;
LENGTH DEFAULT=4;
ARRAY T TN1 TN2 TN3 TN4 TN5 TN6;
ARRAY L LBS1 LBS2 LBS3 LBS4 LBS5 LBS6;
ARRAY LT LBST1 LBST2 LBST3 LBST4 LBST5 LBST6;
```

```
DO OVER T;
T=T/10;
LT=L+T;
END;
DROP TN1 TN2 TN3 TN4 TN5 TN6 LBS1 LBS2 LBS3 LBS4 LBS5 LBS6;
DROP AREA SUB TIME AP RENT CARD1 ;
DATA THREE;
INFILE IN3;
INPUT (WK MO YR LAKE) (@1 4*2.)  @71 EXPTIME 15. CARD3 $ 89-90;
IF (YR GE 79 AND YR LE 83);
LENGTH WK--LAKE EXPTIME 2;
PROC SORT DATA=ONE;
BY LAKE YR WK ;
PROC SORT DATA=THREE;
BY LAKE YR WK ;
DATA TAPE.ALLMRG; MERGE ONE (IN=IN1) THREE (IN=IN3) ; BY LAKE YR WK;
IF IN1 & IN3;
LENGTH WK--LAKE HRFI TN NOHU NOSU SP1-SP6 NO1 NO2 NO3 NO4 NO5 NO6
       MO EXPTIME 2;
DROP CARD3;
//S5 EXEC SAS,REGION=1024K,SORT=25
//WORK DD SPACE=(CYL,(50,10)),UNIT=SYSDA
//TALLMRG DD DSN=ALLMRG,DISP=SHR,
// UNIT=TAPE,VOL=REF=*.S4.GO.TAPE,LABEL=1
//SYSIN DD *
*****-------------------------------------------------------------------*****
*  THE FOLLOWING STATEMENTS CREATE A GRAPH OF THE COMPLETE DATA SET IN A    *
* YEAR-BY-WEEK FORM WHICH SHOWS MISSING DATA BLOCKS. THIS WILL ALLOW YOU TO *
* NOTE MONTHS THAT ARE MADE UP OF ONLY A WEEK OR TWO. THEREFORE LESS        *
* WEIGHT CAN BE GIVEN TO MONTHS CONTAINING INCOMPLETE DATA PERIODS.         *
*  IN THIS FIRST DATA STEP, THE DATA ARE SORTED BY LAKE, YEAR, MONTH, WEEK, *
* AND EXPANSION TIMES. THIS ALLOWS US TO PROCEED TO THE MAJOR TASK OF       *
* TOTALING THIS FACTOR OVER MONTHS.                                         *
*****-------------------------------------------------------------------*****;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT; BY LAKE YR MO WK EXPTIME;
****  THIS DATA STEP BEGINS BY SETTING THE FIRST WEEKLY EXPANSION TIME TO ONE
**** AND THE REST OF THE EXPANSION TIMES IN THE SAME WEEK TO ZERO. IN THIS WAY,
**** ONLY ONE WEEKS' WORTH OF EXPANSION TIME WILL BE LISTED WITH THE ASSOCIATED
**** DATA AND CAN THEREFORE BE ADDED TOGETHER FOR A MONTHLY TOTAL. OTHERWISE,
**** THE SUM OF THE EXPANSION TIMES WOULD BE TOO LARGE A NUMBER AS EACH CREEL
**** RECORD HAS AN ACCOMPANYING EXPANSION TIME AND A WEEK OF CREEL RECORDS HAS
**** THE SAME EXPANSION TIME LISTED MORE THAN ONCE.
****  THE PROC MEANS STATEMENT IS SET UP TO TOTAL ALL EXPANSION TIMES TO
**** MONTHLY TOTALS. THIS WILL BE USED IN LATER ANALYSES;
DATA L721; SET L721; BY LAKE YR MO WK EXPTIME;
IF FIRST.EXPTIME THEN FLAG=1;
IF FLAG NE 1 THEN EXPTIME=0;
PROC SORT; BY LAKE YR MO WK;
PROC MEANS NOPRINT SUM; VAR EXPTIME;
  OUTPUT OUT=NOEXPMO SUM=EXPSUM; BY LAKE YR MO WK;
****  THIS DATA STEP SETS UP THE CREEL RECORDS IN A FORM THAT WILL GIVE A
```

```
**** CLEAN GRAPH WITH FEW OR NO OVERLAPPING POINTS. THE FIRST WEEKLY RECORD
**** IN EACH GROUP IS SAVED BECAUSE IT IS THE ONLY ONE NEEDED IN THE GRAPH.
**** THE YEARS ARE ALREADY INCLUDED WITH THE SAVED WEEKLY RECORDS.
****  ADDITIONALLY, THE LAKES ARE CODED TO PRINT OUT A NAME FOR EACH RESERVOIR
**** SO THE GRAPH IS EASIER TO READ. (NOTE: THE TERM RESERVOIR IS MISSPELLED
**** BECAUSE SAS LIMITS VARIABLE NAMES TO 8 LETTERS).
****  FINALLY, THE DATA ARE SORTED AGAIN TO SET UP OUR DATA FOR THE FINAL GRAPH
**** STATEMENT.;
DATA GRAPH; SET NOEXPMO;
IF EXPSUM NE 0;
LENGTH RESERVOR $ 25;
IF (LAKE='01' OR LAKE='1') THEN RESERVOR='NORRIS 01';
IF (LAKE='02' OR LAKE='2') THEN RESERVOR='KENTUCKY 02';
IF (LAKE='03' OR LAKE='3') THEN RESERVOR='WOODS 03';
IF (LAKE='04' OR LAKE='4') THEN RESERVOR='DALE HOLLOW 04';
IF (LAKE='05' OR LAKE='5') THEN RESERVOR='WATAUGA 05';
IF (LAKE='06' OR LAKE='6') THEN RESERVOR='REELFOOT 06';
IF (LAKE='07' OR LAKE='7') THEN RESERVOR='CHEROKEE 07';
IF (LAKE='08' OR LAKE='8') THEN RESERVOR='TIMS FORD 08';
IF LAKE='10' THEN RESERVOR='HIWASSEE 10';
IF LAKE='11' THEN RESERVOR='CENTER HILL 11';
IF LAKE='12' THEN RESERVOR='SOUTH HOLSTON 12';
IF LAKE='13' THEN RESERVOR='PERCY PRIEST 13';
IF LAKE='14' THEN RESERVOR='OLD HICKORY 14';
IF LAKE='15' THEN RESERVOR='CORDELL HULL 15';
IF LAKE='16' THEN RESERVOR='MELTON HILL 16';
IF LAKE='17' THEN RESERVOR='NORMANDY 17';
IF LAKE='18' THEN RESERVOR='DOUGLAS 18';
IF LAKE='20' THEN RESERVOR='DALE HOLLOW TW 20';
IF LAKE='21' THEN RESERVOR='FORT LOUDON 21';
IF LAKE='22' THEN RESERVOR='TELLICO 22';
IF LAKE='23' THEN RESERVOR='BOONE 23';
IF LAKE='75' THEN RESERVOR='WHEELER 75';
IF LAKE='76' THEN RESERVOR='CHICKAMAUGA 76';
IF LAKE='77' THEN RESERVOR='WATTS BAR 77';
IF LAKE='78' THEN RESERVOR='NICKAJACK 78';
PROC SORT; BY RESERVOR YR WK;
****  THIS DATA STEP SETS UP A GRAPH OF THE REQUESTED CREEL RECORDS. AMONG THE
**** COMMANDS ARE THOSE WHICH LABEL AND CLARIFY THE PRINT-OUT SO IT WILL BE
**** UNCLUTTERED AND EASY TO READ. TITLES ARE PRINTED AT THE TOP OF EACH PAGE;
DATA PLOTYRWK; SET GRAPH;
LABEL WK=WEEKS
      YR=YEARS ;
PROC PLOT; BY RESERVOR;
   PLOT YR*WK='X'/HAXIS=1 TO 52 BY 1 VPOS=6 VSPACE=1  ;
TITLE YEARS SAMPLED PLOTTED AGAINST WEEKS SAMPLED ;
TITLE2     INDICATIONS OF MISSING DATA BLOCKS;
//S6 EXEC SAS,REGION=1024K,SORT=25
//WORK DD SPACE=(CYL,(200,50)),UNIT=SYSDA
//TALLMRG DD DSN=ALLMRG,DISP=SHR,
// UNIT=TAPE,VOL=REF=*.S4.GO.TAPE,LABEL=1
//SYSIN DD *
```

```
*****-------------------------------------------------------------------*****
*  THE FOLLOWING SERIES OF STATEMENTS ULTIMATELY CREATE A SUMMARY SHEET    *
* OF ALL CREEL DATA BY YEAR AND LAKE. THIS SUMMARY SHEET IS PRODUCED IN    *
* TABLE FORM. ALL DATA INCLUDED IN THE MASTER TAPE IS PRODUCED ON THIS     *
* SHEET.                                                                   *
*    LISTED BELOW ARE IMPORTANT VARIABLES WITH BRIEF DEFINITIONS:          *
*  EXPTIME =EXPANSION OF HOURS FISHED                                      *
*  EXPSUM  =SUM OF EXPANDED HOURS                                          *
*  TOTNO   =TOTAL NUMBER OF FISH CREELED (PER SPECIES)                     *
*  TOTLB   =TOTAL POUNDS OF FISH CREELED (PER SPECIES)                     *
*  MNLBS   =AVERAGE WEIGHT OF FISH CREELED (PER SPECIES)                   *
*  TOTALNO =SUM OF TOTAL NUMBER OF FISH CREELED (ALL SPECIES)              *
*  TOTALLB =SUM OF TOTAL WEIGHT OF FISH CREELED (ALL SPECIES)              *
*  TOTALMN =TOTAL AVERAGE WEIGHT OF FISH CREELED (ALL SPECIES)             *
*  THRFI   =TOTAL HOURS FISHED (PER CREEL RECORD)                          *
*  HRSAMP  =TOTAL HOURS FISHED (BY TOTAL FISHERMEN PER CREEL RECORD)       *
*  HRSAMPLE=TOTAL HOURS FISHED FOR WEEK SAMPLED                            *
*  WKTOTNO =ESTIMATED WEEKLY TOTAL NUMBER OF FISH CREELED                  *
*  WKTOTLB =ESTIMATED WEEKLY TOTAL WEIGHT OF FISH CREELED                  *
*  ESTOTNO =ESTIMATED TOTAL NUMBER OF FISH CREELED (PER SPECIES)           *
*  ESTOTLB =ESTIMATED TOTAL POUNDS OF FISH CREELED (PER SPECIES)           *
*  ESTHRS  =ESTIMATED HOURS FISHED                                         *
*  ESTRIPS =ESTIMATED NUMBER OF TRIPS                                      *
*  TOTESTNO=SUM OF ESTIMATED TOTAL NUMBER OF FISH CREELED (ALL SPECIES)    *
*  TOTESTLB=SUM OF ESTIMATED TOTAL POUNDS OF FISH CREELED (ALL SPECIES)    *
*  CODE1-6 =CODED VALUES FOR FISH SPECIES                                  *
*  NO1-6   =NUMBER OF FISH CAUGHT PER FISH SPECIES CODE                    *
*  LBST1-6 =POUNDS OF FISH CAUGHT PER FISH SPECIES CODE                    *
*  PERNO   =PERCENT OF TOTAL NUMBER OF FISH CAUGHT (BY SPECIES)            *
*  PERLB   =PERCENT OF TOTAL POUNDS OF FISH CAUGHT (BY SPECIES)            *
*  COMP    =COMPLETED OR NOT COMPLETED TRIP                                *
*  NOCOMPTP=NUMBER OF COMPLETED TRIPS                                      *
*  FMHRS   =HOURS FISHED FOR COMPLETED TRIPS                               *
*  SWKHR   =WEEKLY TOTAL OF HOURS FISHED FOR COMPLETED TRIPS               *
*  WEEKAVE =AVERAGE WEEKLY TOTAL OF HOURS FISHED                           *
*  NWKS    =NUMBER OF WEEKS WITH DATA COLLECTED                            *
*  SWKAVE  =SUM OF WEEKLY AVERAGES OF HOURS FISHED                         *
*  MMOAVE  =MONTHLY AVERAGE OF HOURS FISHED                                *
*  NYRS    =NUMBER OF YEARS WITH DATA COLLECTED                            *
*  MYRAVE  =SUM OF MONTHLY AVERAGES OF HOURS FISHED                        *
*  YRAVTRP =YEARLY AVERAGE LENGTH OF TRIP                                  *
*  MENSAMPD=NUMBER OF FISHERMEN SAMPLED                                    *
*  NOPERHR =NUMBER OF FISH CAUGHT PER HOUR                                 *
*  LBPERHR =POUNDS OF FISH CAUGHT PER HOUR                                 *
*  AVCOTRIP=AVERAGE LENGTH OF COMPLETED TRIP                               *
*    THE FOLLOWING STEP SORTS THE DATA SET BY LAKE, YEAR, MONTH, WEEK, AND *
* EXPANSION TIME TO HELP IN THE TASK OF TOTALING THIS FACTOR OVER A YEAR.  *
*****-------------------------------------------------------------------*****;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT; BY LAKE YR MO WK EXPTIME;
****  THIS DATA STEP TOTALS THE EXPANSION TIMES OVER WEEKS BY LAKE, YEAR
**** AND MONTH. THIS IS THE SAME PROCEDURE THAT WAS USED IN THE FIRST
```

```
**** PROGRAM;
DATA L721; SET L721; BY LAKE YR MO WK EXPTIME;
IF FIRST.EXPTIME THEN FLAG=1;
IF FLAG NE 1 THEN EXPTIME=0;
PROC SORT; BY LAKE YR MO WK;
PROC MEANS NOPRINT SUM; VAR EXPTIME;
  OUTPUT OUT=NOEXPMO SUM=EXPSUM; BY LAKE YR MO WK;
****  THIS SET OF STATEMENTS RENAMES SOME OF THE VARIABLES IN OUR CREEL DATA
**** SET SO FUTURE RESULTS CAN BE ACCESSED AND PRINTED EASIER. THE VARIABLE
**** SPECIES REPLACES THE CODE VARIABLES, LBS REPLACES ASSOCIATED LB VARIABLE,
**** AND NO REPLACES THE NO VARIABLE ALSO ASSOCIATED WITH THE CODE
**** VARIABLE.
****  THIS STEP ALSO CALCULATES THE WEEKLY TOTAL NUMBER AND POUNDS OF
**** FISH CREELED PER SPECIES;
PROC SORT DATA=L721; BY LAKE YR MO WK;
DATA RENAME; SET L721; BY LAKE YR MO WK;
DROP BOBA--SPFI EXPTIME;
DROP LBST1 LBST2 LBST3 LBST4 LBST5 LBST6
     NO1 NO2 NO3 NO4 NO5 NO6
     CODE1 CODE2 CODE3 CODE4 CODE5 CODE6
     SP1 SP2 SP3 SP4 SP5 SP6;
LENGTH SPECIES $ 20;
LENGTH WK--LAKE MO 2;
LENGTH DEFAULT=4;
SPECIES=CODE1; LBS=LBST1; NO=NO1; OUTPUT;
SPECIES=CODE2; LBS=LBST2; NO=NO2; OUTPUT;
SPECIES=CODE3; LBS=LBST3; NO=NO3; OUTPUT;
SPECIES=CODE4; LBS=LBST4; NO=NO4; OUTPUT;
SPECIES=CODE5; LBS=LBST5; NO=NO5; OUTPUT;
SPECIES=CODE6; LBS=LBST6; NO=NO6; OUTPUT;
PROC SORT SORTWKNO=6; BY LAKE YR MO WK SPECIES;
PROC MEANS NOPRINT SUM; VAR NO LBS ; BY LAKE YR MO WK SPECIES;
  OUTPUT OUT=SPLST SUM=TOTNO TOTLB;
PROC DELETE DATA=WORK.RENAME;
**** THIS STEP IS USED TO CREATE THE VARIABLE MNLBS;
DATA SPLST;SET SPLST;
MNLBS=ROUND((TOTLB/TOTNO),.01);
**** THIS STEP CALCULATES TOTAL NUMBERS AND POUNDS OF
**** ALL SPECIES CREELED;
DATA TOTSPLST; SET SPLST;
PROC SORT; BY LAKE YR MO WK;
PROC MEANS NOPRINT SUM; VAR TOTNO TOTLB; BY LAKE YR MO WK;
  OUTPUT OUT=TOTSPLST SUM=TOTALNO TOTALLB;
**** THE NEXT FEW DATA STEPS MERGE TOGETHER SETS CONTAINING
**** IMPORTANT VARIABLES;
DATA BOTH; MERGE TOTSPLST SPLST; BY LAKE YR MO WK;
PROC SORT; BY LAKE YR MO WK;
DATA TOG ; MERGE NOEXPMO BOTH; BY LAKE YR MO WK;
**** THESE COMMANDS CREATE NEW VARIABLES WHICH ARE USED TO
**** CALCULATE A WEEKLY TOTAL OF HOURS FISHED;
DATA L721; SET L721;
THRFI=HRFI+(TN/10);
```

```
HRSAMP=THRFI*NOHU;
PROC SORT; BY LAKE YR MO WK;
PROC MEANS SUM NOPRINT; VAR HRSAMP;
 OUTPUT OUT=SHRFI SUM=HRSAMPLE; BY LAKE YR MO WK;
PROC DELETE DATA= WORK.L721;
**** THIS STEP MERGES TOGETHER SETS CONTAINING IMPORTANT
**** VARIABLES. IT ALSO CREATES A WEEKLY ESTIMATED TOTAL
**** NUMBER AND WEIGHT OF FISH CREELED;
DATA COMB; MERGE TOG SHRFI; BY LAKE YR MO WK;
WKTOTNO=(EXPSUM/HRSAMPLE)*TOTNO;
WKTOTLB=(EXPSUM/HRSAMPLE)*TOTLB;
PROC SORT; BY LAKE YR MO WK;
**** THIS STEP UTILIZES THE VARIABLES CREATED ABOVE TO CALCULATE WEEKLY
**** ESTIMATED TOTAL NUMBERS AND POUNDS OF FISH CREELED BY SPECIES;
DATA ESTNO; SET COMB;
PROC SORT; BY LAKE YR SPECIES;
PROC MEANS SUM NOPRINT; VAR WKTOTNO WKTOTLB; BY LAKE YR SPECIES;
  OUTPUT OUT=SWKTOT SUM=ESTOTNO ESTOTLB;
PROC DELETE DATA=WORK.ESTNO;
**** THE FOLLOWING STEPS ULTIMATELY TOTAL THE EXPANDED ESTIMATES OF
**** HOURS FISHED BY YEAR;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT; BY LAKE YR MO WK EXPTIME;
DATA L721; SET L721; BY LAKE YR MO WK EXPTIME;
IF FIRST.EXPTIME THEN FLAG=1;
IF FLAG NE 1 THEN EXPTIME=0;
PROC SORT; BY LAKE YR  ;
PROC MEANS NOPRINT SUM; VAR EXPTIME;
  OUTPUT OUT=NOEXPMO SUM=ESTHRS; BY LAKE YR  ;
****  THIS SET OF STATEMENTS RENAMES SOME OF THE VARIABLES IN OUR CREEL DATA
**** SET SO FUTURE RESULTS CAN BE ACCESSED AND PRINTED EASIER. THE VARIABLE
**** SPECIES REPLACES THE CODE VARIABLES, LBS REPLACES ASSOCIATED LB VARIABLE,
**** AND NO REPLACES THE NO VARIABLE ALSO ASSOCIATED WITH THE CODE
**** VARIABLE.
****  THIS STEP ALSO CALCULATES THE YEARLY TOTAL NUMBER AND POUNDS OF
**** FISH CREELED PER SPECIES;
DATA L721; SET L721;
PROC SORT; BY LAKE YR  ;
DATA RENAME; SET L721; BY LAKE YR  ;
DROP BOBA--SPFI EXPTIME;
DROP LBST1 LBST2 LBST3 LBST4 LBST5 LBST6
     NO1 NO2 NO3 NO4 NO5 NO6
     CODE1 CODE2 CODE3 CODE4 CODE5 CODE6
     SP1 SP2 SP3 SP4 SP5 SP6;
LENGTH SPECIES $ 40;
LENGTH WK--LAKE MO 2;
LENGTH DEFAULT=4;
SPECIES=CODE1; LBS=LBST1; NO=NO1; SP=SP1; OUTPUT;
SPECIES=CODE2; LBS=LBST2; NO=NO2; SP=SP2; OUTPUT;
SPECIES=CODE3; LBS=LBST3; NO=NO3; SP=SP3; OUTPUT;
SPECIES=CODE4; LBS=LBST4; NO=NO4; SP=SP4; OUTPUT;
SPECIES=CODE5; LBS=LBST5; NO=NO5; SP=SP5; OUTPUT;
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```
SPECIES=CODE6; LBS=LBST6; NO=NO6; SP=SP6; OUTPUT;
PROC SORT SORTWKNO=6; BY LAKE YR SPECIES;
PROC MEANS NOPRINT SUM; VAR NO LBS ; BY LAKE YR SPECIES;
  OUTPUT OUT=SPLST SUM=TOTNO TOTLB;
PROC DELETE DATA=WORK.RENAME;
**** THESE STEPS CREATE THE VARIABLE MNLBS. THEY ALSO CALCULATE
**** YEARLY TOTALS FOR NUMBERS AND POUNDS OF FISH CREELED;
DATA SPLST;SET SPLST;
MNLBS=ROUND((TOTLB/TOTNO),.01);
DATA TOTSPLST; SET SPLST;
PROC SORT; BY LAKE YR  ;
PROC MEANS NOPRINT SUM; VAR TOTNO TOTLB; BY LAKE YR  ;
  OUTPUT OUT=TOTSPLST SUM=TOTALNO TOTALLB;
**** THIS GROUP OF DATA STEPS BEGINS AND ENDS WITH THE MERGING OF
**** STEPS CONTAINING IMPORTANT VARIABLES. THE STEPS ALSO CREATE TWO
**** PERCENT VARIABLES REPRESENTING NUMBERS AND POUNDS OF FISH CREELED;
DATA BOTH; MERGE TOTSPLST SPLST; BY LAKE YR  ;
PERNO=ROUND(((TOTNO/TOTALNO)*100),.01);
PERLB=ROUND(((TOTLB/TOTALLB)*100),.01);
PROC SORT; BY LAKE YR  ;
DATA TOGE;MERGE NOEXPMO BOTH; BY LAKE YR  ;
**** THIS STEP IS USED TO DISCARD ERRONEOUS DATA AND CALCULATE THE
**** WEEKLY TOTAL NUMBER OF COMPLETED AND NOT COMPLETED TRIPS;
DATA COMPTRP1; SET L721;
IF MO=. THEN DELETE;
IF COMP=' ' THEN DELETE;
PROC SORT; BY LAKE YR MO WK COMP;
PROC MEANS SUM NOPRINT; VAR NOHU; BY LAKE YR MO WK COMP;
  OUTPUT OUT=CONVER SUM=NOCOMPTP;
PROC DELETE DATA=WORK.L721;
**** THESE STEPS CREATE FISHING HOUR VARIABLES WHICH ARE USED TO
**** CALCULATE WEEKLY HOURS FISHED BY COMPLETED AND NOT COMPLETED
**** TRIPS;
DATA COMPTRP2; SET COMPTRP1;
THRFI=HRFI+(TN/10);
FMHRS=THRFI*NOHU;
PROC SORT; BY LAKE YR MO WK COMP;
PROC MEANS SUM NOPRINT; VAR FMHRS; BY LAKE YR MO WK COMP;
 OUTPUT OUT=WKHRFI SUM=SWKHR;
PROC DELETE DATA=COMPTRP2;
**** THE FIRST PART OF THIS DATA STEP INVOLVES ORGANIZING AND MERGING
**** SETS CONTAINING IMPORTANT VARIABLES. IT ALSO CREATES A VARIABLE
**** REPRESENTING THE WEEKLY AVERAGE LENGTH OF A FISHING TRIP. THIS
**** AVERAGE IS ALSO ADJUSTED IF IT FALLS OUT OF THE PREDETERMINED
**** RANGE;
DATA CONVER; SET CONVER;
PROC SORT; BY LAKE YR MO WK COMP;
DATA WKHRFI; SET WKHRFI;
PROC SORT; BY LAKE YR MO WK COMP;
DATA AVE; MERGE WKHRFI CONVER; BY LAKE YR MO WK COMP;
WEEKAVE=SWKHR/NOCOMPTP;
IF WEEKAVE LT 2.5 THEN WEEKAVE=5.0;
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IF WEEKAVE GT 7.5 THEN WEEKAVE=5.0;
**** THE FOLLOWING DATA STEPS SORT OUT SETS CONTAINING COMPLETED AND
**** NOT COMPLETED FISHING TRIPS AND CALCULATE THE SUM OF THE WEEKLY
**** AVERAGE TRIPS AND THE NUMBER OF WEEKS THAT CONTAIN DATA. THESE
**** VARIABLES WILL BE USED IN THE NEXT SET OF DATA STEPS;
DATA C1; SET AVE; IF COMP='1';
DATA C2; SET AVE; IF COMP='2';
  WEEKAVE=5.0;
PROC SORT DATA=C1; BY LAKE YR MO WK;
PROC SORT DATA=C2; BY LAKE YR MO WK;
DATA UNQWK; MERGE C2 C1; BY LAKE YR MO WK;
PROC SORT; BY LAKE YR MO;
DATA UNQWK1; SET UNQWK;
PROC SORT; BY LAKE YR MO;
PROC MEANS SUM N NOPRINT; VAR WEEKAVE; BY LAKE YR MO;
 OUTPUT OUT=WS SUM=SWKAVE N=NWKS;
**** THE NEXT SET OF DATA STEPS ADJUST SUMS OF WEEKLY AVERAGE TRIP
**** LENGTHS DEPENDING ON THE NUMBER OF WEEKS IN WHICH DATA WERE
**** COLLECTED. IT FURTHER CONVERTS WEEKLY SUMS INTO MONTHLY TOTALS
**** BASED ON A MINIMUN OF A 4 WEEK MONTH. IF DATA WAS COLLECTED ON ALL
**** WEEKS OF A MONTH WITH 5 WEEKS, THEN THE SUM OF WEEKLY AVERAGES WILL
**** ADJUSTED ACCORDINGLY. THE SECOND PART OF THIS STEP INVOLVES THE
**** CALCULATION OF A MONTHLY AVERAGE TRIP LENGTH BASED ON A 4 OR 5
**** WEEK MONTH;
DATA WS1; SET WS;
IF NWKS=1 THEN SWKAVE=SWKAVE+15;
IF NWKS=2 THEN SWKAVE=SWKAVE+10;
IF NWKS=3 THEN SWKAVE=SWKAVE+5;
DATA WS2; SET WS1;
IF NWKS LE 4 THEN MMOAVE=SWKAVE/4;
IF NWKS GT 4 THEN MMOAVE=SWKAVE/NWKS;
**** THIS SET OF DATA STEPS CALCULATES A SUM OF MONTHLY AVERAGE TRIP
**** LENGTHS AND THE NUMBER OF YEARS IN WHICH DATA WAS COLLECTED;
DATA WS3; SET WS2;
PROC SORT; BY LAKE YR;
PROC MEANS SUM N NOPRINT; VAR MMOAVE; BY LAKE YR;
 OUTPUT OUT=YRHRAVE SUM=MYRAVE N=NYRS;
**** THE NEXT SET OF DATA STEPS CREATES A VARIABLE REPRESENTING A
**** SUM OF THE MONTHLY AVERAGE TRIP LENGTHS. A CONVERSION OCCURS IF
**** AT LEAST 6 MONTHS OF AVERAGES ARE PRESENT. ANOTHER VARIABLE IS
**** CREATED WHICH REPRESENTS A YEARLY AVERAGE TRIP LENGTH;
DATA YRHRAVE; SET YRHRAVE;
IF NYRS=6 THEN MYRAVE=MYRAVE+30;
IF NYRS=7 THEN MYRAVE=MYRAVE+25;
IF NYRS=8 THEN MYRAVE=MYRAVE+20;
IF NYRS=9 THEN MYRAVE=MYRAVE+15;
IF NYRS=10 THEN MYRAVE=MYRAVE+10;
IF NYRS=11 THEN MYRAVE=MYRAVE+5;
YRAVTRP= MYRAVE/12;
PROC SORT; BY LAKE YR;
**** THIS SET OF DATA STEPS MERGES SETS CONTAINING IMPORTANT
**** VARIABLES. IT THEN CREATES A VARIABLE REPRESENTING THE NUMBER
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**** OF FISHERMEN SAMPLED;
DATA YRHRAVE; SET YRHRAVE;
PROC SORT; BY LAKE YR;
DATA WS2; SET WS2;
PROC SORT; BY LAKE YR;
DATA BOND; MERGE YRHRAVE WS2; BY LAKE YR;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT; BY LAKE YR;
PROC MEANS SUM NOPRINT; VAR NOHU; BY LAKE YR;
  OUTPUT OUT=SHUM SUM=MENSAMPD;
**** THIS SET OF DATA STEPS MERGES SETS CONTAINING IMPORTANT
**** VARIABLES. IT THEN CREATES A VARIABLE REPRESENTING THE NUMBER
**** OF FISHERMAN HOURS SAMPLED ON A YEARLY BASIS;
DATA TOGET; MERGE TOGE BOND; BY LAKE YR;
DATA TOG; MERGE TOGET SHUM; BY LAKE YR;
DATA L721; SET L721;
THRFI=HRFI+(TN/10);
HRSAMP=THRFI*NOHU;
PROC SORT; BY LAKE YR  ;
PROC MEANS SUM NOPRINT; VAR HRSAMP;
 OUTPUT OUT=SHRFI SUM=HRSAMPLE; BY LAKE YR  ;
PROC DELETE DATA=WORK.L721;
**** THIS SET OF DATA STEPS MERGES SETS CONTAINING IMPORTANT
**** VARIABLES. IT THEN CREATES A SEVERAL IMPORTANT VARIABLES
**** THAT WILL BE USED IN THE FINAL REPORT. THE FIRST FIVE
**** VARIABLES DO USE ACTUAL COUNT DATA RATHER
**** THAN ESTIMATED COUNTS TO CALCULATE THEIR VALUES;
DATA BOMB; MERGE TOG SHRFI; BY LAKE YR  ;
PROC SORT; BY LAKE YR SPECIES;
DATA SWKTOT;SET SWKTOT;
PROC SORT; BY LAKE YR SPECIES;
DATA COMBINE; SET BOMB;
PROC SORT; BY LAKE YR SPECIES;
DATA TOGETHER; MERGE COMBINE SWKTOT; BY LAKE YR SPECIES;
TOTALMN=ROUND((TOTALLB/TOTALNO),.01);
NOPERHR=ROUND((TOTNO/HRSAMPLE),.001);
LBPERHR=ROUND((TOTLB/HRSAMPLE),.001);
TOTNOHR=ROUND((TOTALNO/HRSAMPLE),.001);
TOTLBHR=ROUND((TOTALLB/HRSAMPLE),.001);
AVCOTRIP=ROUND((YRAVTRP),.01);
IF AVCOTRIP=. THEN AVCOTRIP=5;
ESTRIPS=(ESTHRS/AVCOTRIP);
**** THE NEXT STEP CALCULATES A YEARLY ESTIMATED TOTAL NUMBER
**** OF FISH CREELED;
DATA TOT; SET TOGETHER;
PROC SORT; BY LAKE YR;
PROC MEANS SUM NOPRINT; VAR ESTOTNO;
  OUTPUT OUT=TOTAL1 SUM=TOTESTNO; BY LAKE YR;
**** THE NEXT STEP CALCULATES A YEARLY ESTIMATED TOTAL WEIGHT
**** OF FISH CREELED;
DATA TOTA; SET TOGETHER;
PROC SORT; BY LAKE YR;
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PROC MEANS SUM NOPRINT; VAR ESTOTLB;
  OUTPUT OUT=TOTAL2 SUM=TOTESTLB; BY LAKE YR;
**** THIS STEP FIRST MERGES TOGETHER SEVERAL SETS CONTAINING
**** IMPORTANT VARIABLES. IT THEN RENAMES THE LAKE VARIABLE SO
**** WE CAN PRINT THE RESERVOIR NAME ASSOCIATED WITH THE CODED
**** NUMERICAL LAKE VARIABLE. IT ALSO RENAMES THE CODED SPECIES
**** VARIABLE SO THE ACTUAL SPECIES NAME WILL BE PRINTED OUT;
DATA TOTAL; MERGE TOTAL1 TOTAL2; BY LAKE YR;
PROC SORT; BY LAKE YR;
DATA ALLTOT; MERGE TOGETHER TOTAL; BY LAKE YR;
PROC SORT; BY LAKE YR;
DATA SPECIES; SET ALLTOT;
LENGTH RESERVOR $ 25;
IF (LAKE='01' OR LAKE='1') THEN RESERVOR='NORRIS 01';
IF (LAKE='02' OR LAKE='2') THEN RESERVOR='KENTUCKY 02';
IF (LAKE='03' OR LAKE='3') THEN RESERVOR='WOODS 03';
IF (LAKE='04' OR LAKE='4') THEN RESERVOR='DALE HOLLOW 04';
IF (LAKE='05' OR LAKE='5') THEN RESERVOR='WATAUGA 05';
IF (LAKE='06' OR LAKE='6') THEN RESERVOR='REELFOOT 06';
IF (LAKE='07' OR LAKE='7') THEN RESERVOR='CHEROKEE 07';
IF (LAKE='08' OR LAKE='8') THEN RESERVOR='TIMS FORD 08';
IF LAKE='10' THEN RESERVOR='HIWASSEE 10';
IF LAKE='11' THEN RESERVOR='CENTER HILL 11';
IF LAKE='12' THEN RESERVOR='SOUTH HOLSTON 12';
IF LAKE='13' THEN RESERVOR='PERCY PRIEST 13';
IF LAKE='14' THEN RESERVOR='OLD HICKORY 14';
IF LAKE='15' THEN RESERVOR='CORDELL HULL 15';
IF LAKE='16' THEN RESERVOR='MELTON HILL 16';
IF LAKE='17' THEN RESERVOR='NORMANDY 17';
IF LAKE='18' THEN RESERVOR='DOUGLAS 18';
IF LAKE='20' THEN RESERVOR='DALE HOLLOW TW 20';
IF LAKE='21' THEN RESERVOR='FORT LOUDON 21';
IF LAKE='22' THEN RESERVOR='TELLICO 22';
IF LAKE='23' THEN RESERVOR='BOONE 23';
IF LAKE='75' THEN RESERVOR='WHEELER 75';
IF LAKE='76' THEN RESERVOR='CHICKAMAUGA 76';
IF LAKE='77' THEN RESERVOR='WATTS BAR 77';
IF LAKE='78' THEN RESERVOR='NICKAJACK 78';
IF YR=. OR SPECIES='0' THEN DELETE;
IF (SPECIES='1' OR SPECIES='01' OR SPECIES=' 1' OR SPECIES='1 ')
 THEN SPECIES='PADDLEFISH 01';
IF (SPECIES='2' OR SPECIES='02' OR SPECIES=' 2' OR SPECIES='2 ')
 THEN SPECIES='STURGEON 02';
IF (SPECIES='3' OR SPECIES='03' OR SPECIES=' 3' OR SPECIES='3 ')
 THEN SPECIES='GAR 03';
IF (SPECIES='4' OR SPECIES='04' OR SPECIES=' 4' OR SPECIES='4 ')
 THEN SPECIES='LONGNOSED GAR 04';
IF (SPECIES='5' OR SPECIES='05' OR SPECIES=' 5' OR SPECIES='5 ')
 THEN SPECIES='SHORTNOSED GAR 05';
IF (SPECIES='6' OR SPECIES='06' OR SPECIES=' 6' OR SPECIES='6 ')
 THEN SPECIES='ALLIGATOR GAR 06';
IF (SPECIES='7' OR SPECIES='07' OR SPECIES=' 7' OR SPECIES='7 ')
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 THEN SPECIES='BOWFIN 07';
IF (SPECIES='8' OR SPECIES='08' OR SPECIES=' 8' OR SPECIES='8 ')
 THEN SPECIES='MOONEYE 08';
IF (SPECIES='9' OR SPECIES='09' OR SPECIES=' 9' OR SPECIES='9 ')
 THEN SPECIES='GOLDEYE 09';
IF SPECIES='10' THEN SPECIES= 'SUCKER & REDHORSE 10';
IF SPECIES='11' THEN SPECIES= 'BLUE SUCKER 11';
IF SPECIES='12' THEN SPECIES= 'WHITE SUCKER 12';
IF SPECIES='13' THEN SPECIES= 'HOG SUCKER 13';
IF SPECIES='14' THEN SPECIES= 'SPOTTED SUCKER 14';
IF SPECIES='15' THEN SPECIES= 'SILVER SUCKER  15';
IF SPECIES='16' THEN SPECIES= 'RIVER REDHORSE 16';
IF SPECIES='17' THEN SPECIES= 'BLACK REDHORSE 17';
IF SPECIES='18' THEN SPECIES= 'GOLDEN REDHORSE 18';
IF SPECIES='19' THEN SPECIES= 'SHORTHD REDHORSE 19';
IF SPECIES='20' THEN SPECIES= 'BUFFALO 20';
IF SPECIES='21' THEN SPECIES= 'BIGMOUTH BUFFALO 21';
IF SPECIES='22' THEN SPECIES= 'BLACK BUFFALO 22';
IF SPECIES='23' THEN SPECIES= 'SMALLMO BUFFALO 23';
IF SPECIES='24' THEN SPECIES= 'CARPSUCKERS 24';
IF SPECIES='25' THEN SPECIES= 'QUILB CARPSUCKER 25';
IF SPECIES='26' THEN SPECIES= 'RIVER CARPSUCKER 26';
IF SPECIES='27' THEN SPECIES= 'HIGHFIN SUCKER 27';
IF SPECIES='30' THEN SPECIES= 'CARP 30';
IF SPECIES='31' THEN SPECIES= 'GOLDFISH 31';
IF SPECIES='32' THEN SPECIES= 'MINNOWS -NO CARP 32';
IF SPECIES='33' THEN SPECIES= 'COMMON SHINER 33';
IF SPECIES='34' THEN SPECIES= 'STONEROLLER 34';
IF SPECIES='35' THEN SPECIES= 'RIVER CHUB 35';
IF SPECIES='36' THEN SPECIES= 'CREEK CHUB 36';
IF SPECIES='37' THEN SPECIES= 'GOLDEN SHINER 37';
IF SPECIES='40' THEN SPECIES= 'CATFISH 40';
IF SPECIES='41' THEN SPECIES= 'FLATHEAD CATFISH 41';
IF SPECIES='42' THEN SPECIES= 'BLUE CATFISH 42';
IF SPECIES='43' THEN SPECIES= 'CHANNEL CATFISH 43';
IF SPECIES='44' THEN SPECIES= 'BULLHEAD 44';
IF SPECIES='45' THEN SPECIES= 'YELLOW BULLHEAD 45';
IF SPECIES='46' THEN SPECIES= 'BLACK BULLHEAD 46';
IF SPECIES='47' THEN SPECIES= 'BROWN BULLHEAD 47';
IF SPECIES='50' THEN SPECIES= 'GIZZARD SHAD 50';
IF SPECIES='51' THEN SPECIES= 'RIV.HER.-SKIPJACK 51';
IF SPECIES='52' THEN SPECIES= 'DRUM 52';
IF SPECIES='53' THEN SPECIES= 'BROOK SILVERSIDES 53';
IF SPECIES='54' THEN SPECIES= 'LOGPERCH 54';
IF SPECIES='55' THEN SPECIES= 'EEL 55';
IF SPECIES='56' THEN SPECIES= 'THREADFIN SHAD 56';
IF SPECIES='59' THEN SPECIES= 'LAKE TROUT 59';
IF SPECIES='60' THEN SPECIES= 'COHO SALMON 60';
IF SPECIES='61' THEN SPECIES= 'OHRID TROUT 61';
IF SPECIES='62' THEN SPECIES= 'MISC. TROUT 62';
IF SPECIES='63' THEN SPECIES= 'RAINBOW TROUT 63';
IF SPECIES='64' THEN SPECIES= 'BROWN TROUT 64';
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IF SPECIES='66' THEN SPECIES= 'HYBRD STRIPD BASS 66';
IF SPECIES='67' THEN SPECIES= 'ROCKFISH 67';
IF SPECIES='68' THEN SPECIES= 'WHITE BASS 68';
IF SPECIES='69' THEN SPECIES= 'YELLOW BASS 69';
IF SPECIES='70' THEN SPECIES= 'WALLEYE 70';
IF SPECIES='71' THEN SPECIES= 'SAUGER 71';
IF SPECIES='72' THEN SPECIES= 'YELLOW PERCH 72';
IF SPECIES='73' THEN SPECIES= 'SAUGEYE 73';
IF SPECIES='76' THEN SPECIES= 'GRASS PICKEREL 76';
IF SPECIES='77' THEN SPECIES= 'CHAIN PICKEREL 77';
IF SPECIES='78' THEN SPECIES= 'NORTHERN PIKE 78';
IF SPECIES='79' THEN SPECIES= 'MUSKELLUNGE 79';
IF SPECIES='80' THEN SPECIES= 'BLACK BASS 80';
IF SPECIES='81' THEN SPECIES= 'LARGEMOUTH BASS 81';
IF SPECIES='82' THEN SPECIES= 'SMALLMOUTH BASS 82';
IF SPECIES='83' THEN SPECIES= 'SPOTTED BASS 83';
IF SPECIES='84' THEN SPECIES= 'COOSA BASS 84';
IF SPECIES='87' THEN SPECIES= 'CRAPPIE 87';
IF SPECIES='88' THEN SPECIES= 'WHITE CRAPPIE 88';
IF SPECIES='89' THEN SPECIES= 'BLACK CRAPPIE 89';
IF SPECIES='90' THEN SPECIES= 'SUNFISH 90';
IF SPECIES='91' THEN SPECIES= 'GREEN SUNFISH 91';
IF SPECIES='92' THEN SPECIES= 'SPOTTED SUNFISH 92';
IF SPECIES='93' THEN SPECIES= 'REDBREAST SUNFISH 93';
IF SPECIES='94' THEN SPECIES= 'LONGEAR SUNFISH 94';
IF SPECIES='95' THEN SPECIES= 'BLUEGILL 95';
IF SPECIES='96' THEN SPECIES= 'REDEAR SUNFISH 96';
IF SPECIES='97' THEN SPECIES= 'FLIER 97';
IF SPECIES='98' THEN SPECIES= 'WARMOUTH BASS 98';
IF SPECIES='99' THEN SPECIES= 'ROCK BASS 99';
PROC SORT; BY LAKE YR;
**** THE NEXT STEP CALCULATES THE YEARLY TOTAL NUMBER OF COMPLETED
**** TRIPS;
DATA L721; SET TALLMRG.ALLMRG;
IF COMP='1';
PROC SORT; BY LAKE YR;
PROC MEANS SUM NOPRINT; VAR NOHU; BY LAKE YR;
 OUTPUT OUT= ADDCOMP SUM=NOCOMPTP;
PROC DELETE DATA=WORK.L721;
**** THE NEXT STEPS MERGE TOGETHER SEVERAL SETS CONTAINING IMPORTANT
**** VARIABLES;
DATA ADDCOMP; SET ADDCOMP;
PROC SORT; BY LAKE YR;
DATA SPECIES; SET SPECIES;
PROC SORT; BY LAKE YR;
DATA SPECIES1; MERGE SPECIES ADDCOMP; BY LAKE YR;
**** THE FINAL STEP OF THIS PROGRAM CREATES A REPORT WHICH WILL SET UP
**** THE YEARLY CATCH SUMMARY SHEET BY RESERVOIR;
DATA REPORT; SET SPECIES1;
PROC SORT; BY LAKE YR ;
DATA _NULL_;
SET REPORT ;
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BY LAKE YR ;
FILE PRINT HEADER=HEAD NOTITLES;
IF FIRST.YR THEN DO; PUT _PAGE_; END;
IF NOT(LAST.YR) AND SPECIES=' ' THEN RETURN;
IF LAST.YR AND SPECIES=' ' THEN GO TO TOT;
PUT @1 SPECIES 20. @21 TOTNO 6. @29 TOTLB 6.1 @35 MNLBS 6.1
   @44 NOPERHR 6.3
    @52 LBPERHR 6.3 @58 PERNO 6.1 @65 PERLB 6.1 @72 ESTOTNO COMMA10.1
   @84 ESTOTLB COMMA10.1;
TOT:
IF LAST.YR THEN
 PUT @12 'TOTALS' @20 TOTALNO COMMA7. @28 TOTALLB COMMA7.1
  @36 TOTALMN 5.1
  @44 TOTNOHR 6.3 @52 TOTLBHR 6.3 @71 TOTESTNO COMMA11.
  @83 TOTESTLB COMMA11./
  @1 'HOURS SAMPLED=' @16 HRSAMPLE 9.1/
  @1 'MEN SAMPLED=' @16 MENSAMPD 6./
  @1 'ESTIMATED HOURS=' @18 ESTHRS COMMA11./
  @1 'ESTIMATED TRIPS=' @18 ESTRIPS COMMA10./
  @1 'AVERAGE TRIP=' @16 AVCOTRIP 5.1/
  @1 'COMPLETE TRIPS=' @16 NOCOMPTP 8./;
RETURN;
HEAD: PUT / @53 RESERVOR 25. /   @55 'YEAR' @60 YR 2. /
     @22 'NUMBER' @30 'POUNDS' @37 'AVERAGE' @45 'NUMBER' @52 'POUNDS'
     @59 'PERCENT' @67 'PERCENT' @75 'EST TOTAL' @85 'EST TOTAL'/
     @1 'SPECIES' @22 'CAUGHT' @30 'CAUGHT' @37 'WEIGHT' @45 'PER HR '
    @52 'PER HR ' @59 'BY NO ' @67 'BY WT ' @75 'NUMBER' @85 'WEIGHT';
RETURN;
//S7 EXEC SAS,REGION=1024K,SORT=75
//WORK DD SPACE=(CYL,(200,50)),UNIT=SYSDA
//TALLMRG DD DSN=ALLMRG,DISP=SHR,
// UNIT=TAPE,VOL=REF=*.S4.GO.TAPE,LABEL=1
//SYSIN DD *
*****-------------------------------------------------------------------*****
*  THE FOLLOWING SERIES OF STATEMENTS ULTIMATELY CREATE A SUMMARY SHEET    *
* OF ALL CREEL DATA BY YEAR, MONTH, AND LAKE. THIS SUMMARY SHEET IS        *
* PRINTED OUT IN TABLE FORM. ALL DATA INCLUDED IN THE MASTER TAPE          *
* IS PRODUCED ON THIS SHEET.                                               *
*    LISTED BELOW ARE IMPORTANT VARIABLES WITH BRIEF DEFINITIONS:          *
*  EXPTIME =EXPANSION OF HOURS FISHED                                      *
*  EXPSUM  =SUM OF EXPANDED HOURS                                          *
*  TOTNO   =TOTAL NUMBER OF FISH CREELED (PER SPECIES)                     *
*  TOTLB   =TOTAL POUNDS OF FISH CREELED (PER SPECIES)                     *
*  MNLBS   =AVERAGE WEIGHT OF FISH CREELED (PER SPECIES)                   *
*  TOTALNO =SUM OF TOTAL NUMBER OF FISH CREELED (ALL SPECIES)              *
*  TOTALLB =SUM OF TOTAL WEIGHT OF FISH CREELED (ALL SPECIES)              *
*  TOTALMN =TOTAL AVERAGE WEIGHT OF FISH CREELED (ALL SPECIES)             *
*  THRFI   =TOTAL HOURS FISHED (PER CREEL RECORD)                          *
*  HRSAMP  =TOTAL HOURS FISHED (BY TOTAL FISHERMEN PER CREEL RECORD)       *
*  HRSAMPLE=TOTAL HOURS FISHED FOR WEEK SAMPLED                            *
*  WKTOTNO =ESTIMATED WEEKLY TOTAL NUMBER OF FISH CREELED                  *
*  WKTOTLB =ESTIMATED WEEKLY TOTAL WEIGHT OF FISH CREELED                  *
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*  ESTOTNO =ESTIMATED TOTAL NUMBER OF FISH CREELED (PER SPECIES)          *
*  ESTOTLB =ESTIMATED TOTAL POUNDS OF FISH CREELED (PER SPECIES)          *
*  ESTHRS  =ESTIMATED HOURS FISHED                                        *
*  ESTRIPS =ESTIMATED NUMBER OF TRIPS                                     *
*  TOTESTNO=SUM OF ESTIMATED TOTAL NUMBER OF FISH CREELED (ALL SPECIES)   *
*  TOTESTLB=SUM OF ESTIMATED TOTAL POUNDS OF FISH CREELED (ALL SPECIES)   *
*  CODE1-6 =CODED VALUES FOR FISH SPECIES                                 *
*  NO1-6   =NUMBER OF FISH CAUGHT PER FISH SPECIES CODE                   *
*  LBST1-6 =POUNDS OF FISH CAUGHT PER FISH SPECIES CODE                   *
*  PERNO   =PERCENT OF TOTAL NUMBER OF FISH CAUGHT (BY SPECIES)           *
*  PERLB   =PERCENT OF TOTAL POUNDS OF FISH CAUGHT (BY SPECIES)           *
*  COMP    =COMPLETED OR NOT COMPLETED TRIP                               *
*  NOCOMPTP=NUMBER OF COMPLETED TRIPS                                     *
*  FMHRS   =HOURS FISHED FOR COMPLETED TRIPS                              *
*  SWKHR   =WEEKLY TOTAL OF HOURS FISHED FOR COMPLETED TRIPS              *
*  WEEKAVE =AVERAGE WEEKLY TOTAL OF HOURS FISHED                          *
*  NWKS    =NUMBER OF WEEKS WITH DATA COLLECTED                           *
*  SWKAVE  =SUM OF WEEKLY AVERAGES OF HOURS FISHED                        *
*  MMOAVE  =MONTHLY AVERAGE OF HOURS FISHED                               *
*  MENSAMPD=NUMBER OF FISHERMEN SAMPLED                                   *
*  NOPERHR =NUMBER OF FISH CAUGHT PER HOUR                                *
*  LBPERHR =POUNDS OF FISH CAUGHT PER HOUR                                *
*  AVCOTRIP=AVERAGE LENGTH OF COMPLETED TRIP                              *
*    THE FOLLOWING STEP SORTS THE DATA SET BY LAKE, YEAR, MONTH, WEEK, AND *
* EXPANSION TIME TO HELP IN THE TASK OF TOTALING THIS FACTOR OVER A MONTH. *
*****-------------------------------------------------------------------*****;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT; BY LAKE YR MO WK EXPTIME;
****  THIS DATA STEP BEGINS BY SETTING THE FIRST WEEKLY EXPANSION TIME TO ONE
**** AND THE REST OF THE EXPANSION TIMES IN THE SAME WEEK TO ZERO. IN THIS WAY,
**** ONLY ONE WEEKS' WORTH OF EXPANSION TIME WILL BE LISTED WITH THE ASSOCIATED
**** DATA AND CAN THEREFORE BE ADDED TOGETHER FOR A MONTHLY TOTAL. OTHERWISE,
**** THE SUM OF THE EXPANSION TIMES WOULD BE TOO LARGE A NUMBER AS EACH CREEL
**** RECORD HAS AN ACCOMPANYING EXPANSION TIME AND A WEEK OF CREEL RECORDS HAS
**** THE SAME EXPANSION TIME LISTED MORE THAN ONCE.
****  THE PROC MEANS STATEMENT IS SET UP TO TOTAL ALL EXPANSION TIMES TO
**** MONTHLY TOTALS. THIS WILL BE USED IN LATER ANALYSES;
DATA L721; SET L721; BY LAKE YR MO WK EXPTIME;
IF FIRST.EXPTIME THEN FLAG=1;
IF FLAG NE 1 THEN EXPTIME=0;
PROC SORT; BY LAKE YR MO WK;
PROC MEANS NOPRINT SUM; VAR EXPTIME;
  OUTPUT OUT=NOEXPMO SUM=EXPSUM; BY LAKE YR MO WK;
****  THIS SET OF STATEMENTS RENAMES SOME OF THE VARIABLES IN OUR CREEL DATA
**** SET SO FUTURE RESULTS CAN BE ACCESSED AND PRINTED EASIER. THE VARIABLE
**** SPECIES REPLACES THE CODE VARIABLES, LBS REPLACES ASSOCIATED LB VARIABLE,
**** AND NO REPLACES THE NO VARIABLE ALSO ASSOCIATED WITH THE CODE
**** VARIABLE.
****  THIS STEP ALSO CALCULATES THE WEEKLY TOTAL NUMBER AND POUNDS OF
**** FISH CREELED PER SPECIES;
DATA L721; SET L721;
PROC SORT; BY LAKE YR MO WK;
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DATA RENAME; SET L721; BY LAKE YR MO WK;
DROP BOBA--SPFI EXPTIME;
DROP LBST1 LBST2 LBST3 LBST4 LBST5 LBST6
     NO1 NO2 NO3 NO4 NO5 NO6
     CODE1 CODE2 CODE3 CODE4 CODE5 CODE6
     SP1 SP2 SP3 SP4 SP5 SP6;
LENGTH SPECIES $ 40;
LENGTH WK--LAKE MO 2;
LENGTH DEFAULT=4;
SPECIES=CODE1; LBS=LBST1; NO=NO1; OUTPUT;
SPECIES=CODE2; LBS=LBST2; NO=NO2; OUTPUT;
SPECIES=CODE3; LBS=LBST3; NO=NO3; OUTPUT;
SPECIES=CODE4; LBS=LBST4; NO=NO4; OUTPUT;
SPECIES=CODE5; LBS=LBST5; NO=NO5; OUTPUT;
SPECIES=CODE6; LBS=LBST6; NO=NO6; OUTPUT;
PROC SORT SORTWKNO=6; BY LAKE YR MO WK SPECIES;
PROC MEANS NOPRINT SUM; VAR NO LBS ; BY LAKE YR MO WK SPECIES;
  OUTPUT OUT=SPLST SUM=TOTNO TOTLB;
PROC DELETE DATA=WORK.RENAME;
**** THIS STEP IS USED TO CREATE THE VARIABLE MNLBS;
DATA SPLST;SET SPLST;
MNLBS=ROUND((TOTLB/TOTNO),.01);
**** THIS STEP CALCULATES TOTAL NUMBERS AND POUNDS OF
**** ALL SPECIES CREELED;
DATA TOTSPLST; SET SPLST;
PROC SORT; BY LAKE YR MO WK;
PROC MEANS NOPRINT SUM; VAR TOTNO TOTLB; BY LAKE YR MO WK;
  OUTPUT OUT=TOTSPLST SUM=TOTALNO TOTALLB;
**** THE NEXT DATA STEPS MERGE TOGETHER SETS CONTAINING
**** IMPORTANT VARIABLES;
DATA BOTH; MERGE TOTSPLST SPLST; BY LAKE YR MO WK;
PROC SORT; BY LAKE YR MO WK;
DATA TOG ; MERGE NOEXPMO BOTH; BY LAKE YR MO WK;
**** THESE COMMANDS CREATE NEW VARIABLES WHICH ARE USED TO
**** CALCULATE A WEEKLY TOTAL OF HOURS FISHED;
DATA L721; SET L721;
THRFI=HRFI+(TN/10);
HRSAMP=THRFI*NOHU;
PROC SORT; BY LAKE YR MO WK;
PROC MEANS SUM NOPRINT; VAR HRSAMP;
 OUTPUT OUT=SHRFI SUM=HRSAMPLE; BY LAKE YR MO WK;
PROC DELETE DATA=WORK.L721;
**** THIS STEP MERGES TOGETHER SETS CONTAINING IMPORTANT
**** VARIABLES. IT ALSO CREATES A WEEKLY ESTIMATED TOTAL
**** NUMBER AND WEIGHT OF FISH CREELED;
DATA COMB; MERGE TOG SHRFI; BY LAKE YR MO WK;
WKTOTNO=(EXPSUM/HRSAMPLE)*TOTNO;
WKTOTLB=(EXPSUM/HRSAMPLE)*TOTLB;
PROC SORT; BY LAKE YR MO WK;
**** THIS STEP UTILIZES THE VARIABLES CREATED ABOVE TO CALCULATE MONTHLY
**** ESTIMATED TOTAL NUMBERS AND POUNDS OF FISH CREELED BY SPECIES;
DATA ESTNO; SET COMB;
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PROC SORT; BY LAKE YR MO SPECIES;
PROC MEANS SUM NOPRINT; VAR WKTOTNO WKTOTLB; BY LAKE YR MO SPECIES;
  OUTPUT OUT=SWKTOT SUM=ESTOTNO ESTOTLB;
PROC DELETE DATA=WORK.ESTNO;
**** THE FOLLOWING STEPS ULTIMATELY TOTAL THE EXPANDED ESTIMATES OF
**** HOURS FISHED BY MONTH;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT; BY LAKE YR MO WK EXPTIME;
DATA L721; SET L721; BY LAKE YR MO WK EXPTIME;
IF FIRST.EXPTIME THEN FLAG=1;
IF FLAG NE 1 THEN EXPTIME=0;
PROC SORT; BY LAKE YR MO  ;
PROC MEANS NOPRINT SUM; VAR EXPTIME;
  OUTPUT OUT=NOEXPMO SUM=ESTHRS; BY LAKE YR MO  ;
****  THIS SET OF STATEMENTS RENAMES SOME OF THE VARIABLES IN OUR CREEL DATA
**** SET SO FUTURE RESULTS CAN BE ACCESSED AND PRINTED EASIER. THE VARIABLE
**** SPECIES REPLACES THE CODE VARIABLES, LBS REPLACES ASSOCIATED LB VARIABLE,
**** AND NO REPLACES THE NO VARIABLE ALSO ASSOCIATED WITH THE CODE
**** VARIABLE.
****  THIS STEP ALSO CALCULATES THE MONTHLY TOTAL NUMBER AND POUNDS OF
**** FISH CREELED PER SPECIES;
DATA L721; SET L721;
PROC SORT; BY LAKE YR MO  ;
DATA RENAME; SET L721; BY LAKE YR MO  ;
DROP BOBA--SPFI EXPTIME;
DROP LBST1 LBST2 LBST3 LBST4 LBST5 LBST6
     NO1 NO2 NO3 NO4 NO5 NO6
     CODE1 CODE2 CODE3 CODE4 CODE5 CODE6
     SP1 SP2 SP3 SP4 SP5 SP6;
LENGTH SPECIES $ 40;
LENGTH WK--LAKE MO 2;
LENGTH DEFAULT=4;
SPECIES=CODE1; LBS=LBST1; NO=NO1; OUTPUT;
SPECIES=CODE2; LBS=LBST2; NO=NO2; OUTPUT;
SPECIES=CODE3; LBS=LBST3; NO=NO3; OUTPUT;
SPECIES=CODE4; LBS=LBST4; NO=NO4; OUTPUT;
SPECIES=CODE5; LBS=LBST5; NO=NO5; OUTPUT;
SPECIES=CODE6; LBS=LBST6; NO=NO6; OUTPUT;
PROC SORT SORTWKNO=6; BY LAKE YR MO SPECIES;
PROC MEANS NOPRINT SUM; VAR NO LBS ; BY LAKE YR MO SPECIES;
  OUTPUT OUT=SPLST SUM=TOTNO TOTLB;
PROC DELETE DATA=WORK.RENAME;
**** THESE STEPS CREATE THE VARIABLE MNLBS. THEY ALSO CALCULATE
**** MONTHLY TOTALS FOR NUMBERS AND POUNDS OF FISH CREELED;
DATA SPLST;SET SPLST;
MNLBS=ROUND((TOTLB/TOTNO),.01);
DATA TOTSPLST; SET SPLST;
PROC SORT; BY LAKE YR MO  ;
PROC MEANS NOPRINT SUM; VAR TOTNO TOTLB; BY LAKE YR MO  ;
  OUTPUT OUT=TOTSPLST SUM=TOTALNO TOTALLB;
**** THIS GROUP OF DATA STEPS BEGINS AND ENDS WITH THE MERGING OF
**** STEPS CONTAINING IMPORTANT VARIABLES. THE STEPS ALSO CREATE TWO
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**** PERCENT VARIABLES REPRESENTING NUMBERS AND POUNDS OF FISH CREELED;
DATA BOTH; MERGE TOTSPLST SPLST; BY LAKE YR MO  ;
PERNO=ROUND(((TOTNO/TOTALNO)*100),.01);
PERLB=ROUND(((TOTLB/TOTALLB)*100),.01);
PROC SORT; BY LAKE YR MO  ;
DATA TOGE;MERGE NOEXPMO BOTH; BY LAKE YR MO  ;
**** THIS STEP IS USED TO DISCARD ERRONEOUS DATA AND CALCULATE THE
**** WEEKLY TOTAL NUMBER OF COMPLETED AND NOT COMPLETED TRIPS;
DATA COMPTRP1; SET L721;
IF MO=. THEN DELETE;
IF COMP=' ' THEN DELETE;
PROC SORT; BY LAKE YR MO WK COMP;
PROC MEANS SUM NOPRINT; VAR NOHU; BY LAKE YR MO WK COMP;
  OUTPUT OUT=CONVER SUM=NOCOMPTP;
PROC DELETE DATA=WORK.L721;
**** THESE STEPS CREATE FISHING HOUR VARIABLES WHICH ARE USED TO
**** CALCULATE WEEKLY HOURS FISHED BY COMPLETED AND NOT COMPLETED
**** TRIPS;
DATA COMPTRP2; SET COMPTRP1;
THRFI=HRFI+(TN/10);
FMHRS=THRFI*NOHU;
PROC SORT; BY LAKE YR MO WK COMP;
PROC MEANS SUM NOPRINT; VAR FMHRS; BY LAKE YR MO WK COMP;
 OUTPUT OUT=WKHRFI SUM=SWKHR;
PROC DELETE DATA=WORK.COMPTRP2;
**** THE FIRST PART OF THIS DATA STEP INVOLVES ORGANIZING AND MERGING
**** SETS CONTAINING IMPORTANT VARIABLES. IT ALSO CREATES A VARIABLE
**** REPRESENTING THE WEEKLY AVERAGE LENGTH OF A FISHING TRIP. THIS
**** AVERAGE IS ALSO ADJUSTED IF IT FALLS OUT OF THE PREDETERMINED
**** RANGE;
DATA CONVER; SET CONVER;
PROC SORT; BY LAKE YR MO WK COMP;
DATA WKHRFI; SET WKHRFI;
PROC SORT; BY LAKE YR MO WK COMP;
DATA AVE; MERGE WKHRFI CONVER; BY LAKE YR MO WK COMP;
WEEKAVE=SWKHR/NOCOMPTP;
IF WEEKAVE LT 2.5 THEN WEEKAVE=5.0;
IF WEEKAVE GT 7.5 THEN WEEKAVE=5.0;
**** THE FOLLOWING DATA STEPS SORT OUT SETS CONTAINING COMPLETED AND
**** NOT COMPLETED FISHING TRIPS AND CALCULATE THE SUM OF THE WEEKLY
**** AVERAGE TRIPS AND THE NUMBER OF WEEKS THAT CONTAIN DATA. THESE
**** VARIABLES WILL BE USED IN THE NEXT SET OF DATA STEPS;
DATA C1; SET AVE; IF COMP='1';
DATA C2; SET AVE; IF COMP='2';
  WEEKAVE=5.0;
PROC SORT DATA=C1; BY LAKE YR MO WK;
PROC SORT DATA=C2; BY LAKE YR MO WK;
DATA UNQWK; MERGE C2 C1; BY LAKE YR MO WK;
PROC SORT; BY LAKE YR MO;
DATA UNQWK1; SET UNQWK;
PROC SORT; BY LAKE YR MO;
PROC MEANS SUM N NOPRINT; VAR WEEKAVE; BY LAKE YR MO;
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 OUTPUT OUT=WS SUM=SWKAVE N=NWKS;
**** THE NEXT SET OF DATA STEPS ADJUST SUMS OF WEEKLY AVERAGE TRIP
**** LENGTHS DEPENDING ON THE NUMBER OF WEEKS IN WHICH DATA WERE
**** COLLECTED. IT FURTHER CONVERTS WEEKLY SUMS INTO MONTHLY TOTALS
**** BASED ON A MINIMUN OF A 4 WEEK MONTH. IF DATA WAS COLLECTED ON ALL
**** WEEKS OF A MONTH WITH 5 WEEKS, THEN THE SUM OF WEEKLY AVERAGES WILL
**** ADJUSTED ACCORDINGLY. THE SECOND PART OF THIS STEP INVOLVES THE
**** CALCULATION OF A MONTHLY AVERAGE TRIP LENGTH BASED ON A 4 OR 5
**** WEEK MONTH;
DATA WS1; SET WS;
IF NWKS=1 THEN SWKAVE=SWKAVE+15;
IF NWKS=2 THEN SWKAVE=SWKAVE+10;
IF NWKS=3 THEN SWKAVE=SWKAVE+5;
IF NWKS LE 4 THEN MMOAVE=SWKAVE/4;
IF NWKS GT 4 THEN MMOAVE=SWKAVE/NWKS;
**** THE NEXT STEPS MERGE TOGETHER SETS CONTAINING IMPORTANT
**** VARIABLES. IT THEN CREATES A VARIABLE REPRESENTING THE NUMBER
**** OF FISHERMEN SAMPLED;
DATA WS; SET WS;
PROC SORT; BY LAKE YR;
DATA WS1; SET WS1;
PROC SORT; BY LAKE YR;
DATA BOND; MERGE WS1 WS; BY LAKE YR;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT; BY LAKE YR MO;
PROC MEANS SUM NOPRINT; VAR NOHU; BY LAKE YR MO;
  OUTPUT OUT=SHUM SUM=MENSAMPD;
**** THIS SET OF DATA STEPS MERGES SETS CONTAINING IMPORTANT
**** VARIABLES. IT THEN CREATES A VARIABLE REPRESENTING THE NUMBER
**** OF FISHERMAN HOURS SAMPLED ON A MONTHLY BASIS;
DATA TOGET; MERGE TOGE BOND; BY LAKE YR MO;
DATA TOG; MERGE TOGET SHUM; BY LAKE YR MO;
DATA L721; SET L721;
THRFI=HRFI+(TN/10);
HRSAMP=THRFI*NOHU;
PROC SORT; BY LAKE YR MO  ;
PROC MEANS SUM NOPRINT; VAR HRSAMP;
 OUTPUT OUT=SHRFI SUM=HRSAMPLE; BY LAKE YR MO  ;
PROC DELETE DATA=WORK.L721;
**** THIS SET OF DATA STEPS MERGES SETS CONTAINING IMPORTANT
**** VARIABLES. IT THEN CREATES A SEVERAL IMPORTANT VARIABLES
**** THAT WILL BE USED IN THE FINAL REPORT. THE FIRST FIVE VARIABLES
**** USE ACTUAL COUNT VARIABLES RATHER THAN ESTIMATED COUNT VARIABLES
**** TO CALCULATE THEIR VALUES;
DATA BOMB; MERGE TOG SHRFI; BY LAKE YR MO  ;
PROC SORT; BY LAKE YR MO SPECIES;
DATA SWKTOT;SET SWKTOT;
PROC SORT; BY LAKE YR MO SPECIES;
DATA COMBINE; SET BOMB;
PROC SORT; BY LAKE YR MO SPECIES;
DATA TOGETHER; MERGE COMBINE SWKTOT; BY LAKE YR MO SPECIES;
TOTALMN=ROUND((TOTALLB/TOTALNO),.01);
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NOPERHR=ROUND((TOTNO/HRSAMPLE),.001);
LBPERHR=ROUND((TOTLB/HRSAMPLE),.001);
TOTNOHR=ROUND((TOTALNO/HRSAMPLE),.001);
TOTLBHR=ROUND((TOTALLB/HRSAMPLE),.001);
AVCOTRIP=ROUND((MMOAVE),.01);
IF AVCOTRIP=. THEN AVCOTRIP=5;
ESTRIPS=(ESTHRS/AVCOTRIP);
**** THE NEXT STEP CALCULATES A MONTHLY ESTIMATED TOTAL NUMBER
**** OF FISH CREELED;
DATA TOT; SET TOGETHER;
PROC SORT; BY LAKE YR MO;
PROC MEANS SUM NOPRINT; VAR ESTOTNO;
  OUTPUT OUT=TOTAL1 SUM=TOTESTNO; BY LAKE YR MO;
**** THE NEXT STEP CALCULATES A MONTHLY ESTIMATED TOTAL WEIGHT
**** OF FISH CREELED;
DATA TOTA; SET TOGETHER;
PROC SORT; BY LAKE YR MO;
PROC MEANS SUM NOPRINT; VAR ESTOTLB;
  OUTPUT OUT=TOTAL2 SUM=TOTESTLB; BY LAKE YR MO;
**** THIS STEP FIRST MERGES TOGETHER SEVERAL SETS CONTAINING
**** IMPORTANT VARIABLES. IT THEN RENAMES THE LAKE VARIABLE SO
**** WE CAN PRINT THE RESERVOIR NAME ASSOCIATED WITH THE CODED
**** NUMERICAL LAKE VARIABLE. IT ALSO RENAMES THE CODED SPECIES
**** VARIABLE SO THE ACTUAL SPECIES NAME WILL BE PRINTED OUT;
DATA TOTAL; MERGE TOTAL1 TOTAL2; BY LAKE YR MO;
PROC SORT; BY LAKE YR MO;
DATA ALLTOT; MERGE TOGETHER TOTAL; BY LAKE YR MO;
PROC SORT; BY LAKE YR MO;
DATA SPECIES; SET ALLTOT;
LENGTH RESERVOR $ 25;
IF (LAKE='01' OR LAKE='1') THEN RESERVOR='NORRIS 01';
IF (LAKE='02' OR LAKE='2') THEN RESERVOR='KENTUCKY 02';
IF (LAKE='03' OR LAKE='3') THEN RESERVOR='WOODS 03';
IF (LAKE='04' OR LAKE='4') THEN RESERVOR='DALE HOLLOW 04';
IF (LAKE='05' OR LAKE='5') THEN RESERVOR='WATAUGA 05';
IF (LAKE='06' OR LAKE='6') THEN RESERVOR='REELFOOT 06';
IF (LAKE='07' OR LAKE='7') THEN RESERVOR='CHEROKEE 07';
IF (LAKE='08' OR LAKE='8') THEN RESERVOR='TIMS FORD 08';
IF LAKE='10' THEN RESERVOR='HIWASSEE 10';
IF LAKE='11' THEN RESERVOR='CENTER HILL 11';
IF LAKE='12' THEN RESERVOR='SOUTH HOLSTON 12';
IF LAKE='13' THEN RESERVOR='PERCY PRIEST 13';
IF LAKE='14' THEN RESERVOR='OLD HICKORY 14';
IF LAKE='15' THEN RESERVOR='CORDELL HULL 15';
IF LAKE='16' THEN RESERVOR='MELTON HILL 16';
IF LAKE='17' THEN RESERVOR='NORMANDY 17';
IF LAKE='18' THEN RESERVOR='DOUGLAS 18';
IF LAKE='20' THEN RESERVOR='DALE HOLLOW TW 20';
IF LAKE='21' THEN RESERVOR='FORT LOUDON 21';
IF LAKE='22' THEN RESERVOR='TELLICO 22';
IF LAKE='23' THEN RESERVOR='BOONE 23';
IF LAKE='75' THEN RESERVOR='WHEELER 75';
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IF LAKE='76' THEN RESERVOR='CHICKAMAUGA 76';
IF LAKE='77' THEN RESERVOR='WATTS BAR 77';
IF LAKE='78' THEN RESERVOR='NICKAJACK 78';
LENGTH MONTH $ 10;
IF MO=1 THEN MONTH='JANUARY ';
IF MO=2 THEN MONTH='FEBRUARY';
IF MO=3 THEN MONTH='MARCH';
IF MO=4 THEN MONTH='APRIL';
IF MO=5 THEN MONTH='MAY';
IF MO=6 THEN MONTH='JUNE';
IF MO=7 THEN MONTH='JULY';
IF MO=8 THEN MONTH='AUGUST';
IF MO=9 THEN MONTH='SEPTEMBER';
IF MO=10 THEN MONTH='OCTOBER';
IF MO=11 THEN MONTH='NOVEMBER';
IF MO=12 THEN MONTH='DECEMBER';
IF YR=. OR SPECIES='0' THEN DELETE;
IF (SPECIES='1' OR SPECIES='01' OR SPECIES=' 1' OR SPECIES='1 ')
 THEN SPECIES='PADDLEFISH 01';
IF (SPECIES='2' OR SPECIES='02' OR SPECIES=' 2' OR SPECIES='2 ')
 THEN SPECIES='STURGEON 02';
IF (SPECIES='3' OR SPECIES='03' OR SPECIES=' 3' OR SPECIES='3 ')
 THEN SPECIES='GAR 03';
IF (SPECIES='4' OR SPECIES='04' OR SPECIES=' 4' OR SPECIES='4 ')
 THEN SPECIES='LONGNOSED GAR 04';
IF (SPECIES='5' OR SPECIES='05' OR SPECIES=' 5' OR SPECIES='5 ')
 THEN SPECIES='SHORTNOSED GAR 05';
IF (SPECIES='6' OR SPECIES='06' OR SPECIES=' 6' OR SPECIES='6 ')
 THEN SPECIES='ALLIGATOR GAR 06';
IF (SPECIES='7' OR SPECIES='07' OR SPECIES=' 7' OR SPECIES='7 ')
 THEN SPECIES='BOWFIN 07';
IF (SPECIES='8' OR SPECIES='08' OR SPECIES=' 8' OR SPECIES='8 ')
 THEN SPECIES='MOONEYE 08';
IF (SPECIES='9' OR SPECIES='09' OR SPECIES=' 9' OR SPECIES='9 ')
 THEN SPECIES='GOLDEYE 09';
IF SPECIES='10' THEN SPECIES= 'SUCKER & REDHORSE 10';
IF SPECIES='11' THEN SPECIES= 'BLUE SUCKER 11';
IF SPECIES='12' THEN SPECIES= 'WHITE SUCKER 12';
IF SPECIES='13' THEN SPECIES= 'HOG SUCKER 13';
IF SPECIES='14' THEN SPECIES= 'SPOTTED SUCKER 14';
IF SPECIES='15' THEN SPECIES= 'SILVER SUCKER  15';
IF SPECIES='16' THEN SPECIES= 'RIVER REDHORSE 16';
IF SPECIES='17' THEN SPECIES= 'BLACK REDHORSE 17';
IF SPECIES='18' THEN SPECIES= 'GOLDEN REDHORSE 18';
IF SPECIES='19' THEN SPECIES= 'SHORTHD REDHORSE 19';
IF SPECIES='20' THEN SPECIES= 'BUFFALO 20';
IF SPECIES='21' THEN SPECIES= 'BIGMOUTH BUFFALO 21';
IF SPECIES='22' THEN SPECIES= 'BLACK BUFFALO 22';
IF SPECIES='23' THEN SPECIES= 'SMALLMO BUFFALO 23';
IF SPECIES='24' THEN SPECIES= 'CARPSUCKERS 24';
IF SPECIES='25' THEN SPECIES= 'QUILB CARPSUCKER 25';
IF SPECIES='26' THEN SPECIES= 'RIVER CARPSUCKER 26';
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IF SPECIES='27' THEN SPECIES= 'HIGHFIN SUCKER 27';
IF SPECIES='30' THEN SPECIES= 'CARP 30';
IF SPECIES='31' THEN SPECIES= 'GOLDFISH 31';
IF SPECIES='32' THEN SPECIES= 'MINNOWS -NO CARP 32';
IF SPECIES='33' THEN SPECIES= 'COMMON SHINER 33';
IF SPECIES='34' THEN SPECIES= 'STONEROLLER 34';
IF SPECIES='35' THEN SPECIES= 'RIVER CHUB 35';
IF SPECIES='36' THEN SPECIES= 'CREEK CHUB 36';
IF SPECIES='37' THEN SPECIES= 'GOLDEN SHINER 37';
IF SPECIES='40' THEN SPECIES= 'CATFISH 40';
IF SPECIES='41' THEN SPECIES= 'FLATHEAD CATFISH 41';
IF SPECIES='42' THEN SPECIES= 'BLUE CATFISH 42';
IF SPECIES='43' THEN SPECIES= 'CHANNEL CATFISH 43';
IF SPECIES='44' THEN SPECIES= 'BULLHEAD 44';
IF SPECIES='45' THEN SPECIES= 'YELLOW BULLHEAD 45';
IF SPECIES='46' THEN SPECIES= 'BLACK BULLHEAD 46';
IF SPECIES='47' THEN SPECIES= 'BROWN BULLHEAD 47';
IF SPECIES='50' THEN SPECIES= 'GIZZARD SHAD 50';
IF SPECIES='51' THEN SPECIES= 'RIV.HER.-SKIPJACK 51';
IF SPECIES='52' THEN SPECIES= 'DRUM 52';
IF SPECIES='53' THEN SPECIES= 'BROOK SILVERSIDES 53';
IF SPECIES='54' THEN SPECIES= 'LOGPERCH 54';
IF SPECIES='55' THEN SPECIES= 'EEL 55';
IF SPECIES='56' THEN SPECIES= 'THREADFIN SHAD 56';
IF SPECIES='59' THEN SPECIES= 'LAKE TROUT 59';
IF SPECIES='60' THEN SPECIES= 'COHO SALMON 60';
IF SPECIES='61' THEN SPECIES= 'OHRID TROUT 61';
IF SPECIES='62' THEN SPECIES= 'MISC. TROUT 62';
IF SPECIES='63' THEN SPECIES= 'RAINBOW TROUT 63';
IF SPECIES='64' THEN SPECIES= 'BROWN TROUT 64';
IF SPECIES='66' THEN SPECIES= 'HYBRD STRIPD BASS 66';
IF SPECIES='67' THEN SPECIES= 'ROCKFISH 67';
IF SPECIES='68' THEN SPECIES= 'WHITE BASS 68';
IF SPECIES='69' THEN SPECIES= 'YELLOW BASS 69';
IF SPECIES='70' THEN SPECIES= 'WALLEYE 70';
IF SPECIES='71' THEN SPECIES= 'SAUGER 71';
IF SPECIES='72' THEN SPECIES= 'YELLOW PERCH 72';
IF SPECIES='73' THEN SPECIES= 'SAUGEYE 73';
IF SPECIES='76' THEN SPECIES= 'GRASS PICKEREL 76';
IF SPECIES='77' THEN SPECIES= 'CHAIN PICKEREL 77';
IF SPECIES='78' THEN SPECIES= 'NORTHERN PIKE 78';
IF SPECIES='79' THEN SPECIES= 'MUSKELLUNGE 79';
IF SPECIES='80' THEN SPECIES= 'BLACK BASS 80';
IF SPECIES='81' THEN SPECIES= 'LARGEMOUTH BASS 81';
IF SPECIES='82' THEN SPECIES= 'SMALLMOUTH BASS 82';
IF SPECIES='83' THEN SPECIES= 'SPOTTED BASS 83';
IF SPECIES='84' THEN SPECIES= 'COOSA BASS 84';
IF SPECIES='87' THEN SPECIES= 'CRAPPIE 87';
IF SPECIES='88' THEN SPECIES= 'WHITE CRAPPIE 88';
IF SPECIES='89' THEN SPECIES= 'BLACK CRAPPIE 89';
IF SPECIES='90' THEN SPECIES= 'SUNFISH 90';
IF SPECIES='91' THEN SPECIES= 'GREEN SUNFISH 91';
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IF SPECIES='92' THEN SPECIES= 'SPOTTED SUNFISH 92';
IF SPECIES='93' THEN SPECIES= 'REDBREAST SUNFISH 93';
IF SPECIES='94' THEN SPECIES= 'LONGEAR SUNFISH 94';
IF SPECIES='95' THEN SPECIES= 'BLUEGILL 95';
IF SPECIES='96' THEN SPECIES= 'REDEAR SUNFISH 96';
IF SPECIES='97' THEN SPECIES= 'FLIER 97';
IF SPECIES='98' THEN SPECIES= 'WARMOUTH BASS 98';
IF SPECIES='99' THEN SPECIES= 'ROCK BASS 99';
PROC SORT; BY LAKE YR MO;
**** THE NEXT STEP CALCULATES THE MONTHLY TOTAL NUMBER OF COMPLETED
**** TRIPS;
DATA L721; SET TALLMRG.ALLMRG;
IF COMP='1';
PROC SORT; BY LAKE YR MO;
PROC MEANS SUM NOPRINT; VAR NOHU; BY LAKE YR MO;
 OUTPUT OUT= ADDCOMP SUM=NOCOMPTP;
PROC DELETE DATA=WORK.L721;
**** THE NEXT STEPS MERGE TOGETHER SEVERAL SETS CONTAINING IMPORTANT
**** VARIABLES;
DATA ADDCOMP; SET ADDCOMP;
PROC SORT; BY LAKE YR MO;
DATA SPECIES; SET SPECIES;
PROC SORT; BY LAKE YR MO;
DATA SPECIES1; MERGE SPECIES ADDCOMP; BY LAKE YR MO;
**** THE FINAL STEP OF THIS PROGRAM CREATES A REPORT WHICH WILL SET UP
**** THE MONTHLY CATCH SUMMARY SHEET BY RESERVOIR;
DATA REPORT; SET SPECIES1;
IF HRSAMPLE=. THEN DELETE;
PROC SORT; BY LAKE YR MO;
DATA _NULL_;
SET REPORT ;
BY LAKE YR MO;
FILE PRINT HEADER=HEAD NOTITLES;
IF FIRST.MO THEN DO; PUT _PAGE_; END;
IF NOT(LAST.MO) AND SPECIES=' ' THEN RETURN;
IF LAST.MO AND SPECIES=' ' THEN GO TO TOT;
PUT @1 SPECIES 20. @21 TOTNO 6. @29 TOTLB 6.1 @35 MNLBS 6.1
   @44 NOPERHR 6.3
    @52 LBPERHR 6.3 @58 PERNO 6.1 @65 PERLB 6.1 @72 ESTOTNO COMMA10.1
   @84 ESTOTLB COMMA10.1;
TOT:
IF LAST.MO THEN
 PUT @12 'TOTALS' @20 TOTALNO COMMA7. @28 TOTALLB COMMA7.1
  @36 TOTALMN 5.1
  @44 TOTNOHR 6.3 @52 TOTLBHR 6.3 @71 TOTESTNO COMMA11.
