

ECONOMIC AND ENVIRONMENTAL IMPACTS OF LAKE
DEVELOPMENTS ON ADJACENT COMMUNITIES

By

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PREFACE

It is with much pleasure and a note of sadness that I complete my graduate program at Oklahoma State University. Throughout the past two years several people have contributed many hours to the completion of this thesis and many good friends have been made along the way.

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TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION.	1
The Problem.	1
Objectives	4
Area Selected for Study.	4
Organization of Remainder of Thesis.	6
II. REVIEW OF LITERATURE AND PROCEDURE.	8
Review of Literature	8
Procedure.	11
III. SOCIO-ECONOMIC ANALYSIS	15
Survey Results	15
Economic Growth.	22
IV. PUBLIC SECTOR IMPACTS: AN IN-DEPTH STUDY OF LAKE KEYSTONE	27
Primary Benefits - Sales Tax Computation	29
Ad Valorem Tax Computation	35
Computation of Apportioned Funds	39
Primary Costs - Costs of Education	53
Highway Expenses	57
Computation of General Expenses.	59
Summary of Benefits and Costs.	61
Secondary Impacts.	66
V. INSTITUTIONAL AND ENVIRONMENTAL CONSIDERATIONS.	68
Explanation of Net Benefits.	68
Services Demanded by Lake Development Residents.	69
Local Community Participation in Providing Services to Lake Developments.	73
County Employment	75
The Environmental Impact Assessment.	80
Defining Environmental Problems.	80
The Environmental Impact Assessment.	82

Chapter	Page
VI. SUMMARY AND CONCLUSIONS	85
Methods.	85
Results.	86
Economic Growth	86
Benefit-Cost Analysis	86
Environmental Impacts	87
Conclusions and Policy Implications.	87
Limitations of Study	89
Suggestions for Further Research	90
A SELECTED BIBLIOGRAPHY.	91
APPENDIX	94

LIST OF TABLES

Table	Page
I. Number of Seasonal and Permanent Home Owners Surveyed in the McClellan-Kerr Arkansas River Navigation System Study, 1974-75	12
II. Age of Head of Household Living in Keystone, Ft. Gibson, Tenkiller, Oologah, or Eufaula Lake Developments, (1974 and 1975 Survey Data).	16
III. Occupation of Head of Household Living in Keystone, Ft. Gibson, Tenkiller, Oologah, or Eufaula Lake Developments (1974 and 1975 Survey Data)	17
IV. Education of Head of Household Living in Keystone, Ft. Gibson, Tenkiller, Oologah, or Eufaula Lake Developments (1974 and 1975 Survey Data)	19
V. Number of Permanent Lake Development Families from Five-Lake Area Participating in Lake Related Recreational Activities, by Hour-Class and By Season, 1974-75 Survey Data, Permanent Residents Only	21
VI. Annual Household Income for Keystone, Ft. Gibson, Tenkiller, Oologah, and Eufaula Development Households (1974 and 1975 Survey Data)	24
VII. Market Value of Homes Owned by Lake Development Residents Living in Developments Near Keystone, Ft. Gibson, Tenkiller, Oologah, or Eufaula Lakes (1974 and 1975 Survey Data).	25
VIII. Sales Tax for Mannford and Cleveland Cities, and Surrounding Counties, 1967-75.	32
IX. State Sales Tax for the Three Counties Containing SMSA's: State and Rural Oklahoma Totals, 1966-67 to 1974-75	33
X. Recreational Equipment Owned by the Five-Lake Development Residents Surveyed 1974-75 Survey Data . . .	34

Table	Page
XI. Recreational Equipment Owned by Keystone Development Residents Surveyed 1974-75 Survey Data	36
XII. Ad Valorem Taxes Collected by School Districts in the Three Counties Surrounding Lake Keystone, 1967-75. . . .	37
XIII. State Payments to County Governments in Keystone Lake Impact Area, 1967-1975	40
XIV. Added Revenue to Local Governments from Increase in Keystone Lake Development Students, 1967-75	43
XV. Cumulative Increase in Funds Apportioned to Local Governments from Boat and Motor License Fees Due to Keystone Lake Developments (Based on 1974-75 Survey Data)	45
XVI. Cumulative Increase in Funds Apportioned to Local Governments from Mobile Home License Fees Due to Lake Developments.	47
XVII. Apportioned Oklahoma State Funds to the 77 County Governments, 1970-75	51
XVIII. Amount of State Gas and Special Fuel Tax Apportioned to Osage, Pawnee and Creek Counties Due to Lake Developments	52
XIX. Local Expenditures Per Pupil: Osage, Pawnee, Creek Counties, Three County Weighted Average 1967-1975. . . .	54
XX. Change in Enrollment and Costs for Mannford, Prue, and Cleveland School Districts, 1967-1975.	55
XXI. General Expenses of Osage, Creek, and Pawnee Counties, Due to Increase Population of Keystone Lake Developments 1967-1975.	62
XXII. Summarized Benefits and Costs of Keystone Lake Developments to Local Governments, 1967-1975	63
XXIII. Source of Water Supply for Five-Lake Seasonal and Permanent Development Residents, 1974-75 Survey Data	70
XXIV. Means of Sewage Disposal for Five-Lake Seasonal and Permanent Development Residents, 1974-75 Survey Data	71
XXV. County Employment in Governmental Offices for Creek, Osage, and Pawnee Counties	76

Table	Page
XXVI. Environmental Impact Assessment for Lake Developments Impacts on Local Communities	81

LIST OF FIGURES

Figure	Page
1. Location of Oklahoma Lakes Selected for Seasonal and Permanent Home Impact Study.	5
2. Six Townships Included in the Lake Keystone Benefit-Cost Study.	30
3. Graphical Analysis of Summarized Benefits and Costs of Keystone Lake Developments to Local Governments, 1967-1975.	64

CHAPTER I

INTRODUCTION

The Problem

Since the McClellan-Kerr Arkansas River Navigation System was completed there has been considerable debate as to the waterway's effectiveness, with regard to its economic and environmental aspects. Some of the major multiple purposes analyzed have been flow of barge traffic (navigation), industrial and municipal water supply, flood control and recreation.

Many studies have been completed with these purposes in mind. Most of the studies dealt with the impact of these purposes on the surrounding environment, both economically and environmentally. Comparisons have been made for these purposes in relation to time--before the lake was built in comparison to after the lake was completed.

Some of these studies include the flood control purpose. The Corps of Engineers defines flood control work to be the regulation of floodflows and thus prevention of flood damage, by means of lakes, channel enlargement, realignment, removal of obstructions, construction of levees and flood walls, bank protection, and appurtenant works. According to the Corps' studies, through June of 1976, flood losses prevented in Oklahoma through Corps projects amounted to about \$406,545,000 (22).

The Corps' studies have clarified the objectives of navigation as follows: 1) assistance in the development of waterborne commerce; 2) recreation; 3) promote production and harvest of seafood; 4) improvements in environmental quality; 5) expansion of agricultural production; 6) reduction of regional and sectional handicaps due to poor accessibility; 7) enhancement of fish and wildlife resources; 8) enhancement of social well being (22).

Hydroelectric power is also a primary purpose for the building of dams on the river systems in Oklahoma. Electric power is only provided in the project when the Congress deems it necessary, upon recommendation of the Federal Power Commission.

Water supply from lakes for municipal and industrial uses is possible by permission of the Secretary of Army, for states, municipalities, or even individuals. In Oklahoma the dependable yield from the Corps of Engineers' lakes is about 873 million gallons daily for water supply (22).

Environmental considerations are important for any man made lake. Environmental effects of the lakes in Oklahoma are many, but are difficult to measure in terms of dollars and cents. Therefore impacts of environmental effects are difficult to include in a benefit-cost analysis. The long run and short run effects on the environment, locally, regionally, and nationally all should be taken into account.

When recreation is considered as part of the impacts of a lake project, it can have a large effect on the studies of benefit-cost analysis. In Oklahoma alone, 448,690 surface acres of water are available for recreation. Campgrounds, picnic areas, and other recreation facilities are available on many lakes throughout Oklahoma.

Most of the facilities are free for public use; the exception being camping fees charged by the Corps at selected recreational areas.

All of the above factors are examples of studies that have been used in the past to calculate the impact of a lake on a certain area. While these factors are important from a macro or regional standpoint, there are other factors which affect any given area from a local, micro standpoint. For instance, how do local communities or governments react when a lake is built in their area? If the lake area attracts seasonal recreationists or permanent dwellers, the local communities feel various impacts from the additional population.

On a study of the community of Mannford, Oklahoma, Morgan (1) found that Keystone Lake affected the community by providing considerable economic growth and improvement of the residents' "well being". However, "interpersonal relationships" weakened as a result of the lake being built, due to the increase in population of the area.

Many impacts on the local communities result from the increase in population brought about by the building of a lake. Badger, Schreiner, and Presley (16) reported an increase of 604 families, in seasonal and permanent home developments around Keystone Lake, since it had been built. While there was increases in local population other than from lake developments, the development increase has had a major impact in the local communities surrounding the lake area.

Two factors of importance emerge for careful study. First, an economic study of the developments' contribution to the local economy would describe the lake developments as either additions or hindrances towards economic growth of the area. Then the economic growth (or

lack of it) can be weighed against the environmental impacts of the lake developments on the local communities.

Objectives

Since the lake developments have grown rapidly around lakes in Oklahoma, the extent of the developments' impact on the local communities is important. Five lakes in Northeastern Oklahoma were chosen for data collection sites. These lakes include: Keystone, Oologah, Ft. Gibson, Tenkiller, and Eufaula. This is the area selected for study. The major objectives of the study were:

- 1) to determine the extent of economic growth in the local communities brought about by the lake developments.
- 2) to examine a specific lake for the changes in revenues and costs that are attributable to lake developments. These revenues and costs are of a local government nature (taxes, apportionments, etc.) and were measured over time.
- 3) to analyze some of the environmental impacts associated with the existence of lake developments.

Area Selected for Study

The locations of the five lakes in the study are shown in Figure 1. Keystone Lake is located on the Arkansas and Cimarron Rivers and in the northwest corner of Tulsa County. The lake was completed for flood control in September of 1965, and for power generation in June of 1968. The normal surface area of the lake is 26,020 acres but during top flood stage its surface area is 55,320 acres.

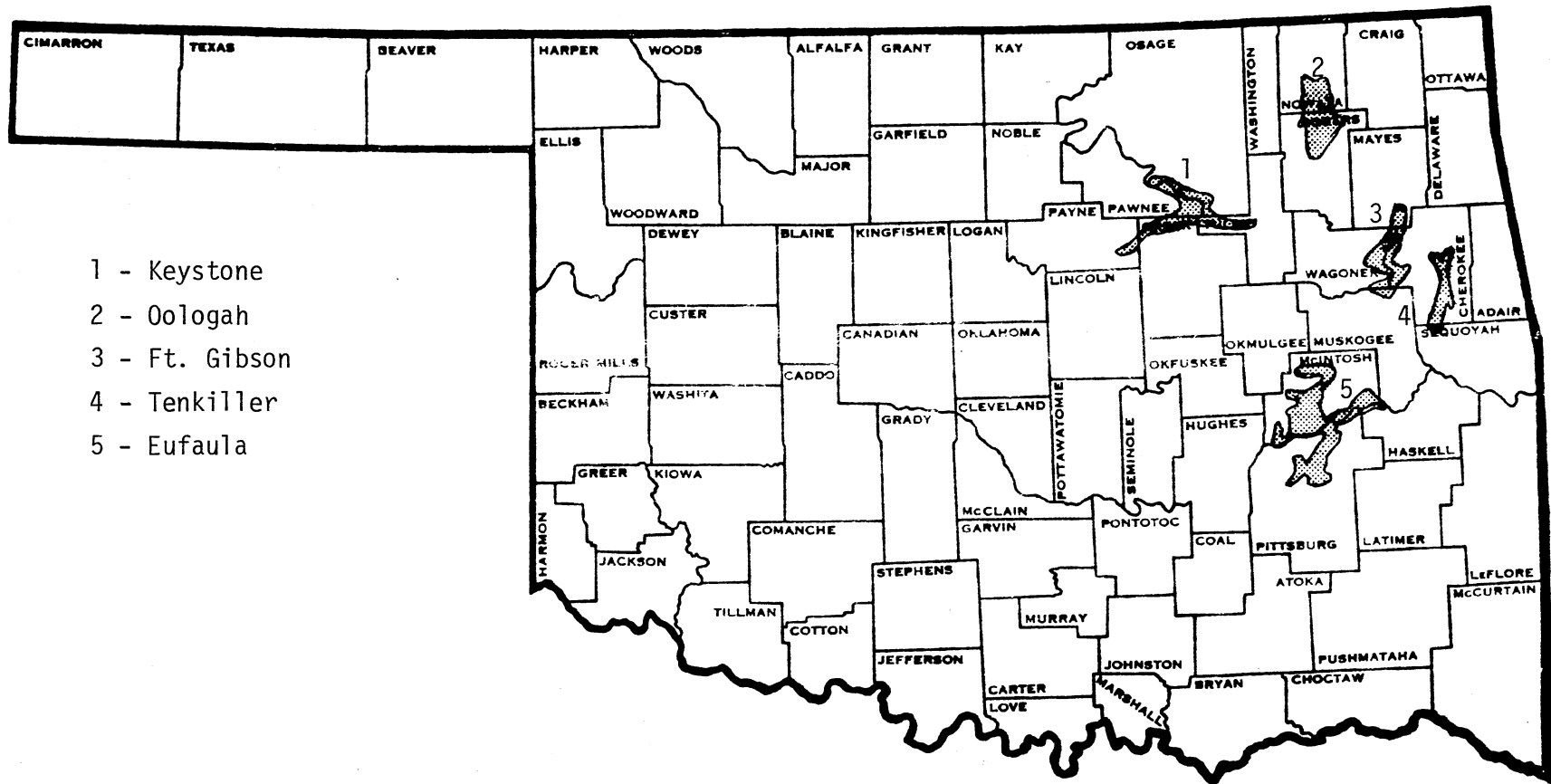


Figure 1. Location of Oklahoma Lakes Selected for Seasonal and Permanent Home Impact Study

Fort Gibson Lake is located on the Grand River in Wagoner, Cherokee and Mayes Counties. Construction was completed in 1953, at a cost of \$43 million. Its normal surface area is 19,900 acres but may increase to 51,000 surface acres in flood stage operation.

Eufaula Lake was completed in December, 1964, at a cost of \$122 million. It is located on the Canadian River, 12 miles east of Eufaula in McIntosh County. The 15th largest man-made lake in the U. S., Eufaula has a normal surface area of 102,500 acres, and at floodstage 143,000 acres.

Tenkiller Ferry Lake is located 22 miles southeast of Muskogee, on the Illinois River. The lake was completed in 1952 at a cost of \$24 million. The lake has a surface area of 20,800 acres at flood-stage and 12,500 acres normally.

Oologah Lake, situated on the Verdigris River, two miles southeast of Oologah, was completed in May, 1963. Its normal surface area is 29,500 acres with 57,000 surface acres at floodstage. Cost of the project was \$46.5 million.

Organization of Remainder of Thesis

The remainder of the thesis is organized into six chapters. A review of literature and the procedural techniques used for the study are presented in Chapter II. The results of the surveys are included in Chapter III, along with an economic growth analysis. A benefit-cost analysis for Lake Keystone is presented in Chapter IV. A study of the interactions between the local communities and the lake developments is contained in Chapter V. Environmental considerations of the

lake developments are discussed in Chapter V and the summary and conclusions are detailed in Chapter VI.

CHAPTER II

REVIEW OF LITERATURE AND PROCEDURE

Review of Literature

Most studies in the area of rural development related to lake developments included the environmental and direct economic effects on the original land owners. The cost of moving, the loss of their land and the environmental impacts on the immediate area have been covered by a selected number of authors.

