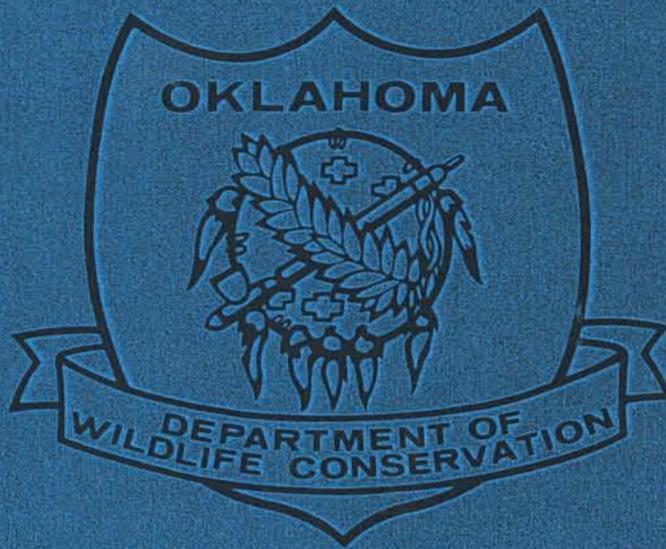


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Ref 50136

**FINAL REPORT**

**RESEARCH AND SURVEYS**



**FEDERAL AID GRANT NO. F-41-R**

**FACTORS INFLUENCING FISH POPULATIONS  
IN OKLAHOMA WATERS**

**PROJECT NO. 18**

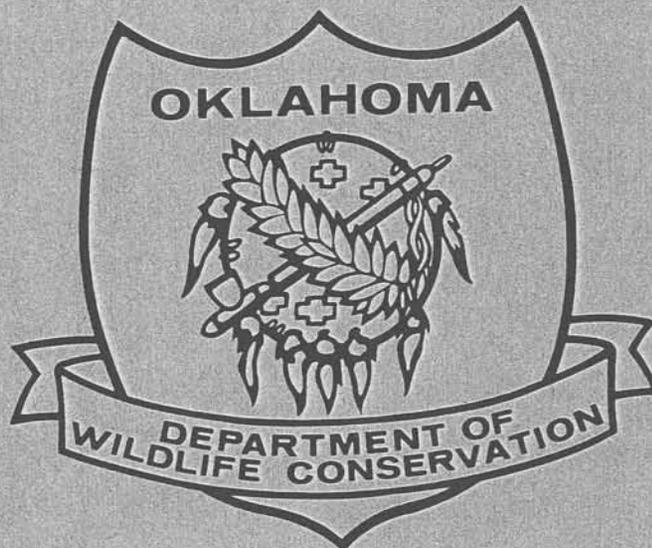
**EVALUATION OF THE SMALLMOUTH BASS RECREATIONAL  
FISHERY IN EASTERN OKLAHOMA STREAMS**

**JULY 1, 1992 to JUNE 30, 1996**

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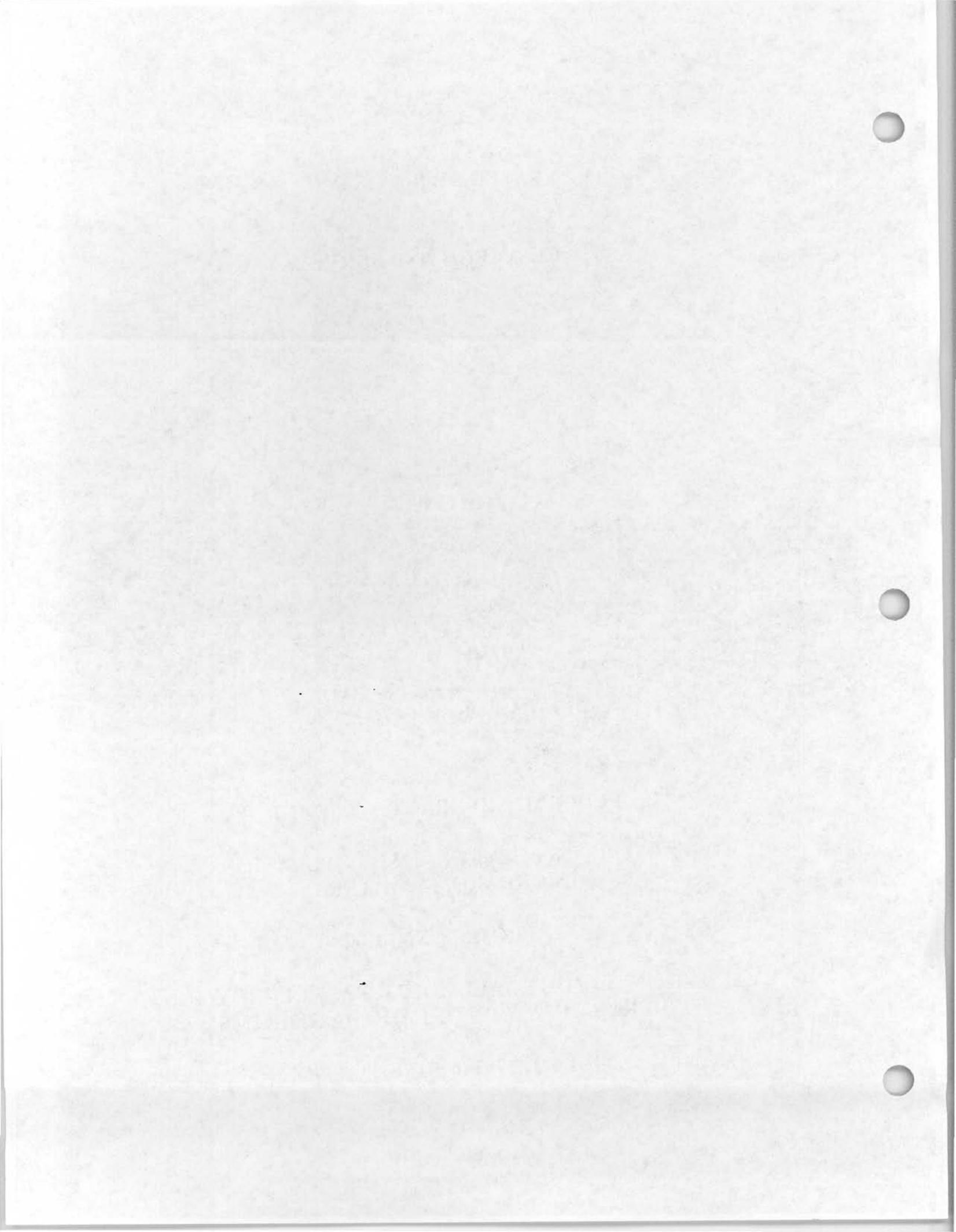
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**EVALUATION OF THE SMALLMOUTH BASS RECREATIONAL  
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## FINAL REPORT

STATE: OKLAHOMA

GRANT NUMBER: F-41-R

GRANT TITLE: Factors Influencing Fish Populations in Oklahoma Waters

PROJECT TITLE: Evaluation of the Smallmouth Bass Recreational Fishery in Eastern Oklahoma Streams

PROJECT NUMBER: 18

PROJECT OBJECTIVE: To evaluate the recreational fishery for smallmouth bass in eastern Oklahoma streams by assessing angler effort, harvest and expenditures.

### ABSTRACT

We evaluated the recreational fishery for smallmouth bass and other sportfish in eastern Oklahoma streams to assess the value of this resource and develop management strategies. Our specific objectives, which are presented in four independent chapters, were to: (1) conduct telephone surveys of Oklahoma licensed anglers to assess their attitudes and opinions on, and effort and success at angling in eastern Oklahoma streams, (2) conduct follow-up telephone surveys of creel smallmouth bass stream anglers to obtain socio-economic information, (3) conduct on-site access point creel surveys of smallmouth bass anglers on streams in eastern Oklahoma to obtain angler success information, and (4) assess smallmouth bass populations in streams where on-site creel surveys were conducted to determine the effects of angler exploitation on harvested populations. Results of the telephone surveys indicated that about 12% of all 1992 Oklahoma license holders fished eastern Oklahoma streams that year, most were from eastern Oklahoma counties. In 1993, the average cost per fishing trip made to eastern Oklahoma streams by residents of the region was about \$10, the one-way distance per trip was about 14 miles, and the number of trips was about 26. The estimated annual expenditures of all trips made to eastern Oklahoma streams in 1993 was \$29,000,000. Fish population surveys in 1994 and 1995 revealed slightly lower growth rates of younger fish but higher growth rates of older fish, low annual mortality, and high recruitment in a representative northeastern Oklahoma stream (Baron Fork Creek) compared with a southeastern Oklahoma stream (Glover River) where growth rates were high in all age classes but high annual mortality resulted in low recruitment to older ages. Creel and tagging exploitation studies in these rivers from 1993 to 1995 documented significant fisheries for smallmouth, largemouth and spotted bass, and sunfish species. Catch and harvest, fishing pressure, and yield of fish from Baron Fork Creek exceeded that from Glover River. Exploitation of smallmouth bass was about 25% greater in Baron Fork Creek than in Glover River, although the creel in Baron Fork Creek was made up of smaller individuals compared with that of Glover River. A proposed stream management program for eastern Oklahoma stream fisheries should focus on angler education, harvest regulations for northeastern streams, habitat improvement projects, and cooperative watershed management efforts.