  @83 TOTESTLB COMMA11./
  @1 'HOURS SAMPLED=' @16 HRSAMPLE 9.1/
  @1 'MEN SAMPLED=' @16 MENSAMPD 6./
  @1 'ESTIMATED HOURS=' @18 ESTHRS COMMA11./
  @1 'ESTIMATED TRIPS=' @18 ESTRIPS COMMA10./
  @1 'AVERAGE TRIP=' @16 AVGOTRIP 5.1/
  @1 'COMPLETE TRIPS=' @16 NOCOMPTP 8./;
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RETURN;
HEAD: PUT / @53 RESERVOR 25. /   @53 MONTH 10. @63 YR 2. /
     @22 'NUMBER' @30 'POUNDS' @37 'AVERAGE' @45 'NUMBER' @52 'POUNDS'
     @59 'PERCENT' @67 'PERCENT' @75 'EST TOTAL' @85 'EST TOTAL'/
     @1 'SPECIES' @22 'CAUGHT' @30 'CAUGHT' @37 'WEIGHT' @45 'PER HR '
    @52 'PER HR ' @59 'BY NO ' @67 'BY WT ' @75 'NUMBER' @85 'WEIGHT';
 RETURN;
//S8 EXEC SAS,REGION=1024K,SORT=75,OPTIONS='MACRO'
//WORK DD SPACE=(CYL,(200,50)),UNIT=SYSDA
//TALLMRG DD DSN=ALLMRG,DISP=SHR,
// UNIT=TAPE,VOL=REF=*.S4.GO.TAPE,LABEL=1
//RPOUT DD UNIT=SYSDA,DISP=(NEW,PASS),SPACE=(TRK,(75,25),RLSE),
//  DCB=(RECFM=FB,LRECL=80,BLKSIZE=8000),DSN=&&RPOUT
//SYSIN DD *
*****-------------------------------------------------------------------*****
*  THE FOLLOWING SERIES OF STATEMENTS ULTIMATELY CREATE A SUMMARY SHEET    *
* OF ALL CREEL DATA BY LAKE AND YEAR. THIS SUMMARY SHEET IS PRODUCED IN AN *
* ORGANIZED TYPED FORM WHICH COVERS A FIVE YEAR PERIOD. THIS SUMMARY       *
* SHEET IS TWO PAGES LONG PER RESERVOIR AND COVERS ALL RESERVOIRS CREELED. *
*    LISTED BELOW ARE IMPORTANT VARIABLES WITH BRIEF DEFINITIONS:          *
*  EXPTIME =EXPANSION OF HOURS FISHED                                      *
*  EXPSUM  =SUM OF EXPANDED HOURS                                          *
*  TOTNO   =TOTAL NUMBER OF FISH CREELED (PER SPECIES)                     *
*  TOTLB   =TOTAL POUNDS OF FISH CREELED (PER SPECIES)                     *
*  MNLBS   =AVERAGE WEIGHT OF FISH CREELED (PER SPECIES)                   *
*  TOTALNO =SUM OF TOTAL NUMBER OF FISH CREELED (ALL SPECIES)              *
*  TOTALLB =SUM OF TOTAL WEIGHT OF FISH CREELED (ALL SPECIES)              *
*  TOTALMN =TOTAL AVERAGE WEIGHT OF FISH CREELED (ALL SPECIES)             *
*  THRFI   =TOTAL HOURS FISHED (PER CREEL RECORD)                          *
*  HRSAMP  =TOTAL HOURS FISHED (BY TOTAL FISHERMEN PER CREEL RECORD)       *
*  HRSAMPLE=TOTAL HOURS FISHED FOR WEEK SAMPLED                            *
*  WKTOTNO =ESTIMATED WEEKLY TOTAL NUMBER OF FISH CREELED                  *
*  WKTOTLB =ESTIMATED WEEKLY TOTAL WEIGHT OF FISH CREELED                  *
*  ESTOTNO =ESTIMATED TOTAL NUMBER OF FISH CREELED (PER SPECIES)           *
*  ESTOTLB =ESTIMATED TOTAL POUNDS OF FISH CREELED (PER SPECIES)           *
*  ESTHRS  =ESTIMATED HOURS FISHED                                         *
*  ESTRIPS =ESTIMATED NUMBER OF TRIPS                                      *
*  TOTESTNO=SUM OF ESTIMATED TOTAL NUMBER OF FISH CREELED (ALL SPECIES)    *
*  TOTESTLB=SUM OF ESTIMATED TOTAL POUNDS OF FISH CREELED (ALL SPECIES)    *
*  CODE1-6 =CODED VALUES FOR FISH SPECIES                                  *
*  NO1-6   =NUMBER OF FISH CAUGHT PER FISH SPECIES CODE                    *
*  LBST1-6 =POUNDS OF FISH CAUGHT PER FISH SPECIES CODE                    *
*  PERNO   =PERCENT OF TOTAL NUMBER OF FISH CAUGHT (BY SPECIES)            *
*  PERLB   =PERCENT OF TOTAL POUNDS OF FISH CAUGHT (BY SPECIES)            *
*  COMP    =COMPLETED OR NOT COMPLETED TRIP                                *
*  NOCOMPTP=NUMBER OF COMPLETED TRIPS                                      *
*  FMHRS   =HOURS FISHED FOR COMPLETED TRIPS                               *
*  SWKHR   =WEEKLY TOTAL OF HOURS FISHED FOR COMPLETED TRIPS               *
*  WEEKAVE =AVERAGE WEEKLY TOTAL OF HOURS FISHED                           *
*  NWKS    =NUMBER OF WEEKS WITH DATA COLLECTED                            *
*  SWKAVE  =SUM OF WEEKLY AVERAGES OF HOURS FISHED                         *
*  MMOAVE  =MONTHLY AVERAGE OF HOURS FISHED                                *
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*  NYRS     =NUMBER OF YEARS WITH DATA COLLECTED                          *
*  YRAVTRP  =YEARLY AVERAGE LENGTH OF TRIP                                *
*  MYRAVE   =SUM OF MONTHLY AVERAGES OF HOURS FISHED                      *
*  TRPRAC   =NUMBER OF TRIPS PER ACRE                                     *
*  HRPRAC   =NUMBER OF HOURS SPENT FISHING PER ACRE                       *
*  NOSUCC   =NUMBER OF SUCCESSFUL FISHERMEN                               *
*  NOCMPTRP=NUMBER OF COMPLETED TRIPS                                     *
*  PERSUC   =PERCENT OF SUCCESSFUL FISHERMEN                              *
*  BOBA     =BOAT OR BANK FISHERMAN                                       *
*  SUBOAT   =TOTAL NUMBER OF BOAT FISHERMEN                               *
*  SUBANK   =TOTAL NUMBER OF BANK FISHERMEN                               *
*  TOTMEN   =TOTAL NUMBER OF FISHERMEN SAMPLED                            *
*  BOATPER  =PERCENTAGE OF BOAT FISHERMEN                                 *
*  BANKPER  =PERCENTAGE OF BANK FISHERMEN                                 *
*  ALLTOG   =A COUNTING VARIABLE                                          *
*  AVEWT    =ESTIMATED AVERAGE WEIGHT OF FISH CREELED (PER SPECIES)       *
*  LBACRE   =NUMBER OF ESTIMATED POUNDS CREELED PER ACRE (PER SPECIES)    *
*  MENSAMPD=NUMBER OF FISHERMEN SAMPLED                                   *
*  NOPERHR  =NUMBER OF FISH CAUGHT PER HOUR                               *
*  LBPERHR  =POUNDS OF FISH CAUGHT PER HOUR                               *
*  AVCOTRIP=AVERAGE LENGTH OF COMPLETED TRIP                              *
*  SPFI     =PREFERRED SPECIES FISHED FOR BY FISHERMAN                    *
*  SPECHUM  =NUMBER OF FISHERMEN FISHING FOR PREFERRED SPECIES            *
*  PERSPETP=PERCENTAGE OF TRIPS SPENT FISHING FOR PARTICULAR SPECIES      *
*  SPECTRAC=NUMBER OF TRIPS PER ACRE FOR A PARTICULAR SPECIES             *
*  SPECHR   =NUMBER OF HOURS SPENT FISHING FOR A PARTICULAR SPECIES       *
*  PERSPEHR=PERCENTAGE OF HOURS SPENT FISHING FOR A PARTICULAR SPECIES    *
*  SPECHRAC=NUMBER OF HOURS SPENT PER ACRE FISHING FOR PARTICULAR SPECIES *
*    THE FOLLOWING STEPS ARE MACROS THAT ARE USED THROUGHOUT THE PROGRAM  *
* TO RENAME THE CODED VARIABLES: SPECIES AND LAKE, AND TO COMBINE AN      *
* ACREAGE VARIABLE WITH THE ASSOCIATED LAKE.                             *
*****-------------------------------------------------------------------*****;
%MACRO TRANSPEC;
IF (SPECIES='88' OR SPECIES='89' OR SPECIES='87') THEN SPECIES='A. CRAPPIE 87';
IF (SPECIES='81' OR SPECIES='82' OR SPECIES='83' OR SPECIES='84' OR
  SPECIES='80') THEN SPECIES='B. BLACK BASS 80';
IF (SPECIES='41' OR SPECIES='42' OR SPECIES='43') THEN SPECIES='C. CATFISH 40';
IF (SPECIES='60' OR SPECIES='61' OR SPECIES='62' OR SPECIES='63' OR SPECIES=
  '64' OR SPECIES='59') THEN SPECIES= 'H. TROUT 62';
IF (SPECIES='66' OR SPECIES='67') THEN SPECIES='D. STRIPD/HYB 65';
IF (SPECIES='91' OR SPECIES='92' OR SPECIES='93' OR SPECIES='94' OR SPECIES=
   '95' OR SPECIES='96' OR SPECIES='97' OR SPECIES='98' OR SPECIES='99' OR
   SPECIES='90') THEN SPECIES='F. SUNFISH 90';
IF SPECIES='68' THEN SPECIES='E. WHITE BASS 68';
IF (SPECIES='70' OR SPECIES='71' OR SPECIES='73') THEN
  SPECIES='G. WALL/SAUG 74';
IF (SPECIES='1' OR SPECIES='2' OR SPECIES='3' OR SPECIES='4' OR SPECIES='5' OR
  SPECIES='6' OR SPECIES='7' OR SPECIES='8' OR SPECIES='9' OR SPECIES='01' OR
  SPECIES='02' OR SPECIES='03' OR SPECIES='04' OR SPECIES='05' OR SPECIES='06'
  OR SPECIES='07' OR SPECIES='08' OR SPECIES='09' OR SPECIES='10' OR SPECIES=
  '11' OR SPECIES='12' OR SPECIES='13' OR SPECIES='14' OR SPECIES='15' OR
  SPECIES='16' OR SPECIES='17' OR SPECIES='18' OR SPECIES='19' OR SPECIES='20'
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  OR SPECIES='21' OR SPECIES='22' OR SPECIES='23' OR SPECIES='24' OR SPECIES=
  '25' OR SPECIES='26' OR SPECIES='27' OR SPECIES='30' OR SPECIES='31' OR
  SPECIES='32' OR SPECIES='33' OR SPECIES='34' OR SPECIES='35' OR SPECIES='36'
  OR SPECIES='37' OR SPECIES='44' OR SPECIES='45' OR SPECIES='46' OR SPECIES=
  '47' OR SPECIES='50' OR SPECIES='51' OR SPECIES='52' OR SPECIES='53' OR
  SPECIES='54' OR SPECIES='55' OR SPECIES='56' OR SPECIES='69' OR SPECIES='72'
  OR SPECIES='76' OR SPECIES='77' OR SPECIES='78' OR SPECIES='79')
  THEN SPECIES='I. OTHER 00';
 IF (SPECIES='A. CRAPPIE 87' OR SPECIES='B. BLACK BASS 80' OR
     SPECIES='C. CATFISH 40' OR SPECIES='H. TROUT 62' OR
     SPECIES='D. STRIPD/HYB 65' OR SPECIES='F. SUNFISH 90' OR
     SPECIES='E. WHITE BASS 68' OR SPECIES='G. WALL/SAUG 74' OR
     SPECIES='I. OTHER 00');
 %MEND;
%MACRO TRANACRE;
LENGTH ACRE 8;
IF LAKE=01 THEN ACRE=34200;
IF LAKE=02 THEN ACRE=110200;
IF LAKE=03 THEN ACRE=3910;
IF LAKE=04 THEN ACRE=23400;
IF LAKE=05 THEN ACRE=6430;
IF LAKE=06 THEN ACRE=10000;
IF LAKE=07 THEN ACRE=30300;
IF LAKE=08 THEN ACRE=10600;
IF LAKE=11 THEN ACRE=18220;
IF LAKE=12 THEN ACRE=7580;
IF LAKE=13 THEN ACRE=14200;
IF LAKE=14 THEN ACRE=22500;
IF LAKE=15 THEN ACRE=11960;
IF LAKE=16 THEN ACRE=5690;
IF LAKE=17 THEN ACRE=3230;
IF LAKE=18 THEN ACRE=30400;
IF LAKE=21 THEN ACRE=14600;
IF LAKE=22 THEN ACRE=13000;
IF LAKE=23 THEN ACRE=4400;
IF LAKE=76 THEN ACRE=35400;
IF LAKE=77 THEN ACRE=39000;
IF LAKE=78 THEN ACRE=10370;
 %MEND;
%MACRO TRANRES;
LENGTH RESERVOR $ 25;
IF LAKE=01 THEN RESERVOR='NORRIS 01';
IF LAKE=02 THEN RESERVOR='KENTUCKY 02';
IF LAKE=03  THEN RESERVOR='WOODS 03';
IF LAKE=04  THEN RESERVOR='DALE HOLLOW 04';
IF LAKE=05  THEN RESERVOR='WATAUGA 05';
IF LAKE=06  THEN RESERVOR='REELFOOT 06';
IF LAKE=07  THEN RESERVOR='CHEROKEE 07';
IF LAKE=08  THEN RESERVOR='TIMS FORD 08';
IF LAKE=10  THEN RESERVOR='HIWASSEE 10';
IF LAKE=11  THEN RESERVOR='CENTER HILL 11';
IF LAKE=12  THEN RESERVOR='SOUTH HOLSTON 12';
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IF LAKE=13  THEN RESERVOR='PERCY PRIEST 13';
IF LAKE=14  THEN RESERVOR='OLD HICKORY 14';
IF LAKE=15  THEN RESERVOR='CORDELL HULL 15';
IF LAKE=16  THEN RESERVOR='MELTON HILL 16';
IF LAKE=17  THEN RESERVOR='NORMANDY 17';
IF LAKE=18  THEN RESERVOR='DOUGLAS 18';
IF LAKE=20  THEN RESERVOR='DALE HOLLOW TW 20';
IF LAKE=21  THEN RESERVOR='FORT LOUDON 21';
IF LAKE=22  THEN RESERVOR='TELLICO 22';
IF LAKE=23  THEN RESERVOR='BOONE 23';
IF LAKE=75  THEN RESERVOR='WHEELER 75';
IF LAKE=76 THEN RESERVOR='CHICKAMAUGA 76';
IF LAKE=77 THEN RESERVOR='WATTS BAR 77';
IF LAKE=78 THEN RESERVOR='NICKAJACK 78';
 %MEND;
**** THIS STEP SORTS THE VARIABLES SO THE FUTURE STEPS CAN EASILY
**** CALCULATE THE DESIRED RESULTS;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT; BY LAKE YR MO WK EXPTIME;
****  THIS DATA STEP BEGINS BY SETTING THE FIRST WEEKLY EXPANSION TIME TO ONE
**** AND THE REST OF THE EXPANSION TIMES IN THE SAME WEEK TO ZERO. IN THIS WAY,
**** ONLY ONE WEEKS' WORTH OF EXPANSION TIME WILL BE LISTED WITH THE ASSOCIATED
**** DATA AND CAN THEREFORE BE ADDED TOGETHER FOR A MONTHLY TOTAL. OTHERWISE,
**** THE SUM OF THE EXPANSION TIMES WOULD BE TOO LARGE A NUMBER AS EACH CREEL
**** RECORD HAS AN ACCOMPANYING EXPANSION TIME AND A WEEK OF CREEL RECORDS HAS
**** THE SAME EXPANSION TIME LISTED MORE THAN ONCE.
****  THE PROC MEANS STATEMENT IS SET UP TO TOTAL ALL EXPANSION TIMES TO
**** WEEKLY TOTALS. THIS WILL BE USED IN LATER ANALYSES;
DATA L721; SET L721; BY LAKE YR MO WK EXPTIME;
IF FIRST.EXPTIME THEN FLAG=1;
IF FLAG NE 1 THEN EXPTIME=0;
PROC SORT; BY LAKE YR MO WK;
PROC MEANS NOPRINT SUM; VAR EXPTIME;
  OUTPUT OUT=NOEXPMO SUM=EXPSUM; BY LAKE YR MO WK;
****  THIS SET OF STATEMENTS RENAMES SOME OF THE VARIABLES IN OUR CREEL DATA
**** SET SO FUTURE RESULTS CAN BE ACCESSED AND PRINTED EASIER. THE VARIABLE
**** SPECIES REPLACES THE CODE VARIABLES, LBS REPLACES ASSOCIATED LB VARIABLE,
**** AND NO REPLACES THE NO VARIABLE ALSO ASSOCIATED WITH THE CODE
**** VARIABLE. THE MACRO TO RENAME CODED SPECIES VARIABLES IS USED IN
**** THIS STEP. IT ALSO CALCULATES THE WEEKLY TOTAL NUMBER AND POUNDS OF
**** FISH CREELED PER SPECIES;
PROC SORT DATA=L721; BY LAKE YR MO WK;
DATA RENAME; SET L721; BY LAKE YR MO WK;
DROP BOBA--SPFI EXPTIME;
DROP LBST1 LBST2 LBST3 LBST4 LBST5 LBST6
     NO1 NO2 NO3 NO4 NO5 NO6
     CODE1 CODE2 CODE3 CODE4 CODE5 CODE6
     SP1 SP2 SP3 SP4 SP5 SP6;
LENGTH SPECIES $ 20;
LENGTH DY--LAKE MO 2;
LENGTH DEFAULT=4;
SPECIES=CODE1; LBS=LBST1; NO=NO1; OUTPUT;
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SPECIES=CODE2; LBS=LBST2; NO=NO2; OUTPUT;
SPECIES=CODE3; LBS=LBST3; NO=NO3; OUTPUT;
SPECIES=CODE4; LBS=LBST4; NO=NO4; OUTPUT;
SPECIES=CODE5; LBS=LBST5; NO=NO5; OUTPUT;
SPECIES=CODE6; LBS=LBST6; NO=NO6; OUTPUT;
PROC SORT SORTWKNO=6; BY LAKE YR MO WK SPECIES;
DATA RENAME; SET RENAME;
%TRANSPEC
PROC SORT; BY LAKE YR MO WK SPECIES;
PROC MEANS NOPRINT SUM; VAR NO LBS ; BY LAKE YR MO WK SPECIES;
  OUTPUT OUT=SPLST SUM=TOTNO TOTLB;
PROC DELETE DATA=WORK.RENAME;
**** THIS STEP IS USED TO CREATE THE VARIABLE MNLBS;
DATA SPLST;SET SPLST;
MNLBS=ROUND((TOTLB/TOTNO),.01);
**** THIS STEP CALCULATES TOTAL NUMBERS AND POUNDS OF
**** ALL SPECIES CREELED;
DATA TOTSPLST; SET SPLST;
PROC SORT; BY LAKE YR MO WK;
PROC MEANS NOPRINT SUM; VAR TOTNO TOTLB; BY LAKE YR MO WK;
  OUTPUT OUT=TOTSPLST SUM=TOTALNO TOTALLB;
**** THE NEXT FEW DATA STEPS MERGE TOGETHER SETS CONTAINING
**** IMPORTANT VARIABLES;
DATA BOTH; MERGE TOTSPLST SPLST; BY LAKE YR MO WK;
PROC SORT; BY LAKE YR MO WK;
DATA TOG ; MERGE NOEXPMO BOTH; BY LAKE YR MO WK;
**** THESE COMMANDS CREATE NEW VARIABLES WHICH ARE USED TO
**** CALCULATE A WEEKLY TOTAL OF HOURS FISHED;
DATA L721; SET L721;
THRFI=HRFI+(TN/10);
HRSAMP=THRFI*NOHU;
PROC SORT DATA=L721; BY LAKE YR MO WK;
PROC MEANS SUM NOPRINT; VAR HRSAMP;
 OUTPUT OUT=SHRFI SUM=HRSAMPLE; BY LAKE YR MO WK;
**** THIS STEP MERGES TOGETHER SETS CONTAINING IMPORTANT
**** VARIABLES. IT ALSO CREATES A WEEKLY ESTIMATED TOTAL
**** NUMBER AND WEIGHT OF FISH CREELED;
DATA COMB; MERGE TOG SHRFI; BY LAKE YR MO WK;
WKTOTNO=(EXPSUM/HRSAMPLE)*TOTNO;
WKTOTLB=(EXPSUM/HRSAMPLE)*TOTLB;
PROC SORT; BY LAKE YR MO WK;
**** THIS STEP UTILIZES THE VARIABLES CREATED ABOVE TO CALCULATE YEARLY
**** ESTIMATED TOTAL NUMBERS AND POUNDS OF FISH CREELED BY SPECIES;
DATA ESTNO; SET COMB;
PROC SORT; BY LAKE YR SPECIES;
PROC MEANS SUM NOPRINT; VAR WKTOTNO WKTOTLB; BY LAKE YR SPECIES;
  OUTPUT OUT=SWKTOT SUM=ESTOTNO ESTOTLB;
PROC DELETE DATA=WORK.ESTNO;
**** THE FOLLOWING STEPS ULTIMATELY TOTAL THE EXPANDED ESTIMATES OF
**** HOURS FISHED BY YEAR;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT DATA=L721; BY LAKE YR MO WK EXPTIME;
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DATA L721; SET L721; BY LAKE YR MO WK EXPTIME;
IF FIRST.EXPTIME THEN FLAG=1;
IF FLAG NE 1 THEN EXPTIME=0;
PROC SORT; BY LAKE YR  ;
PROC MEANS NOPRINT SUM; VAR EXPTIME;
  OUTPUT OUT=NOEXPMO SUM=ESTHRS; BY LAKE YR  ;
**** THIS STEP IS USED TO DISCARD ERRONEOUS DATA AND CALCULATE THE
**** WEEKLY TOTAL NUMBER OF COMPLETED AND NOT COMPLETED TRIPS;
DATA COMPTRP1; SET L721;
IF MO=. THEN DELETE;
IF COMP=' ' THEN DELETE;
PROC SORT; BY LAKE YR MO WK COMP;
PROC MEANS SUM NOPRINT; VAR NOHU; BY LAKE YR MO WK COMP;
  OUTPUT OUT=CONVER SUM=NOCOMPTP;
PROC DELETE DATA=WORK.L721;
**** THESE STEPS CREATE FISHING HOUR VARIABLES WHICH ARE USED TO
**** CALCULATE WEEKLY HOURS FISHED BY COMPLETED AND NOT COMPLETED
**** TRIPS;
DATA COMPTRP2; SET COMPTRP1;
THRFI=HRFI+(TN/10);
FMHRS=THRFI*NOHU;
PROC SORT; BY LAKE YR MO WK COMP;
PROC MEANS SUM NOPRINT; VAR FMHRS; BY LAKE YR MO WK COMP;
 OUTPUT OUT=WKHRFI SUM=SWKHR;
PROC DELETE DATA=WORK.COMPTRP2;
**** THE FIRST PART OF THIS DATA STEP INVOLVES ORGANIZING AND MERGING
**** SETS CONTAINING IMPORTANT VARIABLES. IT ALSO CREATES A VARIABLE
**** REPRESENTING THE WEEKLY AVERAGE LENGTH OF A FISHING TRIP. THIS
**** AVERAGE IS ALSO ADJUSTED IF IT FALLS OUT OF THE PREDETERMINED
**** RANGE;
DATA CONVER; SET CONVER;
PROC SORT; BY LAKE YR MO WK COMP;
DATA WKHRFI; SET WKHRFI;
PROC SORT; BY LAKE YR MO WK COMP;
DATA AVE; MERGE WKHRFI CONVER; BY LAKE YR MO WK COMP;
WEEKAVE=SWKHR/NOCOMPTP;
IF WEEKAVE LT 2.5 THEN WEEKAVE=5.0;
IF WEEKAVE GT 7.5 THEN WEEKAVE=5.0;
**** THE FOLLOWING DATA STEPS SORT OUT SETS CONTAINING COMPLETED AND
**** NOT COMPLETED FISHING TRIPS AND CALCULATE THE SUM OF THE WEEKLY
**** AVERAGE TRIPS AND THE NUMBER OF WEEKS THAT CONTAIN DATA. THESE
**** VARIABLES WILL BE USED IN THE NEXT SET OF DATA STEPS;
DATA C1; SET AVE; IF COMP='1';
DATA C2; SET AVE; IF COMP='2';
  WEEKAVE=5.0;
PROC SORT DATA=C1; BY LAKE YR MO WK;
PROC SORT DATA=C2; BY LAKE YR MO WK;
DATA UNQWK; MERGE C2 C1; BY LAKE YR MO WK;
PROC SORT; BY LAKE YR MO;
DATA UNQWK1; SET UNQWK;
PROC SORT; BY LAKE YR MO;
PROC MEANS SUM N NOPRINT; VAR WEEKAVE; BY LAKE YR MO;
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```
 OUTPUT OUT=WS SUM=SWKAVE N=NWKS;
**** THE NEXT SET OF DATA STEPS ADJUST SUMS OF WEEKLY AVERAGE TRIP
**** LENGTHS DEPENDING ON THE NUMBER OF WEEKS IN WHICH DATA WERE
**** COLLECTED. IT FURTHER CONVERTS WEEKLY SUMS INTO MONTHLY TOTALS
**** BASED ON A MINIMUN OF A 4 WEEK MONTH. IF DATA WAS COLLECTED ON ALL
**** WEEKS OF A MONTH WITH 5 WEEKS, THEN THE SUM OF WEEKLY AVERAGES WILL
**** ADJUSTED ACCORDINGLY. THE SECOND PART OF THIS STEP INVOLVES THE
**** CALCULATION OF A MONTHLY AVERAGE TRIP LENGTH BASED ON A 4 OR 5
**** WEEK MONTH;
DATA WS1; SET WS;
IF NWKS=1 THEN SWKAVE=SWKAVE+15;
IF NWKS=2 THEN SWKAVE=SWKAVE+10;
IF NWKS=3 THEN SWKAVE=SWKAVE+5;
DATA WS2; SET WS1;
IF NWKS LE 4 THEN MMOAVE=SWKAVE/4;
IF NWKS GT 4 THEN MMOAVE=SWKAVE/NWKS;
**** THIS SET OF DATA STEPS CALCULATES A SUM OF MONTHLY AVERAGE TRIP
**** LENGTHS AND THE NUMBER OF YEARS IN WHICH DATA WAS COLLECTED;
DATA WS3; SET WS2;
PROC SORT; BY LAKE YR;
PROC MEANS SUM N NOPRINT; VAR MMOAVE; BY LAKE YR;
 OUTPUT OUT=YRHRAVE SUM=MYRAVE N=NYRS;
**** THE NEXT SET OF DATA STEPS CREATES A VARIABLE REPRESENTING A
**** SUM OF THE MONTHLY AVERAGE TRIP LENGTHS. A CONVERSION OCCURS IF
**** AT LEAST 6 MONTHS OF AVERAGES ARE PRESENT. ANOTHER VARIABLE IS
**** CREATED WHICH REPRESENTS A YEARLY AVERAGE TRIP LENGTH;
DATA YRHRAVE; SET YRHRAVE;
IF NYRS=1 THEN MYRAVE=MYRAVE+55;
IF NYRS=2 THEN MYRAVE=MYRAVE+50;
IF NYRS=3 THEN MYRAVE=MYRAVE+45;
IF NYRS=4 THEN MYRAVE=MYRAVE+40;
IF NYRS=5 THEN MYRAVE=MYRAVE+35;
IF NYRS=6 THEN MYRAVE=MYRAVE+30;
IF NYRS=7 THEN MYRAVE=MYRAVE+25;
IF NYRS=8 THEN MYRAVE=MYRAVE+20;
IF NYRS=9 THEN MYRAVE=MYRAVE+15;
IF NYRS=10 THEN MYRAVE=MYRAVE+10;
IF NYRS=11 THEN MYRAVE=MYRAVE+5;
YRAVTRP= MYRAVE/12;
PROC SORT; BY LAKE YR;
**** THIS SET OF DATA STEPS MERGES SETS CONTAINING IMPORTANT
**** VARIABLES AND USES A MACRO TO ADD AN ACREAGE VARIABLE TO EACH LAKE
**** SAMPLED. IT THEN CREATES A SEVERAL IMPORTANT VARIABLES
**** THAT WILL BE USED IN THE FINAL REPORT;
DATA YRHRAVE; SET YRHRAVE;
PROC SORT; BY LAKE YR;
DATA AA; SET NOEXPMO;
PROC SORT; BY LAKE YR;
DATA BOND; MERGE AA YRHRAVE; BY LAKE YR;
DATA FIRST; SET BOND;
%TRANACRE
AVCOTRIP=ROUND(YRAVTRP,.01);
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IF AVCOTRIP=. THEN AVCOTRIP=5;
ESTRIPS=(ESTHRS/AVCOTRIP);
TRPRAC=(ESTRIPS/ACRE);
HRPRAC=(ESTHRS/ACRE);
**** THIS STEP CALCULATES THE NUMBER OF SUCCESSFUL FISHERMEN WHO
**** HAVE COMPLETED FISHING TRIPS;
DATA SUCCESS; SET TALLMRG.ALLMRG;
IF COMP='1';
PROC SORT; BY LAKE YR;
PROC MEANS NOPRINT SUM; VAR NOSU; BY LAKE YR;
OUTPUT OUT=SUCC SUM=NOSUCC;
**** THIS STEP CALCULATES THE NUMBER OF COMPLETED FISHERMAN-TRIPS;
DATA FIX; SET SUCCESS;
PROC SORT; BY LAKE YR;
PROC MEANS SUM NOPRINT; VAR NOHU; BY LAKE YR;
OUTPUT OUT=CONVERS SUM=NOCMPTRP;
PROC DELETE DATA=WORK.FIX;
PROC DELETE DATA=WORK.SUCCESS;
**** THE FIRST AND LAST STEPS IN THIS PROCEDURE COMBINES SEVERAL SETS
**** WHICH CONTAIN IMPORTANT VARIABLES. IT ALSO USES A MACRO TO RENAME
**** CODED LAKE VARIABLES. NEXT, IT CREATES A VARIABLE REPRESENTING
**** THE PERCENTAGE OF COMPLETED SUCCESSFUL TRIPS;
DATA P; SET SUCC;
PROC SORT; BY LAKE YR;
DATA Q; SET CONVERS;
%TRANRES
PROC SORT; BY LAKE YR;
DATA J; MERGE P Q; BY LAKE YR;
PERSUC=(NOSUCC/NOCMPTRP)*100;
PROC SORT; BY LAKE YR;
DATA R; SET FIRST; PROC SORT; BY LAKE YR;
DATA JOIN; MERGE R J; BY LAKE YR;
**** THE NEXT SET OF STEPS CALCULATE THE NUMBER OF BOAT FISHERMEN;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT; BY LAKE YR;
DATA BOAT; SET L721;
IF BOBA=' ' THEN DELETE;
IF BOBA='1';
PROC SORT; BY LAKE YR BOBA;
PROC MEANS NOPRINT SUM; VAR NOHU; BY LAKE YR BOBA;
OUTPUT OUT=TOTBOAT SUM=SUBOAT;
PROC DELETE DATA=WORK.BOAT;
**** THE NEXT SET OF STEPS CALCULATE THE NUMBER OF BANK FISHERMEN;
DATA BANK; SET L721;
IF BOBA=' ' THEN DELETE;
IF BOBA='2';
PROC SORT; BY LAKE YR BOBA;
PROC MEANS NOPRINT SUM; VAR NOHU; BY LAKE YR BOBA;
OUTPUT OUT=TOTBANK SUM=SUBANK;
PROC DELETE DATA=WORK.BANK;
**** THIS STEP CALCULATES THE TOTAL NUMBER OF FISHERMEN CREELED;
DATA TFMEN; SET L721;
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PROC SORT; BY LAKE YR;
PROC MEANS NOPRINT SUM; VAR NOHU; BY LAKE YR;
OUTPUT OUT= NOFMEN SUM=TOTMEN;
PROC DELETE DATA=WORK.TFMEN;
**** THIS STEP MERGES TOGETHER SETS CONTAINING IMPORTANT VARIABLES AND
**** CALCULATES THE PERCENTAGE OF BOAT FISHERMEN;
DATA A; SET TOTBOAT; PROC SORT; BY LAKE YR;
DATA B; SET NOFMEN; PROC SORT; BY LAKE YR;
DATA PERBOAT; MERGE A B; BY LAKE YR;
BOATPER=(SUBOAT/TOTMEN)*100;
**** THIS STEP MERGES TOGETHER SETS CONTAINING IMPORTANT VARIABLES AND
**** CALCULATES THE PERCENTAGE OF BANK FISHERMEN;
DATA C; SET TOTBANK; PROC SORT; BY LAKE YR;
DATA PERBANK; MERGE C B; BY LAKE YR;
BANKPER=(SUBANK/TOTMEN)*100;
**** THE FOLLOWING STEPS ARE USED TO MERGE TOGETHER SETS CONTAINING
**** IMPORTANT VARIABLES AND ALSO CREATES A DATA SET THAT WILL BE USED
**** IN CREATING THE FINAL PRINTED REPORT;
DATA D; SET PERBOAT; PROC SORT; BY LAKE YR;
DATA E; SET PERBANK; PROC SORT; BY LAKE YR;
DATA FINI; MERGE D E; BY LAKE YR;
DATA FUSE; SET JOIN; PROC SORT; BY LAKE YR;
DATA FINISH;SET FINI; PROC SORT; BY LAKE YR;
DATA END; MERGE FUSE FINISH; BY LAKE YR;
DATA HEADR; SET END; ALLTOG=0;
 KEEP LAKE YR ESTRIPS TRPRAC HRPRAC PERSUC BOATPER BANKPER ALLTOG;
****  THIS SET OF STATEMENTS RENAMES SOME OF THE VARIABLES IN OUR CREEL DATA
**** SET SO FUTURE RESULTS CAN BE ACCESSED AND PRINTED EASIER. THE VARIABLE
**** SPECIES REPLACES THE CODE VARIABLES, LBS REPLACES ASSOCIATED LB VARIABLE,
**** AND NO REPLACES THE NO VARIABLE ALSO ASSOCIATED WITH THE CODE
**** VARIABLE. IT ALSO USES A MACRO TO RENAME CODED SPECIES VARIABLES.
**** THIS STEP THEN CALCULATES THE YEARLY TOTAL NUMBER AND POUNDS OF
**** FISH CREELED PER SPECIES;
PROC SORT DATA=L721; BY LAKE YR  ;
DATA RENAME2; SET L721; BY LAKE YR  ;
DROP BOBA--SPFI EXPTIME MO WK;
DROP LBST1 LBST2 LBST3 LBST4 LBST5 LBST6
     NO1 NO2 NO3 NO4 NO5 NO6
     CODE1 CODE2 CODE3 CODE4 CODE5 CODE6
     SP1 SP2 SP3 SP4 SP5 SP6;
LENGTH SPECIES $ 20;
LENGTH DY--LAKE MO 2;
LENGTH DEFAULT=4;
SPECIES=CODE1; LBS=LBST1; NO=NO1; OUTPUT;
SPECIES=CODE2; LBS=LBST2; NO=NO2; OUTPUT;
SPECIES=CODE3; LBS=LBST3; NO=NO3; OUTPUT;
SPECIES=CODE4; LBS=LBST4; NO=NO4; OUTPUT;
SPECIES=CODE5; LBS=LBST5; NO=NO5; OUTPUT;
SPECIES=CODE6; LBS=LBST6; NO=NO6; OUTPUT;
PROC SORT SORTWKNO=6; BY LAKE YR SPECIES;
PROC DELETE DATA=WORK.L721;
DATA RENAME2; SET RENAME2;
```

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%TRANSPEC
PROC SORT; BY LAKE YR SPECIES;
PROC MEANS NOPRINT SUM; VAR NO LBS ; BY LAKE YR SPECIES;
  OUTPUT OUT=SPLST SUM=TOTNO TOTLB;
PROC DELETE DATA=WORK.RENAME2;
**** THIS STEP IS USED TO CREATE THE VARIABLE MNLBS;
DATA SPLST;SET SPLST;
MNLBS=ROUND((TOTLB/TOTNO),.01);
**** THIS STEP CALCULATES TOTAL NUMBERS AND POUNDS OF
**** ALL SPECIES CREELED;
DATA TOTSPLST; SET SPLST;
PROC SORT; BY LAKE YR  ;
PROC MEANS NOPRINT SUM; VAR TOTNO TOTLB; BY LAKE YR  ;
  OUTPUT OUT=TOTSPLST SUM=TOTALNO TOTALLB;
**** THIS GROUP OF DATA STEPS BEGINS AND ENDS WITH THE MERGING OF
**** STEPS CONTAINING IMPORTANT VARIABLES. THE STEPS ALSO CREATE TWO
**** PERCENT VARIABLES REPRESENTING NUMBERS AND POUNDS OF FISH CREELED;
DATA BOTH; MERGE TOTSPLST SPLST; BY LAKE YR  ;
PERNO=ROUND(((TOTNO/TOTALNO)*100),.01);
PERLB=ROUND(((TOTLB/TOTALLB)*100),.01);
PROC SORT; BY LAKE YR  ;
DATA TOGE;MERGE NOEXPMO BOTH; BY LAKE YR  ;
**** THIS STEP CALCULATES THE TOTAL NUMBER OF FISHERMEN SAMPLED;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT; BY LAKE YR;
PROC MEANS SUM NOPRINT; VAR NOHU; BY LAKE YR;
  OUTPUT OUT=SHUM SUM=MENSAMPD;
**** THIS SET OF DATA STEPS MERGES SETS CONTAINING IMPORTANT
**** VARIABLES. IT THEN CREATES VARIABLES THAT ARE USED TO CALCULATE
**** THE NUMBER OF HOURS SAMPLED;
DATA SHUM; SET SHUM;
PROC SORT; BY LAKE YR;
DATA TOGET; MERGE TOGE BOND; BY LAKE YR;
DATA TOG; MERGE TOGET SHUM; BY LAKE YR;
DATA L721; SET L721;
PROC SORT; BY LAKE YR  ;
DATA L721; SET L721;
THRFI=HRFI+(TN/10);
HRSAMP=THRFI*NOHU;
PROC MEANS SUM NOPRINT; VAR HRSAMP;
 OUTPUT OUT=SHRFI SUM=HRSAMPLE; BY LAKE YR  ;
**** THIS SET OF DATA STEPS MERGES SETS CONTAINING IMPORTANT
**** VARIABLES. IT THEN CREATES A SEVERAL IMPORTANT VARIABLES
**** THAT WILL BE USED IN THE FINAL REPORT;
DATA BOMB; MERGE TOG SHRFI; BY LAKE YR  ;
PROC SORT; BY LAKE YR SPECIES;
DATA SWKTOT;SET SWKTOT;
PROC SORT; BY LAKE YR SPECIES;
DATA COMBINE; SET BOMB;
PROC SORT; BY LAKE YR SPECIES;
DATA TOGETHER; MERGE COMBINE SWKTOT; BY LAKE YR SPECIES;
TOTALMN=ROUND((TOTALLB/TOTALNO),.01);
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NOPERHR=ROUND((TOTNO/HRSAMPLE),.001);
LBPERHR=ROUND((TOTLB/HRSAMPLE),.001);
TOTNOHR=ROUND((TOTALNO/HRSAMPLE),.001);
TOTLBHR=ROUND((TOTALLB/HRSAMPLE),.001);
**** THE NEXT STEP CALCULATES A YEARLY ESTIMATED TOTAL NUMBER
**** OF FISH CREELED;
DATA TOT; SET TOGETHER;
PROC SORT; BY LAKE YR;
PROC MEANS SUM NOPRINT; VAR ESTOTNO;
  OUTPUT OUT=TOTAL1 SUM=TOTESTNO; BY LAKE YR;
**** THE NEXT STEP CALCULATES A YEARLY ESTIMATED TOTAL WEIGHT
**** OF FISH CREELED;
DATA TOTA; SET TOGETHER;
PROC SORT; BY LAKE YR;
PROC MEANS SUM NOPRINT; VAR ESTOTLB;
  OUTPUT OUT=TOTAL2 SUM=TOTESTLB; BY LAKE YR;
**** THE FOLLOWING STEPS MERGE TOGETHER SETS CONTAINING IMPORTANT
**** VARIABLES AND USES A MACRO TO ADD ACREAGE VARIABLES TO EACH LAKE
**** SAMPLED. IT ALSO DELETES INCOMPLETE DATA SETS;
DATA TOTAL; MERGE TOTAL1 TOTAL2; BY LAKE YR;
PROC SORT; BY LAKE YR;
DATA ALLTOT; MERGE TOGETHER TOTAL; BY LAKE YR;
PROC SORT; BY LAKE YR;
DATA EXPAND; SET L721;
PROC SORT; BY LAKE YR MO WK EXPTIME;
DATA EXPAND1; SET EXPAND; BY LAKE YR MO WK EXPTIME;
IF FIRST.EXPTIME THEN FLAG=1;
IF FLAG NE 1 THEN EXPTIME=0;
PROC SORT; BY LAKE YR  ;
PROC MEANS NOPRINT SUM; VAR EXPTIME;
  OUTPUT OUT=NOEXPMO SUM=ESTHRS; BY LAKE YR  ;
DATA NOEXPMO; SET NOEXPMO;
PROC SORT; BY LAKE YR;
DATA ALLTOT1; MERGE ALLTOT NOEXPMO; BY LAKE YR;
PROC SORT; BY LAKE YR;
DATA SPECIES; SET ALLTOT1;
%TRANACRE
IF (YR=.  OR SPECIES=' ') THEN DELETE;
PROC SORT; BY LAKE YR;
**** THIS STEP CREATES TWO NEW VARIABLES REPRESENTING THE AVERAGE WEIGHT
**** AND POUNDS PER ACRE OF EACH SPECIES. NEXT IT CREATES A DATA SET THAT
**** WILL BE USED IN THE FINAL REPORT;
DATA ACREST; SET SPECIES;
AVEWT= ESTOTLB/ESTOTNO;
LBACRE= ESTOTLB/ACRE;
NOPERHR=ESTOTNO/ESTHRS;
LBPERHR=ESTOTLB/ESTHRS;
DATA MIDDLE; SET ACREST;
 KEEP LAKE YR SPECIES ESTOTNO ESTOTLB AVEWT LBACRE NOPERHR LBPERHR;
**** THIS STEP RENAMES CODED SPECIES VARIABLES SO THEY CAN BE PRINTED
**** IN THE FINAL REPORT. IT ALSO DELETES INCOMPLETE DATA AND
**** CALCULATES THE NUMBER OF FISHERMEN SEEKING A PARTICULAR SPECIES;
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DATA PRCNT; SET TALLMRG.ALLMRG;
LENGTH SPECIES $ 20;
IF SPFI='&' THEN SPECIES='J. STRIPD/HYB &';
IF SPFI='0' THEN SPECIES='K. MUSKY 0';
IF SPFI='1' THEN SPECIES='A. ANY 1';
IF SPFI='2' THEN SPECIES='B. CRAPPIE 2';
IF SPFI='3' THEN SPECIES='C. BLACK BASS 3';
IF SPFI='4' THEN SPECIES='D. SUNFISH 4';
IF SPFI='5' THEN SPECIES='E. CATFISH 5';
IF SPFI='6' THEN SPECIES='F. WALL/SAUG 6';
IF SPFI='7' THEN SPECIES='G. TROUT 7';
IF SPFI='8' THEN SPECIES='H. ROUGH 8';
IF SPFI='9' THEN SPECIES='I. WHITE BASS 9';
IF SPECIES=' ' THEN DELETE;
PROC SORT; BY LAKE YR SPECIES;
PROC MEANS NOPRINT SUM; VAR NOHU; BY LAKE YR SPECIES;
OUTPUT OUT=SPNOHU SUM=SPECHUM;
**** THIS STEP CALCULATES THE TOTAL NUMBER OF FISHERMEN CREELED;
DATA PRCENT; SET PRCNT;
PROC SORT; BY LAKE YR;
PROC MEANS NOPRINT SUM; VAR NOHU; BY LAKE YR;
OUTPUT OUT=HUMTOT SUM=TOTMEN;
**** THE FOLLOWING STEPS FIRST COMBINE SETS CONTAINING IMPORTANT
**** VARIABLES. NEXT, IT CREATES NEW VARIABLES REPRESENTING THE
**** PERCENTAGE OF TRIPS SPENT FISHING FOR A PARTICULAR SPECIES AND
**** THE NUMBER OF TRIPS PER ACRE FOR A PARTICULAR SPECIES;
DATA S; SET SPNOHU;
PROC SORT; BY LAKE YR;
DATA T; SET HUMTOT;
PROC SORT; BY LAKE YR;
DATA JOIN; MERGE S T; BY LAKE YR;
DATA ED; SET FIRST;
PROC SORT; BY LAKE YR;
DATA JOINED; MERGE JOIN ED; BY LAKE YR;
PERSPETP=(SPECHUM/TOTMEN)*100;
SPECTRAC=(PERSPETP*TRPRAC)/100;
PROC SORT; BY LAKE YR;
**** THIS STEP CALCULATES THE TOTAL NUMBER OF HOURS SPENT FISHING
**** FOR A PARTICULAR SPECIES;
DATA PERCENT; SET PRCNT;
THRFI=HRFI+(TN/10);
HRSAMP=THRFI*NOHU;
PROC SORT; BY LAKE YR SPECIES;
PROC MEANS SUM NOPRINT; VAR HRSAMP; BY LAKE YR SPECIES;
 OUTPUT OUT=SPNOHR SUM=SPECHR;
PROC DELETE DATA=WORK.PERCENT;
PROC DELETE DATA=WORK.PRCNT;
**** THIS STEP FIRST COMBINES SETS CONTAINING IMPORTANT VARIABLES. NEXT,
**** IT CALCULATES THE PERCENTAGE OF HOURS SPENT FISHING FOR A
**** PARTICULAR SPECIES;
DATA SPNOHR; SET SPNOHR;
PROC SORT; BY LAKE YR;
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DATA TOTHRFI; SET SHRFI;
PROC SORT; BY LAKE YR;
DATA WORKHR; MERGE TOTHRFI SPNOHR; BY LAKE YR;
PERSPEHR=(SPECHR/HRSAMPLE)*100;
**** THIS STEP COMBINES SETS CONTAINING IMPORTANT VARIABLES AND CREATES
**** A VARIABLE REPRESENTING THE NUMBER OF HOURS SPENT PER ACRE FISHING
**** FOR A PARTICULAR SPECIES. NEXT, IT CREATES A FINAL DATA SET WHICH
**** WILL BE USED IN THE FINAL PRINT-OUT;
DATA WORKHR1; SET WORKHR;
PROC SORT; BY LAKE YR;
DATA JOINED1; SET JOINED;
PROC SORT; BY LAKE YR;
DATA LAS; MERGE WORKHR1 JOINED1; BY LAKE YR;
SPECHRAC=(PERSPEHR/HRPRAC)/100;
PROC SORT; BY LAKE YR;
DATA LAST; SET LAS;
 KEEP LAKE YR SPECIES PERSPETP SPECTRAC PERSPEHR SPECHRAC;
**** THIS STEP BEGINS A SERIES OF PROCEDURES THAT CREATE A "FILLER" DATA
**** SET WHICH SERVES AS A TEMPLATE FOR THE FIVE YEAR BLOCK OF DATA
**** THAT WILL BE CONSIDERED. THE FIRST PART OF THE PROCEDURE ALLOWS ALL
**** LAKES THAT ARE CODED FROM 1 TO 80 TO BE CONSIDERED AND ALL
**** YEARS FROM 1976 TO 1999 TO BE CONSIDERED. IT INITIALLY SETS
**** IMPORTANT VARIABLES EQUAL TO ZERO SO THAT WHEN THE TEMPLATE IS
**** FILLED WITH REAL DATA, THE MISSING DATA POINTS WILL EQUAL ZERO;
DATA FIL0;
DO LAKE = 1 TO 80;
   DO YR= 76 TO 99;
      ALLTOG=0; ESTRIPS=0; TRPRAC=0; HRPRAC=0; PERSUC=0; BOATPER=0;
      BANKPER=0;
   OUTPUT;
   END;
END;
DATA FIL0;SET FIL0;
 IF (YR GE 76 AND YR LE 83) AND
 ((01=<LAKE<=08) OR (10=<LAKE<=18) OR (20=<LAKE<=23) OR (75=<LAKE<=78));
**** THIS STEP COMBINES THE ALLTOG ("COUNT") VARIABLE WITH SPECIFIC
**** SPECIES GROUPS. THE VARIABLES CONSIDERED IN THIS PART OF THE
**** TEMPLATE ARE INITIATED TO ZERO;
DATA FIL1;
LENGTH SPECIES $ 20;
DO LAKE = 1 TO 80;
   DO YR= 76 TO 99;
      DO ALLTOG=1 TO 9;
         IF ALLTOG=1 THEN SPECIES='A. CRAPPIE 87';
         IF ALLTOG=2 THEN SPECIES='B. BLACK BASS 80';
         IF ALLTOG=3 THEN SPECIES='C. CATFISH 40';
         IF ALLTOG=4 THEN SPECIES='D. STRIPD/HYB 65';
         IF ALLTOG=5 THEN SPECIES='E. WHITE BASS 68';
         IF ALLTOG=6 THEN SPECIES='F. SUNFISH 90';
         IF ALLTOG=7 THEN SPECIES='G. WALL/SAUG 74';
         IF ALLTOG=8 THEN SPECIES='H. TROUT 62';
         IF ALLTOG=9 THEN SPECIES='I. OTHER 00';
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      ESTOTNO=0; ESTOTLB=0; AVEWT=0; LBACRE=0; NOPERHR=0; LBPERHR=0;
         OUTPUT;
      END;
   END;
END;
DATA FIL1;SET FIL1;
 IF (YR GE 76 AND YR LE 83) AND
 ((01=<LAKE<=08) OR (10=<LAKE<=18) OR (20=<LAKE<=23) OR (75=<LAKE<=78));
**** THIS STEP COMBINES SOME MORE ALLTOG VARIABLES WHICH ARE ASSOCIATED
**** WITH OTHER SPECIFIC SPECIES GROUPS. THE VARIABLES CONSIDERED IN THIS
**** PART OF THE TEMPLATE ARE ALSO INITIATED TO ZERO;
DATA FIL2;
LENGTH SPECIES $ 20;
DO LAKE = 1 TO 80;
   DO YR= 76 TO 99;
      DO ALLTOG=10 TO 20;
         IF ALLTOG=10 THEN SPECIES='A. ANY 1';
         IF ALLTOG=11 THEN SPECIES='B. CRAPPIE 2';
         IF ALLTOG=12 THEN SPECIES='C. BLACK BASS 3';
         IF ALLTOG=13 THEN SPECIES='D. SUNFISH 4';
         IF ALLTOG=14 THEN SPECIES='E. CATFISH 5';
         IF ALLTOG=15 THEN SPECIES='F. WALL/SAUG 6';
         IF ALLTOG=16 THEN SPECIES='G. TROUT 7';
         IF ALLTOG=17 THEN SPECIES='H. ROUGH 8';
         IF ALLTOG=18 THEN SPECIES='I. WHITE BASS 9';
         IF ALLTOG=19 THEN SPECIES='J. STRIPD/HYB &';
         IF ALLTOG=20 THEN SPECIES='K. MUSKY 0';
      PERSPETP=0; PERSPEHR=0; SPECTRAC=0; SPECHRAC=0;
         OUTPUT;
      END;
   END;
END;
DATA FIL2;SET FIL2;
 IF (YR GE 76 AND YR LE 83) AND
 ((01=<LAKE<=08) OR (10=<LAKE<=18) OR (20=<LAKE<=23) OR (75=<LAKE<=78));
**** THE FOLLOWING STEPS MERGE TOGETHER SETS CONTAINING VARIABLES
**** THAT WILL BE USED IN THE FINAL REPORT;
PROC SORT DATA=HEADR; BY LAKE YR;
PROC SORT DATA=FIL0; BY LAKE YR;
DATA HEADR1; MERGE FIL0 HEADR; BY LAKE YR;
PROC SORT DATA= FIL1 ; BY LAKE YR SPECIES;
PROC SORT DATA= MIDDLE; BY LAKE YR SPECIES;
DATA FILMID; MERGE FIL1  MIDDLE; BY LAKE YR SPECIES;
PROC SORT DATA= FIL2 ; BY LAKE YR SPECIES;
PROC SORT DATA= LAST; BY LAKE YR SPECIES;
DATA FILLAS; MERGE FIL2  LAST; BY LAKE YR SPECIES;
PROC SORT DATA=HEADR1; BY LAKE YR;
DATA EVRYTING; SET HEADR1 FILMID FILLAS;
PROC SORT; BY LAKE YR ALLTOG;
DATA EVERYTHG; SET EVRYTING;
 IF (YR GE 79 AND YR LE 83);
PROC SORT; BY LAKE YR ;
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**** THIS STEP ORGANIZES OUR DATA SET INTO A FIVE YEAR BLOCK ;
DATA Y1 Y2 Y3 Y4 Y5; SET EVERYTHG; BY LAKE YR ;
IF FIRST.YR THEN N+1;
IF N=1 THEN OUTPUT Y1;
IF N=2 THEN OUTPUT Y2;
IF N=3 THEN OUTPUT Y3;
IF N=4 THEN OUTPUT Y4;
IF N=5 THEN OUTPUT Y5;
IF N=5 AND LAST.YR THEN DO;
  N=0;
END;
**** THIS STEP ORGANIZES THE DATA USED IN THE FINAL SUMMARY INTO
**** SPECIFIC FIRST YEAR VARIABLES;
DATA Y1; SET Y1;
RENAME YR=YR1 ESTRIPS=ESTRIPS1 TRPRAC=TRPRAC1 HRPRAC=HRPRAC1 PERSUC=PERSUC1
 BOATPER=BOATPER1 BANKPER=BANKPER1 ESTOTNO=ESTOTNO1 ESTOTLB=ESTOTLB1
 AVEWT=AVEWT1 LBACRE=LBACRE1 NOPERHR=NOPERHR1 LBPERHR=LBPERHR1
 PERSPETP=PERSPET1 PERSPEHR=PERSPEH1 SPECTRAC=SPECTRA1 SPECHRAC=SPECHRA1;
**** THIS STEP ORGANIZES THE DATA USED IN THE FINAL SUMMARY INTO
**** SPECIFIC SECOND YEAR VARIABLES;
DATA Y2; SET Y2;
RENAME YR=YR2 ESTRIPS=ESTRIPS2 TRPRAC=TRPRAC2 HRPRAC=HRPRAC2 PERSUC=PERSUC2
 BOATPER=BOATPER2 BANKPER=BANKPER2 ESTOTNO=ESTOTNO2 ESTOTLB=ESTOTLB2
 AVEWT=AVEWT2 LBACRE=LBACRE2 NOPERHR=NOPERHR2 LBPERHR=LBPERHR2
 PERSPETP=PERSPET2 PERSPEHR=PERSPEH2 SPECTRAC=SPECTRA2 SPECHRAC=SPECHRA2;
**** THIS STEP ORGANIZES THE DATA USED IN THE FINAL SUMMARY INTO
**** SPECIFIC THIRD YEAR VARIABLES;
DATA Y3; SET Y3;
RENAME YR=YR3 ESTRIPS=ESTRIPS3 TRPRAC=TRPRAC3 HRPRAC=HRPRAC3 PERSUC=PERSUC3
 BOATPER=BOATPER3 BANKPER=BANKPER3 ESTOTNO=ESTOTNO3 ESTOTLB=ESTOTLB3
 AVEWT=AVEWT3 LBACRE=LBACRE3 NOPERHR=NOPERHR3 LBPERHR=LBPERHR3
 PERSPETP=PERSPET3 PERSPEHR=PERSPEH3 SPECTRAC=SPECTRA3 SPECHRAC=SPECHRA3;
**** THIS STEP ORGANIZES THE DATA USED IN THE FINAL SUMMARY INTO
**** SPECIFIC FOURTH YEAR VARIABLES;
DATA Y4; SET Y4;
RENAME YR=YR4 ESTRIPS=ESTRIPS4 TRPRAC=TRPRAC4 HRPRAC=HRPRAC4 PERSUC=PERSUC4
 BOATPER=BOATPER4 BANKPER=BANKPER4 ESTOTNO=ESTOTNO4 ESTOTLB=ESTOTLB4
 AVEWT=AVEWT4 LBACRE=LBACRE4 NOPERHR=NOPERHR4 LBPERHR=LBPERHR4
 PERSPETP=PERSPET4 PERSPEHR=PERSPEH4 SPECTRAC=SPECTRA4 SPECHRAC=SPECHRA4;
**** THIS STEP ORGANIZES THE DATA USED IN THE FINAL SUMMARY INTO
**** SPECIFIC FIFTH YEAR VARIABLES;
DATA Y5; SET Y5;
RENAME YR=YR5 ESTRIPS=ESTRIPS5 TRPRAC=TRPRAC5 HRPRAC=HRPRAC5 PERSUC=PERSUC5
 BOATPER=BOATPER5 BANKPER=BANKPER5 ESTOTNO=ESTOTNO5 ESTOTLB=ESTOTLB5
 AVEWT=AVEWT5 LBACRE=LBACRE5 NOPERHR=NOPERHR5 LBPERHR=LBPERHR5
 PERSPETP=PERSPET5 PERSPEHR=PERSPEH5 SPECTRAC=SPECTRA5 SPECHRAC=SPECHRA5;
**** THIS STEP SORTS AND MERGES OUR FINAL VARIABLES INTO THE ORDER
**** THAT WILL APPEAR ON THE FINAL SUMMARY SHEET;
PROC SORT DATA=Y1; BY LAKE ALLTOG;
PROC SORT DATA=Y2; BY LAKE ALLTOG;
PROC SORT DATA=Y3; BY LAKE ALLTOG;
PROC SORT DATA=Y4; BY LAKE ALLTOG;
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PROC SORT DATA=Y5; BY LAKE ALLTOG;
DATA REPORT; MERGE Y1 Y2 Y3 Y4 Y5; BY LAKE ALLTOG;
%TRANRES
**** THE FOLLOWING STEPS SET UP THE REPORT IN A FIVE YEAR BLOCK.
**** IT CAN THEN BE OUTPUT IN A LINE BY LINE FORMAT;
DATA RPT1; SET REPORT; FILE RPOUT;
 IF ALLTOG=0 THEN
   PUT @1 RESERVOR $CHAR20.
   / (ESTRIPS1--BANKPER1) (@1 6*10.2) @70 YR1 2.
   / (ESTRIPS2--BANKPER2) (@1 6*10.2) @70 YR2 2.
   / (ESTRIPS3--BANKPER3) (@1 6*10.2) @70 YR3 2.
   / (ESTRIPS4--BANKPER4) (@1 6*10.2) @70 YR4 2.
   / (ESTRIPS5--BANKPER5) (@1 6*10.2) @70 YR5 2.;
 IF 1 LE ALLTOG LE 9 THEN
   PUT @1 SPECIES $CHAR20.
   / (ESTOTNO1--LBPERHR1) (@1 6*10.2)
   / (ESTOTNO2--LBPERHR2) (@1 6*10.2)
   / (ESTOTNO3--LBPERHR3) (@1 6*10.2)
   / (ESTOTNO4--LBPERHR4) (@1 6*10.2)
   / (ESTOTNO5--LBPERHR5) (@1 6*10.2);
 IF 10 LE ALLTOG LE 21 THEN
   PUT @1 SPECIES $CHAR20.
   / (PERSPET1--SPECHRA1) (@1 4*10.3)
   / (PERSPET2--SPECHRA2) (@1 4*10.3)
   / (PERSPET3--SPECHRA3) (@1 4*10.3)
   / (PERSPET4--SPECHRA4) (@1 4*10.3)
   / (PERSPET5--SPECHRA5) (@1 4*10.3);
**** THIS STEP SETS UP THE FINAL ORDER OF THE PRINTED VARIABLES. IT ALSO
**** RENAMES THE VARIABLES ASSOCIATED WITH EACH SPECIES SO THEY CAN BE
**** REFERENCED EASIER;
DATA RPTFIN; INFILE RPOUT;
 INPUT @1 RESERVOR $CHAR20.
   / (ESTRIPS1 TRPRAC1 HRPRAC1 PERSUC1 BOATPER1 BANKPER1)
 (@1 6*10.2) @70 YR1 2.
   / (ESTRIPS2 TRPRAC2 HRPRAC2 PERSUC2 BOATPER2 BANKPER2)
 (@1 6*10.2) @70 YR2 2.
   / (ESTRIPS3 TRPRAC3 HRPRAC3 PERSUC3 BOATPER3 BANKPER3)
 (@1 6*10.2) @70 YR3 2.
   / (ESTRIPS4 TRPRAC4 HRPRAC4 PERSUC4 BOATPER4 BANKPER4)
 (@1 6*10.2) @70 YR4 2.
   / (ESTRIPS5 TRPRAC5 HRPRAC5 PERSUC5 BOATPER5 BANKPER5)
 (@1 6*10.2) @70 YR5 2.
   / @1 SPMA $CHAR20.
   / (TN1MA TP1MA TM1MA TPA1MA TNH1MA TPH1MA) (@1 6*10.2)
   / (TN2MA TP2MA TM2MA TPA2MA TNH2MA TPH2MA) (@1 6*10.2)
   / (TN3MA TP3MA TM3MA TPA3MA TNH3MA TPH3MA) (@1 6*10.2)
   / (TN4MA TP4MA TM4MA TPA4MA TNH4MA TPH4MA) (@1 6*10.2)
   / (TN5MA TP5MA TM5MA TPA5MA TNH5MA TPH5MA) (@1 6*10.2)
   / @1 SPMB $CHAR20.
   / (TN1MB TP1MB TM1MB TPA1MB TNH1MB TPH1MB) (@1 6*10.2)
   / (TN2MB TP2MB TM2MB TPA2MB TNH2MB TPH2MB) (@1 6*10.2)
   / (TN3MB TP3MB TM3MB TPA3MB TNH3MB TPH3MB) (@1 6*10.2)
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/ (TN4MB TP4MB TM4MB TPA4MB TNH4MB TPH4MB) (@1 6*10.2)
/ (TN5MB TP5MB TM5MB TPA5MB TNH5MB TPH5MB) (@1 6*10.2)
/ @1 SPMC $CHAR20.
/ (TN1MC TP1MC TM1MC TPA1MC TNH1MC TPH1MC) (@1 6*10.2)
/ (TN2MC TP2MC TM2MC TPA2MC TNH2MC TPH2MC) (@1 6*10.2)
/ (TN3MC TP3MC TM3MC TPA3MC TNH3MC TPH3MC) (@1 6*10.2)
/ (TN4MC TP4MC TM4MC TPA4MC TNH4MC TPH4MC) (@1 6*10.2)
/ (TN5MC TP5MC TM5MC TPA5MC TNH5MC TPH5MC) (@1 6*10.2)
/ @1 SPMD $CHAR20.
/ (TN1MD TP1MD TM1MD TPA1MD TNH1MD TPH1MD) (@1 6*10.2)
/ (TN2MD TP2MD TM2MD TPA2MD TNH2MD TPH2MD) (@1 6*10.2)
/ (TN3MD TP3MD TM3MD TPA3MD TNH3MD TPH3MD) (@1 6*10.2)
/ (TN4MD TP4MD TM4MD TPA4MD TNH4MD TPH4MD) (@1 6*10.2)
/ (TN5MD TP5MD TM5MD TPA5MD TNH5MD TPH5MD) (@1 6*10.2)
/ @1 SPME $CHAR20.
/ (TN1ME TP1ME TM1ME TPA1ME TNH1ME TPH1ME) (@1 6*10.2)
/ (TN2ME TP2ME TM2ME TPA2ME TNH2ME TPH2ME) (@1 6*10.2)
/ (TN3ME TP3ME TM3ME TPA3ME TNH3ME TPH3ME) (@1 6*10.2)
/ (TN4ME TP4ME TM4ME TPA4ME TNH4ME TPH4ME) (@1 6*10.2)
/ (TN5ME TP5ME TM5ME TPA5ME TNH5ME TPH5ME) (@1 6*10.2)
/ @1 SPMF $CHAR20.
/ (TN1MF TP1MF TM1MF TPA1MF TNH1MF TPH1MF) (@1 6*10.2)
/ (TN2MF TP2MF TM2MF TPA2MF TNH2MF TPH2MF) (@1 6*10.2)
/ (TN3MF TP3MF TM3MF TPA3MF TNH3MF TPH3MF) (@1 6*10.2)
/ (TN4MF TP4MF TM4MF TPA4MF TNH4MF TPH4MF) (@1 6*10.2)
/ (TN5MF TP5MF TM5MF TPA5MF TNH5MF TPH5MF) (@1 6*10.2)
/ @1 SPMG $CHAR20.
/ (TN1MG TP1MG TM1MG TPA1MG TNH1MG TPH1MG) (@1 6*10.2)
/ (TN2MG TP2MG TM2MG TPA2MG TNH2MG TPH2MG) (@1 6*10.2)
/ (TN3MG TP3MG TM3MG TPA3MG TNH3MG TPH3MG) (@1 6*10.2)
/ (TN4MG TP4MG TM4MG TPA4MG TNH4MG TPH4MG) (@1 6*10.2)
/ (TN5MG TP5MG TM5MG TPA5MG TNH5MG TPH5MG) (@1 6*10.2)
/ @1 SPMH $CHAR20.
/ (TN1MH TP1MH TM1MH TPA1MH TNH1MH TPH1MH) (@1 6*10.2)
/ (TN2MH TP2MH TM2MH TPA2MH TNH2MH TPH2MH) (@1 6*10.2)
/ (TN3MH TP3MH TM3MH TPA3MH TNH3MH TPH3MH) (@1 6*10.2)
/ (TN4MH TP4MH TM4MH TPA4MH TNH4MH TPH4MH) (@1 6*10.2)
/ (TN5MH TP5MH TM5MH TPA5MH TNH5MH TPH5MH) (@1 6*10.2)
/ @1 SPMI $CHAR20.
/ (TN1MI TP1MI TM1MI TPA1MI TNH1MI TPH1MI) (@1 6*10.2)
/ (TN2MI TP2MI TM2MI TPA2MI TNH2MI TPH2MI) (@1 6*10.2)
/ (TN3MI TP3MI TM3MI TPA3MI TNH3MI TPH3MI) (@1 6*10.2)
/ (TN4MI TP4MI TM4MI TPA4MI TNH4MI TPH4MI) (@1 6*10.2)
/ (TN5MI TP5MI TM5MI TPA5MI TNH5MI TPH5MI) (@1 6*10.2)
/ @1 SPLA $CHAR20.
/ (PT1LA PH1LA ST1LA SH1LA) (@1 4*10.3)
/ (PT2LA PH2LA ST2LA SH2LA) (@1 4*10.3)
/ (PT3LA PH3LA ST3LA SH3LA) (@1 4*10.3)
/ (PT4LA PH4LA ST4LA SH4LA) (@1 4*10.3)
/ (PT5LA PH5LA ST5LA SH5LA) (@1 4*10.3)
/ @1 SPLB $CHAR20.
/ (PT1LB PH1LB ST1LB SH1LB) (@1 4*10.3)
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/ (PT2LB PH2LB ST2LB SH2LB) (@1 4*10.3)
/ (PT3LB PH3LB ST3LB SH3LB) (@1 4*10.3)
/ (PT4LB PH4LB ST4LB SH4LB) (@1 4*10.3)
/ (PT5LB PH5LB ST5LB SH5LB) (@1 4*10.3)
/ @1 SPLC $CHAR20.
/ (PT1LC PH1LC ST1LC SH1LC) (@1 4*10.3)
/ (PT2LC PH2LC ST2LC SH2LC) (@1 4*10.3)
/ (PT3LC PH3LC ST3LC SH3LC) (@1 4*10.3)
/ (PT4LC PH4LC ST4LC SH4LC) (@1 4*10.3)
/ (PT5LC PH5LC ST5LC SH5LC) (@1 4*10.3)
/ @1 SPLD $CHAR20.
/ (PT1LD PH1LD ST1LD SH1LD) (@1 4*10.3)
/ (PT2LD PH2LD ST2LD SH2LD) (@1 4*10.3)
/ (PT3LD PH3LD ST3LD SH3LD) (@1 4*10.3)
/ (PT4LD PH4LD ST4LD SH4LD) (@1 4*10.3)
/ (PT5LD PH5LD ST5LD SH5LD) (@1 4*10.3)
/ @1 SPLE $CHAR20.
/ (PT1LE PH1LE ST1LE SH1LE) (@1 4*10.3)
/ (PT2LE PH2LE ST2LE SH2LE) (@1 4*10.3)
/ (PT3LE PH3LE ST3LE SH3LE) (@1 4*10.3)
/ (PT4LE PH4LE ST4LE SH4LE) (@1 4*10.3)
/ (PT5LE PH5LE ST5LE SH5LE) (@1 4*10.3)
/ @1 SPLF $CHAR20.
/ (PT1LF PH1LF ST1LF SH1LF) (@1 4*10.3)
/ (PT2LF PH2LF ST2LF SH2LF) (@1 4*10.3)
/ (PT3LF PH3LF ST3LF SH3LF) (@1 4*10.3)
/ (PT4LF PH4LF ST4LF SH4LF) (@1 4*10.3)
/ (PT5LF PH5LF ST5LF SH5LF) (@1 4*10.3)
/ @1 SPLG $CHAR20.
/ (PT1LG PH1LG ST1LG SH1LG) (@1 4*10.3)
/ (PT2LG PH2LG ST2LG SH2LG) (@1 4*10.3)
/ (PT3LG PH3LG ST3LG SH3LG) (@1 4*10.3)
/ (PT4LG PH4LG ST4LG SH4LG) (@1 4*10.3)
/ (PT5LG PH5LG ST5LG SH5LG) (@1 4*10.3)
/ @1 SPLH $CHAR20.
/ (PT1LH PH1LH ST1LH SH1LH) (@1 4*10.3)
/ (PT2LH PH2LH ST2LH SH2LH) (@1 4*10.3)
/ (PT3LH PH3LH ST3LH SH3LH) (@1 4*10.3)
/ (PT4LH PH4LH ST4LH SH4LH) (@1 4*10.3)
/ (PT5LH PH5LH ST5LH SH5LH) (@1 4*10.3)
/ @1 SPLI $CHAR20.
/ (PT1LI PH1LI ST1LI SH1LI) (@1 4*10.3)
/ (PT2LI PH2LI ST2LI SH2LI) (@1 4*10.3)
/ (PT3LI PH3LI ST3LI SH3LI) (@1 4*10.3)
/ (PT4LI PH4LI ST4LI SH4LI) (@1 4*10.3)
/ (PT5LI PH5LI ST5LI SH5LI) (@1 4*10.3)
/ @1 SPLJ $CHAR20.
/ (PT1LJ PH1LJ ST1LJ SH1LJ) (@1 4*10.3)
/ (PT2LJ PH2LJ ST2LJ SH2LJ) (@1 4*10.3)
/ (PT3LJ PH3LJ ST3LJ SH3LJ) (@1 4*10.3)
/ (PT4LJ PH4LJ ST4LJ SH4LJ) (@1 4*10.3)
/ (PT5LJ PH5LJ ST5LJ SH5LJ) (@1 4*10.3)
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   / @1 SPLK $CHAR20.
   / (PT1LK PH1LK ST1LK SH1LK) (@1 4*10.3)
   / (PT2LK PH2LK ST2LK SH2LK) (@1 4*10.3)
   / (PT3LK PH3LK ST3LK SH3LK) (@1 4*10.3)
   / (PT4LK PH4LK ST4LK SH4LK) (@1 4*10.3)
   / (PT5LK PH5LK ST5LK SH5LK) (@1 4*10.3);
PROC SORT; BY RESERVOR ;
**** THIS STEP PRINTS OUT THE FINAL SUMMARY RESULTS IN SPECIFIC COLUMNS;
DATA _NULL_; SET RPTFIN; BY RESERVOR ;
FILE PRINT HEADER=HEAD NOTITLES;
IF FIRST.RESERVOR THEN DO; PUT _PAGE_; END;
PUT @1 '1. TOTAL TRIPS' @22 ESTRIPS1 COMMA8. @33 ESTRIPS2 COMMA8.
     @44 ESTRIPS3 COMMA8. @55 ESTRIPS4 COMMA8. @66 ESTRIPS5 COMMA8./
    @1 '2. TRIPS PER ACRE' @25 TRPRAC1 5.2 @36 TRPRAC2 5.2
     @47 TRPRAC3 5.2 @58 TRPRAC4 5.2 @69 TRPRAC5 5.2/
    @1 '3. HOURS PER ACRE' @25 HRPRAC1 5.2 @36 HRPRAC2 5.2
     @47 HRPRAC3 5.2 @58 HRPRAC4 5.2 @69 HRPRAC5 5.2/
    @1 '4. % SUCCESS-COMP.TRIP' @25 PERSUC1 5.1 @36 PERSUC2 5.1
     @47 PERSUC3 5.1 @58 PERSUC4 5.1 @69 PERSUC5 5.1/
    @1 '5. % BOAT FISHERMEN' @25 BOATPER1 5.1 @36 BOATPER2 5.1
     @47 BOATPER3 5.1 @58 BOATPER4 5.1 @69 BOATPER5 5.1/
    @1 '6. % BANK FISHERMEN' @25 BANKPER1 5.1 @36 BANKPER2 5.1
     @47 BANKPER3 5.1 @58 BANKPER4 5.1 @69 BANKPER5 5.1/
    @1 '7. NUMBER CAUGHT:'/
    @3 SPMA $CHAR20. @19 TN1MA COMMA11. @30 TN2MA COMMA11.
     @41 TN3MA COMMA11. @52 TN4MA COMMA11. @63 TN5MA COMMA11./
    @3 SPMB $CHAR20. @19 TN1MB COMMA11. @30 TN2MB COMMA11.
     @41 TN3MB COMMA11. @52 TN4MB COMMA11. @63 TN5MB COMMA11./
    @3 SPMC $CHAR20. @19 TN1MC COMMA11. @30 TN2MC COMMA11.
     @41 TN3MC COMMA11. @52 TN4MC COMMA11. @63 TN5MC COMMA11./
    @3 SPMD $CHAR20. @19 TN1MD COMMA11. @30 TN2MD COMMA11.
     @41 TN3MD COMMA11. @52 TN4MD COMMA11. @63 TN5MD COMMA11./
    @3 SPME $CHAR20. @19 TN1ME COMMA11. @30 TN2ME COMMA11.
     @41 TN3ME COMMA11. @52 TN4ME COMMA11. @63 TN5ME COMMA11./
    @3 SPMF $CHAR20. @19 TN1MF COMMA11. @30 TN2MF COMMA11.
     @41 TN3MF COMMA11. @52 TN4MF COMMA11. @63 TN5MF COMMA11./
    @3 SPMG $CHAR20. @19 TN1MG COMMA11. @30 TN2MG COMMA11.
     @41 TN3MG COMMA11. @52 TN4MG COMMA11. @63 TN5MG COMMA11./
    @3 SPMH $CHAR20. @19 TN1MH COMMA11. @30 TN2MH COMMA11.
     @41 TN3MH COMMA11. @52 TN4MH COMMA11. @63 TN5MH COMMA11./
    @3 SPMI $CHAR20. @19 TN1MI COMMA11. @30 TN2MI COMMA11.
     @41 TN3MI COMMA11. @52 TN4MI COMMA11. @63 TN5MI COMMA11./
    @1 '8. POUNDS CAUGHT:'/
    @3 SPMA $CHAR20. @19 TP1MA COMMA11. @30 TP2MA COMMA11.
     @41 TP3MA COMMA11. @52 TP4MA COMMA11. @63 TP5MA COMMA11./
    @3 SPMB $CHAR20. @19 TP1MB COMMA11. @30 TP2MB COMMA11.
     @41 TP3MB COMMA11. @52 TP4MB COMMA11. @63 TP5MB COMMA11./
    @3 SPMC $CHAR20. @19 TP1MC COMMA11. @30 TP2MC COMMA11.
     @41 TP3MC COMMA11. @52 TP4MC COMMA11. @63 TP5MC COMMA11./
    @3 SPMD $CHAR20. @19 TP1MD COMMA11. @30 TP2MD COMMA11.
     @41 TP3MD COMMA11. @52 TP4MD COMMA11. @63 TP5MD COMMA11./
    @3 SPME $CHAR20. @19 TP1ME COMMA11. @30 TP2ME COMMA11.
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 @41 TP3ME COMMA11. @52 TP4ME COMMA11. @63 TP5ME COMMA11./
@3 SPMF $CHAR20. @19 TP1MF COMMA11. @30 TP2MF COMMA11.
 @41 TP3MF COMMA11. @52 TP4MF COMMA11. @63 TP5MF COMMA11./
@3 SPMG $CHAR20. @19 TP1MG COMMA11. @30 TP2MG COMMA11.
 @41 TP3MG COMMA11. @52 TP4MG COMMA11. @63 TP5MG COMMA11./
@3 SPMH $CHAR20. @19 TP1MH COMMA11. @30 TP2MH COMMA11.
 @41 TP3MH COMMA11. @52 TP4MH COMMA11. @63 TP5MH COMMA11./
@3 SPMI $CHAR20. @19 TP1MI COMMA11. @30 TP2MI COMMA11.