Badger (2) discusses some of the socio-economic factors important in an analysis of man-made lakes. Socio-economic factors include the well being of all people involved, the environmental considerations and the quality of life that a certain situation demands or exhibits. Qualitative variables that cannot be measured or incorporated into a benefit-cost analysis numerically should be explored as a way to research the effects of lake developments.

Perhaps Ballard (7) best introduces this study, when he presented the question, "Once there is a lake. . .what happens?" Ballard goes on to explain some of the noneconomic and mythical revenues purported by government agencies to raise the benefit cost ratio to an acceptable level. Ballard cites flood control as simply flood transfer, from the downstream to the upstream side of the dam. He also questions any gain from fish and wildlife conservation, water quality improvement, and water supply.

In a similar study, Ballard (8) reported economic growth due to three lakes being built in Illinois was nonexistent for the first five years of their life. Employment had not risen in the short run. Ballard quoted primary statistics which called for long run effects to be tremendous in residential, recreational, and industrial development. But Ballard concluded that the optimism was based on "imaginary" benefits. His conclusions were based mainly on property valuations, over time, for the counties containing the lakes. These valuations had not increased as much as predicted.

The Nature Conservancy (9) raises questions about the externalities of lake developments, and the added strain on existing sewage plants and water supplies. Public services such as fire protection, law enforcement and health care must be provided. Transportation and governmental services may also need revision with development growth.

Brown (4) reported some of the economic impacts of second-home communities located around Lake Latonka, Pennsylvania. From the study, Brown concluded that the changing of the area around the lake from agricultural land to residential dwellings brought added income to local businesses, increased tax revenues and brought about little or no change in the demand for government services.

Vandever's study (6) dealt with changing land usage patterns around Lake Keystone. With a Markov procedure, Vandever showed how the land patterns shifted with the lake's existence and compared it to a simulated land pattern had the lake not been built. Vandever found that lake construction increased most non-agricultural uses of

land. He also found that private property wealth increased substantially in the lake development areas.

In a report on land use change around lakes Prebble (23) stated that

Land use shifts from nonproject to project oriented uses, property values change, and some land owners gain economically. However, other land owners, who are forced to sell their land for construction of the reservoir, do not obtain large economic gains (p. 17).

Knetsch (24) reported that

the increased sales prices of land established in the real estate market reflect values due entirely to location on or near reservoir projects. These increased prices represent the capitalization of values derived from such locational advantage (p. 231).

A discussion of benefits from changed land use is presented in Chapter IV. These benefits are not looked at from the viewpoint of the private sector, but from the community or county government viewpoint, in the form of ad valorem taxes.

Aside from the economic benefits and costs, there are other impacts to be considered. Clawson (25) pointed out that "aesthetic considerations may be as important as economic ones" in a recreational quality of water study. Milliken and Mew (26) concluded that "the long term benefits to society as a whole may well be measured in terms of the physical and mental well-being of the populace."

The previous two references bring out a different kind of impact, one that is for the most part immeasurable. The environmental and social well-being impacts on a society are of major importance to this study and will be discussed and analyzed in Chapters V and VI.

Procedure

To estimate the effects of lake developments on the environment and economy of local communities and governments, data were gathered by personal interview with seasonal and permanent residents in lake developments. The lakes included in the study were Keystone, Eufaula, Fort Gibson, Tenkiller, and Oologah. In the summers of 1974 and 1975 approximately 4.5 percent of the residents were interviewed. A copy of the survey is contained in Appendix A.

The surveys were taken by undergraduate and graduate students from Oklahoma State University. All known lake developments on the five lakes were visited, and from two to six surveys were taken at each development, depending on its size. Teams of two were usually used in surveying the developments and "randomness" of data was assumed. Randomness was limited to who was home when the interviewers came by. But, because houses, within the developments, were usually of the same nature, randomness of the data could be upheld.

Of the five lakes where surveys were taken, Lake Keystone was most thoroughly studied, as evidenced by the number of interviews taken in relation to its number of residences (Table I). "Estimated number of residences" came from a study by Schreiner and Badger (16). In all, 255 surveys were taken of the estimated 5,496 homes available for survey. Oologah Lake was included for the 1975 surveys and no estimates for number of residences is available. However, Oologah Lake has relatively few seasonal and permanent homes, and would not change the total number of residences significantly. The study on economic growth begins in Chapter III, when interview data is presented and analyzed. The interview data contains many relevant data about

TABLE I
 NUMBER OF SEASONAL AND PERMANENT HOME OWNERS SURVEYED
 IN THE MCCLELLAN-KERR ARKANSAS RIVER
 NAVIGATION SYSTEM STUDY, 1974-75

Lakes	Estimated Number of Residences	Number of Interviews 1974	Number of Interviews 1975
Keystone	604	22	41
Fort Gibson	1,465	51	24
Eufaula	2,432	53	24
Tenkiller	995	5 ^{a/}	30
Oologah ^{b/}	<u>0</u>	<u>0</u>	<u>5</u>
Total	5,496	131	124

^{a/} Since 127 seasonal and permanent home owners had been interviewed around Lake Tenkiller earlier in 1974 (April, May and June) for another study by the Department of Agricultural Economics at Oklahoma State University, it was decided not to survey intensively at that lake in 1974.

^{b/} Since data was collected for 1975 only, no data on estimates of residences were found.

economic growth. However, the data analyzed in Chapter IV will give much more evidence, if indeed, the lake developments have been a basis for economic growth in a lake development-local community area.

To estimate a benefit-cost relationship between the lake developments and the developments impact on the local economy, data were gathered from local governmental units. From county courthouse records, data were obtained for ad valorem taxes. Additional data pertaining to sales taxes, education costs, highway expenses, general county expenses, and state apportionments to local governments were obtained from governmental publications, courthouse records, and survey data. These data were aggregated to show the benefits and costs to local governments by the lake developments. Since the time period 1967 to 1975 was chosen for the study period, the trends in the data also were explored.

This benefit-cost study includes only the three county region around Keystone Lake. Keystone Lake was chosen for this in depth study because of the accessibility of data, its location, and previous research on the lake.

The final objective of the study was to examine the environmental impact on the local communities that the lake developments have caused. The environmental factors have been discussed in many recent publications (1, 2, 9, 10), but putting any kind of value on these factors is difficult. The environmental impacts were studied by comparing conditions in the local communities and lake developments of this study to other studies conducted on environmental impacts. Factors defined as significant in other environmental studies will be analyzed as they pertain to this study area, since an environmental impact on one lake may not be a factor on another lake.

Throughout the study, it was assumed that the interviews of the lake development population were an unbiased sampling of the total population of the lake developments residents. Thus the data from the sample would exhibit the same characteristics as the total population.

CHAPTER III

SOCIO-ECONOMIC ANALYSIS

Survey Results

In the five lake areas, 255 surveys were taken for analysis. However, any one question on the survey will probably not contain all 255 answers. This situation is due to some people's lack of information about their own living conditions or expenses, or to their reluctance to provide some information. The data from the surveys will be presented in tabular form throughout this chapter.

Age levels tell much about the people who live in a certain area. The average lake development resident interviewed was just under fifty-three years of age; fifty percent of the home-owners were about forty years of age; and, nearly seventy percent were over thirty-five years of age (Table II).

One of the most interesting statistics of the survey relates to employment. The kind of occupation was listed in ten categories, ranging from unemployed to professional. One hundred fifteen heads of households out of 255 heads of households interviewed were retired (Table III). None of the developments were especially designated for retired people. This "retirement home" phenomena can best be explained by the feeling of the "home away from home" attitude that many of the people expressed in their interviews. While eighty percent of the

TABLE II

AGE OF HEAD OF HOUSEHOLD LIVING IN KEYSTONE,
 FT. GIBSON, TENKILLER, OOLOGAH, OR
 EUFAULA LAKE DEVELOPMENTS,
 (1974 AND 1975 SURVEY DATA)

Age Group	Number	Percent of Total
15-19	2	0.8
20-24	5	2.0
25-29	5	2.0
30-34	11	4.3
35-39	17	6.7
40-44	19	7.4
45-49	20	7.8
50-54	45	17.6
55-65	70	27.4
65 +	53	20.8
No Response	<u>8</u>	<u>3.1</u>
Total	255	100.0

TABLE III

OCCUPATION OF HEAD OF HOUSEHOLD LIVING IN
 KEYSTONE, FT. GIBSON, TENKILLER, OOLOGAH,
 OR EUFAULA LAKE DEVELOPMENTS
 (1974 AND 1975 SURVEY DATA)

Occupation	Number	Percent of Total
Professional	35	13.7
Manager; Administrator	24	9.4
Sales; Clerical	19	7.4
Craftsman	22	8.6
Laborer; Operatives	12	4.7
Service Worker	3	1.2
Farmer or Farm Workers	0	0.0
Retired	115	45.1
Not Employed	2	0.8
Other	16	6.3
No Response	<u>7</u>	<u>2.7</u>
Total	255	100.0

homeowners interviewed had permanent homes, the general feeling of a vacation-type cottage on the lake prevailed.

The retired persons' income stream, if known, could clarify many of his expenditures. While the retired persons' income was listed at his current level of income, it was evident that many people were living off past income and investments. Also, retired people are more free to participate in recreational activities than working people. Since most communities' economies in these lake developments are based on recreation, it is likely that retired people add more to the local economy than the seasonal residents who are employed elsewhere.

Over 75 percent of the development residents surveyed have at least completed high school (Table IV). Over 41 percent had gone to college, and 18 percent had received at least a Bachelor's degree.

Less than one percent of the heads of households living in the lake developments were unemployed (Table III), well below the national average that fluctuated between five and eight percent unemployment while the surveys were being taken. The 1975 state average of 7.4 percent unemployment was well above the lake development unemployment figure also (27).

The low unemployment figure would seem logical if one looked at the values of lots and houses in the development areas. The unemployed could not afford to purchase the lot in most developments because of the built-in speculative value by developers. Also, most developments are well away from major employment opportunities for the unemployed to look for jobs. With very few exceptions, developments were not in the business of renting lots or housing.

TABLE IV

EDUCATION OF HEAD OF HOUSEHOLD LIVING IN KEYSTONE, FT.
GIBSON, TENKILLER, OOLOGAH, OR EUFAULA LAKE
DEVELOPMENTS (1974 AND 1975 SURVEY DATA)

Education Level	Number	Percent of Total
Grades 1-6	7	2.7
Grades 7-11	46	18.0
High School Degree	84	32.9
Two Years of College	60	23.5
B.S. or B.A.	32	12.5
M.S.	10	3.9
Ph.D. or M.D.	4	1.6
Technical	<u>10</u>	<u>3.9</u>
Total	255	100.0

A portion of the local economy is dependent upon recreational activity for economic growth and stability. New businesses, such as boat docks, bait houses, repair shops, and recreational equipment stores have located around the lake development communities in hope of doing business with both recreationists who frequent the lake but live away from the lake, and permanent residents. With recreationists, the business is highly seasonal. After Labor Day, the recreationists simply do not show up on the lakes. Therefore, the shops that stay open year around are especially dependent upon the permanent dwellers to keep their businesses going. A good indication of the recreational interests of the lake development residents is the number of days and hours spent on the lake in relation to recreation per week per season. On the survey, there was a question on hours per week per season spent on lake related activities. As expected, the winter season shows little participation in lake related activities from the lake development residents (Table V).

While spring brings an upsurge to the participants in lake related activities, even during that season, almost fifty percent of the development residents participate less than four hours per week. The favorite sports in the spring include boating and fishing.

Summer brings even more people outside for recreation. With boating, skiing, camping and picnicing going on in and around the various lakes, a clear majority of the people enjoyed substantial amounts of exposure to outdoor, lake-related activities. In the fall, participation again fell. Hunting and fishing were the main sports participated in.

TABLE V

NUMBER OF PERMANENT LAKE DEVELOPMENT FAMILIES FROM FIVE-LAKE
 AREA PARTICIPATING IN LAKE RELATED RECREATIONAL
 ACTIVITIES, BY HOUR-CLASS AND BY SEASON,
 1974-75 SURVEY DATA, PERMANENT
 RESIDENTS ONLY

Season	0-4 hrs.	5-9 hrs.	10-14 hrs.	15-19 hrs.	20-24 hrs.	25+ hrs.	Total
Winter	151	21	9	6	1	1	189
Spring	88	31	26	20	12	12	189
Summer	80	34	29	19	10	17	189
Fall	98	28	21	19	13	10	189

In a follow up question, lake development residents were asked a more specific question about lake-related activities. It was hard to tell with a category of "four hours or less" when, in fact, a household never participated in lake-related activities. It was interesting to note that through the year, almost twenty percent of the development residents never participated in any lake related activity. Only 75 percent of the residents used the lake for recreational activities and only 58 percent used the facilities in the winter.

There are, of course, more variables on the survey that have not been covered up to this point. However, in the following chapters many of these remaining variables will provide much needed support for the analysis in those chapters. So, to keep the risk of redundancy to a minimum, these variables will be presented in those chapters and not here.

Economic Growth

"Economic growth" has many definitions and justifications within the field of economics. Broadly, economic growth can be defined to include "measures to increase income" (13). Beyond this broad definition economists disagree as to the proper measures of economic growth.

Defense of economic growth has been made because a wider choice of opportunities is assumed to exist when economic growth has occurred in a region or area. Other economists believe that increases in income raise satisfactions in less-developed countries. Still others justify economic growth as essential to keep national income in line with the growth in population and to preserve a world balance of

power. Perhaps the best indication of the need for economic growth is

. . .the knowledge that individuals and societies give ample evidence in national pronouncements, legislation, and salaries that economic growth and the services of economists that contribute therero are much in demand (13, p. 3).

With the assumption that economic growth is "good" for a society, the measurement of economic growth can be the objective of this study. The basic problem is choosing a measure of economic growth.

From the survey data, several variables may be incorporated to show measurements of economic growth. By comparing the magnitude of these variables to the "norms" or averages of the communities, economic growth can be analyzed.

For example, when new families move into the lake developments, their impact on the area depends greatly on the family's income. It was assumed that the families in the lake developments would have higher incomes than those families already living in the county. Another logical assumption was that the cost of the home built in the lake development would depend heavily upon the owner's income. These two factors, along with other characteristics of the lake development tenants were explored for their relevance to economic growth in the area surrounding a particular lake or lakes.

Annual household incomes for lake development residents provide a basis for comparison with the community average incomes (Table VI). The market values of homes for lake development residents are presented in Table VII. Both the annual household income and market value of homes are on the average much higher than similar categories for average Oklahomans. From these data comparisons one might conclude

TABLE VI

ANNUAL HOUSEHOLD INCOME FOR KEYSTONE, FT. GIBSON,
TENKILLER, OOLOGAH, AND EUFAULA DEVELOPMENT
HOUSEHOLDS (1974 AND 1975 SURVEY DATA)

Annual Household Income	Number of Households	Percent of Total
\$ 0 - \$ 3,000	12	4.7
\$ 3,000 - \$ 5,000	34	13.3
\$ 5,000 - \$ 7,000	30	11.8
\$ 7,000 - \$ 9,000	12	4.7
\$ 9,000 - \$12,000	29	11.4
\$12,000 - \$15,000	31	12.2
\$15,000 - \$20,000	32	12.5
\$20,000 - \$30,000	31	12.2
\$30,000 +	16	6.3
No Response	<u>28</u>	<u>11.0</u>
Total	255	100.0

TABLE VII
 MARKET VALUE OF HOMES OWNED BY LAKE DEVELOPMENT
 RESIDENTS LIVING IN DEVELOPMENTS NEAR
 KEYSTONE, FT. GIBSON, TENKILLER,
 OOLOGAH, OR EUFAULA LAKES
 (1974 AND 1975 SURVEY
 DATA)

Market Value of Homes	Number of Homes	Percent of Total
\$ 0 - \$ 5,000	22	8.6
\$ 5,000 - \$ 8,000	31	12.2
\$ 8,000 - \$10,000	20	7.8
\$10,000 - \$15,000	28	11.0
\$15,000 - \$20,000	41	16.1
\$20,000 - \$30,000	40	15.7
\$30,000 +	63	24.7
No Response	<u>10</u>	<u>3.9</u>
Total	255	100.0

that, due to the greater incomes and assets of the lake development residents, economic growth has occurred. However, looking a little closer at the definition of economic growth, the conclusion may be a bit premature.