## EXECUTIVE SUMMARY

The recreational fishery for smallmouth bass and other sportfish in eastern Oklahoma streams was evaluated by surveying licensed anglers about their attitudes, opinions, and fishing expenditures; creeling anglers to assess their catch and harvest; and sampling fish to determine population characteristics. The specific project objectives were to: (1) conduct telephone surveys of Oklahoma licensed anglers to assess their attitudes and opinions on, and effort and success at angling in eastern Oklahoma streams, (2) conduct follow-up telephone surveys of creeled smallmouth bass stream anglers to obtain socio-economic information, (3) conduct on-site access point creel surveys of smallmouth bass anglers on streams in eastern Oklahoma to obtain angler success information, and (4) assess smallmouth bass populations in streams where on-site creel surveys were conducted to determine the effects of angler exploitation on harvested populations.

Telephone surveys of licensed Oklahoma anglers were used to determine their fishing and socio-economic characteristics. We utilized the population of 1992 Oklahoma license holders to draw a sample of 3,609 people for conducting a screening survey to determine those that fished in eastern Oklahoma streams and their characteristics. From this sample we conducted a follow-up telephone survey of 172 people to obtain socio-economic information. About 11.6% of all Oklahoma license holders fished eastern Oklahoma streams in 1992. The percentage of license holders fishing eastern Oklahoma streams varied by license type, with eastern Oklahoma annual resident license holders having the highest percentage (23.8%). About 10.1% of all fishing trips taken by all license holders were made to eastern Oklahoma streams in 1992. Eastern Oklahoma streams were utilized for fishing all year; however, spring (March, April and May) and summer (June, July and August) months had the highest percent of angler use. The average cost per trip made in 1993 to eastern Oklahoma streams ranged from \$4.68 for senior license holders to \$50.00 for non-resident license holders. For eastern Oklahoma residents (annual license holders) making trips to eastern Oklahoma streams, the average cost per trip was \$9.88, the average one-way travel distance per trip was 13.6 miles, and the average number of trips per license holder that fished in 1993 was 25.7. The estimated annual expenditures on all trips made to eastern Oklahoma streams was about \$29 million in 1992-1993 price level. These results illustrate the importance of natural stream fishing in eastern Oklahoma and the economic importance of fishing eastern Oklahoma streams to the regional economy.

Black bass and sunfish populations in Baron Fork Creek in northeastern Oklahoma and Glover River southeastern Oklahoma were sampled during 1994 and 1995 to assess regional differences in population characteristics, and the fishery potential of and management options for smallmouth bass in eastern Oklahoma streams. Population characteristics (e.g., abundance, age and size structure, growth rates, mortality rates, and condition) of these species showed distinct differences between the two regions. The fishery potential for smallmouth bass in Glover River was limited, in part, by poor year class success and a high annual mortality resulting in low recruitment to older ages. In contrast, the smallmouth bass populations in Baron Fork Creek had slightly reduced growth rates of young fish, increased growth in large individuals, low annual mortality, and good recruitment. These population differences may be partially attributable to the lower water temperatures, a stable flow regime, and relatively conservative watershed land use in Baron Fork Creek compared with higher water temperatures, a flashy flow regime, and intensive

silviculture activities in Glover River.

We conducted creel and tagging exploitation studies on Baron Fork Creek and Glover River from 1993 to 1995 to gain information on the recreational fishery for black bass species, particularly smallmouth bass, and sunfish in eastern Oklahoma streams. The population of anglers on Baron Fork Creek was sampled with a roving creel survey and that on Glover River with the bus-route creel survey. Over the three years, exploitation rates of smallmouth bass in Baron Fork Creek exceeded those in Glover River by about one fourth, although those for all black bass were similar. Catch and harvest per unit effort, fishing pressure, and yield on Baron Fork Creek exceeded that on Glover River. The smallmouth bass fishery in Baron Fork Creek was characterized by high catch and harvest rates, and even though the creel was made up of relatively small individuals, yield was among the highest reported in the literature for smallmouth bass stream fisheries. Conversely, the smallmouth bass fishery in Glover River was typified by lower catch and harvest rates; however, the average length of smallmouth bass at harvest was greater than that of Baron Fork Creek. Spotted bass, largemouth bass and sunfish species made up a substantial proportion of the catch and harvest in Glover River, but proportionately less in Baron Fork Creek. These differences in catch and harvest are related to the unique characteristics of the fish populations and angler populations between regions.

In conclusion, eastern Oklahoma streams provide a unique and valuable fishing opportunity in Oklahoma. Because of the cultural and economic importance of stream fishing to Oklahomans, particularly those in the eastern part of the state, the fishing and aquatic resources and anglers of eastern Oklahoma streams deserve an effective stream management program. We recommend a program that includes the following components: (1) a concerted effort to educate and inform Oklahoma anglers and citizens about the characteristics and values of the eastern Oklahoma stream fisheries, (2) harvest regulations for northeastern Oklahoma streams designed to increase the number of quality-sized smallmouth bass, (3) stream habitat improvement projects to stabilize stream banks and restore riparian vegetation, and (4) cooperative watershed management efforts to minimize the impacts of land use activities (e.g., silviculture, poultry farming) of stream habitat and water quality. Such a program should be tailored to the fish and angler populations of each region. For northeastern Oklahoma streams, the emphasis of the program should be on catch and harvest regulations, stream habitat improvement projects, and limiting poultry farming waste runoff into streams. For southeastern Oklahoma streams, the emphasis should be placed on monitoring and managing watershed activities that impact stream fish habitat and improving stream access. For the program to be effective, it will require the dedication of sufficient human and financial resources to survey and monitor fish populations, anglers, and stream habitat, and the cooperation of state and federal agencies and private landowners to better manage watershed activities.

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Approved by:

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## Chapter I

**SURVEY OF FISHING CHARACTERISTICS AND OPINIONS OF LICENSED EASTERN  
OKLAHOMA STREAM AND RIVER ANGLERS**

and

## Chapter II

**FOLLOW-UP SURVEY OF SOCIO-ECONOMIC CHARACTERISTICS OF LICENSED  
EASTERN OKLAHOMA STREAM AND RIVER ANGLERS**

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## Chapter I

### Survey of Fishing Characteristics and Opinions of Licensed Eastern Oklahoma Stream and River Anglers

Objective.--To conduct telephone surveys of Oklahoma licensed anglers to assess their attitudes and opinions on, and effort and success at angling in eastern Oklahoma streams.

#### Procedures

A survey to identify eastern Oklahoma stream anglers from the 1992 population of Oklahoma fishing and combination fishing/hunting license holders (627,000) was completed. The 1992 population of license holders was stratified by license type and a random sample was independently drawn from each license type. The original sample of 3,000 license holders was augmented by about 600 randomly-selected annual resident fishing license holders from counties in eastern Oklahoma to increase the number of eastern Oklahoma stream anglers (Table 1).

Telephone interviews were concluded for resident, non-resident, senior citizens and lifetime license holders. Responses from completed surveys of all license holders were compared to those who fish eastern Oklahoma streams. Information was obtained by interviewers on license holder demographics and fishing experiences in 1992. License holders using eastern Oklahoma small rivers and streams were identified for the purpose of gathering data for 1993 and for participation in the Oklahoma Stream Angler Cooperator Program (see Chapter II).

Screening survey process.--Information on type of license and total license sales (rounded to the nearest thousand) was provided by the Oklahoma Department of Wildlife Conservation (Table 1). Senior citizens and lifetime license data records contained information on license holders who are known to actively fish (i.e., not incapacitated by physical infirmities or deceased).

The survey instrument we used was designed primarily to identify individual license holders who fished in eastern Oklahoma small rivers and streams and who would participate in a two-year cooperator program. However, to accomplish this the survey first identified whether the license holder fished in Oklahoma in 1992. If the license holder did fish in Oklahoma in 1992, then the water types they frequented were recorded. Subsequently, licensed eastern Oklahoma stream anglers were distinguished from all other license holders.

An overview of the survey process is illustrated in the flow diagram in Figure 1. The right branch of the flow diagram describes the path for incomplete surveys, which occurred for 2,462 license holders. An incomplete survey occurred for many reasons. The three primary reasons were: wrong phone number, inability to contact person after 5 attempts, and outright refusal to answer questions. The left branch of the flow diagram shows the completed survey steps. Surveys were completed for 32% of the 3,609 license holders in the combined original and supplementary sample. Interviewers completed a slightly higher percentage (35%) of license holders in the smaller supplementary sample, which contained only residents of eastern Oklahoma in 1992, than

for the larger original sample (31%), which contained license holders from any Oklahoma county and outside the state (Figure 2).

## Results

The following results are a complete analysis of the screening survey data. These results may differ from data presented in previous performance reports (segment dates 1 July 1993 through 30 June 1995) because of completion of more surveys or because of errors found in earlier analyses.

Completed surveys from respondents who purchased a license in 1992, but did not fish in Oklahoma, are enumerated in Table 2. Reasons for not fishing ranged from having purchased a license too late in the season to illness. About one-fourth of senior citizen license holders did not fish in 1992. Combination fishing and hunting license holders more frequently did not fish in 1992 compared to those holding only the fishing license.

Fishing by Oklahoma License Holders.--Reservoirs were the predominate type of waters fished by Oklahoma resident license holders (Table 2). From 54 percent to 84 percent of Oklahoma resident license holders fished reservoirs depending on license type. Small impoundments, farm ponds, and large rivers were similarly frequented by most Oklahoma resident license type holders. However, non-resident anglers frequented reservoirs most often followed by small impoundments. They frequented farm ponds, large rivers, and small rivers least often.