@41 TP3MI COMMA11. @52 TP4MI COMMA11. @63 TP5MI COMMA11./
@1 '9. AVE. WEIGHT (8.BY7.):'/
@3 SPMA $CHAR20. @25 TM1MA 5.2 @36 TM2MA 5.2
 @47 TM3MA 5.2 @58 TM4MA 5.2 @69 TM5MA 5.2/
@3 SPMB $CHAR20. @25 TM1MB 5.2 @36 TM2MB 5.2
 @47 TM3MB 5.2 @58 TM4MB 5.2 @69 TM5MB 5.2/
@3 SPMC $CHAR20. @25 TM1MC 5.2 @36 TM2MC 5.2
 @47 TM3MC 5.2 @58 TM4MC 5.2 @69 TM5MC 5.2/
@3 SPMD $CHAR20. @25 TM1MD 5.2 @36 TM2MD 5.2
 @47 TM3MD 5.2 @58 TM4MD 5.2 @69 TM5MD 5.2/
@3 SPME $CHAR20. @25 TM1ME 5.2 @36 TM2ME 5.2
 @47 TM3ME 5.2 @58 TM4ME 5.2 @69 TM5ME 5.2/
@3 SPMF $CHAR20. @25 TM1MF 5.2 @36 TM2MF 5.2
 @47 TM3MF 5.2 @58 TM4MF 5.2 @69 TM5MF 5.2/
@3 SPMG $CHAR20. @25 TM1MG 5.2 @36 TM2MG 5.2
 @47 TM3MG 5.2 @58 TM4MG 5.2 @69 TM5MG 5.2/
@3 SPMH $CHAR20. @25 TM1MH 5.2 @36 TM2MH 5.2
 @47 TM3MH 5.2 @58 TM4MH 5.2 @69 TM5MH 5.2/
@3 SPMI $CHAR20. @25 TM1MI 5.2 @36 TM2MI 5.2
 @47 TM3MI 5.2 @58 TM4MI 5.2 @69 TM5MI 5.2/
@1 '10. LBS PER ACRE (8.BY ACRES):'/
@3 SPMA $CHAR20. @25 TPA1MA 5.2 @36 TPA2MA 5.2
 @47 TPA3MA 5.2 @58 TPA4MA 5.2 @69 TPA5MA 5.2/
@3 SPMB $CHAR20. @25 TPA1MB 5.2 @36 TPA2MB 5.2
 @47 TPA3MB 5.2 @58 TPA4MB 5.2 @69 TPA5MB 5.2/
@3 SPMC $CHAR20. @25 TPA1MC 5.2 @36 TPA2MC 5.2
 @47 TPA3MC 5.2 @58 TPA4MC 5.2 @69 TPA5MC 5.2/
@3 SPMD $CHAR20. @25 TPA1MD 5.2 @36 TPA2MD 5.2
 @47 TPA3MD 5.2 @58 TPA4MD 5.2 @69 TPA5MD 5.2/
@3 SPME $CHAR20. @25 TPA1ME 5.2 @36 TPA2ME 5.2
 @47 TPA3ME 5.2 @58 TPA4ME 5.2 @69 TPA5ME 5.2/
@3 SPMF $CHAR20. @25 TPA1MF 5.2 @36 TPA2MF 5.2
 @47 TPA3MF 5.2 @58 TPA4MF 5.2 @69 TPA5MF 5.2/
@3 SPMG $CHAR20. @25 TPA1MG 5.2 @36 TPA2MG 5.2
 @47 TPA3MG 5.2 @58 TPA4MG 5.2 @69 TPA5MG 5.2/
@3 SPMH $CHAR20. @25 TPA1MH 5.2 @36 TPA2MH 5.2
 @47 TPA3MH 5.2 @58 TPA4MH 5.2 @69 TPA5MH 5.2/
@3 SPMI $CHAR20. @25 TPA1MI 5.2 @36 TPA2MI 5.2
@47 TPA3MI 5.2 @58 TPA4MI 5.2 @69 TPA5MI 5.2/
 @1 '11. NO. PER HOUR (7.BY EST HRS):'/
@3 SPMA $CHAR20. @25 TNH1MA 5.2 @36 TNH2MA 5.2
 @47 TNH3MA 5.2 @58 TNH4MA 5.2 @69 TNH5MA 5.2/
@3 SPMB $CHAR20. @25 TNH1MB 5.2 @36 TNH2MB 5.2
 @47 TNH3MB 5.2 @58 TNH4MB 5.2 @69 TNH5MB 5.2/
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@3 SPMC $CHAR20. @25 TNH1MC 5.2 @36 TNH2MC 5.2
 @47 TNH3MC 5.2 @58 TNH4MC 5.2 @69 TNH5MC 5.2/
@3 SPMD $CHAR20. @25 TNH1MD 5.2 @36 TNH2MD 5.2
 @47 TNH3MD 5.2 @58 TNH4MD 5.2 @69 TNH5MD 5.2/
@3 SPME $CHAR20. @25 TNH1ME 5.2 @36 TNH2ME 5.2
 @47 TNH3ME 5.2 @58 TNH4ME 5.2 @69 TNH5ME 5.2/
@3 SPMF $CHAR20. @25 TNH1MF 5.2 @36 TNH2MF 5.2
 @47 TNH3MF 5.2 @58 TNH4MF 5.2 @69 TNH5MF 5.2/
@3 SPMG $CHAR20. @25 TNH1MG 5.2 @36 TNH2MG 5.2
 @47 TNH3MG 5.2 @58 TNH4MG 5.2 @69 TNH5MG 5.2/
@3 SPMH $CHAR20. @25 TNH1MH 5.2 @36 TNH2MH 5.2
 @47 TNH3MH 5.2 @58 TNH4MH 5.2 @69 TNH5MH 5.2/
@3 SPMI $CHAR20. @25 TNH1MI 5.2 @36 TNH2MI 5.2
@47 TNH3MI 5.2 @58 TNH4MI 5.2 @69 TNH5MI 5.2/
 @1 '12. LB. PER HOUR (8.BY EST HRS):'/
@3 SPMA $CHAR20. @25 TPH1MA 5.2 @36 TPH2MA 5.2
 @47 TPH3MA 5.2 @58 TPH4MA 5.2 @69 TPH5MA 5.2/
@3 SPMB $CHAR20. @25 TPH1MB 5.2 @36 TPH2MB 5.2
 @47 TPH3MB 5.2 @58 TPH4MB 5.2 @69 TPH5MB 5.2/
@3 SPMC $CHAR20. @25 TPH1MC 5.2 @36 TPH2MC 5.2
 @47 TPH3MC 5.2 @58 TPH4MC 5.2 @69 TPH5MC 5.2/
@3 SPMD $CHAR20. @25 TPH1MD 5.2 @36 TPH2MD 5.2
 @47 TPH3MD 5.2 @58 TPH4MD 5.2 @69 TPH5MD 5.2/
@3 SPME $CHAR20. @25 TPH1ME 5.2 @36 TPH2ME 5.2
 @47 TPH3ME 5.2 @58 TPH4ME 5.2 @69 TPH5ME 5.2/
@3 SPMF $CHAR20. @25 TPH1MF 5.2 @36 TPH2MF 5.2
 @47 TPH3MF 5.2 @58 TPH4MF 5.2 @69 TPH5MF 5.2/
@3 SPMG $CHAR20. @25 TPH1MG 5.2 @36 TPH2MG 5.2
 @47 TPH3MG 5.2 @58 TPH4MG 5.2 @69 TPH5MG 5.2/
@3 SPMH $CHAR20. @25 TPH1MH 5.2 @36 TPH2MH 5.2
 @47 TPH3MH 5.2 @58 TPH4MH 5.2 @69 TPH5MH 5.2/
@3 SPMI $CHAR20. @25 TPH1MI 5.2 @36 TPH2MI 5.2
@47 TPH3MI 5.2 @58 TPH4MI 5.2 @69 TPH5MI 5.2/
 @1 '13. FISHING TRIPS (%) FOR:'/
@3 SPLA $CHAR20. @25 PT1LA 5.2 @36 PT2LA 5.2
 @47 PT3LA 5.2 @58 PT4LA 5.2 @69 PT5LA 5.2/
@3 SPLB $CHAR20. @25 PT1LB 5.2 @36 PT2LB 5.2
 @47 PT3LB 5.2 @58 PT4LB 5.2 @69 PT5LB 5.2/
@3 SPLC $CHAR20. @25 PT1LC 5.2 @36 PT2LC 5.2
 @47 PT3LC 5.2 @58 PT4LC 5.2 @69 PT5LC 5.2/
@3 SPLD $CHAR20. @25 PT1LD 5.2 @36 PT2LD 5.2
 @47 PT3LD 5.2 @58 PT4LD 5.2 @69 PT5LD 5.2/
@3 SPLE $CHAR20. @25 PT1LE 5.2 @36 PT2LE 5.2
 @47 PT3LE 5.2 @58 PT4LE 5.2 @69 PT5LE 5.2/
@3 SPLF $CHAR20. @25 PT1LF 5.2 @36 PT2LF 5.2
 @47 PT3LF 5.2 @58 PT4LF 5.2 @69 PT5LF 5.2/
@3 SPLG $CHAR20. @25 PT1LG 5.2 @36 PT2LG 5.2
 @47 PT3LG 5.2 @58 PT4LG 5.2 @69 PT5LG 5.2/
@3 SPLH $CHAR20. @25 PT1LH 5.2 @36 PT2LH 5.2
 @47 PT3LH 5.2 @58 PT4LH 5.2 @69 PT5LH 5.2/
@3 SPLI $CHAR20. @25 PT1LI 5.2 @36 PT2LI 5.2
 @47 PT3LI 5.2 @58 PT4LI 5.2 @69 PT5LI 5.2/
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@3 SPLJ $CHAR20. @25 PT1LJ 5.2 @36 PT2LJ 5.2
 @47 PT3LJ 5.2 @58 PT4LJ 5.2 @69 PT5LJ 5.2/
@3 SPLK $CHAR20. @25 PT1LK 5.2 @36 PT2LK 5.2
 @47 PT3LK 5.2 @58 PT4LK 5.2 @69 PT5LK 5.2/
@1 '14. HOURS FISHING (%) FOR:'/
@3 SPLA $CHAR20. @25 PH1LA 5.2 @36 PH2LA 5.2
 @47 PH3LA 5.2 @58 PH4LA 5.2 @69 PH5LA 5.2/
@3 SPLB $CHAR20. @25 PH1LB 5.2 @36 PH2LB 5.2
 @47 PH3LB 5.2 @58 PH4LB 5.2 @69 PH5LB 5.2/
@3 SPLC $CHAR20. @25 PH1LC 5.2 @36 PH2LC 5.2
 @47 PH3LC 5.2 @58 PH4LC 5.2 @69 PH5LC 5.2/
@3 SPLD $CHAR20. @25 PH1LD 5.2 @36 PH2LD 5.2
 @47 PH3LD 5.2 @58 PH4LD 5.2 @69 PH5LD 5.2/
@3 SPLE $CHAR20. @25 PH1LE 5.2 @36 PH2LE 5.2
 @47 PH3LE 5.2 @58 PH4LE 5.2 @69 PH5LE 5.2/
@3 SPLF $CHAR20. @25 PH1LF 5.2 @36 PH2LF 5.2
 @47 PH3LF 5.2 @58 PH4LF 5.2 @69 PH5LF 5.2/
@3 SPLG $CHAR20. @25 PH1LG 5.2 @36 PH2LG 5.2
 @47 PH3LG 5.2 @58 PH4LG 5.2 @69 PH5LG 5.2/
@3 SPLH $CHAR20. @25 PH1LH 5.2 @36 PH2LH 5.2
 @47 PH3LH 5.2 @58 PH4LH 5.2 @69 PH5LH 5.2/
@3 SPLI $CHAR20. @25 PH1LI 5.2 @36 PH2LI 5.2
 @47 PH3LI 5.2 @58 PH4LI 5.2 @69 PH5LI 5.2/
@3 SPLJ $CHAR20. @25 PH1LJ 5.2 @36 PH2LJ 5.2
 @47 PH3LJ 5.2 @58 PH4LJ 5.2 @69 PH5LJ 5.2/
@3 SPLK $CHAR20. @25 PH1LK 5.2 @36 PH2LK 5.2
 @47 PH3LK 5.2 @58 PH4LK 5.2 @69 PH5LK 5.2/
@1 '15. TRIPS PER ACRE FOR:'/
@3 SPLA $CHAR20. @25 ST1LA 5.3 @36 ST2LA 5.3
 @47 ST3LA 5.3 @58 ST4LA 5.3 @69 ST5LA 5.3/
@3 SPLB $CHAR20. @25 ST1LB 5.3 @36 ST2LB 5.3
 @47 ST3LB 5.3 @58 ST4LB 5.3 @69 ST5LB 5.3/
@3 SPLC $CHAR20. @25 ST1LC 5.3 @36 ST2LC 5.3
 @47 ST3LC 5.3 @58 ST4LC 5.3 @69 ST5LC 5.3/
@3 SPLD $CHAR20. @25 ST1LD 5.3 @36 ST2LD 5.3
 @47 ST3LD 5.3 @58 ST4LD 5.3 @69 ST5LD 5.3/
@3 SPLE $CHAR20. @25 ST1LE 5.3 @36 ST2LE 5.3
 @47 ST3LE 5.3 @58 ST4LE 5.3 @69 ST5LE 5.3/
@3 SPLF $CHAR20. @25 ST1LF 5.3 @36 ST2LF 5.3
 @47 ST3LF 5.3 @58 ST4LF 5.3 @69 ST5LF 5.3/
@3 SPLG $CHAR20. @25 ST1LG 5.3 @36 ST2LG 5.3
 @47 ST3LG 5.3 @58 ST4LG 5.3 @69 ST5LG 5.3/
@3 SPLH $CHAR20. @25 ST1LH 5.3 @36 ST2LH 5.3
 @47 ST3LH 5.3 @58 ST4LH 5.3 @69 ST5LH 5.3/
@3 SPLI $CHAR20. @25 ST1LI 5.3 @36 ST2LI 5.3
 @47 ST3LI 5.3 @58 ST4LI 5.3 @69 ST5LI 5.3/
@3 SPLJ $CHAR20. @25 ST1LJ 5.3 @36 ST2LJ 5.3
 @47 ST3LJ 5.3 @58 ST4LJ 5.3 @69 ST5LJ 5.3/
@3 SPLK $CHAR20. @25 ST1LK 5.3 @36 ST2LK 5.3
 @47 ST3LK 5.3 @58 ST4LK 5.3 @69 ST5LK 5.3/
@1 '16. HOURS PER ACRE FOR:'/
@3 SPLA $CHAR20. @25 SH1LA 5.3 @36 SH2LA 5.3
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      @47 SH3LA 5.3 @58 SH4LA 5.3 @69 SH5LA 5.3/
     @3 SPLB $CHAR20. @25 SH1LB 5.3 @36 SH2LB 5.3
      @47 SH3LB 5.3 @58 SH4LB 5.3 @69 SH5LB 5.3/
     @3 SPLC $CHAR20. @25 SH1LC 5.3 @36 SH2LC 5.3
      @47 SH3LC 5.3 @58 SH4LC 5.3 @69 SH5LC 5.3/
     @3 SPLD $CHAR20. @25 SH1LD 5.3 @36 SH2LD 5.3
      @47 SH3LD 5.3 @58 SH4LD 5.3 @69 SH5LD 5.3/
     @3 SPLE $CHAR20. @25 SH1LE 5.3 @36 SH2LE 5.3
      @47 SH3LE 5.3 @58 SH4LE 5.3 @69 SH5LE 5.3/
     @3 SPLF $CHAR20. @25 SH1LF 5.3 @36 SH2LF 5.3
      @47 SH3LF 5.3 @58 SH4LF 5.3 @69 SH5LF 5.3/
     @3 SPLG $CHAR20. @25 SH1LG 5.3 @36 SH2LG 5.3
      @47 SH3LG 5.3 @58 SH4LG 5.3 @69 SH5LG 5.3/
     @3 SPLH $CHAR20. @25 SH1LH 5.3 @36 SH2LH 5.3
      @47 SH3LH 5.3 @58 SH4LH 5.3 @69 SH5LH 5.3/
     @3 SPLI $CHAR20. @25 SH1LI 5.3 @36 SH2LI 5.3
      @47 SH3LI 5.3 @58 SH4LI 5.3 @69 SH5LI 5.3/
     @3 SPLJ $CHAR20. @25 SH1LJ 5.3 @36 SH2LJ 5.3
      @47 SH3LJ 5.3 @58 SH4LJ 5.3 @69 SH5LJ 5.3/
     @3 SPLK $CHAR20. @25 SH1LK 5.3 @36 SH2LK 5.3
      @47 SH3LK 5.3 @58 SH4LK 5.3 @69 SH5LK 5.3;
RETURN;
 HEAD: PUT / @25 'COMBINED FISHERIES-' @44 RESERVOR 25./
        @25 'YEAR1' @36 'YEAR2' @47 'YEAR3' @58 'YEAR4' @69 'YEAR5'/
        @25 YR1 5. @36 YR2 5. @47 YR3 5. @58 YR4 5. @69 YR5 5.;
 RETURN;
**** THE FOLLOWING SERIES OF STATEMENTS CREATE GRAPHICS OF NORRIS, KENTUCKY,
**** AND TIMS FORD RESERVOIRS WITH EMPHASIS ON CRAPPIE AND BLACK BASS CATCH AND
**** PRESSURE;
DATA GRAFF; SET EVERYTHG;
IF (YR GE 79 AND YR LE 83);
IF (LAKE=01 OR LAKE=02 OR LAKE=08);
DATA GRAPH; SET GRAFF;
%TRANRES
DATA GR1; SET GRAPH;
IF ALLTOG=1;
LABEL NOPERHR= NUMBER PER HOUR
      YR= YEAR;
PROC SORT; BY RESERVOR;
PROC PLOT; BY RESERVOR;
PLOT NOPERHR*YR=*/HPOS=64 VPOS=50;
TITLE ESTIMATED NUMBER CAUGHT PER HOUR OF CRAPPIE (87) BY YEAR;
DATA GR2; SET GRAPH;
IF ALLTOG=1;
LABEL ESTOTLB= TOTAL POUNDS
      YR= YEAR;
PROC SORT; BY RESERVOR;
PROC PLOT; BY RESERVOR;
PLOT ESTOTLB*YR=*/HPOS=64 VPOS=50;
TITLE ESTIMATED TOTAL POUNDS OF CRAPPIE (87) BY YEAR;
DATA GR3; SET GRAPH;
IF ALLTOG=1;
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```
LABEL LBACRE= POUNDS PER ACRE
      YR= YEAR;
PROC SORT; BY RESERVOR;
PROC PLOT; BY RESERVOR;
PLOT LBACRE*YR=*/HPOS=64 VPOS=50;
TITLE ESTIMATED POUNDS PER ACRE OF CRAPPIE (87) BY YEAR;
DATA GR4; SET GRAPH;
IF ALLTOG=2;
LABEL NOPERHR= NUMBER PER HOUR
      YR= YEAR;
PROC SORT; BY RESERVOR;
PROC PLOT; BY RESERVOR;
PLOT NOPERHR*YR=*/HPOS=64 VPOS=50;
TITLE ESTIMATED NUMBER CAUGHT PER HOUR OF BLACK BASS (80) BY YEAR;
DATA GR5; SET GRAPH;
IF ALLTOG=2;
LABEL ESTOTLB= TOTAL POUNDS
      YR= YEAR;
PROC SORT; BY RESERVOR;
PROC PLOT; BY RESERVOR;
PLOT ESTOTLB*YR=*/HPOS=64 VPOS=50;
TITLE ESTIMATED TOTAL POUNDS OF BLACK BASS (80) BY YEAR;
DATA GR6; SET GRAPH;
IF ALLTOG=2;
LABEL LBACRE= POUNDS PER ACRE
      YR= YEAR;
PROC SORT; BY RESERVOR;
PROC PLOT; BY RESERVOR;
PLOT LBACRE*YR=*/HPOS=64 VPOS=50;
TITLE ESTIMATED POUNDS PER ACRE OF BLACK BASS (80) BY YEAR;
//S9 EXEC SAS,REGION=1024K,SORT=75,OPTIONS='MACRO'
//WORK DD SPACE=(CYL,(200,50)),UNIT=SYSDA
//TALLMRG DD DSN=ALLMRG,DISP=SHR,
// UNIT=TAPE,VOL=REF=*.S4.GO.TAPE,LABEL=1
//RPOUT DD UNIT=SYSDA,DISP=(NEW,PASS),SPACE=(TRK,(75,25),RLSE),
//  DCB=(RECFM=FB,LRECL=100,BLKSIZE=1000),DSN=&&RPOUT
//SYSIN DD *
*****-------------------------------------------------------------------*****
*  THE FOLLOWING SERIES OF STATEMENTS ULTIMATELY CREATE A SUMMARY SHEET    *
* OF ALL CREEL DATA BY YEAR. THIS SUMMARY SHEET IS PRODUCED IN AN          *
* ORGANIZED TYPED FORM WHICH COVERS A FIVE YEAR PERIOD. THIS SUMMARY       *
* SHEET IS ONLY TWO PAGES LONG AND COVERS ALL RESERVOIRS CREELED.          *
*    LISTED BELOW ARE IMPORTANT VARIABLES WITH BRIEF DEFINITIONS:          *
*  EXPTIME =EXPANSION OF HOURS FISHED                                      *
*  EXPSUM  =SUM OF EXPANDED HOURS                                          *
*  TOTNO   =TOTAL NUMBER OF FISH CREELED (PER SPECIES)                     *
*  TOTLB   =TOTAL POUNDS OF FISH CREELED (PER SPECIES)                     *
*  MNLBS   =AVERAGE WEIGHT OF FISH CREELED (PER SPECIES)                   *
*  TOTALNO =SUM OF TOTAL NUMBER OF FISH CREELED (ALL SPECIES)              *
*  TOTALLB =SUM OF TOTAL WEIGHT OF FISH CREELED (ALL SPECIES)              *
*  TOTALMN =TOTAL AVERAGE WEIGHT OF FISH CREELED (ALL SPECIES)             *
*  THRFI   =TOTAL HOURS FISHED (PER CREEL RECORD)                          *
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*  HRSAMP  =TOTAL HOURS FISHED (BY TOTAL FISHERMEN PER CREEL RECORD)      *
*  HRSAMPLE=TOTAL HOURS FISHED FOR WEEK SAMPLED                           *
*  WKTOTNO =ESTIMATED WEEKLY TOTAL NUMBER OF FISH CREELED                 *
*  WKTOTLB =ESTIMATED WEEKLY TOTAL WEIGHT OF FISH CREELED                 *
*  ESTOTNO =ESTIMATED TOTAL NUMBER OF FISH CREELED (PER SPECIES)          *
*  ESTOTLB =ESTIMATED TOTAL POUNDS OF FISH CREELED (PER SPECIES)          *
*  ESTHRS  =ESTIMATED HOURS FISHED                                        *
*  ESTRIPS =ESTIMATED NUMBER OF TRIPS                                     *
*  TOTESTNO=SUM OF ESTIMATED TOTAL NUMBER OF FISH CREELED (ALL SPECIES)   *
*  TOTESTLB=SUM OF ESTIMATED TOTAL POUNDS OF FISH CREELED (ALL SPECIES)   *
*  CODE1-6 =CODED VALUES FOR FISH SPECIES                                 *
*  NO1-6   =NUMBER OF FISH CAUGHT PER FISH SPECIES CODE                   *
*  LBST1-6 =POUNDS OF FISH CAUGHT PER FISH SPECIES CODE                   *
*  PERNO   =PERCENT OF TOTAL NUMBER OF FISH CAUGHT (BY SPECIES)           *
*  PERLB   =PERCENT OF TOTAL POUNDS OF FISH CAUGHT (BY SPECIES)           *
*  COMP    =COMPLETED OR NOT COMPLETED TRIP                               *
*  NOCOMPTP=NUMBER OF COMPLETED TRIPS                                     *
*  FMHRS   =HOURS FISHED FOR COMPLETED TRIPS                              *
*  SWKHR   =WEEKLY TOTAL OF HOURS FISHED FOR COMPLETED TRIPS              *
*  WEEKAVE =AVERAGE WEEKLY TOTAL OF HOURS FISHED                          *
*  NWKS    =NUMBER OF WEEKS WITH DATA COLLECTED                           *
*  SWKAVE  =SUM OF WEEKLY AVERAGES OF HOURS FISHED                        *
*  MMOAVE  =MONTHLY AVERAGE OF HOURS FISHED                               *
*  NYRS    =NUMBER OF YEARS WITH DATA COLLECTED                           *
*  YRAVTRP =YEARLY AVERAGE LENGTH OF TRIP                                 *
*  MYRAVE  =SUM OF MONTHLY AVERAGES OF HOURS FISHED                       *
*  NORES   =NUMBER OF RESERVOIRS IN YEARLY SAMPLE                         *
*  SUMACRE =SUM OF THE NUMBER OF ACRES IN YEARLY SAMPLE                   *
*  TRPRAC  =NUMBER OF TRIPS PER ACRE                                      *
*  HRPRAC  =NUMBER OF HOURS SPENT FISHING PER ACRE                        *
*  NOSUCC  =NUMBER OF SUCCESSFUL FISHERMEN                                *
*  NOCMPTRP=NUMBER OF COMPLETED TRIPS                                     *
*  PERSUC  =PERCENT OF SUCCESSFUL FISHERMEN                               *
*  BOBA    =BOAT OR BANK FISHERMAN                                        *
*  SUBOAT  =TOTAL NUMBER OF BOAT FISHERMEN                                *
*  SUBANK  =TOTAL NUMBER OF BANK FISHERMEN                                *
*  TOTMEN  =TOTAL NUMBER OF FISHERMEN SAMPLED                             *
*  BOATPER =PERCENTAGE OF BOAT FISHERMEN                                  *
*  BANKPER =PERCENTAGE OF BANK FISHERMEN                                  *
*  ALLTOG  =A COUNTING VARIABLE                                           *
*  AVEWT   =ESTIMATED AVERAGE WEIGHT OF FISH CREELED (PER SPECIES)        *
*  LBACRE  =NUMBER OF ESTIMATED POUNDS CREELED PER ACRE (PER SPECIES)     *
*  MENSAMPD=NUMBER OF FISHERMEN SAMPLED                                   *
*  NOPERHR =NUMBER OF FISH CAUGHT PER HOUR                                *
*  LBPERHR =POUNDS OF FISH CAUGHT PER HOUR                                *
*  AVCOTRIP=AVERAGE LENGTH OF COMPLETED TRIP                              *
*  SPFI    =PREFERRED SPECIES FISHED FOR BY FISHERMAN                     *
*  SPECHUM =NUMBER OF FISHERMEN FISHING FOR PREFERRED SPECIES             *
*  PERSPETP=PERCENTAGE OF TRIPS SPENT FISHING FOR PARTICULAR SPECIES      *
*  SPECTRAC=NUMBER OF TRIPS PER ACRE FOR A PARTICULAR SPECIES             *
*  SPECHR  =NUMBER OF HOURS SPENT FISHING FOR A PARTICULAR SPECIES        *
*  PERSPEHR=PERCENTAGE OF HOURS SPENT FISHING FOR A PARTICULAR SPECIES    *
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*  SPECHRAC=NUMBER OF HOURS SPENT PER ACRE FISHING FOR PARTICULAR SPECIES  *
*     THE FOLLOWING STEPS ARE MACROS THAT ARE USED THROUGHOUT THE PROGRAM   *
* TO RENAME THE CODED VARIABLES: SPECIES AND LAKE, AND TO COMBINE AN       *
* ACREAGE VARIABLE WITH THE ASSOCIATED LAKE.                               *
*****-------------------------------------------------------------------*****;
%MACRO TRANSPEC;
IF (SPECIES='88' OR SPECIES='89' OR SPECIES='87') THEN SPECIES='A. CRAPPIE 87';
IF (SPECIES='81' OR SPECIES='82' OR SPECIES='83' OR SPECIES='84' OR
  SPECIES='80') THEN SPECIES='B. BLACK BASS 80';
IF (SPECIES='41' OR SPECIES='42' OR SPECIES='43') THEN SPECIES='C. CATFISH 40';
IF (SPECIES='60' OR SPECIES='61' OR SPECIES='62' OR SPECIES='63' OR SPECIES=
  '64' OR SPECIES='59') THEN SPECIES= 'H. TROUT 62';
IF (SPECIES='66' OR SPECIES='67') THEN SPECIES='D. STRIPD/HYB 65';
IF (SPECIES='91' OR SPECIES='92' OR SPECIES='93' OR SPECIES='94' OR SPECIES=
   '95' OR SPECIES='96' OR SPECIES='97' OR SPECIES='98' OR SPECIES='99' OR
   SPECIES='90') THEN SPECIES='F. SUNFISH 90';
IF SPECIES='68' THEN SPECIES='E. WHITE BASS 68';
IF (SPECIES='70' OR SPECIES='71' OR SPECIES='73') THEN
  SPECIES='G. WALL/SAUG 74';
IF (SPECIES='1' OR SPECIES='2' OR SPECIES='3' OR SPECIES='4' OR SPECIES='5' OR
  SPECIES='6' OR SPECIES='7' OR SPECIES='8' OR SPECIES='9' OR SPECIES='01' OR
  SPECIES='02' OR SPECIES='03' OR SPECIES='04' OR SPECIES='05' OR SPECIES='06'
  OR SPECIES='07' OR SPECIES='08' OR SPECIES='09' OR SPECIES='10' OR SPECIES=
  '11' OR SPECIES='12' OR SPECIES='13' OR SPECIES='14' OR SPECIES='15' OR
  SPECIES='16' OR SPECIES='17' OR SPECIES='18' OR SPECIES='19' OR SPECIES='20'
  OR SPECIES='21' OR SPECIES='22' OR SPECIES='23' OR SPECIES='24' OR SPECIES=
  '25' OR SPECIES='26' OR SPECIES='27' OR SPECIES='30' OR SPECIES='31' OR
  SPECIES='32' OR SPECIES='33' OR SPECIES='34' OR SPECIES='35' OR SPECIES='36'
  OR SPECIES='37' OR SPECIES='44' OR SPECIES='45' OR SPECIES='46' OR SPECIES=
  '47' OR SPECIES='50' OR SPECIES='51' OR SPECIES='52' OR SPECIES='53' OR
  SPECIES='54' OR SPECIES='55' OR SPECIES='56' OR SPECIES='69' OR SPECIES='72'
  OR SPECIES='76' OR SPECIES='77' OR SPECIES='78' OR SPECIES='79')
  THEN SPECIES='I. OTHER 00';
  IF (SPECIES='A. CRAPPIE 87' OR SPECIES='B. BLACK BASS 80' OR
     SPECIES='C. CATFISH 40' OR SPECIES='H. TROUT 62' OR
     SPECIES='D. STRIPD/HYB 65' OR SPECIES='F. SUNFISH 90' OR
     SPECIES='E. WHITE BASS 68' OR SPECIES='G. WALL/SAUG 74' OR
     SPECIES='I. OTHER 00');
 %MEND;
%MACRO TRANACRE;
LENGTH ACRE 8;
IF LAKE=01 THEN ACRE=34200;
IF LAKE=02 THEN ACRE=110200;
IF LAKE=03 THEN ACRE=3910;
IF LAKE=04 THEN ACRE=23400;
IF LAKE=05 THEN ACRE=6430;
IF LAKE=06 THEN ACRE=10000;
IF LAKE=07 THEN ACRE=30300;
IF LAKE=08 THEN ACRE=10600;
IF LAKE=11 THEN ACRE=18220;
IF LAKE=12 THEN ACRE=7580;
IF LAKE=13 THEN ACRE=14200;
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IF LAKE=14 THEN ACRE=22500;
IF LAKE=15 THEN ACRE=11960;
IF LAKE=16 THEN ACRE=5690;
IF LAKE=17 THEN ACRE=3230;
IF LAKE=18 THEN ACRE=30400;
IF LAKE=21 THEN ACRE=14600;
IF LAKE=22 THEN ACRE=13000;
IF LAKE=23 THEN ACRE=4400;
IF LAKE=76 THEN ACRE=35400;
IF LAKE=77 THEN ACRE=39000;
IF LAKE=78 THEN ACRE=10370;
 %MEND;
%MACRO TRANRES;
LENGTH RESERVOR $ 25;
IF LAKE=01 THEN RESERVOR='NORRIS 01';
IF LAKE=02 THEN RESERVOR='KENTUCKY 02';
IF LAKE=03  THEN RESERVOR='WOODS 03';
IF LAKE=04  THEN RESERVOR='DALE HOLLOW 04';
IF LAKE=05  THEN RESERVOR='WATAUGA 05';
IF LAKE=06  THEN RESERVOR='REELFOOT 06';
IF LAKE=07  THEN RESERVOR='CHEROKEE 07';
IF LAKE=08  THEN RESERVOR='TIMS FORD 08';
IF LAKE=10  THEN RESERVOR='HIWASSEE 10';
IF LAKE=11  THEN RESERVOR='CENTER HILL 11';
IF LAKE=12  THEN RESERVOR='SOUTH HOLSTON 12';
IF LAKE=13  THEN RESERVOR='PERCY PRIEST 13';
IF LAKE=14  THEN RESERVOR='OLD HICKORY 14';
IF LAKE=15  THEN RESERVOR='CORDELL HULL 15';
IF LAKE=16  THEN RESERVOR='MELTON HILL 16';
IF LAKE=17  THEN RESERVOR='NORMANDY 17';
IF LAKE=18  THEN RESERVOR='DOUGLAS 18';
IF LAKE=20  THEN RESERVOR='DALE HOLLOW TW 20';
IF LAKE=21  THEN RESERVOR='FORT LOUDON 21';
IF LAKE=22  THEN RESERVOR='TELLICO 22';
IF LAKE=23  THEN RESERVOR='BOONE 23';
IF LAKE=75  THEN RESERVOR='WHEELER 75';
IF LAKE=76 THEN RESERVOR='CHICKAMAUGA 76';
IF LAKE=77 THEN RESERVOR='WATTS BAR 77';
IF LAKE=78 THEN RESERVOR='NICKAJACK 78';
 %MEND;
**** THIS STEP SORTS THE VARIABLES SO THE FUTURE STEPS CAN EASILY
**** CALCULATE THE DESIRED RESULTS;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT; BY LAKE YR MO WK EXPTIME;
****  THIS DATA STEP BEGINS BY SETTING THE FIRST WEEKLY EXPANSION TIME TO ONE
**** AND THE REST OF THE EXPANSION TIMES IN THE SAME WEEK TO ZERO. IN THIS WAY,
**** ONLY ONE WEEKS' WORTH OF EXPANSION TIME WILL BE LISTED WITH THE ASSOCIATED
**** DATA AND CAN THEREFORE BE ADDED TOGETHER FOR A MONTHLY TOTAL. OTHERWISE,
**** THE SUM OF THE EXPANSION TIMES WOULD BE TOO LARGE A NUMBER AS EACH CREEL
**** RECORD HAS AN ACCOMPANYING EXPANSION TIME AND A WEEK OF CREEL RECORDS HAS
**** THE SAME EXPANSION TIME LISTED MORE THAN ONCE.
****  THE PROC MEANS STATEMENT IS SET UP TO TOTAL ALL EXPANSION TIMES TO
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**** WEEKLY TOTALS. THIS WILL BE USED IN LATER ANALYSES;
DATA L721; SET L721; BY LAKE YR MO WK EXPTIME;
IF FIRST.EXPTIME THEN FLAG=1;
IF FLAG NE 1 THEN EXPTIME=0;
PROC SORT; BY LAKE YR MO WK;
PROC MEANS NOPRINT SUM; VAR EXPTIME;
  OUTPUT OUT=NOEXPMO SUM=EXPSUM; BY LAKE YR MO WK;
****  THIS SET OF STATEMENTS RENAMES SOME OF THE VARIABLES IN OUR CREEL DATA
**** SET SO FUTURE RESULTS CAN BE ACCESSED AND PRINTED EASIER. THE VARIABLE
**** SPECIES REPLACES THE CODE VARIABLES, LBS REPLACES ASSOCIATED LB VARIABLE,
**** AND NO REPLACES THE NO VARIABLE ALSO ASSOCIATED WITH THE CODE
**** VARIABLE. THE MACRO TO RENAME CODED SPECIES VARIABLES IS USED IN
**** THIS STEP. IT ALSO CALCULATES THE WEEKLY TOTAL NUMBER AND POUNDS OF
**** FISH CREELED PER SPECIES;
PROC SORT DATA=L721; BY LAKE YR MO WK;
DATA RENAME; SET L721; BY LAKE YR MO WK;
DROP BOBA--SPFI EXPTIME;
DROP LBST1 LBST2 LBST3 LBST4 LBST5 LBST6
     NO1 NO2 NO3 NO4 NO5 NO6
     CODE1 CODE2 CODE3 CODE4 CODE5 CODE6
     SP1 SP2 SP3 SP4 SP5 SP6;
LENGTH SPECIES $ 20;
LENGTH DY--LAKE MO 2;
LENGTH DEFAULT=4;
SPECIES=CODE1; LBS=LBST1; NO=NO1; OUTPUT;
SPECIES=CODE2; LBS=LBST2; NO=NO2; OUTPUT;
SPECIES=CODE3; LBS=LBST3; NO=NO3; OUTPUT;
SPECIES=CODE4; LBS=LBST4; NO=NO4; OUTPUT;
SPECIES=CODE5; LBS=LBST5; NO=NO5; OUTPUT;
SPECIES=CODE6; LBS=LBST6; NO=NO6; OUTPUT;
PROC SORT SORTWKNO=6; BY LAKE YR MO WK SPECIES;
DATA RENAME; SET RENAME;
%TRANSPEC
PROC SORT; BY LAKE YR MO WK SPECIES;
PROC MEANS NOPRINT SUM; VAR NO LBS ; BY LAKE YR MO WK SPECIES;
  OUTPUT OUT=SPLST SUM=TOTNO TOTLB;
PROC DELETE DATA=WORK.RENAME;
**** THIS STEP IS USED TO CREATE THE VARIABLE MNLBS;
DATA SPLST;SET SPLST;
MNLBS=ROUND((TOTLB/TOTNO),.01);
**** THIS STEP CALCULATES TOTAL NUMBERS AND POUNDS OF
**** ALL SPECIES CREELED;
DATA TOTSPLST; SET SPLST;
PROC SORT; BY LAKE YR MO WK;
PROC MEANS NOPRINT SUM; VAR TOTNO TOTLB; BY LAKE YR MO WK;
  OUTPUT OUT=TOTSPLST SUM=TOTALNO TOTALLB;
**** THE NEXT FEW DATA STEPS MERGE TOGETHER SETS CONTAINING
**** IMPORTANT VARIABLES;
DATA BOTH; MERGE TOTSPLST SPLST; BY LAKE YR MO WK;
PROC SORT; BY LAKE YR MO WK;
DATA TOG ; MERGE NOEXPMO BOTH; BY LAKE YR MO WK;
**** THESE COMMANDS CREATE NEW VARIABLES WHICH ARE USED TO
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**** CALCULATE A WEEKLY TOTAL OF HOURS FISHED;
DATA L721; SET L721;
THRFI=HRFI+(TN/10);
HRSAMP=THRFI*NOHU;
PROC SORT DATA=L721; BY LAKE YR MO WK;
PROC MEANS SUM NOPRINT; VAR HRSAMP;
 OUTPUT OUT=SHRFI SUM=HRSAMPLE; BY LAKE YR MO WK;
**** THIS STEP MERGES TOGETHER SETS CONTAINING IMPORTANT
**** VARIABLES. IT ALSO CREATES A WEEKLY ESTIMATED TOTAL
**** NUMBER AND WEIGHT OF FISH CREELED;
DATA COMB; MERGE TOG SHRFI; BY LAKE YR MO WK;
WKTOTNO=(EXPSUM/HRSAMPLE)*TOTNO;
WKTOTLB=(EXPSUM/HRSAMPLE)*TOTLB;
PROC SORT; BY LAKE YR MO WK;
**** THIS STEP UTILIZES THE VARIABLES CREATED ABOVE TO CALCULATE YEARLY
**** ESTIMATED TOTAL NUMBERS AND POUNDS OF FISH CREELED BY SPECIES;
DATA ESTNO; SET COMB;
PROC SORT; BY YR SPECIES;
PROC MEANS SUM NOPRINT; VAR WKTOTNO WKTOTLB; BY YR SPECIES;
  OUTPUT OUT=SWKTOT SUM=ESTOTNO ESTOTLB;
PROC DELETE DATA=WORK.ESTNO;
**** THE FOLLOWING STEPS ULTIMATELY TOTAL THE EXPANDED ESTIMATES OF
**** HOURS FISHED BY YEAR;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT; BY LAKE YR MO WK EXPTIME;
DATA L721; SET L721; BY LAKE YR MO WK EXPTIME;
IF FIRST.EXPTIME THEN FLAG=1;
IF FLAG NE 1 THEN EXPTIME=0;
PROC SORT; BY YR  ;
PROC MEANS NOPRINT SUM; VAR EXPTIME;
  OUTPUT OUT=NOEXPMO SUM=ESTHRS; BY YR  ;
**** THIS STEP IS USED TO DISCARD ERRONEOUS DATA AND CALCULATE THE
**** WEEKLY TOTAL NUMBER OF COMPLETED AND NOT COMPLETED TRIPS;
DATA COMPTRP1; SET L721;
IF MO=. THEN DELETE;
IF COMP=' ' THEN DELETE;
PROC SORT; BY  YR MO WK COMP;
PROC MEANS SUM NOPRINT; VAR NOHU; BY  YR MO WK COMP;
  OUTPUT OUT=CONVER SUM=NOCOMPTP;
PROC DELETE DATA=WORK.L721;
**** THESE STEPS CREATE FISHING HOUR VARIABLES WHICH ARE USED TO
**** CALCULATE WEEKLY HOURS FISHED BY COMPLETED AND NOT COMPLETED
**** TRIPS;
DATA COMPTRP2; SET COMPTRP1;
THRFI=HRFI+(TN/10);
FMHRS=THRFI*NOHU;
PROC SORT; BY  YR MO WK COMP;
PROC MEANS SUM NOPRINT; VAR FMHRS; BY  YR MO WK COMP;
 OUTPUT OUT=WKHRFI SUM=SWKHR;
PROC DELETE DATA=WORK.COMPTRP2;
**** THE FIRST PART OF THIS DATA STEP INVOLVES ORGANIZING AND MERGING
**** SETS CONTAINING IMPORTANT VARIABLES. IT ALSO CREATES A VARIABLE
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**** REPRESENTING THE WEEKLY AVERAGE LENGTH OF A FISHING TRIP. THIS
**** AVERAGE IS ALSO ADJUSTED IF IT FALLS OUT OF THE PREDETERMINED
**** RANGE;
DATA CONVER; SET CONVER;
PROC SORT; BY YR MO WK COMP;
DATA WKHRFI; SET WKHRFI;
PROC SORT; BY YR MO WK COMP;
DATA AVE; MERGE WKHRFI CONVER; BY YR MO WK COMP;
WEEKAVE=SWKHR/NOCOMPTP;
IF WEEKAVE LT 2.5 THEN WEEKAVE=5.0;
IF WEEKAVE GT 7.5 THEN WEEKAVE=5.0;
**** THE FOLLOWING DATA STEPS SORT OUT SETS CONTAINING COMPLETED AND
**** NOT COMPLETED FISHING TRIPS AND CALCULATE THE SUM OF THE WEEKLY
**** AVERAGE TRIPS AND THE NUMBER OF WEEKS THAT CONTAIN DATA. THESE
**** VARIABLES WILL BE USED IN THE NEXT SET OF DATA STEPS;
DATA C1; SET AVE; IF COMP='1';
DATA C2; SET AVE; IF COMP='2';
  WEEKAVE=5.0;
PROC SORT DATA=C1; BY YR MO WK;
PROC SORT DATA=C2; BY YR MO WK;
DATA UNQWK; MERGE C2 C1; BY YR MO WK;
PROC SORT; BY YR MO;
DATA UNQWK1; SET UNQWK;
PROC SORT; BY YR MO;
PROC MEANS SUM N NOPRINT; VAR WEEKAVE; BY YR MO;
 OUTPUT OUT=WS SUM=SWKAVE N=NWKS;
**** THE NEXT SET OF DATA STEPS ADJUST SUMS OF WEEKLY AVERAGE TRIP
**** LENGTHS DEPENDING ON THE NUMBER OF WEEKS IN WHICH DATA WERE
**** COLLECTED. IT FURTHER CONVERTS WEEKLY SUMS INTO MONTHLY TOTALS
**** BASED ON A MINIMUN OF A 4 WEEK MONTH. IF DATA WAS COLLECTED ON ALL
**** WEEKS OF A MONTH WITH 5 WEEKS, THEN THE SUM OF WEEKLY AVERAGES WILL
**** ADJUSTED ACCORDINGLY. THE SECOND PART OF THIS STEP INVOLVES THE
**** CALCULATION OF A MONTHLY AVERAGE TRIP LENGTH BASED ON A 4 OR 5
**** WEEK MONTH;
DATA WS1; SET WS;
IF NWKS=1 THEN SWKAVE=SWKAVE+15;
IF NWKS=2 THEN SWKAVE=SWKAVE+10;
IF NWKS=3 THEN SWKAVE=SWKAVE+5;
DATA WS2; SET WS1;
IF NWKS LE 4 THEN MMOAVE=SWKAVE/4;
IF NWKS GT 4 THEN MMOAVE=SWKAVE/NWKS;
**** THIS SET OF DATA STEPS CALCULATES A SUM OF MONTHLY AVERAGE TRIP
**** LENGTHS AND THE NUMBER OF YEARS IN WHICH DATA WAS COLLECTED;
DATA WS3; SET WS2;
PROC SORT; BY YR;
PROC MEANS SUM N NOPRINT; VAR MMOAVE; BY YR;
 OUTPUT OUT=YRHRAVE SUM=MYRAVE N=NYRS;
**** THE NEXT SET OF DATA STEPS CREATES A VARIABLE REPRESENTING A
**** SUM OF THE MONTHLY AVERAGE TRIP LENGTHS. A CONVERSION OCCURS IF
**** AT LEAST 6 MONTHS OF AVERAGES ARE PRESENT. ANOTHER VARIABLE IS
**** CREATED WHICH REPRESENTS A YEARLY AVERAGE TRIP LENGTH;
DATA YRHRAVE; SET YRHRAVE;
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IF NYRS=1 THEN MYRAVE=MYRAVE+55;
IF NYRS=2 THEN MYRAVE=MYRAVE+50;
IF NYRS=3 THEN MYRAVE=MYRAVE+45;
IF NYRS=4 THEN MYRAVE=MYRAVE+40;
IF NYRS=5 THEN MYRAVE=MYRAVE+35;
IF NYRS=6 THEN MYRAVE=MYRAVE+30;
IF NYRS=7 THEN MYRAVE=MYRAVE+25;
IF NYRS=8 THEN MYRAVE=MYRAVE+20;
IF NYRS=9 THEN MYRAVE=MYRAVE+15;
IF NYRS=10 THEN MYRAVE=MYRAVE+10;
IF NYRS=11 THEN MYRAVE=MYRAVE+5;
YRAVTRP= MYRAVE/12;
PROC SORT; BY YR;
**** THIS SET OF DATA STEPS MERGES SETS CONTAINING IMPORTANT
**** VARIABLES. IT THEN USES A MACRO TO ADD AN ACREAGE VARIABLE TO EACH
**** LAKE SAMPLED. THIS STEP ALSO SETS UP A SMALL DATA SET THAT IS USED
**** TO CALCULATE THE NUMBER OF RESERVOIRS SAMPLED AND THE TOTAL NUMBER
**** OF ACRES CREELED IN EACH YEAR SAMPLED;
DATA YRHRAVE; SET YRHRAVE;
PROC SORT; BY YR;
DATA AA; SET NOEXPMO;
PROC SORT; BY YR;
DATA BOND; MERGE AA YRHRAVE; BY YR;
DATA L721; SET TALLMRG.ALLMRG;
%TRANACRE
PROC SORT; BY LAKE YR ACRE;
DATA FIRSTA; SET L721;
KEEP LAKE YR ACRE;
PROC SORT; BY YR LAKE;
DATA FIRSTA; SET FIRSTA; BY YR LAKE;
IF FIRST.LAKE;
PROC MEANS NOPRINT SUM N; VAR ACRE; BY YR;
  OUTPUT OUT= YRACRE SUM=SUMACRE N=NORES;
**** THIS SET OF DATA STEPS MERGES SETS CONTAINING IMPORTANT
**** VARIABLES. IT THEN CREATES A SEVERAL IMPORTANT VARIABLES
**** THAT WILL BE USED IN THE FINAL REPORT;
DATA Y; SET YRACRE; PROC SORT; BY YR;
DATA B; SET BOND; PROC SORT; BY YR;
DATA BOND2; MERGE Y B; BY YR;
DATA FIRST; SET BOND2;
AVCOTRIP=ROUND(YRAVTRP,.01);
IF AVCOTRIP=. THEN AVCOTRIP=5;
ESTRIPS=(ESTHRS/AVCOTRIP);
TRPRAC=(ESTRIPS/SUMACRE);
HRPRAC=(ESTHRS/SUMACRE);
**** THIS STEP CALCULATES THE NUMBER OF SUCCESSFUL FISHERMEN WHO
**** HAVE COMPLETED FISHING TRIPS;
DATA SUCCESS; SET L721;
IF COMP='1';
PROC SORT; BY YR;
PROC MEANS NOPRINT SUM; VAR NOSU; BY YR;
OUTPUT OUT=SUCC SUM=NOSUCC;
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**** THIS STEP CALCULATES THE NUMBER OF COMPLETED FISHERMAN-TRIPS;
DATA FIX; SET SUCCESS;
PROC SORT; BY YR;
PROC MEANS SUM NOPRINT; VAR NOHU; BY YR;
OUTPUT OUT=CONVERS SUM=NOCMPTRP;
PROC DELETE DATA=WORK.FIX;
PROC DELETE DATA=WORK.SUCCESS;
**** THE FIRST AND LAST STEPS IN THIS PROCEDURE COMBINES SEVERAL SETS
**** WHICH CONTAIN IMPORTANT VARIABLES. IT ALSO CREATES A VARIABLE
**** REPRESENTING THE PERCENTAGE OF COMPLETED SUCCESSFUL TRIPS;
DATA P; SET SUCC;
PROC SORT; BY YR;
DATA Q; SET CONVERS;
PROC SORT; BY YR;
DATA J; MERGE P Q; BY YR;
PERSUC=(NOSUCC/NOCMPTRP)*100;
PROC SORT; BY YR;
DATA R; SET FIRST; PROC SORT; BY YR;
DATA JOIN; MERGE R J; BY YR;
**** THE NEXT SET OF STEPS CALCULATE THE NUMBER OF BOAT FISHERMEN;
DATA BOAT; SET L721;
IF BOBA=' ' THEN DELETE;
IF BOBA='1';
PROC SORT; BY YR BOBA;
PROC MEANS NOPRINT SUM; VAR NOHU; BY YR BOBA;
OUTPUT OUT=TOTBOAT SUM=SUBOAT;
PROC DELETE DATA=WORK.BOAT;
**** THE NEXT SET OF STEPS CALCULATE THE NUMBER OF BANK FISHERMEN;
DATA BANK; SET L721;
IF BOBA=' ' THEN DELETE;
IF BOBA='2';
PROC SORT; BY YR BOBA;
PROC MEANS NOPRINT SUM; VAR NOHU; BY YR BOBA;
OUTPUT OUT=TOTBANK SUM=SUBANK;
PROC DELETE DATA=WORK.BANK;
**** THIS STEP CALCULATES THE TOTAL NUMBER OF FISHERMEN CREELED;
DATA TFMEN; SET L721;
PROC SORT; BY YR;
PROC MEANS NOPRINT SUM; VAR NOHU; BY YR;
OUTPUT OUT=NOFMEN SUM=TOTMEN;
PROC DELETE DATA=WORK.TFMEN;
**** THIS STEP MERGES TOGETHER SETS CONTAINING IMPORTANT VARIABLES AND
**** CALCULATES THE PERCENTAGE OF BOAT FISHERMEN;
DATA A; SET TOTBOAT; PROC SORT; BY YR;
DATA B; SET NOFMEN; PROC SORT; BY YR;
DATA PERBOAT; MERGE A B; BY YR;
BOATPER=(SUBOAT/TOTMEN)*100;
**** THIS STEP MERGES TOGETHER SETS CONTAINING IMPORTANT VARIABLES AND
**** CALCULATES THE PERCENTAGE OF BANK FISHERMEN;
DATA C; SET TOTBANK; PROC SORT; BY YR;
DATA PERBANK; MERGE C B; BY YR;
BANKPER=(SUBANK/TOTMEN)*100;
```

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**** THE FOLLOWING STEPS ARE USED TO MERGE TOGETHER SETS CONTAINING
**** IMPORTANT VARIABLES AND ALSO CREATES A DATA SET THAT WILL BE USED
**** IN CREATING THE FINAL PRINTED REPORT;
DATA D; SET PERBOAT; PROC SORT; BY YR;
DATA E; SET PERBANK; PROC SORT; BY YR;
DATA FINI; MERGE D E; BY YR;
DATA FUSE; SET JOIN; PROC SORT; BY YR;
DATA FINISH;SET FINI; PROC SORT; BY YR;
DATA END; MERGE FUSE FINISH; BY YR;
DATA HEADR; SET END; ALLTOG=0;
 KEEP YR NORES SUMACRE ESTRIPS TRPRAC HRPRAC PERSUC
  BOATPER BANKPER ALLTOG;
****  THIS SET OF STATEMENTS RENAMES SOME OF THE VARIABLES IN OUR CREEL DATA
**** SET SO FUTURE RESULTS CAN BE ACCESSED AND PRINTED EASIER. THE VARIABLE
**** SPECIES REPLACES THE CODE VARIABLES, LBS REPLACES ASSOCIATED LB VARIABLE,
**** AND NO REPLACES THE NO VARIABLE ALSO ASSOCIATED WITH THE CODE
**** VARIABLE. IT ALSO USES A MACRO TO RENAME CODED SPECIES VARIABLES.
**** THIS STEP THEN CALCULATES THE YEARLY TOTAL NUMBER AND POUNDS OF
**** FISH CREELED PER SPECIES;
PROC SORT DATA=L721; BY YR  ;
DATA RENAME2; SET L721; BY YR  ;
DROP BOBA--SPFI EXPTIME MO WK;
DROP LBST1 LBST2 LBST3 LBST4 LBST5 LBST6
     NO1 NO2 NO3 NO4 NO5 NO6
     CODE1 CODE2 CODE3 CODE4 CODE5 CODE6
     SP1 SP2 SP3 SP4 SP5 SP6;
LENGTH SPECIES $ 20;
LENGTH DY--LAKE MO 2;
LENGTH DEFAULT=4;
SPECIES=CODE1; LBS=LBST1; NO=NO1; OUTPUT;
SPECIES=CODE2; LBS=LBST2; NO=NO2; OUTPUT;
SPECIES=CODE3; LBS=LBST3; NO=NO3; OUTPUT;
SPECIES=CODE4; LBS=LBST4; NO=NO4; OUTPUT;
SPECIES=CODE5; LBS=LBST5; NO=NO5; OUTPUT;
SPECIES=CODE6; LBS=LBST6; NO=NO6; OUTPUT;
PROC SORT SORTWKNO=6; BY YR SPECIES;
PROC DELETE DATA=WORK.L721;
DATA RENAME2; SET RENAME2;
%TRANSPEC
PROC SORT; BY YR SPECIES;
PROC MEANS NOPRINT SUM; VAR NO LBS ; BY YR SPECIES;
  OUTPUT OUT=SPLST SUM=TOTNO TOTLB;
PROC DELETE DATA=WORK.RENAME2;
**** THIS STEP IS USED TO CREATE THE VARIABLE MNLBS;
DATA SPLST;SET SPLST;
MNLBS=ROUND((TOTLB/TOTNO),.01);
**** THIS STEP CALCULATES TOTAL NUMBERS AND POUNDS OF
**** ALL SPECIES CREELED;
DATA TOTSPLST; SET SPLST;
PROC SORT; BY YR  ;
PROC MEANS NOPRINT SUM; VAR TOTNO TOTLB; BY YR  ;
  OUTPUT OUT=TOTSPLST SUM=TOTALNO TOTALLB;
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**** THIS GROUP OF DATA STEPS BEGINS AND ENDS WITH THE MERGING OF
**** STEPS CONTAINING IMPORTANT VARIABLES. THE STEPS ALSO CREATE TWO
**** PERCENT VARIABLES REPRESENTING NUMBERS AND POUNDS OF FISH CREELED;
DATA BOTH; MERGE TOTSPLST SPLST; BY YR  ;
PERNO=ROUND(((TOTNO/TOTALNO)*100),.01);
PERLB=ROUND(((TOTLB/TOTALLB)*100),.01);
PROC SORT; BY YR  ;
DATA TOGE;MERGE NOEXPMO BOTH; BY YR  ;
**** THIS STEP CALCULATES THE TOTAL NUMBER OF FISHERMEN SAMPLED;
DATA L721; SET TALLMRG.ALLMRG;
PROC SORT; BY YR;
PROC MEANS SUM NOPRINT; VAR NOHU; BY YR;
  OUTPUT OUT=SHUM SUM=MENSAMPD;
**** THIS SET OF DATA STEPS MERGES SETS CONTAINING IMPORTANT
**** VARIABLES. IT THEN CREATES VARIABLES THAT ARE USED TO CALCULATE
**** THE NUMBER OF HOURS SAMPLED;
DATA SHUM; SET SHUM;
PROC SORT; BY YR;
DATA TOGET; MERGE TOGE BOND; BY YR;
DATA TOG; MERGE TOGET SHUM; BY YR;
DATA L721; SET L721;
THRFI=HRFI+(TN/10);
HRSAMP=THRFI*NOHU;
PROC SORT DATA=L721; BY YR;
PROC MEANS SUM NOPRINT; VAR HRSAMP;
 OUTPUT OUT=SHRFI SUM=HRSAMPLE; BY YR  ;
PROC DELETE DATA=WORK.L721;
**** THIS SET OF DATA STEPS MERGES SETS CONTAINING IMPORTANT
**** VARIABLES. IT THEN CREATES A SEVERAL IMPORTANT VARIABLES
**** THAT WILL BE USED IN THE FINAL REPORT;
DATA BOMB; MERGE TOG SHRFI; BY YR  ;
PROC SORT; BY YR SPECIES;
DATA SWKTOT;SET SWKTOT;
PROC SORT; BY YR SPECIES;
DATA COMBINE; SET BOMB;
PROC SORT; BY YR SPECIES;
DATA TOGETHER; MERGE COMBINE SWKTOT; BY YR SPECIES;
TOTALMN=ROUND((TOTALLB/TOTALNO),.01);
NOPERHR=ROUND((TOTNO/HRSAMPLE),.001);
LBPERHR=ROUND((TOTLB/HRSAMPLE),.001);
TOTNOHR=ROUND((TOTALNO/HRSAMPLE),.001);
TOTLBHR=ROUND((TOTALLB/HRSAMPLE),.001);
**** THE NEXT STEP CALCULATES A YEARLY ESTIMATED TOTAL NUMBER
**** OF FISH CREELED;
DATA TOT; SET TOGETHER;
PROC SORT; BY YR;
PROC MEANS SUM NOPRINT; VAR ESTOTNO;
  OUTPUT OUT=TOTAL1 SUM=TOTESTNO; BY YR;
**** THE NEXT STEP CALCULATES A YEARLY ESTIMATED TOTAL WEIGHT
**** OF FISH CREELED;
DATA TOTA; SET TOGETHER;
PROC SORT; BY YR;
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PROC MEANS SUM NOPRINT; VAR ESTOTLB;
  OUTPUT OUT=TOTAL2 SUM=TOTESTLB; BY YR;
**** THE FOLLOWING STEPS MERGE TOGETHER SETS CONTAINING IMPORTANT
**** VARIABLES. IT ALSO DELETES INCOMPLETE DATA SETS;
DATA TOTAL; MERGE TOTAL1 TOTAL2; BY YR;
PROC SORT; BY YR;
DATA ALLTOT; MERGE TOGETHER TOTAL; BY YR;
PROC SORT; BY YR;
DATA EXPAND; SET TALLMRG.ALLMRG;
PROC SORT; BY LAKE YR MO WK EXPTIME;
DATA EXPAND1; SET EXPAND; BY LAKE YR MO WK EXPTIME;
IF FIRST.EXPTIME THEN FLAG=1;
IF FLAG NE 1 THEN EXPTIME=0;
PROC SORT; BY YR  ;
PROC MEANS NOPRINT SUM; VAR EXPTIME;
  OUTPUT OUT=NOEXPMO SUM=ESTHRS; BY YR  ;
PROC DELETE DATA=WORK.EXPAND;
DATA NOEXPMO; SET NOEXPMO;
PROC SORT; BY YR;
DATA ALLTOT1; MERGE ALLTOT NOEXPMO; BY YR;
PROC SORT; BY YR;
DATA SPECIES; SET ALLTOT1;
IF (YR=.  OR SPECIES=' ') THEN DELETE;
PROC SORT; BY YR;
DATA YA; SET YRACRE; PROC SORT; BY YR;
DATA SP; SET SPECIES; PROC SORT; BY YR;
DATA SPECIES1; MERGE YA SP; BY YR;
**** THIS STEP CREATES TWO NEW VARIABLES REPRESENTING THE AVERAGE WEIGHT
**** AND POUNDS PER ACRE OF EACH SPECIES. NEXT IT CREATES A DATA SET THAT
**** WILL BE USED IN THE FINAL REPORT;
DATA ACREST; SET SPECIES1;
AVEWT= ESTOTLB/ESTOTNO;
LBACRE= ESTOTLB/SUMACRE;
NOPERHR=ESTOTNO/ESTHRS;
LBPERHR=ESTOTLB/ESTHRS;
DATA MIDDLE; SET ACREST;
 KEEP YR SPECIES ESTOTNO ESTOTLB AVEWT LBACRE NOPERHR LBPERHR;
**** THIS STEP RENAMES CODED SPECIES VARIABLES SO THEY CAN BE PRINTED
**** IN THE FINAL REPORT. IT ALSO DELETES INCOMPLETE DATA AND
**** CALCULATES THE NUMBER OF FISHERMEN SEEKING A PARTICULAR SPECIES;
DATA PRCNT; SET TALLMRG.ALLMRG;
LENGTH SPECIES $ 20;
IF SPFI='&' THEN SPECIES='J. STRIPD/HYB &';
IF SPFI='0' THEN SPECIES='K. MUSKY 0';
IF SPFI='1' THEN SPECIES='A. ANY 1';
IF SPFI='2' THEN SPECIES='B. CRAPPIE 2';
IF SPFI='3' THEN SPECIES='C. BLACK BASS 3';
IF SPFI='4' THEN SPECIES='D. SUNFISH 4';
IF SPFI='5' THEN SPECIES='E. CATFISH 5';
IF SPFI='6' THEN SPECIES='F. WALL/SAUG 6';
IF SPFI='7' THEN SPECIES='G. TROUT 7';
IF SPFI='8' THEN SPECIES='H. ROUGH 8';
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IF SPFI='9' THEN SPECIES='I. WHITE BASS 9';
IF SPECIES=' ' THEN DELETE;
PROC SORT; BY YR SPECIES;
PROC MEANS NOPRINT SUM; VAR NOHU; BY YR SPECIES;
OUTPUT OUT=SPNOHU SUM=SPECHUM;
**** THIS STEP CALCULATES THE TOTAL NUMBER OF FISHERMEN CREELED;
DATA PRCENT; SET PRCNT;
PROC SORT; BY YR;
PROC MEANS NOPRINT SUM; VAR NOHU; BY YR;
OUTPUT OUT=HUMTOT SUM=TOTMEN;
**** THE FOLLOWING STEPS FIRST COMBINE SETS CONTAINING IMPORTANT
**** VARIABLES. NEXT, IT CREATES NEW VARIABLES REPRESENTING THE
**** PERCENTAGE OF TRIPS SPENT FISHING FOR A PARTICULAR SPECIES AND
**** THE NUMBER OF TRIPS PER ACRE FOR A PARTICULAR SPECIES;
DATA S; SET SPNOHU;
PROC SORT; BY YR;
DATA T; SET HUMTOT;
PROC SORT; BY YR;
DATA JOIN; MERGE S T; BY YR;
DATA ED; SET FIRST;
PROC SORT; BY YR;
DATA JOINED; MERGE JOIN ED; BY YR;
PERSPETP=(SPECHUM/TOTMEN)*100;
SPECTRAC=(PERSPETP*TRPRAC)/100;
**** THIS STEP CALCULATES THE TOTAL NUMBER OF HOURS SPENT FISHING
**** FOR A PARTICULAR SPECIES;
DATA PERCENT; SET PRCNT;
THRFI=HRFI+(TN/10);
HRSAMP=THRFI*NOHU;
PROC SORT; BY YR SPECIES;
PROC MEANS SUM NOPRINT; VAR HRSAMP; BY YR SPECIES;
 OUTPUT OUT=SPNOHR SUM=SPECHR;
PROC DELETE DATA=WORK.PERCENT;
PROC DELETE DATA=WORK.PRCNT;
**** THIS STEP FIRST COMBINES SETS CONTAINING IMPORTANT VARIABLES. NEXT,
**** IT CALCULATES THE PERCENTAGE OF HOURS SPENT FISHING FOR A
**** PARTICULAR SPECIES;
DATA SPNOHR; SET SPNOHR;
PROC SORT; BY YR;
DATA TOTHRFI; SET SHRFI;
PROC SORT; BY YR;
DATA WORKHR; MERGE TOTHRFI SPNOHR; BY YR;
PERSPEHR=(SPECHR/HRSAMPLE)*100;
**** THIS STEP COMBINES SETS CONTAINING IMPORTANT VARIABLES AND CREATES
**** A VARIABLE REPRESENTING THE NUMBER OF HOURS SPENT PER ACRE FISHING
**** FOR A PARTICULAR SPECIES. NEXT, IT CREATES A FINAL DATA SET WHICH
**** WILL BE USED IN THE FINAL PRINT-OUT;
DATA WORKHR1; SET WORKHR;
PROC SORT; BY YR;
DATA JOINED1; SET JOINED;
PROC SORT; BY YR;
DATA LAS; MERGE WORKHR1 JOINED1; BY YR;
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SPECHRAC=(PERSPEHR/HRPRAC)/100;
PROC SORT; BY YR;
DATA LAST; SET LAS;
 KEEP YR SPECIES PERSPETP PERSPEHR SPECTRAC SPECHRAC;
**** THIS STEP BEGINS A SERIES OF PROCEDURES THAT CREATE A "FILLER" DATA
**** SET WHICH SERVES AS A TEMPLATE FOR THE FIVE YEAR BLOCK OF DATA
**** THAT WILL BE CONSIDERED. THE FIRST PART OF THE PROCEDURE ALLOWS ALL
**** YEARS FROM 1976 TO 1999 TO BE CONSIDERED. IT INITIALLY SETS
**** IMPORTANT VARIABLES EQUAL TO ZERO SO THAT WHEN THE TEMPLATE IS
**** FILLED WITH REAL DATA, THE MISSING DATA POINTS WILL EQUAL ZERO;
DATA FIL0;
DO YR=76 TO 99;
  ALLTOG=0; NORES=0; SUMACRE=0; ESTRIPS=0; TRPRAC=0; HRPRAC=0;
  PERSUC=0; BOATPER=0; BANKPER=0;
  OUTPUT;
END;
DATA FIL0; SET FIL0;
 IF (YR GE 79 AND YR LE 83);
**** THIS STEP COMBINES THE ALLTOG ("COUNT") VARIABLE WITH SPECIFIC
**** SPECIES GROUPS. THE VARIABLES CONSIDERED IN THIS PART OF THE
**** TEMPLATE ARE INITIATED TO ZERO;
DATA FIL1;
LENGTH SPECIES $ 20;
   DO YR= 76 TO 99;
      DO ALLTOG=1 TO 9;
         IF ALLTOG=1 THEN SPECIES='A. CRAPPIE 87';
         IF ALLTOG=2 THEN SPECIES='B. BLACK BASS 80';
         IF ALLTOG=3 THEN SPECIES='C. CATFISH 40';
         IF ALLTOG=4 THEN SPECIES='D. STRIPD/HYB 65';
         IF ALLTOG=5 THEN SPECIES='E. WHITE BASS 68';
         IF ALLTOG=6 THEN SPECIES='F. SUNFISH 90';
         IF ALLTOG=7 THEN SPECIES='G. WALL/SAUG 74';
         IF ALLTOG=8 THEN SPECIES='H. TROUT 62';
         IF ALLTOG=9 THEN SPECIES='I. OTHER 00';
      ESTOTNO=0; ESTOTLB=0; AVEWT=0; LBACRE=0; NOPERHR=0; LBPERHR=0;
         OUTPUT;
      END;
   END;
DATA FIL1;SET FIL1;
 IF (YR GE 79 AND YR LE 83);
**** THIS STEP COMBINES SOME MORE ALLTOG VARIABLES WHICH ARE ASSOCIATED
**** WITH OTHER SPECIFIC SPECIES GROUPS. THE VARIABLES CONSIDERED IN THIS
**** PART OF THE TEMPLATE ARE ALSO INITIATED TO ZERO;
DATA FIL2;
LENGTH SPECIES $ 20;
   DO YR= 76 TO 99;
      DO ALLTOG=10 TO 20;
         IF ALLTOG=10 THEN SPECIES='A. ANY 1';
         IF ALLTOG=11 THEN SPECIES='B. CRAPPIE 2';
         IF ALLTOG=12 THEN SPECIES='C. BLACK BASS 3';
         IF ALLTOG=13 THEN SPECIES='D. SUNFISH 4';
         IF ALLTOG=14 THEN SPECIES='E. CATFISH 5';
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         IF ALLTOG=15 THEN SPECIES='F. WALL/SAUG 6';
         IF ALLTOG=16 THEN SPECIES='G. TROUT 7';
         IF ALLTOG=17 THEN SPECIES='H. ROUGH 8';
         IF ALLTOG=18 THEN SPECIES='I. WHITE BASS 9';
         IF ALLTOG=19 THEN SPECIES='J. STRIPD/HYB &';
         IF ALLTOG=20 THEN SPECIES='K. MUSKY 0';
      PERSPETP=0; PERSPEHR=0; SPECTRAC=0; SPECHRAC=0;
         OUTPUT;
      END;
   END;
DATA FIL2;SET FIL2;
 IF (YR GE 79 AND YR LE 83);
**** THE FOLLOWING STEPS MERGE TOGETHER SETS CONTAINING VARIABLES
**** THAT WILL BE USED IN THE FINAL REPORT;
PROC SORT DATA=HEADR; BY YR;
PROC SORT DATA=FIL0; BY YR;
DATA HEADER; MERGE FIL0 HEADR; BY YR;
PROC SORT DATA= FIL1; BY YR SPECIES;
PROC SORT DATA= MIDDLE; BY YR SPECIES;
DATA FILMID; MERGE FIL1 MIDDLE; BY YR SPECIES;
PROC SORT DATA= FIL2; BY YR SPECIES;
PROC SORT DATA= LAST; BY YR SPECIES;
DATA FILLAS; MERGE FIL2 LAST; BY YR SPECIES;
DATA EVRYTING; SET HEADER FILMID FILLAS;
PROC SORT; BY YR ALLTOG;
DATA EVERYTHG; SET EVRYTING;
 IF (YR GE 79 AND YR LE 83);
PROC SORT; BY YR;
**** THIS STEP ORGANIZES OUR DATA SET INTO A FIVE YEAR BLOCK ;
DATA Y1 Y2 Y3 Y4 Y5; SET EVERYTHG; BY YR;
IF FIRST.YR THEN N+1;
IF N=1 THEN OUTPUT Y1;
IF N=2 THEN OUTPUT Y2;
IF N=3 THEN OUTPUT Y3;
IF N=4 THEN OUTPUT Y4;
IF N=5 THEN OUTPUT Y5;
**** THIS STEP ORGANIZES THE DATA USED IN THE FINAL SUMMARY INTO
**** SPECIFIC FIRST YEAR VARIABLES;
DATA Y1; SET Y1;
RENAME YR=YR1 NORES=NORES1 SUMACRE=SUMACRE1 ESTRIPS=ESTRIPS1
 TRPRAC=TRPRAC1 HRPRAC=HRPRAC1 PERSUC=PERSUC1
 BOATPER=BOATPER1 BANKPER=BANKPER1 ESTOTNO=ESTOTNO1 ESTOTLB=ESTOTLB1
 AVEWT=AVEWT1 LBACRE=LBACRE1 NOPERHR=NOPERHR1 LBPERHR=LBPERHR1
 PERSPETP=PERSPET1 PERSPEHR=PERSPEH1 SPECTRAC=SPECTRA1 SPECHRAC=SPECHRA1;
**** THIS STEP ORGANIZES THE DATA USED IN THE FINAL SUMMARY INTO
**** SPECIFIC SECOND YEAR VARIABLES;
DATA Y2; SET Y2;
RENAME YR=YR2 NORES=NORES2 SUMACRE=SUMACRE2 ESTRIPS=ESTRIPS2
 TRPRAC=TRPRAC2 HRPRAC=HRPRAC2 PERSUC=PERSUC2
 BOATPER=BOATPER2 BANKPER=BANKPER2 ESTOTNO=ESTOTNO2 ESTOTLB=ESTOTLB2
 AVEWT=AVEWT2 LBACRE=LBACRE2 NOPERHR=NOPERHR2 LBPERHR=LBPERHR2
 PERSPETP=PERSPET2 PERSPEHR=PERSPEH2 SPECTRAC=SPECTRA2 SPECHRAC=SPECHRA2;
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**** THIS STEP ORGANIZES THE.DATA USED IN THE FINAL SUMMARY INTO
**** SPECIFIC THIRD YEAR VARIABLES;
DATA Y3; SET Y3;
RENAME YR=YR3 NORES=NORES3 SUMACRE=SUMACRE3 ESTRIPS=ESTRIPS3
 TRPRAC=TRPRAC3 HRPRAC=HRPRAC3 PERSUC=PERSUC3
 BOATPER=BOATPER3 BANKPER=BANKPER3 ESTOTNO=ESTOTNO3 ESTOTLB=ESTOTLB3
 AVEWT=AVEWT3 LBACRE=LBACRE3 NOPERHR=NOPERHR3 LBPERHR=LBPERHR3
 PERSPETP=PERSPET3 PERSPEHR=PERSPEH3 SPECTRAC=SPECTRA3 SPECHRAC=SPECHRA3;
**** THIS STEP ORGANIZES THE DATA USED IN THE FINAL SUMMARY INTO
**** SPECIFIC FOURTH YEAR VARIABLES;
DATA Y4; SET Y4;
RENAME YR=YR4 NORES=NORES4 SUMACRE=SUMACRE4 ESTRIPS=ESTRIPS4
 TRPRAC=TRPRAC4 HRPRAC=HRPRAC4 PERSUC=PERSUC4
 BOATPER=BOATPER4 BANKPER=BANKPER4 ESTOTNO=ESTOTNO4 ESTOTLB=ESTOTLB4
 AVEWT=AVEWT4 LBACRE=LBACRE4 NOPERHR=NOPERHR4 LBPERHR=LBPERHR4
 PERSPETP=PERSPET4 PERSPEHR=PERSPEH4 SPECTRAC=SPECTRA4 SPECHRAC=SPECHRA4;
**** THIS STEP ORGANIZES THE DATA USED IN THE FINAL SUMMARY INTO
**** SPECIFIC FIFTH YEAR VARIABLES;
DATA Y5; SET Y5;
RENAME YR=YR5 NORES=NORES5 SUMACRE=SUMACRE5 ESTRIPS=ESTRIPS5
 TRPRAC=TRPRAC5 HRPRAC=HRPRAC5 PERSUC=PERSUC5
 BOATPER=BOATPER5 BANKPER=BANKPER5 ESTOTNO=ESTOTNO5 ESTOTLB=ESTOTLB5
 AVEWT=AVEWT5 LBACRE=LBACRE5 NOPERHR=NOPERHR5 LBPERHR=LBPERHR5
 PERSPETP=PERSPET5 PERSPEHR=PERSPEH5 SPECTRAC=SPECTRA5 SPECHRAC=SPECHRA5;
**** THIS STEP SORTS AND MERGES OUR FINAL VARIABLES INTO THE ORDER
**** THAT WILL APPEAR ON THE FINAL SUMMARY SHEET;
PROC SORT DATA=Y1; BY ALLTOG;
PROC SORT DATA=Y2; BY ALLTOG;
PROC SORT DATA=Y3; BY ALLTOG;
PROC SORT DATA=Y4; BY ALLTOG;
PROC SORT DATA=Y5; BY ALLTOG;
DATA REPORT; MERGE Y1 Y2 Y3 Y4 Y5; BY ALLTOG;
**** THE FOLLOWING STEPS SET UP THE REPORT IN A FIVE YEAR BLOCK.
**** IT CAN THEN BE OUTPUT IN A LINE BY LINE FORMAT;
DATA RPT1; SET REPORT; FILE RPOUT;
 IF ALLTOG=0 THEN
PUT  (NORES1--BANKPER1) (@1 8*10.2) @90 YR1 2.
   / (NORES2--BANKPER2) (@1 8*10.2) @90 YR2 2.
   / (NORES3--BANKPER3) (@1 8*10.2) @90 YR3 2.
   / (NORES4--BANKPER4) (@1 8*10.2) @90 YR4 2.
   / (NORES5--BANKPER5) (@1 8*10.2) @90 YR5 2.;
 IF 1 LE ALLTOG LE 9 THEN
   PUT @1 SPECIES $CHAR20.
   / (ESTOTNO1--LBPERHR1) (@1 6*10.2)
   / (ESTOTNO2--LBPERHR2) (@1 6*10.2)
   / (ESTOTNO3--LBPERHR3) (@1 6*10.2)
   / (ESTOTNO4--LBPERHR4) (@1 6*10.2)
   / (ESTOTNO5--LBPERHR5) (@1 6*10.2);
 IF 10 LE ALLTOG LE 21 THEN
   PUT @1 SPECIES $CHAR20.
   / (PERSPET1--SPECHRA1) (@1 4*10.3)
   / (PERSPET2--SPECHRA2) (@1 4*10.3)
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   / (PERSPET3--SPECHRA3) (@1 4*10.3)
   / (PERSPET4--SPECHRA4) (@1 4*10.3)
   / (PERSPET5--SPECHRA5) (@1 4*10.3);
**** THIS STEP SETS UP THE FINAL ORDER OF THE PRINTED VARIABLES. IT ALSO
**** RENAMES THE VARIABLES ASSOCIATED WITH EACH SPECIES SO THEY CAN BE
**** REFERENCED EASIER;
DATA RPTFIN; INFILE RPOUT;
INPUT (NORES1 SUMACRE1 ESTRIPS1 TRPRAC1 HRPRAC1 PERSUC1 BOATPER1 BANKPER1)
 (@1 8*10.2) @90 YR1 2.
   / (NORES2 SUMACRE2 ESTRIPS2 TRPRAC2 HRPRAC2 PERSUC2 BOATPER2 BANKPER2)
 (@1 8*10.2) @90 YR2 2.
   / (NORES3 SUMACRE3 ESTRIPS3 TRPRAC3 HRPRAC3 PERSUC3 BOATPER3 BANKPER3)
 (@1 8*10.2) @90 YR3 2.
   / (NORES4 SUMACRE4 ESTRIPS4 TRPRAC4 HRPRAC4 PERSUC4 BOATPER4 BANKPER4)
 (@1 8*10.2) @90 YR4 2.
   / (NORES5 SUMACRE5 ESTRIPS5 TRPRAC5 HRPRAC5 PERSUC5 BOATPER5 BANKPER5)
 (@1 8*10.2) @90 YR5 2.
   / @1 SPMA $CHAR20.
   / (TN1MA TP1MA TM1MA TPA1MA TNH1MA TPH1MA) (@1 6*10.2)
   / (TN2MA TP2MA TM2MA TPA2MA TNH2MA TPH2MA) (@1 6*10.2)
   / (TN3MA TP3MA TM3MA TPA3MA TNH3MA TPH3MA) (@1 6*10.2)
   / (TN4MA TP4MA TM4MA TPA4MA TNH4MA TPH4MA) (@1 6*10.2)
   / (TN5MA TP5MA TM5MA TPA5MA TNH5MA TPH5MA) (@1 6*10.2)
   / @1 SPMB $CHAR20.
   / (TN1MB TP1MB TM1MB TPA1MB TNH1MB TPH1MB) (@1 6*10.2)
   / (TN2MB TP2MB TM2MB TPA2MB TNH2MB TPH2MB) (@1 6*10.2)
   / (TN3MB TP3MB TM3MB TPA3MB TNH3MB TPH3MB) (@1 6*10.2)
   / (TN4MB TP4MB TM4MB TPA4MB TNH4MB TPH4MB) (@1 6*10.2)
   / (TN5MB TP5MB TM5MB TPA5MB TNH5MB TPH5MB) (@1 6*10.2)
   / @1 SPMC $CHAR20.
   / (TN1MC TP1MC TM1MC TPA1MC TNH1MC TPH1MC) (@1 6*10.2)
   / (TN2MC TP2MC TM2MC TPA2MC TNH2MC TPH2MC) (@1 6*10.2)
   / (TN3MC TP3MC TM3MC TPA3MC TNH3MC TPH3MC) (@1 6*10.2)
   / (TN4MC TP4MC TM4MC TPA4MC TNH4MC TPH4MC) (@1 6*10.2)
   / (TN5MC TP5MC TM5MC TPA5MC TNH5MC TPH5MC) (@1 6*10.2)
   / @1 SPMD $CHAR20.
   / (TN1MD TP1MD TM1MD TPA1MD TNH1MD TPH1MD) (@1 6*10.2)
   / (TN2MD TP2MD TM2MD TPA2MD TNH2MD TPH2MD) (@1 6*10.2)
   / (TN3MD TP3MD TM3MD TPA3MD TNH3MD TPH3MD) (@1 6*10.2)
   / (TN4MD TP4MD TM4MD TPA4MD TNH4MD TPH4MD) (@1 6*10.2)
   / (TN5MD TP5MD TM5MD TPA5MD TNH5MD TPH5MD) (@1 6*10.2)
   / @1 SPME $CHAR20.
   / (TN1ME TP1ME TM1ME TPA1ME TNH1ME TPH1ME) (@1 6*10.2)
   / (TN2ME TP2ME TM2ME TPA2ME TNH2ME TPH2ME) (@1 6*10.2)
   / (TN3ME TP3ME TM3ME TPA3ME TNH3ME TPH3ME) (@1 6*10.2)
   / (TN4ME TP4ME TM4ME TPA4ME TNH4ME TPH4ME) (@1 6*10.2)
   / (TN5ME TP5ME TM5ME TPA5ME TNH5ME TPH5ME) (@1 6*10.2)
   / @1 SPMF $CHAR20.
   / (TN1MF TP1MF TM1MF TPA1MF TNH1MF TPH1MF) (@1 6*10.2)
   / (TN2MF TP2MF TM2MF TPA2MF TNH2MF TPH2MF) (@1 6*10.2)
   / (TN3MF TP3MF TM3MF TPA3MF TNH3MF TPH3MF) (@1 6*10.2)
   / (TN4MF TP4MF TM4MF TPA4MF TNH4MF TPH4MF) (@1 6*10.2)
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/ (TN5MF TP5MF TM5MF TPA5MF TNH5MF TPH5MF) (@1 6*10.2)
/ @1 SPMG $CHAR20.
/ (TN1MG TP1MG TM1MG TPA1MG TNH1MG TPH1MG) (@1 6*10.2)
/ (TN2MG TP2MG TM2MG TPA2MG TNH2MG TPH2MG) (@1 6*10.2)
/ (TN3MG TP3MG TM3MG TPA3MG TNH3MG TPH3MG) (@1 6*10.2)
/ (TN4MG TP4MG TM4MG TPA4MG TNH4MG TPH4MG) (@1 6*10.2)
/ (TN5MG TP5MG TM5MG TPA5MG TNH5MG TPH5MG) (@1 6*10.2)
/ @1 SPMH $CHAR20.
/ (TN1MH TP1MH TM1MH TPA1MH TNH1MH TPH1MH) (@1 6*10.2)
/ (TN2MH TP2MH TM2MH TPA2MH TNH2MH TPH2MH) (@1 6*10.2)
/ (TN3MH TP3MH TM3MH TPA3MH TNH3MH TPH3MH) (@1 6*10.2)
/ (TN4MH TP4MH TM4MH TPA4MH TNH4MH TPH4MH) (@1 6*10.2)
/ (TN5MH TP5MH TM5MH TPA5MH TNH5MH TPH5MH) (@1 6*10.2)
/ @1 SPMI $CHAR20.
/ (TN1MI TP1MI TM1MI TPA1MI TNH1MI TPH1MI) (@1 6*10.2)
/ (TN2MI TP2MI TM2MI TPA2MI TNH2MI TPH2MI) (@1 6*10.2)
/ (TN3MI TP3MI TM3MI TPA3MI TNH3MI TPH3MI) (@1 6*10.2)
/ (TN4MI TP4MI TM4MI TPA4MI TNH4MI TPH4MI) (@1 6*10.2)
/ (TN5MI TP5MI TM5MI TPA5MI TNH5MI TPH5MI) (@1 6*10.2)
/ @1 SPLA $CHAR20.
/ (PT1LA PH1LA ST1LA SH1LA) (@1 4*10.3)
/ (PT2LA PH2LA ST2LA SH2LA) (@1 4*10.3)
/ (PT3LA PH3LA ST3LA SH3LA) (@1 4*10.3)
/ (PT4LA PH4LA ST4LA SH4LA) (@1 4*10.3)
/ (PT5LA PH5LA ST5LA SH5LA) (@1 4*10.3)
/ @1 SPLB $CHAR20.
/ (PT1LB PH1LB ST1LB SH1LB) (@1 4*10.3)
/ (PT2LB PH2LB ST2LB SH2LB) (@1 4*10.3)
/ (PT3LB PH3LB ST3LB SH3LB) (@1 4*10.3)
/ (PT4LB PH4LB ST4LB SH4LB) (@1 4*10.3)
/ (PT5LB PH5LB ST5LB SH5LB) (@1 4*10.3)
/ @1 SPLC $CHAR20.
/ (PT1LC PH1LC ST1LC SH1LC) (@1 4*10.3)
/ (PT2LC PH2LC ST2LC SH2LC) (@1 4*10.3)
/ (PT3LC PH3LC ST3LC SH3LC) (@1 4*10.3)
/ (PT4LC PH4LC ST4LC SH4LC) (@1 4*10.3)
/ (PT5LC PH5LC ST5LC SH5LC) (@1 4*10.3)
/ @1 SPLD $CHAR20.
/ (PT1LD PH1LD ST1LD SH1LD) (@1 4*10.3)
/ (PT2LD PH2LD ST2LD SH2LD) (@1 4*10.3)
/ (PT3LD PH3LD ST3LD SH3LD) (@1 4*10.3)
/ (PT4LD PH4LD ST4LD SH4LD) (@1 4*10.3)
/ (PT5LD PH5LD ST5LD SH5LD) (@1 4*10.3)
/ @1 SPLE $CHAR20.
/ (PT1LE PH1LE ST1LE SH1LE) (@1 4*10.3)
/ (PT2LE PH2LE ST2LE SH2LE) (@1 4*10.3)
/ (PT3LE PH3LE ST3LE SH3LE) (@1 4*10.3)
/ (PT4LE PH4LE ST4LE SH4LE) (@1 4*10.3)
/ (PT5LE PH5LE ST5LE SH5LE) (@1 4*10.3)
/ @1 SPLF $CHAR20.
/ (PT1LF PH1LF ST1LF SH1LF) (@1 4*10.3)
/ (PT2LF PH2LF ST2LF SH2LF) (@1 4*10.3)
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    / (PT3LF PH3LF ST3LF SH3LF) (@1 4*10.3)
    / (PT4LF PH4LF ST4LF SH4LF) (@1 4*10.3)
    / (PT5LF PH5LF ST5LF SH5LF) (@1 4*10.3)
    / @1 SPLG $CHAR20.
    / (PT1LG PH1LG ST1LG SH1LG) (@1 4*10.3)
    / (PT2LG PH2LG ST2LG SH2LG) (@1 4*10.3)
    / (PT3LG PH3LG ST3LG SH3LG) (@1 4*10.3)
    / (PT4LG PH4LG ST4LG SH4LG) (@1 4*10.3)
    / (PT5LG PH5LG ST5LG SH5LG) (@1 4*10.3)
    / @1 SPLH $CHAR20.
    / (PT1LH PH1LH ST1LH SH1LH) (@1 4*10.3)
    / (PT2LH PH2LH ST2LH SH2LH) (@1 4*10.3)
    / (PT3LH PH3LH ST3LH SH3LH) (@1 4*10.3)
    / (PT4LH PH4LH ST4LH SH4LH) (@1 4*10.3)
    / (PT5LH PH5LH ST5LH SH5LH) (@1 4*10.3)
    / @1 SPLI $CHAR20.
    / (PT1LI PH1LI ST1LI SH1LI) (@1 4*10.3)
    / (PT2LI PH2LI ST2LI SH2LI) (@1 4*10.3)
    / (PT3LI PH3LI ST3LI SH3LI) (@1 4*10.3)
    / (PT4LI PH4LI ST4LI SH4LI) (@1 4*10.3)
    / (PT5LI PH5LI ST5LI SH5LI) (@1 4*10.3)
    / @1 SPLJ $CHAR20.
    / (PT1LJ PH1LJ ST1LJ SH1LJ) (@1 4*10.3)
    / (PT2LJ PH2LJ ST2LJ SH2LJ) (@1 4*10.3)
    / (PT3LJ PH3LJ ST3LJ SH3LJ) (@1 4*10.3)
    / (PT4LJ PH4LJ ST4LJ SH4LJ) (@1 4*10.3)
    / (PT5LJ PH5LJ ST5LJ SH5LJ) (@1 4*10.3)
    / @1 SPLK $CHAR20.
    / (PT1LK PH1LK ST1LK SH1LK) (@1 4*10.3)
    / (PT2LK PH2LK ST2LK SH2LK) (@1 4*10.3)
    / (PT3LK PH3LK ST3LK SH3LK) (@1 4*10.3)
    / (PT4LK PH4LK ST4LK SH4LK) (@1 4*10.3)
    / (PT5LK PH5LK ST5LK SH5LK) (@1 4*10.3);
**** THIS STEP PRINTS OUT THE FINAL SUMMARY RESULTS IN SPECIFIC COLUMNS;
DATA _NULL_; SET RPTFIN;
FILE PRINT HEADER=HEAD NOTITLES;
PUT @1 '1. SAMPLE NO OF LAKES' @25 NORES1 5.1 @36 NORES2 5.1
     @47 NORES3 5.1 @58 NORES4 5.1 @69 NORES5 5.1/
    @1 '2. TOTAL NO ACRES' @19 SUMACRE1 COMMA11. @30 SUMACRE2 COMMA11.
     @41 SUMACRE3 COMMA11. @52 SUMACRE4 COMMA11. @63 SUMACRE5 COMMA11./
    @1 '3. TOTAL TRIPS' @19 ESTRIPS1 COMMA11. @30 ESTRIPS2 COMMA11.
     @41 ESTRIPS3 COMMA11. @52 ESTRIPS4 COMMA11. @63 ESTRIPS5 COMMA11./
    @1 '4. TRIPS PER ACRE' @25 TRPRAC1 5.2 @36 TRPRAC2 5.2
     @47 TRPRAC3 5.2 @58 TRPRAC4 5.2 @69 TRPRAC5 5.2/
    @1 '5. HOURS PER ACRE' @25 HRPRAC1 5.2 @36 HRPRAC2 5.2
     @47 HRPRAC3 5.2 @58 HRPRAC4 5.2 @69 HRPRAC5 5.2/
    @1 '6. % SUCCESS-COMP.TRIP' @25 PERSUC1 5.1 @36 PERSUC2 5.1
     @47 PERSUC3 5.1 @58 PERSUC4 5.1 @69 PERSUC5 5.1/
    @1 '7. % BOAT FISHERMEN' @25 BOATPER1 5.1 @36 BOATPER2 5.1
     @47 BOATPER3 5.1 @58 BOATPER4 5.1 @69 BOATPER5 5.1/
    @1 '8. % BANK FISHERMEN' @25 BANKPER1 5.1 @36 BANKPER2 5.1
     @47 BANKPER3 5.1 @58 BANKPER4 5.1 @69 BANKPER5 5.1/
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@1 '9. NUMBER CAUGHT:'/
@3 SPMA $CHAR20. @19 TN1MA COMMA11. @30 TN2MA COMMA11.
 @41 TN3MA COMMA11. @52 TN4MA COMMA11. @63 TN5MA COMMA11./
@3 SPMB $CHAR20. @19 TN1MB COMMA11. @30 TN2MB COMMA11.
 @41 TN3MB COMMA11. @52 TN4MB COMMA11. @63 TN5MB COMMA11./
@3 SPMC $CHAR20. @19 TN1MC COMMA11. @30 TN2MC COMMA11.
 @41 TN3MC COMMA11. @52 TN4MC COMMA11. @63 TN5MC COMMA11./
@3 SPMD $CHAR20. @19 TN1MD COMMA11. @30 TN2MD COMMA11.
 @41 TN3MD COMMA11. @52 TN4MD COMMA11. @63 TN5MD COMMA11./
@3 SPME $CHAR20. @19 TN1ME COMMA11. @30 TN2ME COMMA11.
 @41 TN3ME COMMA11. @52 TN4ME COMMA11. @63 TN5ME COMMA11./
@3 SPMF $CHAR20. @19 TN1MF COMMA11. @30 TN2MF COMMA11.
 @41 TN3MF COMMA11. @52 TN4MF COMMA11. @63 TN5MF COMMA11./
@3 SPMG $CHAR20. @19 TN1MG COMMA11. @30 TN2MG COMMA11.
 @41 TN3MG COMMA11. @52 TN4MG COMMA11. @63 TN5MG COMMA11./
@3 SPMH $CHAR20. @19 TN1MH COMMA11. @30 TN2MH COMMA11.
 @41 TN3MH COMMA11. @52 TN4MH COMMA11. @63 TN5MH COMMA11./
@3 SPMI $CHAR20. @19 TN1MI COMMA11. @30 TN2MI COMMA11.
 @41 TN3MI COMMA11. @52 TN4MI COMMA11. @63 TN5MI COMMA11./
@1 '10. POUNDS CAUGHT:'/
@3 SPMA $CHAR20. @19 TP1MA COMMA11. @30 TP2MA COMMA11.
 @41 TP3MA COMMA11. @52 TP4MA COMMA11. @63 TP5MA COMMA11./
@3 SPMB $CHAR20. @19 TP1MB COMMA11. @30 TP2MB COMMA11.
 @41 TP3MB COMMA11. @52 TP4MB COMMA11. @63 TP5MB COMMA11./
@3 SPMC $CHAR20. @19 TP1MC COMMA11. @30 TP2MC COMMA11.
 @41 TP3MC COMMA11. @52 TP4MC COMMA11. @63 TP5MC COMMA11./
@3 SPMD $CHAR20. @19 TP1MD COMMA11. @30 TP2MD COMMA11.
 @41 TP3MD COMMA11. @52 TP4MD COMMA11. @63 TP5MD COMMA11./
@3 SPME $CHAR20. @19 TP1ME COMMA11. @30 TP2ME COMMA11.
 @41 TP3ME COMMA11. @52 TP4ME COMMA11. @63 TP5ME COMMA11./
@3 SPMF $CHAR20. @19 TP1MF COMMA11. @30 TP2MF COMMA11.
 @41 TP3MF COMMA11. @52 TP4MF COMMA11. @63 TP5MF COMMA11./
@3 SPMG $CHAR20. @19 TP1MG COMMA11. @30 TP2MG COMMA11.
 @41 TP3MG COMMA11. @52 TP4MG COMMA11. @63 TP5MG COMMA11./
@3 SPMH $CHAR20. @19 TP1MH COMMA11. @30 TP2MH COMMA11.
 @41 TP3MH COMMA11. @52 TP4MH COMMA11. @63 TP5MH COMMA11./
@3 SPMI $CHAR20. @19 TP1MI COMMA11. @30 TP2MI COMMA11.