First of all the comparison of incomes and market value of homes is made at only one point in time. The survey data have limited the research as far as growth over time is concerned. One can say that, with a choice of having lake development residents or "normal" community residents move into an area, lake development residents would be favored because their addition to economic growth is greater than the community resident addition to economic growth would be. This latter comparison is difficult to analyze and to attach any economic significance.

The survey data leave the economic growth analysis short of a satisfactory answer. While the incomes and assets of lake development residents were shown to be greater than those of community residents, the economic growth analysis suffered because of the lack of growth over time data. It was necessary, therefore, to collect more data over time, for a specific region, to analyze the economic growth question. The data collected was in the form of benefits and costs to local communities and governments, as a result of the growth of lake developments in the immediate area. These benefits and costs are examined in-depth in the next chapter, and will give a more complete analysis of economic growth.

CHAPTER IV

PUBLIC SECTOR IMPACTS: AN IN-DEPTH STUDY OF LAKE KEYSTONE

Edwin H. Clark (15) discussed the effects of rural suburbs. He stated that economically, impacts on incomes and costs are important. Also, impacts that occur in the market place as opposed to those that occur in the public sector are deemed significant to the study of rural suburbs. "Rural suburb" is defined in this study to be any organized group of homes located beyond the physical limits of an established town or city. In this chapter, benefits and costs that accrue to county governments from the addition of lake developments adjacent to Keystone Lake are analyzed.

Lewis (14) stated that

. . .vacation homes represent a higher use of land than agricultural pursuits, so that the value and tax yields increase automatically. Other benefits include private goods and services purchased by the added population included in the developments (p. 114).

To estimate the costs and benefits of lake developments to the county governments and local communities, one of the lakes was selected for a more intensive study. Because of its location, size, and previous research, Lake Keystone was chosen as the impact area to study in relation to benefits and costs to local communities. While the five-lake survey results will be used in this chapter for comparison, the actual calculations will use data from Keystone Lake only.

In this study, benefits to local governments are defined in terms of sales tax, property or ad valorem taxes, mobile home license taxes, and special fuel use taxes. The costs to local governments include: education, highway, and general costs.

A benefit-cost analysis based on economic feasibility studies incorporates environmental, economic, and social well-being impacts of a certain project on a specific area, region, and the nation as a whole. However, a benefit-cost analysis of lake developments on local communities is beyond the scope of the data contained in this study. Benefits are defined as revenues coming into county budget as a result of lake developments and/or the lake developments' population. Costs are defined as expenditures incurred by county governments as a result of the lake developments and/or the lake developments' population.

These benefits and costs are not separate from other county revenues and expenditures. The county governments are not profit maximizers, i.e., the county governments spend what they have in their budgets. So, the benefits and costs from the lake developments will be absorbed into the county budget. The net difference between benefits and costs will be a key factor in determining the economic relevancy of the lake developments.

A comparison of benefits and costs to local governments will provide information as to the economic relevance of such lake developments. As stated earlier, (14) the lake developments represent a higher use of land than the original land use. This fact in itself is not startling since after the lake is constructed, the land developers soon buy the land for industrial or residential purposes, as compared to its former use as agricultural or waste lands. The

benefits accrue from the increase in the valuation of land due to land improvements. These increased real estate taxes are probably the biggest factor as far as benefits to local governments are concerned. The study area of the Keystone Lake surveys includes six townships around the lake. Mannford Township in Creek County; Black Dog and Hominy Townships in Osage County; and Jordan Valley, Cimarron, and House Creek Townships in Pawnee County. Within these townships are five school districts: Cleveland Rural, Keystone, Mannford, Mannford Number 3, and Prue. When the Keystone study area is referred to throughout this chapter, it is in reference to these townships shown in Figure 2.

In the first part of the chapter, benefits were defined to include private goods and services purchased by the added population in the developments. To estimate the benefits from private goods and services purchased, data were collected for city sales tax revenues from the towns of Mannford and Cleveland. These two towns are the major towns around the lake that may exhibit growth in sales tax as a result of increases in purchases in goods and services.

Primary Benefits - Sales Tax Computation

Mannford's sales tax figures are presented in city sales tax because state sales tax data were not available. State sales tax data were available for other units of government.¹ Compared to the

¹The 2% state sales tax collections credited to cities and towns do not always match what a local sales tax will produce. For statistical purposes only, state sales tax collections are credited to the city of address of the reporting business. City sales tax, however, are collected for a city only on sales technically completed inside the city limits.

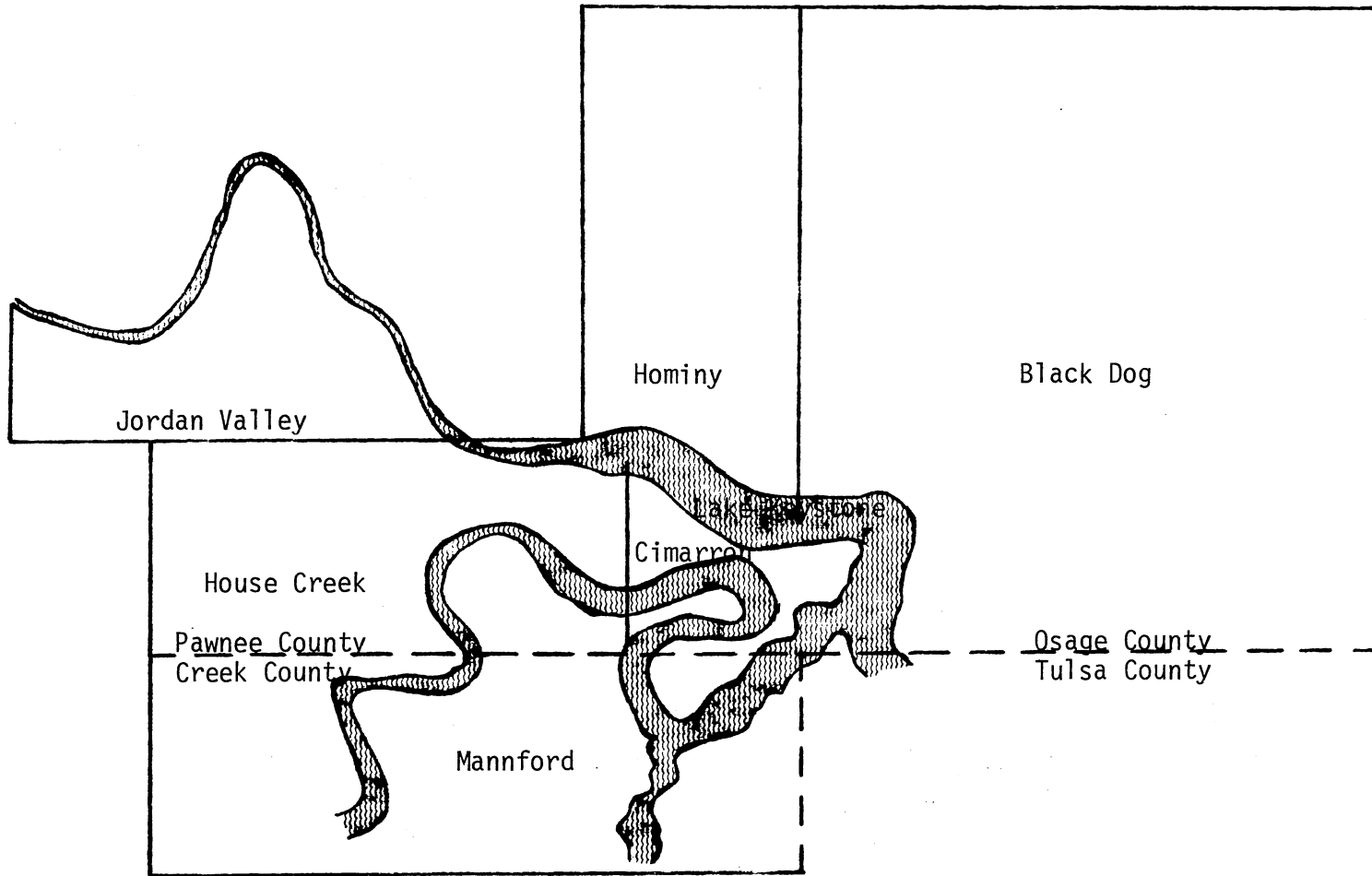


Figure 2. Six Townships Included in the Lake Keystone Benefit-Cost Study

counties in the survey or to the state average, the sales tax from the two cities shows a substantial increase (Table VIII). Also, sales tax from counties with SMSA's were excluded to leave a "Rural Oklahoma" figure (Table IX). The increase from 1967 to 1975 was about 48 percent lower than the two cities' increase.

A factor which could influence retail sales is the permanency of residence of a lake development dweller. Seasonal families would add to sales only during the summer months. However, out of 247 families responding, 189, or 80 percent of them, indicated they were permanent residents of the lake developments.

Some of the biggest investments for development residents are those for recreation. Perhaps the answer to the sales tax issue lies with the origin of the recreational equipment purchased by the development families. The sales and origin of recreational equipment are presented in Table X. The "percent purchased in region" (Table V) is related only the region as defined in Figure 2. The region includes Tulsa, and over 50 percent of the purchases within the region were made in Tulsa. While the purchases of the equipment is "good" for the region economically, and could have secondary economic gains for the local community, the fact remains that the local governments do not benefit greatly from the sales tax on recreational equipment (or as much as they could) due to the existence of a large metropolitan center in the region.

The average market value of the recreational equipment owned by the 255 families at the five lakes was \$1318 per family ($\$336,086 \div 255 = \1318 , Table X). The average investment per family for recreational

TABLE VIII
SALES TAX FOR MANNFORD AND CLEVELAND CITIES, AND SURROUNDING COUNTIES, 1967-75

	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	Total	% Increase
<u>Cities</u>										
Mannford ^a	\$15,399 ^d	\$16,047 ^d	\$18,923	\$21,163	\$23,403	\$27,931	\$31,551	\$37,928		
Cleveland ^b	<u>78,084</u>	<u>87,721</u>	<u>101,040</u>	<u>113,208</u>	<u>130,990</u>	<u>152,157</u>	<u>169,678</u>	<u>201,678</u>		
Total	\$93,483	\$103,768	\$119,963	\$134,371	\$154,393	\$180,088	\$201,229	\$239,533	\$1,226,828	% 156.23
<u>Counties</u>										
Creek ^b	879,500 ^c	909,491	1,000,309	1,090,881	1,176,826	1,339,365	1,526,169	1,722,378		
Osage ^b	416,500 ^c	425,351	437,993	431,720	437,307	475,510	597,929	703,896		
Pawnee ^b	187,900 ^c	195,131	214,486	233,932	266,587	296,684	352,079	396,706		
Tulsa ^b	16,711,500 ^c	17,846,671	19,227,509	20,583,173	22,706,500	24,383,176	28,338,315	32,272,249		
State Total ^b	77,471,000 ^c	82,802,591	88,867,949	94,037,837	106,623,323	116,595,290	134,285,860	150,128,190		% 93.78

Source: Statistical Abstract of Oklahoma.

^aCity sales tax collected.

^bProjected from 1966-68 average.

^cProjected from 1966-68 average.

^dProjected by using Mannford as percent of Cleveland city sales taxes by 4 year (1969-73) average.

TABLE IX

STATE SALES TAX FOR THE THREE COUNTIES CONTAINING SMSA'S: STATE AND
RURAL OKLAHOMA TOTALS, 1966-67 TO 1974-75

	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	% Increase
Comanche	\$ 2,060,000	\$ 2,240,093	\$ 2,420,187	\$ 2,593,808	\$ 2,788,775	\$ 2,956,655	\$ 3,133,601	\$ 3,487,528	\$ 3,806,039	
Oklahoma	19,515,000	21,295,273	23,075,546	25,250,412	27,812,371	31,076,569	33,996,961	37,996,455	41,143,724	
Tulsa	15,577,000	16,711,835	17,846,671	19,227,509	20,583,173	22,706,560	2,272,062	28,338,315	32,272,249	
State Total	72,140,000	77,471,295	82,802,591	88,857,959	95,037,837	106,623,323	124,383,176	134,285,860	150,128,190	
Rural Oklahoma	34,988,000	37,224,098	39,460,187	41,730,862	43,853,518	49,894,539	54,980,552	64,964,562	72,896,178	108.35

Source: Statistical Abstract of Oklahoma, 1972 and 1975.

TABLE X
 RECREATIONAL EQUIPMENT OWNED BY THE FIVE-LAKE DEVELOPMENT RESIDENTS SURVEYED
 1974-75 SURVEY DATA

Type	Number Owned	Total Market Value ^a	Percent Purchased in Region	Market Value Purchased Inside Region
Canoe	1	\$ 250	100.0	\$ 250
Boat	157	191,695	75.8	145,278
Boat Motor	155	129,023	77.3	99,735
Boat Trailer	135	30,866	72.6	22,409
Ski	55	4,601	74.5	3,427
Tent	13	910	64.5	585
Camper Trailer	8	32,000	33.3	10,656
Pickup Camper	19	16,625	57.9	9,625
Motor Home	2	2,400	100.0	2,400
Bicycle	39	2,099	69.2	1,453
Mini-Bike	5	1,083	60.0	650
Motorcyle	22	13,518	63.6	28,597
OTHER	42	41,723	74.3	31,020

Source: Personal interview data.

^a1975 average values were incorporated for 1975 totals to come up with total market value.

equipment at Lake Keystone was \$1308, based on the 1974-75 survey data ($\$82,373 \div 63 = \1308 , Table XI).

Badger, Schreiner, and Presley (16) in a study of Lake Keystone and its developments estimated 604 families lived in the developments as of 1975. If the data for Keystone are assumed to be representative of the total population in the developments, then:

$$604(1308) = \$790,032$$

It must be remembered that the \$790,032 represents market value of recreation equipment and not a purchase price. If it is assumed that the \$790,032 represented the "real" or deflated purchase price, over time, of all recreational equipment, then the local sales tax on the equipment would be over \$16,500 (taxing at 2 percent). Over 50 percent of the Keystone Lake sales were made in Tulsa. This fact reinforces the earlier statement that local governments do not receive the economic stimulus they could, due to a highly-populated city in the area. For the purpose of the study, the cumulative increase in sales taxes from Table VIII of \$1,266,828 will be used for benefits from the lake developments. It must be remembered that these benefits will be adjusted by the increases in costs due to the lake developments later in this chapter.

Ad Valorem Tax Computation

Another benefit to local governments is the increase in ad valorem taxes. The data from the five school districts are presented in Table XII. The cumulative increase from 1967 to 1975 was \$4,210,816. The annual percentage increases in taxes collected do not indicate

TABLE XI
 RECREATIONAL EQUIPMENT OWNED BY KEYSTONE DEVELOPMENT RESIDENTS SURVEYED
 1974-75 SURVEY DATA

Type	Number Owned	Total Market Value	% Purchased in Region	Market Value Purchased in Region
Boat	38	\$38,250	95.29	\$36,450
Boat Motor	36	22,950	89.38	20,500
Boat Trailer	27	4,925	92.89	4,575
Ski	31	1,395	91.04	1,270
Tent	3	220	31.82	70
Motorcycle	5	3,400	100.00	3,400
Pickup Camper	1	6,330	59.20	3,730
Bicycle	21	1,732	82.39	1,427
Mini-Bike	1	216	100.00	216
Canoe	1	250	100.00	250
Motor Home	1	1,200	100.00	1,200
Camper Trailer	3	13,500	37.04	5,000
OTHER	5	<u>4,285</u>	100.00	<u>4,285</u>
Total		\$98,653		\$82,373

Source: Personal interview data.