Lifetime license holders frequented all types of waters but fished large and small rivers less often. Senior license holders were predominately reservoir anglers. River fishing was less important to this type of license holder.

About one-fourth of eastern Oklahoma annual resident and all lifetime license holders fished the small rivers and streams in eastern Oklahoma. Five percent or fewer of the non-eastern Oklahoma annual fishing and non-resident license holders fished the eastern Oklahoma small rivers and streams.

The estimated number of Oklahoma license holders that fished the various water types is reported in Table 3. These data are the results of applying the percentages of Table 2 to the number of license holders that fished. Caution in comparing totals (across all license type holders) by types of waters should be taken because 3-day and 10-day non-resident permits are added with annual license holders. However, about 61 percent of all license holders fished the reservoirs versus 29 percent, 33 percent, 15 percent, and 17 percent for small impoundments, farm ponds, large rivers, and small rivers and streams, respectively. About 11.6 percent of all license holders that fished, fished the small rivers and streams in eastern Oklahoma. An estimated 72,600 licensed holders fished eastern Oklahoma small rivers and streams of which 38,500 (53%) resided in eastern Oklahoma counties. The remaining 34,100 (47%) license holders fishing eastern Oklahoma small rivers and streams resided in other parts of the state and out-of-state.

Average number of trips per angler per year by license holder type are reported in Table 4 and the estimated total number of trips by all license holders is reported in Table 5. Number of trips per

year by Oklahoma resident license holders varied from 14.2 for senior fishing license holders to 51.4 for lifetime fishing license holders. Non-resident license holders varied from 2.8 trips per year for 3-day permits to 11.2 trips per year for annual fishing license holders.

On average, all Oklahoma resident license holders took one or more trips per year to eastern Oklahoma small rivers and streams except rest-of-Oklahoma annual license holders who averaged 0.3.

The estimated total number of sport fishing trips by Oklahoma license holders from the current survey was 18,019,200 in 1992 (Table 5). This compares to the estimated number of sport fishing trips in Oklahoma from the 1991 National Survey (USDOI and USDOC 1993) of 10,790,000. Differences in methods used in survey procedures may account for the different results.

About 38.6 percent of all sport fishing trips were to reservoirs in Oklahoma. Farm ponds accounted for 23.6 percent of all trips and small impoundments accounted for 14.7 percent of all trips. Large rivers accounted for 8.0 percent of all trips and small rivers and streams accounted for 15.1 percent.

Small rivers and streams in eastern Oklahoma accounted for about one out of ten sport fishing trips. This amounts to about 1.8 million sport fishing trips per year. Over half (62 percent) of these trips were accounted for by eastern Oklahoma annual fishing license holders. However, all combination hunting and fishing license holders (resident, lifetime, and senior) accounted for 544,000 trips per year to eastern Oklahoma small rivers and streams or about 10.4 percent of all fishing trips.

The results shown in Table 5 indicate that the small rivers and streams of eastern Oklahoma are an important component of the total fisheries of the state of Oklahoma.

Number of license holders per household varied from about 1.3 to 1.8 depending on type of license (Table 6). Non-resident license holders had fewer licensed family members compared to residents. Resident license holders were very similar in number of members per household with licenses ranging from about 1.6 for seniors to 1.8 for eastern Oklahoma annual fishing.

Number of non-licensed children per household that fished in 1992 ranged from zero to 0.8 (Table 6). Lifetime fishing and annual resident fishing had the highest average number of non-licensed children fishing. As expected, senior license holders had very few non-licensed children fishing.

License holders that fished were asked if they fished for smallmouth bass (SMB) in reservoirs and large rivers (Table 7). Such fishing is potentially competitive with fishing in eastern Oklahoma small rivers and streams where the predominate species is SMB. Reservoirs are more competitive than large rivers in providing a SMB fishery to anglers.

License holders that fished were asked if they fished out-of-state (out-of-Oklahoma) in 1992 (Table 8). From 18 to 27 percent of Oklahoma resident license holders fished in other states. The most frequent states mentioned were Texas, Missouri, Arkansas, Colorado and Kansas. Non-

resident Oklahoma license holders show a considerable higher percent of sample that fished in other states, ranging from 60 percent to 86 percent. This is expected because they are from out-of-state holding Oklahoma licenses.

The question was asked whether the 1992 license holder had purchased or expected to purchase a license in 1993 (Table 9). The survey was administered in 1993 at various dates and, hence, not all 1992 license holders are expected to have purchased the 1993 license by date of interview. Data in Table 9 excludes senior and lifetime license holders. From 82 to 92 percent of resident license holders had purchased or expected to purchase a 1993 license depending on license type. From 80 to 95 percent of non-resident license holders had purchased or expected to purchase a 1993 license.

Socioeconomic Data for License Holders. --Gender distribution of Oklahoma license holders in 1992 is estimated at 73% male and 27% female based on the sample data (Table 10). This compares to a distribution of state population of 16 years and older of 47% male and 53% female in 1991. Combination fishing and hunting license holders are predominately more male for annual, lifetime, and senior license holders (96.4%, 97.8%, and 93.8%, respectively) compared to annual, lifetime, and senior fishing only license holders (65.0% and 71.1%, 81.7%, and 39.4%, respectively). Females are less inclined to purchase the fishing and hunting license combination. Non-resident annual and 10-day fishing license holders are more frequently male (81.8% and 85.0%, respectively) than for the overall (weighted) average. Non-resident 3-day license holder is more frequently female than male (54.6% and 45.5%, respectively). This may be an anomaly of the data or possibly the result of a family purchasing a 10-day license for the male and a 3-day license for the female.

Average age of all license holders is about 45 years (Table 11). Average age of annual license holders (fishing and combination of fishing and hunting) is 42 to 44 whereas the average age of lifetime license holders is 39 to 40. Average age of senior license holders is between 67 and 68 years. Average age of non-resident license holders is more than the overall average and ranges between 46 and 50 years. Eastern Oklahoma annual fishing license holders are slightly older than the rest-of-the-state license holders (44.5 years compared to 42.2 years).

About 20% of all Oklahoma license holders are retired (Table 12). Annual license holders (fishing and combination fishing and hunting) range from 10% to 20%. Eastern Oklahoma annual fishing license holders are twice as likely to be retired compared to rest-of-state annual fishing license holders. Only about 7% to 8% of the lifetime license holders are retired. A much larger percent of senior license holders are retired (97% of fishing and 87.5% of fishing and hunting). Non-resident license holders are represented very much by the overall resident license holders with respect to retirement.

About 72% of the Oklahoma license holders have a grade school or high school education and 28% have more than a high school education (Table 13). This compares with the state population 16 years and older of 61% and 38%, respectively. Combination fishing and hunting (annual, lifetime, and senior) license holders are more educated compared to fishing only (annual, lifetime, and senior) license holders. Eastern Oklahoma annual resident license holders are slightly less

educated than rest-of-Oklahoma annual resident license holders. Senior license holders are less educated compared to the overall average. Non-resident Oklahoma license holders do not vary significantly from the overall resident license holders in education levels although very few reported vocational technical education.

More Caucasian, fewer blacks, and more other races hold Oklahoma licenses compared to the state population of 16 years and older (Table 14). Over 14% of the annual resident fishing license holders in eastern Oklahoma report ethnic origin as Native American. This compares to the overall average of all license holders of 7%. No single license type reports a higher percent of blacks than what is reported for the state population.

The overall mean and median household income in 1992 of Oklahoma license holders is estimated at \$40,978 and \$37,500, respectively (Table 15). Comparisons among license types should be with care because of large percentages of some types of license holders that do not report income. For example, over 50% of senior license holders do not report income. Comparisons with data on the state population of households is not presented because of significant potential for not using the same procedures in accounting for income.

In general, senior license holders have lower income. Combination license holders (fishing and hunting) have higher incomes compared to fishing only license holders (annual, lifetime, and senior). Non-resident license holders have higher income compared to resident license holders. Eastern Oklahoma annual resident license holders have lower income compared to rest-of-Oklahoma annual resident license holders.

Eastern Oklahoma Small River and Stream Fishing.--Our objective was to identify those Oklahoma license holders that fished small rivers and streams in eastern Oklahoma and to assess their fishing characteristics. The screening survey of all license holder types was used to identify those that fished eastern Oklahoma rivers and streams (Table 2). A total of 172 of the sample of license holders that fished (1,066) in 1992 fished in eastern Oklahoma small rivers and streams (Figure 1). This becomes the sample of license holders used to assess fishing information about eastern Oklahoma stream fishing (Table 16). Care should be taken in interpreting results for specific license types because of extremely small sample size.

The species most frequently sought by licensed anglers is smallmouth, largemouth, and spotted bass (Table 17). About 70% of the licensed anglers fished for this group of fish species. About 53% of the licensed anglers fished for catfish. The percentages for the remaining species were: white bass, striped bass, and hybrids, 17%; sunfish and perch, 13%; and trout, 12%. The eastern Oklahoma licensed anglers preferred smallmouth, largemouth, and spotted bass (68%) only slightly over catfish (61%). However, statewide annual license holders preferred the bass group over catfish (67% versus 44%). Lifetime and senior license holders fished about equally for the bass group and catfish. The sample of non-resident license holders is too small to draw any conclusions.