@41 TP3MI COMMA11. @52 TP4MI COMMA11. @63 TP5MI COMMA11./
@1 '11. AVE. WEIGHT (10.BY9.):'/
@3 SPMA $CHAR20. @25 TM1MA 5.2 @36 TM2MA 5.2
 @47 TM3MA 5.2 @58 TM4MA 5.2 @69 TM5MA 5.2/
@3 SPMB $CHAR20. @25 TM1MB 5.2 @36 TM2MB 5.2
 @47 TM3MB 5.2 @58 TM4MB 5.2 @69 TM5MB 5.2/
@3 SPMC $CHAR20. @25 TM1MC 5.2 @36 TM2MC 5.2
 @47 TM3MC 5.2 @58 TM4MC 5.2 @69 TM5MC 5.2/
@3 SPMD $CHAR20. @25 TM1MD 5.2 @36 TM2MD 5.2
 @47 TM3MD 5.2 @58 TM4MD 5.2 @69 TM5MD 5.2/
@3 SPME $CHAR20. @25 TM1ME 5.2 @36 TM2ME 5.2
 @47 TM3ME 5.2 @58 TM4ME 5.2 @69 TM5ME 5.2/
@3 SPMF $CHAR20. @25 TM1MF 5.2 @36 TM2MF 5.2
 @47 TM3MF 5.2 @58 TM4MF 5.2 @69 TM5MF 5.2/
@3 SPMG $CHAR20. @25 TM1MG 5.2 @36 TM2MG 5.2
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 @47 TM3MG 5.2 @58 TM4MG 5.2 @69 TM5MG 5.2/
@3 SPMH $CHAR20. @25 TM1MH 5.2 @36 TM2MH 5.2
 @47 TM3MH 5.2 @58 TM4MH 5.2 @69 TM5MH 5.2/
@3 SPMI $CHAR20. @25 TM1MI 5.2 @36 TM2MI 5.2
 @47 TM3MI 5.2 @58 TM4MI 5.2 @69 TM5MI 5.2/
@1 '12. LBS PER ACRE (10.BY ACRES):'/
@3 SPMA $CHAR20. @25 TPA1MA 5.2 @36 TPA2MA 5.2
 @47 TPA3MA 5.2 @58 TPA4MA 5.2 @69 TPA5MA 5.2/
@3 SPMB $CHAR20. @25 TPA1MB 5.2 @36 TPA2MB 5.2
 @47 TPA3MB 5.2 @58 TPA4MB 5.2 @69 TPA5MB 5.2/
@3 SPMC $CHAR20. @25 TPA1MC 5.2 @36 TPA2MC 5.2
 @47 TPA3MC 5.2 @58 TPA4MC 5.2 @69 TPA5MC 5.2/
@3 SPMD $CHAR20. @25 TPA1MD 5.2 @36 TPA2MD 5.2
 @47 TPA3MD 5.2 @58 TPA4MD 5.2 @69 TPA5MD 5.2/
@3 SPME $CHAR20. @25 TPA1ME 5.2 @36 TPA2ME 5.2
 @47 TPA3ME 5.2 @58 TPA4ME 5.2 @69 TPA5ME 5.2/
@3 SPMF $CHAR20. @25 TPA1MF 5.2 @36 TPA2MF 5.2
 @47 TPA3MF 5.2 @58 TPA4MF 5.2 @69 TPA5MF 5.2/
@3 SPMG $CHAR20. @25 TPA1MG 5.2 @36 TPA2MG 5.2
 @47 TPA3MG 5.2 @58 TPA4MG 5.2 @69 TPA5MG 5.2/
@3 SPMH $CHAR20. @25 TPA1MH 5.2 @36 TPA2MH 5.2
 @47 TPA3MH 5.2 @58 TPA4MH 5.2 @69 TPA5MH 5.2/
@3 SPMI $CHAR20. @25 TPA1MI 5.2 @36 TPA2MI 5.2
@47 TPA3MI 5.2 @58 TPA4MI 5.2 @69 TPA5MI 5.2/
@1 '13. NO. PER HOUR (9.BY EST HRS):'/
@3 SPMA $CHAR20. @25 TNH1MA 5.2 @36 TNH2MA 5.2
 @47 TNH3MA 5.2 @58 TNH4MA 5.2 @69 TNH5MA 5.2/
@3 SPMB $CHAR20. @25 TNH1MB 5.2 @36 TNH2MB 5.2
 @47 TNH3MB 5.2 @58 TNH4MB 5.2 @69 TNH5MB 5.2/
@3 SPMC $CHAR20. @25 TNH1MC 5.2 @36 TNH2MC 5.2
 @47 TNH3MC 5.2 @58 TNH4MC 5.2 @69 TNH5MC 5.2/
@3 SPMD $CHAR20. @25 TNH1MD 5.2 @36 TNH2MD 5.2
 @47 TNH3MD 5.2 @58 TNH4MD 5.2 @69 TNH5MD 5.2/
@3 SPME $CHAR20. @25 TNH1ME 5.2 @36 TNH2ME 5.2
 @47 TNH3ME 5.2 @58 TNH4ME 5.2 @69 TNH5ME 5.2/
@3 SPMF $CHAR20. @25 TNH1MF 5.2 @36 TNH2MF 5.2
 @47 TNH3MF 5.2 @58 TNH4MF 5.2 @69 TNH5MF 5.2/
@3 SPMG $CHAR20. @25 TNH1MG 5.2 @36 TNH2MG 5.2
 @47 TNH3MG 5.2 @58 TNH4MG 5.2 @69 TNH5MG 5.2/
@3 SPMH $CHAR20. @25 TNH1MH 5.2 @36 TNH2MH 5.2
 @47 TNH3MH 5.2 @58 TNH4MH 5.2 @69 TNH5MH 5.2/
@3 SPMI $CHAR20. @25 TNH1MI 5.2 @36 TNH2MI 5.2
@47 TNH3MI 5.2 @58 TNH4MI 5.2 @69 TNH5MI 5.2/
 @1 '14. LB. PER HOUR (8.BY EST HRS):'/
@3 SPMA $CHAR20. @25 TPH1MA 5.2 @36 TPH2MA 5.2
 @47 TPH3MA 5.2 @58 TPH4MA 5.2 @69 TPH5MA 5.2/
@3 SPMB $CHAR20. @25 TPH1MB 5.2 @36 TPH2MB 5.2
 @47 TPH3MB 5.2 @58 TPH4MB 5.2 @69 TPH5MB 5.2/
@3 SPMC $CHAR20. @25 TPH1MC 5.2 @36 TPH2MC 5.2
 @47 TPH3MC 5.2 @58 TPH4MC 5.2 @69 TPH5MC 5.2/
@3 SPMD $CHAR20. @25 TPH1MD 5.2 @36 TPH2MD 5.2
 @47 TPH3MD 5.2 @58 TPH4MD 5.2 @69 TPH5MD 5.2/
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@3 SPME $CHAR20. @25 TPH1ME 5.2 @36 TPH2ME 5.2
 @47 TPH3ME 5.2 @58 TPH4ME 5.2 @69 TPH5ME 5.2/
@3 SPMF $CHAR20. @25 TPH1MF 5.2 @36 TPH2MF 5.2
 @47 TPH3MF 5.2 @58 TPH4MF 5.2 @69 TPH5MF 5.2/
@3 SPMG $CHAR20. @25 TPH1MG 5.2 @36 TPH2MG 5.2
 @47 TPH3MG 5.2 @58 TPH4MG 5.2 @69 TPH5MG 5.2/
@3 SPMH $CHAR20. @25 TPH1MH 5.2 @36 TPH2MH 5.2
 @47 TPH3MH 5.2 @58 TPH4MH 5.2 @69 TPH5MH 5.2/
@3 SPMI $CHAR20. @25 TPH1MI 5.2 @36 TPH2MI 5.2
@47 TPH3MI 5.2 @58 TPH4MI 5.2 @69 TPH5MI 5.2/
@1 '15. FISHING TRIPS (%) FOR:'/
@3 SPLA $CHAR20. @25 PT1LA 5.2 @36 PT2LA 5.2
 @47 PT3LA 5.2 @58 PT4LA 5.2 @69 PT5LA 5.2/
@3 SPLB $CHAR20. @25 PT1LB 5.2 @36 PT2LB 5.2
 @47 PT3LB 5.2 @58 PT4LB 5.2 @69 PT5LB 5.2/
@3 SPLC $CHAR20. @25 PT1LC 5.2 @36 PT2LC 5.2
 @47 PT3LC 5.2 @58 PT4LC 5.2 @69 PT5LC 5.2/
@3 SPLD $CHAR20. @25 PT1LD 5.2 @36 PT2LD 5.2
 @47 PT3LD 5.2 @58 PT4LD 5.2 @69 PT5LD 5.2/
@3 SPLE $CHAR20. @25 PT1LE 5.2 @36 PT2LE 5.2
 @47 PT3LE 5.2 @58 PT4LE 5.2 @69 PT5LE 5.2/
@3 SPLF $CHAR20. @25 PT1LF 5.2 @36 PT2LF 5.2
 @47 PT3LF 5.2 @58 PT4LF 5.2 @69 PT5LF 5.2/
@3 SPLG $CHAR20. @25 PT1LG 5.2 @36 PT2LG 5.2
 @47 PT3LG 5.2 @58 PT4LG 5.2 @69 PT5LG 5.2/
@3 SPLH $CHAR20. @25 PT1LH 5.2 @36 PT2LH 5.2
 @47 PT3LH 5.2 @58 PT4LH 5.2 @69 PT5LH 5.2/
@3 SPLI $CHAR20. @25 PT1LI 5.2 @36 PT2LI 5.2
 @47 PT3LI 5.2 @58 PT4LI 5.2 @69 PT5LI 5.2/
@3 SPLJ $CHAR20. @25 PT1LJ 5.2 @36 PT2LJ 5.2
 @47 PT3LJ 5.2 @58 PT4LJ 5.2 @69 PT5LJ 5.2/
@3 SPLK $CHAR20. @25 PT1LK 5.2 @36 PT2LK 5.2
 @47 PT3LK 5.2 @58 PT4LK 5.2 @69 PT5LK 5.2/
@1 '16. HOURS FISHING (%) FOR:'/
@3 SPLA $CHAR20. @25 PH1LA 5.2 @36 PH2LA 5.2
 @47 PH3LA 5.2 @58 PH4LA 5.2 @69 PH5LA 5.2/
@3 SPLB $CHAR20. @25 PH1LB 5.2 @36 PH2LB 5.2
 @47 PH3LB 5.2 @58 PH4LB 5.2 @69 PH5LB 5.2/
@3 SPLC $CHAR20. @25 PH1LC 5.2 @36 PH2LC 5.2
 @47 PH3LC 5.2 @58 PH4LC 5.2 @69 PH5LC 5.2/
@3 SPLD $CHAR20. @25 PH1LD 5.2 @36 PH2LD 5.2
 @47 PH3LD 5.2 @58 PH4LD 5.2 @69 PH5LD 5.2/
@3 SPLE $CHAR20. @25 PH1LE 5.2 @36 PH2LE 5.2
 @47 PH3LE 5.2 @58 PH4LE 5.2 @69 PH5LE 5.2/
@3 SPLF $CHAR20. @25 PH1LF 5.2 @36 PH2LF 5.2
 @47 PH3LF 5.2 @58 PH4LF 5.2 @69 PH5LF 5.2/
@3 SPLG $CHAR20. @25 PH1LG 5.2 @36 PH2LG 5.2
 @47 PH3LG 5.2 @58 PH4LG 5.2 @69 PH5LG 5.2/
@3 SPLH $CHAR20. @25 PH1LH 5.2 @36 PH2LH 5.2
 @47 PH3LH 5.2 @58 PH4LH 5.2 @69 PH5LH 5.2/
@3 SPLI $CHAR20. @25 PH1LI 5.2 @36 PH2LI 5.2
 @47 PH3LI 5.2 @58 PH4LI 5.2 @69 PH5LI 5.2/
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    @3 SPLJ $CHAR20. @25 PH1LJ 5.2 @36 PH2LJ 5.2
     @47 PH3LJ 5.2 @58 PH4LJ 5.2 @69 PH5LJ 5.2/
    @3 SPLK $CHAR20. @25 PH1LK 5.2 @36 PH2LK 5.2
     @47 PH3LK 5.2 @58 PH4LK 5.2 @69 PH5LK 5.2/
    @1 '17. TRIPS PER ACRE FOR:'/
    @3 SPLA $CHAR20. @25 ST1LA 5.3 @36 ST2LA 5.3
     @47 ST3LA 5.3 @58 ST4LA 5.3 @69 ST5LA 5.3/
    @3 SPLB $CHAR20. @25 ST1LB 5.3 @36 ST2LB 5.3
     @47 ST3LB 5.3 @58 ST4LB 5.3 @69 ST5LB 5.3/
    @3 SPLC $CHAR20. @25 ST1LC 5.3 @36 ST2LC 5.3
     @47 ST3LC 5.3 @58 ST4LC 5.3 @69 ST5LC 5.3/
    @3 SPLD $CHAR20. @25 ST1LD 5.3 @36 ST2LD 5.3
     @47 ST3LD 5.3 @58 ST4LD 5.3 @69 ST5LD 5.3/
    @3 SPLE $CHAR20. @25 ST1LE 5.3 @36 ST2LE 5.3
     @47 ST3LE 5.3 @58 ST4LE 5.3 @69 ST5LE 5.3/
    @3 SPLF $CHAR20. @25 ST1LF 5.3 @36 ST2LF 5.3
     @47 ST3LF 5.3 @58 ST4LF 5.3 @69 ST5LF 5.3/
    @3 SPLG $CHAR20. @25 ST1LG 5.3 @36 ST2LG 5.3
     @47 ST3LG 5.3 @58 ST4LG 5.3 @69 ST5LG 5.3/
    @3 SPLH $CHAR20. @25 ST1LH 5.3 @36 ST2LH 5.3
     @47 ST3LH 5.3 @58 ST4LH 5.3 @69 ST5LH 5.3/
    @3 SPLI $CHAR20. @25 ST1LI 5.3 @36 ST2LI 5.3
     @47 ST3LI 5.3 @58 ST4LI 5.3 @69 ST5LI 5.3/
    @3 SPLJ $CHAR20. @25 ST1LJ 5.3 @36 ST2LJ 5.3
     @47 ST3LJ 5.3 @58 ST4LJ 5.3 @69 ST5LJ 5.3/
    @3 SPLK $CHAR20. @25 ST1LK 5.3 @36 ST2LK 5.3
     @47 ST3LK 5.3 @58 ST4LK 5.3 @69 ST5LK 5.3/
    @1 '18. HOURS PER ACRE FOR:'/
    @3 SPLA $CHAR20. @25 SH1LA 5.3 @36 SH2LA 5.3
     @47 SH3LA 5.3 @58 SH4LA 5.3 @69 SH5LA 5.3/
    @3 SPLB $CHAR20. @25 SH1LB 5.3 @36 SH2LB 5.3
     @47 SH3LB 5.3 @58 SH4LB 5.3 @69 SH5LB 5.3/
    @3 SPLC $CHAR20. @25 SH1LC 5.3 @36 SH2LC 5.3
     @47 SH3LC 5.3 @58 SH4LC 5.3 @69 SH5LC 5.3/
    @3 SPLD $CHAR20. @25 SH1LD 5.3 @36 SH2LD 5.3
     @47 SH3LD 5.3 @58 SH4LD 5.3 @69 SH5LD 5.3/
    @3 SPLE $CHAR20. @25 SH1LE 5.3 @36 SH2LE 5.3
     @47 SH3LE 5.3 @58 SH4LE 5.3 @69 SH5LE 5.3/
    @3 SPLF $CHAR20. @25 SH1LF 5.3 @36 SH2LF 5.3
     @47 SH3LF 5.3 @58 SH4LF 5.3 @69 SH5LF 5.3/
    @3 SPLG $CHAR20. @25 SH1LG 5.3 @36 SH2LG 5.3
     @47 SH3LG 5.3 @58 SH4LG 5.3 @69 SH5LG 5.3/
    @3 SPLH $CHAR20. @25 SH1LH 5.3 @36 SH2LH 5.3
     @47 SH3LH 5.3 @58 SH4LH 5.3 @69 SH5LH 5.3/
    @3 SPLI $CHAR20. @25 SH1LI 5.3 @36 SH2LI 5.3
     @47 SH3LI 5.3 @58 SH4LI 5.3 @69 SH5LI 5.3/
    @3 SPLJ $CHAR20. @25 SH1LJ 5.3 @36 SH2LJ 5.3
     @47 SH3LJ 5.3 @58 SH4LJ 5.3 @69 SH5LJ 5.3/
    @3 SPLK $CHAR20. @25 SH1LK 5.3 @36 SH2LK 5.3
     @47 SH3LK 5.3 @58 SH4LK 5.3 @69 SH5LK 5.3;
RETURN;
 HEAD: PUT / @25 'COMBINED FISHERIES-ALL RESERVOIRS CREELED'/
```

```
        @25 'YEAR1' @36 'YEAR2' @47 'YEAR3' @58 'YEAR4' @69 'YEAR5'/
        @25 YR1 5. @36 YR2 5. @47 YR3 5. @58 YR4 5. @69 YR5 5.;
 RETURN;
**** THE FOLLOWING STATEMENTS CREATE GRAPHICS OF ALL RESERVOIRS COMBINED
**** WITH EMPHASIS ON CRAPPIE AND BLACK BASS CATCH AND PRESSURE VARIABLES;
DATA GRAFF; SET EVERYTHG;
IF (YR GE 79 AND YR LE 83);
DATA GRAPH; SET GRAFF;
DATA GR1; SET GRAPH;
IF ALLTOG=0;
LABEL ESTRIPS= NUMBER OF TRIPS
      YR= YEAR;
PROC SORT; BY ALLTOG  ;
PROC PLOT; BY ALLTOG;
PLOT ESTRIPS*YR=*/HPOS=64 VPOS=50;
TITLE ESTIMATED NUMBER OF TRIPS BY YEAR;
DATA GR2; SET GRAPH;
IF ALLTOG=1;
LABEL NOPERHR= NUMBER PER HOUR
      YR= YEAR;
PROC SORT; BY ALLTOG;
PROC PLOT; BY ALLTOG;
PLOT NOPERHR*YR=*/HPOS=64 VPOS=50;
TITLE ESTIMATED NUMBER CAUGHT PER HOUR OF CRAPPIE (87) BY YEAR;
DATA GR3; SET GRAPH;
IF ALLTOG=1;
LABEL ESTOTLB= TOTAL POUNDS
      YR= YEAR;
PROC SORT; BY ALLTOG;
PROC PLOT; BY ALLTOG;
PLOT ESTOTLB*YR=*/HPOS=64 VPOS=50;
TITLE ESTIMATED TOTAL POUNDS OF CRAPPIE (87) BY YEAR;
DATA GR4; SET GRAPH;
IF ALLTOG=1;
LABEL LBACRE= POUNDS PER ACRE
      YR= YEAR;
PROC SORT; BY ALLTOG;
PROC PLOT; BY ALLTOG;
PLOT LBACRE*YR=*/HPOS=64 VPOS=50;
TITLE ESTIMATED POUNDS PER ACRE OF CRAPPIE (87) BY YEAR;
DATA GR5; SET GRAPH;
IF ALLTOG=2;
LABEL NOPERHR= NUMBER PER HOUR
      YR= YEAR;
PROC SORT; BY ALLTOG;
PROC PLOT; BY ALLTOG;
PLOT NOPERHR*YR=*/HPOS=64 VPOS=50;
TITLE ESTIMATED NUMBER CAUGHT PER HOUR OF BLACK BASS (80) BY YEAR;
DATA GR6; SET GRAPH;
IF ALLTOG=2;
LABEL ESTOTLB= TOTAL POUNDS
      YR= YEAR;
```

```
PROC SORT; BY ALLTOG;
PROC PLOT; BY ALLTOG;
PLOT ESTOTLB*YR=*/HPOS=64 VPOS=50;
TITLE ESTIMATED TOTAL POUNDS OF BLACK BASS (80) BY YEAR;
DATA GR7; SET GRAPH;
IF ALLTOG=2;
LABEL LBACRE= POUNDS PER ACRE
      YR= YEAR;
PROC SORT; BY ALLTOG;
PROC PLOT; BY ALLTOG;
PLOT LBACRE*YR=*/HPOS=64 VPOS=50;
TITLE ESTIMATED POUNDS PER ACRE OF BLACK BASS (80) BY YEAR;
```

APPENDIX B

CORRELATION COEFFICIENTS AND SIGNIFICANCE LEVELS (0.05) FOR HARVEST, PRESSURE-EFFORT, STANDING CROP, AND PHYSICAL-CHEMICAL VARIABLES FOR ALL RESERVOIRS CREELED

Table B.1. Correlation coefficients and significance levels (0.05) for harvest variables (number per acre) for all reservoirs creeled. Coded variables are defined in Table 2, page 22.

	Number Per Acre				
	Total	Crappie	Black Bass	Catfish	Sunfish
PE1				.87 .0001	
PE2	.71 .0001	.67 .0005	.74 .0001		.56 .0051
PE3	.55 .0061	.50 .0143		.67 .0005	.42 .0488
H1	.86 .0001	.84 .0001		.42 .0449	.66 .0007
H2	.85 .0001	.92 .0001			.60 .0026
H3	.61 .0021	.61 .0019	.71 .0001		.41 .0490
H4				.98 .0001	
H5	.89 .0001	.80 .0001			.97 .0001
H6		.97 .0001			.91 .0001
H7	.97 .0001				.82 .0001
H10	.91 .0001	.82 .0001			
S3					.55 .0346
S8					.52 .0458
S10					.56 .0299
PC2			-.45 .0490		
PC3	.60 .0023	.63 .0014			.51 .0138

Table B.1 (continued)

	Number Per Acre				
	Total	Crappie	Black Bass	Catfish	Sunfish
PC4	.59 .0029	.58 .0040			.55 .0060
PC9				.69 .0044	
PC11				.75 .0001	
PC14				.67 .0006	
PC15				.83 .0001	
PC16				.68 .0037	

Table B.2. Correlation coefficients and significance levels (0.05) for pressure-effort variables for all reservoirs creeled. Coded variables are defined in Table 2, page 22.

	Estimated Trips	Hours Per Acre	Pounds Per Hour	Angler Diversity
PE1			.73 .0001	.42 .0485
PE3	.73 .0001			
PE4	.42 .0485			
H1	.53 .0099	.73 .0001	.80 .0001	
H2		.69 .0003	.58 .0039	
H3		.79 .0001	.45 .0322	
H4	.79 .0001		.66 .0007	
H5		.46 .0237	.44 .0349	
H6		.71 .0001	.55 .0061	
H7		.67 .0005	.50 .0143	
H8		.74 .0001		
H9	.87 .0001		.67 .0005	
H10		.56 .0051	.42 .0488	
PC3			.47 .0230	
PC4	.46 .0283		.65 .0009	
PC6		.49 .0237		-.47 .0305
PC9	.62 .0129			
PC11	.86 .0001		.58 .0044	

Table B.2 (continued)

	Estimated Trips	Hours Per Acre	Pounds Per Hour	Angler Diversity
PC14	.65 .0011			
PC15	.87 .0001		.63 .0090	
PC16	.73 .0014			

Table B.3. Correlation coefficients and significance levels (0.05) for standing crop variables (numbers and pounds per acre) for all reservoirs creeled. Coded variables are defined in Table 2, page 22.

	Total	Crappie	Black Bass	Catfish	Sunfish
			Standing Crop Number Per Acre		
H5					.54 .0359
H10			.52 .0458		.56 .0299
S1	.77 .0008	.59 .0202		.70 .0035	
S2		.99 .0001			
S3			.94 .0001		
S4				.82 .0002	
S5	.86 .0001				.97 .0001
S6					.90 .0001
S10	.90 .0001				
PC7	.62 .0139				.71 .0031
PC10	-.55 .0342				-.61 .0158
PC12					-.59 .0327
PC13	-.68 .0102				-.68 .0110
PC19					-.58 .0236
			Standing Crop Pounds Per Acre		
H10			.55 .0346		
S1		.53 .0423	.56 .0299	.86 .0001	
S2	.53 .0423				

Table B.3 (continued)

	Total	Crappie	Black Bass	Catfish	Sunfish
	Standing Crop Pounds Per Acre (Continued)				
S3	.56 .0299				
S4	.86 .0001				
S6	.77 .0008				.86 .0001
S7	.59 .0202	.99 .0001			
S8			.94 .0001		
S9	.70 .0035			.82 .0002	
S10					.97 .0001
PC7					.67 .0064
PC10					-.55 .0339
PC12					-.58 .0396
PC13					-.63 .0199
PC14					.55 .0328
PC19					-.54 .0389

Table B.4. Correlation coefficients and significance levels (0.05) for ten selected physical-chemical variables for all reservoirs creeled. Coded variables are defined in Table 2, page 22.

	Total Hardness	Total Dissolved Solids	Total Phosphorus	Total Suspended Solids	Total Potassium	Dissolved Oxygen	Surface Temperature	Surface pH	Flow	Mean Depth
PE1				.46 .0283					.62 .0129	
PE2						.49 .0237				
PE3			.47 .0230	.65 .0009						
PE4						-.47 .0305				
H1			.56 .0058	.58 .0041						
H2			.58 .0038	.54 .0081						
H3						.48 .0260				
H4									.67 .0058	
H5			.55 .0068	.59 .0034						
H6			.60 .0023	.59 .0029						
H7			.63 .0014	.58 .0040						

Table B.4 (continued)

	Total Hardness	Total Dissolved Solids	Total Phosphorus	Total Suspended Solids	Total Potassium	Dissolved Oxygen	Surface Temperature	Surface pH	Flow	Mean Depth
H8		-.45 .0490								
H9									.69 .0044	
H10			.51 .0138	.55 .0066						
S5							.67 .0064			-.55 .0339
S6							.62 .0139			-.55 .0342
S10							.71 .0031			-.61 .0158
PC1		.92 .0001	.57 .0057		.53 .0232			.54 .0120		
PC2	.92 .0001		.57 .0085	.47 .0381	.52 .0462					
PC3	.57 .0057	.57 .0085		.70 .0002	.57 .0128			.65 .0010		
PC4		.47 .0381	.70 .0002		.52 .0274					
PC5	.53 .0232	.52 .0462	.57 .0128	.52 .0274				.69 .0021		

Table B.4 (continued)

	Total Hardness	Total Dissolved Solids	Total Phosphorus	Total Suspended Solids	Total Potassium	Dissolved Oxygen	Surface Temperature	Surface pH	Flow	Mean Depth
PC7									.69 .0047	-.77 .0001
PC8	.54 .0120		.65 .0010		.69 .0021					
PC9							.69 .0047			-.68 .0054
PC10							-.77 .0001		-.68 .0054	
PC11				.56 .0066					.58 .0001	
PC12							-.67 .0068		-.58 .0231	.82 .0002
PC13							-.88 .0001		-.60 .0185	.94 .0001
PC14							.57 .0052		.99 .0001	-.44 .0444
PC15				.57 .0215			.52 .0394		.84 .0002	
PC16							.56 .0252		.75 .0020	
PC18	.70 .0012	.61 .0066	.57 .0142	.73 .0006	.68 .0071		.47 .0474	.53 .0250	-.70 .0035	-.58 .0112
PC19							-.87 .0001			.91 .0001

Table B.5. Correlation coefficients and significance levels ($\geq$ 0.05) for nine selected physical-chemical variables for all reservoirs creeled. Coded variables are defined in Table 2, page 22.

	Reservoir Area	Fluctuation	Storage Ratio	Drainage Area	Shore Length	Shore Line Development	Age	MEI	Elevation
PE1	.86 .0001			.65 .0011	.87 .0001	.73 .0014			
PE3	.58 .0044				.63 .0090				
H3							-.45 .0414		
H4	.68 .0005			.56 .0069	.84 .0001	.68 .0038			
H9	.75 .0001			.67 .0006	.83 .0001	.68 .0037			
S5		-.58 .0396	-.63 .0199	.55 .0328					-.54 .0389
S6			-.68 .0102						
S10		-.59 .0327	-.68 .0110						-.58 .0236
PC1								.70 .0012	
PC2								.61 .0066	
PC3								.57 .0142	

Table B.5 (continued)

	Reservoir Area	Fluctuation	Storage Ratio	Drainage Area	Shore Length	Shore Line Development	Age	MEI	Elevation
PC4	.56 .0066				.57 .0215			.73 .0006	
PC5								.68 .0071	
PC7		-.67 .0068	-.88 .0001	.57 .0052	.52 .0394	.56 .0252		.47 .0474	-.87 .0001
PC8								.53 .0250	
PC9	.84 .0001	-.58 .0231	-.60 .0185	.99 .0001	.84 .0002	.75 .0020			-.70 .0035
PC10		.82 .0002	.94 .0001	-.44 .0444				-.58 .0112	.91 .0001
PC11				.81 .0001	.99 .0001	.85 .0001			-.49 .0451
PC12			.69 .0041	-.60 .0177					.74 .0017
PC13		.69 .0041		-.61 .0153					.79 .0004
PC14	.81 .0001	.60 .0177	-.61 .0153		.82 .0001	.74 .0011			-.66 .0040
PC15	.99 .0001			.82 .0001		.92 .0001			-.56 .0244

Table B.5 (continued)

	Reservoir Area	Fluctuation	Storage Ratio	Drainage Area	Shore Length	Shore Line Development	Age	MEI	Elevation
PC16	.85 .0001			.74 .0001	.92 .0001				-.62 .0103
PC19	-.49 .0415	.74 .0017	.79 .0004	-.66 .0040	-.56 .0244	-.62 .0103		-.51 .0497	

APPENDIX C

TOTAL FISH HARVESTED IN POUNDS PER ACRE IN GROUPS OF RESERVOIRS WITH SIMILAR HARVESTS DURING THE SEVEN-YEAR PERIOD, 1977-1983. THE GROUPS ARE AS FOLLOWS: GROUP 1 = LOW HARVESTS, GROUP 2 = INTERMEDIATE LOW HARVESTS, GROUP 3 = INTERMEDIATE HIGH HARVESTS, AND GROUP 4 = HIGH HARVESTS

Figure C.1. Total fish harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with low harvests were classified in Group 1: Cordell Hull, Melton Hill, Norris, and Old Hickory. The yearly codes 1-7 represent individual years from 1977-1983.

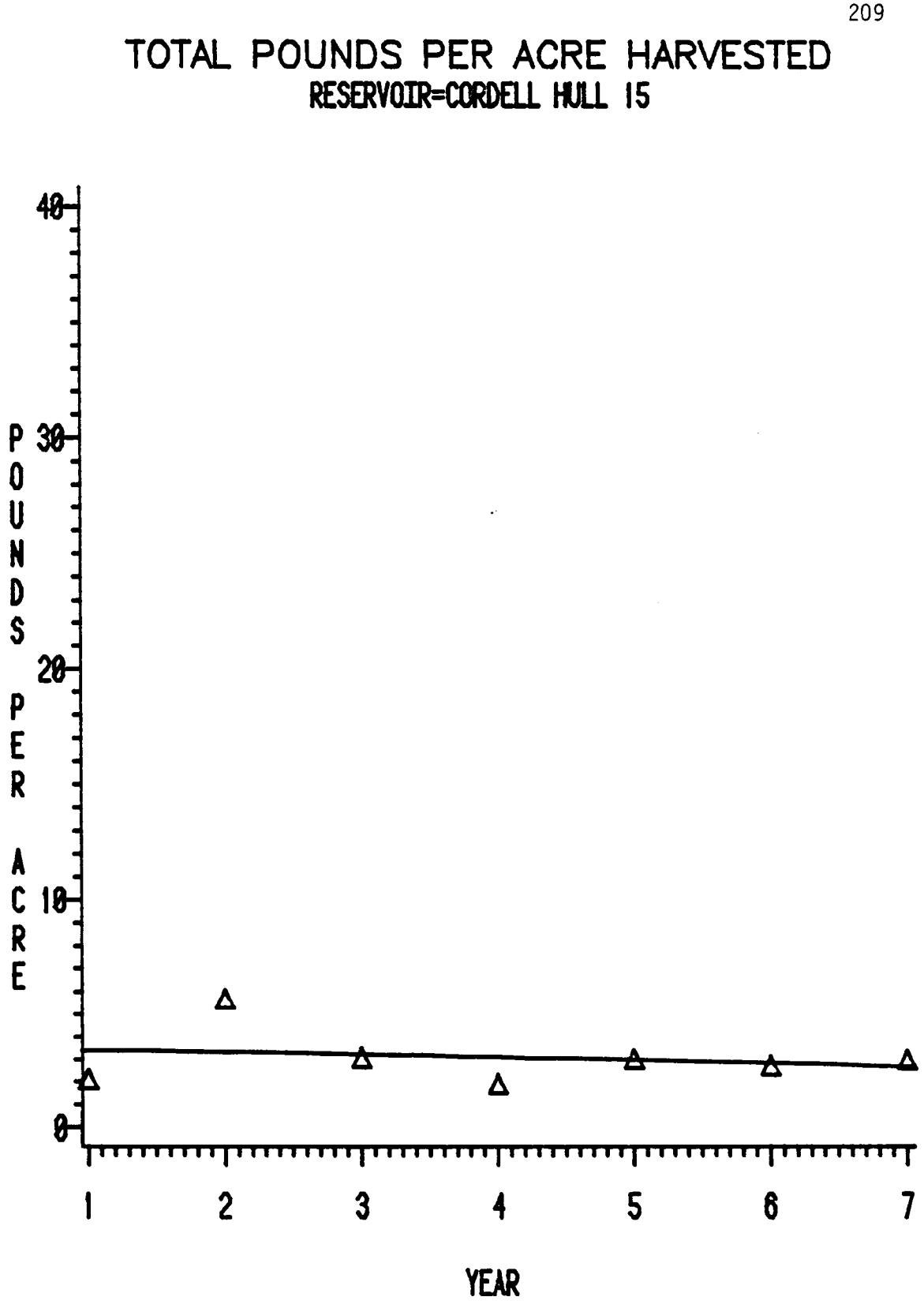

TOTAL POUNDS PER ACRE HARVESTED
RESERVOIR=CORDELL HULL 15
POUNDS PER ACRE
40
30
20
10
0
1
2
3
4
5
6
7
YEAR

Figure C.1

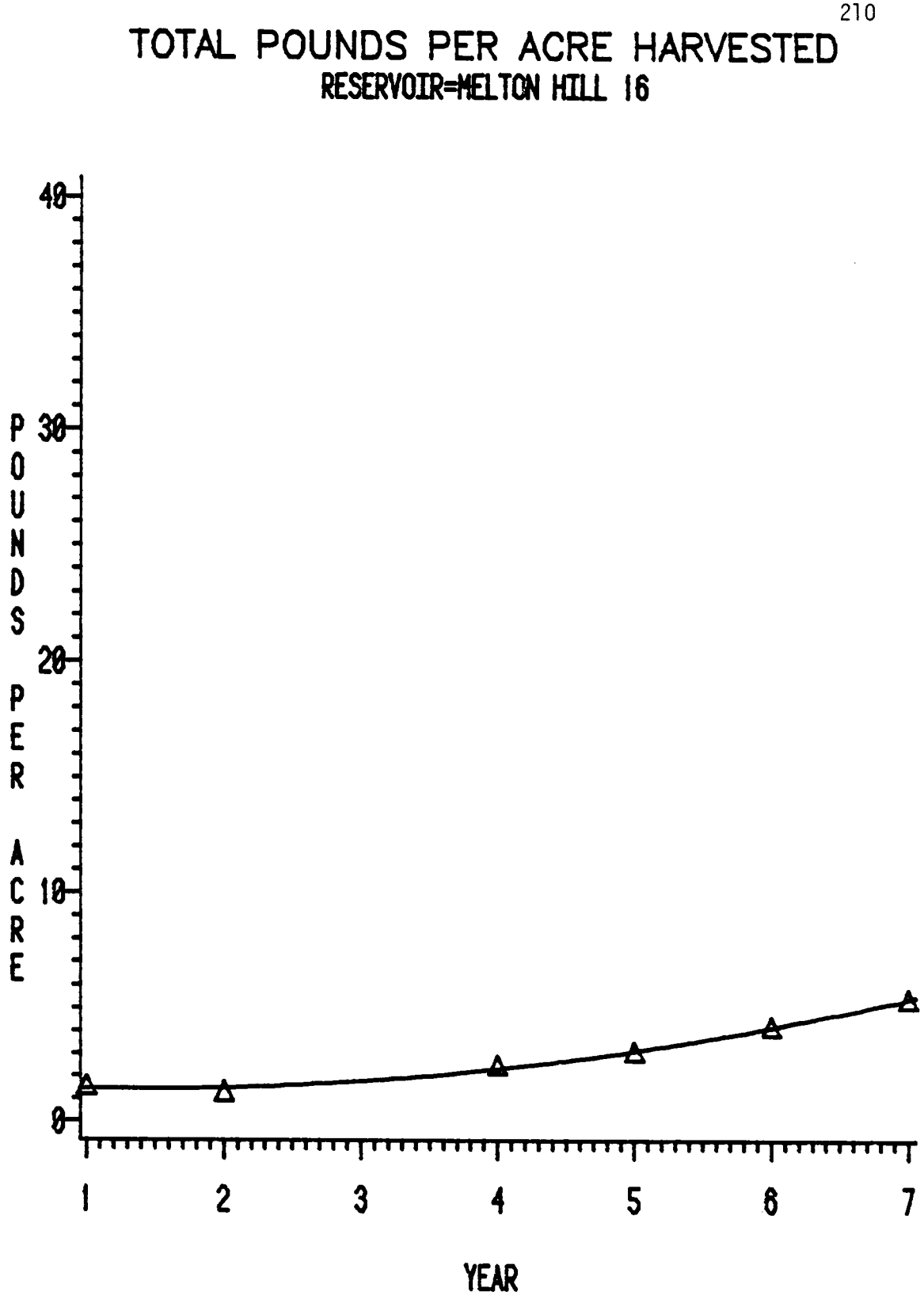


Figure C.1 (continued)

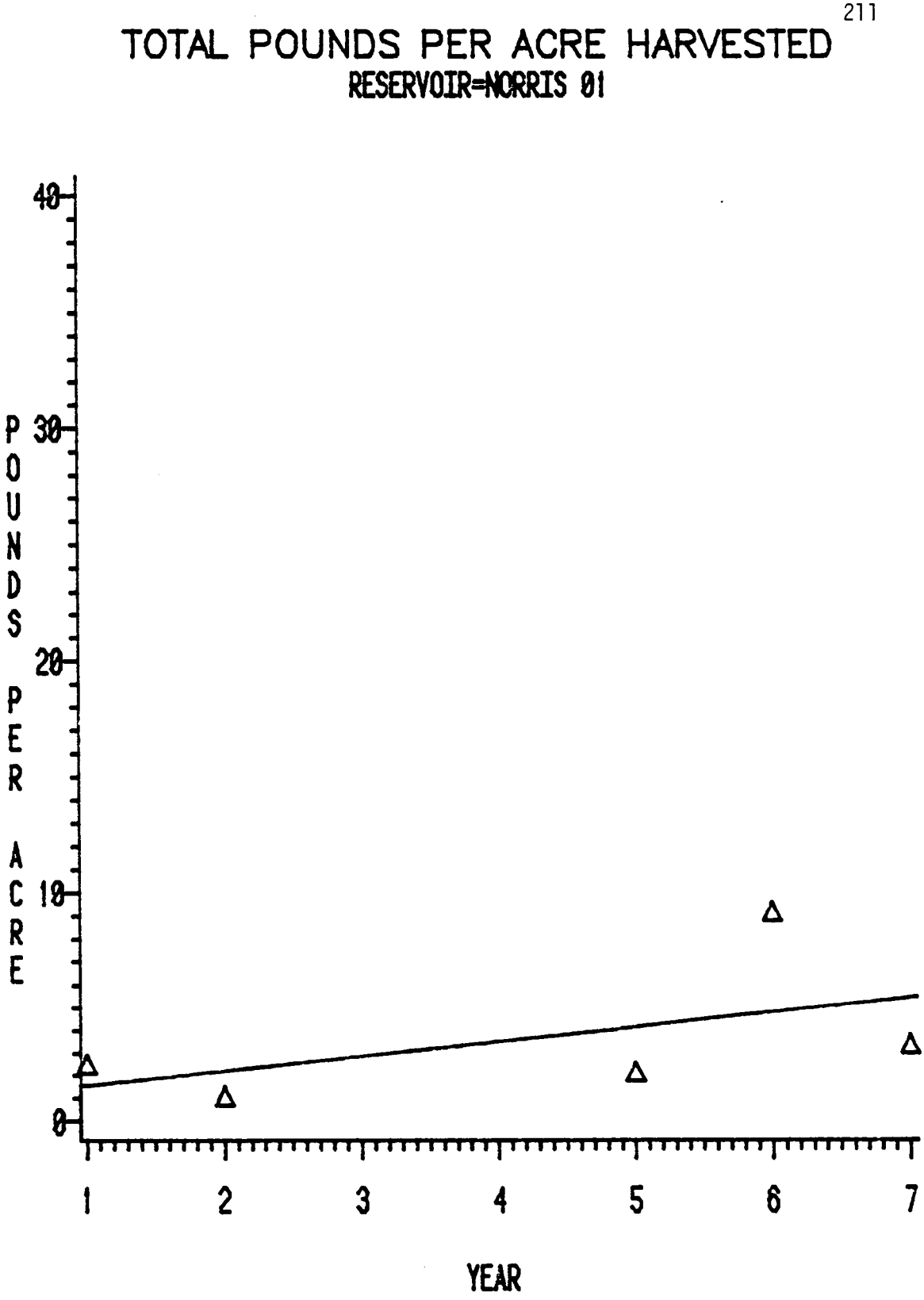


Figure C.1 (continued)

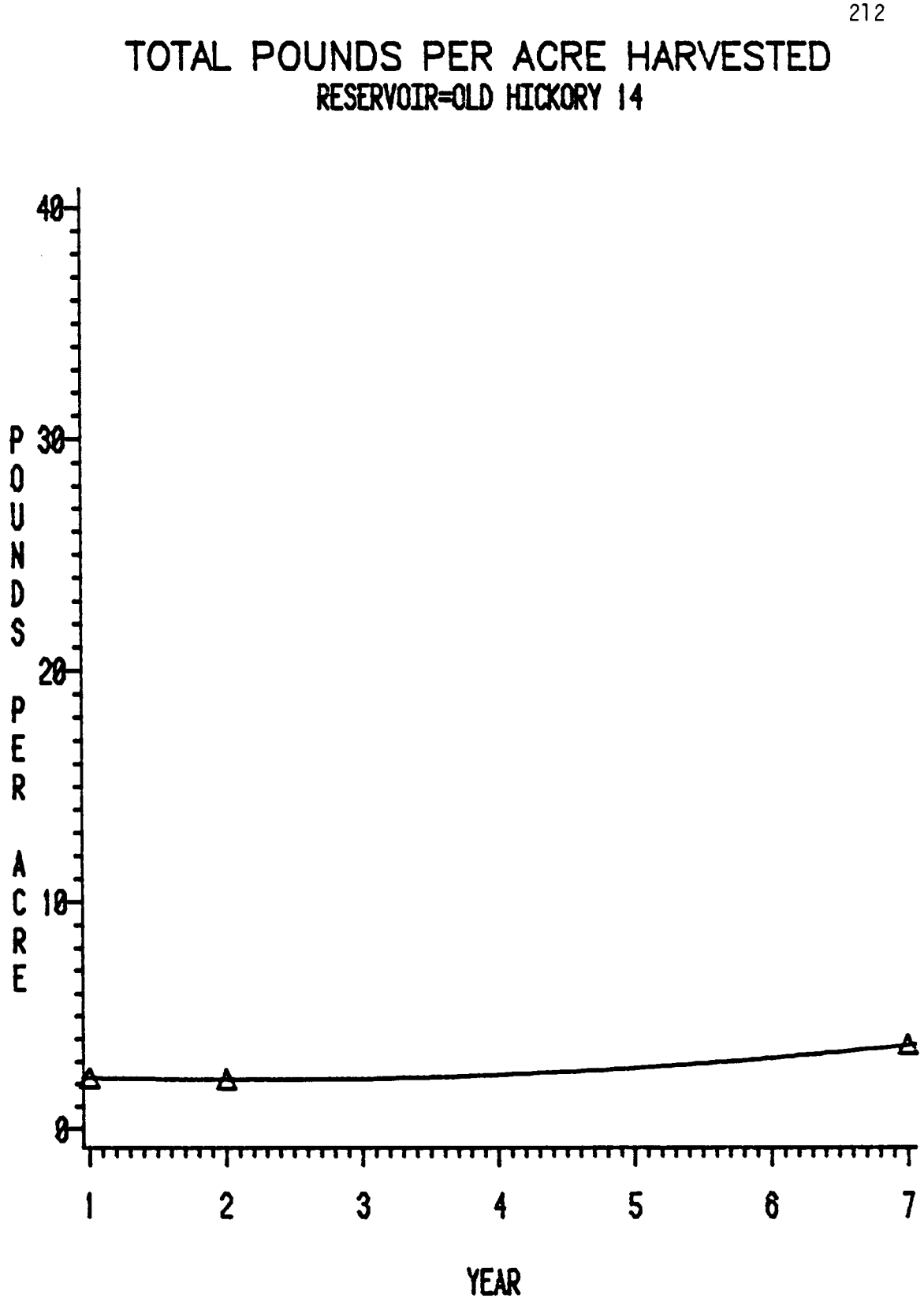


Figure C.1 (continued)

Figure C.2. Total fish harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with intermediate low harvests were classified in Group 2: Boone, Chickamauga, South Holston, Watauga, and Woods. The yearly codes 1-7 represent individual years from 1977-1983.

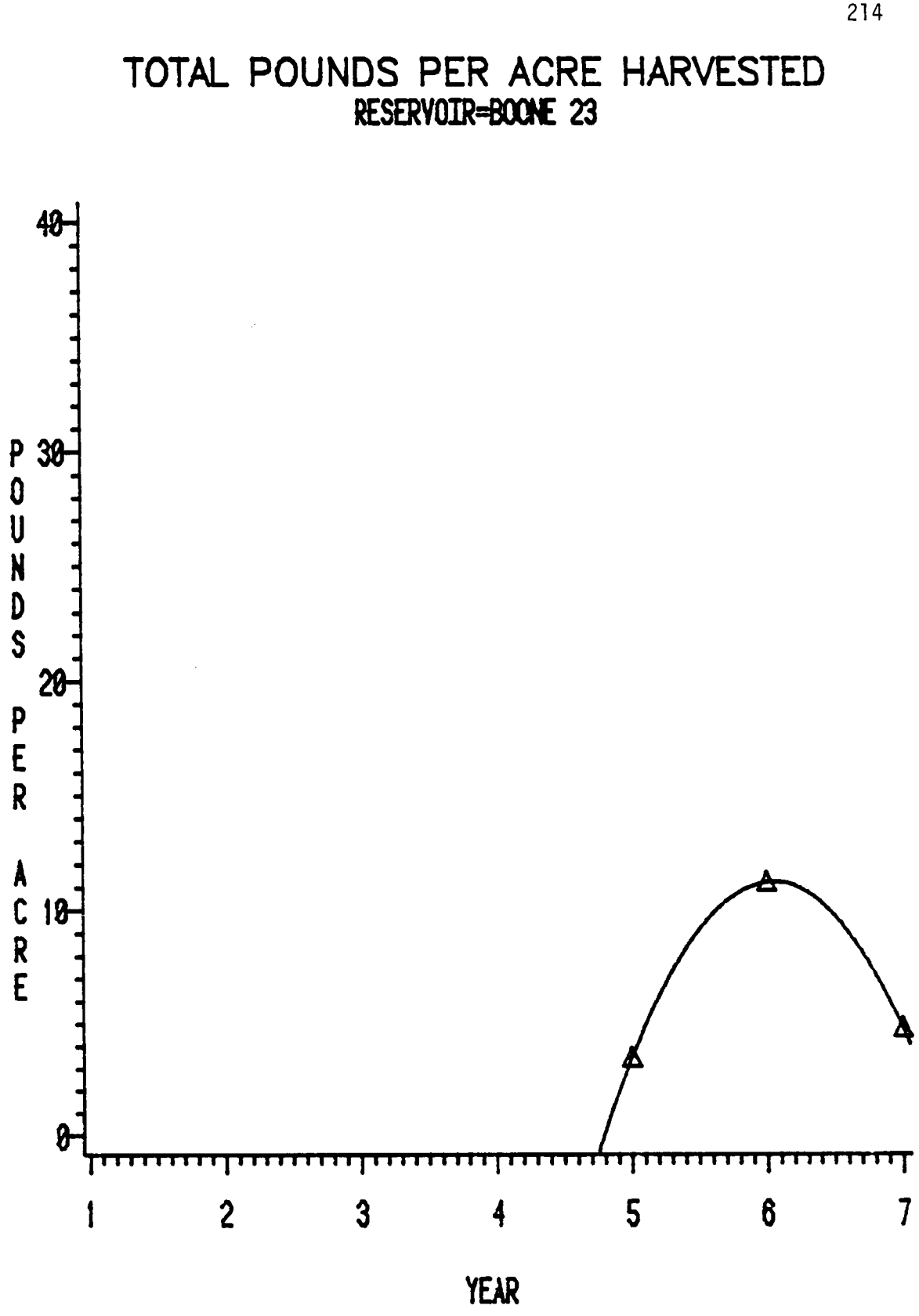

TOTAL POUNDS PER ACRE HARVESTED
RESERVOIR=BOONE 23
POUNDS PER ACRE
40
30
20
10
0
1
2
3
4
5
6
7
YEAR

Figure C.2

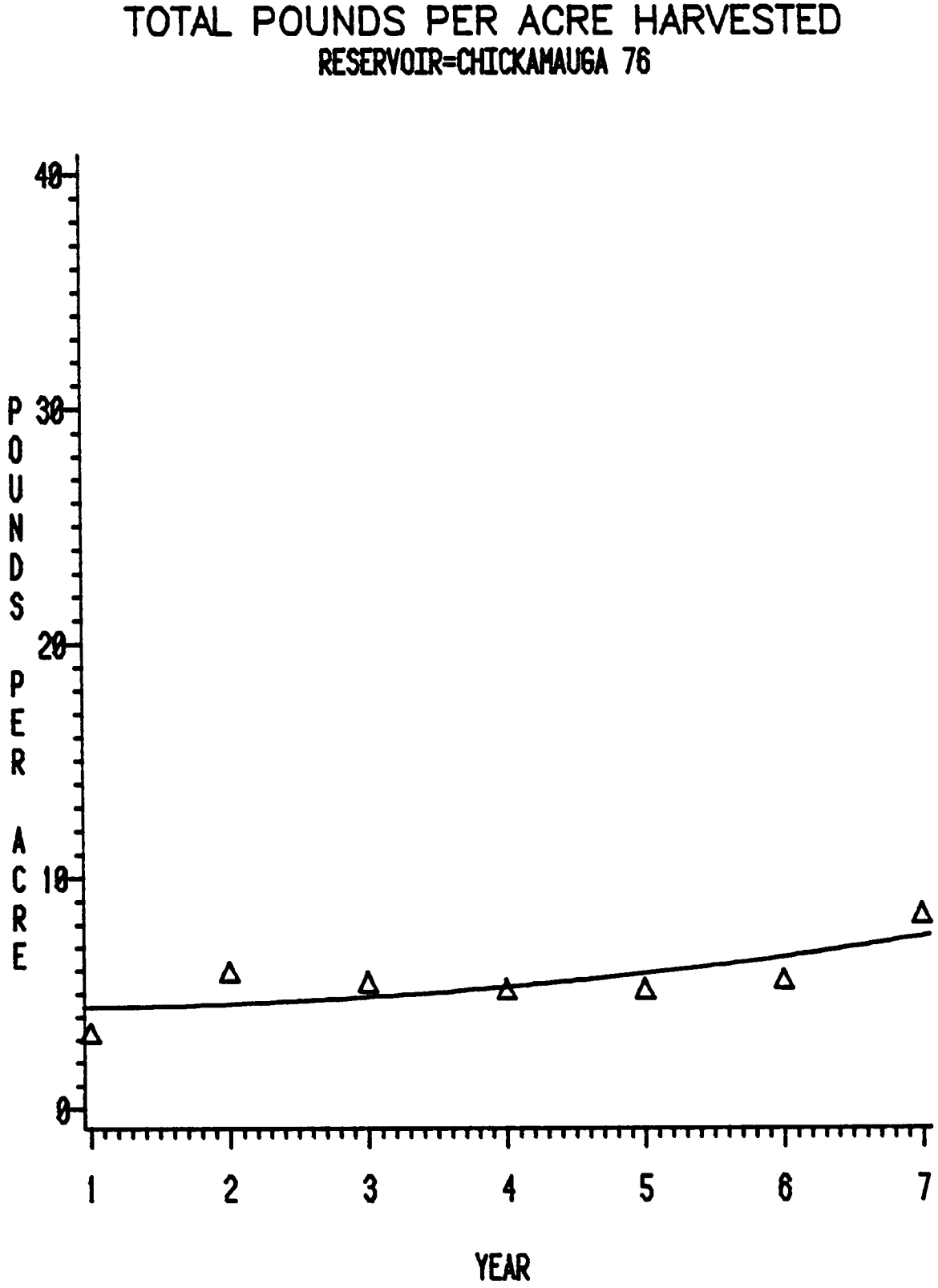


Figure C.2 (continued)

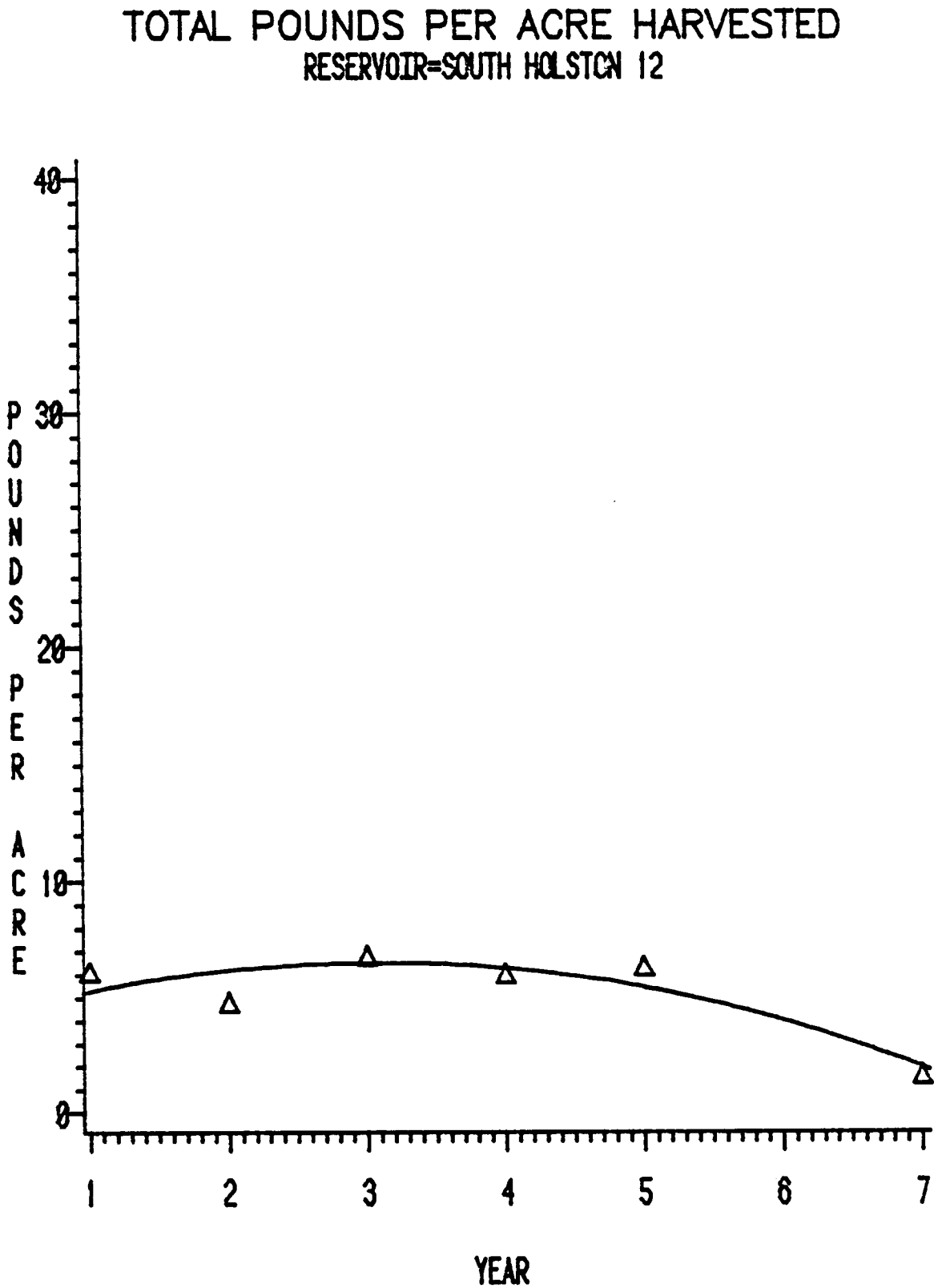


Figure C.2 (continued)

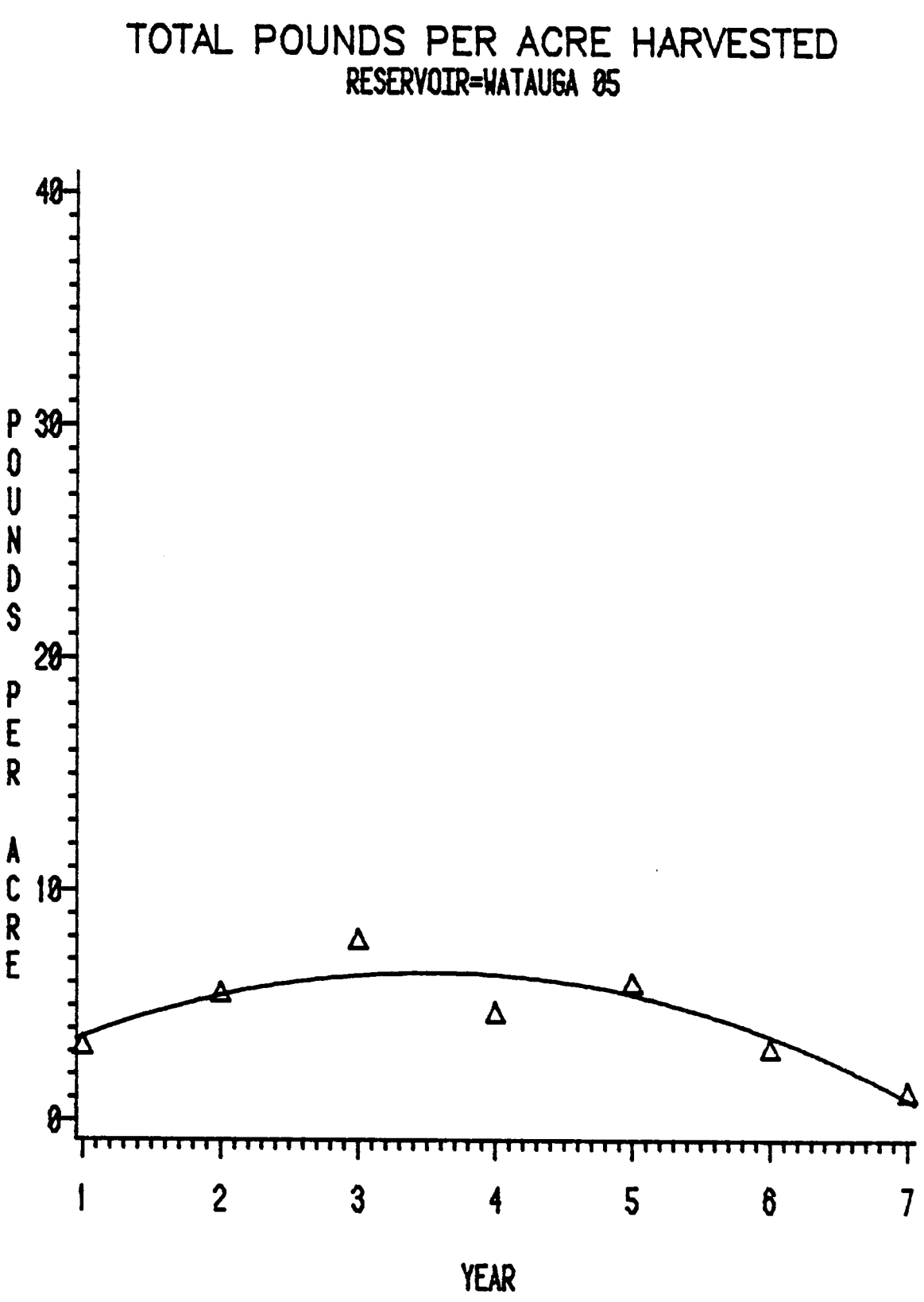


Figure C.2 (continued)

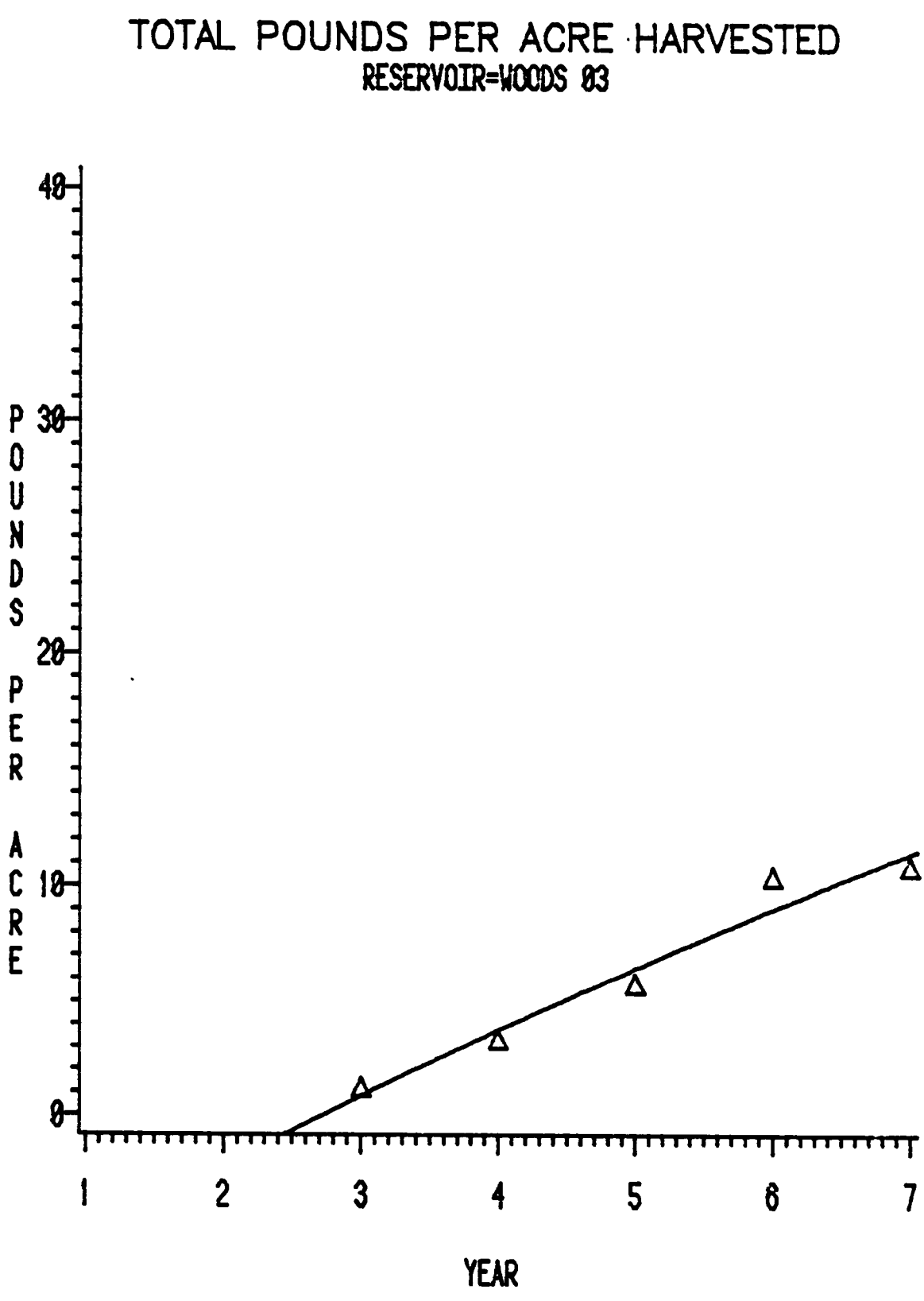


Figure C.2 (continued)

Figure C.3. Total fish harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with intermediate high harvests were classified in Group 3: Center Hill, Cherokee, Douglas, J. Percy Priest, Nickajack, Tellico, and Watts Barr. The yearly codes 1-7 represent individual years from 1977-1983.

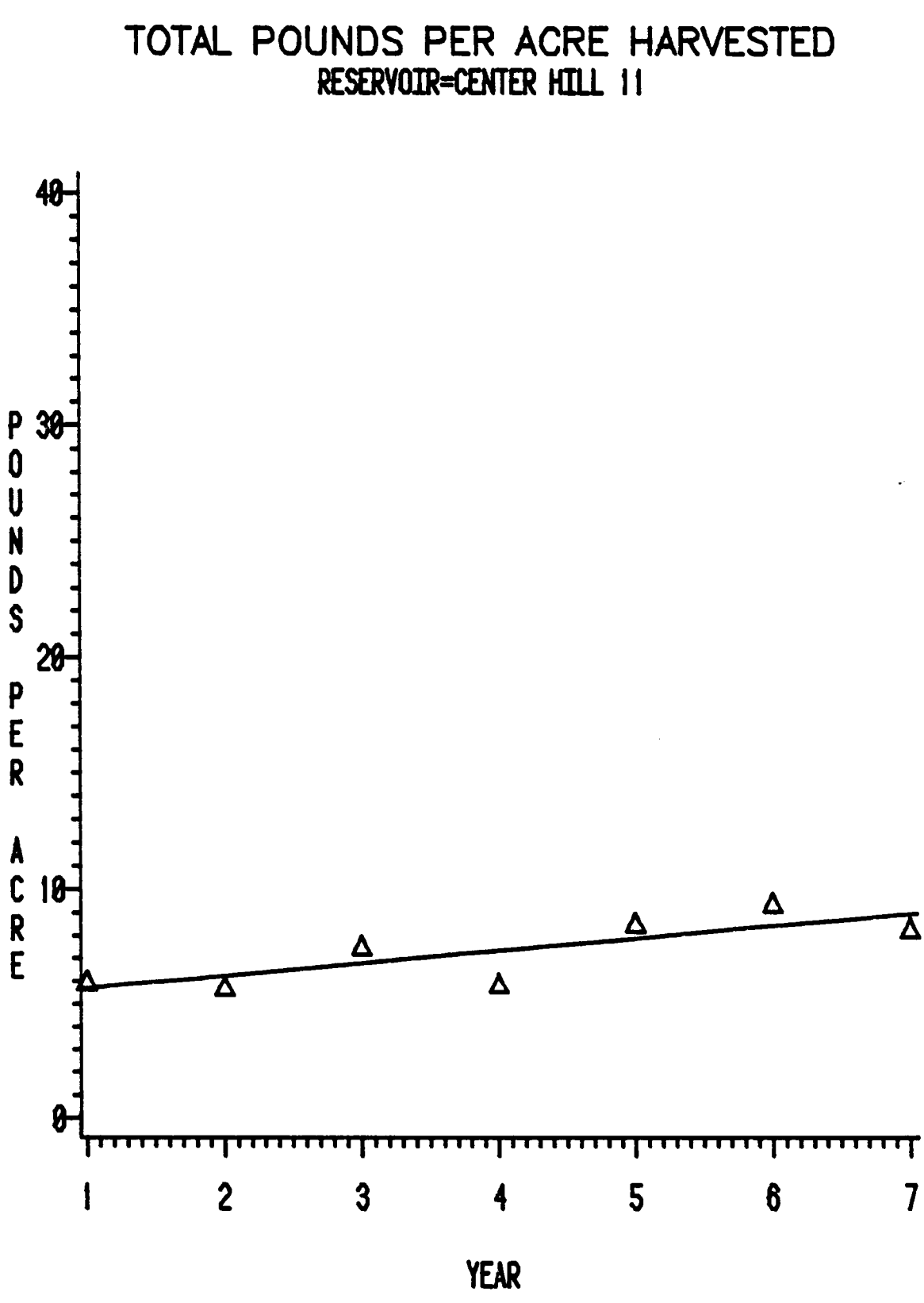

TOTAL POUNDS PER ACRE HARVESTED
RESERVOIR=CENTER HILL 11
40
30
20
10
0
POUNDS PER ACRE
1
2
3
4
5
6
7
YEAR

Figure C.3

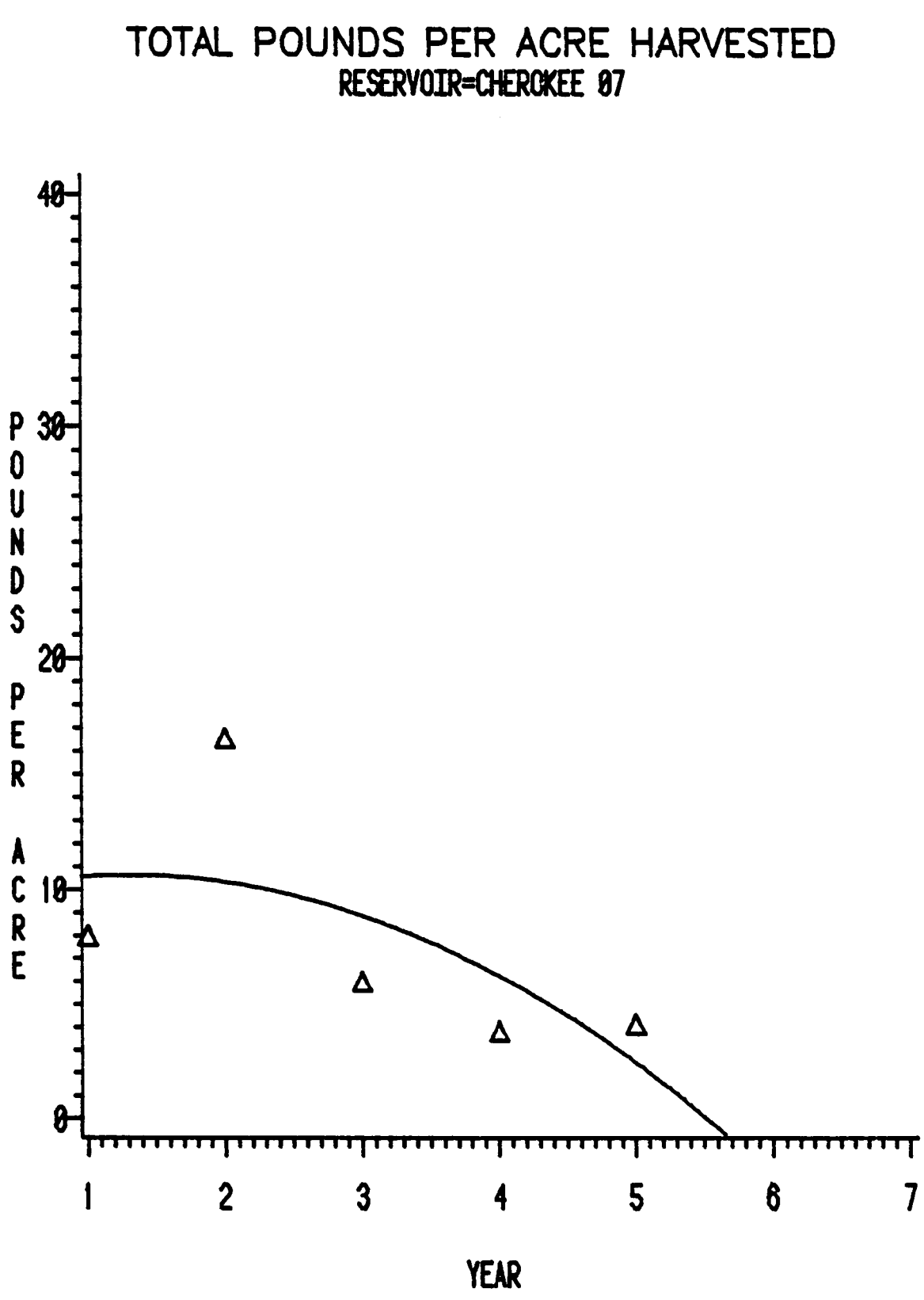


Figure C.3 (continued)

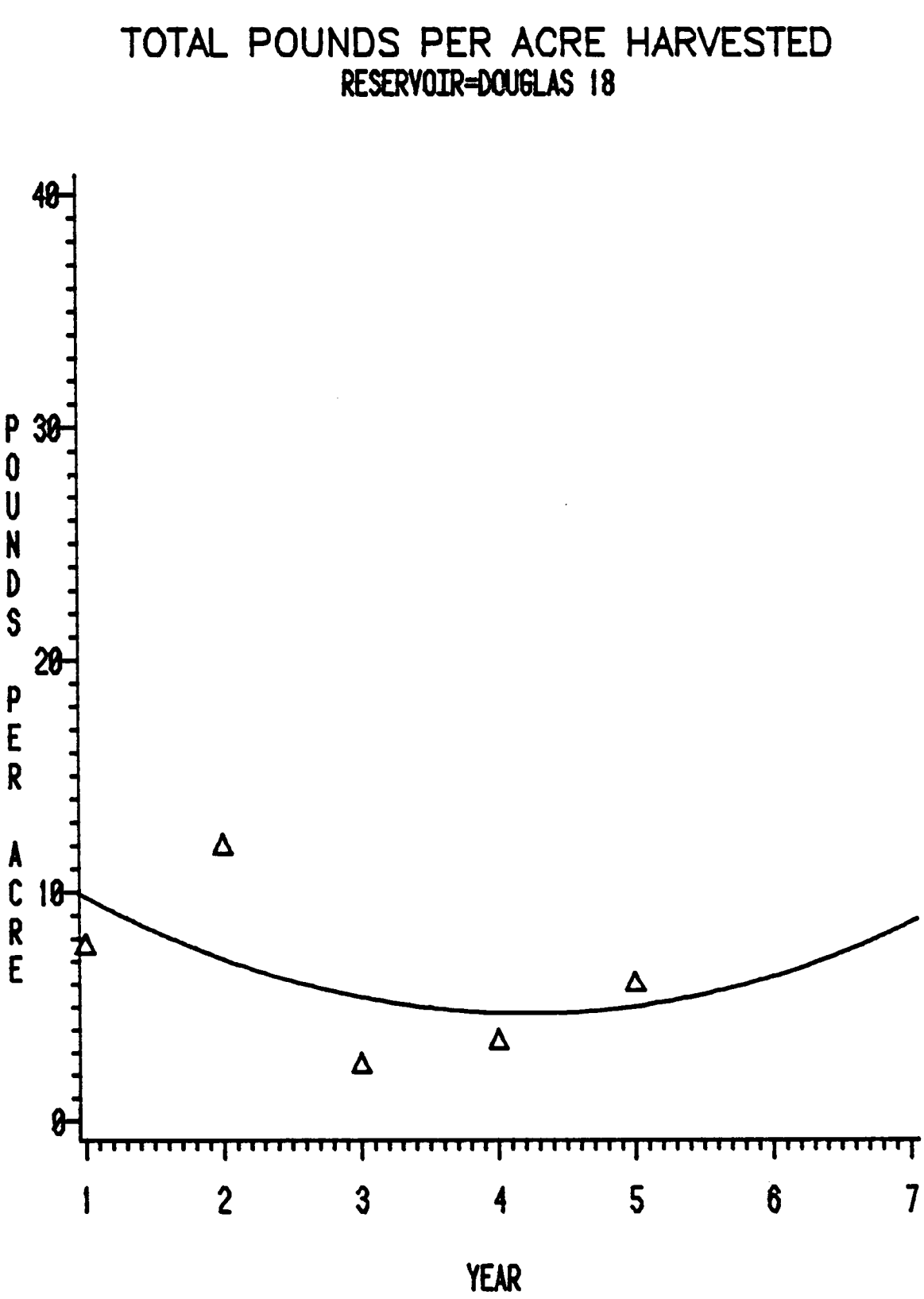


Figure C.3 (continued)

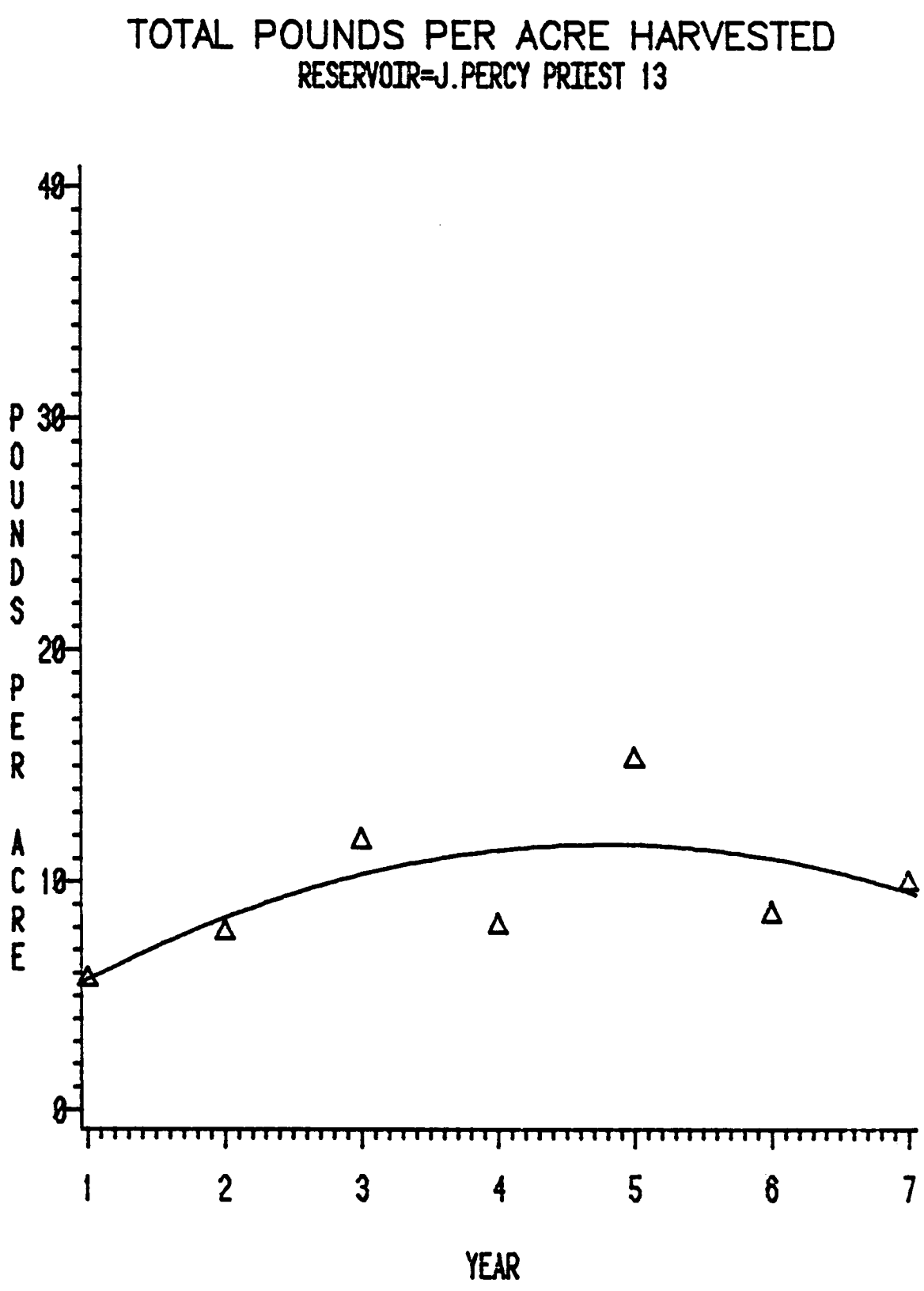


Figure C.3 (continued)

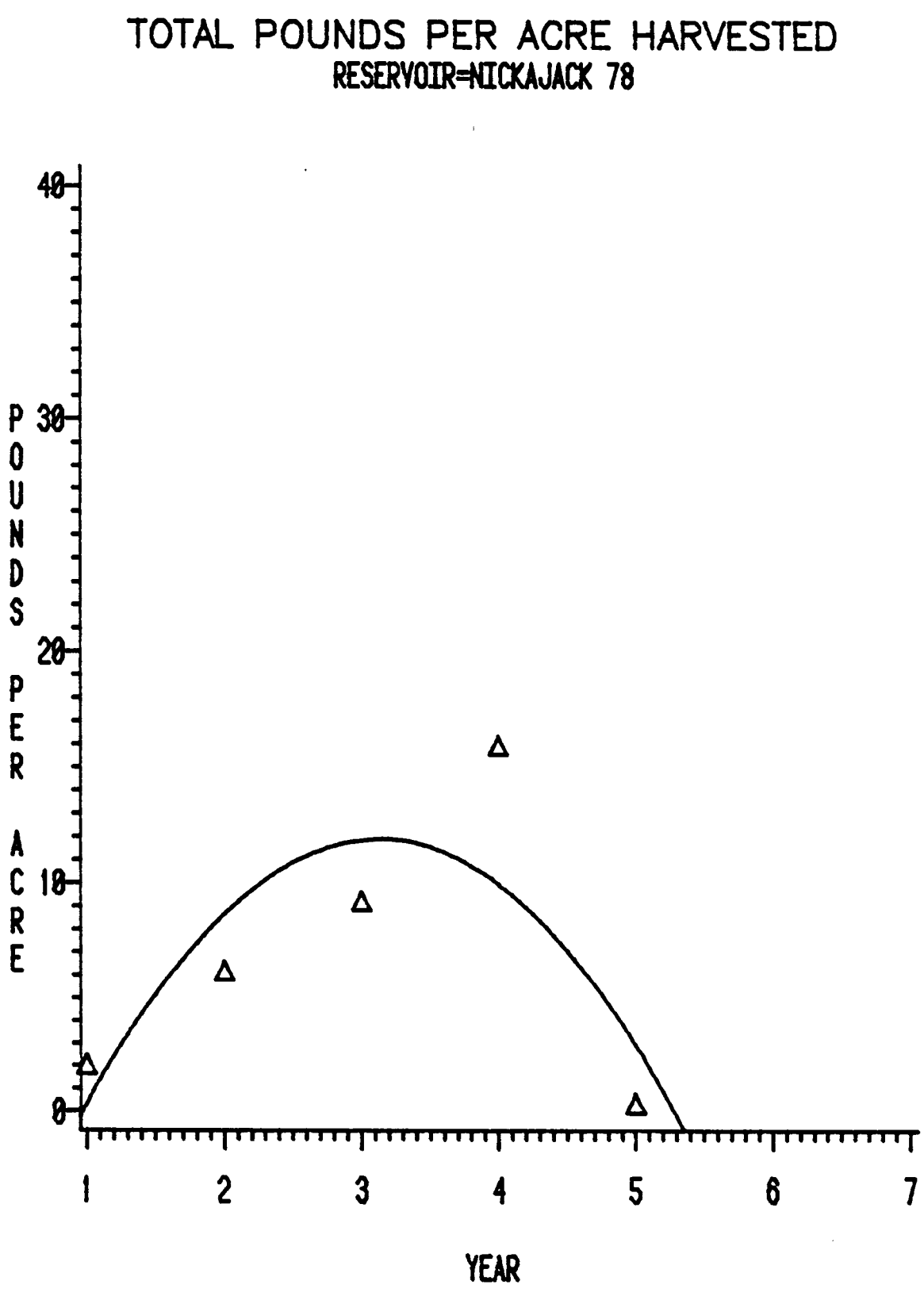


Figure C.3 (continued)

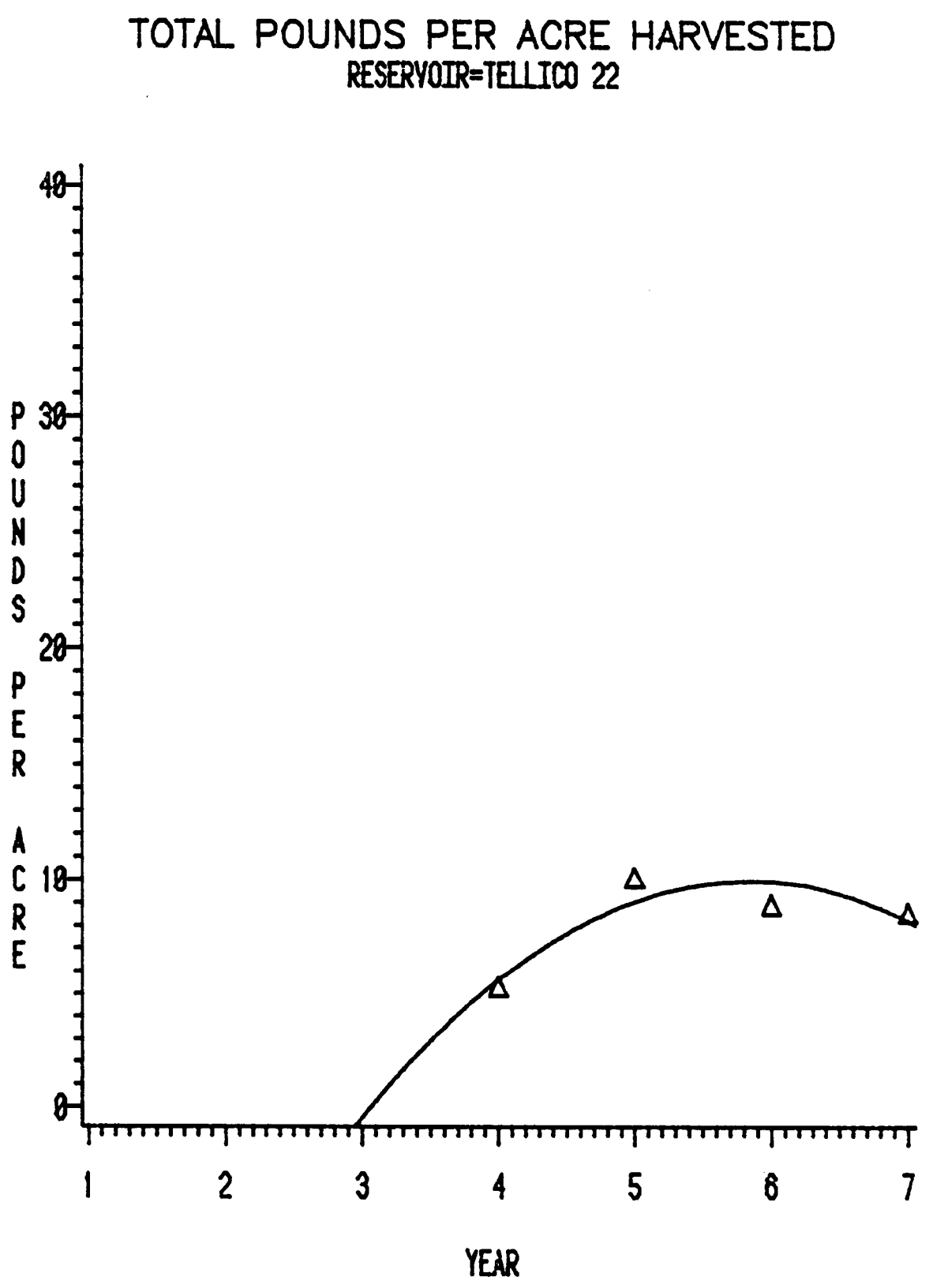


Figure C.3 (continued)

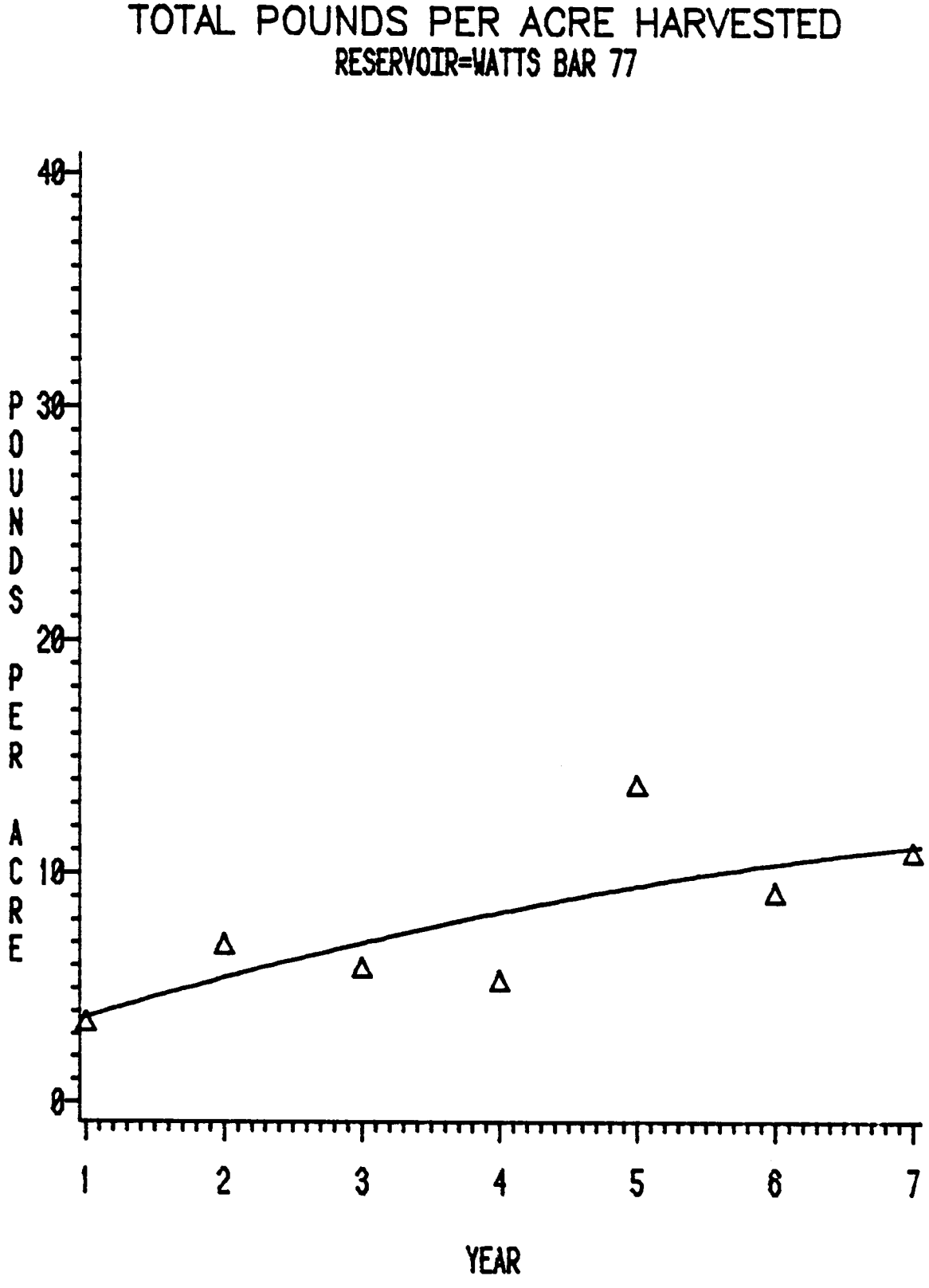


Figure C.3 (continued)

Figure C.4. Total fish harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with high harvests were classified in Group 4: Fort Loudoun, Kentucky, Normandy, Reelfoot, and Tims Ford. The yearly codes 1-7 represent individual years from 1977-1983.