TABLE XII
AD VALOREM TAXES COLLECTED BY SCHOOL DISTRICTS IN THE THREE COUNTIES
SURROUNDING LAKE KEYSTONE, 1967-1975

School District	County	1967	1968	1969	1970	1971	1972	1973	1974	1975	Total
Cleveland Rural	Pawnee	\$153,855	\$164,534	\$176,147	\$169,396	\$170,344	\$248,327	\$284,873	\$303,970	\$304,952	\$1,976,398
Keystone	Pawnee	5,923	6,193	6,890	8,060	11,513	17,852	17,852	20,323	27,756	122,362
Mannford	Pawnee	7,157	11,720	9,954	12,573	14,808	15,385	28,146	32,022	33,221	164,986
Mannford #3	Creek	61,321	90,460	92,930	112,489	115,322	132,617	163,459	167,459	233,204	1,169,261
Prue	Osage	<u>47,254</u>	<u>55,336</u>	<u>52,379</u>	<u>69,043</u>	<u>94,352</u>	<u>105,578</u>	<u>114,237</u>	<u>115,507</u>	<u>128,873</u>	<u>782,559</u>
Totals		\$275,510	\$328,243	\$338,300	\$371,561	\$406,339	\$519,759	\$608,567	\$639,281	\$728,006	\$4,215,556
% Increase ^a			19.14	3.06	9.83	9.36	26.62	18.28	5.12	13.79	

Source: County records for Pawnee, Creek, and Osage Counties.

^a"% Increase" is from preceding year only.

any trend, as the percentage increases have varied substantially throughout the years.

Vandev eer (6) reported that

. . .with the exception of extractive land uses, all non-agricultural land uses increased as a result of reservoir construction. As might be expected for a lake development project near a major metropolitan area, these are large increases in residential land uses. By 1970, residential land uses had accounted for more than half of the increase in non-agricultural land uses (p. 69).

Since Vandev eer's study dealt with Lake Keystone, the results of his study have application to this study. If the increase in residential land usage had not been found, then the increase in ad valorem taxes would be attributable only to inflated agricultural land prices.

The ad valorem tax collections represent a tremendous benefit to the county governments from the lake development areas. The reevaluation of the land to its current residential status brought about the "extra" funds. The development residents, by moving into the area, provided the stimulant for the increase in the taxes, whether all the reevaluated land had been developed or not.

For the purpose of this study, the total increase of \$4,210,816 in ad valorem taxes will be used as the benefits of the lake developments on the county governments. Justification of the total increase of \$4,210,816 in ad valorem taxes being used can be made by adjusting the ad valorem taxes and other benefits by costs to county governments from the same five school districts.

So far, benefits to local governments have been calculated from "direct" sources. Local sales taxes and ad valorem taxes are collected by local governments for their own use. These taxes are used to cover

such costs as education and general expenses. However, there are several more indirect sources of income which are earmarked specifically for local governments. State revenues and distribution statistics revealed sources of income for local governments that would be applicable to the development population (19). The sources are: auto license taxes, boat and motor license taxes, gasoline excise taxes, mobile home license taxes and special fuel use taxes. These sources were used because they were: 1) distributed by the state to local government for their use, and 2) affected by the increased number of people living in the lake developments.

Computation of Apportioned Funds

The amount of state monies distributed to the local governments shows a substantial increase in all categories (Table XIII). The gasoline and special fuel taxes are apportioned to county governments solely for highway building and maintenance. The other three categories are apportioned to county governments for use in school systems only. Each fund has a different calculation technique for apportioning to the local governments. Therefore each fund must be looked at separately.

For all school district funds given back to the county for schools, the monies are divided according to average daily attendance records (20). This criterion will hold for auto and farm truck license funds, boat and motor tax funds, and mobile home license funds.

Automobile and farm truck license fees are returned to schools in the county where the tags were purchased (20). It would be impossible to estimate the number of tags, and price thereof, of all

TABLE XIII
STATE PAYMENTS TO COUNTY GOVERNMENTS IN KEYSTONE LAKE
IMPACT AREA, 1967-1975

Fiscal Year	Creek County				Osage County				Pawnee County			
	Gasoline and Special Fuel Use	Auto & Farm Truck License	Boat & Motor	Mobile Home	Gasoline and Special Fuel Use	Auto & Farm Truck License	Boat & Motor	Mobile Home	Gasoline and Special Fuel Use	Auto & Farm Truck License	Boat & Motor	Mobile Home
1966-67 ¹	\$ 415,702	\$ 493,930	\$ -	\$ -	\$ 655,862	\$ 435,117	\$ -	\$ -	\$ 238,963	\$ 129,841	\$ -	\$ -
1967-68 ¹	436,062	524,805	-	-	688,033	485,183	-	-	250,640	135,093	-	-
1968-69 ¹	456,420	555,681	-	-	720,205	535,250	-	-	262,316	140,345	-	-
1969-70	483,358	574,180	5,175	2,621	739,823	570,248	2,606	1,242	277,333	152,974	3,324	1,037
1970-71	513,716	597,584	8,723	41,111	810,565	613,601	4,409	19,088	294,654	163,080	5,732	15,298
1971-72	546,265	646,237	8,672	48,857	842,444	682,181	4,976	25,051	310,557	176,953	4,481	17,993
1972-73	584,425	709,147	9,496	61,495	901,370	766,229	4,819	27,051	332,102	195,407	4,391	25,405
1973-74	596,986	764,927	10,649	75,975	921,150	861,846	6,563	35,573	339,065	209,301	5,171	31,533
1974-75	<u>596,066</u>	<u>805,071</u>	<u>12,707</u>	<u>87,332</u>	<u>919,180</u>	<u>894,296</u>	<u>7,178</u>	<u>41,246</u>	<u>338,360</u>	<u>217,154</u>	<u>5,504</u>	<u>34,892</u>
Totals	\$4,629,000	\$5,671,562	\$55,422	\$317,391	\$7,198,632	\$5,843,951	\$31,551	\$149,251	\$2,643,990	\$1,520,148	\$28,603	\$126,158

Source: State Payments to Local Governments, Oklahoma Tax Commission, Research Division 1966-76 data.

¹In 1966-67, 1967-68, and 1968-69 years, no mobile home or boat and motor taxes were distributed to county governments.

the residents of the lake developments. So, the apportionment from state to local sources must be the basis for estimation.

In the developments adjoining Lake Keystone, sixty-three families were interviewed. The 63 families represent 187 people and 33 school age children. An additional fifteen children will begin school out of these families in the next five years. If it is assumed that this increase in school population from the developments is total (i.e., in 1967, there were no school children from the subdevelopments) then a direct comparison can be shown between the developments and "normal" increases.

For instance, the three counties surrounding Lake Keystone have a school population which is 22.6 percent of their total population.² That compares with 17.65 percent in the developments, from personal interview data. With an estimate of development population, the number of school children from the development can be predicted.

Earlier in the chapter, it was reported that 604 families resided in lake developments around Keystone. Also from the personal interviews, the average family size was 3.0, with 17.65 percent of the total population being school-age. Given these statistics, the population of the developments plus the number of school age children can be calculated.

$$\begin{array}{rcl} \text{(number of families)}(\text{average size of family}) & = & \text{population of development} \\ 604 & (3.0) & = & 1802 \end{array}$$

²Oklahoma Department of Education and Bureau of Census, U. S. Department of Commerce, 1971.

$$\begin{array}{rcl}
 (\text{population of development})(\% \text{ of school children of population}) & = & \text{number of students} \\
 1812 & (17.65) & = 320
 \end{array}$$

While there was an unusually high percentage of retired persons in the population of the lake developments, the data portrays the retirement people with the lower percentage of school children in the lake development population than the surrounding area. The average size of family (3.0) also reflects the influence of the retired people on the data.

From the interview data, 45.1 percent of the heads of households were retired persons. But for Keystone, only 20 percent were retired. Assuming that the size of a retired family is two, the non-retired population of the development becomes 1570:

$$\begin{array}{l}
 (\text{number of families})(\% \text{ retired}) = 121 \\
 (\text{population of development}) - (2)(121) = 1570
 \end{array}$$

The 320 students from Lake Keystone developments is 20 percent of the total unretired population (1570). The 20 percent is more in line with the three-county average of 22.6 percent. So, the retirement aspect of the lake development residents does show up in the data. Given constant marginal growth in number of students over the time period of this study, a cumulative computation of added funds to local schools due to the added students from lake developments can be calculated (Table XIV).

The first column shows the cumulative change in students, by year, from the developments. The next column is a three county weighted average of the dollar amount of auto and farm truck license fees apportioned back to the county per student average daily attendance

TABLE XIV
 ADDED REVENUE TO LOCAL GOVERNMENTS FROM INCREASE
 IN KEYSTONE LAKE DEVELOPMENT STUDENTS,
 1967-75

Year	Cumulative Change in Number of Students	Weighted 3 County Average \$/Student Revenue from State	Added Revenue to Local Governments
1967	40	74.50	\$ 2,980
1968	80	80.03	6,402
1970	120	84.58	10,149
1971	160	84.78	13,565
1972	200	93.52	18,704
1973	240	102.08	24,499
1974	280	108.84	30,475
1975	320	106.44	<u>34,061</u>
		Total	\$140,835

Source: Table X; Oklahoma Tax Commission, State Payments to Local Governments, Vols. 1966-1975; Oklahoma Department of Education, Annual Statistical Report, Vols. 1966-1975.

(ADA). By multiplying the data in column 1 by column 2, the cumulative dollars apportioned to the local government because of the increase in students from the lake developments are shown in column 3 of Table XIV. Of the total of \$140,835, only 95 percent or \$133,793 is apportioned back to county governments, with five percent remaining in the state fund.

The total of this apportionment might be best thought of, not as revenue, but as defrayed costs to the school systems. The costs will be calculated later in the chapter for the increased student population, and will be compared to these defrayed costs.

Boat and motor license fees are distributed to schools in the county where the equipment is based regardless of where the licenses are purchased (20). By expanding personal interview data, the number of boat and motor units owned by lake development residents were estimated, along with their year of purchase. The fee for licensing a boat or motor in Oklahoma is approximately one percent of the purchased value for the first year license. Thereafter the fee decreases ten percent per year (20). The collected fees are then apportioned back to the county governments, with one-half going to the general county fund, and the other half going to county schools. Boat and motor license fees have been in effect only since 1970. The data shows that a total \$17,133 were apportioned to the three counties from 1970 to 1975 (Table XV). The county governments receive 97 percent of the collected fees (19).

$$(\$17,133)(.97) = \$16,619$$

TABLE XV

CUMULATIVE INCREASE IN FUNDS APPORTIONED TO LOCAL GOVERNMENTS FROM BOAT
AND MOTOR LICENSE FEES DUE TO KEYSTONE LAKE DEVELOPMENTS
(BASED ON 1974-75 SURVEY DATA)

Year	Number of Units ²	Costs of Units	Fees for 1967 ¹	Fees for 1968 ¹	Fees for 1969 ¹	Fees for 1970	Fees for 1971	Fees for 1972	Fees for 1973	Fees for 1974	Fees for 1975	Total
1966-1967	29	\$47,676	-	-	-	\$ 347	\$ 309	\$ 278	\$ 250	\$ 225	\$ 203	\$ 1,612
1968	19	31,236	-	-	-	253	228	205	185	167	150	1,188
1969	29	47,676	-	-	-	428	385	347	309	278	250	1,997
1970	9	14,796	-	-	-	147	132	119	107	96	86	687
1971	96	157,824	-	-	-	-	1,578	1,420	1,278	1,150	1,035	6,461
1972	48	78,912	-	-	-	-	-	789	710	630	575	2,713
1973	29	47,676	-	-	-	-	-	-	476	428	385	1,289
1974	38	62,472	-	-	-	-	-	-	-	624	562	1,186
1975 ³	0	-	-	-	-	-	-	-	-	-	-	-
Total						\$1,175	\$2,632	\$3,158	\$3,315	\$3,607	\$3,246	\$17,133

Source: Oklahoma Tax Commission, "State Payments to Local Governments", Vols. 1966-1976.

¹Fees were not collected until 1970.

²Estimated by aggregating personal surveys.

³Of the 63 surveys taken, no one reported buying a boat in 1975. However, 22 of the surveys were taken in 1974, and most of the 1975 surveys were taken in May, June, and July.

Mobile Home License fees are calculated similar to the Boat and Motor License fees. Approximately one percent of the list price is the first year's fee, with the fees decreasing to 90 percent of the previous year's fee thereafter.

Aggregating techniques used in calculating the boat and motor license fees were also used to estimate the number of mobile homes in the lake developments around Keystone Lake. There was no clear cut pattern as to the years in which more or less mobile homes were brought. The first mobile homes showed up in 1968 and have been increasing in numbers at a constant rate since. Like boat and motor license fees, mobile home fees were not collected until 1970. Statistics for mobile homes are presented in Table XVI. There were not enough mobile home owners sampled to accurately predict any increase in costs of the mobile homes purchased. Differences in quality would warp any chance of trying to inflate a "base" price in some year. So an average of the mobile homes for all years was used to calculate the fees.

The \$33,663 represents the added revenue from the mobile home license fee. Of the total amount of fees, the state apportions 95 percent to the county (19). So the county actually realizes over \$30,000 from the state fund:

$$(\$33,663)(.95) = \$31,979$$

The final revenue producing fund for the county government from the lake development population is the gasoline and special uses taxes. The funds are apportioned by the state according to population, road mileage and land area (20). The state gasoline and special use taxes

TABLE XVI

CUMULATIVE INCREASE IN FUNDS APPORTIONED TO LOCAL GOVERNMENTS FROM
MOBILE HOME LICENSE FEES DUE TO LAKE DEVELOPMENTS

Year	Number of Units	Costs of Units	Apportioned Fees					Total	
			1970	1971	1972	1973	1974		1975
1967-68	8	\$ 130,280	\$1055	\$ 950	\$ 854	\$ 770	\$ 692	\$ 623	\$ 4944
1969	8	130,280	1172	1055	950	854	770	692	5493
1970	8	130,280	1303	1172	1055	950	854	770	6104
1971	8	130,280	-	1303	1172	1055	940	854	5334
1972	8	130,280	-	-	1303	1172	1055	950	4480
1973	8	130,280	-	-	-	1303	1172	1055	3530
1974	8	130,280	-	-	-	-	1303	1172	2475
1975	<u>8</u>	<u>130,280</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>1303</u>	<u>1303</u>
Total	64	\$1,042,240	\$3530	\$4480	\$5334	\$6104	\$6796	\$7419	\$33,663

Source: Personal interview data and Oklahoma Tax Commission, Division of Motor Vehicles.

are apportioned back to county governments by a very complicated formula. There are actually six separate state gas and special fuel taxes: a 4¢ gasoline excise tax; 1¢ gasoline excise tax; 1/2¢ gasoline excise tax; 4¢ special fuel use tax; 1¢ special fuel use tax; and a 1/2¢ special fuel use tax (21). Of these six sources of taxes, the formula used to apportion funds back to county governments is:

$$.22 (4¢ \text{ G.E.T.}) + 1.0(1¢ \text{ G.E.T}) + 1.0(1/2¢ \text{ G.E.T}) + .2425(4¢ \text{ S.F.U.T}) \\ + 1.0(1¢ \text{ S.F.U.T}) + 1.0(1/2¢ \text{ S.F.U.T.})$$

The aggregate figure for years 1967-75 is presented in Table XIII, for the 3 counties in the study. However, each county has an "ultimate factor" by which the monies are apportioned. This ultimate factor usually takes into consideration the county's population, land area, and road mileage as a percentage of the state totals. "Usually" is applicable because each fund can have a different formula to calculate its ultimate factor (U.F.).