License holders more frequently used public access means to fish the eastern Oklahoma small rivers and streams (Table 18). In general, 50 percent or fewer of the license holders used private

access means. Public access included highway crossings and publicly owned land. Private access means permission from land owners or private clubs to fish the rivers and streams.

Annual license holders (fishing and combination fishing and hunting) stream fish from the bank and boat/canoe most often (Table 19). Less frequently do they use wading and float tubes. A small percentage fish from bridge crossings. Multiple answers were permitted from the sample of license holders. Lifetime and senior license holders were very similar to annual license holders except perhaps a slightly larger percent fished with boat/canoe. Samples from non-resident license holders are too small to draw conclusions.

Annual license holders (fishing and combination fishing and hunting) fished most frequently during the morning hours from sunup to 10:00 a.m. (Table 20). However, these groups also fished evenings (3:00 p.m. - sunset) and midday (10:00 a.m. - 3:00 p.m.) although less frequently. About 10% - 13% of these groups said they fished at night (sunset - sunrise). Lifetime and senior license holders were similar in their patterns of the times of the day they fished although they may fish less frequently at night time and more frequently in evenings.

Frequency of eastern Oklahoma stream fishing by months of the year is shown in Table 21. Spring (March-May) and summer (June-August) have the highest frequency. Fall (September-November) season had a lower frequency and winter (December-February) had the lowest frequency. About two-thirds of the sample of license holders fished during each of the months of May and June. About 15% of the sample fished during each of the winter months of December-February.

About 50% of the license holders that fished eastern Oklahoma streams considered eating of the fish caught as important or extremely important. About one-third of the license holders considered eating of fish caught as not important (Table 22). The latter is fairly uniform across all types of license holders. Eastern Oklahoma license holders show little variation from the overall result.

## Chapter II

### Follow-up Survey of Socio-Economic Characteristics of Licensed Eastern Oklahoma Stream and River Anglers

Objective. --To conduct follow-up telephone surveys of eastern Oklahoma stream anglers to obtain fishing trip information.

#### Procedures

Follow-up telephone survey. --From the 1,147 completed screening surveys of 1992 Oklahoma license holders (see Chapter I), 1,066 actually fished in 1992 (see Table 2). Of this number, 172 fished eastern Oklahoma small rivers and streams (see last column of Table 2 and Figure 1). This sample of 172 license holders (in 1992) was the basis to conduct a follow-up survey to obtain further information about eastern Oklahoma stream fishing. The assumption was, because they fished eastern Oklahoma streams in 1992, there would be a high probability that they would fish the same streams in succeeding time periods.

The sample of 172 was contacted after the 1993 fishing year and a follow-up survey was conducted obtaining information about their fishing trips in 1993. From the sample of 172, surveys were completed on 163 or about 95 percent (Table 23). Those not contacted either had moved, were deceased, changed telephone numbers, or were never accessed after repeated (at least five) attempts.

Surprisingly, only 109 of the 163 (67%) contacted fished in Oklahoma in 1993 even though they had fished in 1992 (Table 23). About 62.5% of lifetime and senior license holders fished in 1993 after having fished in 1992. Only one out of three non-resident license holders that fished eastern Oklahoma streams in 1992, fished in Oklahoma in 1993 (However, out of a sample of 86 non-resident license holders in 1992 (see Table 2) only three had fished eastern Oklahoma streams).

#### Results

From the 109 completed surveys, 100 provided complete data on distribution of trips, one-way travel distance, and cost per trip (column 2, Table 24). The sample percent of license holders that fished the various types of waters are shown in Table 24 by license type. These results can be compared with results of Table 2 knowing that the sample for Table 24 is only of those that fished eastern Oklahoma streams in 1992 whereas the sample for Table 2 is license holders that fished any type of water. As expected, the percentage that fished eastern Oklahoma streams is large, ranging from 73.1% to 100% depending on type of license. About two-thirds of the 1993 sample of license holders fished reservoirs, which is similar to the results of Table 2

The sample of license holders was asked about the number of trips made in 1993 and by type of water (Table 25). The total sample of trips and average number of trips per license holder is presented in Table 25. The average number of trips may be compared by license type with the

overall average given in Table 4 remembering that the sample for Table 25 is only of those that fished eastern Oklahoma streams in 1992. Care must be taken in interpreting results for some license types because of the small sample size in 1993. In general, the total number of trips per license holder was similar for the two samples (compare the last column in Tables 4 and 25). Small sample size probably biased the results for senior license holders in Table 25. The same general trend for the 1993 sample exists as with the 1992 sample in terms of highest number of trips per license holder type: (1) eastern Oklahoma annual resident, (108.1); (2) lifetime (fishing and combination fishing and hunting combined) (130-131); (3) annual fishing and hunting (100); and (4) rest-of-Oklahoma annual fishing (108.2). (Non-resident and senior are excluded because of small sample size).

The total sample number of trips (Table 25) on which the average one-way travel distance and cost per trip are based includes (1) 2,185 for eastern Oklahoma annual resident (108.1); (2) 1,429 for combined lifetime (130-131); (3) 482 for combination annual fishing and hunting (100); (4) 340 for combined senior (140-141); and (5) 55 for rest-of-Oklahoma annual fishing (108.2). Sample number of trips for which averages are computed by type of water are fewer as seen in Table 25. However, sample number of trips to eastern Oklahoma streams for which averages are computed are: (1) 1,132 for eastern Oklahoma annual resident (108.1); (2) 540 for combined lifetime (130-131); (3) 196 combined senior (140-141); (4) 156 for combination annual fishing and hunting (100); (5) 5 for combined non-resident (109-116); and (6) 0 for rest-of-Oklahoma annual fishing (108.2).

Average one-way travel distance per trip by license type and type of water for the sample of trips is reported in Table 26. The averages have been weighted by the number of trips per license holder. Eastern Oklahoma annual resident fishing, combined senior, and combination annual fishing and fishing and hunting have the lowest one-way travel distance for all trips (16.9 miles, 23.2 miles, and 29.8 miles, respectively). Rest-of-Oklahoma annual fishing, non-resident, and combined lifetime have the highest one-way travel distance per trip (60.1 miles, 47.0 miles, and 42.6 miles) although some of these are based on very low sample numbers.

Average one-way travel distance for trips made to eastern Oklahoma streams are: (1) combined senior, 5.5 miles; (2) eastern Oklahoma resident annual fishing, 13.6 miles; (3) combination annual fishing and hunting, 27.1 miles; (4) combined lifetime, 27.6 miles; and (5) non-resident, 47.0 miles. Non-resident and combined senior are based on very small sample numbers. Because the streams of interest are in eastern Oklahoma, we expect average one-way travel distance per trip for eastern Oklahoma residents to be low. Similarly, because most reservoirs are in eastern Oklahoma, we expect average one-way travel distance per trip for eastern Oklahoma residents to be low relative to other license type holders. For eastern Oklahoma residents the average one-way travel distance per trip to reservoirs is 22.4 miles versus 31.4 miles for annual combination fishing and hunting and 53.7 miles for combined lifetime license holders.

Average cost per trip by license type and type of water for the sample of trips is reported in Table 27. The cost per trip for all trips and trips for each water body is given by license type. The lowest cost per trip for all trips are for eastern Oklahoma annual resident (\$9.06), resident combination fishing and hunting (\$24.65), and combined senior (\$28.06). The highest cost per

trip for all trips are for annual rest-of-Oklahoma (\$58.18), combined non-resident (\$50.00), and combined lifetime (\$45.33). Eastern Oklahoma stream trips are generally lower cost per trip for each license type compared to trips to other bodies of water. Eastern Oklahoma annual resident is notable in that reservoir and small lake trips are less than small stream fishing in the same region. However, most of the reservoirs are located in eastern Oklahoma and are an important source of trips for that license type.

License holders were asked the names of the small streams in eastern Oklahoma that they fished. The frequency of the number of different streams fished is recorded in Table 28. It is notable that a large number of license holders fished in several streams (up to five different streams).

Of major interest in the current study is the economic contribution of eastern Oklahoma stream fishing to the local economy as well as the benefits of stream fishing to all anglers (license holders) that use the streams. The first issue (economic contribution) is addressed by the results presented in Table 29. The second issue (benefits of stream fishing to anglers) is part of a continuing study of eastern Oklahoma stream fishing.

The number of trips to eastern Oklahoma streams was estimated from the screening survey of 1992 license holders (Table 5). The aggregate number of trips to eastern Oklahoma streams was estimated at 1,823,600.

The cost per trip estimated from the 1993 survey (Table 27) is used to multiply the number of trips to arrive at an aggregate expenditure on trips made to eastern Oklahoma streams. An estimate of the aggregate annual expenditures made on eastern Oklahoma stream trips is about \$29,000,000. The license types representing major amounts of expenditures are annual eastern Oklahoma resident (38.6%), combined lifetime (30.8%), and annual combination fishing and hunting (15.3%). Combined senior, non-resident, and annual rest-of-Oklahoma represent license types with less than \$10,000,000 annual expenditures on trips.

### Conclusions

The objectives of the economic analysis in the current study were to: (1) determine who utilizes eastern Oklahoma small rivers and streams for fishing purposes, (2) obtain socio-economic information about those that utilize the streams and how they utilize the streams, and (3) assess the economic importance of the streams for fishing purposes. The procedures were (1) utilize the population of license holders in 1992 to draw a sample for conducting a screening survey in determining those that fish eastern Oklahoma streams, and (2) conduct telephone surveys for purposes of obtaining information in completing the objectives specified above.