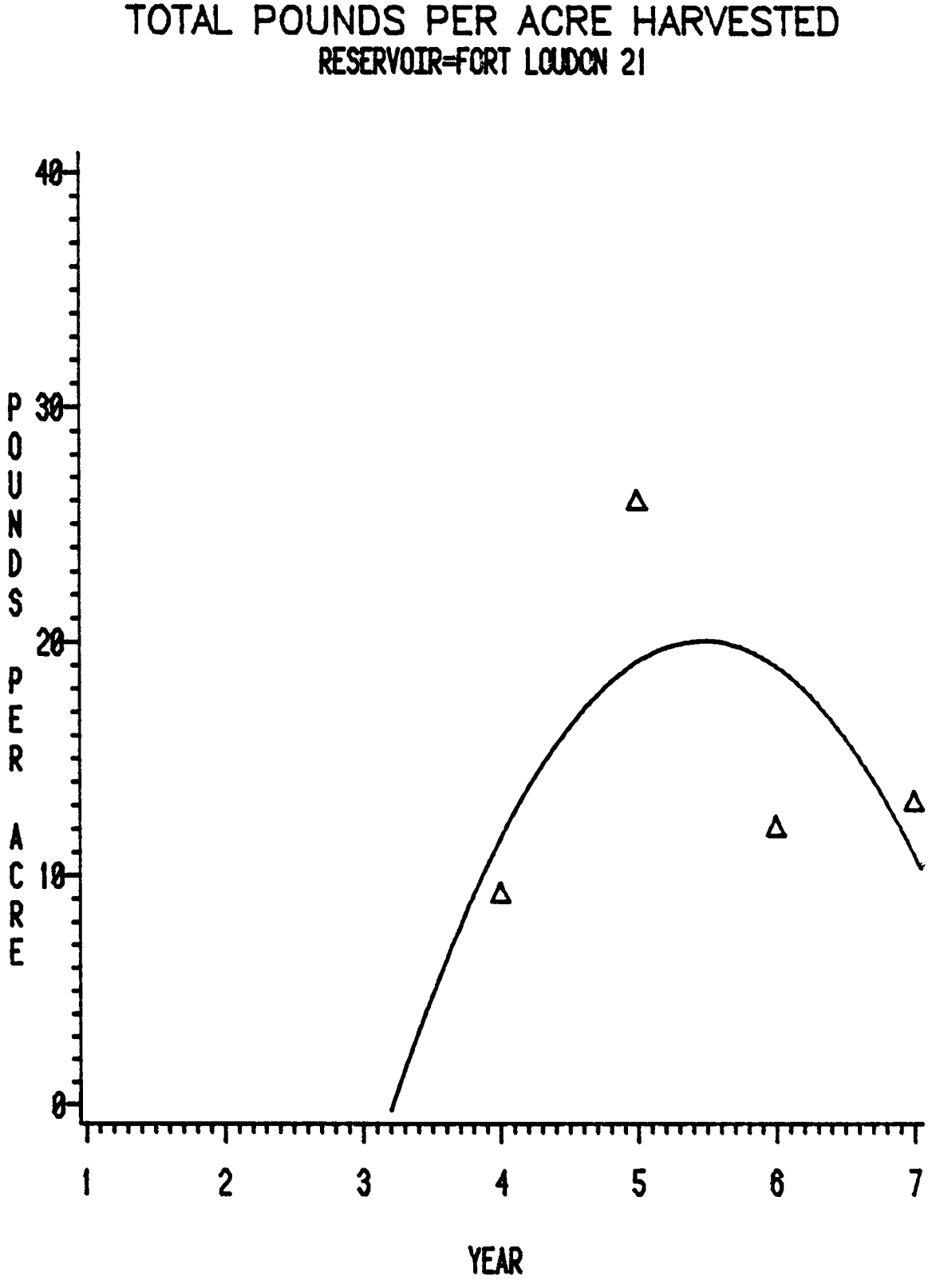

TOTAL POUNDS PER ACRE HARVESTED
RESERVOIR=FORT LOUDON 21
POUNDS PER ACRE
40
30
20
10
0
1
2
3
4
5
6
7
YEAR

Figure C.4

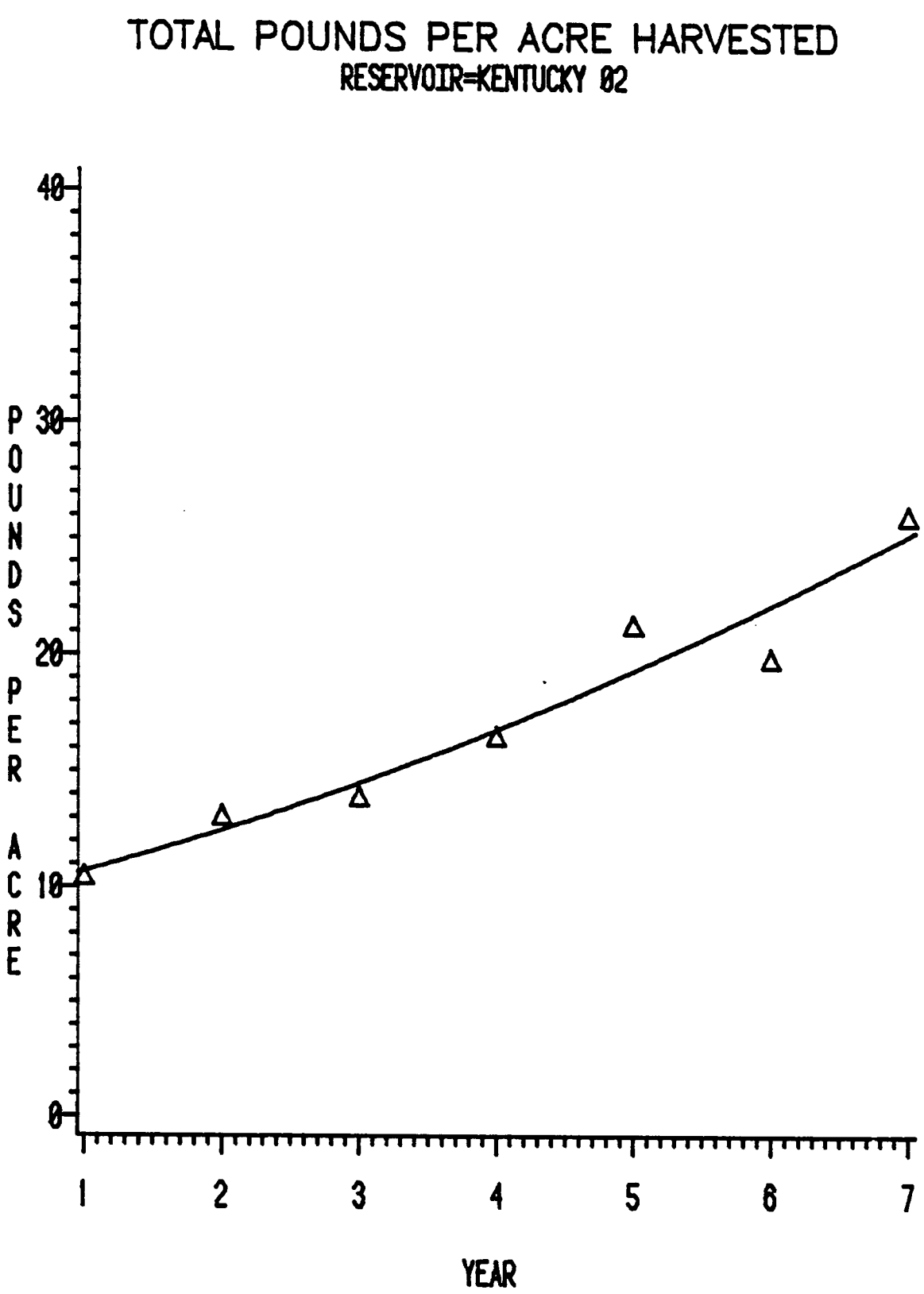


Figure C.4 (continued)

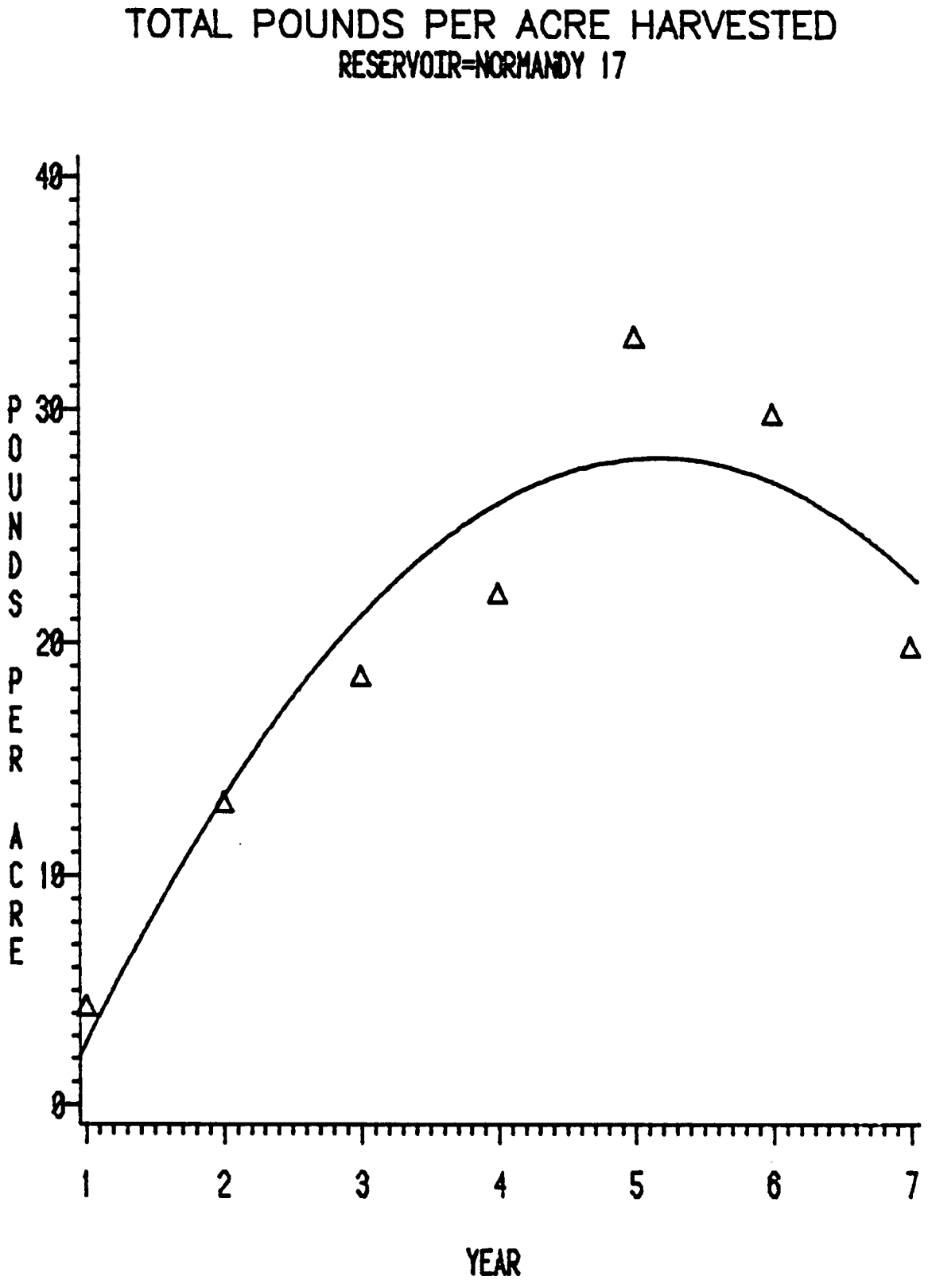


Figure C.4 (continued)

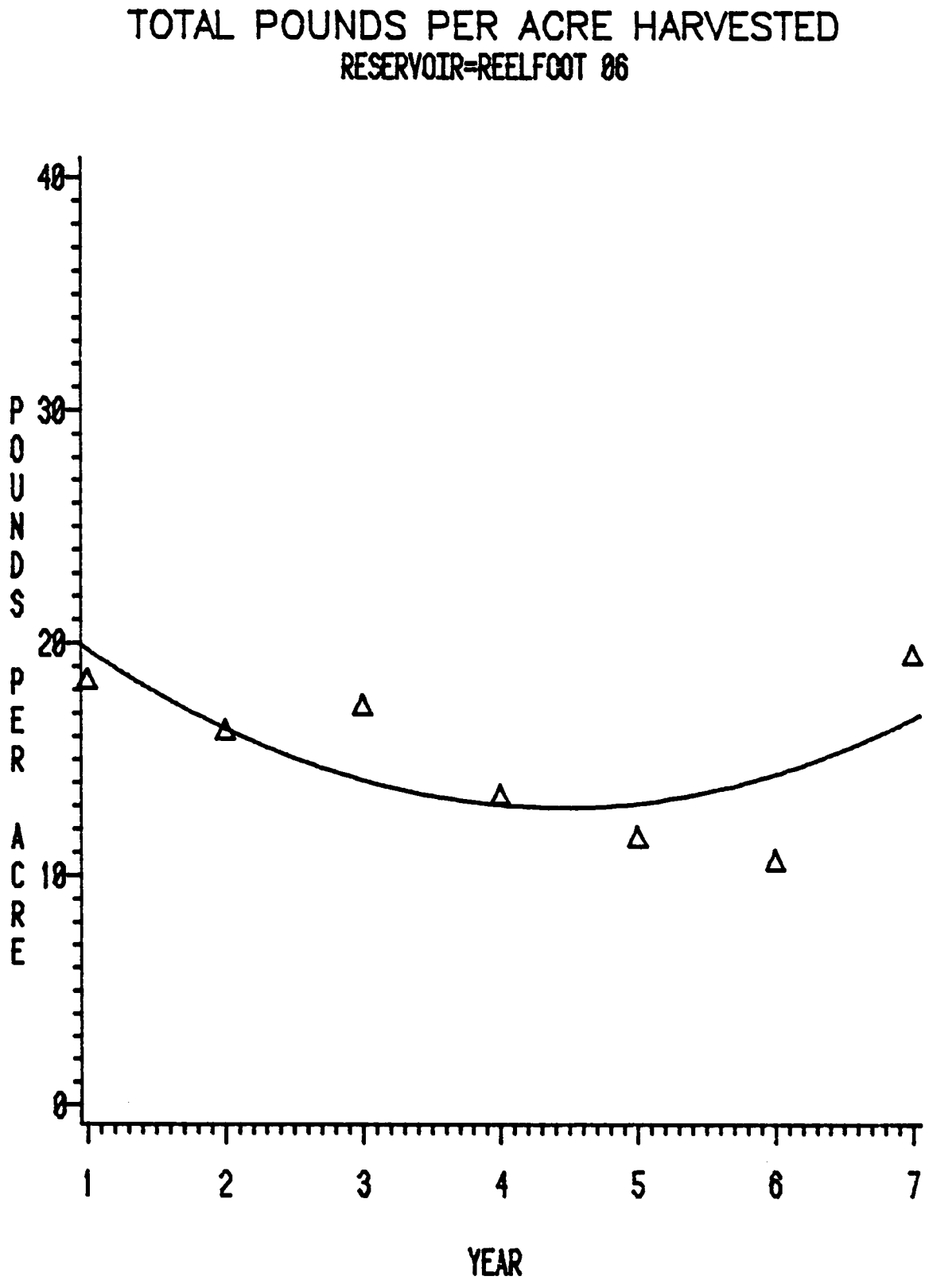


Figure C.4 (continued)

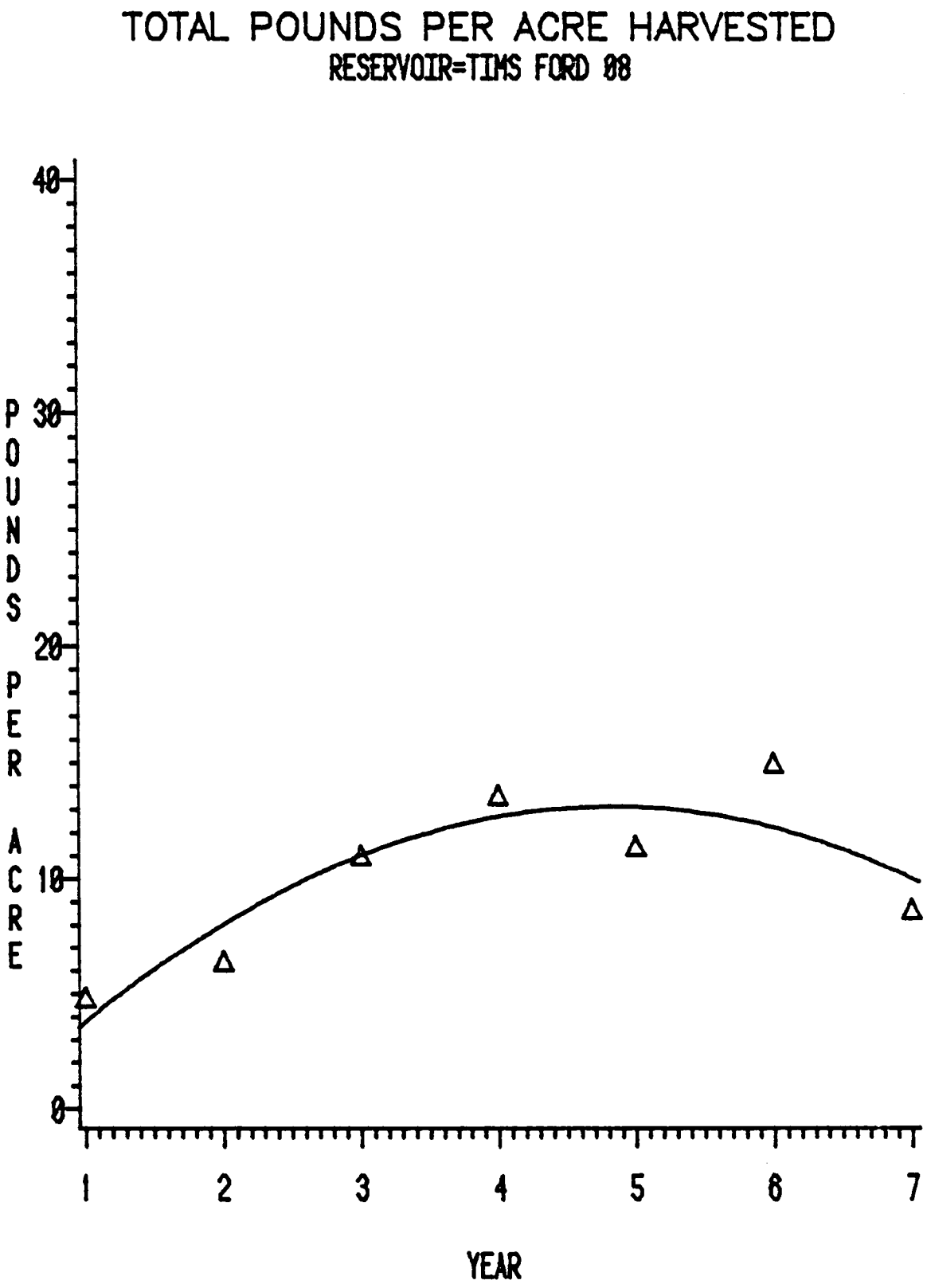


Figure C.4 (continued)

APPENDIX D

CRAPPIE HARVESTED IN POUNDS PER ACRE IN GROUPS OF RESERVOIRS WITH SIMILAR HARVESTS DURING THE SEVEN-YEAR PERIOD, 1977-1983. THE GROUPS ARE AS FOLLOWS: GROUP 1 = LOW HARVESTS, GROUP 2 = INTERMEDIATE LOW HARVESTS, GROUP 3 = INTERMEDIATE HIGH HARVESTS, AND GROUP 4 = HIGH HARVESTS

Figure D.1. Crappie harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with low harvests were classified in Group 1: Center Hill, Cordell Hull, Melton Hill, Norris, and Watauga. The yearly codes 1-7 represent individual years from 1977-1983.

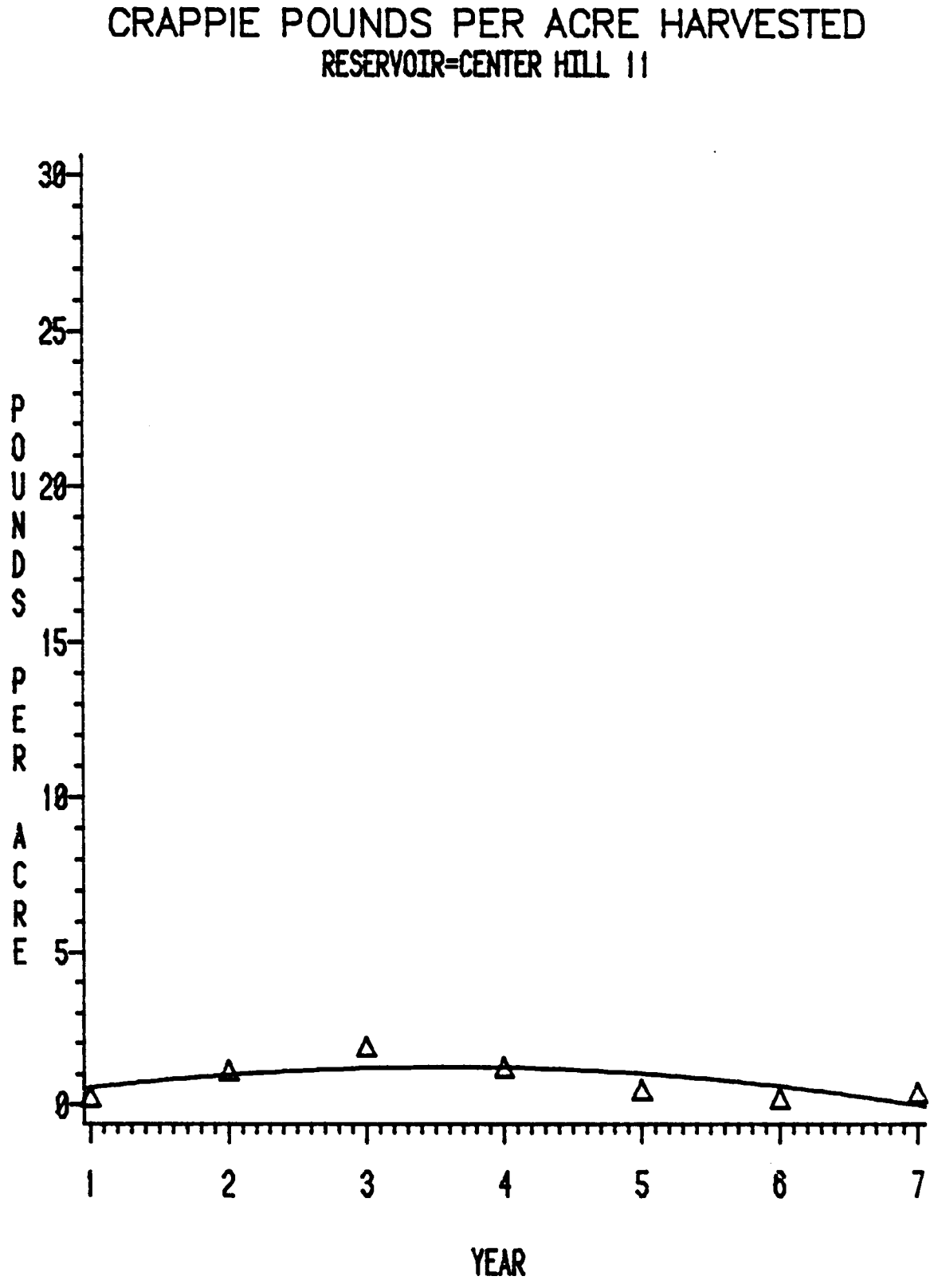

CRAPPIE POUNDS PER ACRE HARVESTED
RESERVOIR=CENTER HILL 11
POUNDS PER ACRE
30
25
20
15
10
5
0
1
2
3
4
5
6
7
YEAR

Figure D.1

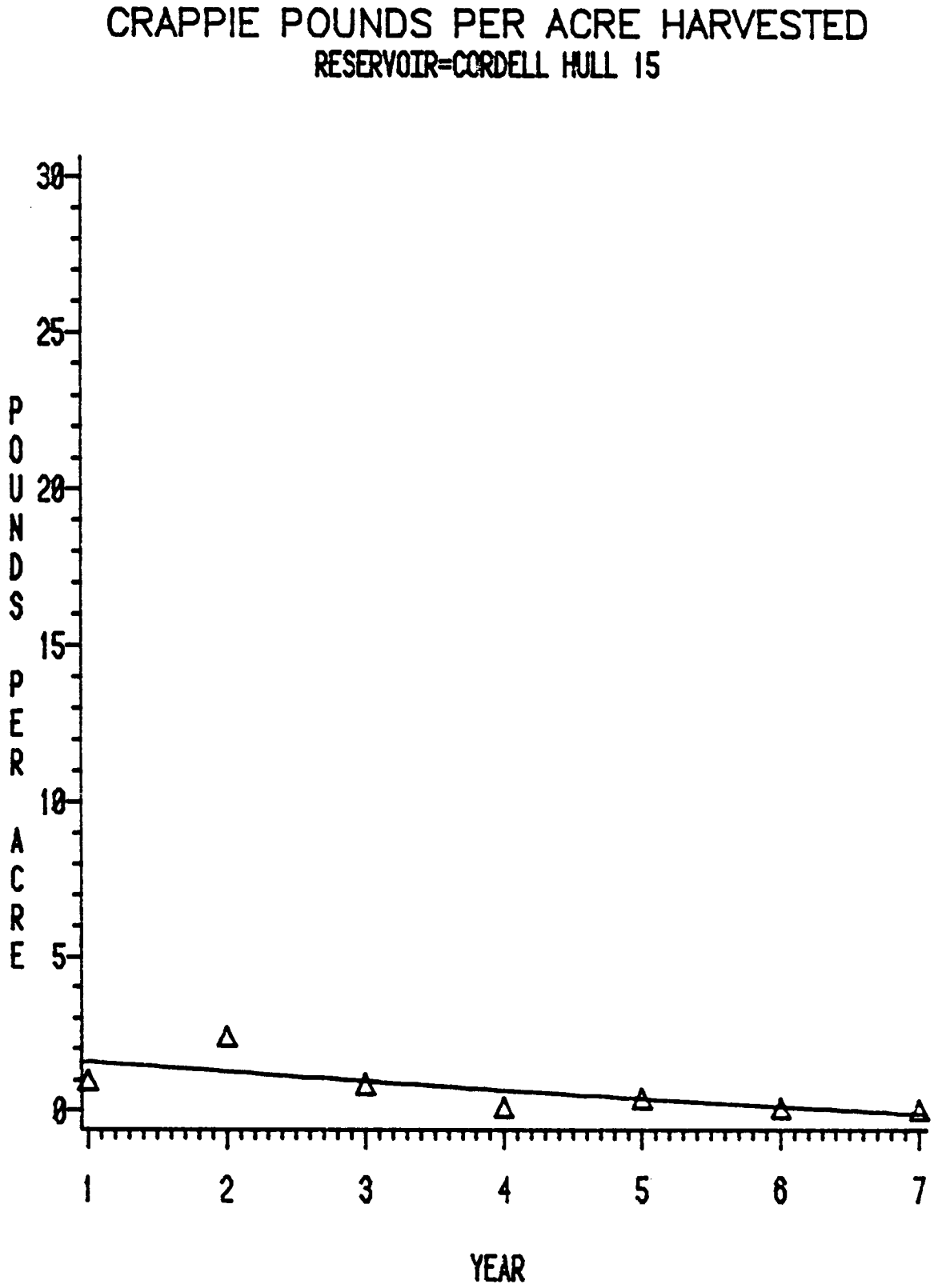


Figure D.1 (continued)

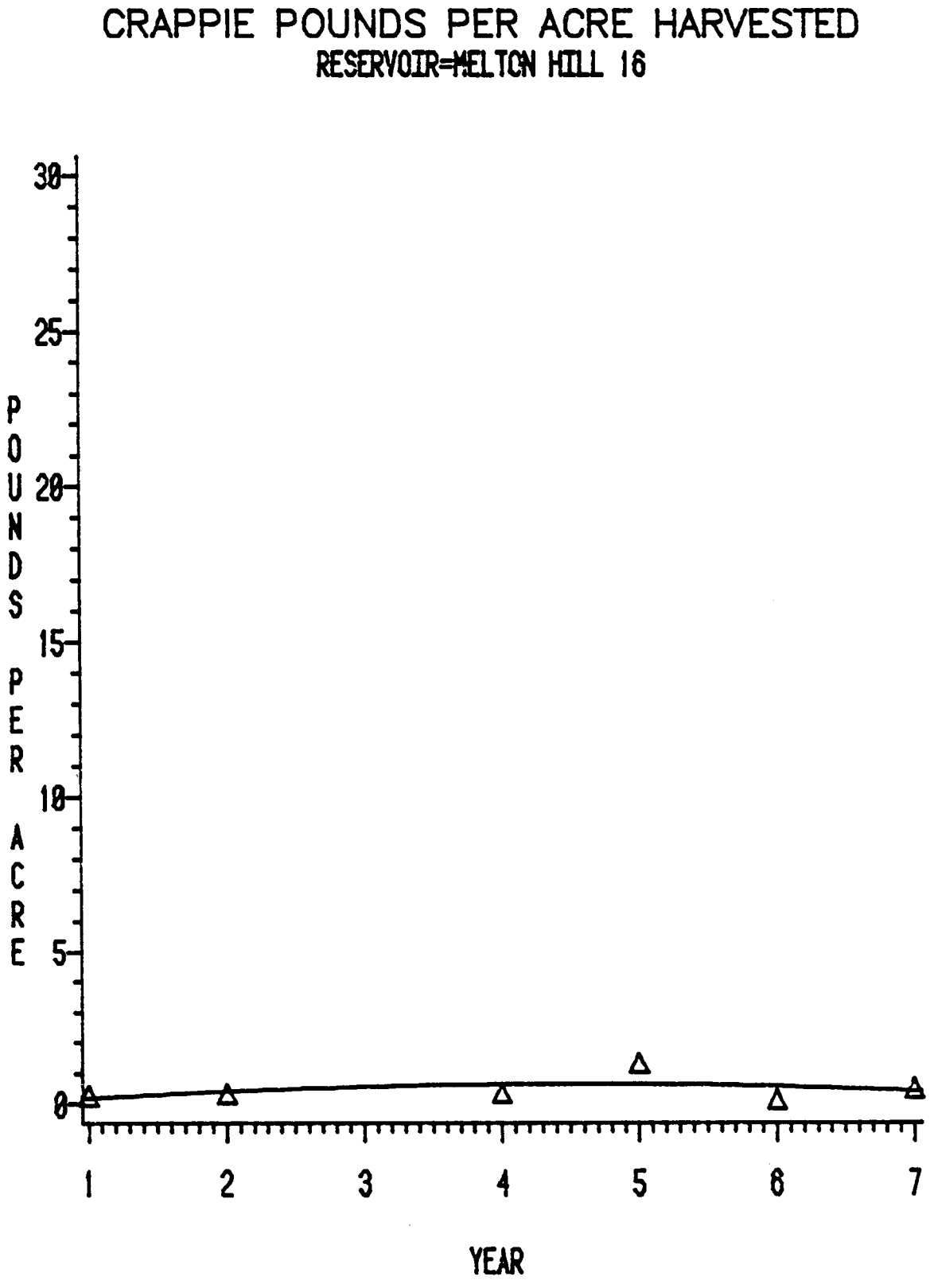


Figure D.1 (continued)

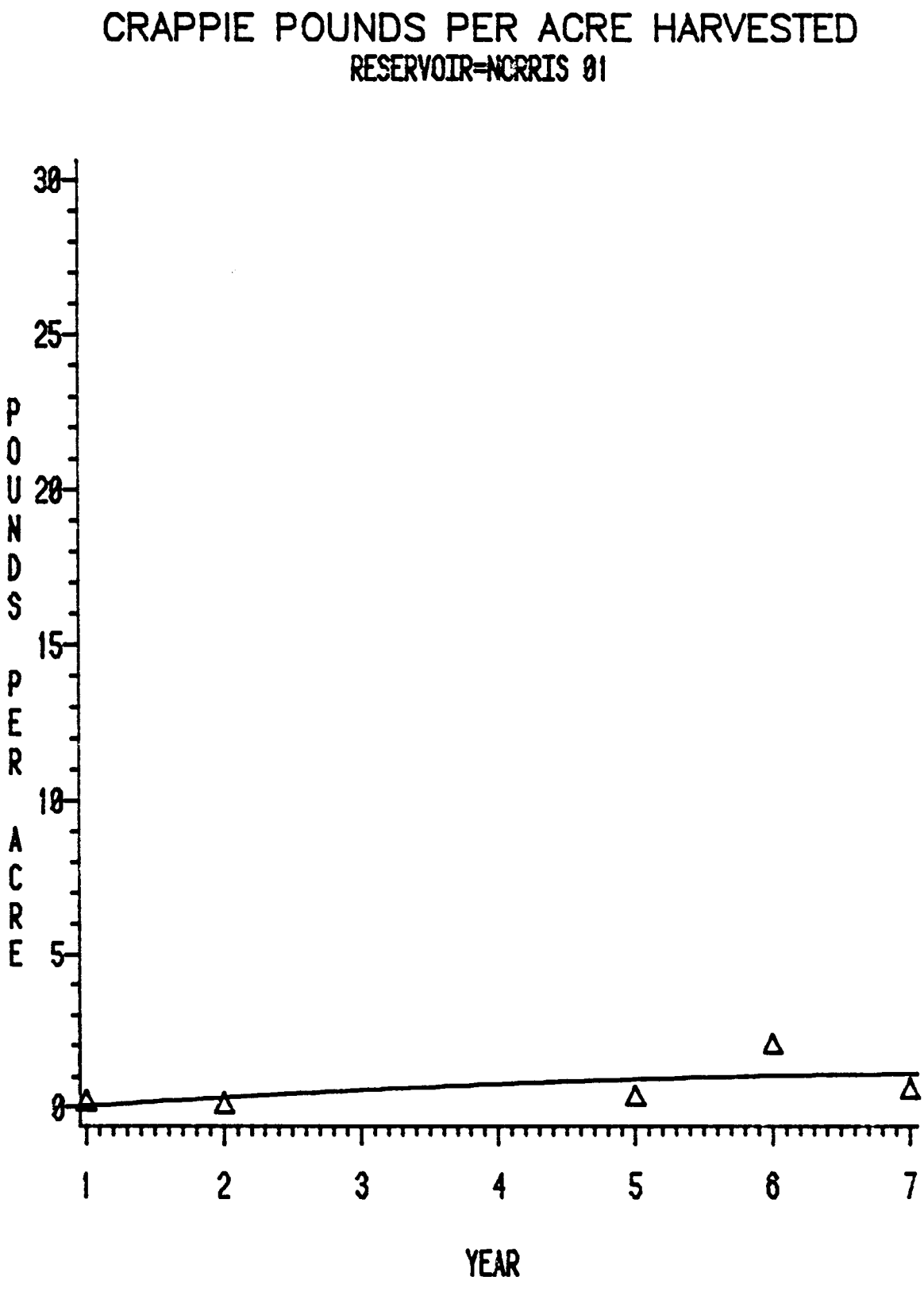


Figure D.1 (continued)

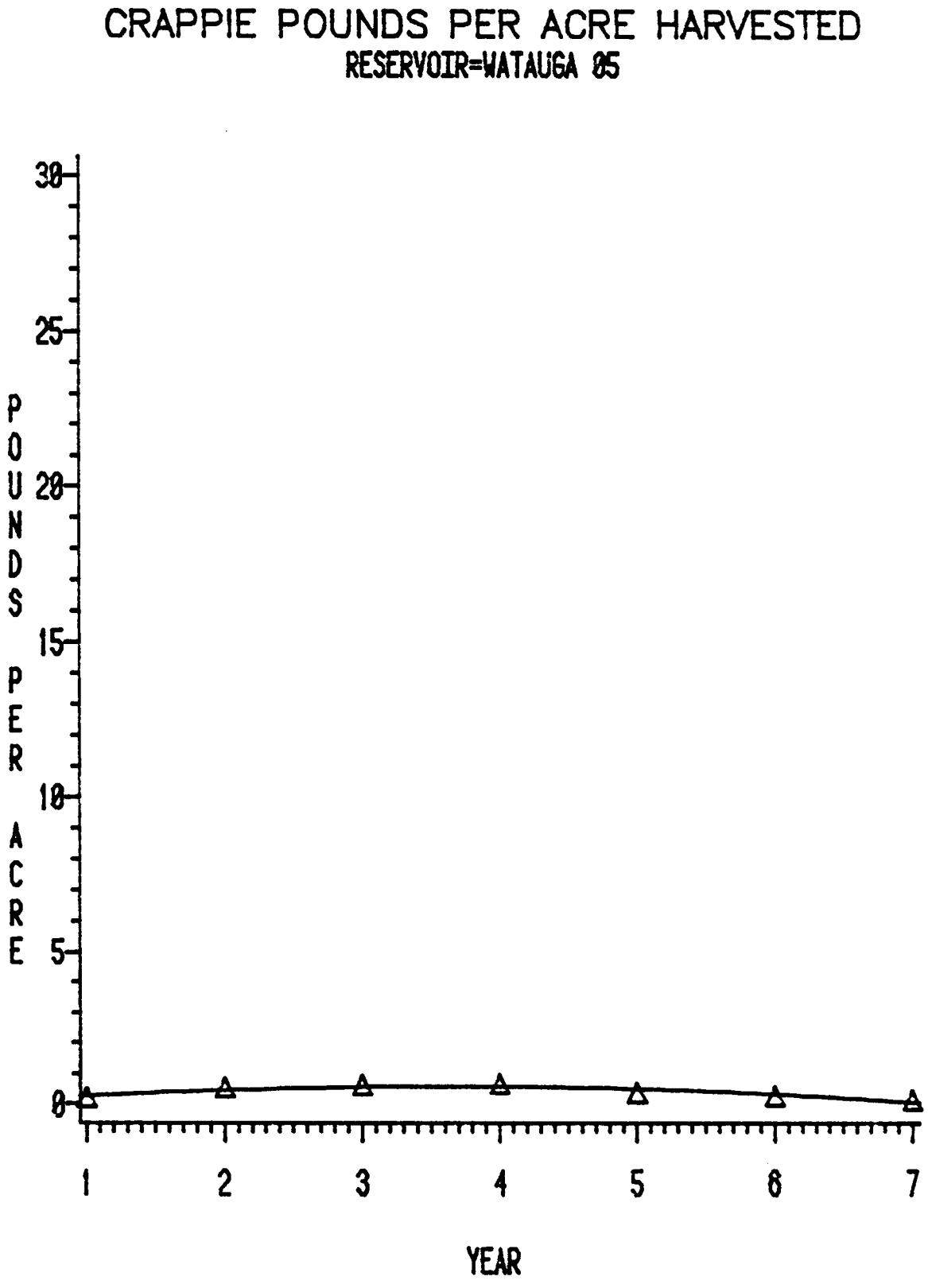


Figure D.1 (continued)

Figure D.2. Crappie harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with intermediate low harvests were classified in Group 2: Boone, Cherokee, Chickamauga, Nickajack, Old Hickory, South Holston, Tellico, and Woods. The yearly codes 1-7 represent individual years from 1977-1983.

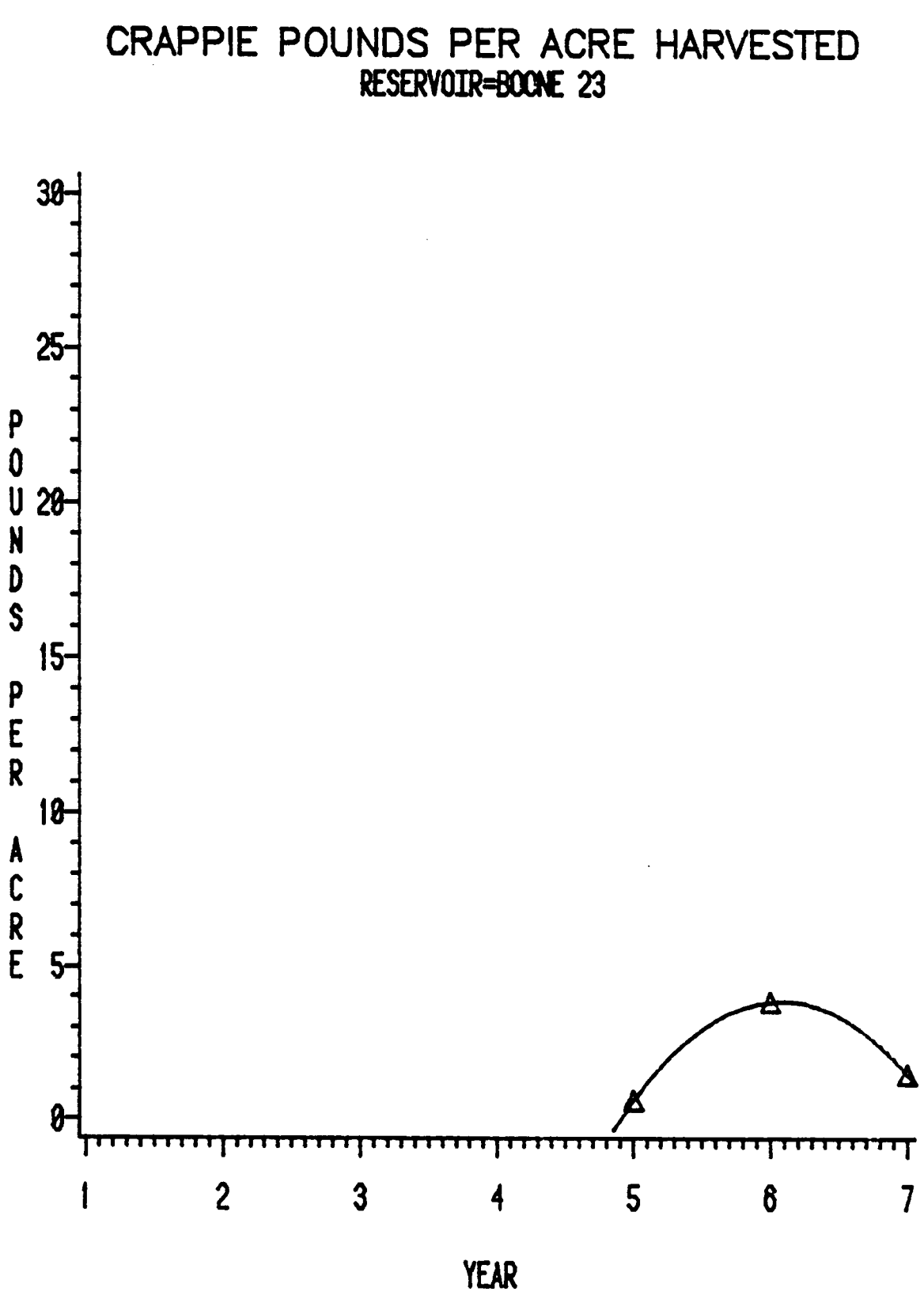

CRAPPIE POUNDS PER ACRE HARVESTED
RESERVOIR=BOONE 23
POUNDS PER ACRE
30
25
20
15
10
5
0
1
2
3
4
5
6
7
YEAR

Figure D.2

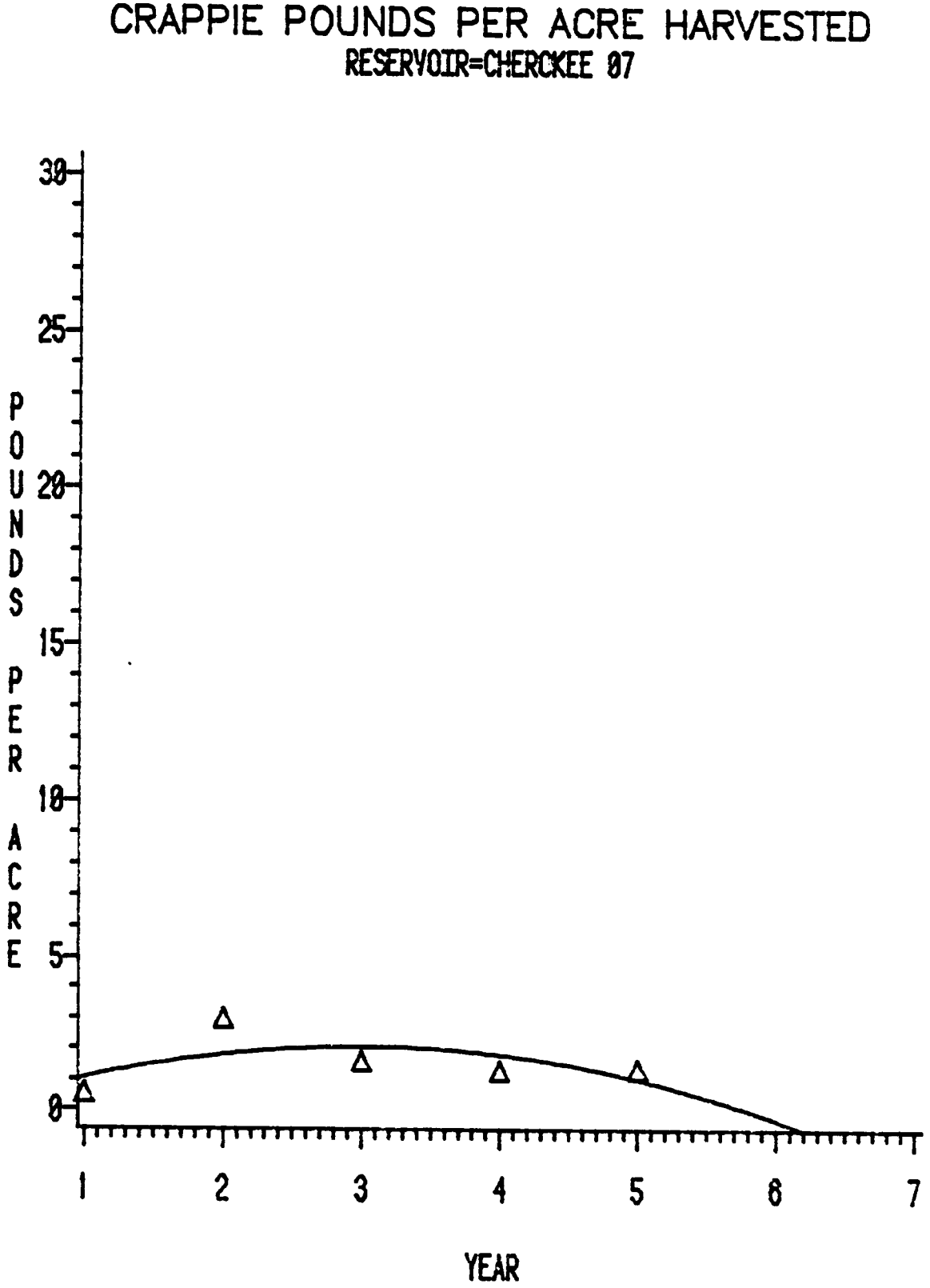


Figure D.2 (continued)

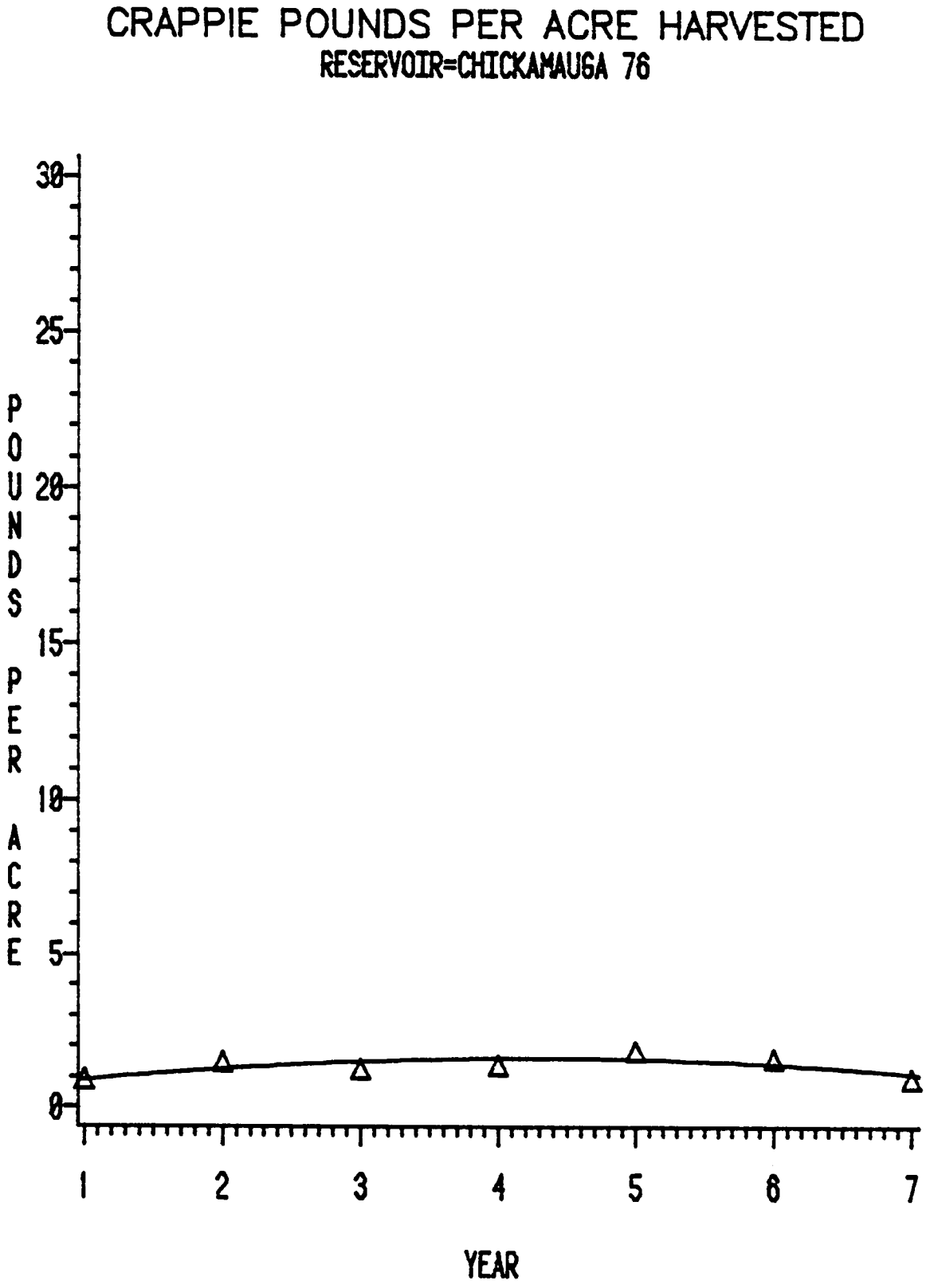


Figure D.2 (continued)

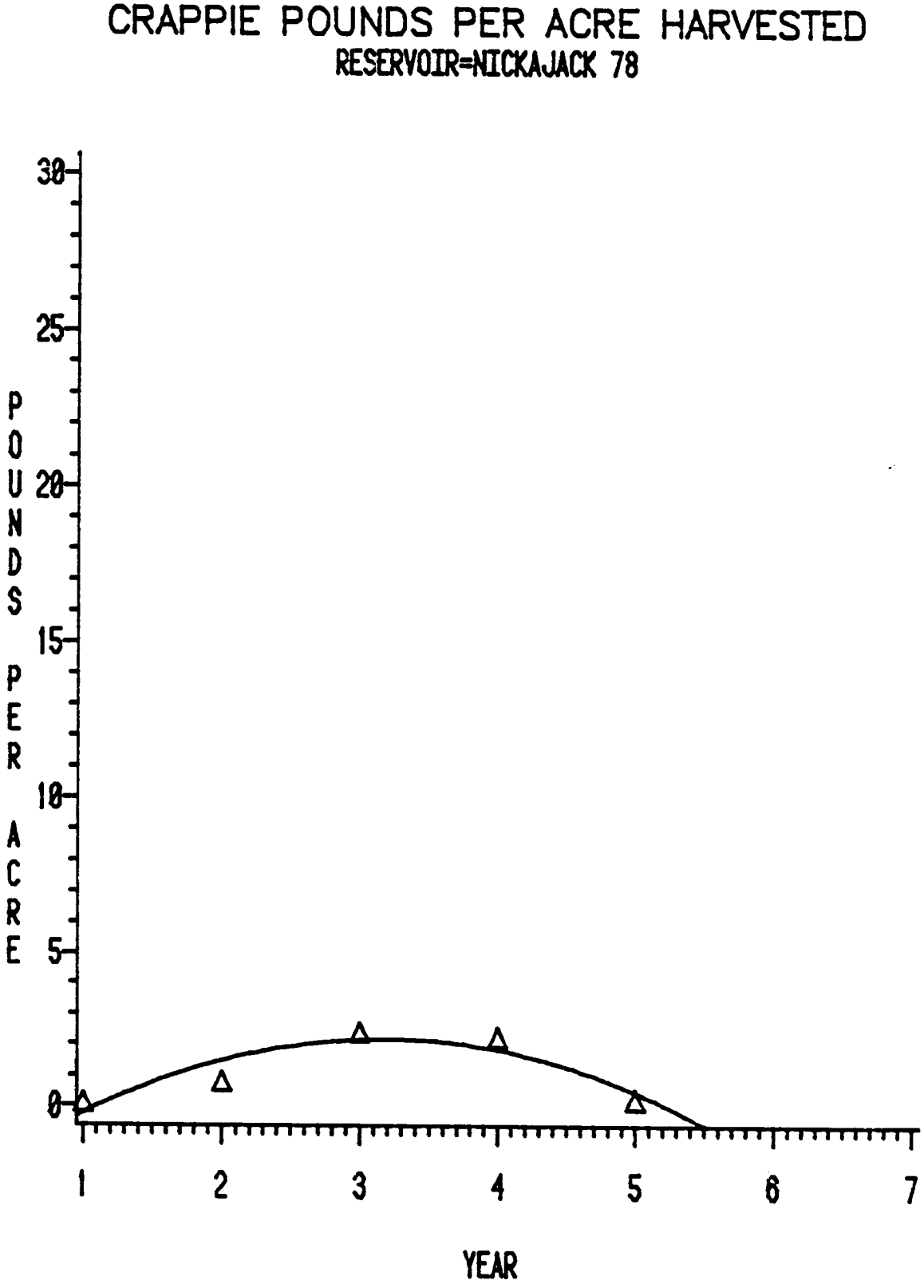


Figure D.2 (continued)

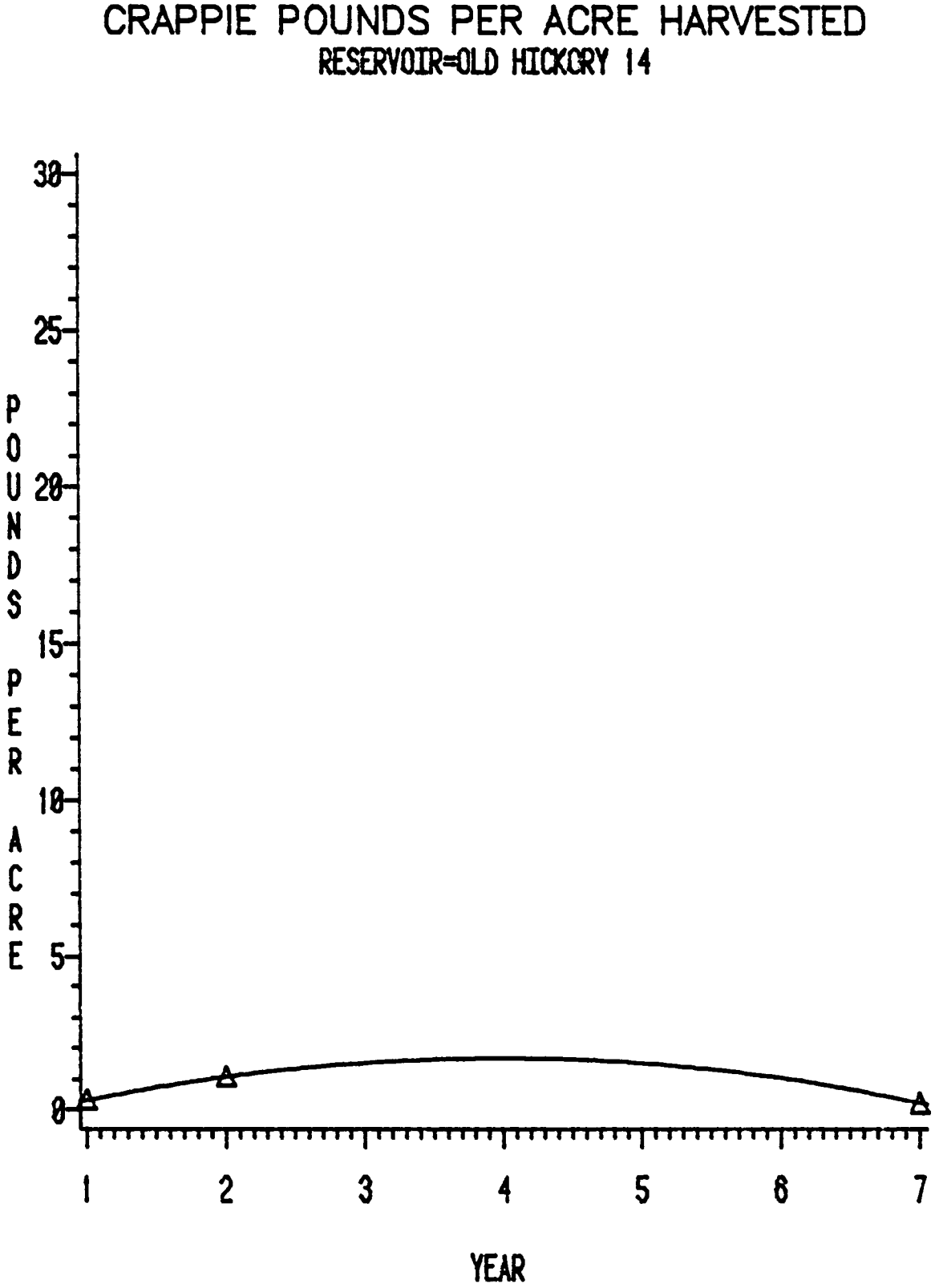


Figure D.2 (continued)

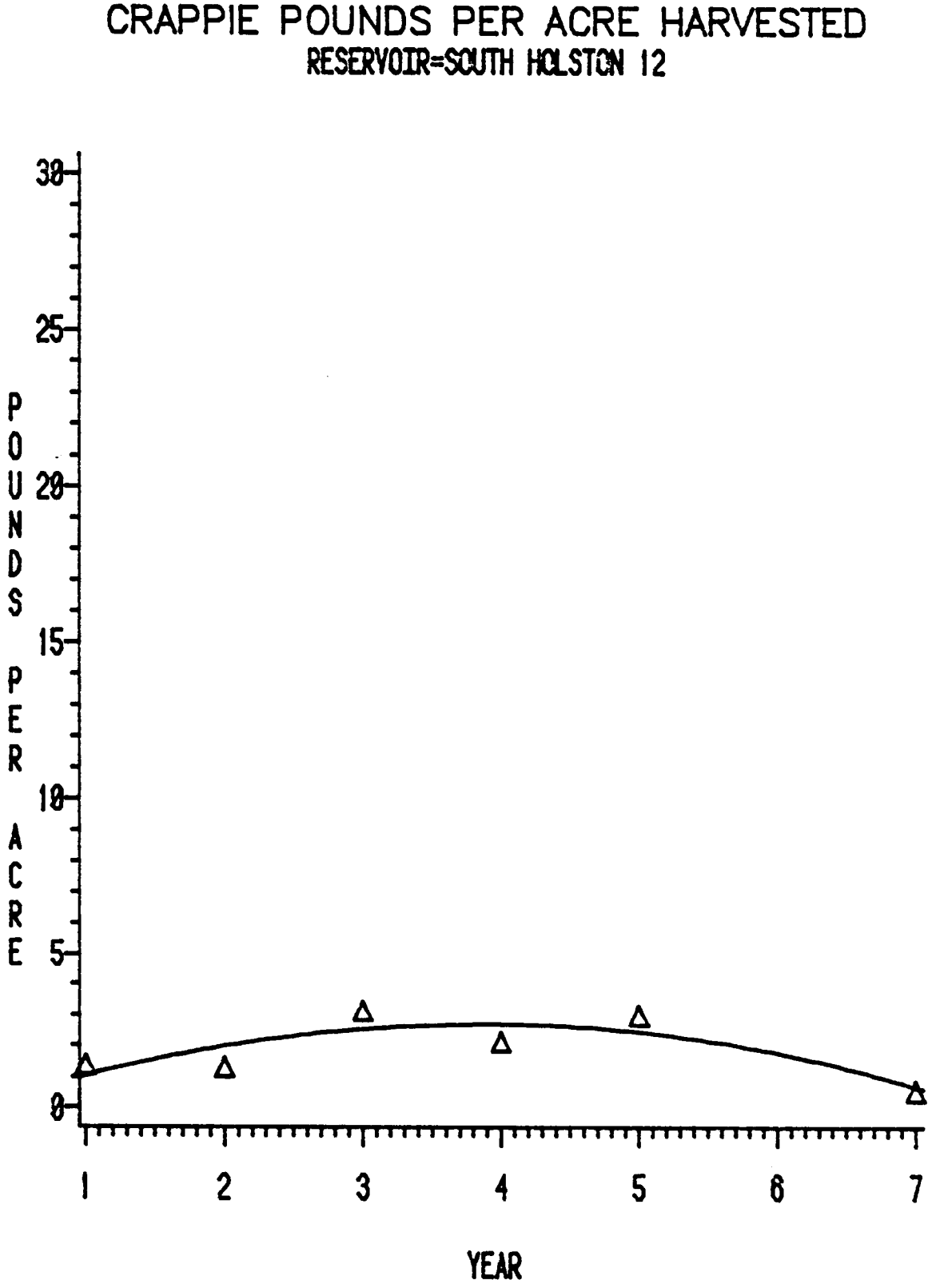


Figure D.2 (continued)

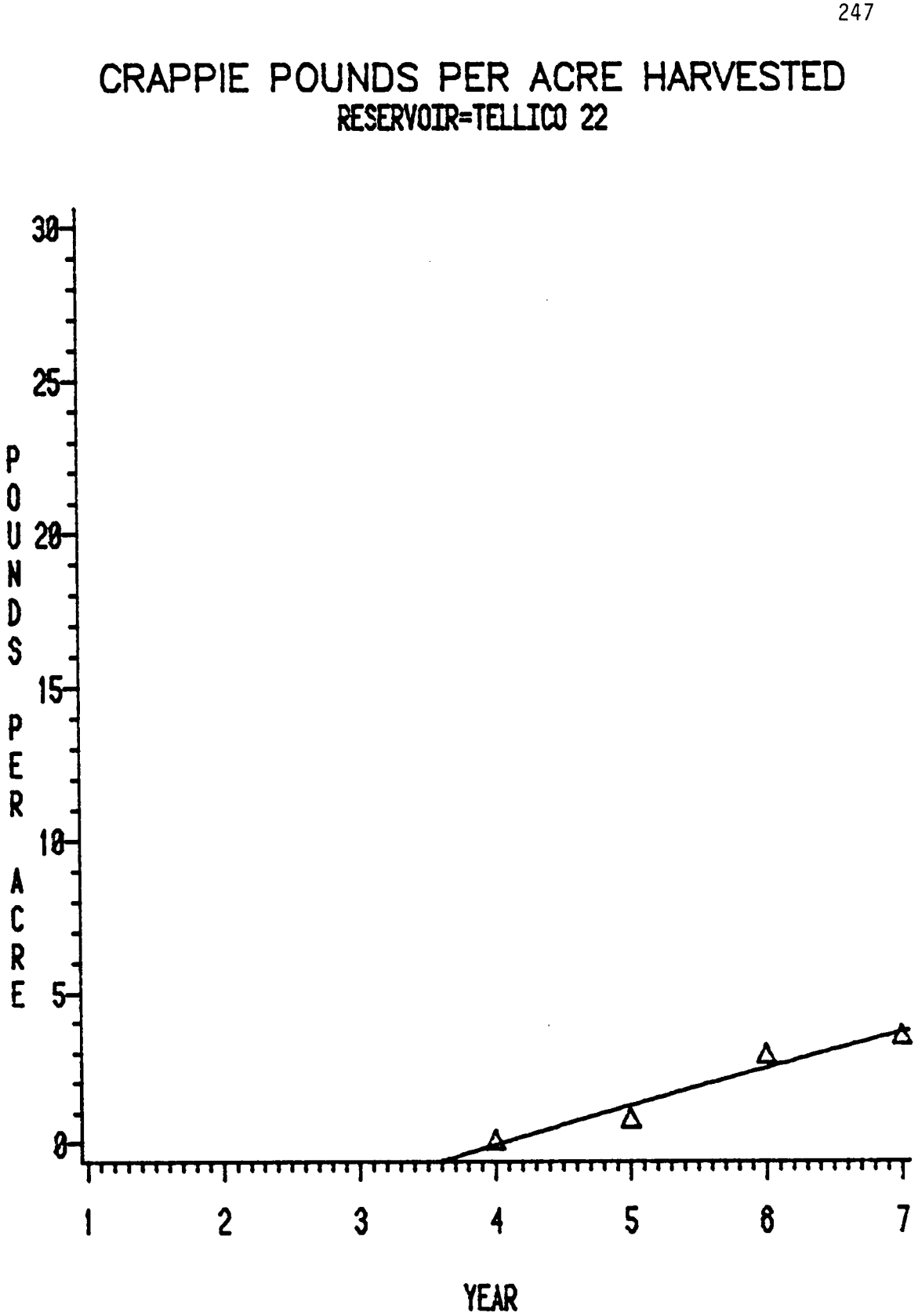


Figure D.2 (continued)

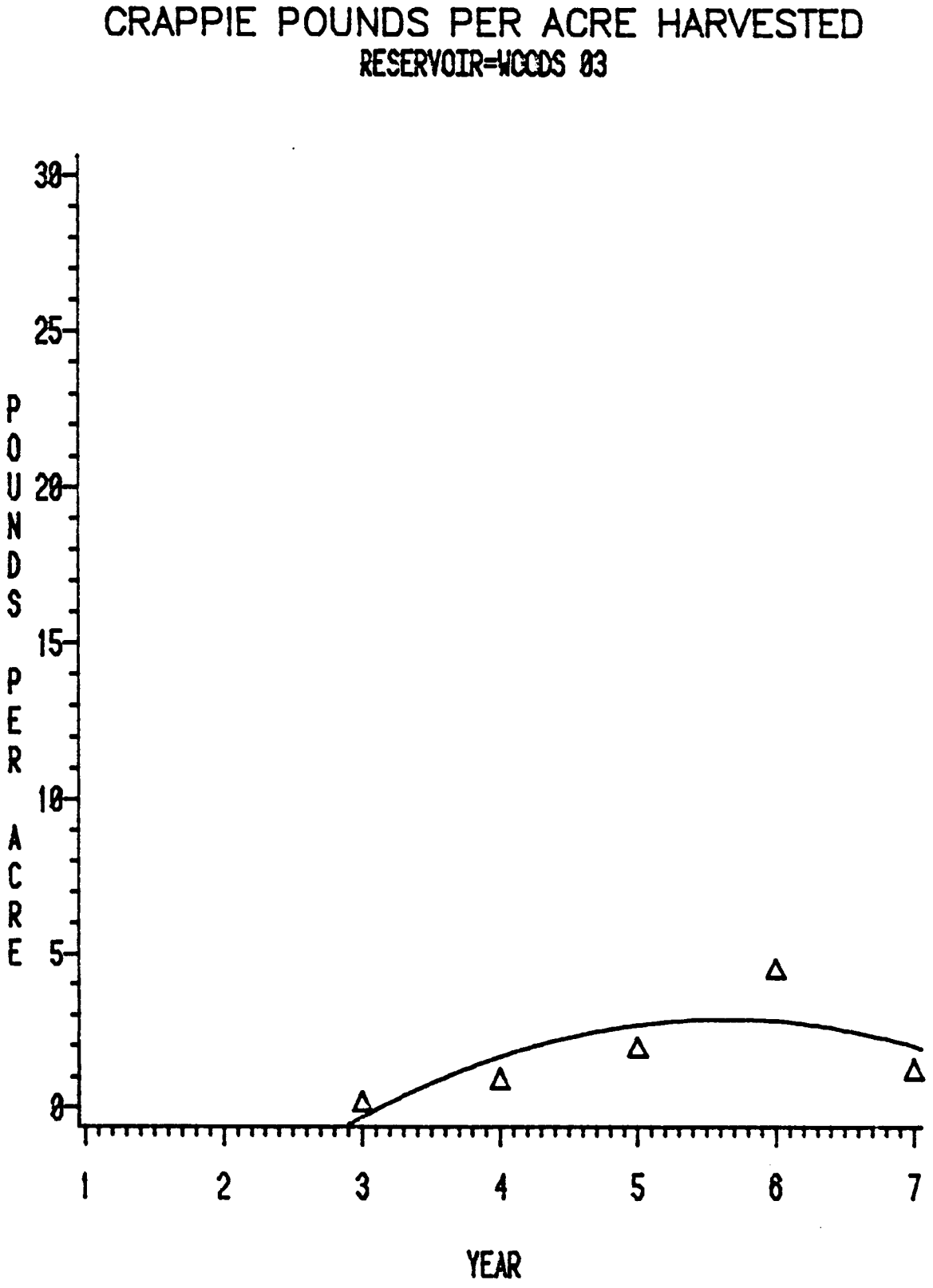


Figure D.2 (continued)

Figure D.3. Crappie harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with intermediate high harvests were classified in Group 3: Douglas, Tims Ford, and Watts Bar. The yearly codes 1-7 represent individual years from 1977-1983.