To arrive at each county's apportionment:

for the 4¢ gasoline excise tax, 1/2¢ gasoline excise tax,
and the 1/2¢ special fuel use tax the ultimate factor (U.F.)
is based on:

$$[1] \quad (40\%)(\% \text{ of County Road Mileage to total state road mileage}) \\ + \quad (30\%)(\% \text{ of County Area in Square miles to total state area in square miles}) \\ + \quad (30\%)(\% \text{ of 1970 Population census of county to state's 1970 population})$$

for the 4¢ special fuel use tax the U.F. is based on:

- [2] (50%)(% of County Area in Square Miles to total state area in square miles)
- + (50%)(% of 1970 population census of county to state's population)

for the gasoline excise tax and the 1¢ special fuel use tax, the U.F. is based on:

- [3] (33 1/3%)(% of County Road Mileage to state total road mileage)
- + (33 1/3%)[% (of 1940 Rural Population Census of county to total Rural Population Census of state divided by 2) + (1950 Rural Population Census of county to total 1950 Rural Population Census of state divided by 20)]
- + (33 1/3%)(% of County Area in Square Miles to total state area in square miles)

While it would be difficult, it would be possible, by the above formula, to calculate the apportionment to the counties in question due to the added lake developments. However, in 1968 the Oklahoma Tax Commission decided to group gasoline excise and special fuel use taxes into one category. Still, some relevant information can be extracted from the apportionment figures contained in Table XIII.

First of all it must be assumed that area in the counties has been held constant since 1967. In this calculation, road mileage also must be held constant. While earlier road mileage was seen to have increased somewhat, the change is negligible when taken as a percent of the state total. That leaves population as the only variable in the equation. The simplest and perhaps most accurate prediction of added revenue caused by the increase in population can be made by computing an average revenue generated per person.

For example, in 1972, \$19,972,275 were apportioned to the 77 county governments from funds generated by the 4¢ gasoline excise tax (G.E.T.), 1/2¢ G.E.T., and the 1/2¢ special fuel use tax (S.F.U.T.) (Table XVII). From formula 1 above, 30% of the apportionment is due to population.

$$\$19,972,275 (.30) = \$5,991,682$$

When the \$5,991,682 is divided by the state population:

$$\frac{\$5,991,682}{2,559,253} = \$2.34$$

\$2.34 is the amount of money apportioned to county governments per person.

By similar techniques, the 4¢ S.F.U.T. fund yielded \$0.26 per person and the 1¢ G.E.T. and 1¢ S.F.U.T. fund gave a figure of \$2.02 per person. So, in 1972, \$4.62 (2.34 + 0.26 + 2.02) was apportioned per person to county governments for roads and education from gasoline and special fuel taxes. These dollar amounts per capita were figured for all the years 1970-75 and are presented in Table XVIII. The years between 1967-1970 were not used for calculating revenues because their figures would be based on 1960 populations. In 1960, lake developments were not a factor in populations of the three counties. Even though these developments were building and growing in the late 1960's the funds were still apportioned on 1960 census data, and any increases in population would not show up in the form of added revenue from tax funds until the new census of 1970.

If marginal growth in population is assumed constant over the five-year period, the amount of money apportioned to Osage, Pawnee, and Creek counties due to the added lake development population is \$37,543 (Table XVIII).

TABLE XVII
 APPORTIONED OKLAHOMA STATE FUNDS TO
 THE 77 COUNTY GOVERNMENTS,
 1970-75

Year Beginning July 1	Gasoline Excise Tax			Special Fuel Use Tax		
	4¢	1¢	1/2¢	4¢	1¢	1/2¢
1970	\$11,007,734	\$12,746,092	\$6,255,403	\$1,087,062	\$1,118,218	\$558,912
1971	11,684,313	13,486,668	6,637,791	1,192,889	1,228,775	614,484
1972	12,322,893	14,215,486	7,010,268	1,330,812	1,295,138	639,114
1973	13,060,392	15,029,436	7,423,218	1,547,902	1,583,108	796,653
1974	13,207,289	15,207,719	7,506,759	1,723,125	1,771,517	885,860
1975	13,204,085	15,178,721	7,500,623	1,700,780	1,756,906	878,397

Source: Oklahoma Tax Commission, Annual Report, 1970-1975.

TABLE XVIII
 AMOUNT OF STATE GAS AND SPECIAL FUEL TAX APPORTIONED
 TO OSAGE, PAWNEE AND CREEK COUNTIES DUE TO
 LAKE DEVELOPMENTS

Fiscal Year	Cumulative ¹ Change in Lake Development Population	\$ Per Capita Apportionment	Total
1969-70	804	\$4.10	\$3,296
1970-71	1,005	4.37	4,391
1971-72	1,206	4.62	5,571
1972-73	1,407	4.95	6,964
1973-74	1,608	5.08	8,168
1974-75	1,809	5.06	<u>9,153</u>
Total			<u>\$37,543</u>

Source: Table XVII and Oklahoma Tax Commission, Annual Report, years 1970-1975.

¹From base year of 1967, constant marginal increase.

Having looked at the segments of the local governments' added income, the adjustment of those figures by the added costs is next. The first cost is in the education sector. The local expenditures per student for the three counties in the study show a fairly constant rate of increase from 1967 to 1975 (Table XIX).

Primary Costs - Costs of Education

When the number of students in the school districts of Mannford, Prue and Cleveland are included, the added expenses, through the increases in students attending those schools, can be derived (Table XX). But, how much of the increase was due to the number of children from the lake developments?

During the period (1967-1975), state school population decreased 1.96 percent, while the three schools' population increased over 85 percent (17). Arguments could be made that a certain percentage of the increase was due to spurious or unrelated factors with regard to Lake Keystone being built. However, the communities in question were all changed drastically with the completion of Lake Keystone. The new businesses or opportunities would never have become available had the lake not been built. The cost to the county would be in the form of the added students attending the schools. This cost assumes a "norm" of no growth in student population even though actually, the state average declined 2 percent during the same period.

It is easy to lose sight of the objectives when estimating some variable such as education costs. To keep the study in the proper perspective, the actual amounts of revenue collected by the local schools can be compared to the estimated costs in Table XX. Because

TABLE XIX
 LOCAL EXPENDITURES PER PUPIL: OSAGE, PAWNEE,
 CREEK COUNTIES, THREE COUNTY WEIGHTED
 AVERAGE* 1967-1975a)

Fiscal Year	Expenditures per Pupil	Percentage Increase From Previous Year
1966-67	\$218.19	-
1967-68	230.41	5.6
1968-69	235.48	2.2
1969-70	246.31	4.6
1970-71	264.05	7.2
1971-72	275.14	4.2
1972-73	297.42	8.1
1973-74	318.24	7.0
1974-75	338.93	6.5

a) Based on 1975 cost/ADA (Average Daily Attendance); deflated by average state % increase to estimate 1967-74 figures.

Source: Oklahoma State Department of Education, Finance Division.
 1974-75 Report.

TABLE XX
 CHANGE IN ENROLLMENT AND COSTS FOR MANNFORD,
 PRUE, AND CLEVELAND SCHOOL DISTRICTS,
 1967-1975

Fiscal Year	Mann- ford	Prue	Cleve- land	Total	Cumu- lative Marginal Change	Local Cost Per Student*	Cost of Change in number of Students
1966-67	428	162	850	1440			
1967-68	507	176	861	1544	104	230.41	\$23,962.64
1968-69	582	194	819	1595	155	235.48	36,499.40
1969-70	662	190	935	1787	347	246.31	85,469.57
1970-71	666	187	930	1783	343	264.05	90,569.15
1971-72	697	246	1975	2018	578	275.14	159,030.92
1972-73	775	301	1220	2296	856	297.42	254,591.52
1973-74	851	327	1366	2544	1104	318.23	351,325.92
1974-75	882	293	1491	2666	1226	338.93	<u>415,528.18</u>
							\$1,416,977.00

*From Table XIX.

Source: Oklahoma State Department of Education, Data for years 1967-1975 and county records.

data were scarce and not complete for all years from 1967 to 1975, a table will not be presented. However, for every year of available data, local revenue for schools at least covered the estimated costs of the three school districts - Mannford, Prue, and Cleveland. These local funds for schools included ad valorem taxes, tuition, transfer fees, interests on investments, county 4 mill, county apportionment, and other miscellaneous. With the amount of funds in the local revenue for schools being larger than the estimated costs in Table XX, this study can now continue with a certain degree of confidence in the estimated costs.

Student enrollment data for the three schools indicate a moderate growth in school population, especially when compared to the negative state average. Certainly the correlation between the growth in student population and growth in population of lake developments have been parallel. But for our study, have the students come from the developments or from other areas? Many of the developments (by personal observation) seem more like retirement villages, which would preclude the increase in students being related to developments.

From earlier in the chapter, the number of students living in the lake developments of Keystone was estimated to be 318. The 318 students compare with the total increase of students in area schools of 1226. The 1226 student increase gave an increase in expenses to the county government of \$1,416,977 (Table XX). To obtain the amount of expenses due to the developments:

$$\left(\frac{\text{increase in number of students from dev.}}{\text{increase in total number of area students}} \right) \left(\text{increase in expenses} \right) = \text{expenses due to developments}$$

$$\left(\frac{318}{1226}\right) (\$1,416,977) = \$367,535.49$$

The \$367,535 is broken down as a year by year expense, using the same percentages of the total education cost for each year as in Table XX. This method allows the \$367,535 to be split up over the years just as the total expenses were. This series is presented in the summarized benefits and costs in Table XXIII.

The \$367,535, when broken down into a series of expenses from 1967-1975, gives a figure of \$107,761 for the 1975 expenses. The cost per student from the lake developments would be \$338 ($\$107,761 \div 318$), or basically the same as for the three county average (Table XX).

School expenses are not the only costs to local governments that may change due to the lake developments. Highway expenses are, of course, highly variable, whether a state, national, or local area. The expenses estimated here are local, but further explanation of "local" is needed.

Highway Expenses

The Cimarron Turnpike is located near the Keystone Lake area, along with Highways 64 and 51. The Cimarron Turnpike was built to channel traffic from the Enid area to Tulsa. Both state Highway 51 and U.S. Highway 64 underwent significant improvements when Lake Keystone was constructed. While all three of these transportation systems are in the vicinity of Lake Keystone, their costs were not included in the costs section of this study. Since the systems were built with federal or state monies, it was not considered as a cost to local government, although the systems do represent at least an indirect cost to the taxpayers living in the county.

So, what highway expenses are charged to the lake developments? For purposes of this study highway costs will be defined as the costs associated with the county government's building of primary roads or streets for lake developments. Only two developments' streets were paved by the county. The remainder were paved by either the developer or owner. So, in reality only three miles³ of pavement was constructed by the county government. Why two developments were singled out as recipients of the paving might call for a more indepth study.

The remainder of the lake developments were graveled only. This service, for the most part was provided by the county, since most of the primary access roads were graveled also. In total 8.5 miles of development roads were graveled.⁴

From the preceding paragraph, a new dimension for the developments' cost structure was opened. Primary access roads, or roads that lead from major highways to the actual development, could be counted in as part of the highway expenses for the development. In all, 33.7 miles of unpaved and 15.2 miles of paved road would fit the category of primary access routes. But the highways that are primary access routes are also used by fishermen, boaters, hunters, sightseers, and in some cases, are roads that lead to recreational areas owned or operated by the Corps of Engineers. So, these access roads will not be used as part of the cost of providing roads for the lake developments.

³Keystone Colony has 1.8 miles of pavement while Hollandia Estates contain 1.2 miles of pavement: From local maps and personal observation.

⁴By local maps, personal observation, and surveys.

The mileage of roadway connected with the developments for cost computation would be with three miles of paved and 8.5 miles of unpaved roads mentioned above. In figuring the cost per mile of roadway the current (1976) price of roadway was used. For paved roads \$190,000/mile was the figure used.⁵ This cost includes 26 foot wide road with curbs and gutters.

For graveled roads, \$6,500/mile includes only material for graveling (no labor or fuel costs).⁶ These costs are summarized below:

3 miles paved road @ \$190,000/mile	=	\$570,000
8.5 miles unpaved road @ \$6,500/mile	=	<u>55,250</u>
		\$625,250

Computation of General Expenses

Another major expense for the county government is the general county expenditures. These expenses include public services such as: county sheriff and his office; officer and salaries of county superintendents; county hospitals; 4-H agents; county fairgrounds, etc.

Lewis (14) stated that

... most county governments spend the greater part of their incomes in providing educational facilities and social services. These are high-cost items in the budget, and the addition of more students to the school systems or a greater demand for social services, such as medical care, greatly increase the cost (p. 114).

⁵Department of Engineering, Payne County.

⁶Department of Engineering, Payne County.

Of course, the addition of more students or an increase in demand for social services depends on the basic demand-shifter for the expenses that of increased population. In a similar study, Drummond and Knight (18) found population to be a highly significant variable in an estimated equation for predicting general county expenditures.

Most of the social services, or general expenses, can be defined as a "public good," in which each person consumes or can consume the same amount of the good. Some examples might be fire protection, hospital care, or civil defense. Of course there are many more examples depending on one's location or particular situation. Consumption of these public goods is difficult to measure, since, for example, one would have to have a fire to "consume" fire protection. One way to estimate the cost of the added population from the lake developments would be to calculate some kind of average cost for each person in reference to general costs. Knowing the added population from the lake developments, an added cost over time could be calculated.

The increase in population column was derived by taking the population of the development (which was calculated earlier in this paper) and weighted it by the percentage of development residents moving to the developments after 1967:

$$\begin{array}{rcl} (\text{Population of dev.})(\% \text{ of residents located after 1967}) & = & \text{increases in} \\ & & \text{population} \\ (1812) & (84.13\%) & = 1524 \text{ since 1967} \end{array}$$

To calculate the added cost of the lake development residents on general county expenses, an average cost per person was calculated from each county's records. A weighted average thereof gave the cost

per resident. The increase in population was assumed constant for all years, 1967 to 1975, and was figured cumulatively for total costs (Table XXI).

The average cost of general expenses per person might be questioned as a relevant way of figuring costs. But the figures indicate that general expenses have increased over the time period in question. Also, populations of the counties have also increased. It seems that the assumption of equal costs and benefits for everyone in the county must apply here. In other words, the public good concept must be assumed.

If the assumption of public goods is relaxed, there is some question as to the developments being far from the "center" of the public good offered. In other words, more expense might be incurred if a fire truck had to make a run from a small town to an out-of-the-way development. There is also some question as to whether or not the developments are actually receiving any of the benefits of the public good. Any of these factors, or a combination thereof, could alter the cost of providing service to the development residents. These factors will be discussed in the next chapter where any adjustment of figures will occur.

Summary of Benefits and Costs

The costs and benefits of the lake developments to local governments are summarized in Table XXII. The trend is for both benefits and costs to rise since 1967. The difference between benefits and costs is fairly constant as shown in Figure 3.