The following are major conclusions drawn from results of the current study:

- (1) About 11.6 percent of all Oklahoma license holders fished eastern Oklahoma small rivers and streams in 1992. The percentage of license holders fishing eastern Oklahoma small streams varied by license type. Eastern Oklahoma annual resident license holders had the highest percent at 23.8%. About 10.1% of all fishing trips made by all license holders

were made to eastern Oklahoma streams in 1992. These results indicate the importance of natural stream fishing in eastern Oklahoma.

- (2) Eastern Oklahoma streams are utilized for fishing all year, however, spring quarter (March, April and May) and summer quarter (June, July and August) have the highest percent of angler use (Table 21).
- (3) The average cost per trip made in 1993 to eastern Oklahoma streams varied from \$4.68 for senior license holders to \$50.00 for non-resident license holders. For eastern Oklahoma residents (annual license holders) making trips to eastern Oklahoma streams, the average cost per trip was \$9.88, the average one-way travel distance per trip was 13.6 miles, and the average number of trips per license holder that fished in 1993 was 25.7.
- (4) The estimated annual expenditures on all trips made to eastern Oklahoma streams is about \$29 million in 1992-1993 price level. This result indicates the economic importance of eastern Oklahoma streams to the regional economy.

Year	1993	1992	1991	1990
191. Average number of trips per license holder	25.7	24.8	23.5	22.1
192. Average cost per trip	\$9.88	\$10.15	\$10.50	\$10.80
193. Average one-way travel distance per trip (miles)	13.6	13.8	14.0	14.2
194. Average number of license holders	1,400,000	1,350,000	1,300,000	1,250,000
195. Total number of license holders	1,400,000	1,350,000	1,300,000	1,250,000
196. Total number of trips	35,500,000	34,800,000	33,750,000	32,625,000
197. Total cost of trips	\$348,000,000	\$341,000,000	\$334,000,000	\$321,000,000
198. Total one-way travel distance	480,000,000 miles	470,000,000 miles	460,000,000 miles	450,000,000 miles
199. Total number of license holders (thousands)	1,400	1,350	1,300	1,250
200. Total number of trips (thousands)	35,500	34,800	33,750	32,625
201. Total cost of trips (thousands)	348,000	341,000	334,000	321,000
202. Total one-way travel distance (thousands of miles)	480,000	470,000	460,000	450,000

Table 1.--Screening survey administered to Oklahoma fishing license holders by type of license, 1992.

License Type	License Holders (FY 92)	Samples		Completed		Non-response <sup>1</sup>
		Original	Supplement	Original	Supplement	
100 Resident, combination fishing and hunting	78,000	501	--	142	--	359 (2)
108 Resident, annual						
108.1 Eastern Oklahoma <sup>2</sup>	162,000	408	609	83	215	719 (11)
108.2 Rest-of-Oklahoma	188,000	592	--	215	--	377 (21)
109 Non-resident, annual fishing	37,000	123	--	44	--	79 (0)
110 Non-resident, 10-day fishing	8,000	50	--	20	--	30 (1)
116 Non-resident, 3-day fishing	62,000	126	--	22	--	104 (0)
130 Lifetime, fishing <sup>3</sup>	8,000	160	--	60	--	100 (0)
131 Lifetime, fishing and hunting <sup>3</sup>	43,000	740	--	232	--	508 (2)
140 Senior, fishing <sup>3</sup>	15,000	98	--	33	--	65 (1)
141 Senior, fishing and hunting <sup>3</sup>	26,000	202	--	81	--	121 (2)
<b>Total</b>	<b>627,000</b>	<b>3,000</b>	<b>609</b>	<b>932</b>	<b>215</b>	<b>2,462 (40)</b>

<sup>1</sup> Number in parentheses equals the number of interview refusals.

<sup>2</sup> Counties in Eastern Oklahoma are shown in Figure 2.

<sup>3</sup> Data from the files of active license holders.

Table 2.--Types of waters fished by Oklahoma license holders, 1992.

License Type	Completed surveys (no.)	Did not fish in 1992 (no.) (%)		Types of waters fished (percentage of those that fished)						
				Reservoirs	Small impoundments	Farm ponds	Large rivers	Small rivers and streams		
								All	In eastern Oklahoma	
100 Resident, combination fishing and hunting	142	10	7.0	58.3	31.1	43.2	18.2	25.0	15.2	
108 Resident, annual fishing										
108.1 Eastern Oklahoma	298	10	3.4	61.1	33.9	30.9	26.4	26.6	24.6	
108.2 Rest-of-Oklahoma	215	7	3.3	67.3	25.6	43.0	8.7	11.6	4.0	
109 Non-resident, annual fishing	44	0	0.0	70.5	25.0	2.3	4.6	9.1	4.5	
110 Non-resident, 10-day fishing	20	0	0.0	70.0	25.0	0.0	10.0	5.0	5.0	
116 Non-resident, 3-day fishing	22	0	0.0	68.2	22.7	18.2	4.6	0.0	0.0	
130 Lifetime, fishing	60	4	6.7	62.5	50.0	66.1	26.8	37.5	28.6	
131 Lifetime, fishing and hunting	232	21	9.1	56.9	51.4	64.0	24.6	31.3	21.0	
140 Senior, fishing	33	8	24.2	84.0	12.0	24.0	4.0	16.0	4.0	
141 Senior, fishing and hunting	81	21	26.3	54.2	39.0	27.1	20.3	20.3	15.3	

Table 3.--Estimated number of Oklahoma license holders that fished different types of water, 1992 (thousands).

License Type	Number of licenses holders	Types of waters						In Eastern Oklahoma
		Reservoirs	Small impoundments	Farm ponds	Large rivers	Small rivers and streams		
						All		
100 Resident, combination fishing and hunting	78	42.3	22.6	31.3	13.2	18.1	11.0	
108 Resident, annual fishing								
108.1 Eastern Oklahoma	162	95.6	53.1	48.4	41.3	41.6	38.5	
108.2 Rest-of-Oklahoma	188	122.3	46.5	78.2	15.8	21.1	7.3	
109 Non-resident, annual fishing	37	26.1	9.3	0.9	1.7	3.4	1.7	
110 Non-resident, 10-day fishing	8	5.6	2.0	0.0	0.8	0.4	0.4	
116 Non-resident, 3-day fishing	62	42.3	14.1	11.3	2.9	0.0	0.0	
130 Lifetime, fishing	8	4.7	3.7	4.9	2.0	2.8	2.1	
131 Lifetime, fishing and hunting	43	22.2	20.1	25.0	9.6	12.2	8.2	
140 Senior, fishing	15	9.6	1.4	2.7	0.5	1.8	0.5	
141 Senior, fishing and hunting	26	10.4	7.5	5.2	3.9	3.9	2.9	
Total	627	381.1	180.3	207.9	91.7	105.3	72.6	
Percent	NA	60.8	28.8	33.2	14.6	16.8	11.6	

Table 4.--Average number of trips per license holder for different water types, 1992.

License Type	Types of water						Total
	Reservoirs	Small impoundments	Farm ponds	Large rivers	Small rivers and streams excluding eastern OK	Small rivers and streams in eastern Oklahoma	
100 Resident, combination fishing and hunting	12.8	7.4	10.7	2.0	2.7	3.1	38.7
108 Resident, annual fishing							
108.1 Eastern Oklahoma	16.8	5.8	6.9	4.8	0.6	7.0	41.9
108.2 Rest-of-Oklahoma	10.5	2.6	8.3	1.5	1.7	0.3	24.9
109 Non-resident, annual fishing	6.6	3.5	0.2	0.3	0.2	0.4	11.2
110 Non-resident, 10-day fishing	1.3	1.2	0.0	1.6	0.0	0.1	4.2
116 Non-resident, 3-day fishing	1.9	0.5	0.3	0.1	0.0	0.0	2.8
130 Lifetime, fishing	13.9	7.0	17.0	2.3	3.9	7.3	51.4
131 Lifetime, fishing and hunting	9.6	6.2	11.9	2.8	2.7	3.7	36.9
140 Senior, fishing	5.5	0.6	1.6	0.3	5.0	1.2	14.2
141 Senior, fishing and hunting	10.9	5.0	1.7	1.8	1.1	5.8	26.3

Table 5.--Estimated number of total trips to different types of water by license holder type, 1992 (thousands).

License Type	Reservoirs	Small impoundments	Farm ponds	Large rivers	Small rivers and streams excluding eastern OK	Small rivers and streams in eastern Oklahoma	Total
100 Resident, combination fishing and hunting	1,001.9	579.0	837.8	158.7	213.7	245.5	3,036.6
108 Resident, annual fishing							
108.1 Eastern Oklahoma	2,725.4	940.9	1,122.0	781.3	101.9	1,128.5	6,800.0
108.2 Rest-of-Oklahoma	1,971.9	494.3	1,553.3	277.9	325.2	48.9	4,671.5
109 Non-resident, annual fishing	243.9	131.2	6.7	10.9	8.8	16.0	417.5
110 Non-resident, 10-day fishing	10.0	9.2	0.0	12.4	0.0	0.4	32.0
116 Non-resident, 3-day fishing	115.5	31.0	19.7	2.8	0.0	0.0	169.0
130 Lifetime, fishing	110.9	55.9	136.3	18.1	31.1	58.0	410.3
131 Lifetime, fishing and hunting	412.3	265.3	512.4	119.5	114.3	157.9	1,581.7
140 Senior, fishing	82.7	9.1	24.4	4.5	75.5	18.2	214.4
141 Senior, fishing and hunting	284.4	129.7	45.2	47.1	29.6	150.2	686.2
Total	6,958.9	2,645.6	4,257.8	1,433.2	900.1	1,823.6	18,019.2
Percent of total trips	38.6	14.7	23.6	8.0	5.0	10.1	100.0

Table 6. Average number of license holders per household and average number of non-licensed children in household, 1992.