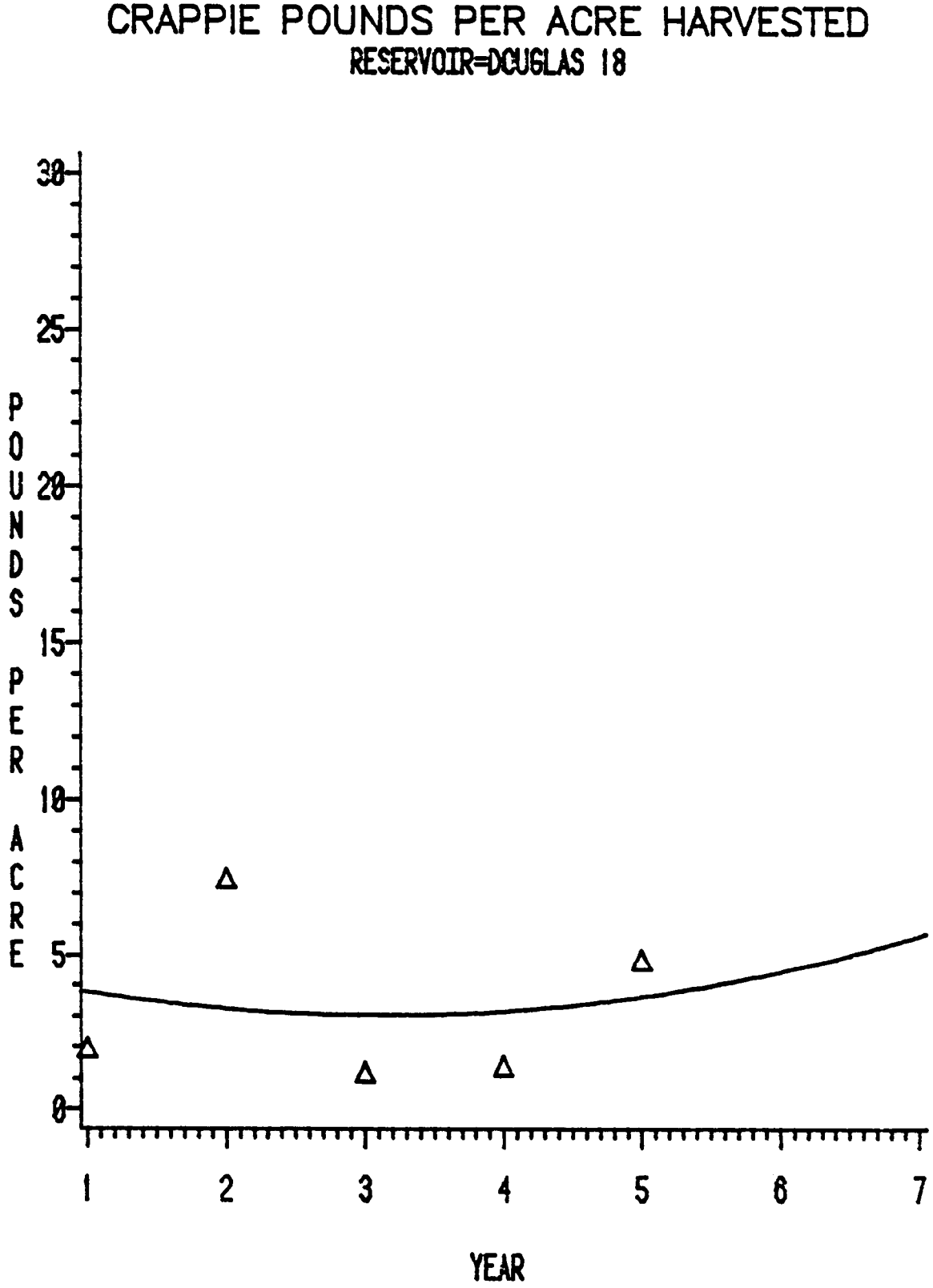

CRAPPIE POUNDS PER ACRE HARVESTED
RESERVOIR=DOUGLAS 18
POUNDS PER ACRE
30
25
20
15
10
5
0
1
2
3
4
5
6
7
YEAR

Figure D.3

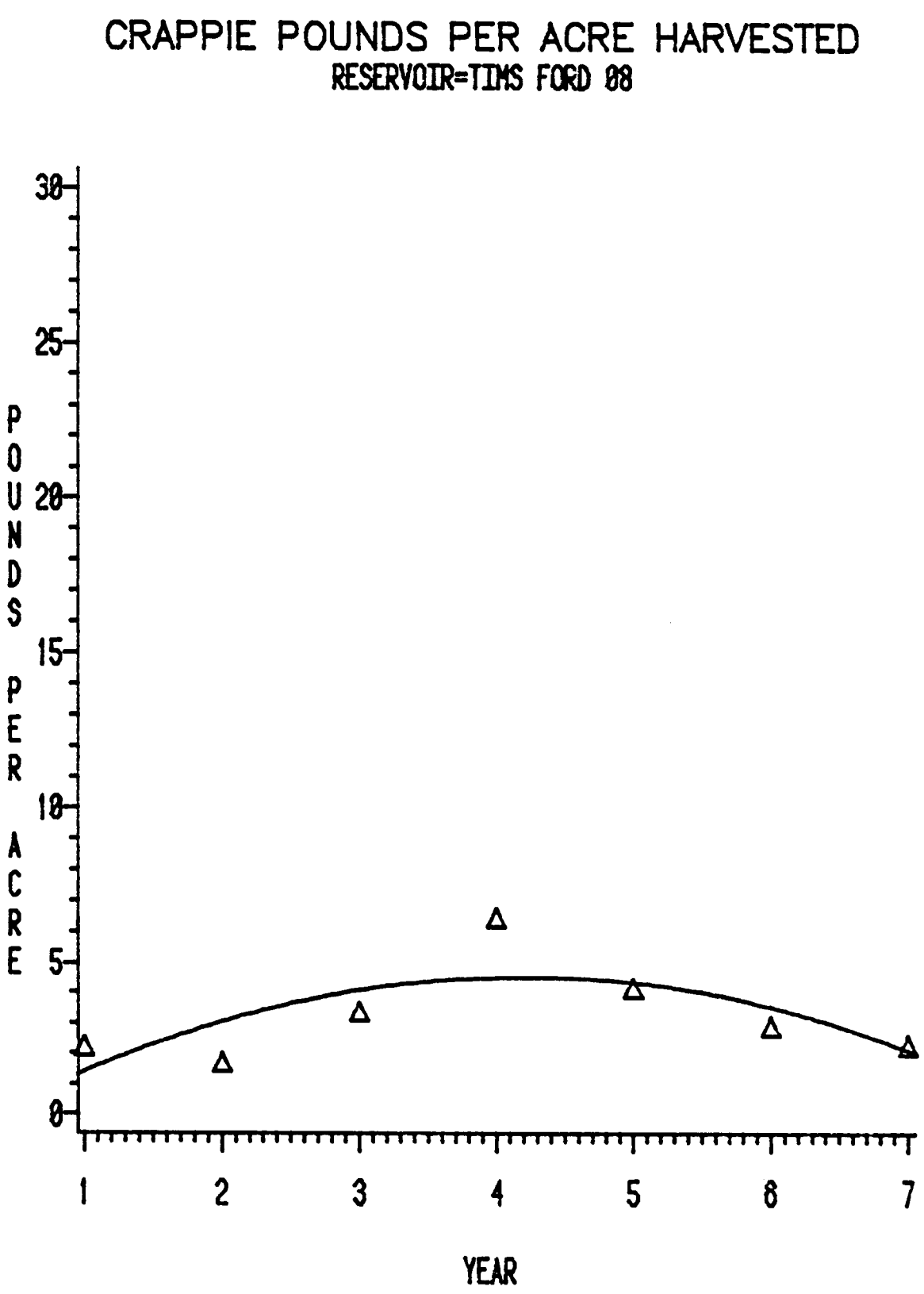


Figure D.3 (continued)

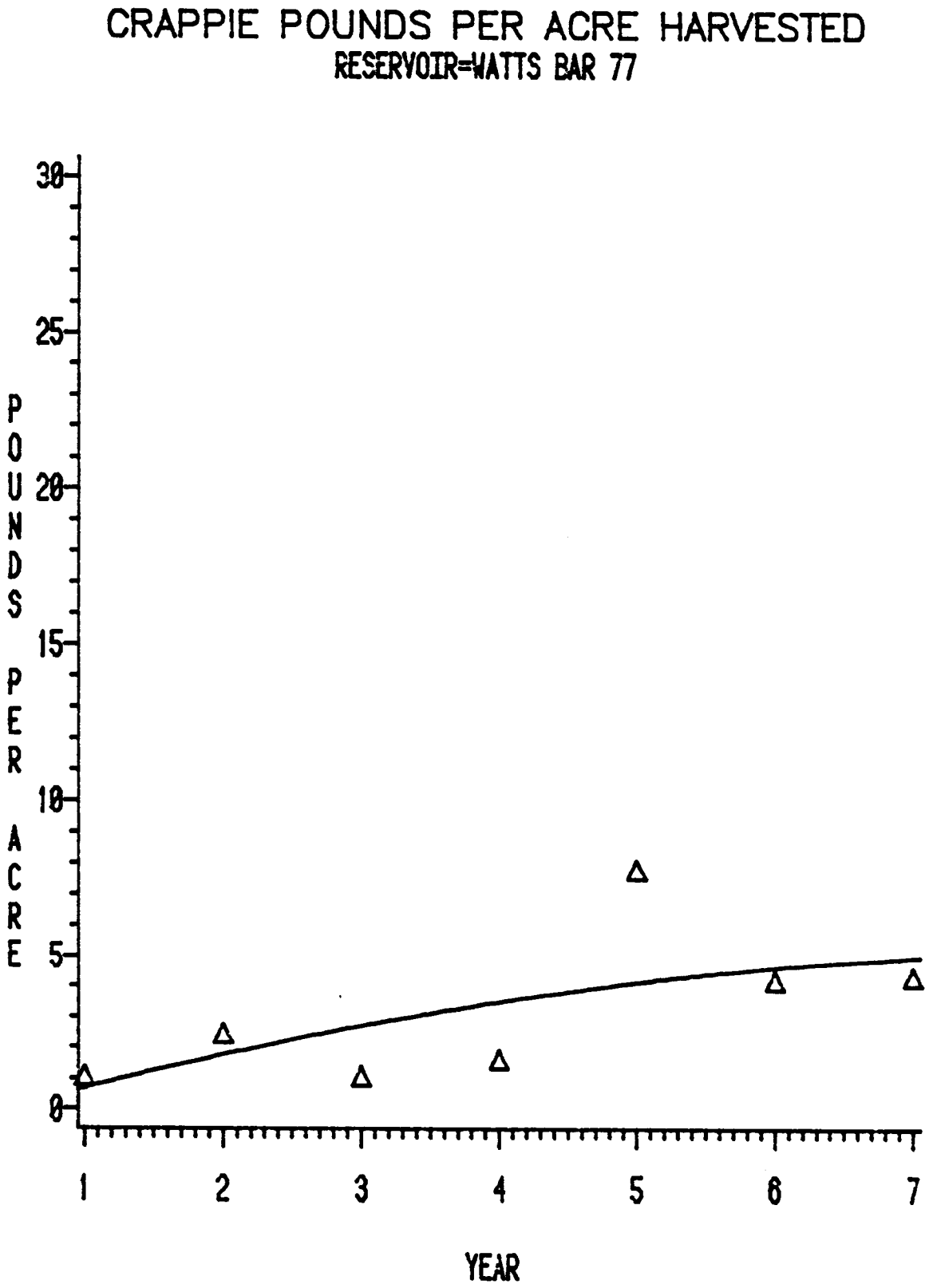


Figure D.3 (continued)

Figure D.4. Crappie harvested (pounds per acre) during the seven-year period, 1977-1985. The following reservoirs with high harvests were classified in Group 4: Fort Loudoun, J. Percy Priest, Kentucky, Normandy, and Reelfoot. The yearly codes 1-7 represent individual years from 1977-1983

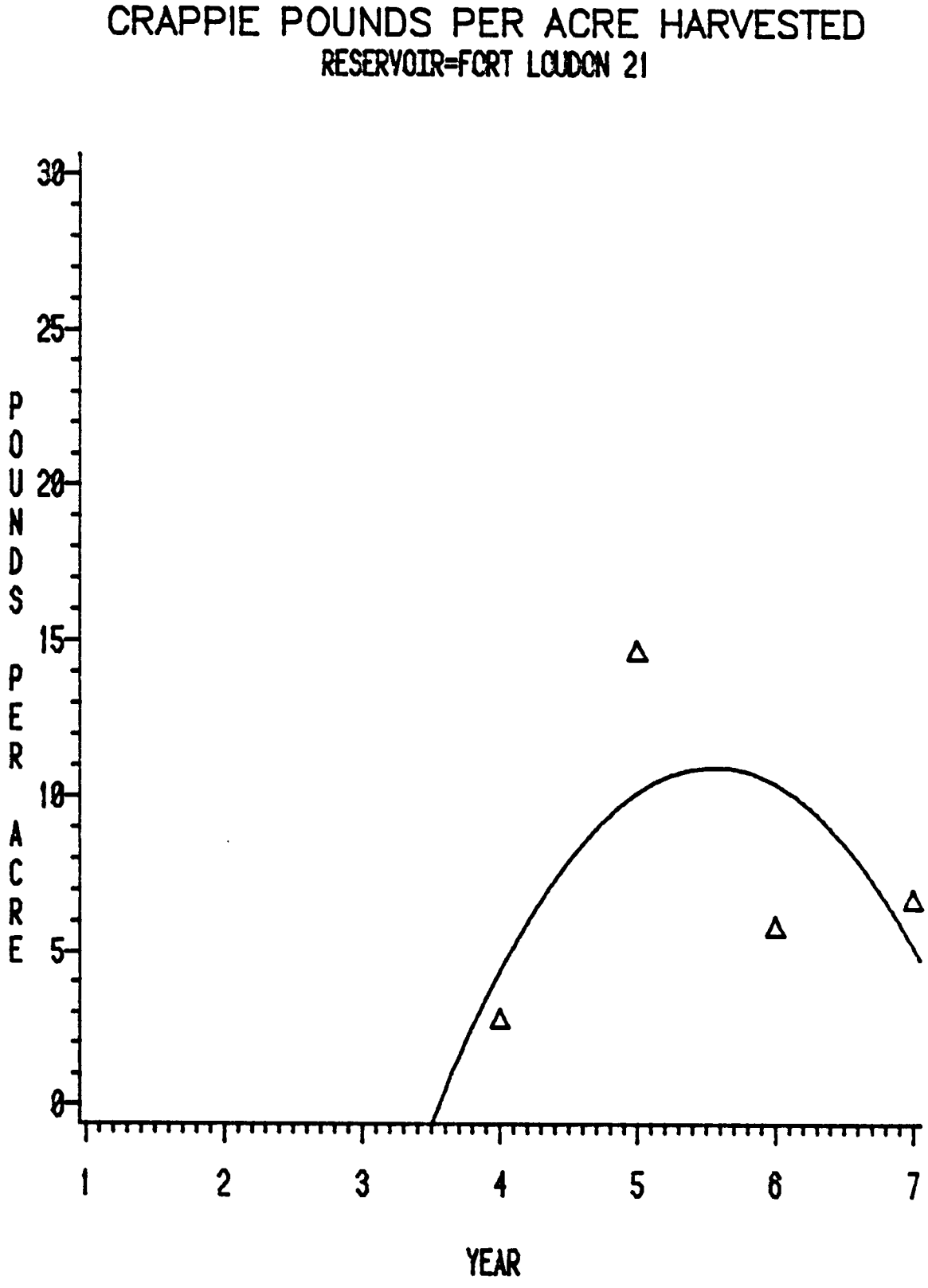

CRAPPIE POUNDS PER ACRE HARVESTED
RESERVOIR=FORT LOUDON 21
POUNDS PER ACRE
30
25
20
15
10
5
0
1
2
3
4
5
6
7
YEAR

Figure D.4

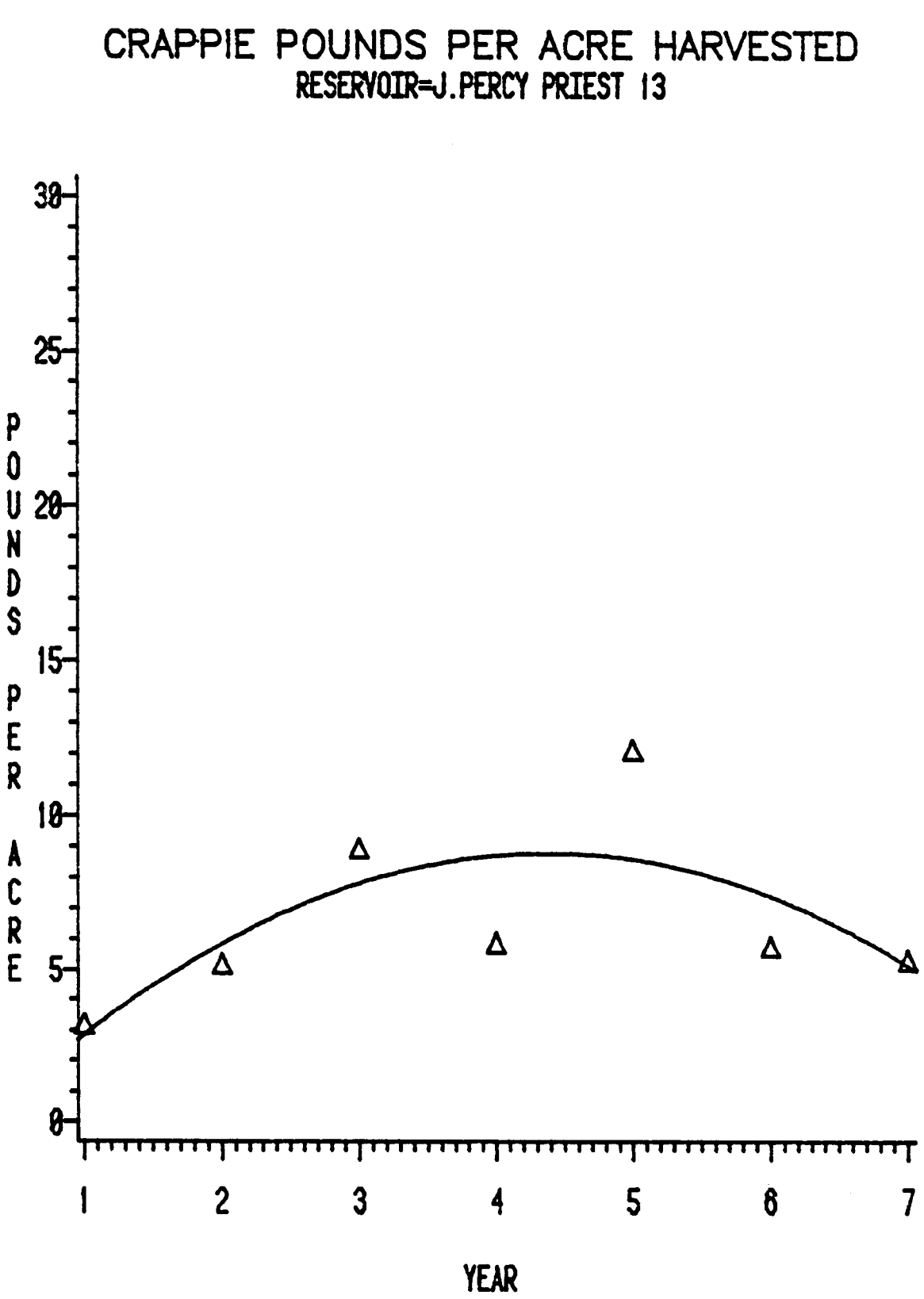


Figure D.4 (continued)

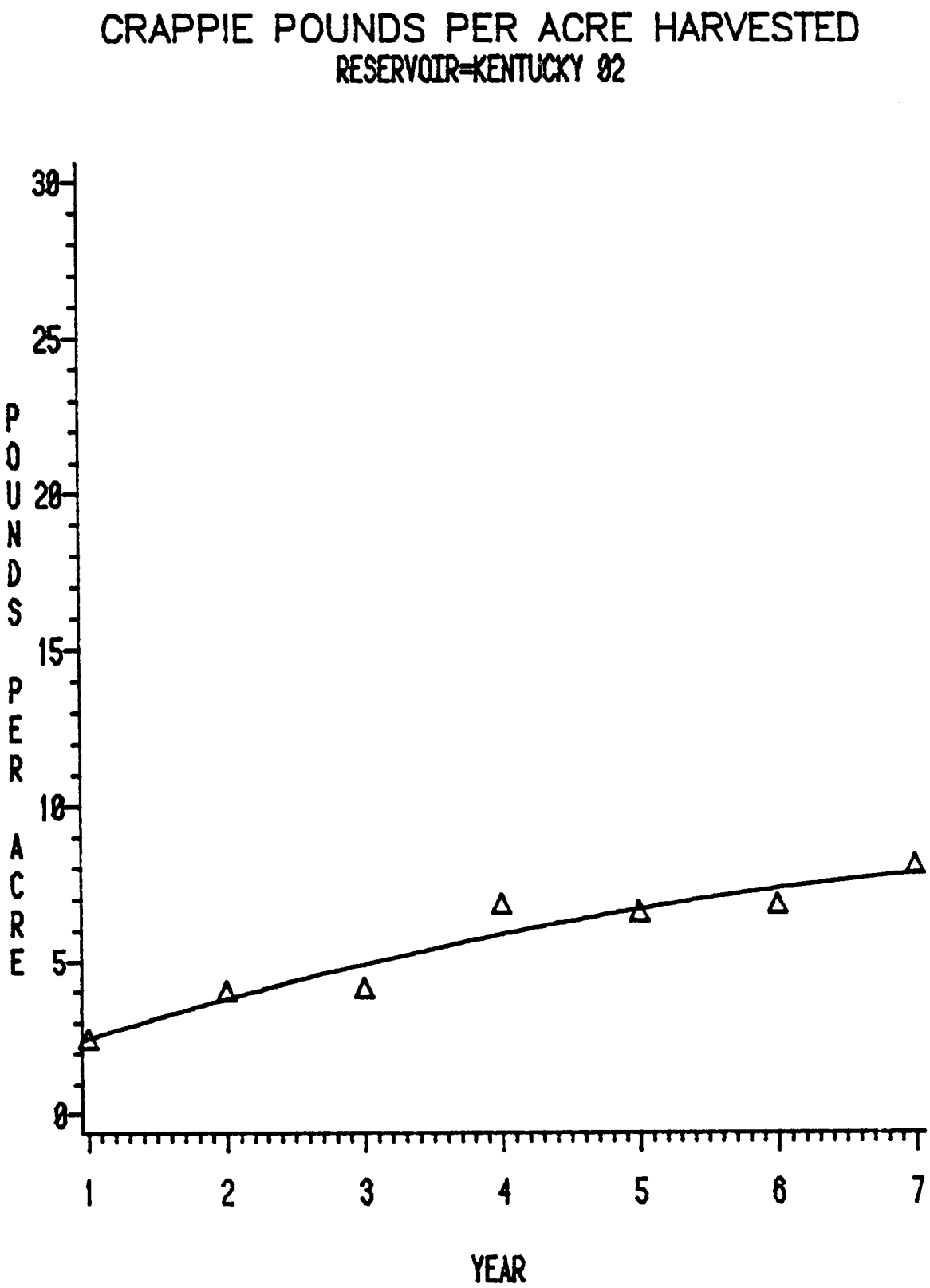


Figure D.4 (continued)

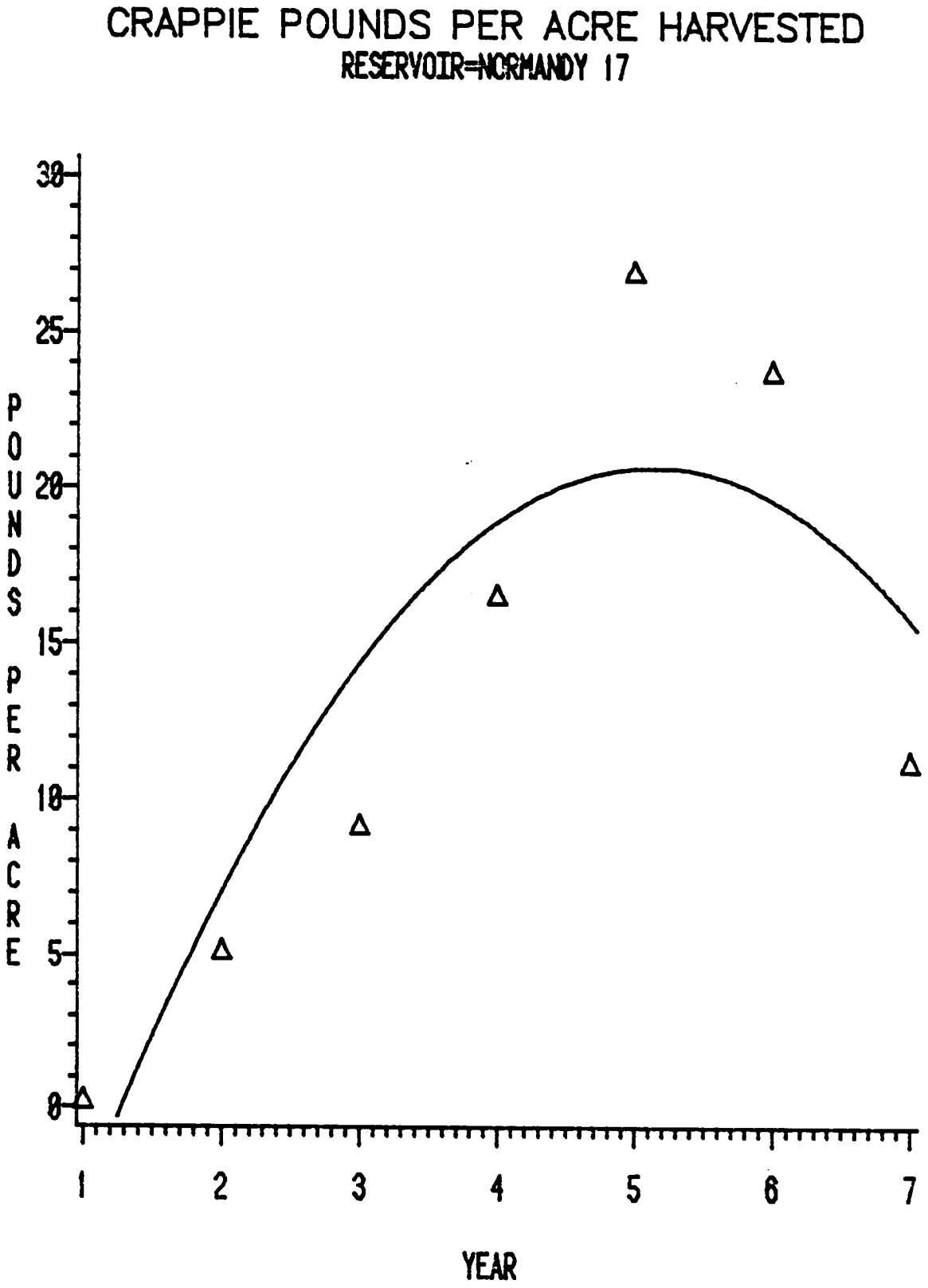


Figure D.4 (continued)

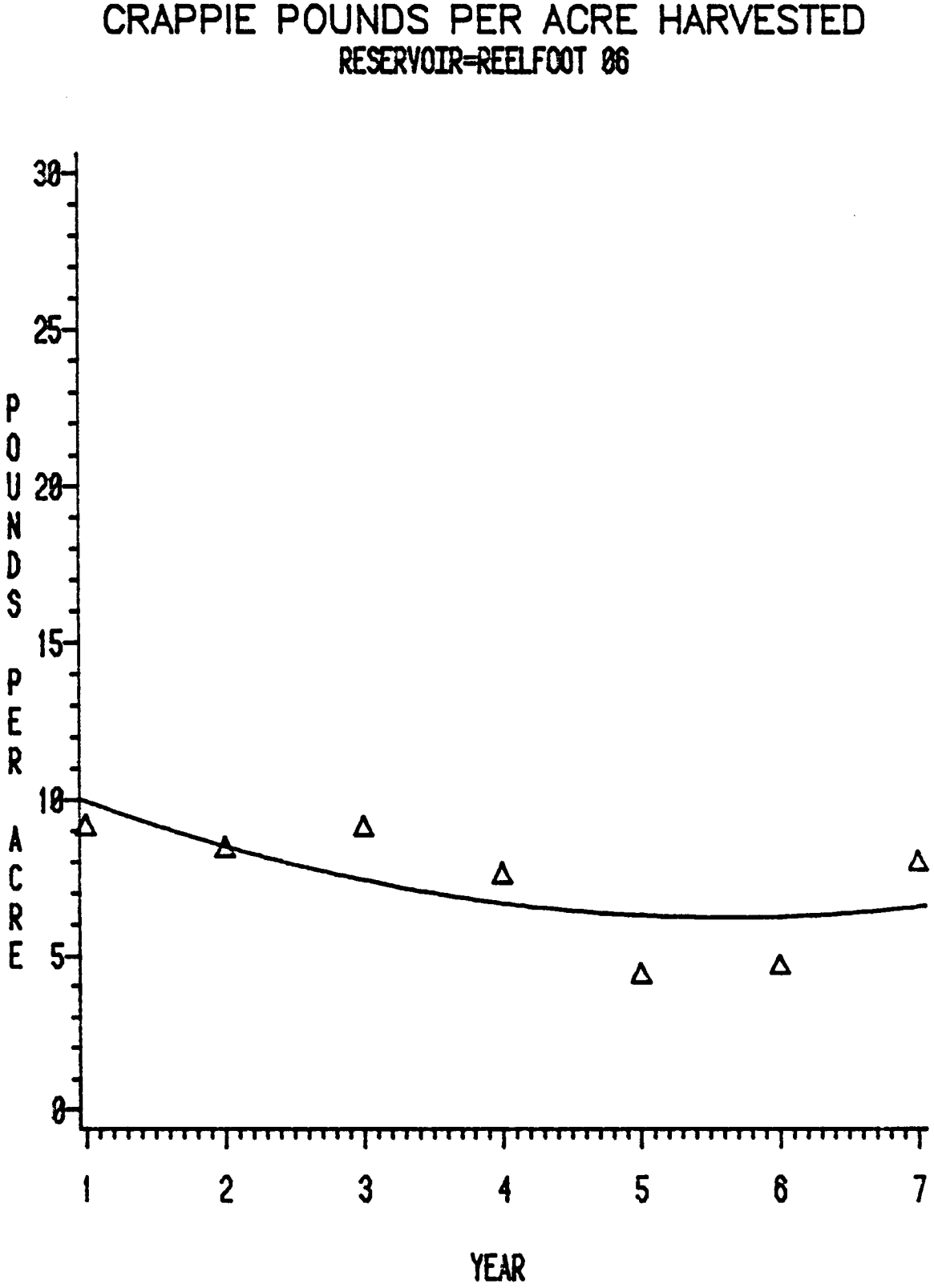


Figure D.4 (continued)

APPENDIX E

BLACK BASS HARVESTED IN POUNDS PER ACRE IN GROUPS OF RESERVOIRS WITH SIMILAR HARVESTS DURING THE SEVEN-YEAR PERIOD, 1977-1983. THE GROUPS ARE AS FOLLOWS: GROUP 1 = LOW HARVESTS, GROUP 2 = INTERMEDIATE LOW HARVESTS, GROUP 3 = INTERMEDIATE HIGH HARVESTS, AND GROUP 4 = HIGH HARVESTS

Figure E.1. Black bass harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with low harvests were classified in Group 1: Norris, Old Hickory, and Woods. The yearly codes 1-7 represent individual years from 1977-1983.

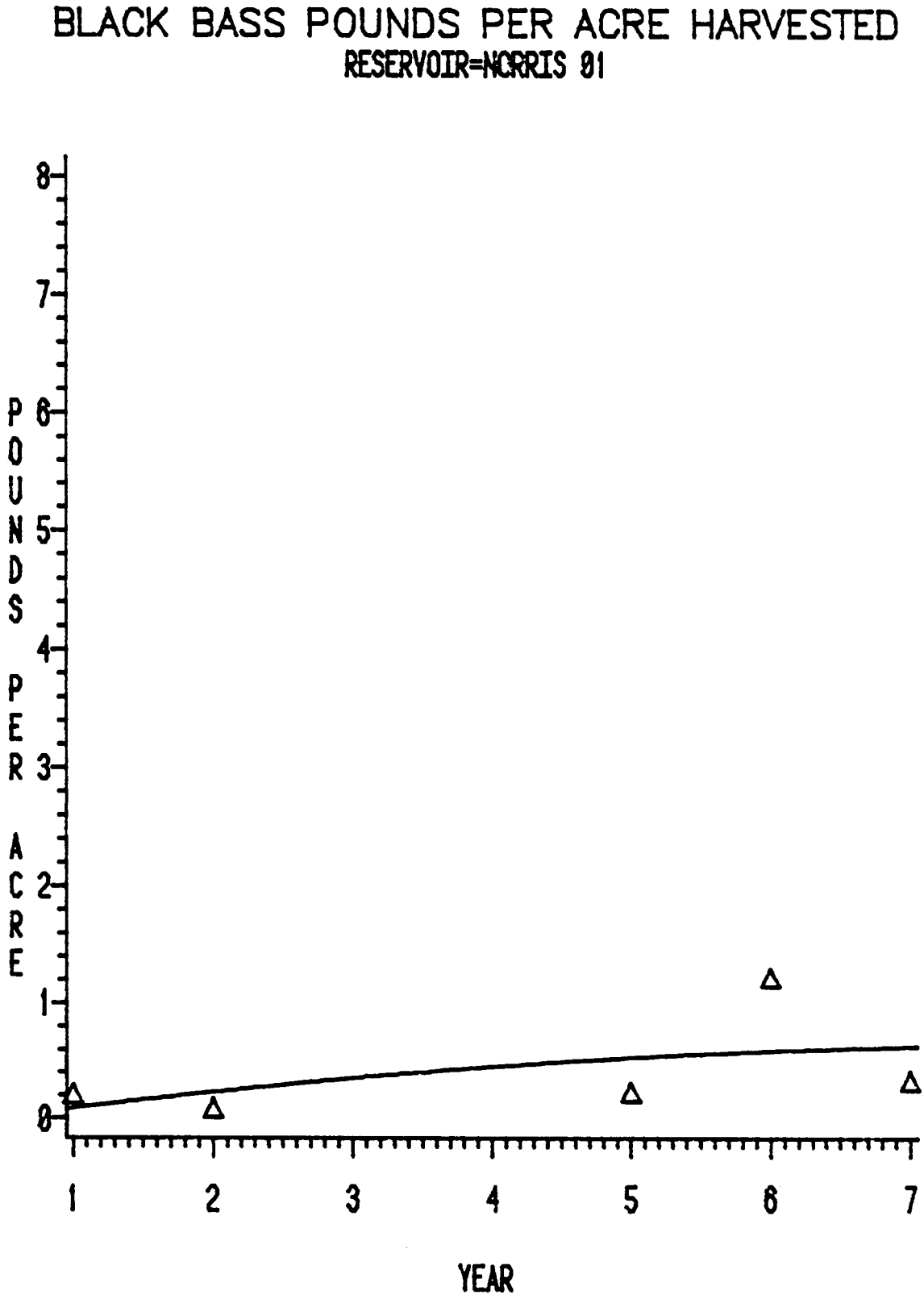

BLACK BASS POUNDS PER ACRE HARVESTED
RESERVOIR=NORRIS 01
POUNDS PER ACRE
0
1
2
3
4
5
6
7
8
1
2
3
4
5
6
7
YEAR

Figure E.1

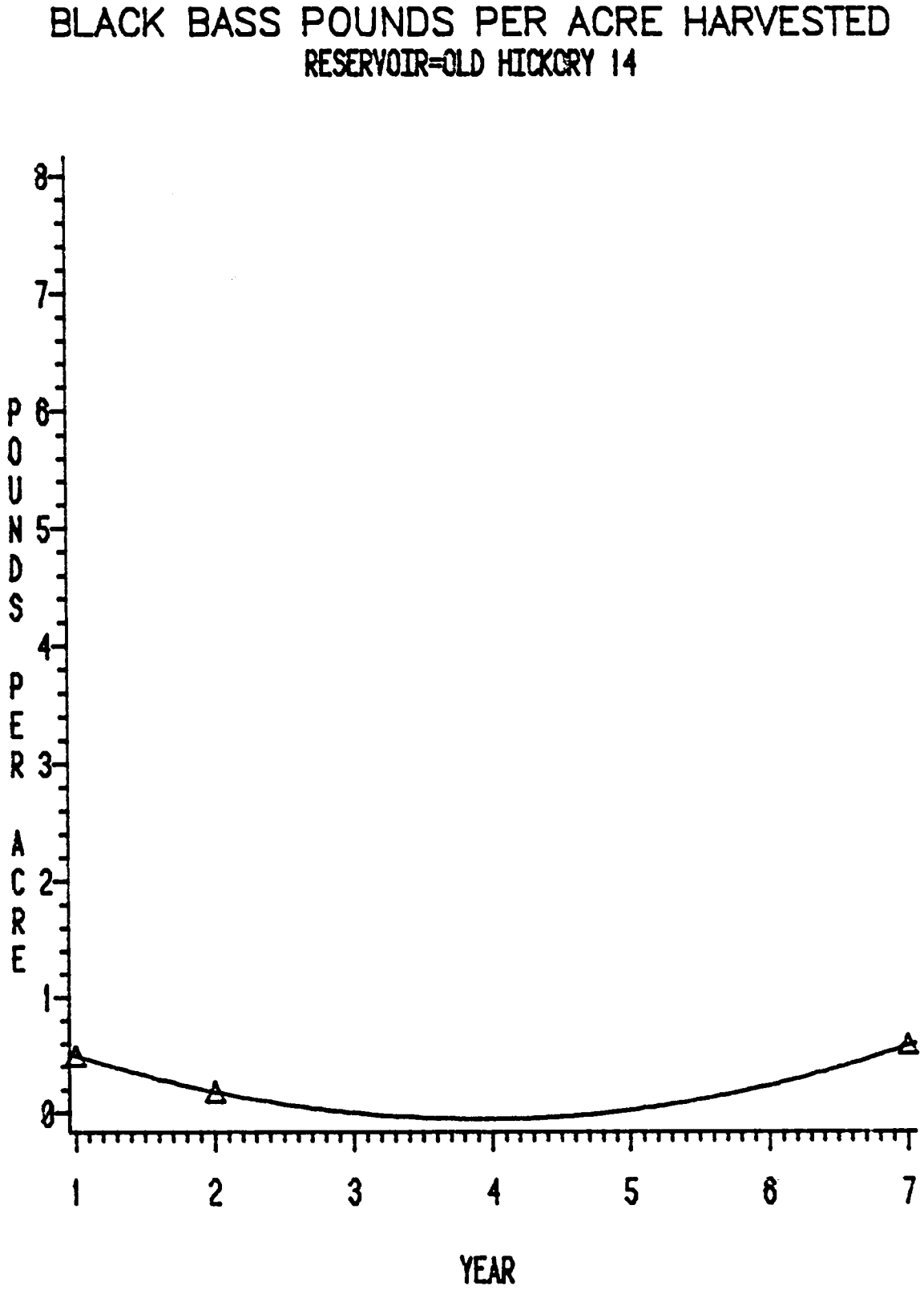


Figure E.1 (continued)

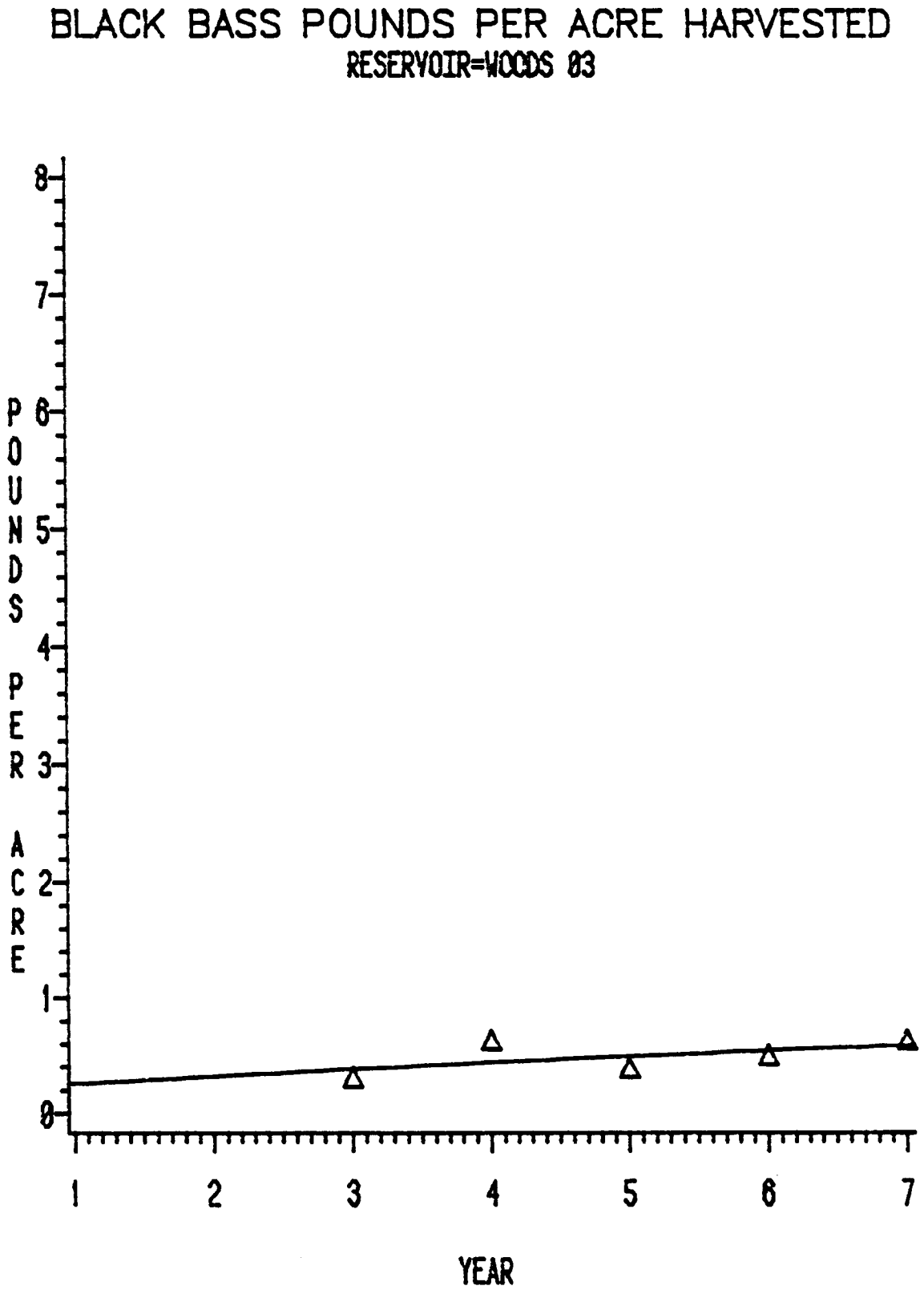


Figure E.1 (continued)

Figure E.2. Black bass harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with intermediate low harvests were classified in Group 2: Chickamauga, Cordell Hull, Douglas, Melton Hill, and Watts Bar. The yearly codes 1-7 represent individual years from 1977-1983.

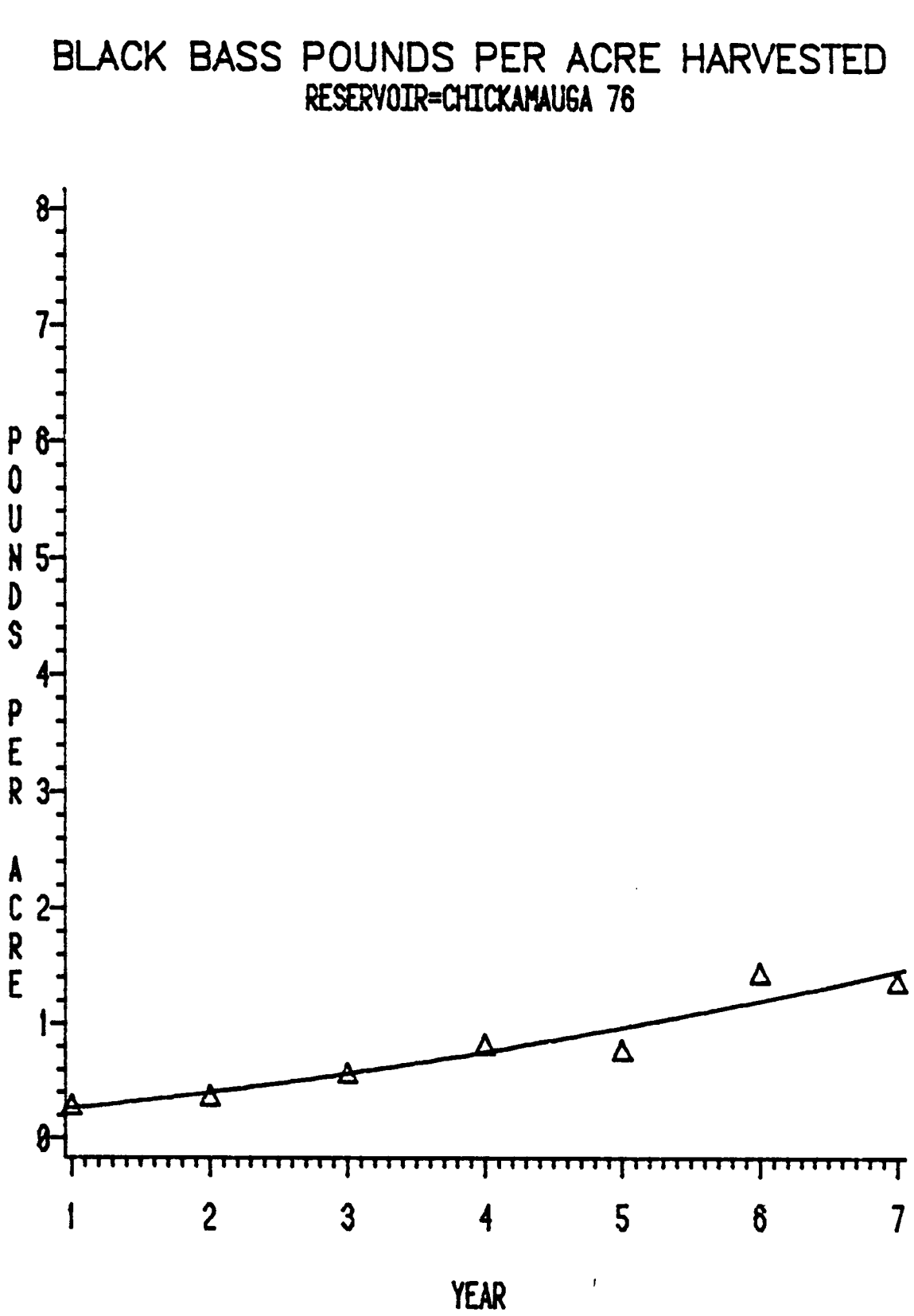

BLACK BASS POUNDS PER ACRE HARVESTED
RESERVOIR=CHICKAMAUGA 76
POUNDS PER ACRE
0
1
2
3
4
5
6
7
8
1
2
3
4
5
6
7
YEAR

Figure E.2

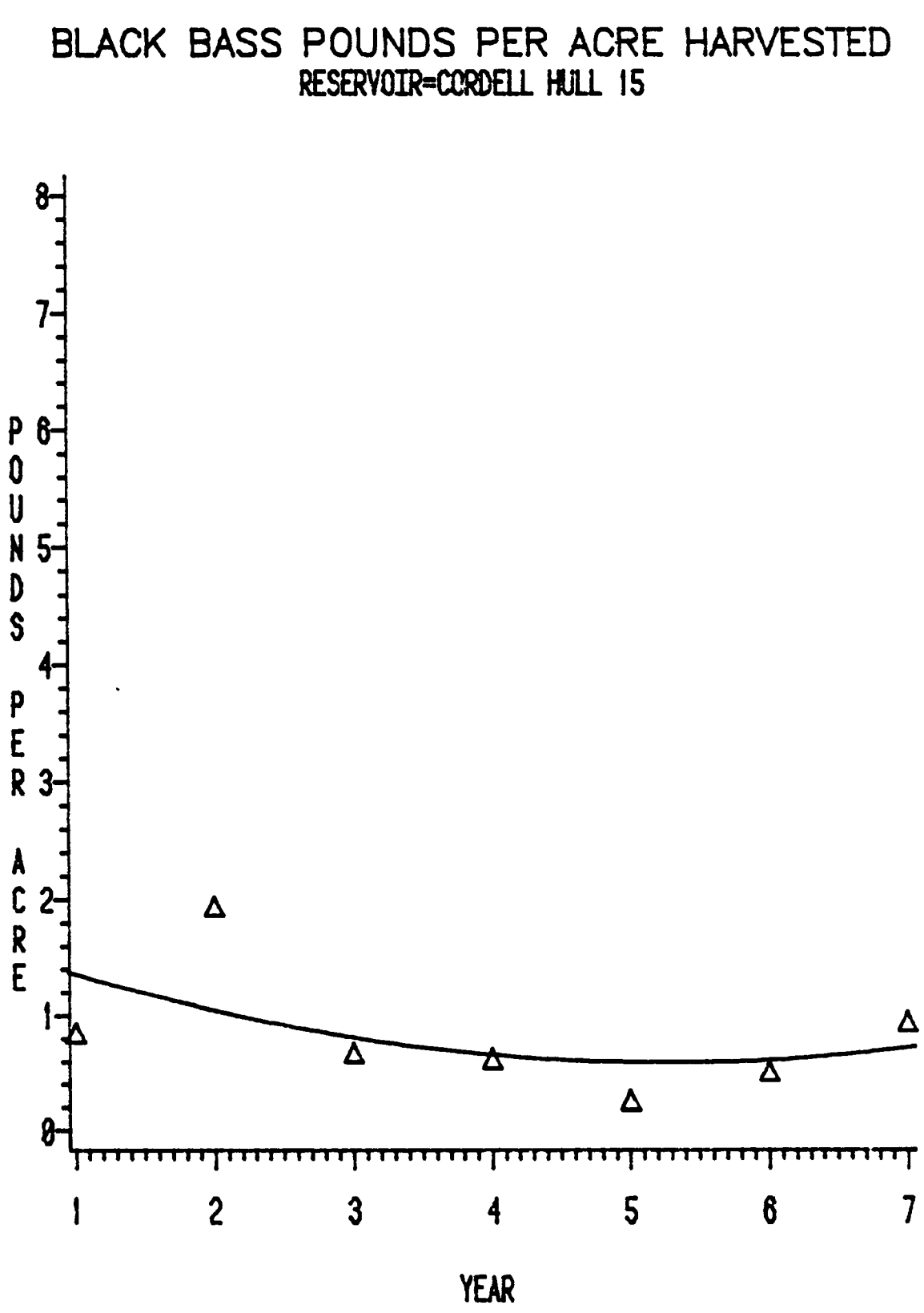


Figure E.2 (continued)

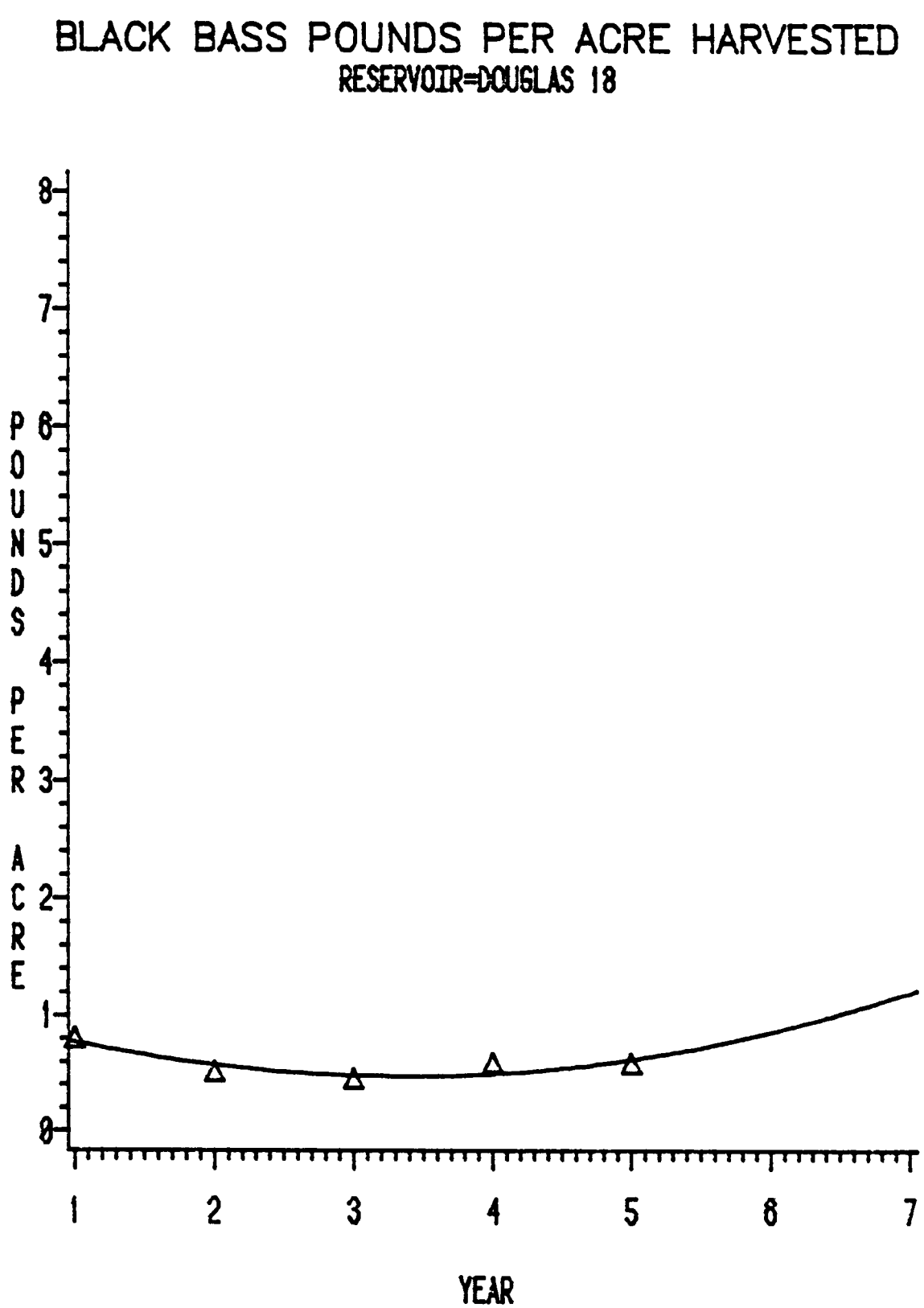


Figure E.2 (continued)

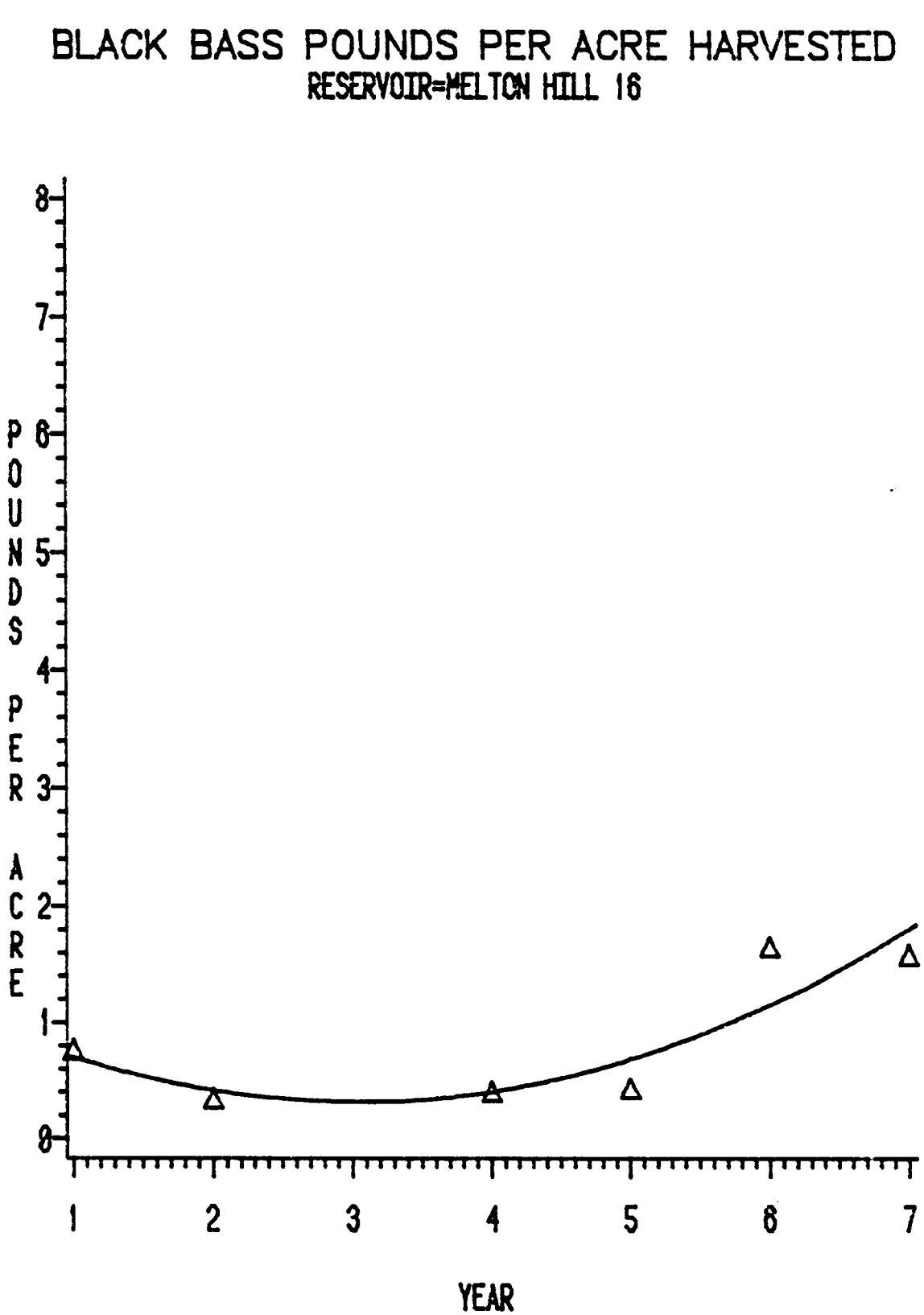


Figure E.2 (continued)

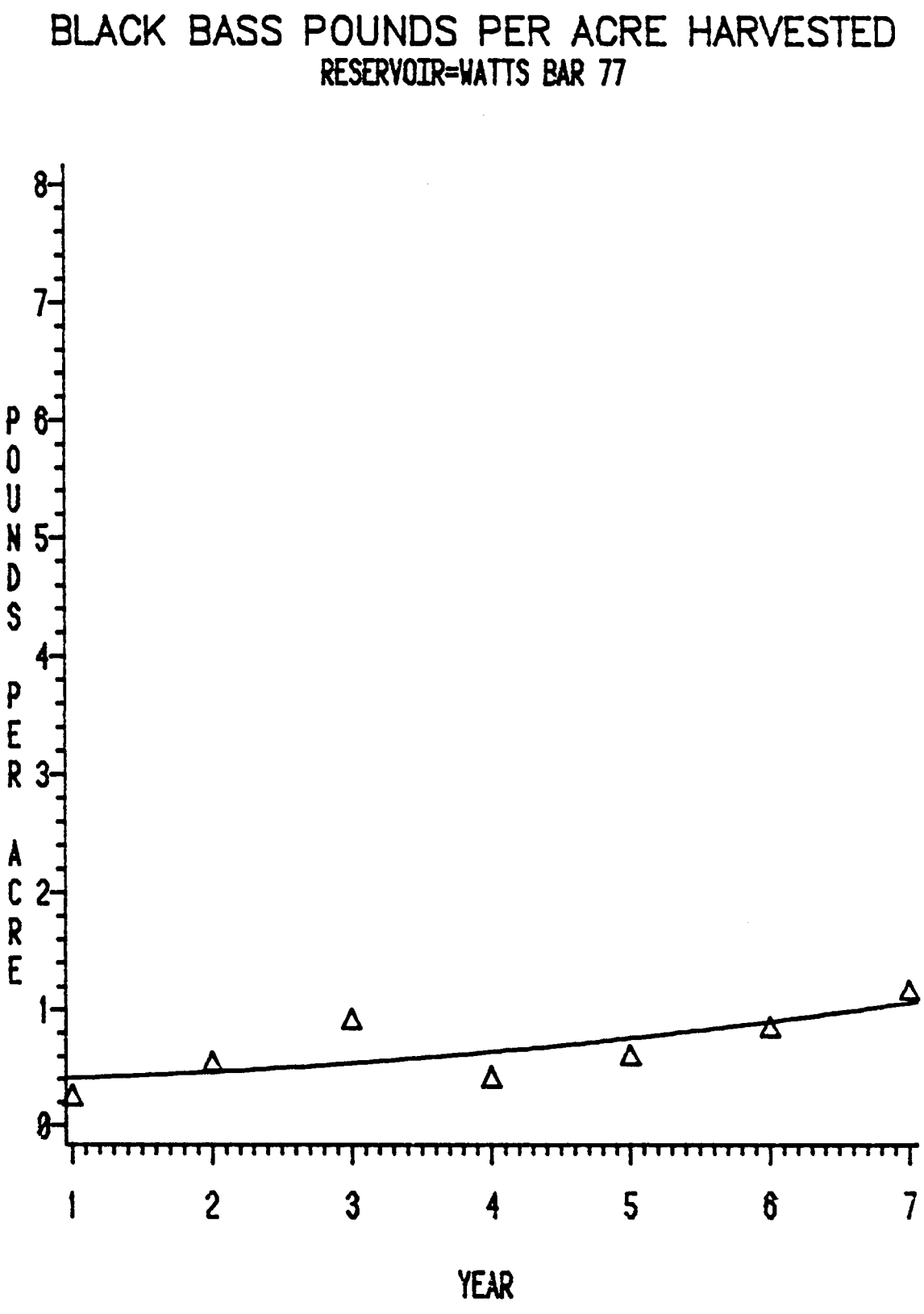


Figure E.2 (continued)

Figure E.3. Black bass harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with intermediate high harvests were classified in Group 3: Boone, Cherokee, J. Percy Priest, Nickajack, Reelfoot, South Holston, and Watauga. The yearly codes 1-7 represent individual years from 1977-1983.

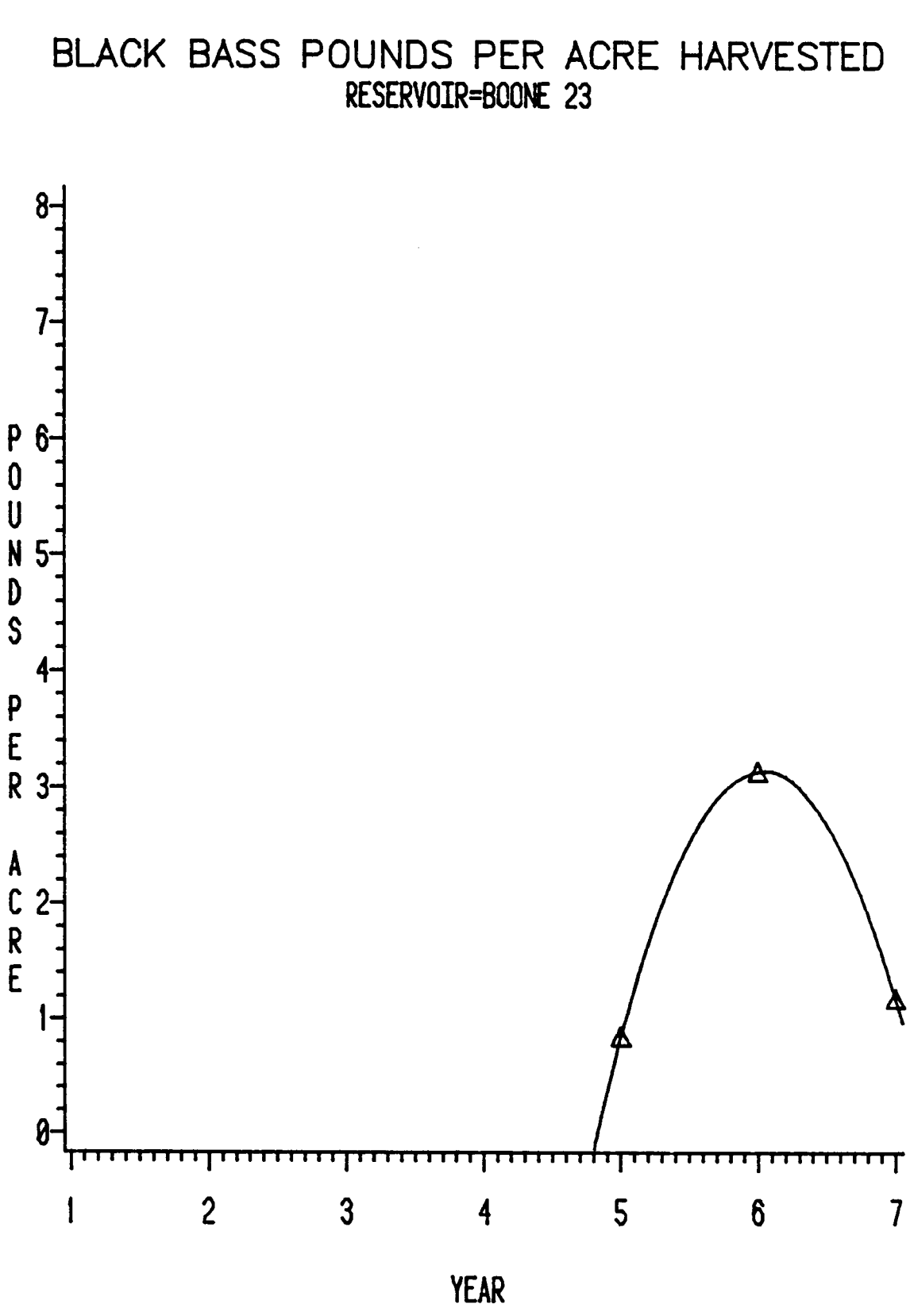

BLACK BASS POUNDS PER ACRE HARVESTED
RESERVOIR=BOONE 23
POUNDS PER ACRE
0
1
2
3
4
5
6
7
8
1
2
3
4
5
6
7
YEAR

Figure E.3

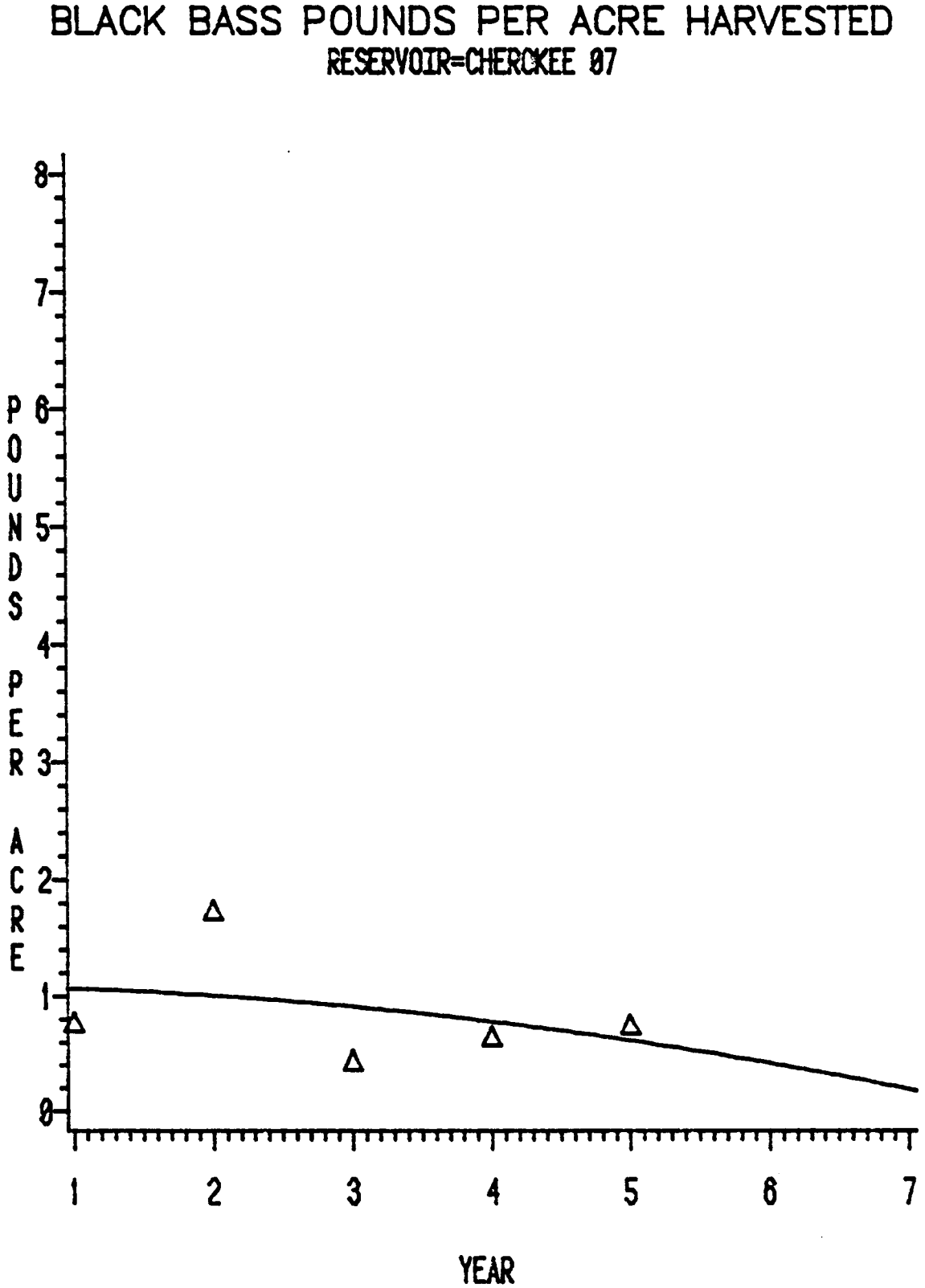


Figure E.3 (continued)

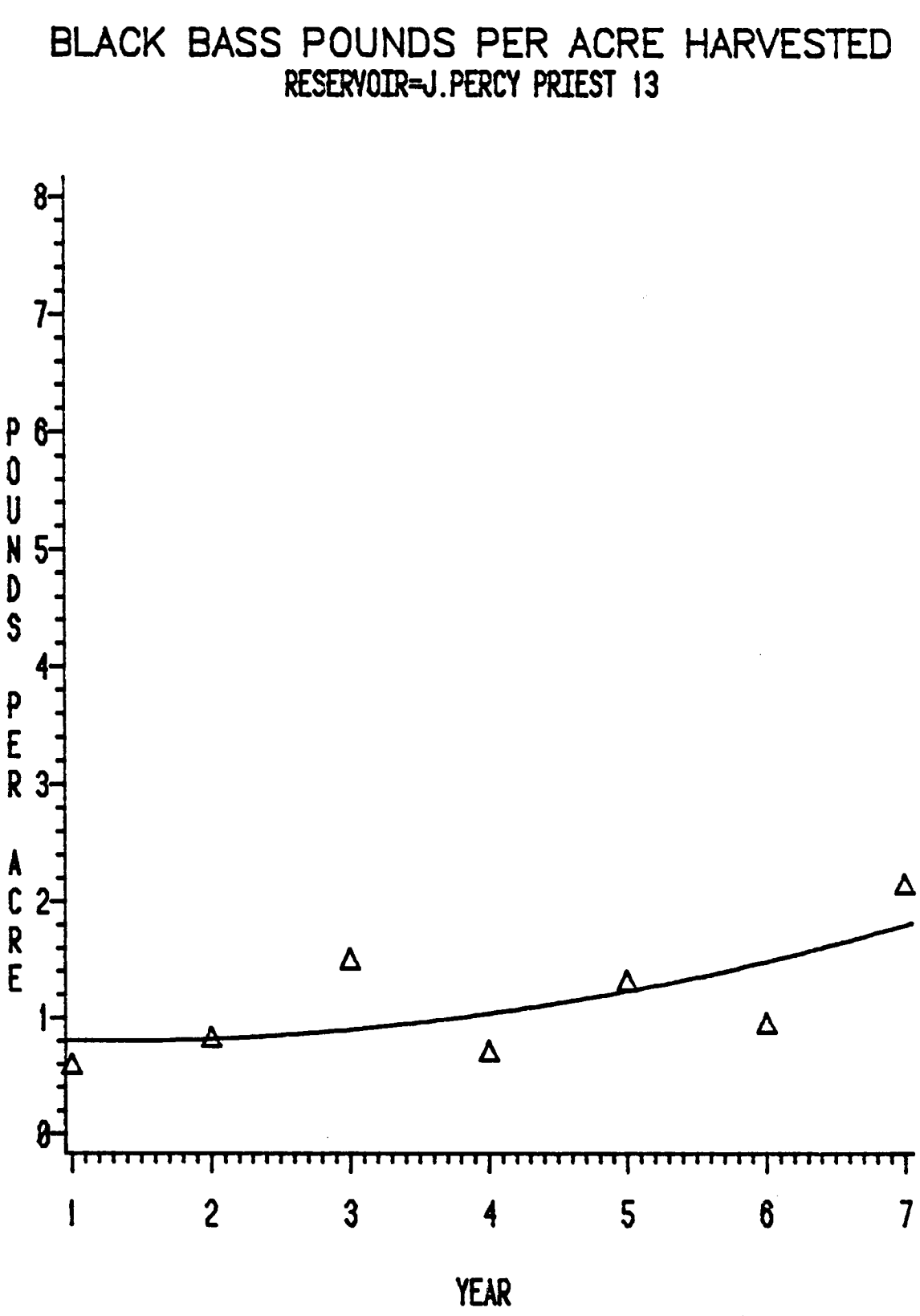


Figure E.3 (continued)

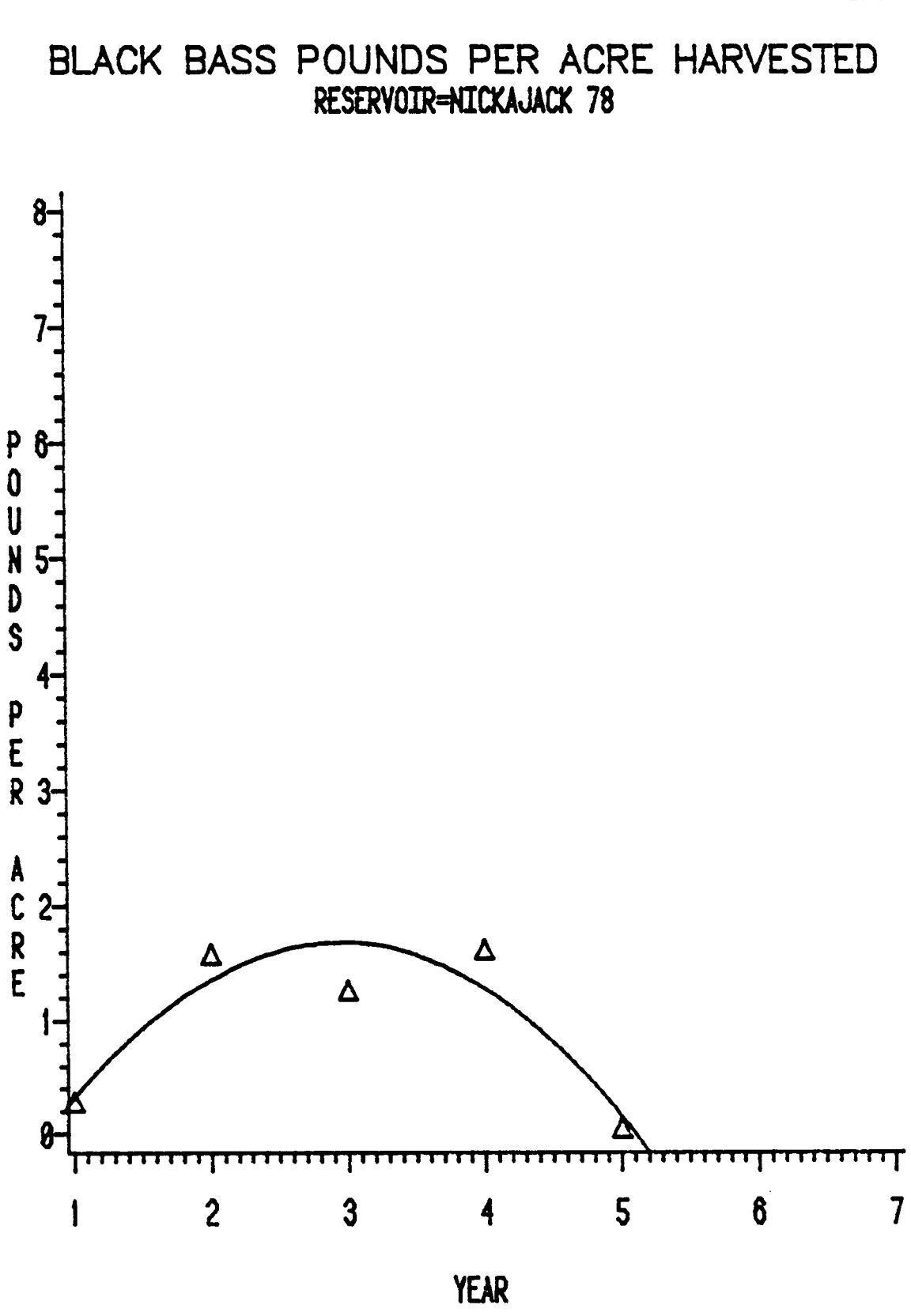


Figure E.3 (continued)

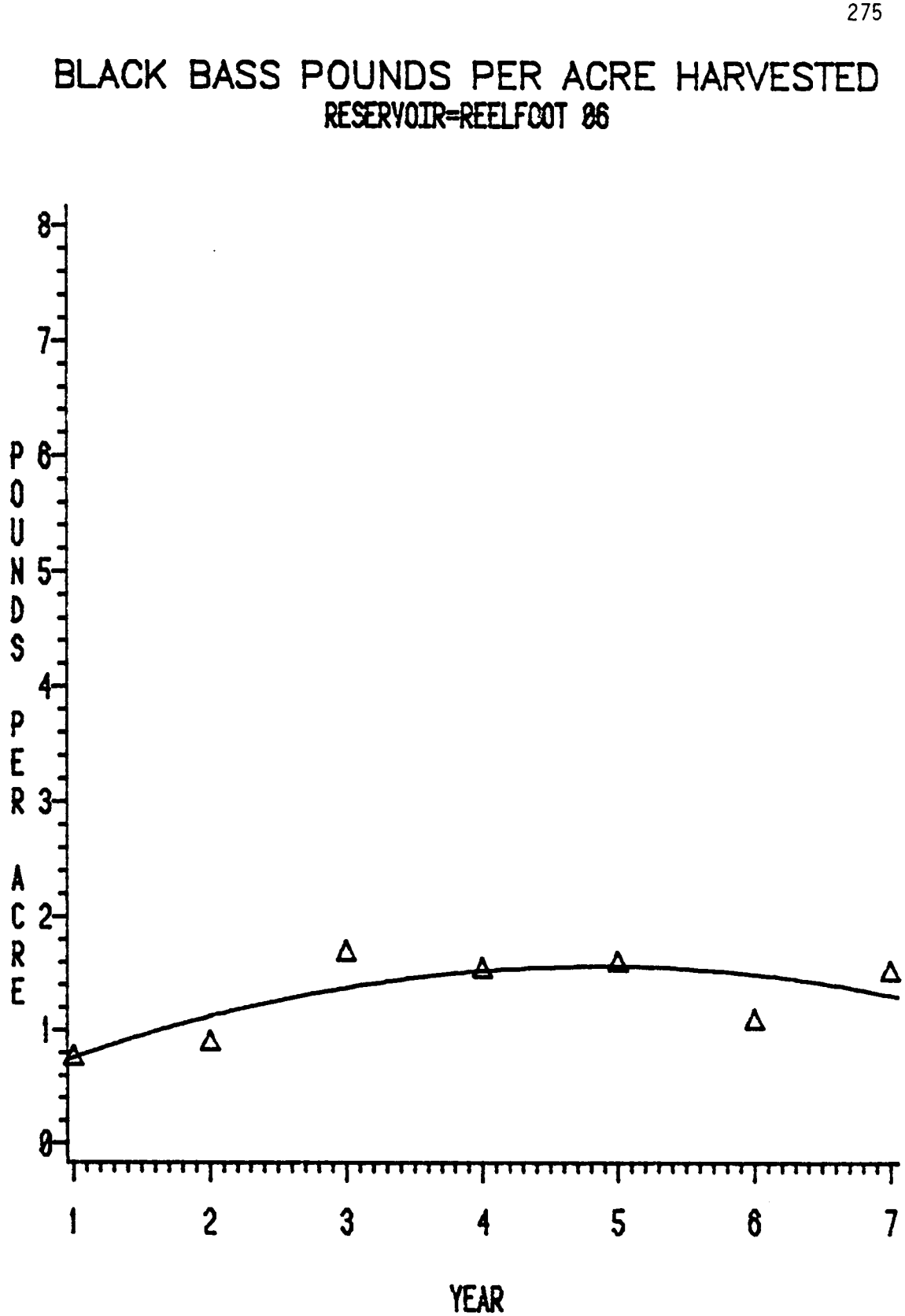


Figure E.3 (continued)

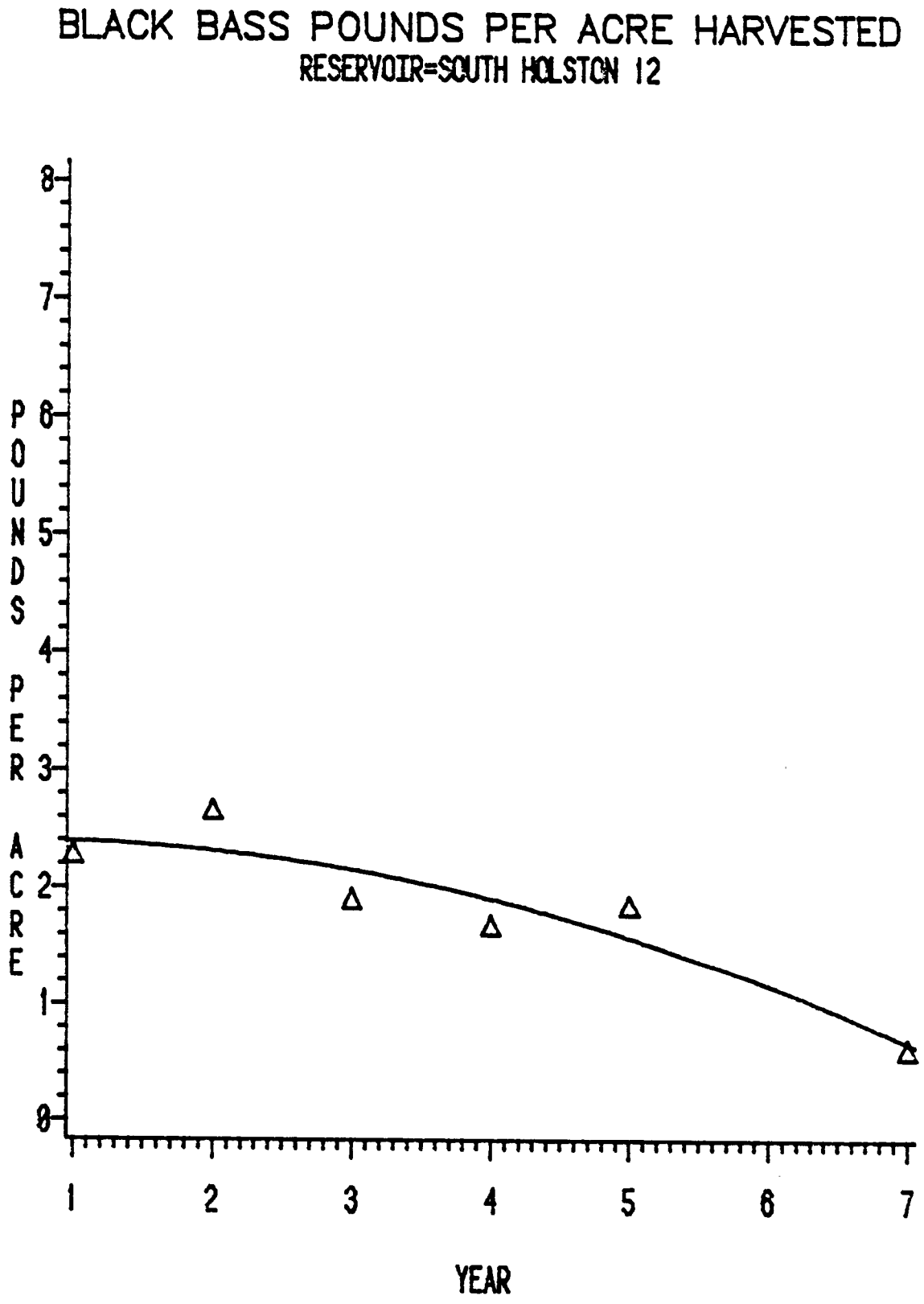


Figure E.3 (continued)

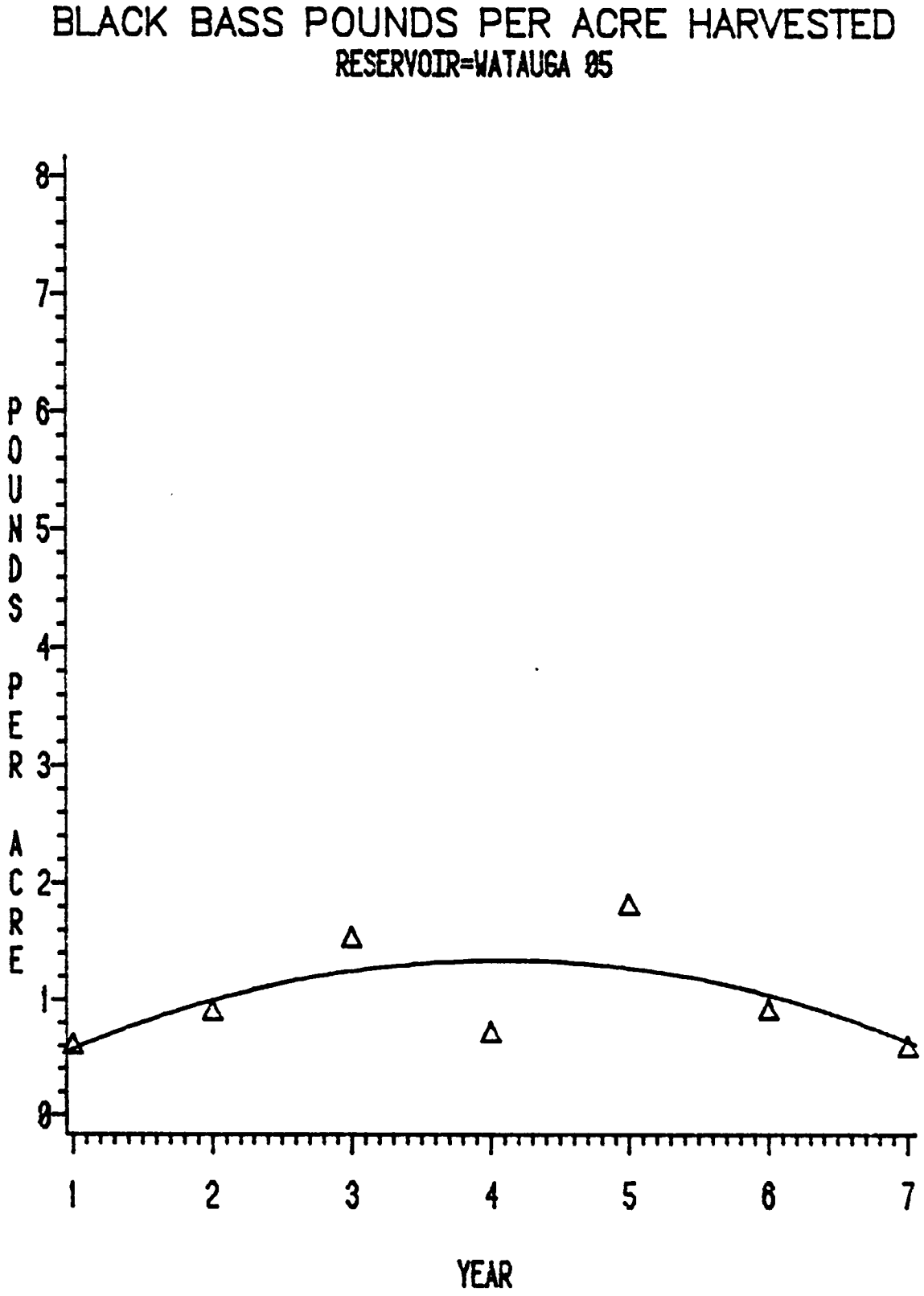


Figure E.3 (continued)

Figure E.4. Black bass harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with high harvests were classified in Group 4: Center Hill, Fort Loudoun, Kentucky, Normandy, Tellico, and Tims Ford. The yearly codes 1-7 represent individual years from 1977-1983.

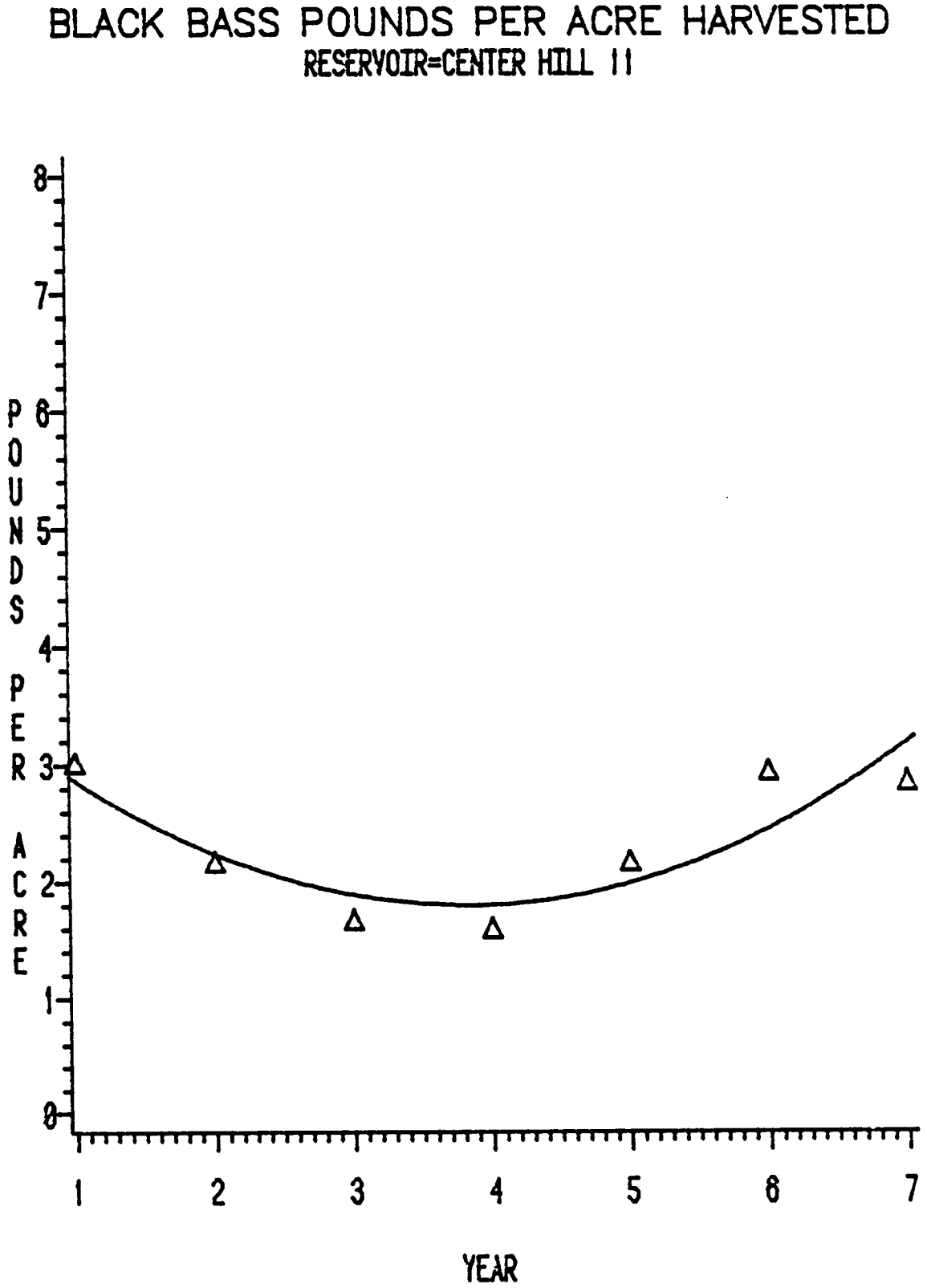

BLACK BASS POUNDS PER ACRE HARVESTED
RESERVOIR=CENTER HILL 11
POUNDS PER ACRE
0
1
2
3
4
5
6
7
8
1
2
3
4
5
6
7
YEAR

Figure E.4

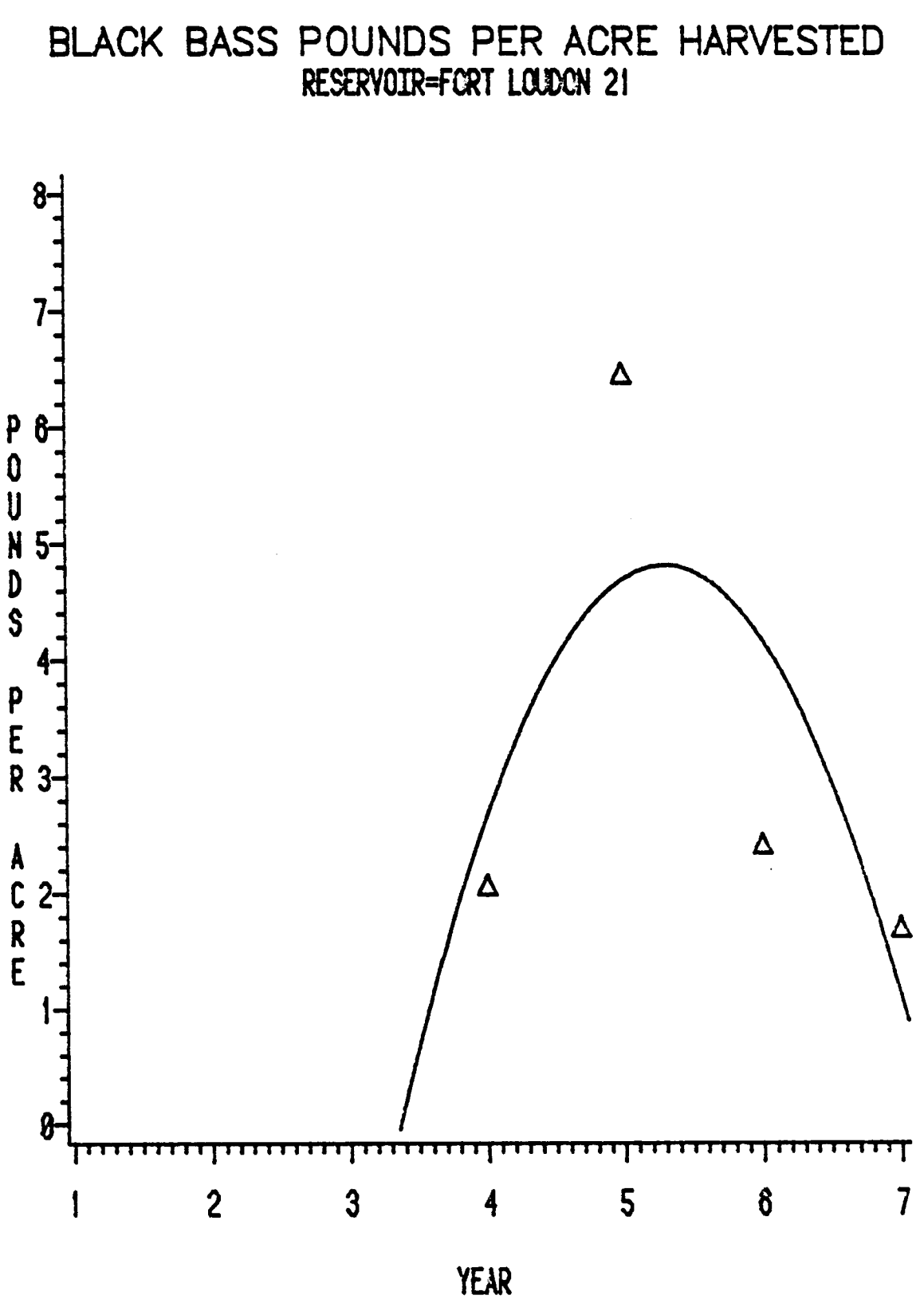


Figure E.4 (continued)

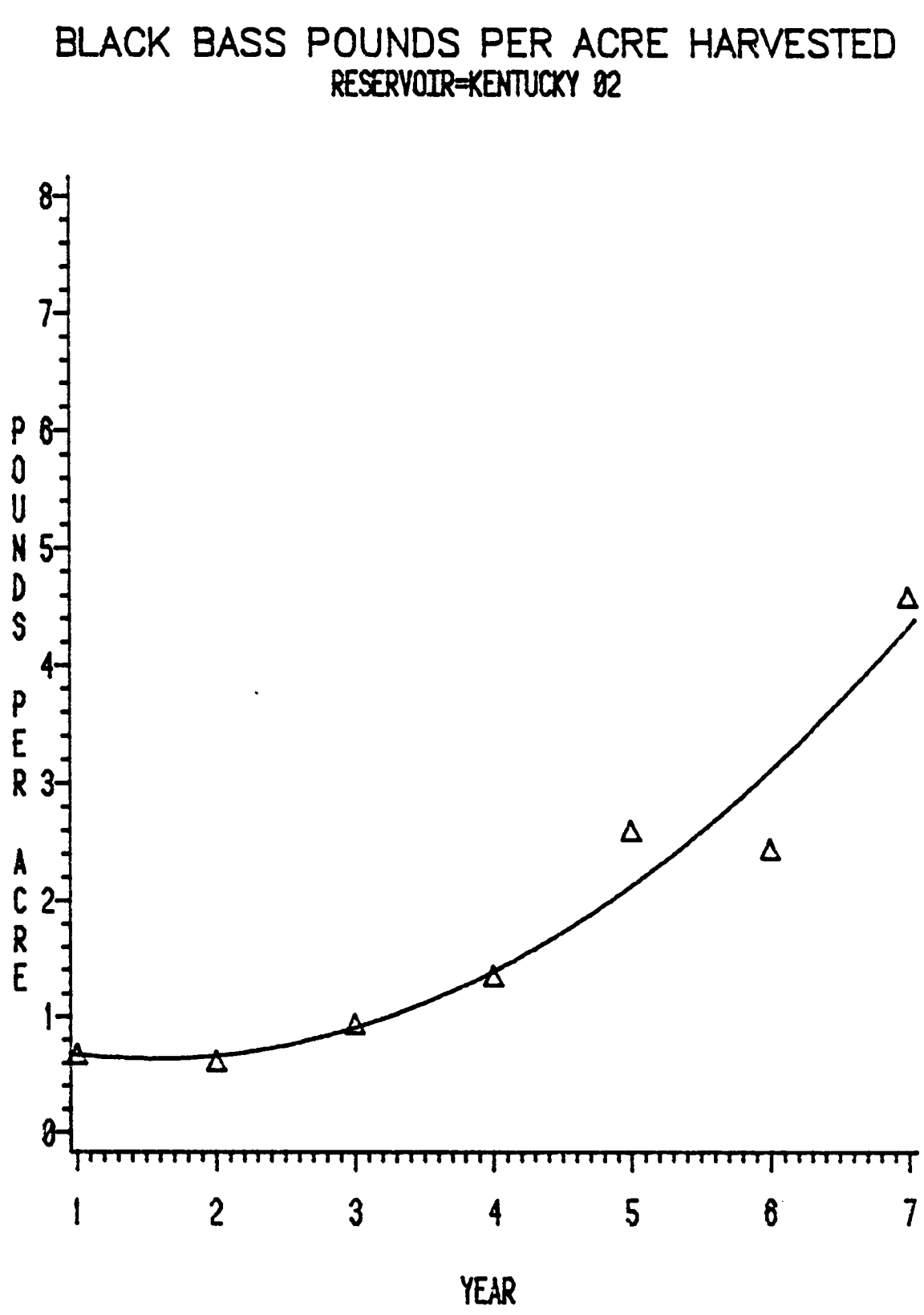


Figure E.4 (continued)

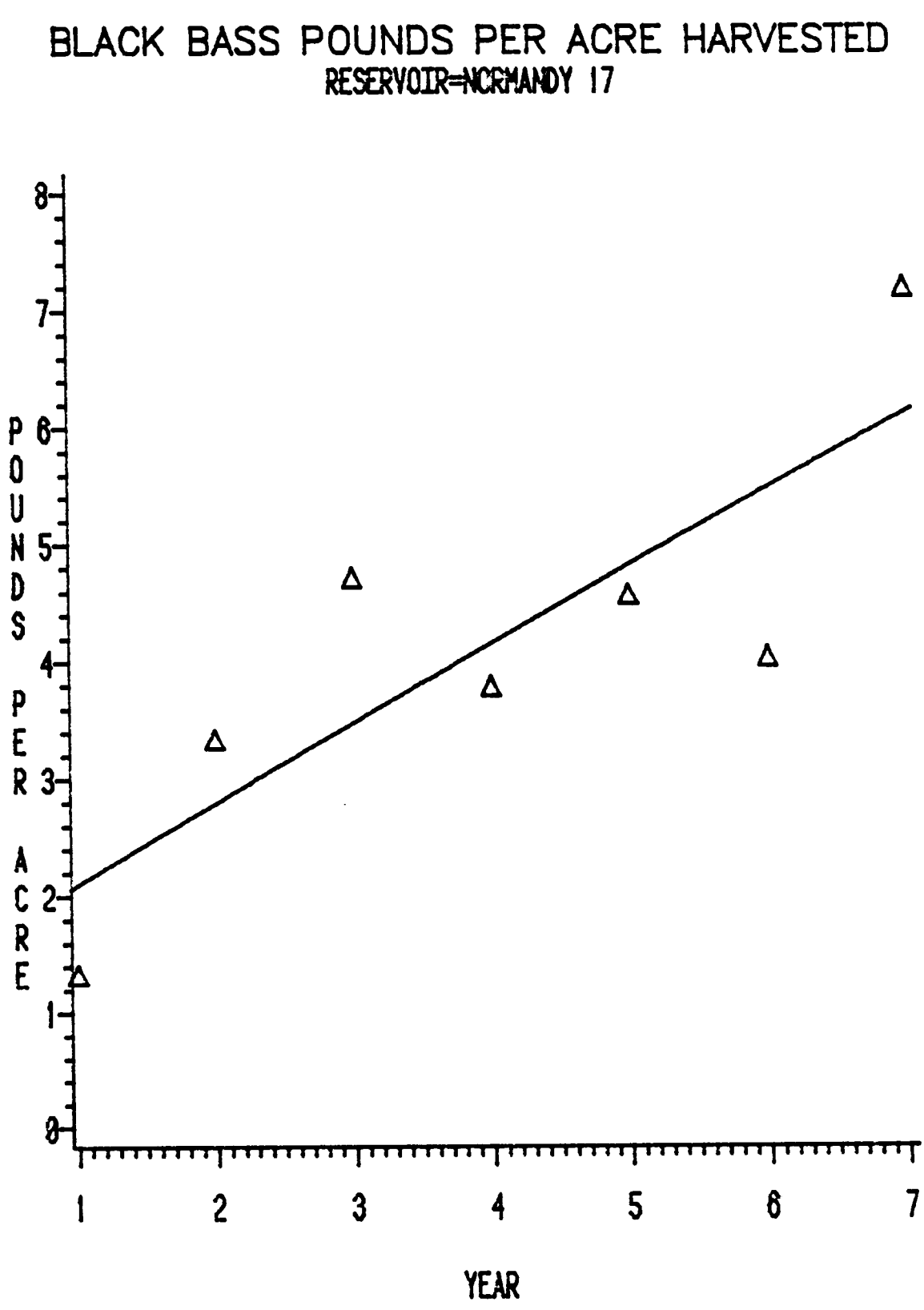


Figure E.4 (continued)

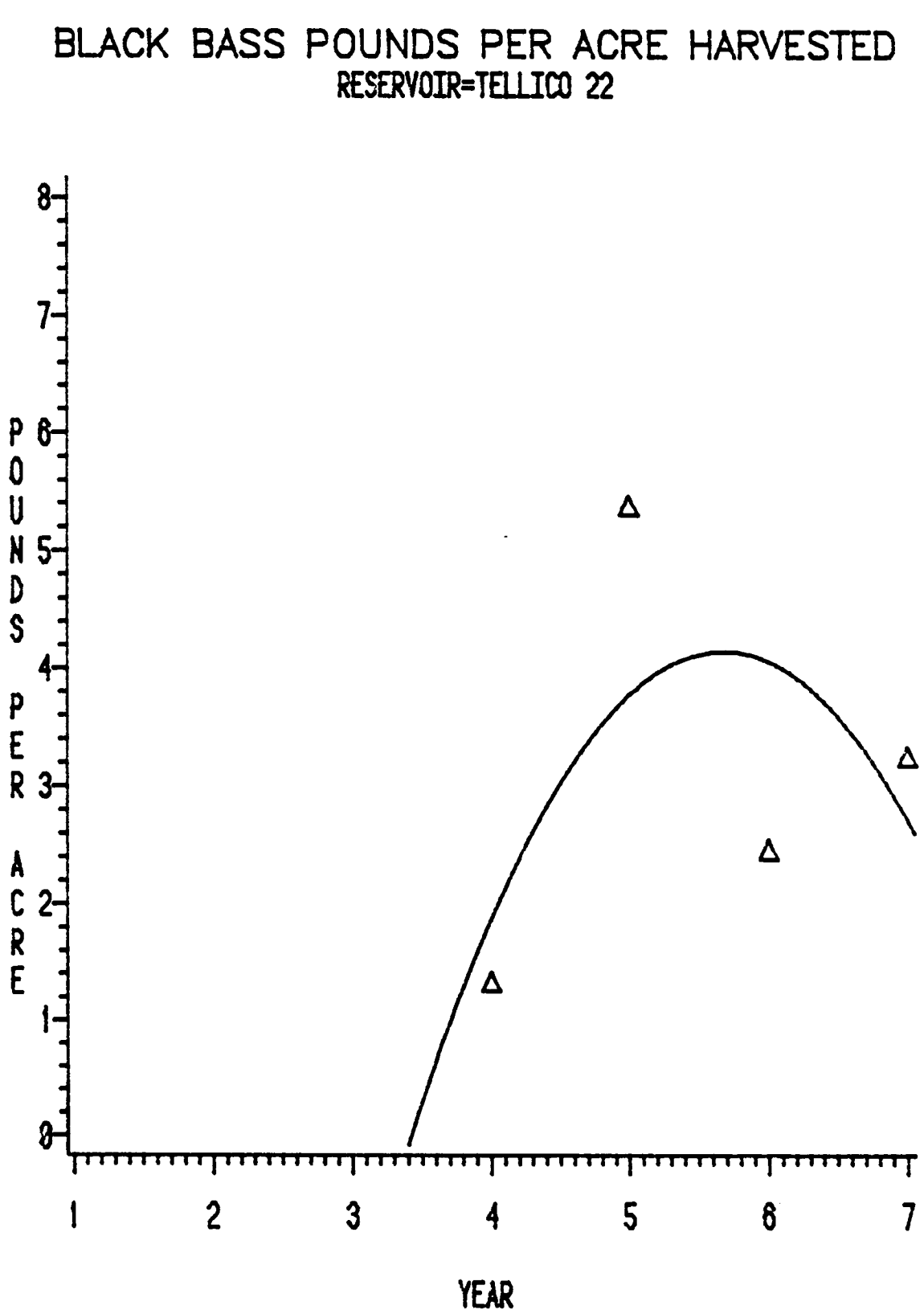


Figure E.4 (continued)

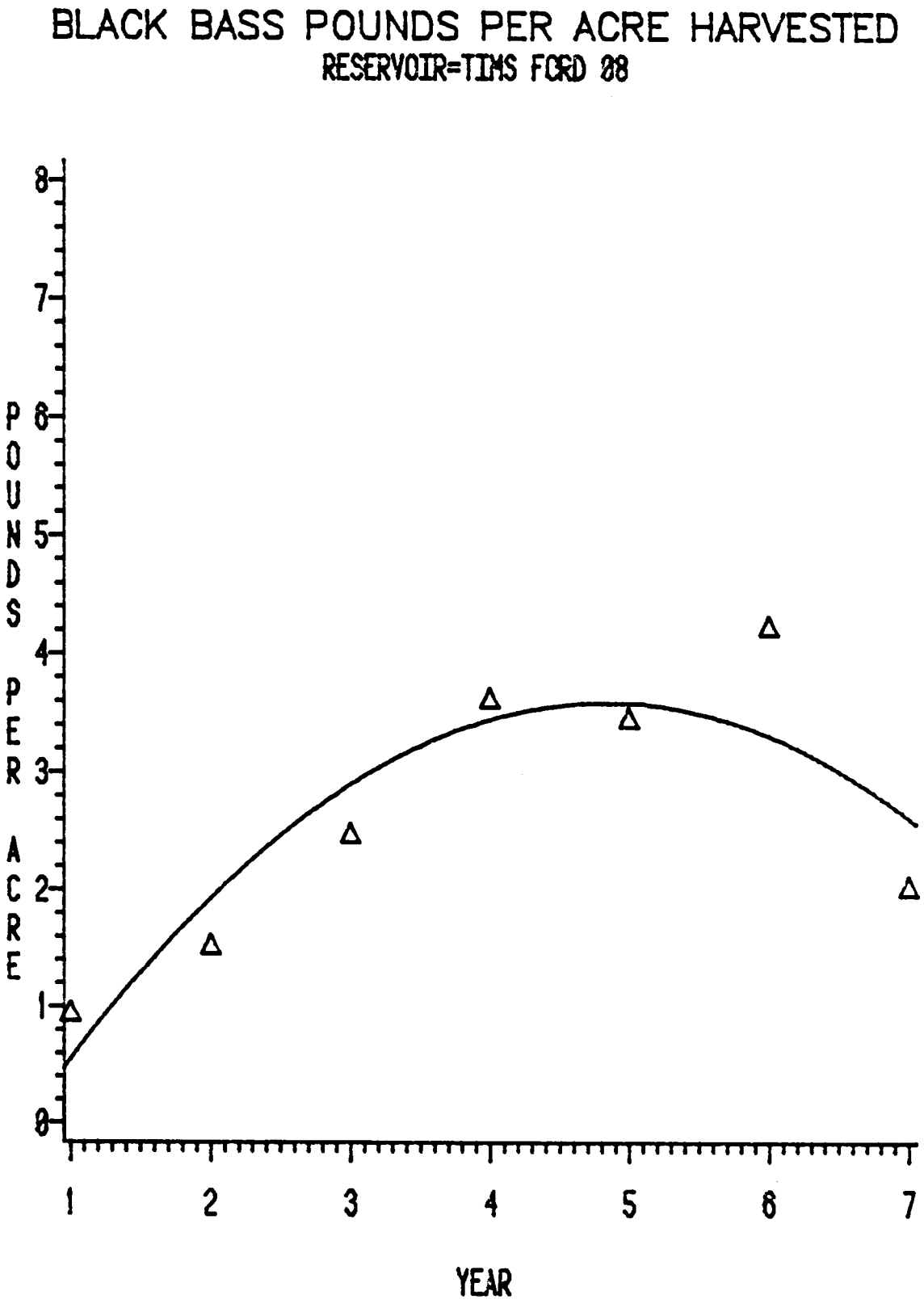


Figure E.4 (continued)

APPENDIX F

CATFISH HARVESTED IN POUNDS PER ACRE IN GROUPS OF RESERVOIRS WITH SIMILAR HARVESTS DURING THE SEVEN-YEAR PERIOD, 1977-1983. THE GROUPS ARE AS FOLLOWS: GROUP 1 = LOW HARVESTS, GROUP 2 = INTERMEDIATE LOW HARVESTS, GROUP 3 = INTERMEDIATE HIGH HARVESTS, AND GROUP 4 = HIGH HARVESTS

Figure F.1. Catfish harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with low harvests were classified in Group 1: Boone, Melton Hill, Normandy, Norris, Reelfoot, South Holston, Tellico, and Watauga. The yearly codes 1-7 represent individual years from 1977-1983.