TABLE XXI
 GENERAL EXPENSES OF OSAGE, CREEK, AND PAWNEE
 COUNTIES, DUE TO INCREASE POPULATION
 OF KEYSTONE LAKE DEVELOPMENTS
 1967-1975

FISCAL YEAR	Cumulative Increase in Population due to Lake Developments ²	Cost/Person ¹ For General Expenses	Increase in Expenses For County
1967-68	190	\$163.30	\$31,027
1968-69	380	183.50	69,730
1969-70	570	203.70	116,109
1970-71	760	223.90	170,164
1971-72	950	244.20	231,990
1972-73	1140	264.40	301,416
1973-74	1330	284.60	378,518
1974-75	1520	304.80	463,296
		Total	\$1,762,250

Source: U.S. Bureau of the Census, "Selected Items Of Local Government Finances For County Areas," Census of Governments 1967, Vol. VII, Part 36 and 1972, Vol. IV.

¹Based on actual 1967 and 1972 figures; intermediate and recent figure projected, weighted 3 county average, Creek, Osage, and Pawnee Counties.

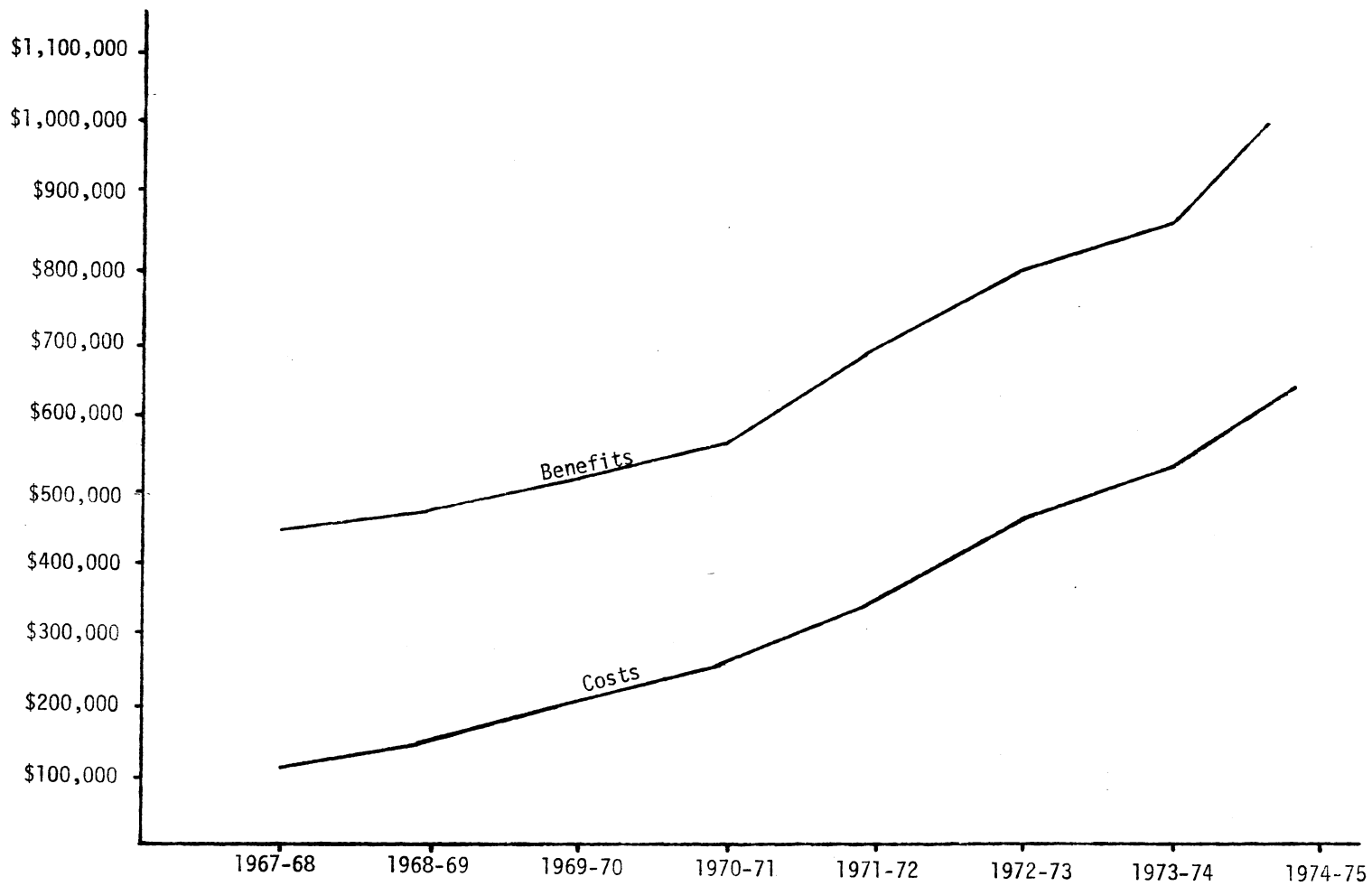
²Base year of 1966-67 assumed zero population.

TABLE XXII
SUMMARIZED BENEFITS AND COSTS OF KEYSTONE LAKE DEVELOPMENTS
TO LOCAL GOVERNMENTS, 1967-1975.

	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
<u>Benefits:</u>								
Sales Taxes	\$ 93,483	\$103,768	\$119,953	\$134,371	\$154,393	\$180,088	\$201,229	\$239,533
Ad Valorem	328,244	338,300	371,561	406,338	514,527	608,567	639,758	728,006
Auto License	2,836	6,074	9,646	12,884	17,767	23,279	28,952	32,351
Boat & Motor	-	-	1,116	2,499	2,999	3,149	3,426	3,082
Mobile Home	-	-	3,351	4,256	5,065	5,797	6,456	7,048
Gas and Special Fuel	-	-	3,296	4,391	5,571	6,964	8,168	9,153
Sub Totals	<u>\$424,563</u>	<u>\$448,142</u>	<u>\$508,933</u>	<u>\$564,739</u>	<u>\$770,322</u>	<u>\$828,844</u>	<u>\$887,989</u>	<u>\$1019,173</u>
<u>Costs:</u>								
Education	\$ 6,211	\$ 9,446	\$ 22,162	\$ 23,485	\$ 41,237	\$ 66,046	\$ 91,112	\$107,761
Highway ¹	45,942	45,942	45,942	45,942	45,942	45,942	45,942	45,942
General	31,027	69,027	116,109	170,164	231,990	301,416	378,518	463,296
Sub Totals	<u>\$ 83,180</u>	<u>\$124,415</u>	<u>\$184,213</u>	<u>\$239,591</u>	<u>\$319,169</u>	<u>\$413,404</u>	<u>\$515,572</u>	<u>\$616,999</u>
Total Benefits minus Total Costs	<u>\$341,383</u>	<u>\$323,727</u>	<u>\$324,720</u>	<u>\$325,148</u>	<u>\$451,153</u>	<u>\$415,440</u>	<u>\$372,417</u>	<u>\$402,174</u>

Source: Tables XII, XV, XVI, XVIII, XX, XXI.

¹Based on 8 years, compared to original nine year data.



Source: Table XXII.

Figure 3. Graphical Analysis of Summarized Benefits and Costs of Keystone Lake Developments to Local Governments, 1967-1975

Looking at the specific costs involved (Table XXII), the largest expenditure by far is for the general expense category. The argument in this chapter was one of a "public good" in which, as the population grew, the general costs also grew proportionately. However, another side of the general cost structure should be considered. If the public goods, as defined earlier in the chapter, are assumed to be fixed costs, at least over a range of the population increase, then the population increase can simply be "absorbed" into the existing, fixed cost structure.

The social services provided by the local governments would have to increase proportionately to the population increases also, if the costs were to increase proportionately. The question is: can the marginal costs of general expenses be equated with the average costs? For the purpose of the study so far, the marginal costs of general expenses can be accepted as an average cost. But, in Chapter 5, if the institutional considerations show the lake developments are not receiving the increase in social services as they have been billed for in this chapter, then a "deflation" of the general expenses will be called for. This would result in an even larger difference between the benefits and costs of the analysis.

Although it has been hinted at, inflation has not been covered so far. No doubt, the years between 1967 and 1975 were quite inflationary for all aspects of the economy. For this study area, inflation affected each factor in the benefit-cost analysis, from ad valorem taxes to educational costs. It is possible to take each individual factor and deflate it by some other factor (consumer price index, etc.). However, some questions as to the sources of inflation

could be relevant. For instance, the change in land usage from agricultural to residential could have provided its own source of inflation in the study area.

Due to the difficulty in choosing an optimal deflator, the deflation of the results can be accomplished by looking at the costs as the deflator of the benefits. The costs have increased by inflation just as the benefits have, so the results will be related in terms of a net effect of benefits less costs, rather than an actual comparison of the dollar amounts of benefits to costs.

Secondary Impacts

In any benefit-cost analysis of the size as large as this one, certain factors must be omitted. Many kinds of benefits and costs exist on such a study, but it is up to the researcher to use those factors which are within the realm of "feasible" research. For example, grazing leases and concessions operated on the lake provide funds for the Corps of Engineers. The Corps then remits 75 percent of these funds to the county governments, specifically earmarked schools. In 1967, \$28,000 was paid back to the three county governments included in this study. However, in 1975, only \$11,000 was paid back to the counties out of this fund. Today, the whole process is tied up in court as to who actually gets to lease the land, the type of lease procurement to use, and other legal problems. In 1976, no funds were collected at all because of this court injunction.

This fund is one of many examples of secondary benefits or costs which exist for the study. While these secondary effects may be

numerous, their impact is minimal and the time and money spent on their research can better be spent researching the more important aspects of the study.

Some very interesting questions are raised by this chapter's findings. If the county governments bring in "new revenue," where do the new revenues go, or how are they spent? Do the lake developments receive their fair share of the county expenditures and apportionments? These two questions lead the study into Chapter V - Institutional Considerations.

CHAPTER V

INSTITUTIONAL AND ENVIRONMENTAL CONSIDERATIONS

Explanation of Net Benefits

In the previous chapter, the local governments seemed to be benefiting from the lake developments' existence, at least economically. Since there are differences in benefits and costs attributed to the lake developments, it is useful to examine how these net benefits are used.

Several possibilities exist that could explain the net benefits received by the local governments from the lake developments and the subsequent disposal of the funds. This study area contains six townships in the three county area. While these six townships are taking in more revenue than they are using from the apportioned taxes, other townships in these three counties might not be in such good financial condition. The county, as an entity, simply pools the funds, not really giving any direct concern to whether a particular township has a surplus or a deficit. In the last chapter apportionments were made on the basis of population changes within the townships. But the funds went directly to the county treasurer, not to any specific township. So the "extra revenue" made possible by the lake developments may have been spread out over the entire county for roads and schools. Some of the added revenue would be designated for schools in the school

districts where the added population from the lake developments is located. The rest of the added revenue for general county and highway expenses could be used in various parts of the county as the need arose.

Services Demanded by Lake Development

Residents

A major objective of this study is to determine if the lake developments are receiving anything for their contributions to the local economy. The quality of public utilities provided for the lake developments needs to be examined. A major consideration for locating a development is the availability of potable water. Survey data on the source of water supplies for the lake developments indicate that only 2.3 percent receive their water supply from a local government (Table XXIII). Most of the water supply was provided by rural water districts, private water systems, and private wells. While rural water districts are usually subsidized to some extent by the federal government through the Farmers Home Administration, the local governments do not usually contribute to their funding. The developments generally have supplied themselves with water, with very little dependence on local governments.

Sewage disposal also is of prime consideration in developing an area. More than economics is at question here. In recent years, especially in lake developments, sewage disposal is recognized as a major polluter of the very water where the people have moved.

Septic tanks are the major type of sewage disposal method (Table XXIV). These systems cause much of the pollution. Only 5.3

TABLE XXIII
SOURCE OF WATER SUPPLY FOR FIVE-LAKE SEASONAL
AND PERMANENT DEVELOPMENT RESIDENTS,
1974-75 SURVEY DATA

Source	Percent
Rural Water System	41.7
Private Water System (by Subdivision)	24.2
Own Well	18.2
From Nearby City	2.3
Other ¹	13.6
Total	100.0

Source: Personal interviews.

¹Other includes private and development treatment systems.

TABLE XXIV
 MEANS OF SEWAGE DISPOSAL FOR FIVE-LAKE SEASONAL
 AND PERMANENT DEVELOPMENT RESIDENTS,
 1974-75 SURVEY DATA

Type of System	Percent
Septic Tank	88.0
Sewer System	5.3
Lagoon	3.0
Other ¹	3.7
Total	100.0

Source: Personal interviews.

¹Other includes temporary sewage disposal systems of mobile homes.

percent of the sewage disposal systems were provided by local governments. Again little help was provided by local governments for the lake developments.

General county expenses such as staff salaries, 4-H agents, or fairground facilities are hard to measure. Even if the costs have increased since the lake developments have been built, the increase could be due to inflation, more federal monies allocated, or a spurious correlation of upkeep due to general depreciation. If county structures were in poor condition, perhaps they were renewed just for basic need, and not because of the added lake development population.

One area of expenses which could have increased substantially would have been the formation of zoning boards or community planning committees. While data were not collected in the area of planning or zoning, it is possible that some expenses were incurred by the zoning or planning of some of the communities. Certainly, Mannford is a prime example of a planned community. It was completely moved and rebuilt when the lake was planned to cover up the existing town of Old Mannford. While much time and money was spent for the planning and zoning of New Mannford, most of the costs were paid by the federal government. Mannford can hardly be considered a lake development, but some of the lake developments (especially Salt Creek Cove) receive water and power from the town of Mannford. Several other lake developments surround Mannford and benefit from the new city and the business that it has attracted.

Local Community Participation in Providing
Services to Lake Developments

In a study designed to research five Northeastern Oklahoma lakes, 47 percent of lake development residents reported fire protection was not available (5). For Lake Keystone, which was included in that study, thirty-one developments responded to the question of fire protection:

Is fire protection available?

	Number	Percent of Total Responses
Yes-Community	9	29.0
Yes-Nearest City	7	22.6
Yes-Volunteer	6	19.4
No	9	29.0

The developments at Lake Keystone appear to have "better" fire protection for their residents, if "better" is measured in terms of number of residents protected. The only problem with looking at this quantity measure is the quality aspect. The nearest city protection ranges from one to fifteen miles in range from the nearest city to the actual development.

Community fire departments range from "good" to barely functional. Community fire departments usually consist of an old renovated fire truck and a small department of volunteers from the development. One person interviewed said a community fire department was available, "but the truck is so bad that we get no decrease in insurance". Volunteer fire departments were much like community fire departments. Most had poor equipment and residents knew very little about the procedure for calling for assistance in event of fire.

Of course not all community or volunteer fire departments were low quality. One development had fire plugs with a functional, well-known plan for fire control. A few developments had well planned volunteer or permanent departments with excellent equipment. But it would be doing a great injustice to development residents if the dangers of fire and the long response times for a fire were not emphasized. Not only is their physical existence threatened, but the home-owners insurance is quite expensive because of the lack of adequate fire protection.

From the same Northeastern Oklahoma lake study, one out of every five development residents had contacted law enforcement agencies since they had lived in their present home (5). For Keystone Lake, one out of three households interviewed had called law agencies. In both cases burglary was the main component of the investigations. The county sheriff was almost solely used as the primary investigator for the incidences. There was no degradation of any of the investigating officers by the lake residents. But these facts do not explain the problem of crime in the lake developments.

Because the developments are purposefully built to be an out-of-the-way place to live, police protection from either nearby cities or from county governments is very difficult to attain. While few developments have security guards, most must rely on local authorities to police their area.

In an investigation of lake developments in Illinois, one county that contained a large number of lake developments reported prisoner days had increased from 500 to 1600 per year in only three years after the lake was built (8). While the report did not go into employment

detail, the added strain on the law enforcement surely added some costs in the form of extra manpower and vehicles.