License	Type	License holders <sup>1/</sup>	Non-licensed children <sup>2/</sup>
100	Resident, combination fishing and hunting	1.63	0.64
108	Resident, annual fishing		
	108.1 Eastern Oklahoma	1.80	0.69
	108.2 Rest-of-Oklahoma	1.75	0.76
109	Non-resident, annual fishing	1.34	0.69
110	Non-resident, 10-day fishing	1.50	0.35
116	Non-resident, 3-day fishing	1.50	0.35
130	Lifetime, fishing	1.70	0.80
131	Lifetime, fishing and hunting	1.79	0.60
140	Senior, fishing	1.60	0.00
141	Senior, fishing and hunting	1.59	0.07

<sup>1/</sup> Including interviewee

<sup>2/</sup> Children that fished

Table 7. Percent of sample that fished for smallmouth bass (SMB) in reservoirs and large rivers compared to number that fished in eastern Oklahoma small rivers and streams.

License	Type	Sample size (no. that fished)	Fished for SMB in reservoirs (%)	Fished for SMB in large river (%)	Fished eastern Oklahoma small rivers and streams <sup>1/</sup> (%)
100	Resident, combination fishing and hunting	132	15.2	4.5	15.2
108	Resident, annual fishing				
	108.1 Eastern Oklahoma	288	18.8	5.6	24.6
	108.2 Rest-of-Oklahoma	208	22.6	3.3	4.0
109	Non-resident, annual fishing	44	6.8	0.0	4.5
110	Non-resident, 10-day fishing	20	1.0	0.0	5.0
116	Non-resident, 3-day fishing	22	13.6	0.0	0.0
130	Lifetime, fishing	56	26.7	10.7	28.6
131	Lifetime, fishing and hunting	211	14.7	6.2	21.0
140	Senior, fishing	25	40.0	4.0	4.0
141	Senior, fishing and hunting	60	13.3	3.3	15.3

<sup>1/</sup> Fished all species.

Table 8. Percent of Oklahoma license holder sample that fished in other states, 1992.

License	Type	Sample size (no. that fished)	Fished in other states (%)	Three most frequent states mentioned
100	Resident, combination fishing and hunting	132	18.2	Texas, Arkansas, Colorado
108	Resident, annual fishing			
	108.1 Eastern Oklahoma	288	18.8	Arkansas, Missouri, Texas
	108.2 Rest-of-Oklahoma	208	21.2	Texas, Arkansas, Colorado
109	Non-resident, annual fishing	44	86.4	Missouri, Kansas, Arkansas
110	Non-resident, 10-day fishing	20	60.0	Texas, Missouri, various
116	Non-resident, 3-day fishing	22	68.2	Missouri, Kansas, various
130	Lifetime, fishing	56	25.0	Arkansas, Texas, Colorado
131	Lifetime, fishing and hunting	211	27.0	Texas, Colorado, Arkansas and Missouri
140	Senior, fishing	25	24.0	One for each of 6 states
141	Senior, fishing and hunting	60	21.7	Texas, Arkansas, Colorado

Table 9. Did you purchase a license in 1993 or do you expect to purchase a license?

License	Type	Sample size (no.)	Have purchased (no.)	Expect to purchase (no.)	Total	
					(no.)	(%)
100	Resident, combination fishing and hunting	142	112	19	131	92.2
108	Resident, annual fishing					
	108.1 Eastern Oklahoma	298	193	52	245	82.2
	108.2 Rest-of-Oklahoma	215	121	73	194	90.2
109	Non-resident, annual fishing	44	25	11	36	81.8
110	Non-resident, 10-day fishing	20	6	10	16	80.0
116	Non-resident, 3-day fishing	22	8	13	21	95.5

Table 10. Gender distribution of Oklahoma license holders by license type, 1992, with comparison to state population, 1991.

License	Type	License Holders (FY 92)	Male (% reporting)	Female (% reporting)	Sample	
					No. reporting	Sample no.
100	Resident, combination fishing and hunting	78,000	96.4	3.6	140	142
108	Resident, annual fishing					
	108.1 Eastern Oklahoma	162,000	65.0	35.0	297	298
	108.2 Rest-of-Oklahoma	188,000	71.1	28.9	211	215
109	Non-resident, annual fishing	37,000	81.8	18.2	44	44
110	Non-resident, 10-day fishing	8,000	85.0	15.0	20	20
116	Non-resident, 3-day fishing	62,000	45.5	54.6	22	22
130	Lifetime, fishing	8,000	81.7	18.3	60	60
131	Lifetime, fishing and hunting	43,000	97.8	2.2	230	232
140	Senior, fishing	15,000	39.4	60.6	33	33
141	Senior, fishing and hunting	26,000	93.8	6.3	80	81
	Total	627,000	73.0 <sup>1/</sup>	27.0 <sup>1/</sup>	1,137	1,147
	State population, 16 years and older 1991 (%)	NA <sup>2/</sup>	47.0	53.0	NA	NA

<sup>1/</sup> Weighted total by number of license holders.

<sup>2/</sup> State population of 2,411,100.

Table 11. Age distribution of Oklahoma license holders by license type, 1992.

License	Type	Average age (years)	Sample	
			No. reporting	Sample no.
100	Resident, combination fishing and hunting	42.5	140	142
108	Resident, annual fishing			
	108.1 Eastern Oklahoma	44.5	294	298
	108.2 Rest-of-Oklahoma	42.2	212	215
109	Non-resident, annual fishing	45.8	43	44
110	Non-resident, 10-day fishing	50.1	20	20
116	Non-resident, 3-day fishing	46.2	21	22
130	Lifetime, fishing	38.6	60	60
131	Lifetime, fishing and hunting	39.8	230	232
140	Senior, fishing	67.9	30	33
141	Senior, fishing and hunting	<u>67.5</u>	<u>79</u>	<u>81</u>
	All	45.0 <sup>1/</sup>	1,129	1,147

<sup>1/</sup> Weighted by number of license holders.

Table 12. Retired status of Oklahoma license holders by license type, 1992.

License	Type	Retired		Sample	
		(% reporting)	(% reporting)	(No. reporting)	(Sample no.)
100	Resident, combination fishing and hunting	13.9	86.1	137	142
108	Resident, annual fishing				
	108.1 Eastern Oklahoma	20.3	79.7	295	298
	108.2 Rest-of-Oklahoma	10.4	89.6	211	215
109	Non-resident, annual fishing	20.9	79.1	43	44
110	Non-resident, 10-day fishing	25.0	75.0	20	20
116	Non-resident, 3-day fishing	18.2	81.8	22	22
130	Lifetime, fishing	6.7	93.3	60	60
131	Lifetime, fishing and hunting	8.3	91.7	230	232
140	Senior, fishing	97.0	3.0	33	33
141	Senior, fishing and hunting	87.5	12.5	80	81
	All	20.5 <sup>1/</sup>	79.5 <sup>1/</sup>	1,131	1,147

<sup>1/</sup> Weighted by number of license holders.

Table 13. Education of Oklahoma license holders by license type, 1993, with comparisons to state population, 1991.

License Type	Highest Education Level Completed (% reporting)				Sample	
	Grade school	High school	Vocational technical	College	No. reporting	Sample no.
100 Resident, combination fishing and hunting	7.9	58.6	7.9	25.7	140	142
108 Resident, annual fishing						
108.1 Eastern Oklahoma	16.7	59.0	5.8	18.4	293	298
108.2 Rest-of-Oklahoma	10.8	63.2	6.6	19.3	212	215
109 Non-resident, annual fishing	16.7	54.8	7.1	21.4	42	44
110 Non-resident, 10-day fishing	10.0	70.0	0.0	20.0	20	20
116 Non-resident, 3-day fishing	9.1	54.6	0.0	36.4	22	22
130 Lifetime, fishing	6.7	73.3	6.7	13.3	60	60
131 Lifetime, fishing and hunting	12.0	54.4	4.0	29.6	226	232
140 Senior, fishing	25.8	64.5	3.2	6.4	31	33
141 Senior, fishing and hunting	30.0	43.8	1.2	25.0	80	81
Total	13.0 <sup>1/</sup>	59.0 <sup>1/</sup>	6.0 <sup>1/</sup>	22.0 <sup>1/</sup>	1,126	1,147
State population 16 years and older, 1991	19.0	42.0	21.0 <sup>2/</sup>	17.0	NA	NA

<sup>1/</sup> Weighted by number of license holders.<sup>2/</sup> Vocational technical and some college.

Table 14. Ethnic distribution of Oklahoma license holders by license type, 1992, with comparisons to state population, 1991.