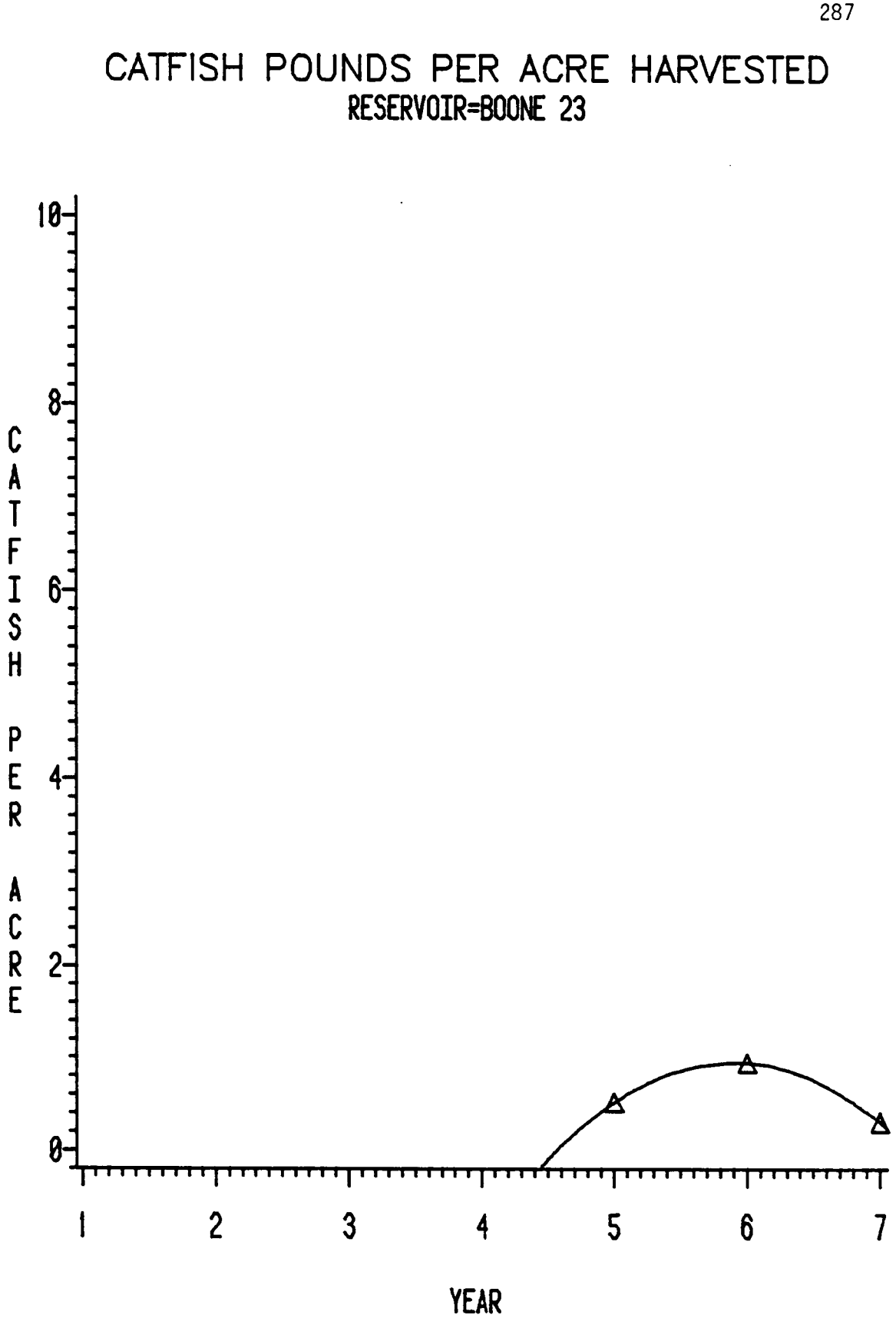

CATFISH POUNDS PER ACRE HARVESTED
RESERVOIR=BOONE 23
CATFISH PER ACRE
10
8
6
4
2
0
1
2
3
4
5
6
7
YEAR

Figure F.1

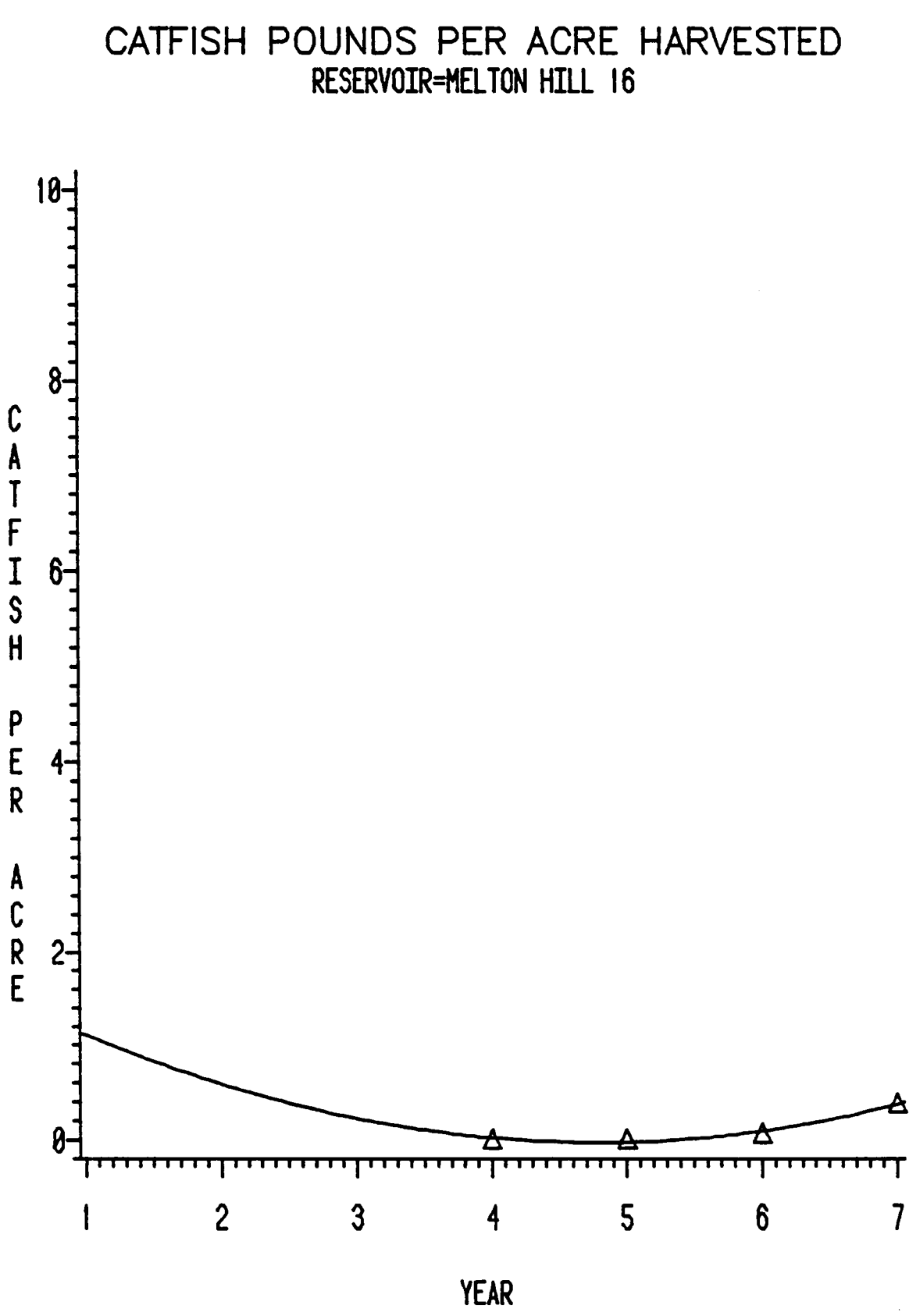


Figure F.1 (continued)

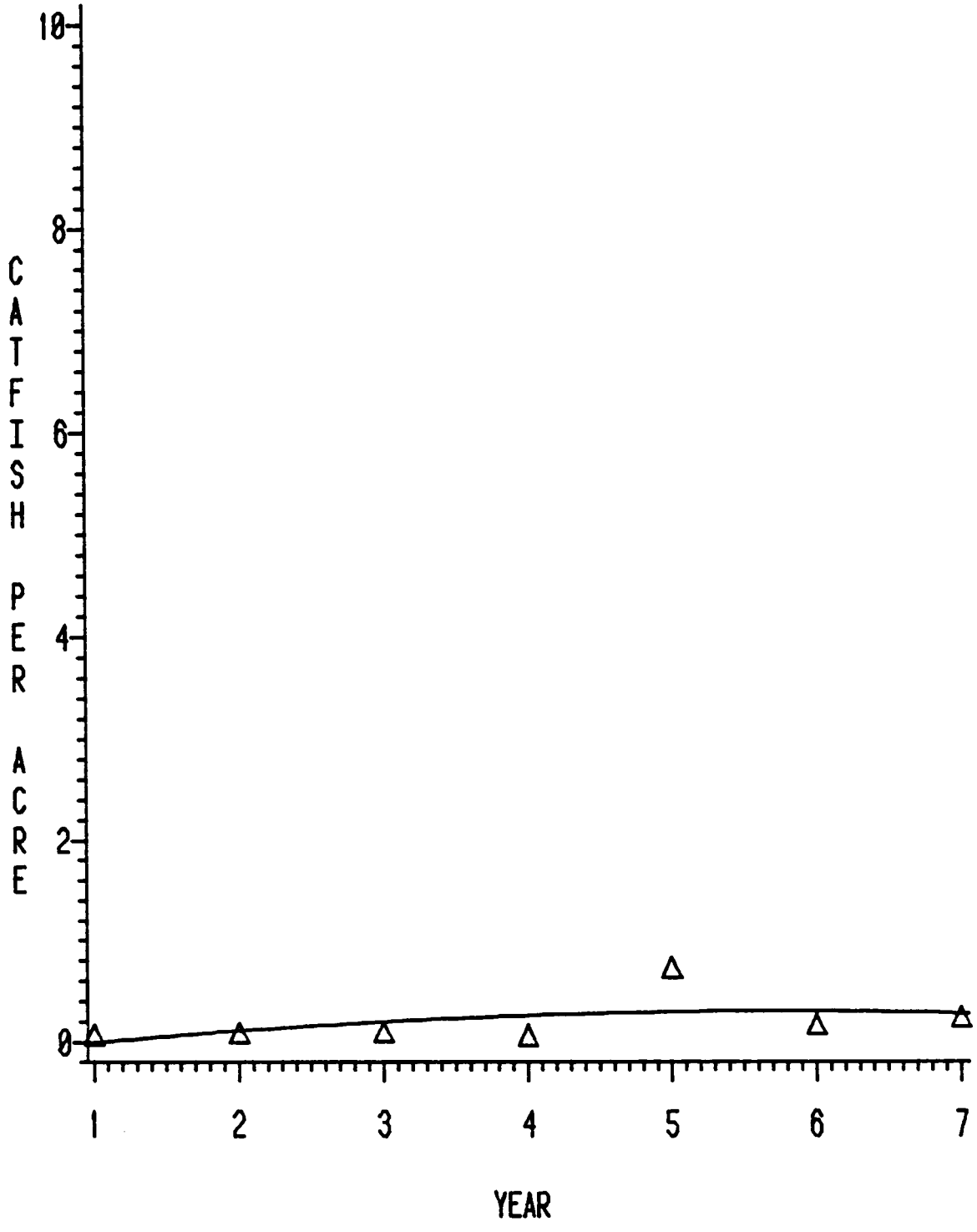


Figure F.1 (continued)

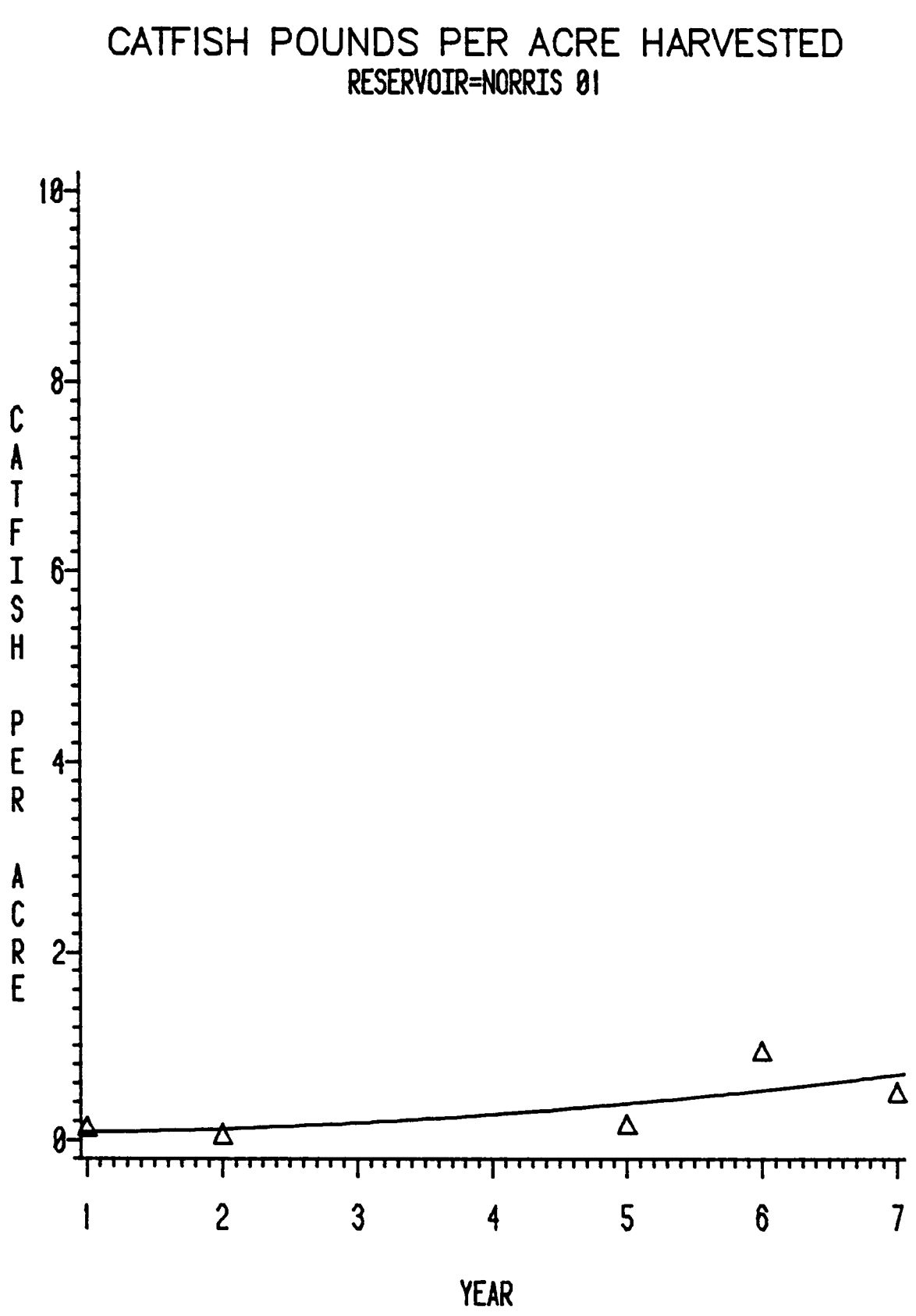


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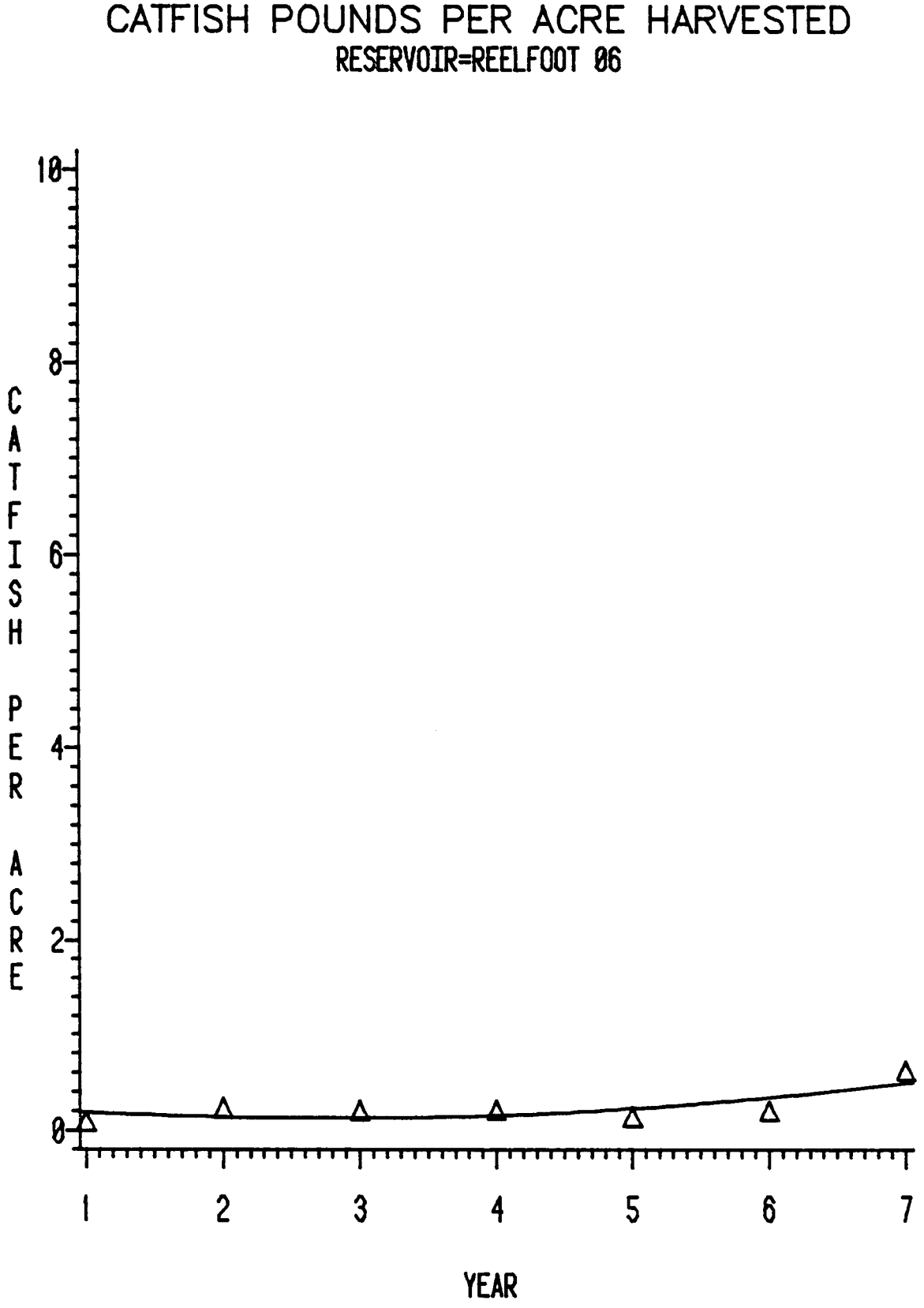


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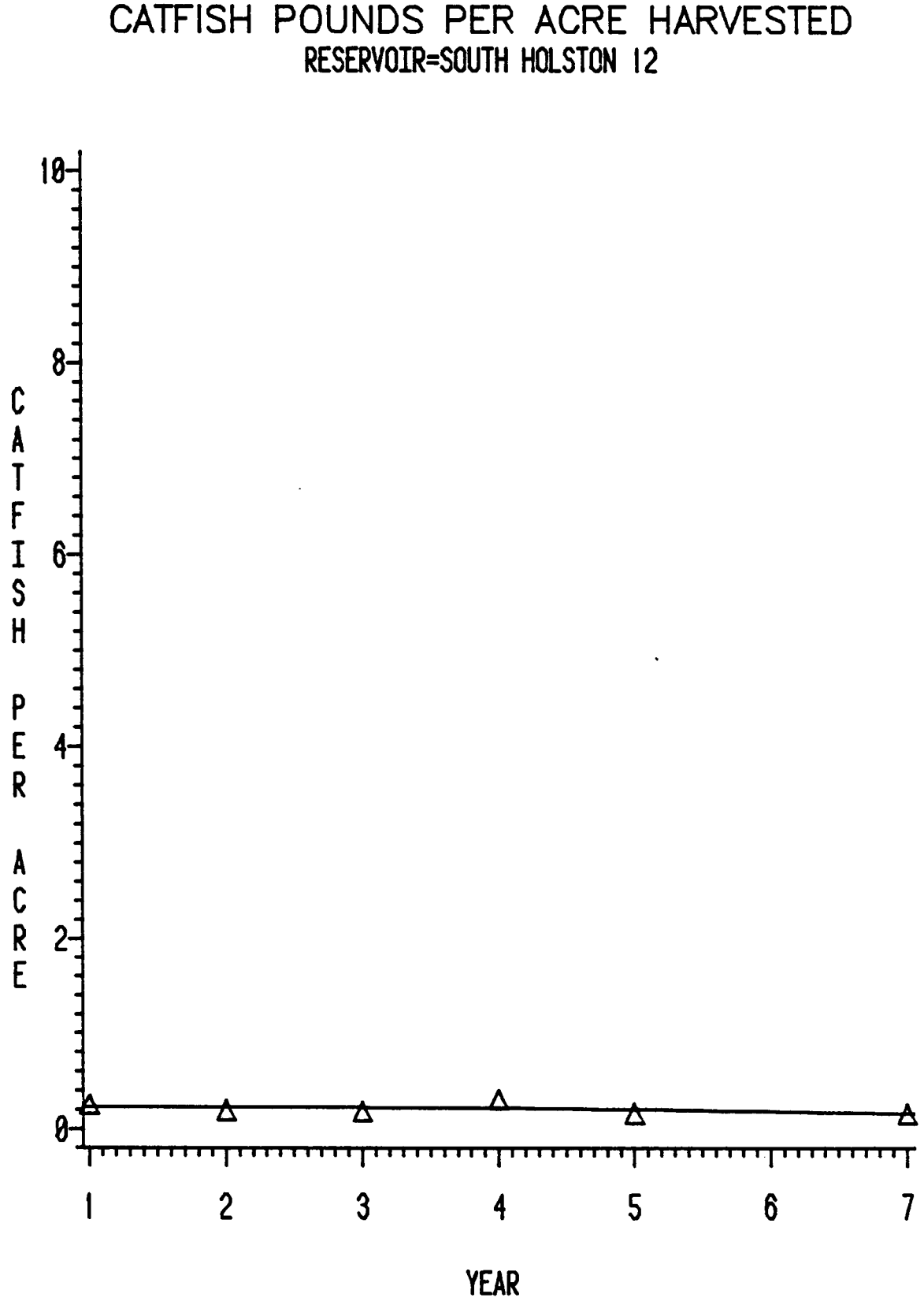


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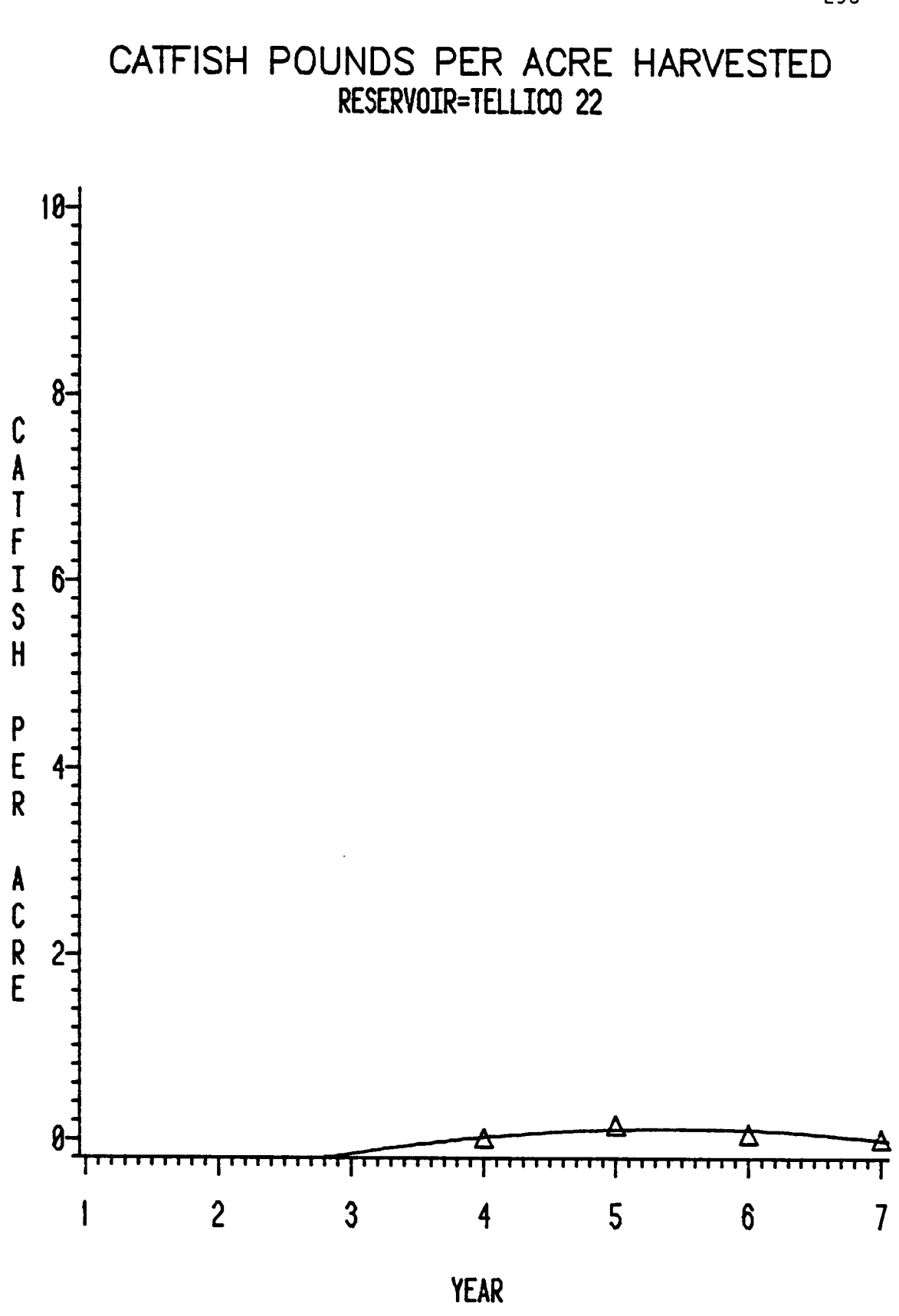


Figure F.1 (continued)

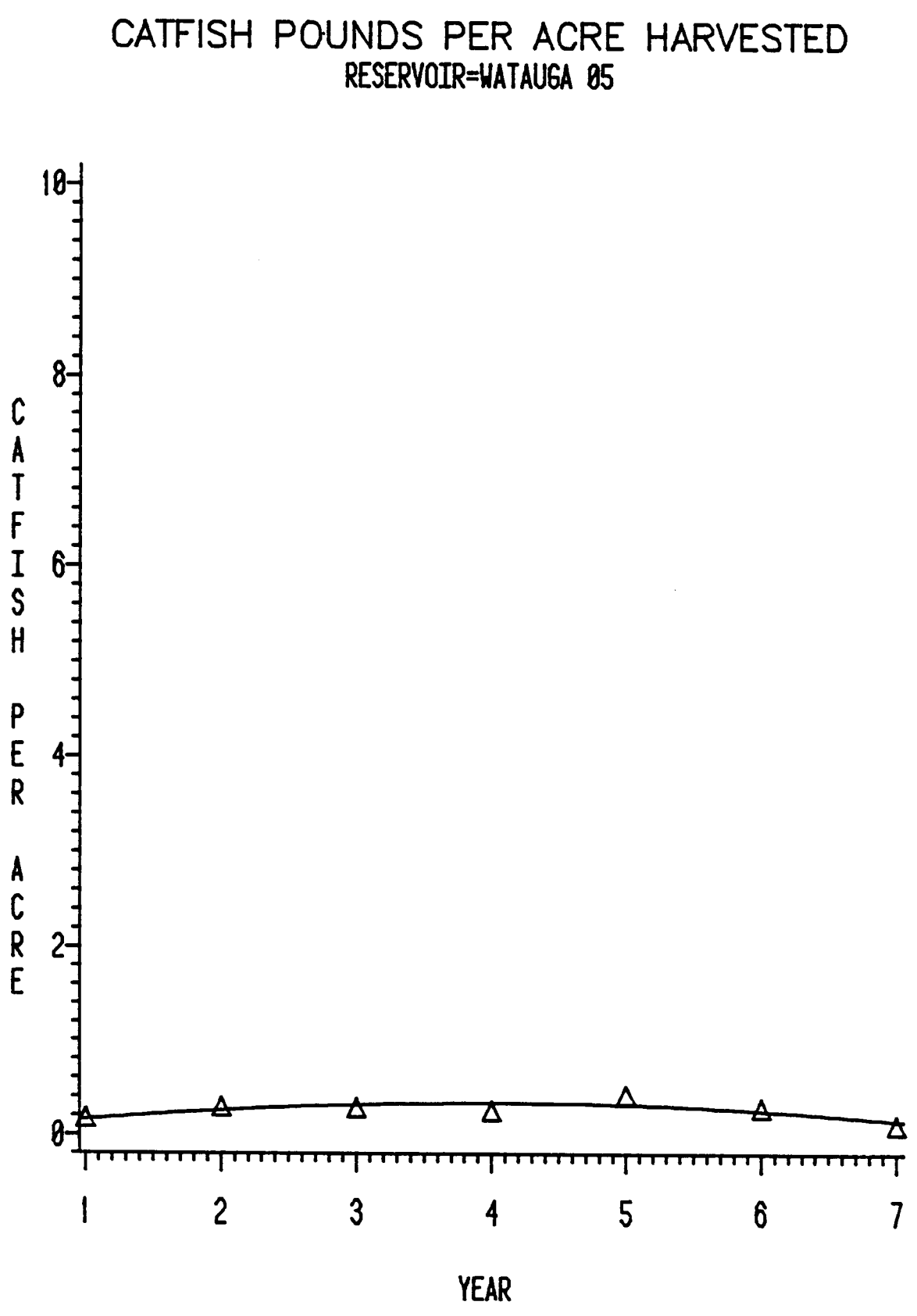


Figure F.1 (continued)

Figure F.2. Catfish harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with intermediate low harvests were classified in Group 2: Cordell Hull, Douglas, J. Percy Priest, Old Hickory, and Tims Ford. The yearly codes 1-7 represent individual years from 1977-1983.

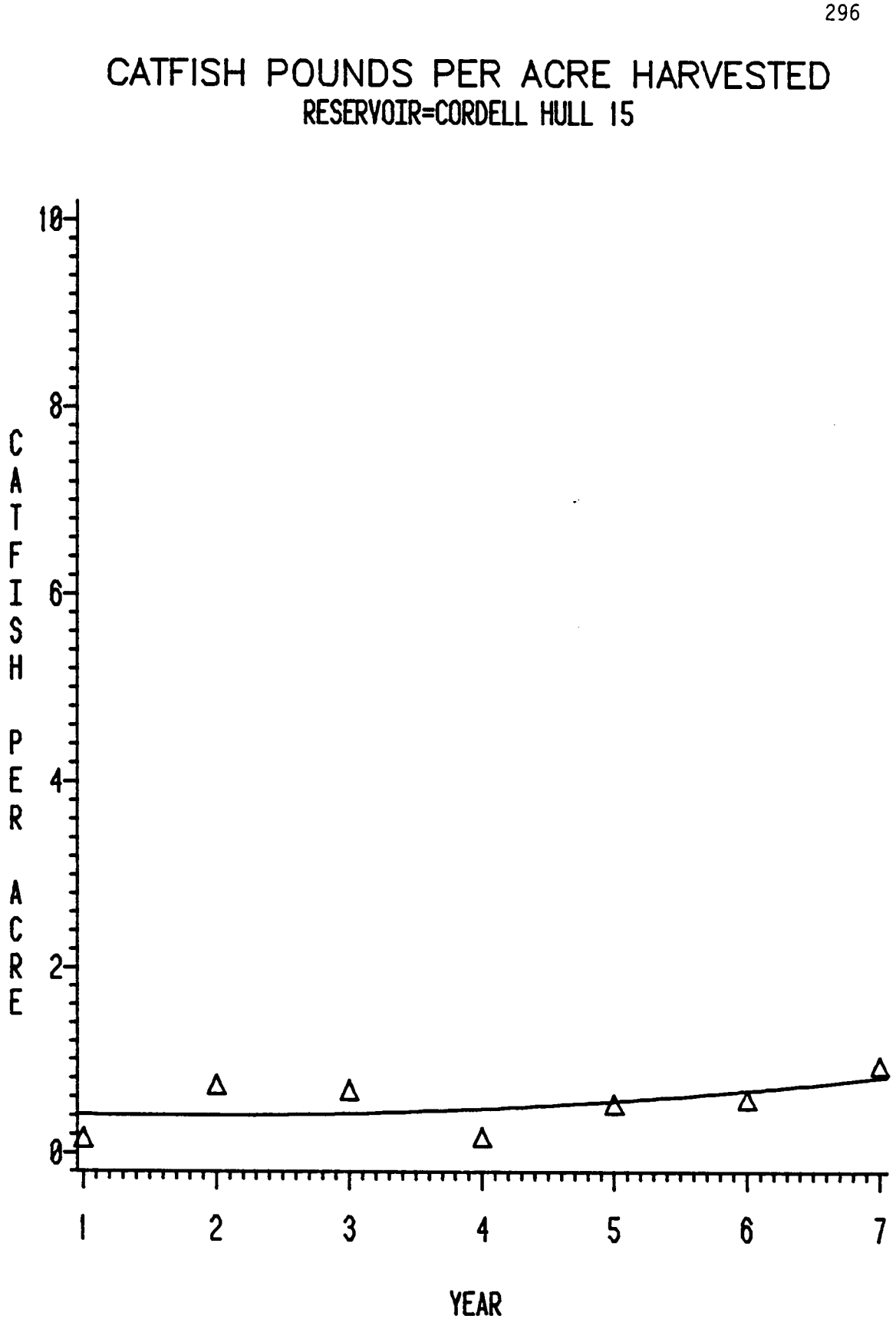

CATFISH POUNDS PER ACRE HARVESTED
RESERVOIR=CORDELL HULL 15
CATFISH PER ACRE
10
8
6
4
2
0
1
2
3
4
5
6
7
YEAR

Figure F.2

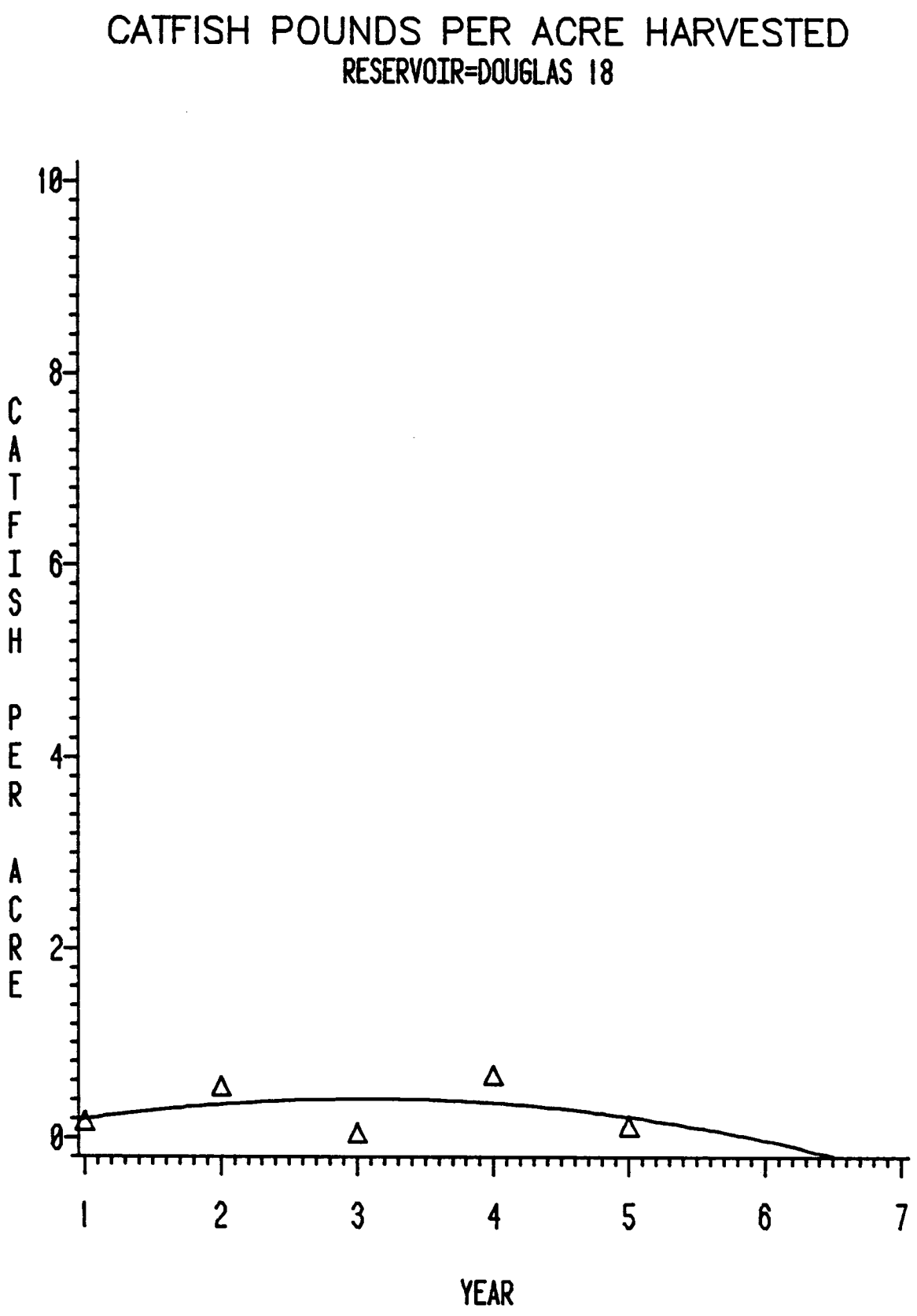


Figure F.2 (continued)

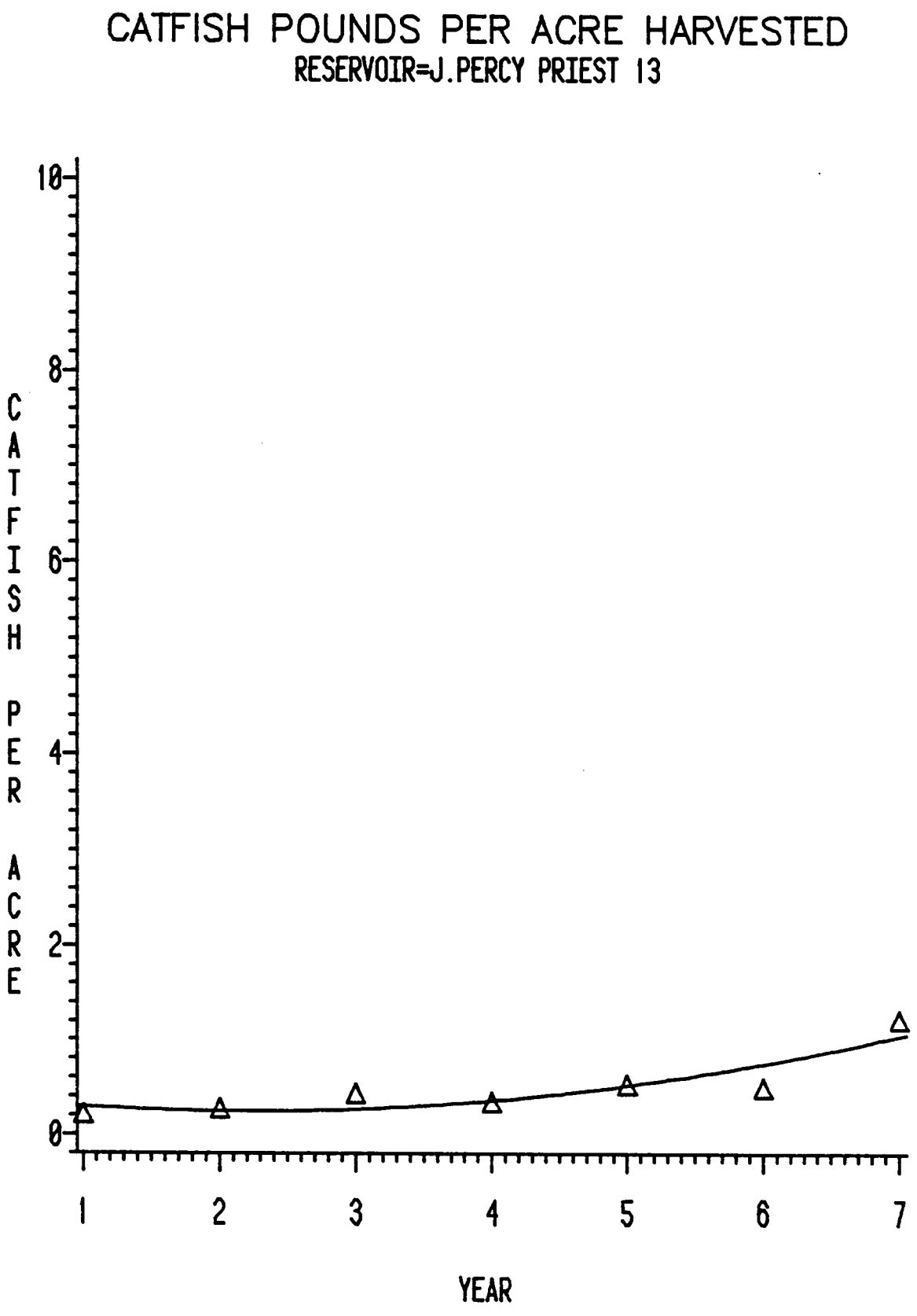


Figure F.2 (continued)

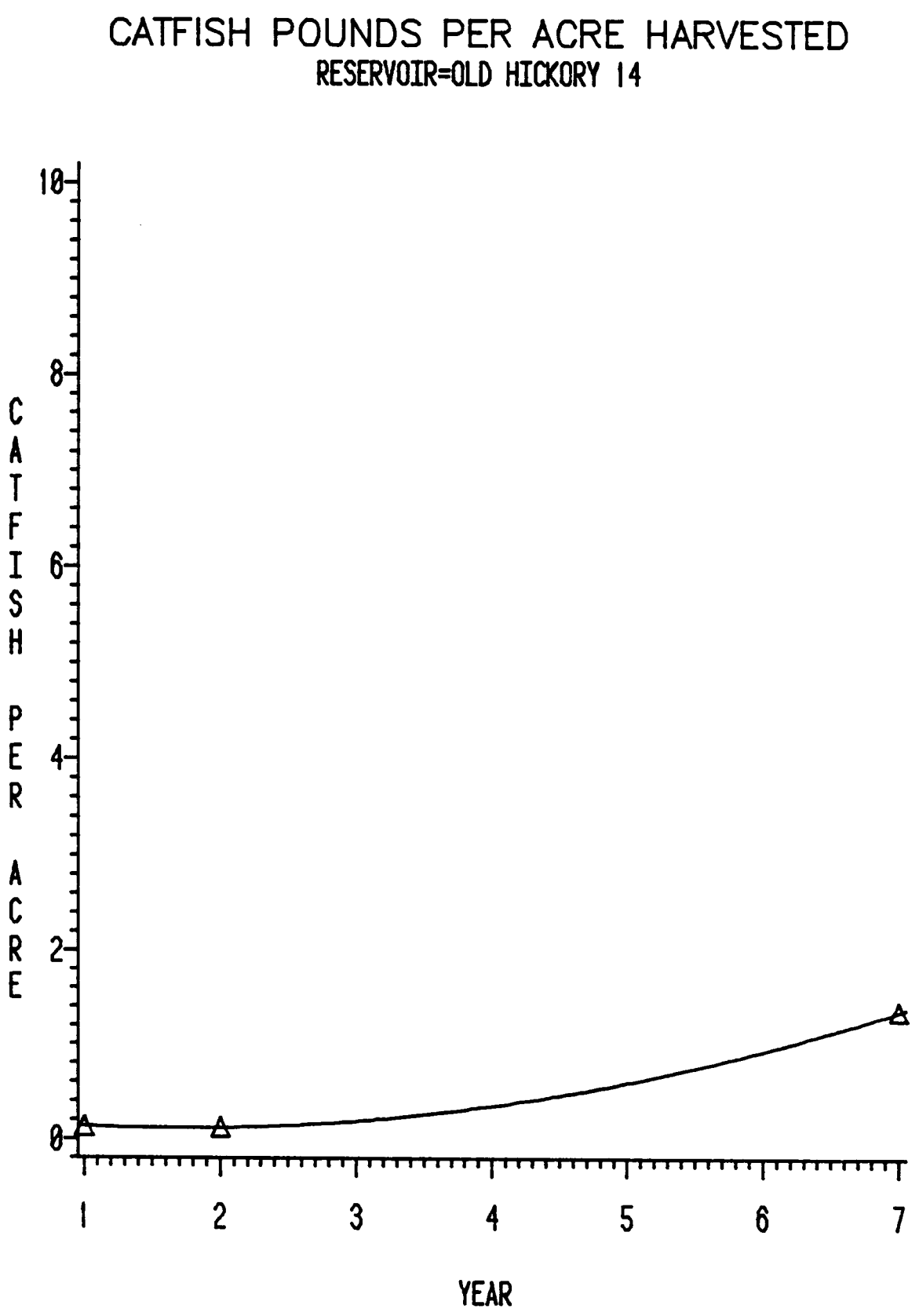


Figure F.2 (continued)

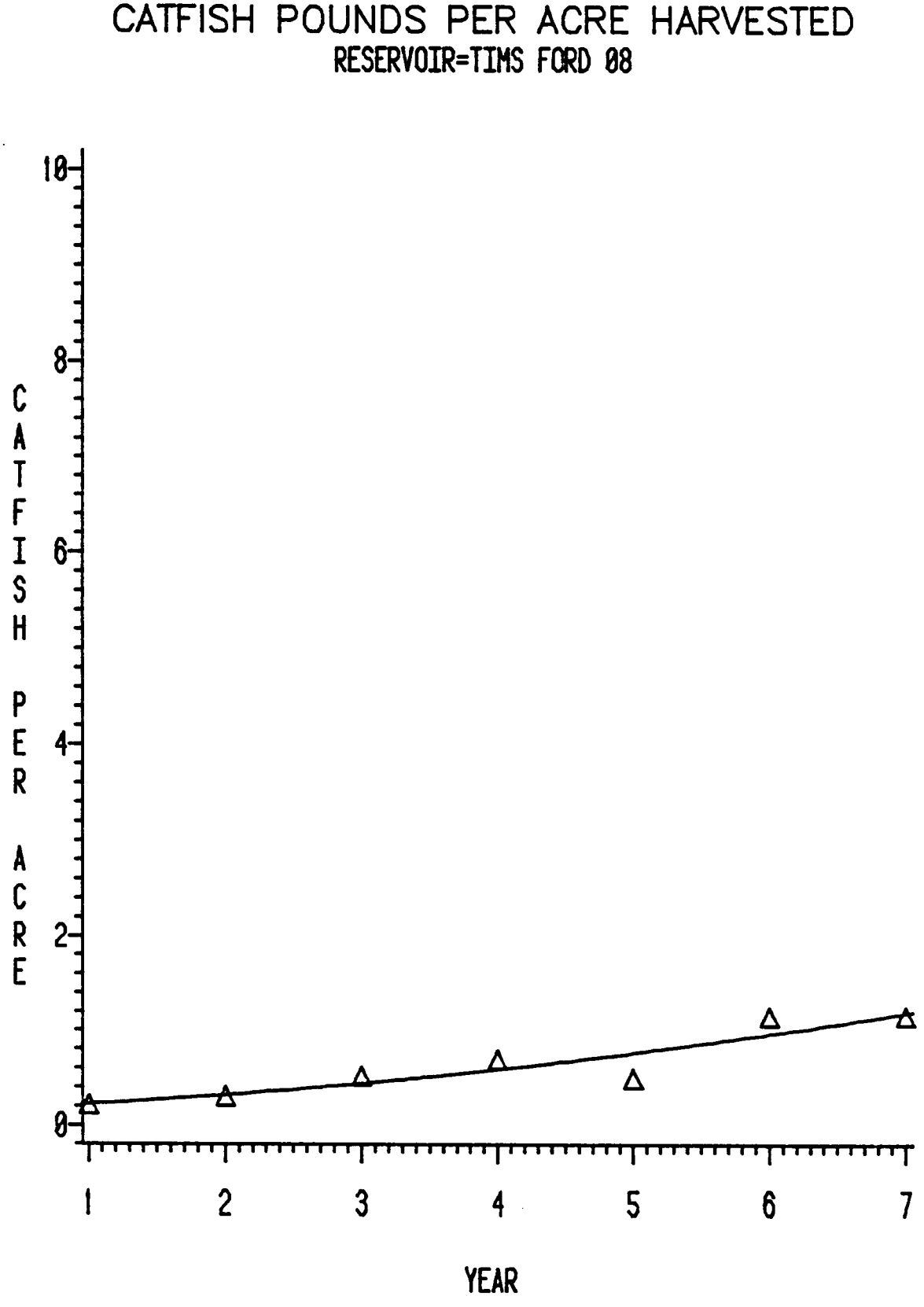


Figure F.2 (continued)

Figure F.3. Catfish harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with intermediate high harvests were classified in Group 3: Center Hill, Cherokee, Chickamauga, Fort Loudoun, Nickajack, and Watts Bar. The yearly codes 1-7 represent individual years from 1977-1983.

CATFISH POUNDS PER ACRE HARVESTED
RESERVOIR=CENTER HILL 11

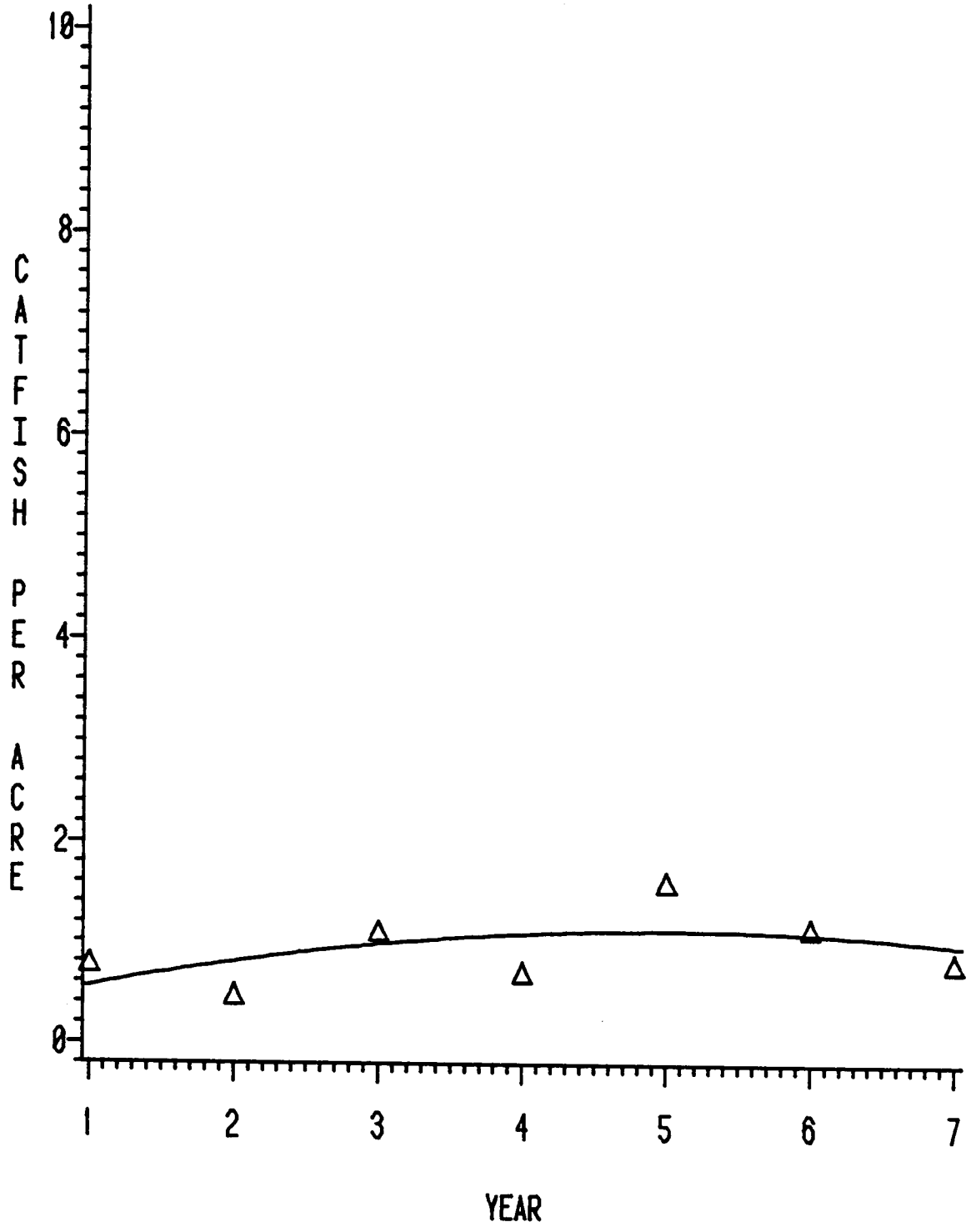


Figure F.3

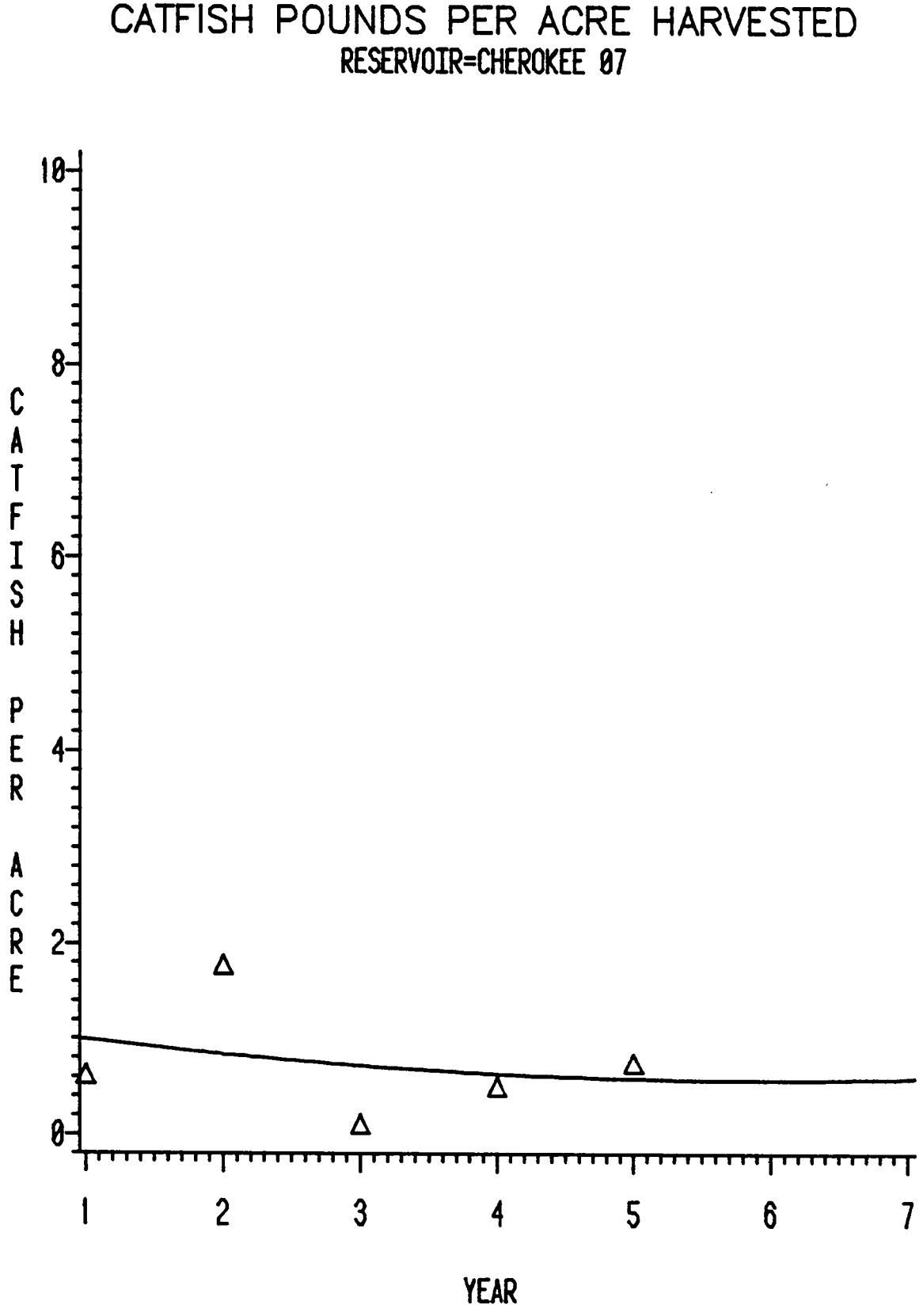


Figure F.3 (continued)

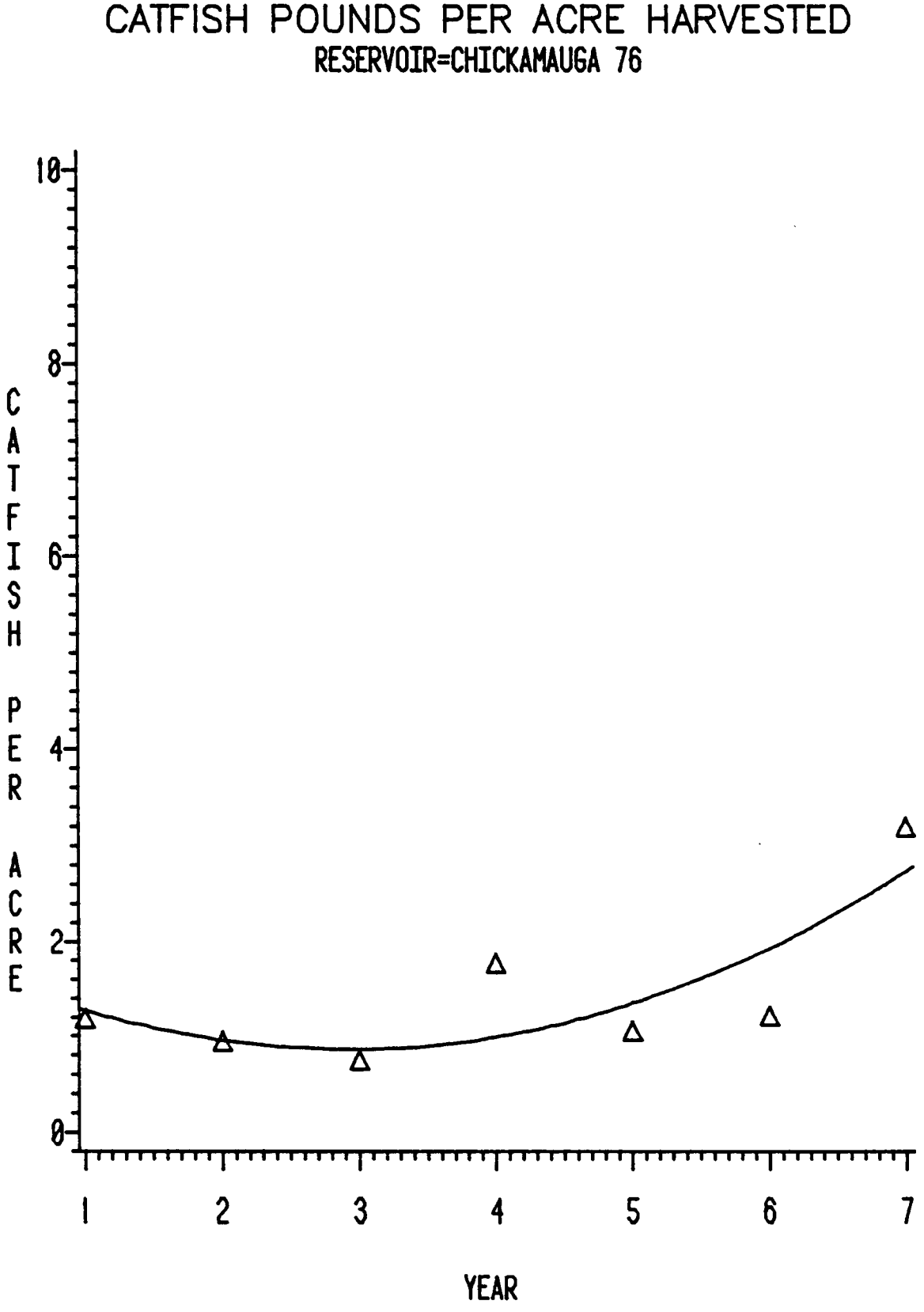


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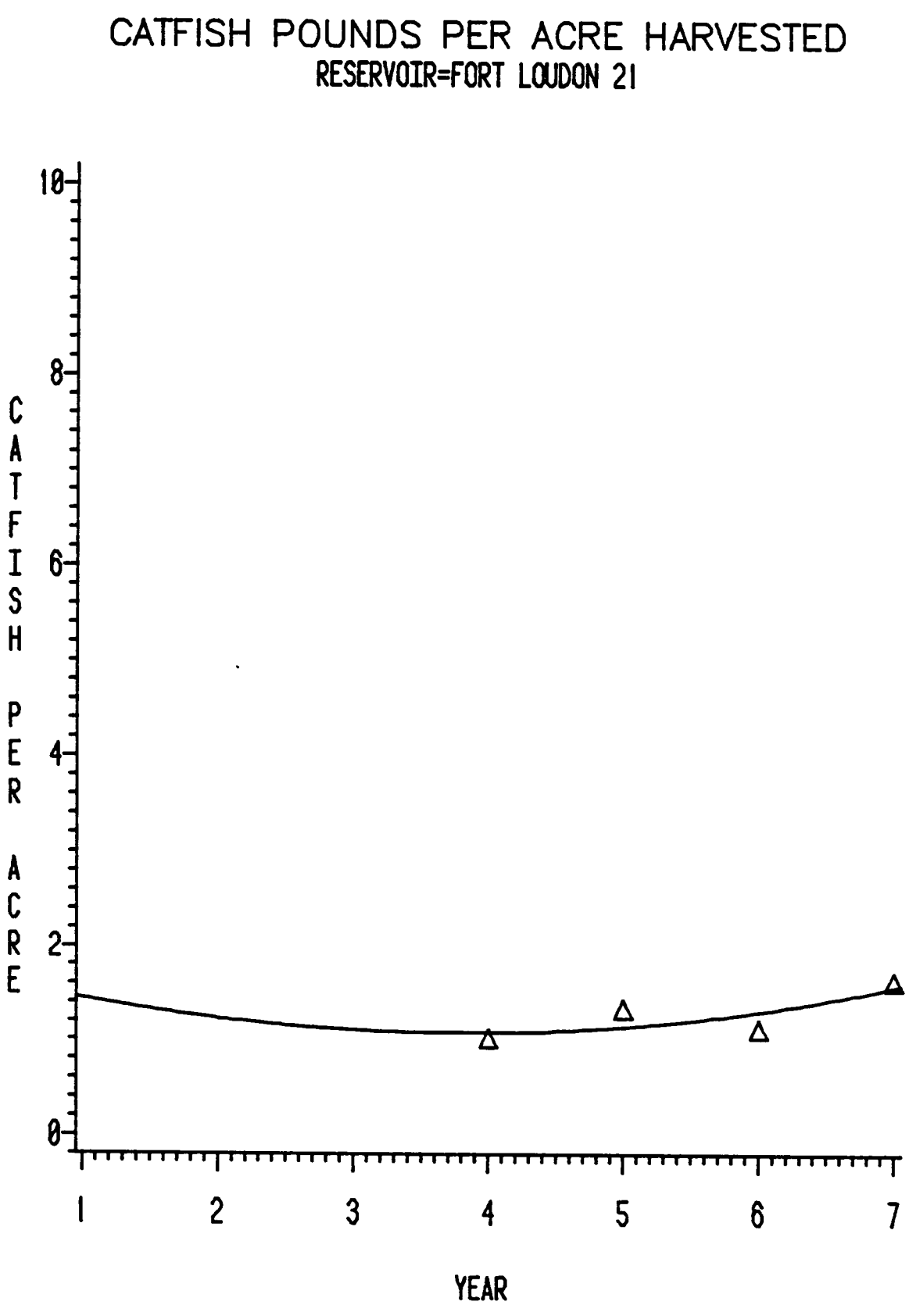


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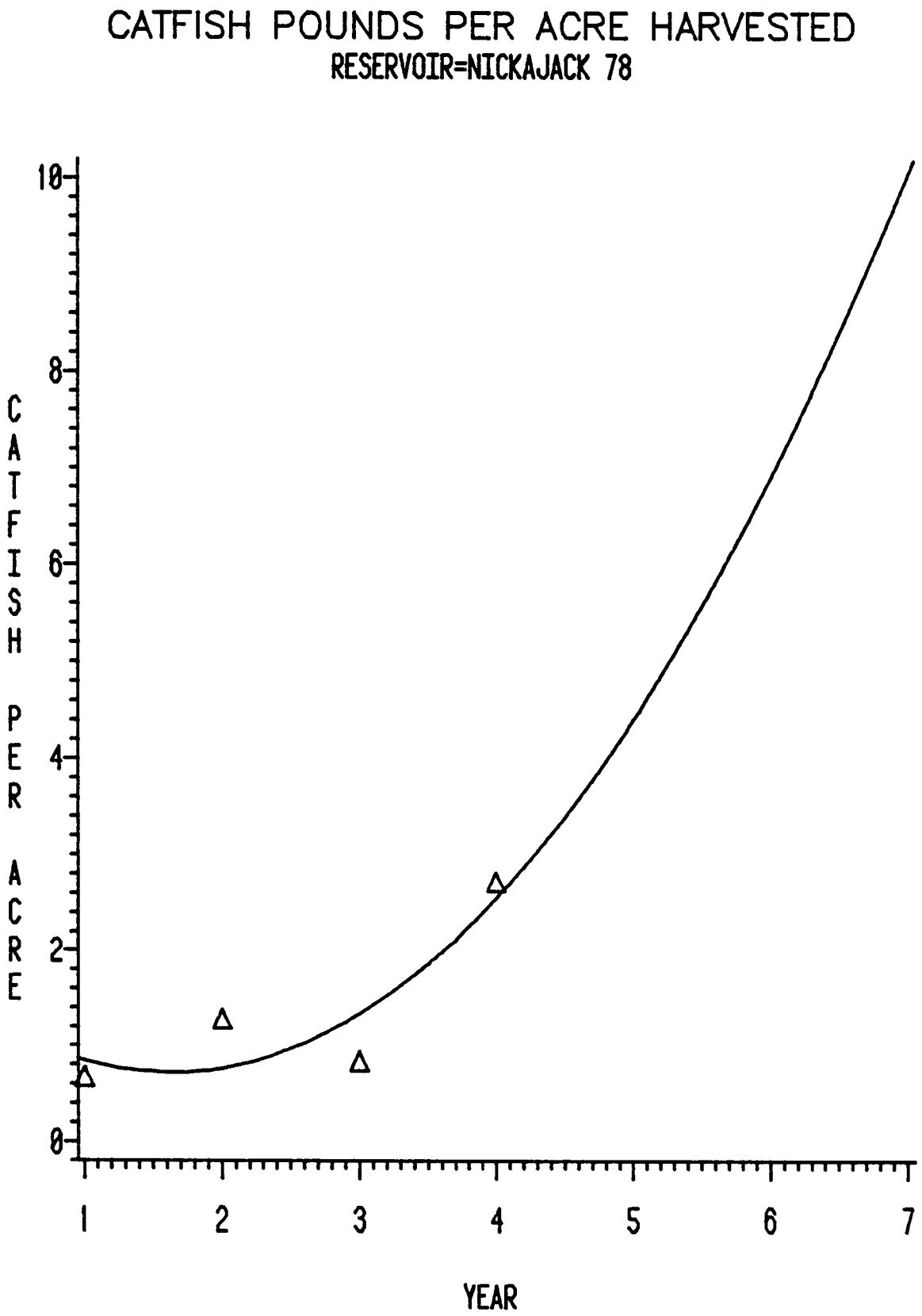


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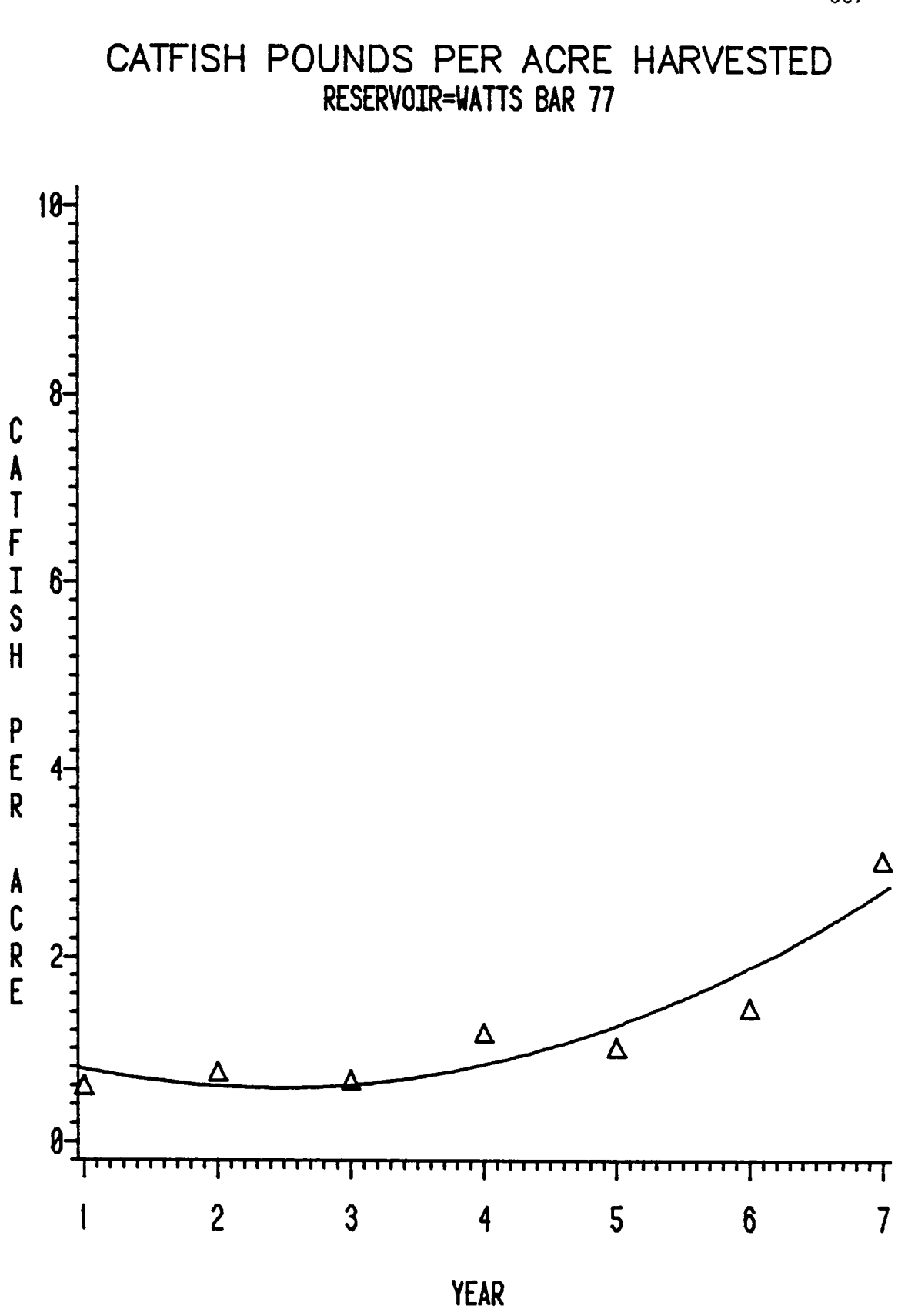


Figure F.3 (continued)

Figure F.4. Catfish harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with high harvests were classified in Group 4: Kentucky and Woods. The yearly codes 1-7 represent individual years from 1977-1983.