County Employment

Data pertaining to county employment are not easy to find. Even for the statistics available, it is difficult to distinguish the reasons for employment. Limited data for county employment for 1967 and 1972 are presented in Table XXV. However, there is a distinct change in the number of county employees in the counties surveyed. Even with these substantial increases in employment for education, police protection, and fire protection in the first five years of the study, it is difficult to say if the additional hirings were positively correlated with the population increases of the lake developments.

After looking at several aspects of the needs of lake development residents, it is questionable whether the developments are being subsidized by the local governments. From the utilities or services discussed in this chapter, the developments have been self-providing. Perhaps in the area of law enforcement, the county or local governments have provided some assistance to the lake developments. Given the benefits received by the local governments from the lake developments, an interesting issue is whether the local governments do overlook the wants and needs of the lake developments.

It was stated in the previous chapter that an argument for the general expenses being "fixed" could be made. From this chapter's results, this latter explanation may be the more correct. The social services provided by the county and local governments to the lake developments have been quite few. This analysis means that the

TABLE XXV
 COUNTY EMPLOYMENT IN GOVERNMENTAL OFFICES FOR CREEK,
 OSAGE, AND PAWNEE COUNTIES

Year	Creek County				Osage County				Pawnee County			
	Non- Education	Non- Education	Police Protection ¹	Fire Protection ¹	Non- Education	Non- Education	Police Protection ¹	Fire Protection ¹	Non- Education	Non- Education	Police Protection ¹	Fire Protection ¹
1967	632	323	50	28	378	313	33	12	161	192	15	3
1972	714	361	63	34	414	371	48	14	187	194	20	9

Source: Census of Governments, "Local Government Employment and Payrolls in Individual County Areas," 1967.

¹Police and Fire Protection Employees included in non-education.

general expense category, as calculated in Chapter IV, overestimates the actual situation.

The amount of over-estimation can be calculated if an estimate of the ratio of fixed to variable costs were known. In Chapter IV, it was assumed that the marginal costs of the added population in the lake developments was equal to the average cost, for general county expenditures. However, if the added population from the lake developments has no correlation to the variable costs of general expense, then that portion of the costs is not applicable to this study. If it is assumed that the added population in the lake developments has had no affect on variable costs of general expenses in the surrounding county governments, then the costs to these governmental units, as calculated in Chapter IV can be adjusted downward by the amount of variable costs contained in the general expenses.

The factors which make up the largest portion of general expenses in county governments are employees' salaries, supplies, and maintenance for county buildings. While highway expenses are carried in general expenses, gasoline and fuel taxes are apportioned specifically for the highway fund. When the lake development population moved into the area, the increased costs for highways were covered by increased apportionments from the state government and, in many cases, from government grants.

The largest effect of the increase in lake development population would be in the number of employees on county payroll. But again the effect would depend on the magnitude of the population change. In the short run the labor employed by county governments is fixed, and it would take a substantial population increase to affect hiring in

the county offices.¹ Modest increases in local government employment occurred in Creek, Osage, and Pawnee counties from 1967-1972 (Table XXV). But it would be difficult to attribute all or any of the increase in employment in the three counties to the increase in lake development population. Earlier, the increase in population in Keystone Lake development was estimated at 1812. Since this 1812 increase was observed over a period of eight years, it hardly represents a huge inflow of population for the area. The impact of the increase in Lake development population on the number of county employees would have to be considered minimal.

The increase on lake development population also would affect the amount of supplies used in county government's operations. "Supplies" would consist mainly of office material, paper, and associated paraphernalia. These expenses would be the most variable, since each land transaction requires paperwork from several offices within the county government. The added population also requires correspondence from the county offices in the form of mailing materials. Even with the variability in the area of supplies, the supply expenses make up a small amount of the county government's budget; so again the impact of the lake development population on the county government's expenses is minimal.

The final large category of general county expenditures is upkeep and maintenance on county property. The only possibility of an increase in these expenses due to lake development population would be a situation in which the growth in population necessitated a

¹From discussions with county government officials, Payne, Creek, Osage, and Pawnee counties.

larger courthouse or other county buildings. So far, such an endeavor has not been necessary due to the added lake development population in the three study counties.

In the previous chapter, general expenses for the added population from the lake developments around Lake Keystone were defined as average costs. But subsequent study has revealed that such a cost structure is not the case. In fact, while some variability in general expenses due to population increases was found, for the amount of population increases in the lake developments of Lake Keystone, the vast majority of general expenses would be fixed. While the general expense category is not an all or none situation, the assumption in Chapter IV that marginal costs of the added population was equivalent to the average costs of general expenses must be relaxed. The final year of estimated expenses resulted in general expenses being over 70 percent of the total expenses incurred by the county and local governments due to the lake developments (Table XXII, in previous chapter).

It would take another study to determine the amount of expenses associated with added unit of population in a county area. But it is evident that the amount of expenses reported in Chapter IV as general expenses are overestimated. The amount of over-estimation depends on the extent of variable costs in the general expense cost structure. The net benefits minus costs from Chapter IV now becomes the narrowest of differences, with adjustments to costs widening the difference in relation to the general expenses category.

The Environmental Impact Assessment

The previous two chapters have dealt with costs and benefits for the local communities affected by Keystone Lake developments. These benefits and costs, including ad valorem taxes, education expenses, highway expenses, and general county expenses were measured in monetary units. In some cases, the lake developments received county or local government benefits in the form of police protection, fire protection, sewage disposal, and other public services.

In this section, the entire five lake survey area is examined, and certain aspects of lake development living which are not so well defined are examined. If an environmental impact assessment (EIA) for the lake developments were to be filed, it would cover the economic, environmental, and social well being aspects of all factors involved with the developments. The economic portion of the EIA already has been covered in this study.

Defining Environmental Problems

Environmental and social well being impacts are not easily measured. Everyone has a different idea of what is "good" and "bad" for the environment and for "social" man. However, an estimation of these two aspects is attempted in this section. While the construction of an EIA is not the objective, it is important to look at the social well being and environmental factors of seasonal and permanent home developments around man-made lakes. Environmental considerations were considered only for the time period 1967-1975.

TABLE XXVI
 ENVIRONMENTAL IMPACT ASSESSMENT FOR LAKE DEVELOPMENTS
 IMPACTS ON LOCAL COMMUNITIES

	*Natural Resources										Environment Quality Elements										Human Social Environment																				
Factors of Lake Development Growth																																									
Increased Population	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	NET Gain or Loss
Increased Traffic	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	-6
Added Roads	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	+4
Development Housing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-18
Waste Disposal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-13
Energy Requirements	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	-4
Water Requirements	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0
Net Effect	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	IV. Ecosystem Diversity and Stability										V. Ecosystem Productivity										VI. Physical and Hydrologic Factors																				
	A. Aquatic										A. Aquatic										A. Land																				
	B. Terrestrial										B. Terrestrial										1. Mineral Resources																				
																					2. Construction Material Resources																				
																					3. Unique Physical Features																				
																					4. Soils																				
																					B. Surface Water																				
																					1. Quantity																				
																					2. Quality																				
																					C. Groundwater																				
																					1. Quantity																				
																					2. Quality																				
																					D. Earth Processes																				
																					1. Floods																				
																					2. Erosion																				
																					a. Upstream																				
																					b. Downstream																				
																					3. Sediment Deposition																				
																					a. Upstream																				
																					b. Downstream																				
																					4. Slope Stability																				
																					a. Upstream																				
																					b. Downstream																				
																					5. Physiological Changes																				
																					6. Compaction and Subsidence																				
	I. Anxiety Factors																																								
	*A. Pollution																																								
	*1. Air																																								
	*2. Water																																								
	*3. Noise																																								
	*B. Community																																								
	*1. Cohesion																																								
	*2. Growth																																								
	C. Population																																								
	1. Mobility																																								
	2. Density																																								
	*3. Displacement																																								
	D. Health and Safety																																								
	1. Utilities																																								
	2. Flooding																																								
	3. Personal Property																																								
	II.*Man-made (or Man-Oriented)																																								
	A. Transportation																																								
	B. Housing																																								
	C. Educational Opportunities																																								
	D. Cultural Opportunities																																								
	E. Aesthetics																																								
	F. Archeologic and Historic Structure																																								
	G. Leisure Opportunities																																								
	1. Aquatic																																								
	a. Sport Fisheries																																								
	1) Lake																																								
	2) Stream																																								
	b. Hunting-Waterfowl																																								
	1) Lake																																								
	2) Stream																																								
	c. Boating, Canoeing																																								
	d. Swimming																																								
	e. Water Skiing																																								
	2. Terrestrial																																								
	a. Upland Gamebirds																																								
	b. Mammals																																								
	c. Camping, Picnicking																																								
	d. Hiking, Trail Biking																																								

The President's Council on Environmental Quality (CEQ), in the 1974 Annual Report stated:

Private recreational developments may also create social (and environmental) problems resulting from the impacts of outsiders on the local culture and the way such developments interfere with the public's use of valuable recreational environments (10, p. 108).

These environmental and social problems were defined as:

1) environmental problems from disposal of residuals - liquid, solid, and gaseous; 2) wildlife harassment; 3) crowding; 4) litter; 5) esthetic damage; 6) noise; 7) soil compaction; 8) vegetation destruction; 9) erosion; 10) vehicle emissions; 11) picnic, fire smoke (10).

But the best way to examine these problems is in the form of an EIA. Using the natural resources and human social environment sections of the EIA, the impacts of the lake development on the surrounding environment can be analyzed (Table XXVI).

The Environmental Impact Assessment

The environmental impact assessment (EIA) proposed in this chapter is a subdivision of a longer, more complete environmental impact statement (EIS). Only the parameters of the EIA that pertain to the lake development-local community situation in this study are included in the EIA. The two major parameters of the EIA are natural resources and human social environment (Table XXVI). The factors of lake development growth that affect the two parameters were defined as: increased population, increased traffic, added roads, development housing waste disposal, energy requirements, and water requirements. These factors were chosen because our data encompassed some of the effects that the factors had had on the local communities.

The effect that each factor has on each parameter in the EIA can be defined as either an "increase", "decrease", or "no effect". While this method is highly subjective, the analysis in general is based on the data collected from the lake developments.

At the end of the row for each factor is the net gain or loss (Table XXVI). According to this method of computation and the individual effects on each parameter, net gains to environmental quality elements were found in "increased population" and "added roads" factors. "Increased traffic", "development housing", "waste disposal", and "energy requirements" all had negative effects on the environmental quality elements.

Certainly, little can be said about the magnitude of the effects as shown by the net gains or losses. It would be hard to compare eighteen "gains" in increased population to eighteen "losses" in development housing. Each person has his own idea about how a factor should be weighted relative to another factor. And even after looking at all the parameters, every person in the local community will not agree that increased population is a gain to the environment.

The purpose for showing the EIA is to relate how the different factors and parameters are evaluated in a governmental feasibility study. And while the results of the EIA here can be questioned by all who read this study, the results are based on two years of interviewing people in and around the lake development and should by no means be considered final.

It has been shown that an environmental study is quite an involved process, involving many factors, parameters, and a great deal of subjectivity from the researcher. If the EIA shows anything

it shows the amount of interaction that is needed, and for the most part is lacking in the lake development-local community areas. With as many parameters on this EIA it is evident that no one factor can be dismissed as insignificant by merely one study on one finite region.

CHAPTER VI

SUMMARY AND CONCLUSIONS

Methods

The general objective of this study was to determine the impact of lake developments on local, adjacent communities and governments. The specific objectives were: (1) to determine if economic growth had been provided by the lake developments on the local economies; (2) to estimate a benefit-cost relationship between the lake development and their impact on the local economy to measure the extent of economic growth; and, (3) to compare economic growth with environmental impacts brought upon local communities by the existence of lake developments.

The need for the study arose from the large numbers of people moving to the lake developments in the late sixties and early seventies. When the people moved in, they demanded utilities, public services, and other necessities of life. The local communities were unsure of their new neighbors. It was evident that there were effects on the environment and the economy of the locale, but to what extent was an unanswered question. For the purposes of this study, Keystone, Fort Gibson, Eufaula, Tenkiller and Oologah lakes and their lake developments were surveyed for data. For a more intensive, benefit-cost study, Keystone Lake and the surrounding area was used solely as the basis for data.

The benefit-cost analysis was accomplished by collecting revenue and cost data from county courthouse records, government publications, and survey data for the Lake Keystone area only. Data for the years 1967-1975 were collected and analyzed for the benefit-cost analysis. Characteristics of the Keystone lake development residents were aggregated to provide an overall analysis of benefits and costs.

A partial environmental impact statement (EIS) was presented to estimate the environmental and social well being aspects of the lake developments. Characteristics of the lake developments were given a plus or minus for each environmental category on the EIS, so that a net effect could be derived.

Results

Economic Growth

The burden of proof for economic growth fell on the benefit-cost analysis. While it was shown that certain socio-economic factors (income, housing, etc.) favored economic growth, the net benefits found in the benefit-cost analysis provided a basis for growth in the area. The extent of economic growth in the immediate area of the lake developments depends on the distribution of funds from the county governments.

Benefit-Cost Analysis

Benefits to local communities from lake developments were defined as: sales taxes, property or ad valorem taxes, auto license taxes, boat and motor license taxes, gasoline excise taxes, mobile home taxes, and special fuel use taxes. Costs to local communities were:

education, highway, and general costs. The benefits were larger than costs for each year of the study, from \$341,383 in 1967 to \$402,174 in 1975.

Institutional considerations were examined to provide information on the relationships between the local communities and the lake developments. The lake developments were shown to be independent of the local communities in most aspects. It was concluded that the general expenses credited to the lake development had been overestimated in the benefit-cost analysis.

Environmental Impacts

The results of the partial EIS were a negative influence on the environment in the area of the lakes surrounded by the lake developments. Five out of seven lake development characteristics were shown to have net negative effects on the environment and human social well being, while the increase in population and added roads characteristics were shown to have positive effects on the environment and human social well being.

Conclusions and Policy Implications

In the benefit-cost portion of this study, it was shown that the added revenues far exceeded the added expenses of the lake developments, in relation to the county governments. The net benefits became even more evident when the general expenses were found to be overestimated. The increase in revenue at the county level was not felt by the lake development residents, as shown by the absence of public services in the lake developments.

The environmental impacts are more localized. The local communities receive most of the impacts from the lake developments. So, while economic benefits are "spread" throughout the counties, environmental impacts, for the most part, are felt only in the immediate area of the local communities. The implication is that funds are apportioned by state and county governments, but most of the negative effects are experienced by the local communities. In relation to the entire project, the lake developments' impact on the environment is quite small. The large impacts were the result of the lakes and dams being constructed. So, as a part of the total environmental impact of the area, the lake developments represent a rather small effect.

The policy implications fall into three categories, those for the lake developments, local communities, and county governments. The lake developments have a serious coordination problem. The residents of the lake developments are often times caught between the government officials and their developers, in asking for aid. The developers have a tendency to worry about the developments only until they are sold out. Then the road repair, public services and utilities are left up to the local or county governments to repair or maintain.

If the lake development residents could form their own government or agency, they could, along with statistics included in this report, make their complaints and demands known to county officials. When the county officials realize the amount of revenue provided by the lake developments, they might be willing to provide some of the public services which the lake developments require.

Local communities are caught between the lake developments and the county governments. Local communities do provide some assistance to lake developments, such as water supplies, fire protection, and sewage treatment facilities. But the local communities receive much support from the lake developments through increases in sales taxes.

The county governments allocate the added revenue of the lake developments to different areas of the county. Some of the funds are specifically earmarked for certain areas, such as school districts. But some of the funds are allocated on the basis of need in a given area. If the county governments realize the importance of the lake developments as being a substantial portion of the county revenues, it is up to the county governments to provide similar services for the lake developments as for any other part of the county.