License Type	White	Black	Native American (%reporting)	All others	Sample	
					No. reporting	Sample no.
100 Resident, combination fishing and hunting	90.6	2.2	6.5	0.7	139	142
108 Resident, annual fishing						
108.1 Eastern Oklahoma	83.7	1.0	14.3	1.0	294	298
108.2 Rest-of-Oklahoma	86.8	2.8	5.2	5.2	212	215
109 Non-resident, annual fishing	95.2	0.0	2.4	2.4	42	44
110 Non-resident, 10-day fishing	100.0	0.0	0.0	0.0	20	20
116 Non-resident, 3-day fishing	95.2	4.8	0.0	0.0	21	22
130 Lifetime, fishing	91.7	0.0	6.7	1.6	60	60
131 Lifetime, fishing and hunting	89.1	0.0	7.4	3.5	229	232
140 Senior, fishing	84.4	3.1	9.4	3.1	32	33
141 Senior, fishing and hunting	92.5	2.5	3.8	1.2	80	81
Total	89.0 <sup>1/</sup>	2.0 <sup>1/</sup>	7.0 <sup>1/</sup>	2.0 <sup>1/</sup>	1,129	1,147
State population 16 years and older, 1991	87.0 <sup>2/</sup>	5.0 <sup>2/</sup>				

<sup>1/</sup> Weighted by number of license holders.

<sup>2/</sup> Native Americans and all others are equal to 8%.

Table 15. Mean and median household income for Oklahoma license holders, 1992.

License Type	Median (\$)	Mean (\$)	SD	Sample		
				Number reporting	Not reporting no.	%
100 Resident, combination fishing and hunting	37,500	42,738	21,237	105	37	26
108 Resident, annual fishing						
108.1 Eastern Oklahoma	32,500	37,904	21,202	198	100	34
108.2 Rest-of-Oklahoma	37,500	39,371	21,000	151	64	30
109 Non-resident, annual fishing	42,500	45,750	23,864	30	14	32
110 Non-resident, 10-day fishing	42,500	46,471	19,567	17	3	15
116 Non-resident, 3-day fishing	42,500	50,313	31,317	16	6	27
130 Lifetime, fishing	37,500	40,426	23,673	47	13	22
131 Lifetime, fishing and hunting	42,500	47,064	22,621	149	83	36
140 Senior, fishing	20,000	27,750	26,470	10	23	70
141 Senior, fishing and hunting	27,500	32,703	21,885	37	44	54
Total	37,500	40,978	NA	760	387	34

<sup>1/</sup> Weighted by number of license holders.

Table 16. Sample of license holders that fished eastern oklahoma small rivers and streams, 1992.

License Type	Sample no.	Sample weight'
100 Resident, combination fishing and hunting	20	0.1379
108 Resident, annual fishing		
108.1 Eastern Oklahoma	71	0.2870
108.2 Rest-of-Oklahoma	8	0.3328
109 Non-resident, annual fishing	2	0.0657
110 Non-resident, 10-day fishing	1	0.0140
116 Non-resident, 3-day fishing	0	0.0000
130 Lifetime, fishing	16	0.0140
131 Lifetime, fishing and hunting	44	0.0762
140 Senior, fishing	1	0.0268
141 Senior, fishing and hunting	9	0.0460
Total	172	1.0000

Table 17. Types of species sought by Oklahoma license holders that fished eastern Oklahoma rivers and streams, 1992.

License Type	Percent of License Holders that fished for				
	Catfish	Smallmouth, largemouth, and spotted bass	Sunfish and perch	White bass, striped bass, and hybrids	Trout
100 Resident, combination fishing and hunting	30	75	10	15	10
108 Resident, annual fishing					
108.1 Eastern Oklahoma	61	68	23	15	13
108.2 Rest-of-Oklahoma	44	67	11	22	11
109 Non-resident, annual fishing	100	100	0	0	0
110 Non-resident, 10-day fishing	0	0	0	0	0
116 Non-resident, 3-day fishing	0	0	0	0	0
130 Lifetime, fishing	50	56	6	38	19
131 Lifetime, fishing and hunting	51	51	5	19	21
140 Senior, fishing	100	100	0	0	0
141 Senior, fishing and hunting	67	78	11	33	33
Total <sup>1/</sup>	53	70	13	17	12

<sup>1/</sup> Weighted by number of license holders.

Table 18. Type of access to eastern Oklahoma small rivers and streams.

License Type	Percent of license holders that used	
	Public access	Private access
100 Resident, combination fishing and hunting	75	50
108 Resident, annual fishing		
108.1 Eastern Oklahoma	92	35
108.2 Rest-of-Oklahoma	89	22
109 Non-resident, annual fishing	100	50
110 Non-resident, 10-day fishing	100	0
116 Non-resident, 3-day fishing	--	--
130 Lifetime, fishing	81	50
131 Lifetime, fishing and hunting	86	37
140 Senior, fishing	0	100
141 Senior, fishing and hunting	67	56

Table 19. Location and method of fishing eastern Oklahoma small rivers and streams.

License Type	From where do you do your stream fishing? (% of sample)			
	Bank	Wading or float tube	Boat/ canoe	Bridge crossing
100 Resident, combination fishing and hunting	40	40	55	5
108 Resident, annual fishing				
108.1 Eastern Oklahoma	69	27	52	3
108.2 Rest-of-Oklahoma	67	33	33	11
109 Non-resident, annual fishing	50	0	100	0
110 Non-resident, 10-day fishing	100	0	100	0
116 Non-resident, 3-day fishing	--	--	--	--
130 Lifetime, fishing	56	25	44	0
131 Lifetime, fishing and hunting	56	30	60	7
140 Senior, fishing	100	0	100	0
141 Senior, fishing and hunting	56	33	67	11

Table 20. Frequencies of the times of the day license holders stream fished.

License Type	Times of the day did stream fishing (% of sample that fished)			
	Morning (sunrise - 10:00a.m.)	Midday (10:00 a.m. - 3:00 p.m.)	Evening (3:00 p.m. - sunset)	Night time (sunset to sunrise)
100 Resident, combination fishing and hunting	35	35	30	10
108 Resident, annual fishing				
108.1 Eastern Oklahoma	44	20	35	13
108.2 Rest-of-Oklahoma	56	0	11	11
109 Non-resident, annual fishing	0	50	0	50
110 Non-resident, 10-day fishing	100	0	100	0
116 Non-resident, 3-day fishing	--	--	--	--
130 Lifetime, fishing	50	19	63	6
131 Lifetime, fishing and hunting	56	14	37	7
140 Senior, fishing	-- <sup>1/</sup>	-- <sup>1/</sup>	-- <sup>1/</sup>	-- <sup>1/</sup>
141 Senior, fishing and hunting	56	22	22	22

<sup>1/</sup> The one observation in this category indicated they fished all times.

Table 21. Overall frequency of eastern Oklahoma stream fishing by months of the year by license holders.

Months	% of sample that fished by month <sup>1/</sup>
January	12
February	17
March	33
April	57
May	69
June	67
July	57
August	43
September	30
October	25
November	19
December	15

<sup>1/</sup> Weighted by number of license holders in each license type.

Table 22. Importance of eating fish caught in eastern Oklahoma streams by license holder types.

License Type	Importance of eating fish caught in eastern Oklahoma streams (% of sample that fished)			
	Extremely Important	Important	Moderately Important	Not Important
100 Resident, combination fishing and hunting	15	35	15	35
108 Resident, annual fishing				
108.1 Eastern Oklahoma	24	24	20	32
108.2 Rest-of-Oklahoma	44	0	22	33
130 Lifetime, fishing	25	25	19	31
131 Lifetime, fishing and hunting	21	16	30	33
140 Senior, fishing	100	0	0	0
141 Senior, fishing and hunting	33	22	11	33

Table 23. Sample number of license holders that fished in eastern Oklahoma streams in 1992 and sample number that fished in 1993.

License Type	1992 sample no.	1993 sample	
		Completed surveys	Number fished
	(1)	(2)	(3)
100 Resident, combination fishing and hunting	20	20	17
108 Resident, annual fishing			
108.1 Eastern Oklahoma	71	67	47
108.2 Rest-of-Oklahoma	8	9	4
109 Non-resident, annual fishing	2	2	1
110 Non-resident, 10-day fishing	1	1	0
116 Non-resident, 3-day fishing	0	0	0
130 Lifetime, fishing	16	15	8
131 Lifetime, fishing and hunting	44	41	27
140 Senior, fishing	1	1	1
141 Senior, fishing and hunting	9	7	4
Total	172	163	109

Table 24. Sample number of license holders that fished eastern Oklahoma streams and other bodies of water, 1993.

License Type	1993 sample		Types of waters fished by license holders (percentage of useable observations)			
	No. that fished <sup>1/</sup>	Useable obs.	Eastern Oklahoma Streams	Reservoirs	Small Lakes	Rivers
	(1)	(2)	(3)	(4)	(5)	(6)
100 Resident, combination fishing and hunting	17	15	86.7	66.7	46.7	26.7
108 Resident, annual fishing						
108.1 Eastern Oklahoma	47	44	81.8	77.3	34.1	45.5
108.2 Rest-of-Oklahoma	4	3	0.0	66.7	66.7	33.3
109 Non-resident, annual fishing	1	1	100.0	0.0	0.0	0.0
110 Non-resident, 10-day fishing	0	0	--	--	--	--
116 Non-resident, 3-day fishing	0	0	--	--	--	--
130 Lifetime, fishing	8	6	100.0	66.7	33.3	33.3
131 Lifetime, fishing and hunting	27	26	73.1	76.9	26.9	34.6
140 Senior, fishing	1	1	100.0	0.0	100.0	0.0
141 Senior, fishing and hunting	4	4	100.0	100.0	50.0	50.0
Total	109	100	NA	NA	NA	NA

<sup>1/</sup> From Table 23 column (3).