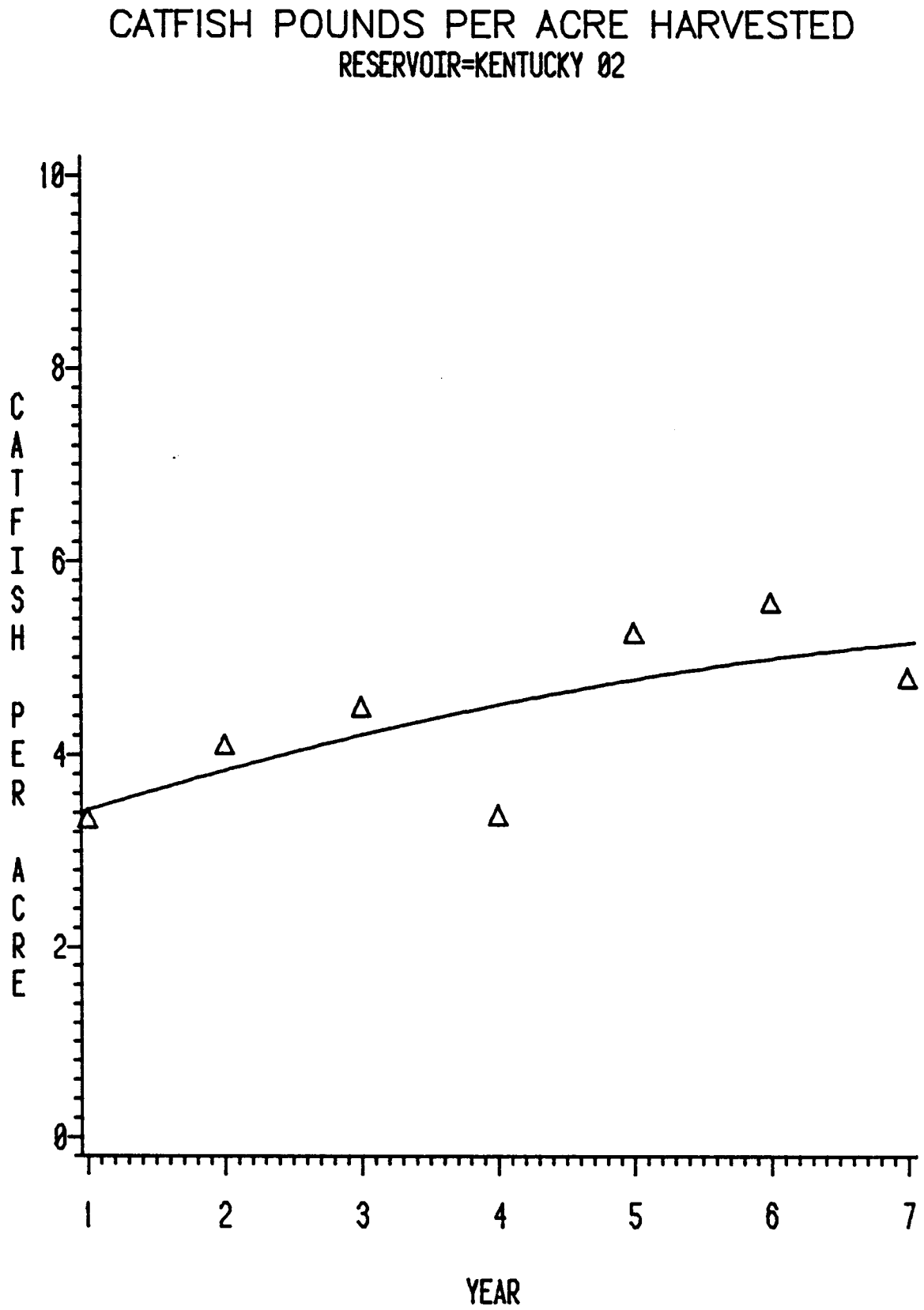

CATFISH POUNDS PER ACRE HARVESTED
RESERVOIR=KENTUCKY 02
CATFISH PER ACRE
10
8
6
4
2
0
1
2
3
4
5
6
7
YEAR

Figure F.4

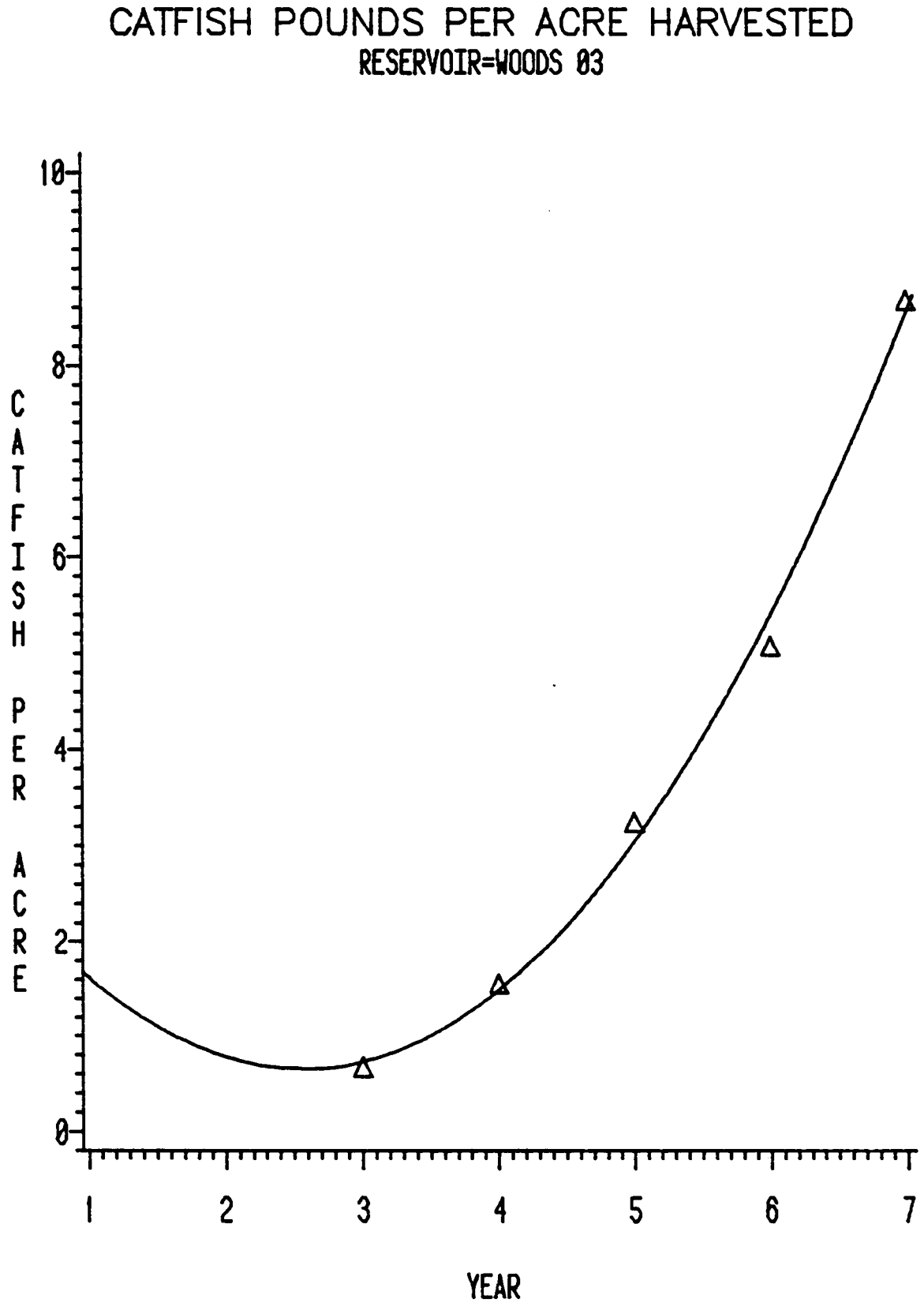


Figure F.4 (continued)

APPENDIX G

SUNFISH HARVESTED IN POUNDS PER ACRE IN GROUPS OF RESERVOIRS WITH SIMILAR HARVESTS DURING THE SEVEN-YEAR PERIOD, 1977-1983. THE GROUPS ARE AS FOLLOWS: GROUP 1 = LOW HARVESTS, GROUP 2 = INTERMEDIATE LOW HARVESTS, GROUP 3 = INTERMEDIATE HIGH HARVESTS, AND GROUP 4 = HIGH HARVESTS

Figure G.1. Sunfish harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with low harvests were classified in Group 1: J. Percy Priest and Woods. The yearly codes 1-7 represent individual years from 1977-1983.

SUNFISH POUNDS PER ACRE HARVESTED

RESERVOIR=J.PERCY PRIEST 13

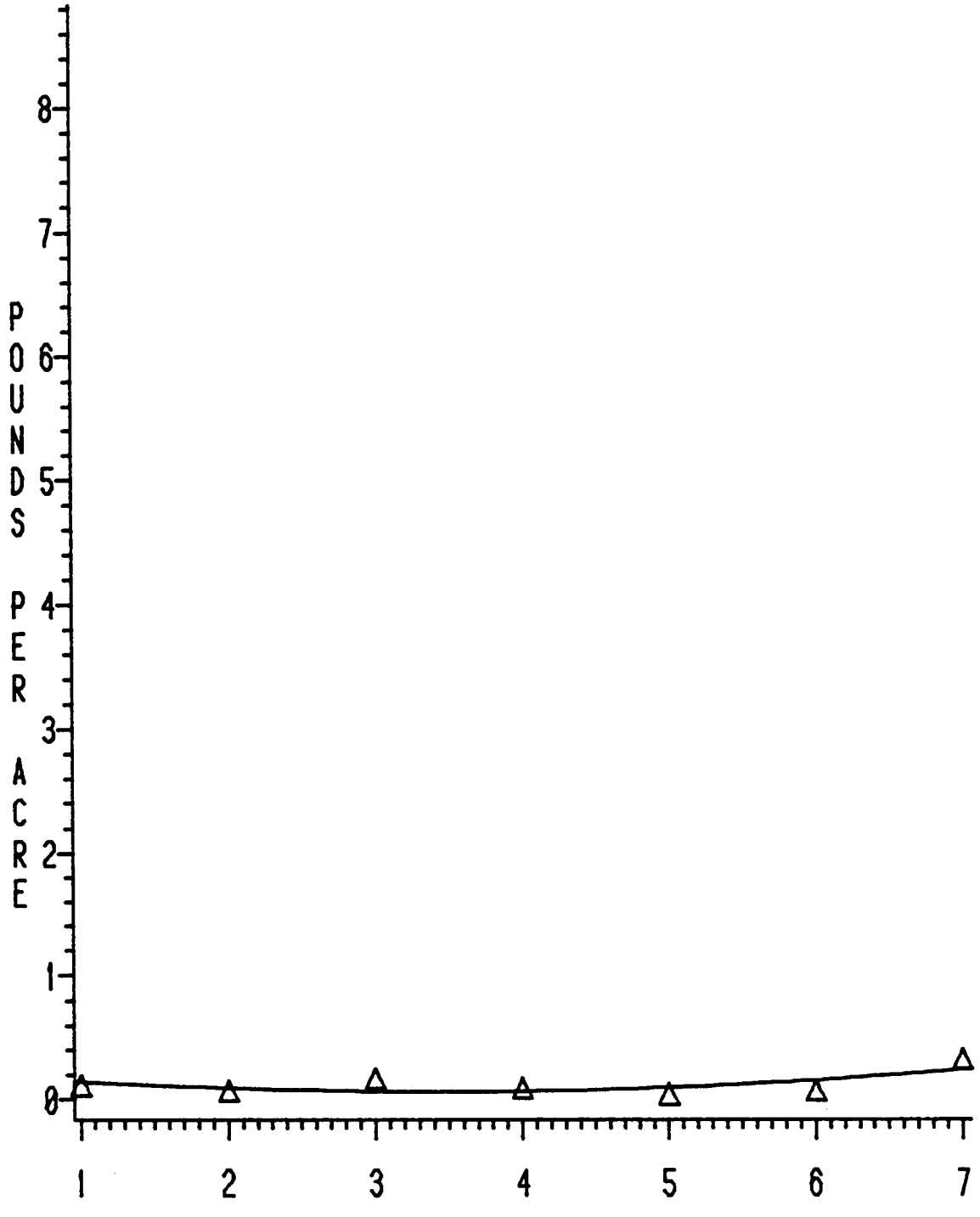


Figure G.1

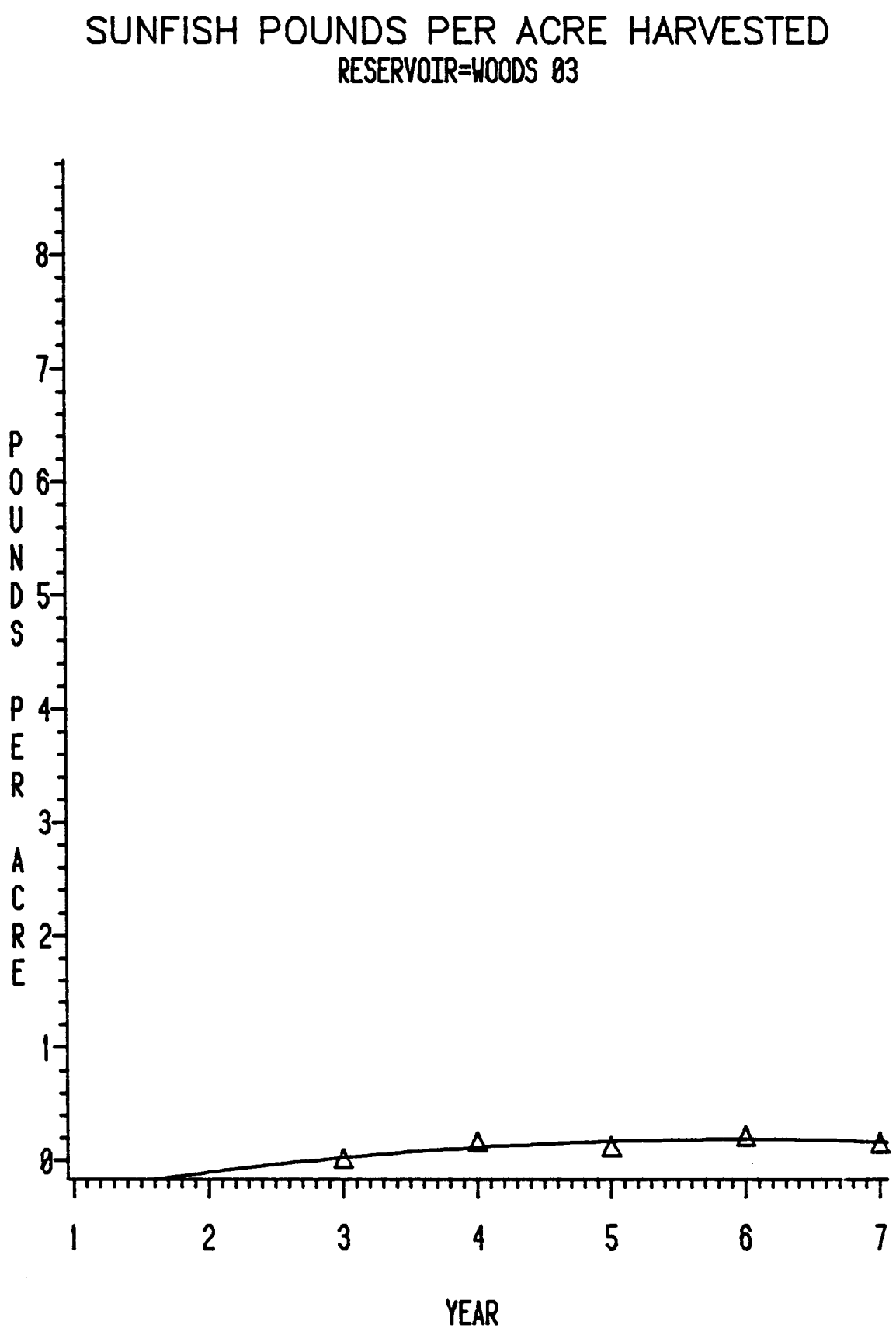


Figure G.1 (continued)

Figure G.2. Sunfish harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with intermediate low harvests were classified in Group 2: Cherokee, Chickamauga, Cordell Hull, Douglas, Norris, Old Hickory, South Holston, Tims Ford, Watauga, and Watts Bar. The yearly codes 1-7 represent individual years from 1977-1983.

SUNFISH POUNDS PER ACRE HARVESTED

RESERVOIR=CHEROKEE 07

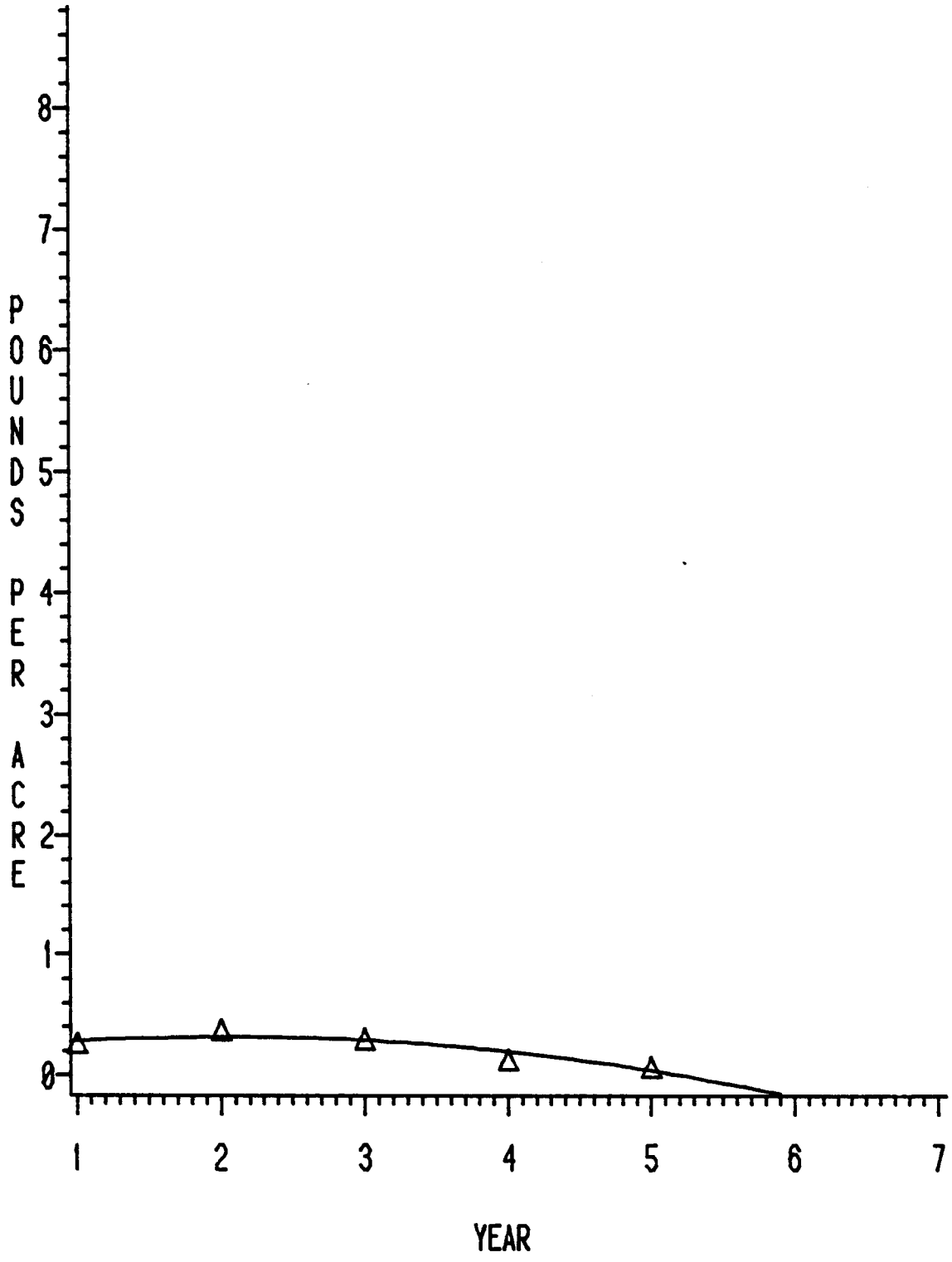


Figure G.2

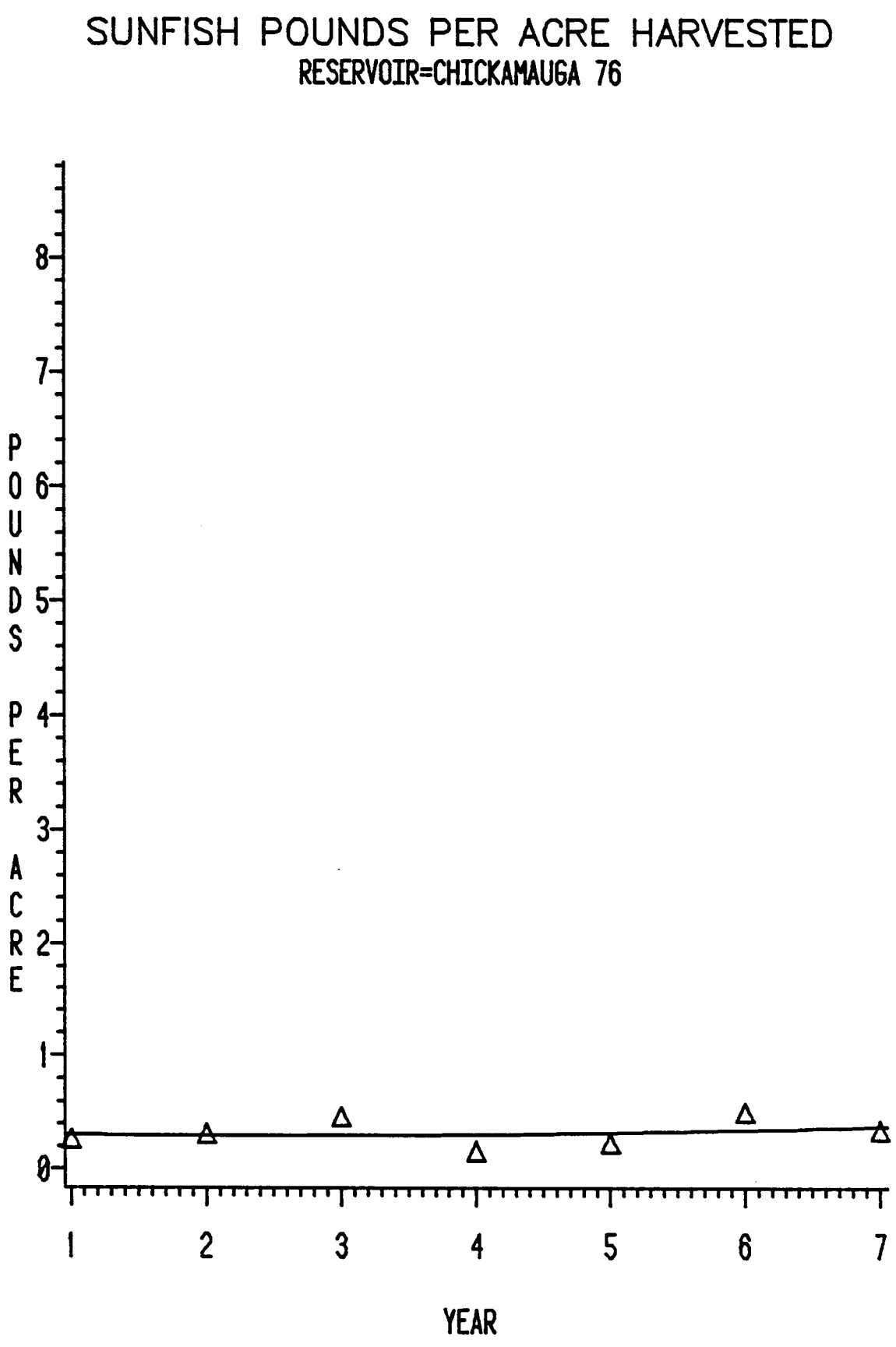


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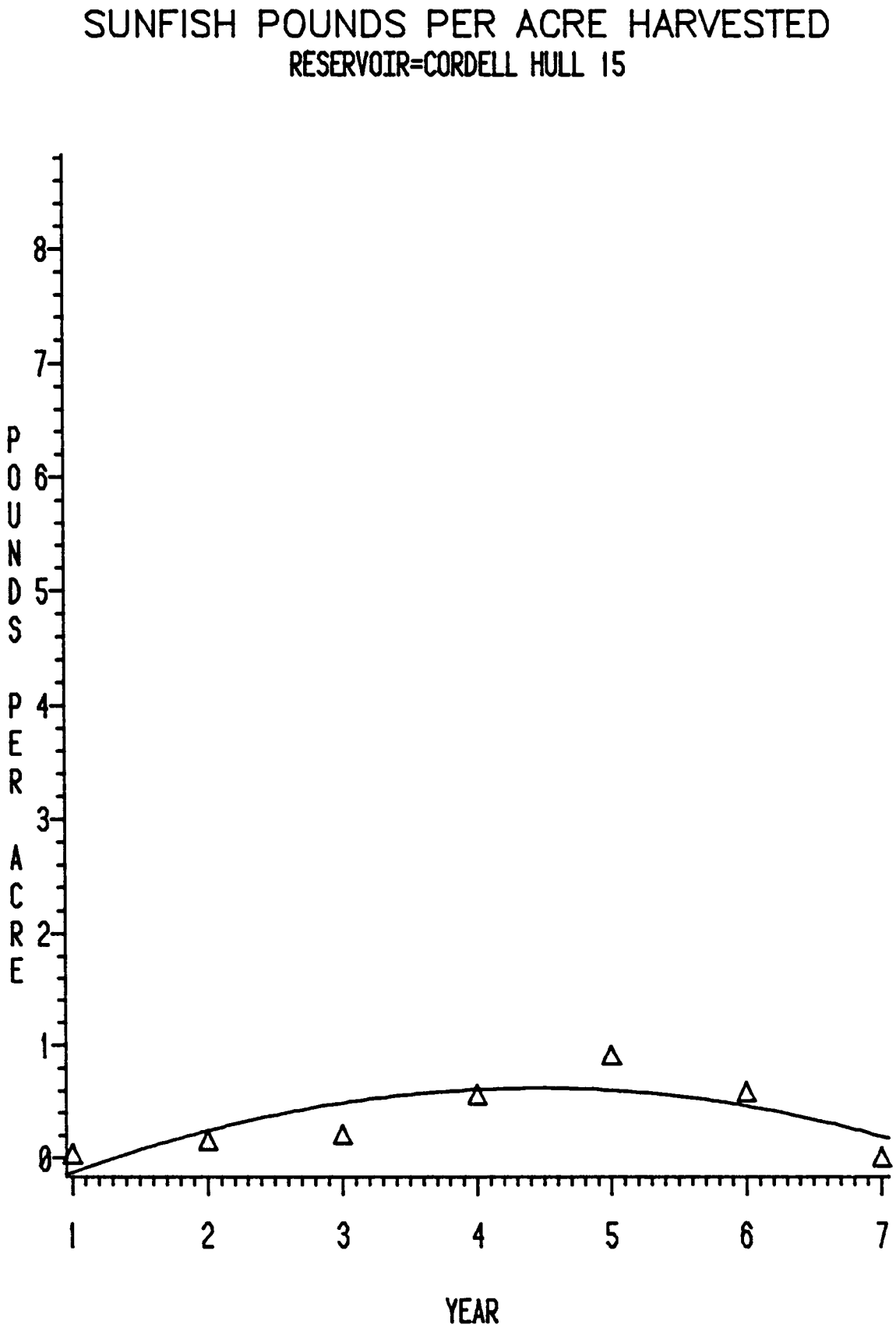


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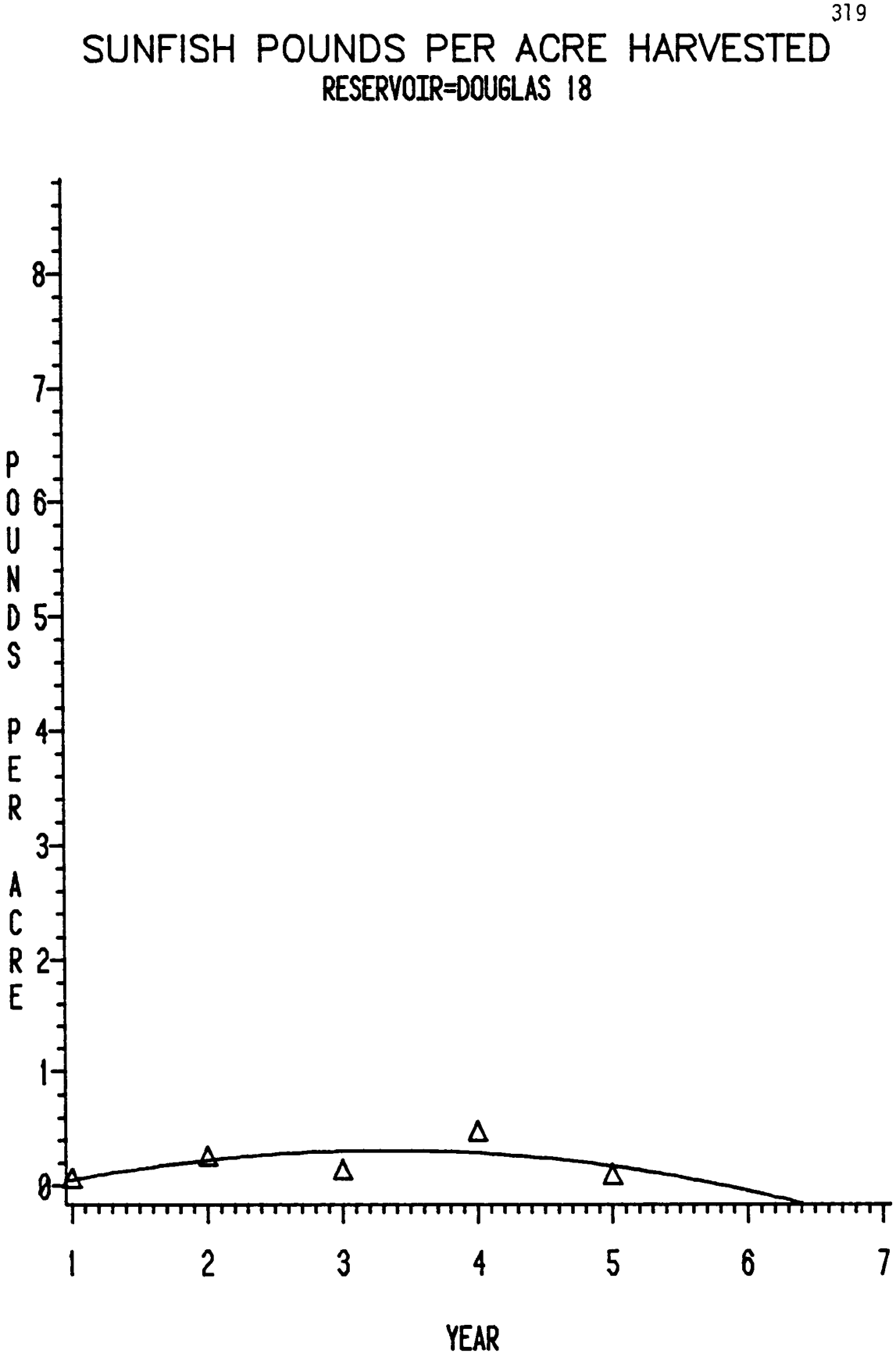


Figure G.2 (continued)

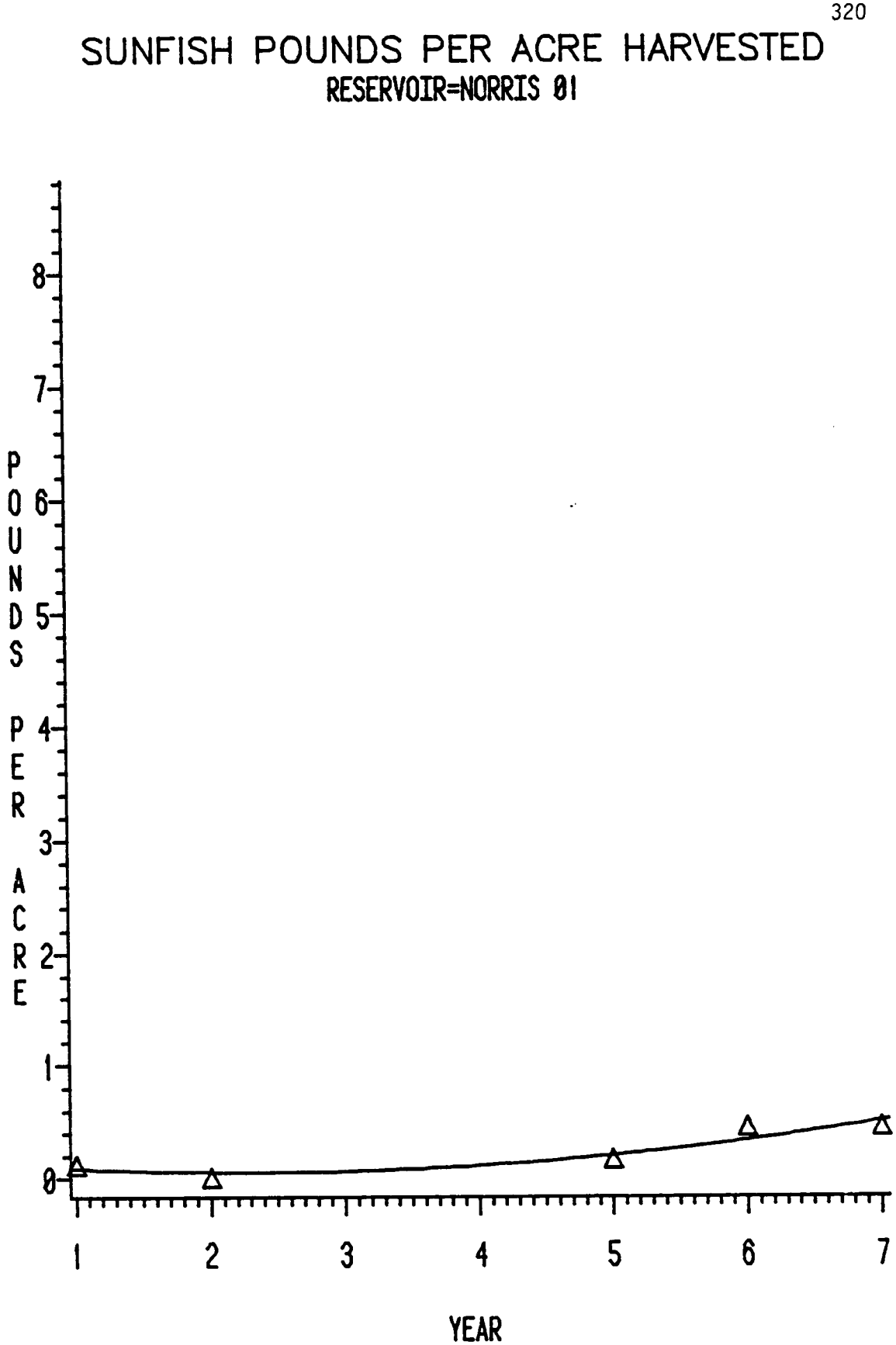


Figure G.2 (continued)

SUNFISH POUNDS PER ACRE HARVESTED

RESERVOIR=OLD HICKORY 14

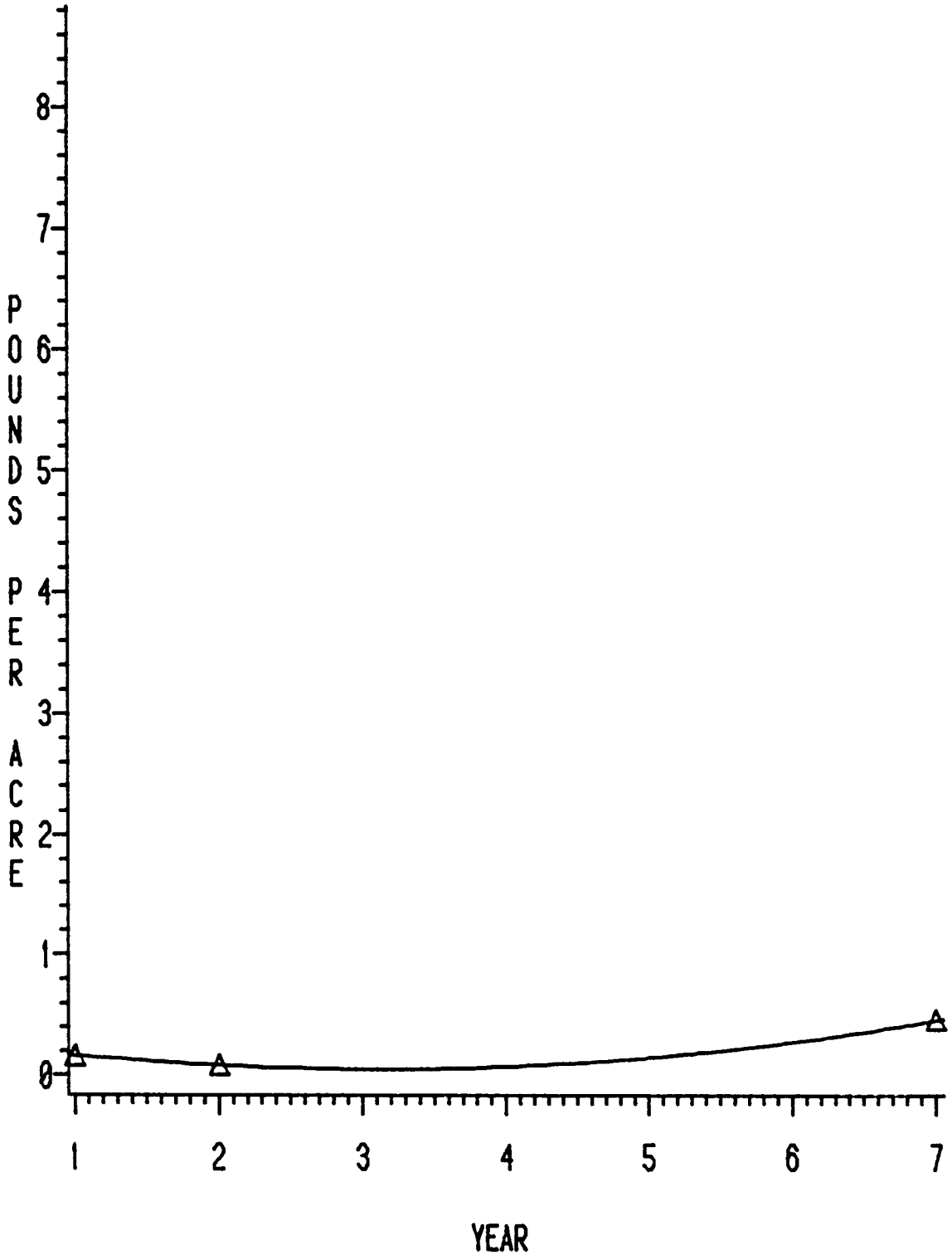


Figure G.2 (continued)

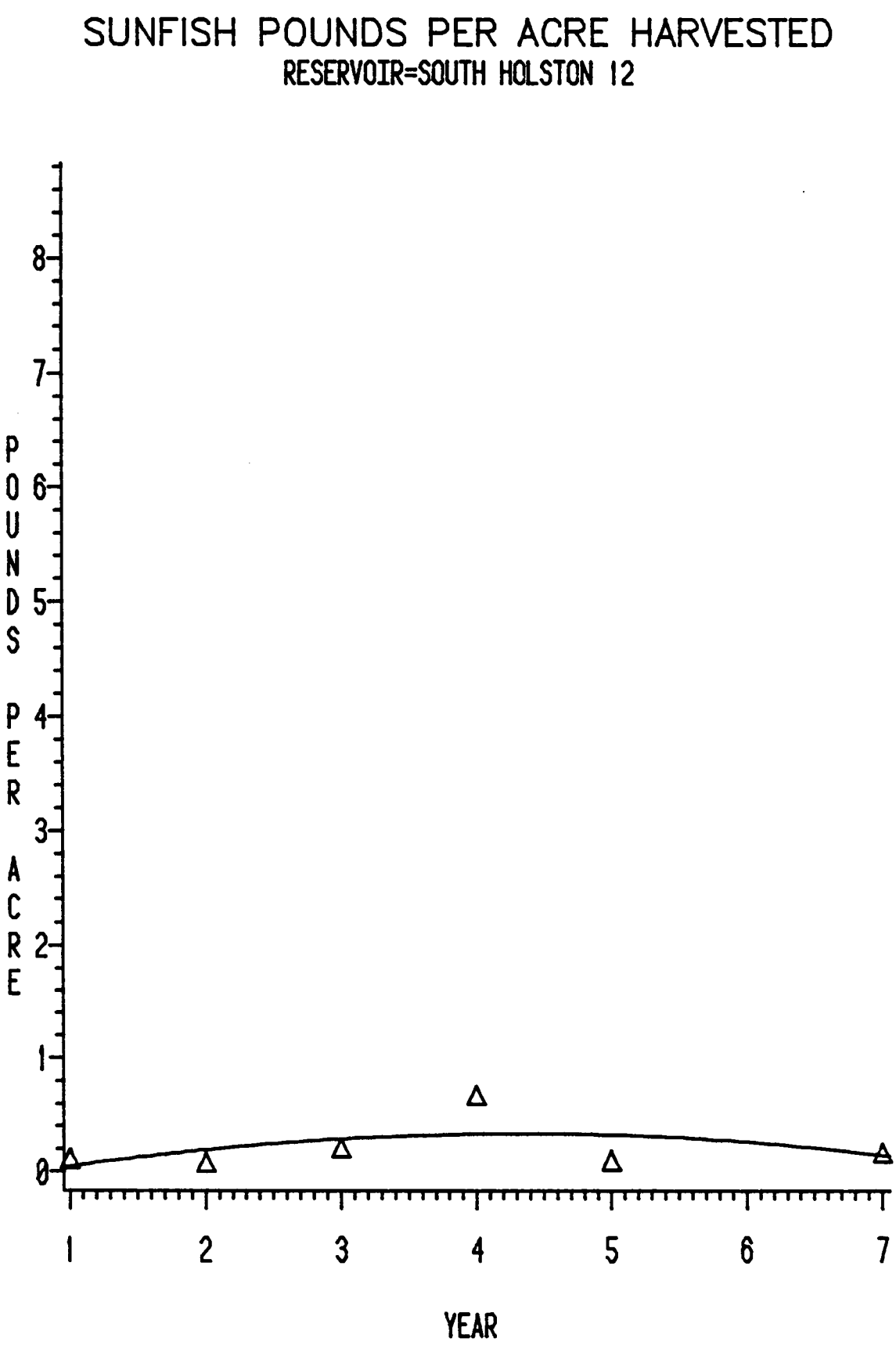


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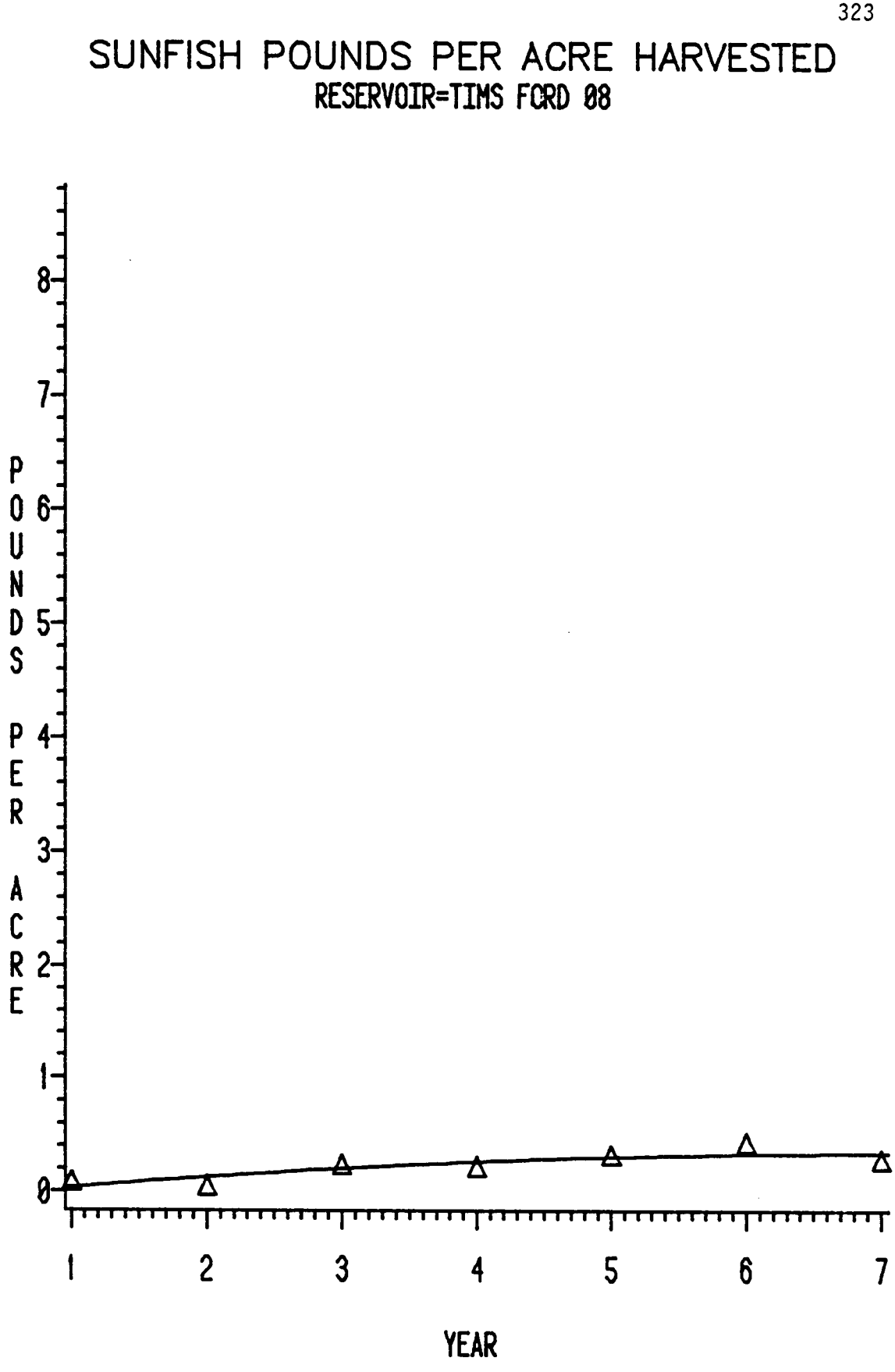


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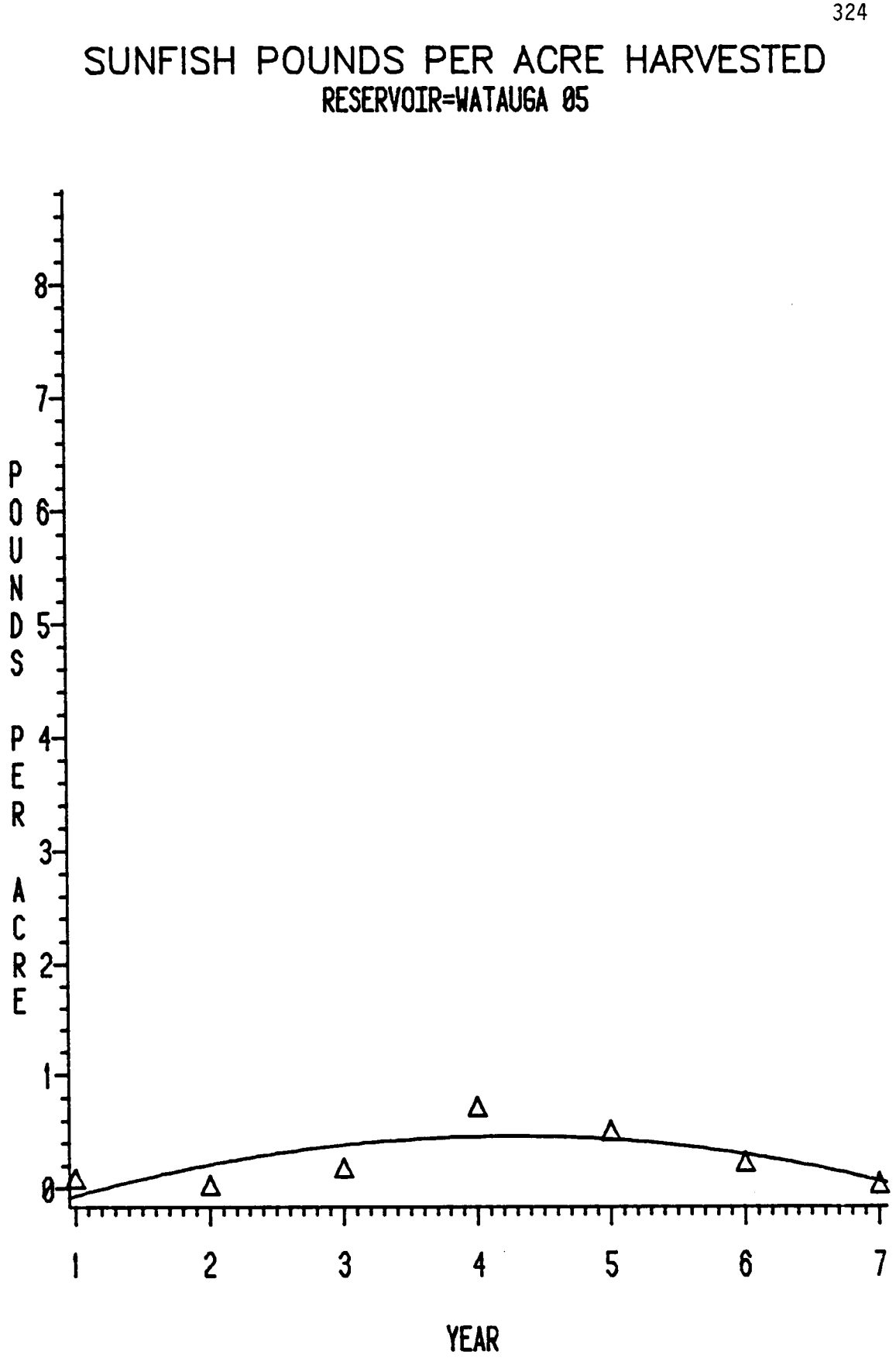


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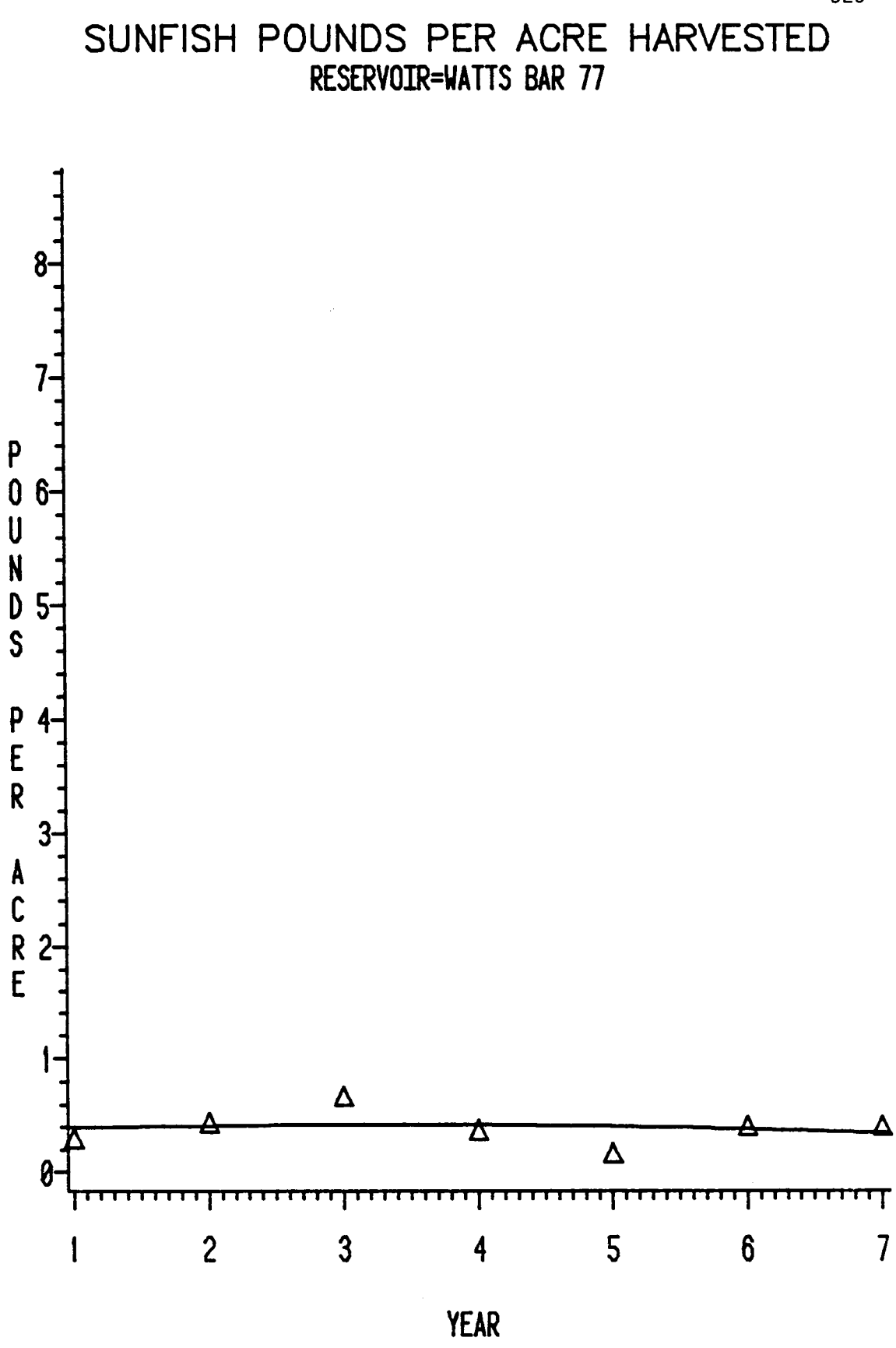


Figure G.2 (continued)

Figure G.3. Sunfish harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with intermediate high harvests were classified in Group 3: Boone, Melton Hill, Nickajack, and Tellico. The yearly codes 1-7 represent individual years from 1977-1983.

SUNFISH POUNDS PER ACRE HARVESTED

RESERVOIR=BOONE 23

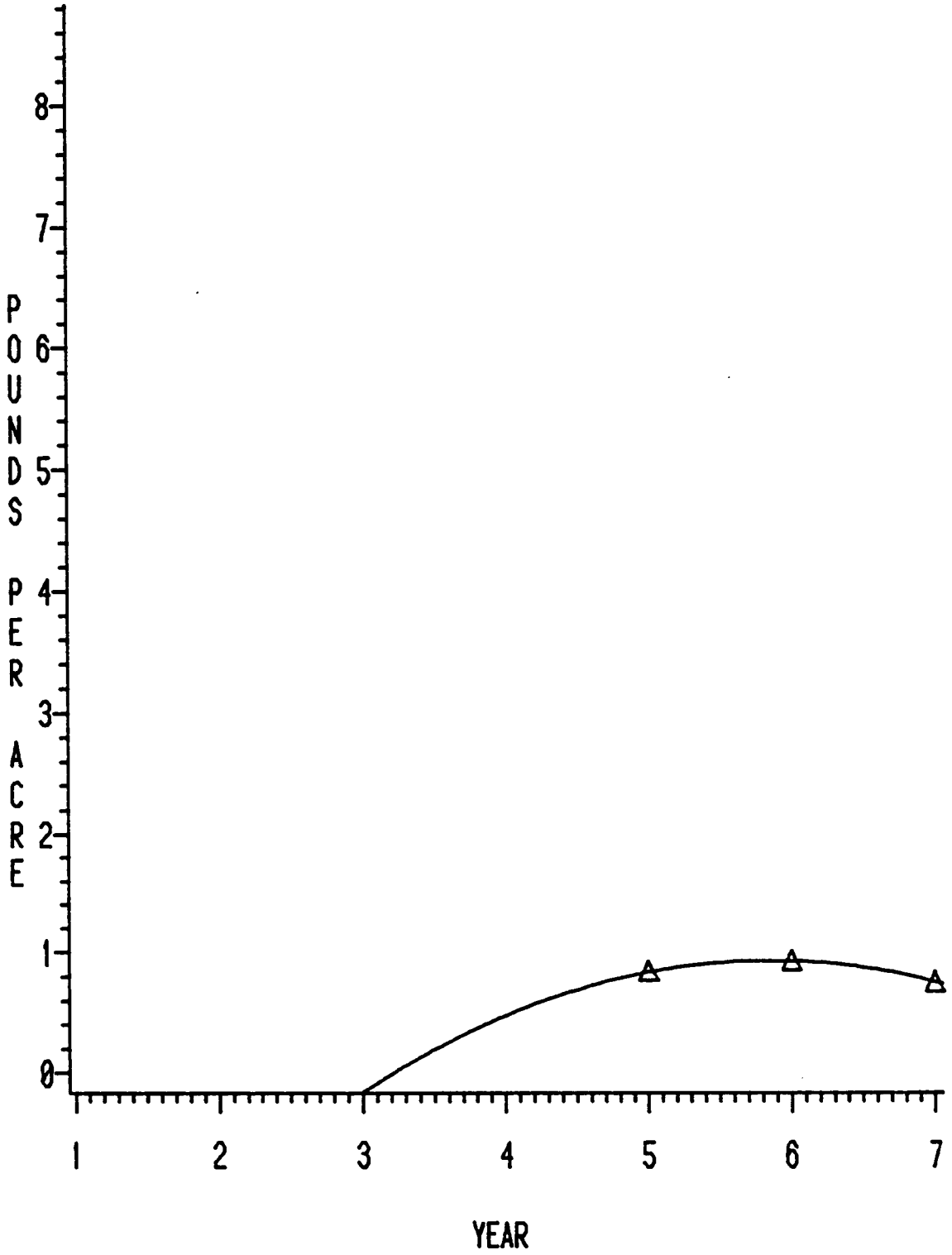


Figure G.3

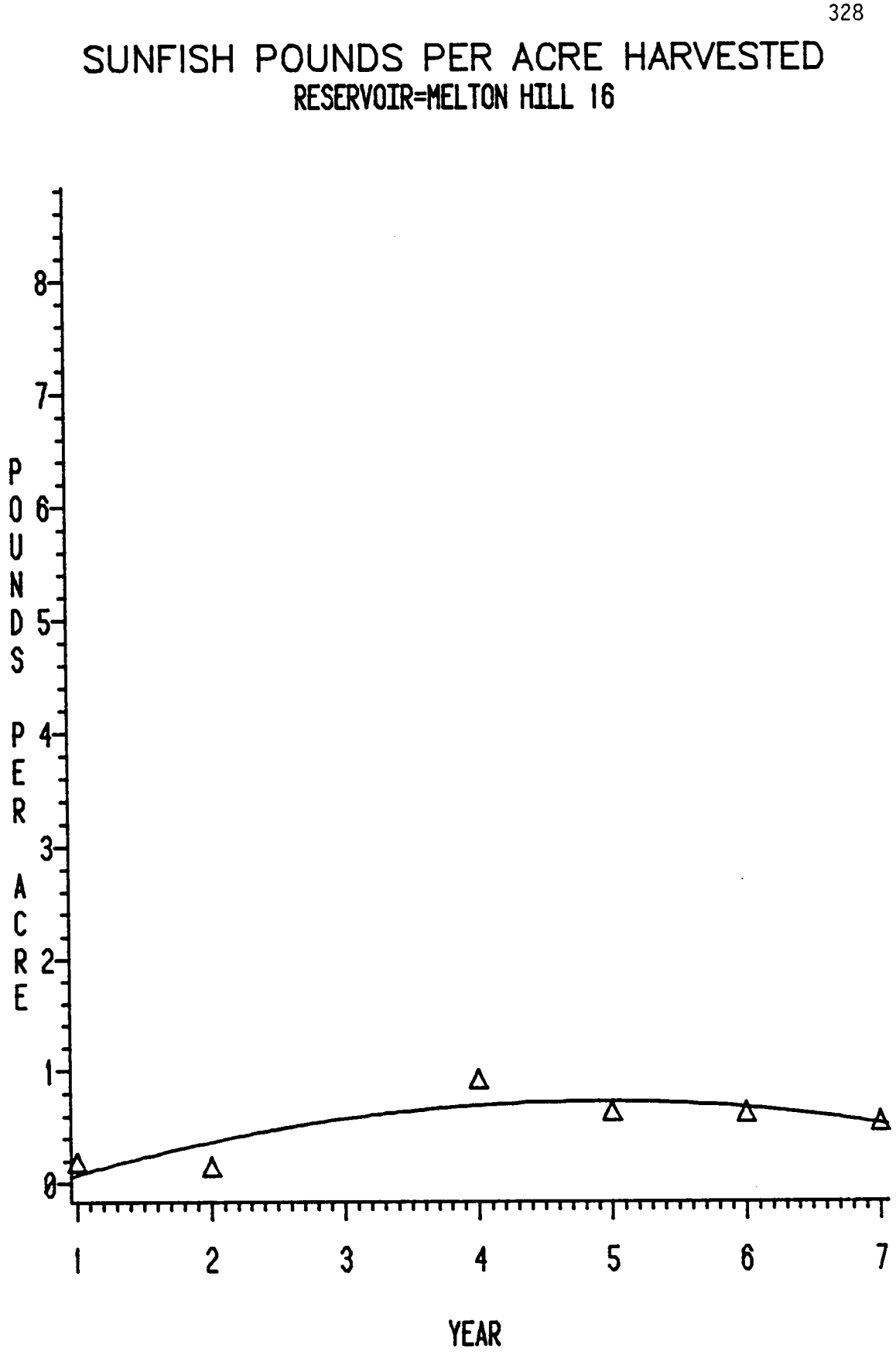


Figure G.3 (continued)

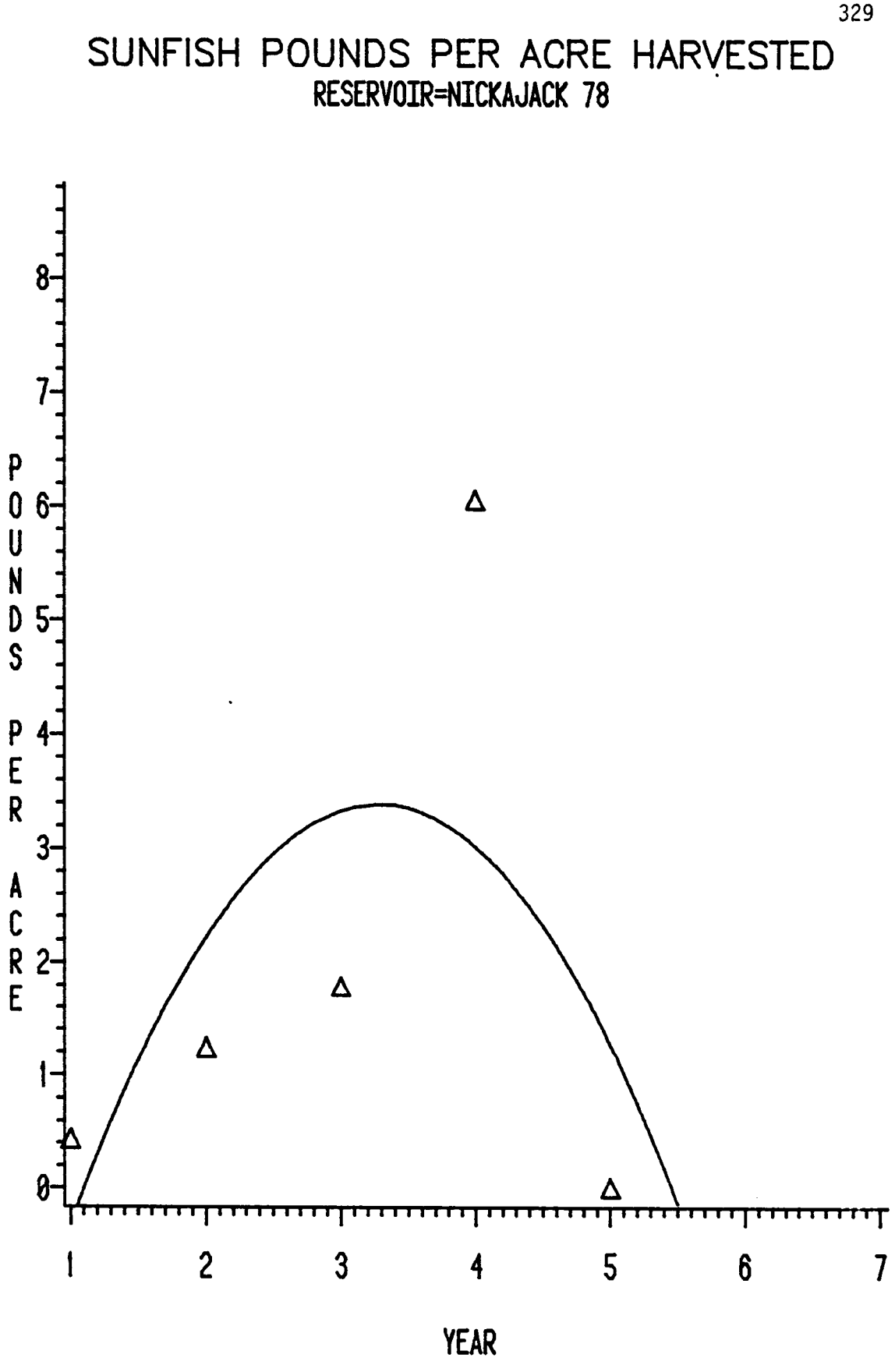


Figure G.3 (continued)

SUNFISH POUNDS PER ACRE HARVESTED

RESERVOIR=TELLICO 22

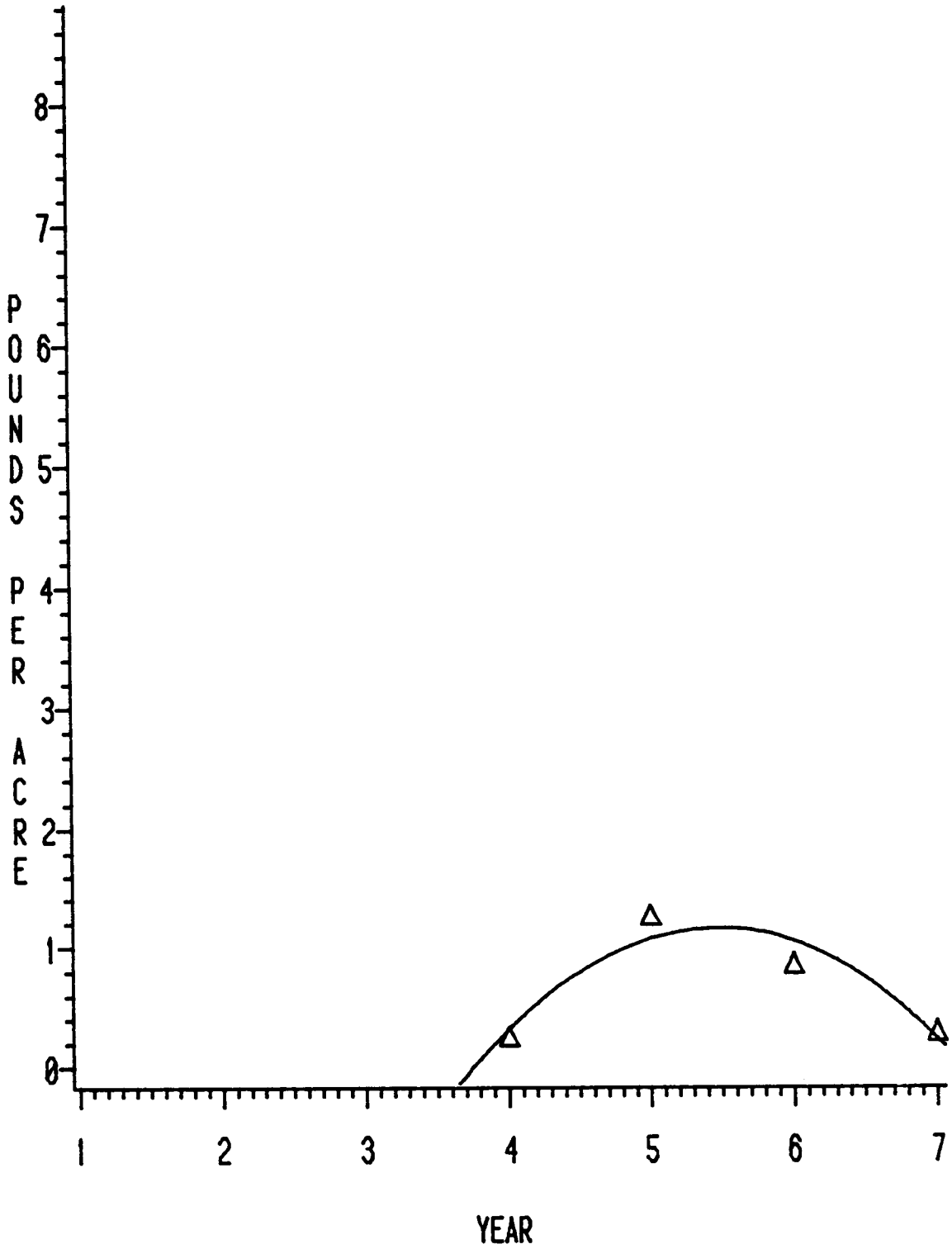


Figure G.3 (continued)

Figure G.4. Sunfish harvested (pounds per acre) during the seven-year period, 1977-1983. The following reservoirs with high harvests were classified in Group 4: Center Hill, Fort Loudoun, Kentucky, Normandy, and Reelfoot. The yearly codes 1-7 represent individual years from 1977-1983.

SUNFISH POUNDS PER ACRE HARVESTED

RESERVOIR=CENTER HILL 11

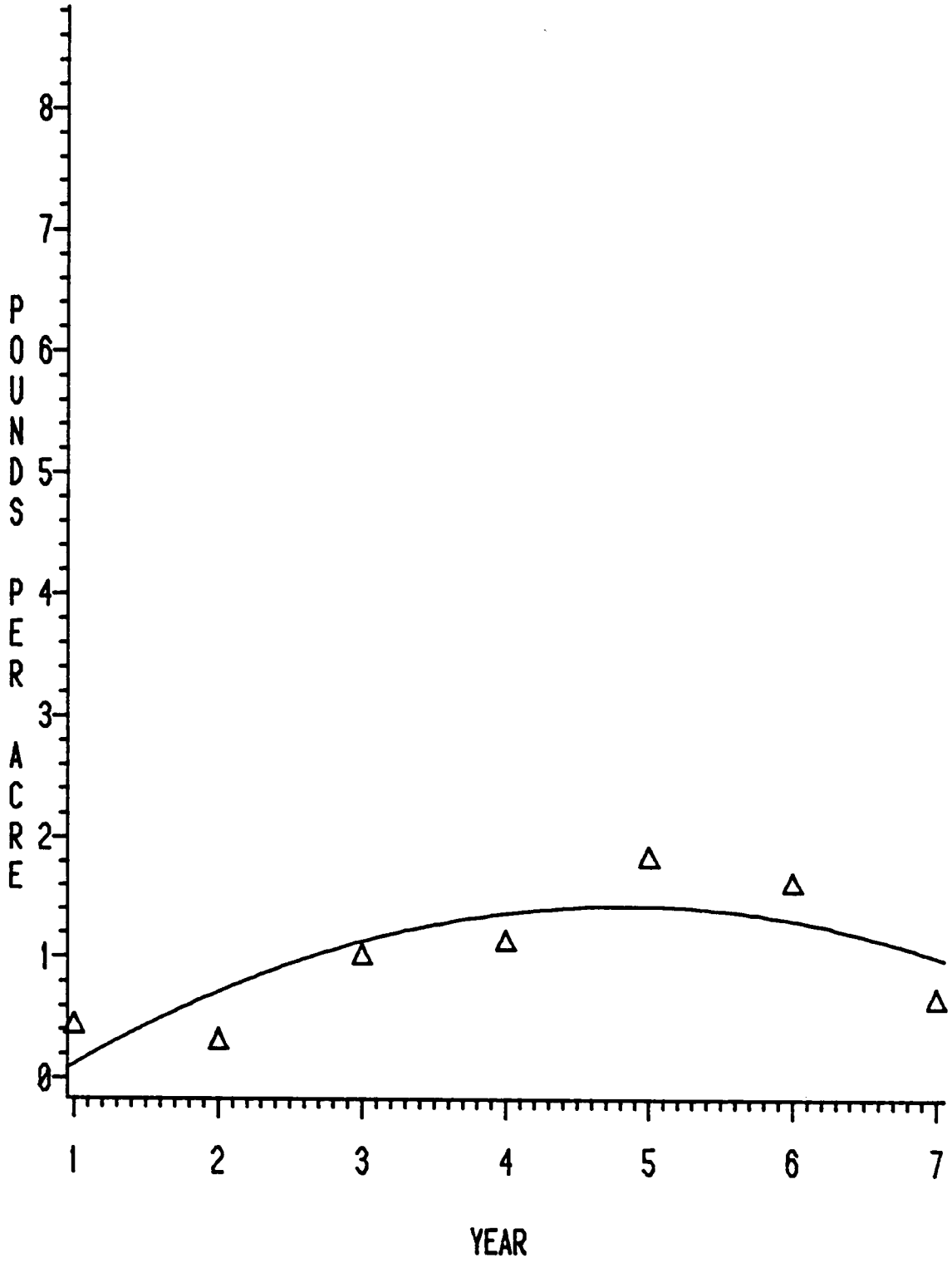


Figure G.4

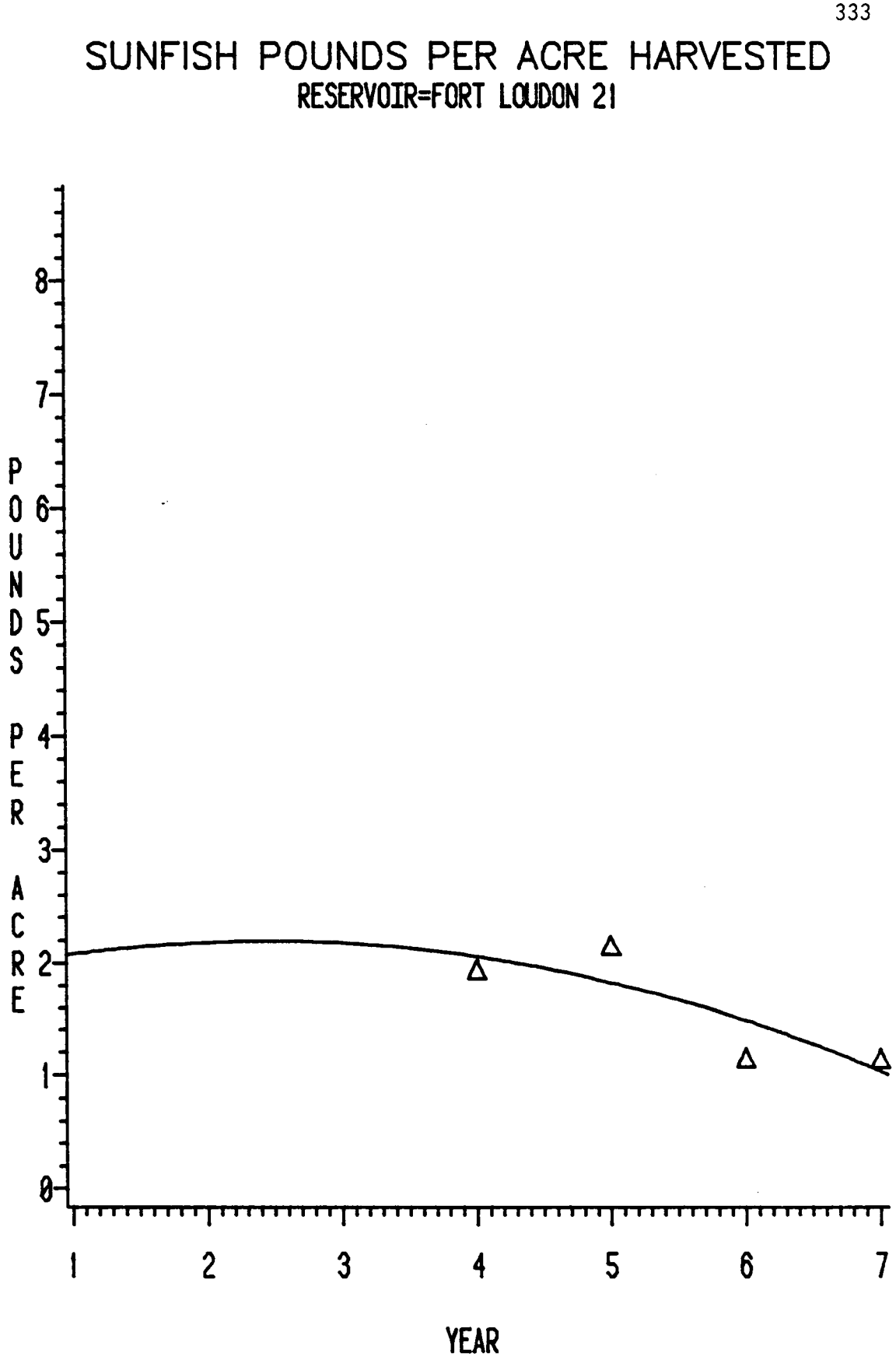


Figure G.4 (continued)

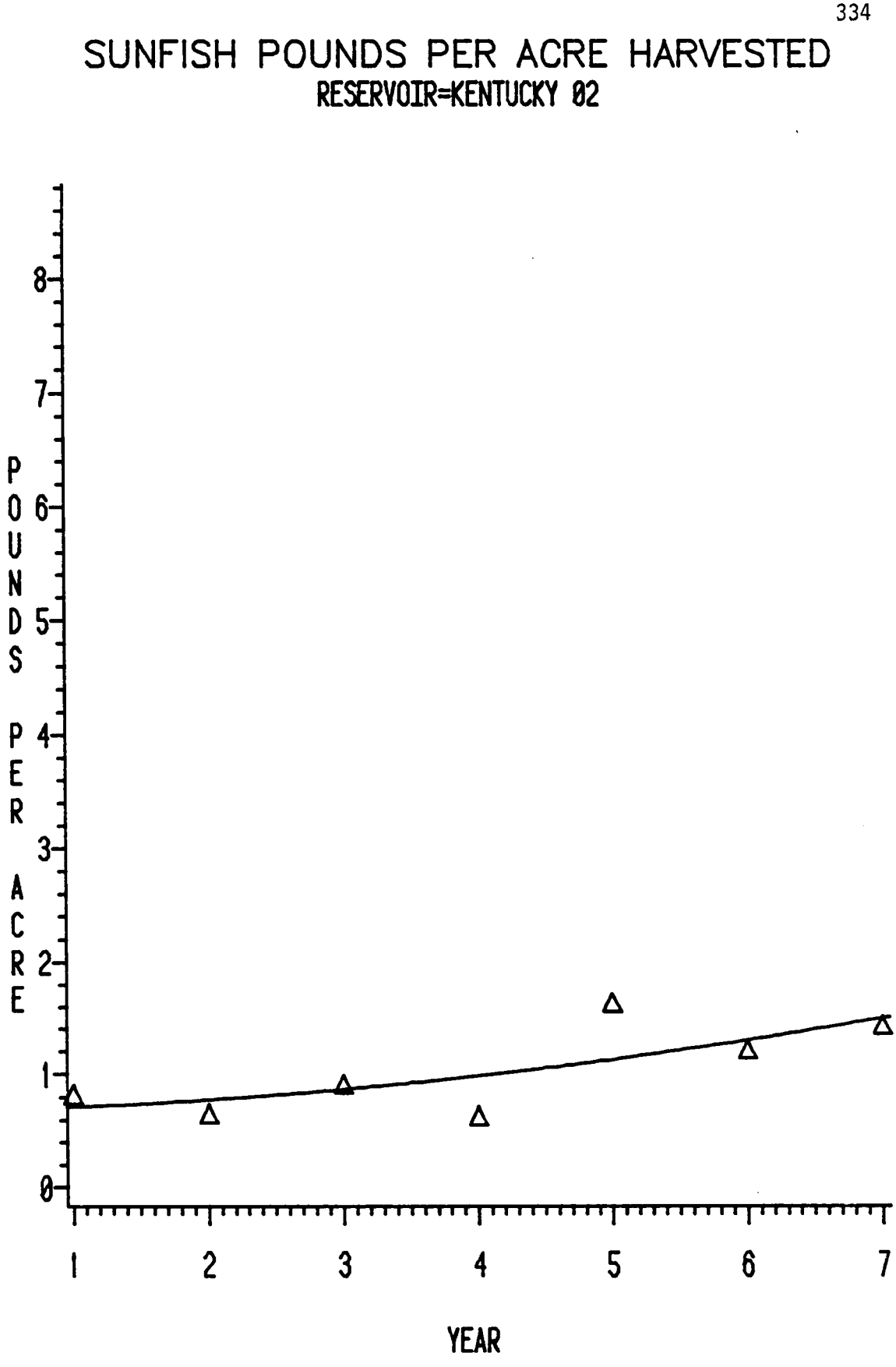


Figure G.4 (continued)

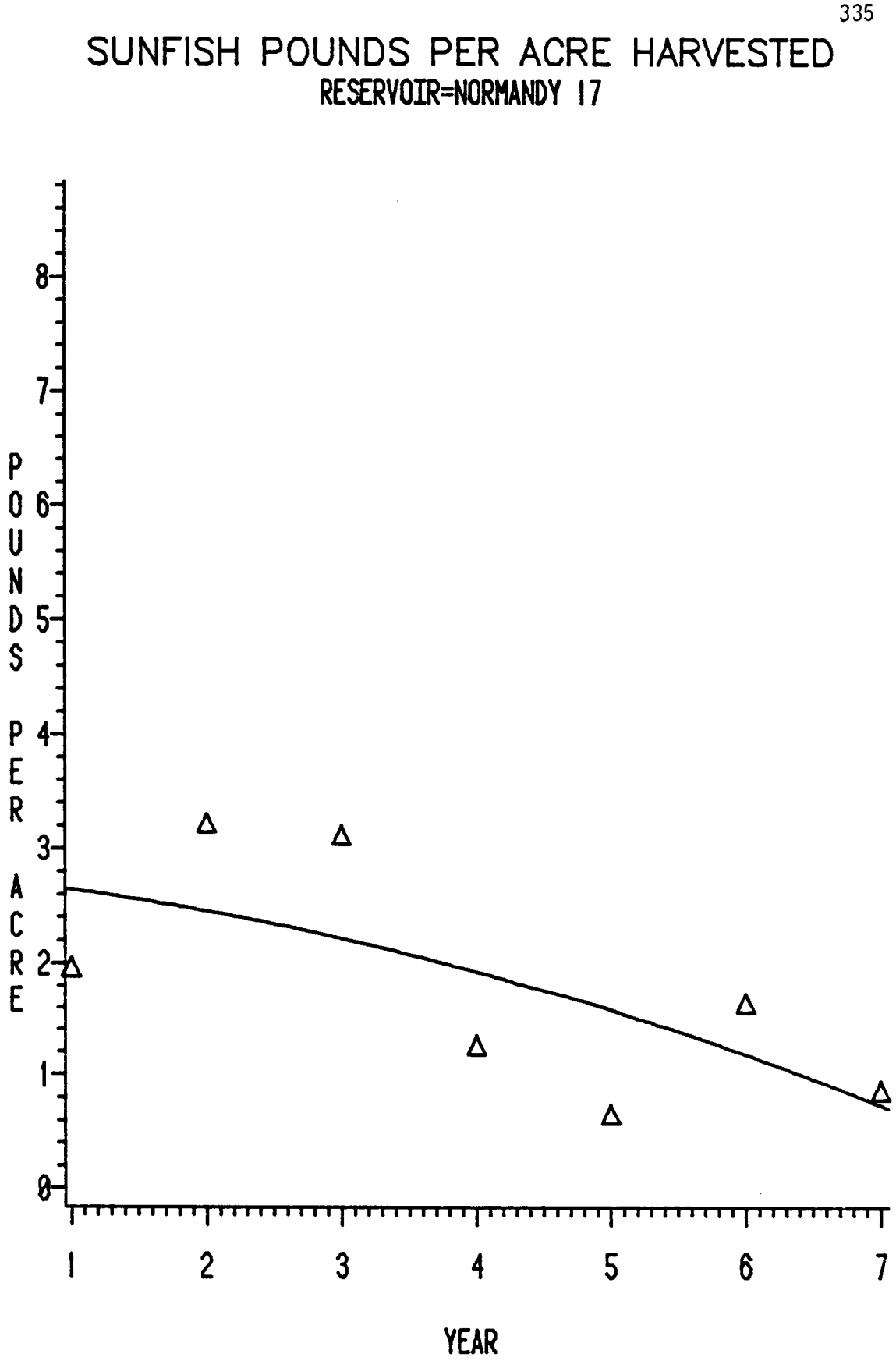


Figure G.4 (continued)

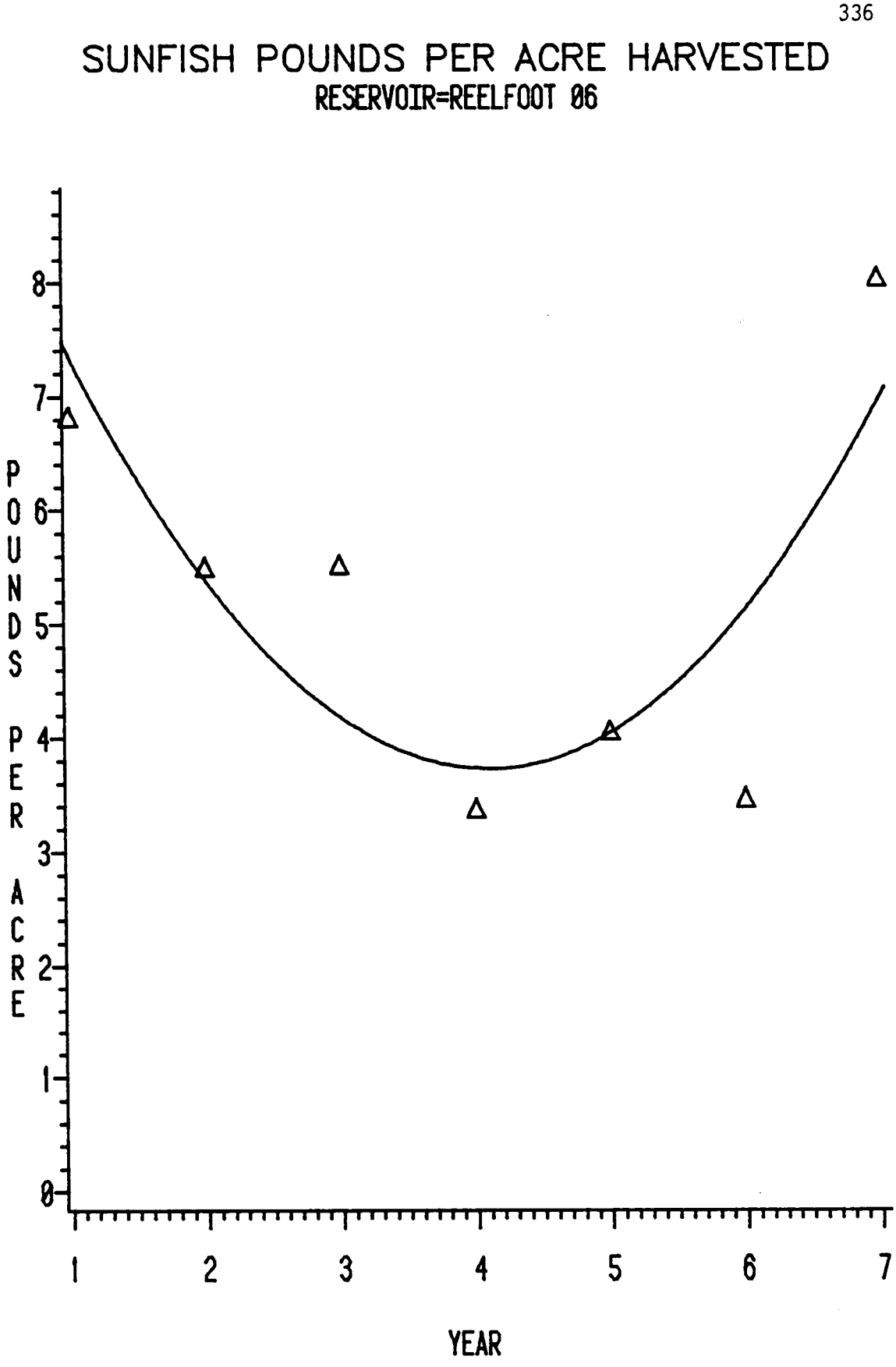


Figure G.4 (continued)

VITA

Bruce Michael Saul was born in Augusta, Georgia, on February 15, 1954. He attended elementary schools in that city and graduated from Augusta Preparatory School in June 1972. In June 1978, he received his Bachelor of Science degree from Augusta College, Augusta, Georgia. In August 1981, he received his Master of Science degree from The University of Tennessee, Knoxville.

He worked for Tennessee Wildlife Resources Agency as a Biologist Assistant from 1981 until his acceptance into the Graduate Program in Ecology at The University of Tennessee in September 1982. He received his Doctor of Philosophy degree with a major in Ecology in August 1985.

He currently resides in Augusta, Georgia, with his wife, the former Debra K. Jones, who is employed as a veterinarian. He is a fisheries ecologist with Environmental and Chemical Sciences in Aiken, South Carolina.