Limitations of Study

The study is somewhat limited because of the lack of data for the local communities and their residents. When comparisons were made to local communities, data from state or county averages had to suffice for local community data. Also some results were dependent upon like characteristics being present for lake development residents and local community residents.

The study is limited to a time restriction of 1967-1975. These were the growth years for the lake development, so if the trend in development growth turns downward, different conclusion might result from a similar study.

Suggestions for Further Research

Further research in the specific area of local community residents characteristics would prove to be very interesting. This study has looked, individually, at only the lake development residents. The local community resident's attitudes, social involvement, and budgets have all changed due to the growth of the lake development population.

Also, if the increases in populations of the lake developments starts to decline, a study on the decline's effect on the economic and social implications of the lake developments would be necessary. Lastly, an in-depth study of the apportioned county funds going to local communities would be a branch of this study. From such a study, the local communities could find out whether they were receiving their "fair share" of the county funds, relative to what they collected from their own area.

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APPENDIX

(1.09) Education of head of household (years of schooling and/or highest degree).

- | | | | |
|---------|----------|------------------|---------------|
| 1. 0-6 | 3. 12 | 5. 16 (BS or BA) | 7. Ph.D. (MD) |
| 2. 7-11 | 4. 13-15 | 6. M. S. | 8. Technical |

(1.10) Household income in 1974:

- | | | | | |
|------------------|--------------|----------------|----------------|--------------|
| 1. under \$3,000 | 3. \$5-6,999 | 5. \$9-11,999 | 7. \$15-19,999 | 9. \$30,000+ |
| 2. \$3-4,999 | 4. \$7-8,999 | 6. \$12-14,999 | 8. \$20-29,999 | |

(1.11) Is this a permanent residence or a seasonal home:

1. Permanent 2. Seasonal

IF PERMANENT RESIDENT, FILL OUT SECTION II; IF SEASONAL RESIDENT, GO TO SECTION III.

Section II: PERMANENT RESIDENT

(2.01) If persons who still reside with you attend school, where do they attend (Write in name of school)

1. _____ 2. _____ 3. _____

(2.02) Place of employment of head of household (Type of Business and Location):

(2.03) Distance from residence to place of employment:

- | | | |
|--------------|--------------|-----------------------|
| 1. 0-4 mi. | 4. 15-19 mi. | 7. 30-34 mi. |
| 2. 5-9 mi. | 5. 20-24 mi. | 8. 35-39 mi. |
| 3. 10-14 mi. | 6. 25-29 mi. | 9. _____ if 40+ miles |
- (write in actual)

(2.04) When did you move to your present residence:

- | | | | |
|--------------------|------------|--------------|-------------|
| 1. less than 1 yr. | 3. 3-4 yr. | 5. 10-15 yr. | 7. 20 + yr. |
| 2. 1-2 yr. | 4. 5-9 yr. | 6. 16-20 yr. | |

(2.05) Where did you live previously: _____
City County State Zip

(2.06) Why did you move to this location? _____

(2.07) Was this property acquired by you and used as a seasonal home prior to moving here permanently: 1. yes 2. No

(2.08) Hours per week you participate in lake related recreation (check for each season):

	<u>Hours</u>	<u>W</u>	<u>Sp</u>	<u>Su</u>	<u>F</u>		<u>Hours</u>	<u>W</u>	<u>Sp</u>	<u>Su</u>	<u>F</u>		<u>Hours</u>	<u>W</u>	<u>Sp</u>	<u>Su</u>	<u>F</u>	
1.	0-4	_____	_____	_____	_____		3.	10-14	_____	_____	_____		5.	20-24	_____	_____	_____	_____
2.	5-9	_____	_____	_____	_____		4.	15-19	_____	_____	_____		6.	25 +	_____	_____	_____	_____

(2.09) How many days of the week does this typically involve (check for each season):

W Sp Su F

No. of days _____

(3.15) In (3.04) you indicated you used your seasonal home about _____ days last year. About how many round trips does this represent from and to your permanent address:

_____ trips

(3.16) Out of these trips, how many are strictly for recreation and how many are to travel to work or for other business reasons:

_____ trips for recreation

_____ trips for business

(3.17) Where is your permanent home:

_____ city _____ county _____ state _____ zip

(3.18) One-way distance from your permanent home to seasonal home:

_____ miles

(3.19) In a typical week or weekend spent at your seasonal home about how many miles of local travel do you do (excluding travel from permanent residence):

1. _____ local miles per week
VACATION of vacation

2. _____ local miles per
WEEKEND weekend

(3.20) What are your average expenditures PER YEAR for TRANSPORTATION while using your seasonal home (include all costs getting to and from the seasonal home as well as local costs in recreation area):

<u>TRANSPORTATION</u>	<u>Expenditure per year</u>	<u>% Purchased in region</u>	<u>% Purchased outside region</u>
Gas and oil	_____	_____	_____
Auto or vehicle repair	_____	_____	_____
Vehicle rental	_____	_____	_____
Commercial fares (air, train, bus, etc.)	_____	_____	_____
Tolls for turnpike travel	_____	_____	_____
Other _____ (specify)	_____	_____	_____

(3.21) What are your average expenditures PER YEAR for FOOD and BEVERAGES while at your seasonal home:

<u>FOOD AND BEVERAGES</u>	<u>Expenditures per year</u>	<u>% Purchased in Region</u>	<u>% Purchased outside Region</u>
Purchased at permanent residence or brought from home	_____	_____	_____
Purchased at other stores (locally and enroute)	_____	_____	_____
Purchased in restaurants	_____	_____	_____
Charcoal	_____	_____	_____
Wood	_____	_____	_____
Lighter fluid	_____	_____	_____
Ice	_____	_____	_____
Other (specify _____)	_____	_____	_____
Other (specify _____)	_____	_____	_____

(3.22) What are your average expenditures PER MONTH for UTILITIES and SERVICES for your seasonal home:

<u>UTILITIES & SERVICES</u>	<u>During Recreation Season</u>		<u>During Off Season</u>	
	<u>Expenditures</u> <u>per month</u>	<u>No. of</u> <u>months</u>	<u>Expenditure</u> <u>per month</u>	<u>No. of</u> <u>months</u>
Electricity	_____	_____	_____	_____
Natural Gas	_____	_____	_____	_____
Propane Gas	_____	_____	_____	_____
Telephone	_____	_____	_____	_____
Garbage collection (private or public)	_____	_____	_____	_____
Water	_____	_____	_____	_____
Sewer	_____	_____	_____	_____
Patrol	_____	_____	_____	_____
Other (specify _____)	_____	_____	_____	_____
Other (specify _____)	_____	_____	_____	_____

Section IV. RECREATION PARTICIPATION

(4.01) How many days PER YEAR do you engage in various water and related land-based recreational activities: (Total at all lakes including this lake, and then at this lake only):

- | | |
|--|--|
| 1. Boating: Total _____
At this lake _____ | 5. Swimming: Total _____
At this lake _____ |
| 2. Fishing: Total _____
At this lake _____ | 6. Hunting: Total _____
At this lake _____ |
| 3. Water-skiing: Total _____
At this lake _____ | 7. Other: Total _____
At this lake _____
(specify) _____ |
| 4. Camping: Total _____
At this lake _____ | 8. Other: Total _____
At this lake _____
(specify) _____ |

(4.02) How often do you have guests who stay with you in your home each year:

1. No. of days _____ 2. Average no. of guests per day _____

(4.03) Activities they participate in while visiting the lake:

- | | | | |
|------------|-------------|----------------|------------|
| 1. Boating | 3. Skiing | 5. Camping | 7. Hunting |
| 2. Fishing | 4. Swimming | 6. Picknicking | |

Section IV. RECREATION PARTICIPATION: (continued)

(4.04) What are your ANNUAL average expenditures for Boating:

<u>BOATING</u>	<u>Annual Average Expenditures</u>	<u>% Purchased in Region</u>	<u>% Purchased Outside Region</u>
Boat and/or motor rental	_____	_____	_____
Boat gas & oil	_____	_____	_____
Boat launching and other user fees (excluding camping fees)	_____	_____	_____
Boat repairs	_____	_____	_____
Boat storage	_____	_____	_____
Insurance	_____	_____	_____
License & Registration Fees	_____	_____	_____
Lake Permit Fees	_____	_____	_____
Auxiliary accessories (lights, preservers)	_____	_____	_____
Other _____ (specify)	_____	_____	_____

(4.05) What are your ANNUAL average expenditures for Fishing:

<u>FISHING</u>	<u>Annual Average Expenditures</u>	<u>% Purchased in Region</u>	<u>% Purchased Outside Region</u>
Boat services (see BOATING)	_____	_____	_____
Rods and Reels	_____	_____	_____
Fishing equipment and supplies (tubes, waders, tackle, lures)	_____	_____	_____
Bait	_____	_____	_____
Fishing licenses	_____	_____	_____
Fishing guides	_____	_____	_____
Other _____ (specify)	_____	_____	_____

(4.06) What are your ANNUAL average expenditures for Waterskiing:

<u>WATER SKIING</u>	<u>Annual Average Expenditures</u>	<u>% Purchased in Region</u>	<u>% Purchased Outside Region</u>
Boat services (see BOATING)	_____	_____	_____
Water skis	_____	_____	_____
Ski belts (not preservers)	_____	_____	_____
Other _____ (specify)	_____	_____	_____

(4.07) What are your ANNUAL average expenditures for Camping:

<u>CAMPING</u>	<u>Annual Average Expenditures</u>	<u>% Purchased in Region</u>	<u>% Purchased Outside Region</u>
Camping equipment (lawn chairs, hammocks)	_____	_____	_____
Camping equipment maintenance repairs	_____	_____	_____
Camping fuels (Butane, etc.)	_____	_____	_____
Camping vehicle insurance	_____	_____	_____
Camper storage	_____	_____	_____
Other _____ (specify)	_____	_____	_____

Section IV. RECREATION PARTICIPATION (continued)

(4.08) What are your ANNUAL average expenditures for Hunting:

<u>HUNTING</u>	<u>Annual Average Expenditures</u>	<u>% Purchased In Region</u>	<u>% Purchased Outside Region</u>
Guns and accessories	_____	_____	_____
Shells	_____	_____	_____
Hunting licenses	_____	_____	_____
Decoys	_____	_____	_____
Other _____ (specify).	_____	_____	_____

(4.09) What are your ANNUAL average expenditures for OTHER RECREATION activities, supplies and services used while at this lake for:

<u>OTHER</u>	<u>Annual Average Expenditures</u>	<u>% Purchased in Region</u>	<u>% Purchased Outside Region</u>
Amusement fees (putt-putt, golf, paddle boats, movies)	_____	_____	_____
Recreation equipment (such as golf clubs, archery, horseshoes)	_____	_____	_____
Float trips	_____	_____	_____
Other (specify) _____	_____	_____	_____

(4.10) RECREATIONAL EQUIPMENT INVENTORY

<u>Item</u>	<u>Quantity</u>	<u>Estimated Market Value</u>	<u>Approx. Age of Equip.</u>	<u>City Where Purchased</u>
(4.10) Canoe (length _____)	_____	_____	_____	_____
(4.11) Boat (length _____)	_____	_____	_____	_____
(4.12) Motor (_____ H.P.)	_____	_____	_____	_____
(4.13) Boat trailer	_____	_____	_____	_____
(4.14) Skiing Equipment	_____	_____	_____	_____
(4.15) Tent (Size _____)	_____	_____	_____	_____
(4.16) Camper Trailer (length _____)	_____	_____	_____	_____
(4.17) Tent Trailer (No. sleeps _____)	_____	_____	_____	_____
(4.18) Pick-up camper (% Rec. Use _____)	_____	_____	_____	_____
(4.19) Motor Home (length _____)	_____	_____	_____	_____
(4.20) Bicycles (Type _____ Speed _____)	_____	_____	_____	_____
(4.21) Minibikes (% rec. use _____)	_____	_____	_____	_____
(4.22) Motorcycles (% rec. use _____)	_____	_____	_____	_____
(4.23) Other _____	_____	_____	_____	_____
(4.24) Other _____	_____	_____	_____	_____

Section V. FACILITIES DATA

(5.01) Type of structure for permanent lake residence or for seasonal home:

1. Wood 2. Stone or Brick 3. Concrete Block 4. Mobile Home
 5. Other _____
 (Specify)

(5.02) Age of home:

1. 0-2 years 3. 5-9 years 5. 15-19 years
 2. 3-4 years 4. 10-14 years 6. 20 +

(5.03) Number of rooms in home:

1 2 3 4 5 6 7 8 9+

(5.04) Current market value of home: (without lot)

1. Under \$5,000 4. \$10-14,999 7. \$30,000 - 39,999

2. \$5-7,999 5. \$15-19,999 8. \$40,000 +

3. \$8-9,999 6. \$20-29,999

(5.05) Current market value of lot: \$ _____

(5.06) Size of lot:

_____ square feet or other measure _____
(specify)

(5.07) Are you the original owner of the lot:

1. yes 2. no 3. if yes, year purchased _____

(5.08) Are you the original owner of the home:

1. yes 2. no 3. If yes, when built or purchased _____

4. If no, when purchased _____

(5.09) If you are the original owner of the lot, what was the use of the land before you purchased it:

(5.10) What is the travel distance from this home to the lake:

(5.11) Water supply:

1. private water system 2. rural water system

3. own well 4. other

(5.12) Electric supply:

1. city _____ 2. REA _____
Name Name

3. Private Company _____ 4. Other _____
Name

(5.13) Sewer system:

1. Septic tank 2. Lagoon 3. Sewer 4. Other _____

(5.14) Telephone service:

1. yes 2. no 3. Exchange or Company _____

(5.15) Gas supply:

1. Propane _____ 2. Natural gas _____ 3. None _____
Company Company

(5.16) Have you had occasion to use the services of a law enforcement agency in conjunction with your property:

1. yes 2. no

(5.17) If Yes on (5.16) why:

1. Vandalism 3. Burglarly 5. Neighborhood Disturbances
2. Breaking & Entering 4. Arson 6. Other _____

(5.18) If Yes to (5.16) which agency was used:

1. County Sheriff 3. FBI 5. Other _____
2. State Highway Patrol 4. Corps of Engineers Ranger

(5.19) Garbage removal:

1. Burn 2. Private Service 3. Take Home 4. Other _____

(5.20) Is fire protection available:

1. Yes 2. No.

(5.21) If Yes on (5.20) what type of fire service:

1. Community 2. Nearest City 3. Other _____

(5.22) Is road to property paved:

1. Yes 2. No.

(5.23) If Yes to (5.22) who paid for the paving:

1. Individual Owner 2. County 3. State 4. Developer 5. Other _____

Section VI. GENERAL:

(6.01) Has population in the immediate area of your property changed in the last 5 years:

1. No change 3. Increased 10-19% 5. Increased 30-49% 7. Declined
2. Increased 0-9% 4. Increased 20-29% 6. Increased 50% +

(6.02) Has the population change lowered the level of satisfaction derived from your property:

1. Yes 2. No.

(6.03) If Yes to (6.02), for what reasons:

1. _____
2. _____
3. _____
4. _____

(6.04) Do you have any problems with:

1. Ticks 2. Chiggers 3. Snakes 4. Other _____ 5. No problems

(6.05) Has the physical environment (setting or scenery) changed around the lake in the last 5 years:

1. Improved 2. Declined 3. No change

Comments: _____

(6.06) Have changes in the water level at this Lake influenced your use of the Lake recreational facilities:

1. Yes. 2. No 3. If yes, adversely 4. If yes, beneficially

Section VI. GENERAL:

(6.07) If yes in (6.06)

When _____ month & year

(6.08) If checked 3 or 4, in (6.06), what activities:

1. Boating 2. Fishing 3. Skiing 4. Camping 5. Picnicking 6. Other

(6.09) General Comments: _____

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