Table 25. Sample number of trips of license holders that fished eastern Oklahoma streams and other bodies of water, 1993.

License Type	Sample of License Holders <sup>1/</sup>	Sample number of trips					Average no. of trips per license holder	
		Eastern OK Streams	Reservoirs	Small Lakes	Rivers	Total		
100	Resident, combination fishing and hunting	15	156	232	75	19	482	32.1
108	Resident, annual fishing							
	108.1 Eastern Oklahoma	44	1,132	557	266	230	2,185	49.7
	108.2 Rest-of-Oklahoma	3	0	20	20	15	55	18.3
109	Non-resident, annual fishing	1	5	0	0	0	5	5.0
110	Non-resident, 10-day fishing	0	0	0	0	0	0	0
116	Non-resident, 3-day fishing	0	0	0	0	0	0	0
130	Lifetime, fishing	6	53	148	11	20	232	38.7
131	Lifetime, fishing and hunting	26	487	562	76	72	1,197	46.0
140	Senior, fishing	1	14	0	4	0	18	18.0
141	Senior, fishing and hunting	4	182	75	36	29	322	80.5

<sup>1/</sup> From Table 24 column (2).

Table 26. Average one-way travel distance for sample of trips to bodies of water, 1993.

License Type	Sample no. <sup>1/</sup>	Average one-way travel distance per trip to water bodies (miles) <sup>2/</sup>					Average all trips
		Eastern Oklahoma Streams	Reservoirs	Small Lakes	Rivers		
100 Resident, combination fishing and hunting	15	27.1	31.4	32.3	22.6	29.8	
108 Resident, annual fishing							
108.1 Eastern Oklahoma	44	13.6	22.4	14.6	44.6	16.9	
108.2 Rest-of-Oklahoma	3	--	106.0	18.0	55.0	60.1	
109-116 Non-resident	1	47.0	--	--	--	47.0	
130-131 Lifetime	32	27.6	53.7	43.8	34.0	42.6	
140-141 Senior	5	5.5	56.3	37.6	2.9	23.2	

<sup>1/</sup> From Table 24 Column (2).

<sup>2/</sup> Sample number of trips are from Table 25. All averages are weighted by number of trips per license holder.

Table 27. Average cost per trip for sample of trips to bodies of water, 1993.

License Type		Sample no. <sup>1/</sup>	Average cost per trip to bodies water (\$) <sup>2/</sup>				Average all trips
			Eastern Oklahoma Streams	Reservoirs	Small Lakes	Rivers	
100	Resident, combination fishing and hunting	15	17.99	29.60	26.11	13.16	24.65
108	Resident, annual fishing						
	108.1 Eastern Oklahoma	44	9.88	4.31	7.28	18.61	9.06
	108.2 Rest-of-Oklahoma	3	--	132.00	16.00	10.00	58.18
109-116	Non-resident	1	50.00	--	--	--	50.00
130-131	Lifetime	32	41.20	49.94	45.80	33.55	45.33
140-141	Senior	5	4.68	93.52	33.00	10.00	28.06

<sup>1/</sup> From Table 24 Column (2).

<sup>2/</sup> Sample number of trips are from Table 25. All averages are weighted by number of trips per license holder.

Table 28. Frequency of number of different streams fished by samples of license holders, 1993.

License Type	Sample Size <sup>1/</sup>	Frequency of Number of Streams Fished				
		1	2	3	4	5
100 Resident, combination fishing and hunting	13	13	9	3	1	0
108 Resident, annual fishing						
108.1 Eastern Oklahoma	36	36	27	14	9	3
108.2 Rest-of-Oklahoma	0	0	0	0	0	0
109-116 Non-resident	1	1	1	0	0	0
130-131 Lifetime	25	25	15	9	4	1
140-141 Senior	5	5	3	2	1	1

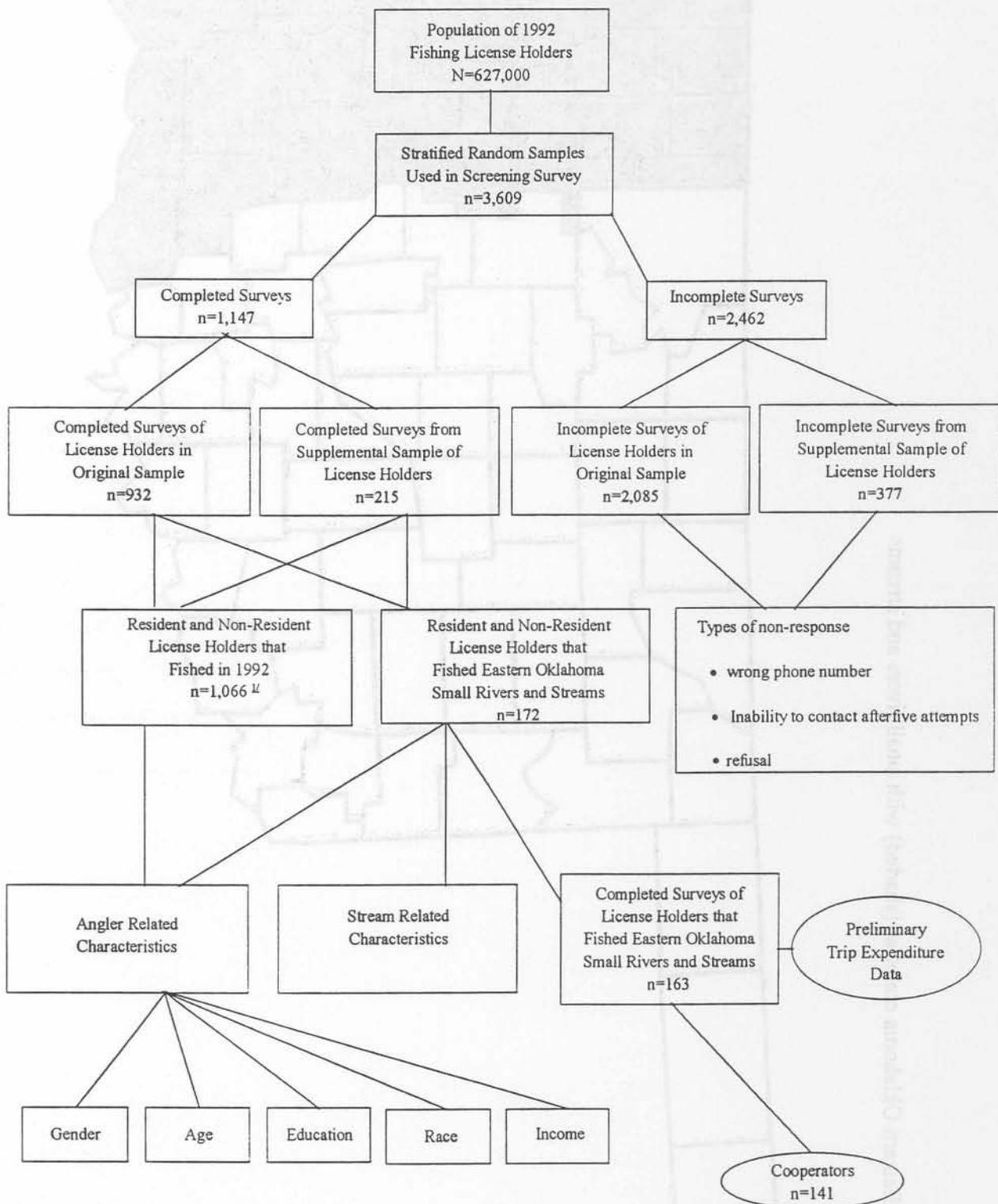
<sup>1/</sup> From data in Table 24 Column (3).

Table 29. Aggregate expenditure by license holder types on trips to eastern Oklahoma streams.

License Type	No. of trips in 1992 to eastern Oklahoma small rivers and streams <sup>1/</sup>	Frequency of Number of Streams Fished		
		Average cost per trip in 1993 <sup>2/</sup> (\$)	Aggregate expenditure for all trips to eastern Oklahoma streams (\$1,000)	(%)
100 Resident, combination fishing and hunting	245,500	17.99	4,417	15.3
108 Resident, annual fishing				
108.1 Eastern Oklahoma	1,128,500	9.88	11,150	38.6
108.2 Rest-of-Oklahoma	48,900	(58.18) <sup>2/</sup>	2,845	9.8
109-116 Non-resident	16,400	50.00	820	2.8
130-131 Lifetime	215,900	41.20	8,895	30.8
140-141 Senior	<u>168,400</u>	<u>4.68</u>	<u>788</u>	<u>2.7</u>
Total	1,823,600	NA	28,915	100.0

<sup>1/</sup> From Table 5.<sup>2/</sup> From Table 27.<sup>3/</sup> Average cost for all trips (Table 27).

Figure 1.--Flow diagram of telephone screening survey process.



<sup>1</sup> Excludes license holders (n=81) that indicated they did not fish in Oklahoma during 1992.

Figure 2. Eastern Oklahoma counties (shaded) with small rivers and streams.

