RECREATIONAL USES OF PRIVATE BOAT DOCKS ON GRAND LAKE O' THE CHEROKEES

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RECREATIONAL USES OF PRIVATE

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O' THE CHEROKEES

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PREFACE

This study was conducted to expand the knowledge about recreation activities on private boat docks on Grand Lake o' Cherokees. Army Corps of Engineers has named this type of recreation as 'dispersed recreation'. The objective of this study was to better define the factors that affect types of recreation occurring on private boat docks. In this study four factors were investigated; type of boat dock structure, placement of the boat dock, depth of water under boat dock and boat dock density. A survey was sent to 3340 private boat dock permit holders and 1490 surveys were returned. I sincerely thank my master committee, Dr. Christine Cashel, Dr. Lowell Caneday and Dr. Sue Yuan for guidance, support and patience in the completion of this research. I would like to thank Bob Sullivan and Jennifer Weatherford from Grand River Dam Authority for their assistance and support.

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CHAPTER I

INTRODUCTION

Background

In the Recreation Management Plan (Caneday, Neal, Ruby, & Ruby, 1996) as required by the Federal Energy Regulatory Commission, recommendations were made to further research recreational uses of private boat docks on Grand Lake o' the Cherokees (Grand Lake). Grand Lake is located in northeastern Oklahoma. The lake covers parts of Delaware, Mayes, and Ottawa Counties. Pensacola Dam, the impoundment structure, was completed in October, 1940 and created Grand Lake. The lake has a physical drainage area of 10,298 square miles with an actual impoundment of 46,500 acres. Population centers located within five hours driving time are Kansas City, Springfield and Joplin, Missouri; Fayetteville and Ft. Smith, Arkansas; and Tulsa and Oklahoma City, Oklahoma. Grand Lake is operated by the Grand River Dam Authority (GRDA) under the Federal Energy Regulatory Commission (FERC) license agreement (1494-002). The GRDA was formed in 1935 by the Oklahoma Legislature (Oklahoma Statutes, Title 82 § 861 et seq.) which established GRDA as a "conservation and reclamation district." The current federal license (1494-002) was issued April 24, 1992 and included eight new

requirements placed upon GRDA. One of those requirements was the development of a long-term recreation management plan for Grand Lake.

Dock structures on Grand Lake are used for the storage of watercraft, social functions, fishing, swimming, and occasionally people live on them. There are very few regulations concerning the use of boat dock facilities. Most of the regulations, which are established by GRDA, concern the construction and placement of docks. Private boat docks on Grand Lake provide the greatest number of recreational accesses to the lake, and therefore, it is important to know more about the use of these dock structures (Caneday et al., 1996). There are two issues concerning boat docks on Grand Lake: 1) the management of those boat docks by GRDA and, 2) the recreation that occurs on those boat docks. This study will focus on the recreation issue.

Statement of the Problem

In the previous Grand Lake study (Caneday et al., 1996), approximately 60% of the points of access to the lake were from private docks/boat houses, 11% were from public access, and 19% were from marinas. Current recreational access to the lake is provided from the following sources: five state parks, 3830 private boat docks, three county and municipal facilities, and 130 marinas (commercial boat docks). Private boat docks and marinas provide access for the greatest number of users. The 3830 private boat docks registered as of January, 1996 had an average number of 1.7 boats per private dock owner (Caneday et al., 1996). Based on this average, 6511 boats are being maintained in private boat docks. In comparison, the 130 commercial boat docks have a total of 3580 slips.

Safety issues and lack of information concerning private boat dock owners' activities are lake management questions that need to be addressed. Private boat dock uses and activities cannot be addressed without seeking information directly from the 3830 private owners. In addition, several lake management questions and issues related to private boat docks are a concern for GRDA. Who are the private boat dock owners? What types of recreational activities occur on the private boat docks and how often are they occurring? Do all boat docks have a permit? Are private boat docks being properly maintained? And, where are the docks located? Knowing this information would aid GRDA in managing private boat docks on the lake. Also, this information could be used to promote safe use of docks and improve the general appearance of lake property.

The GRDA manages boat docks by using a permit system. This system requires that all structures on the lake have a permit, including both commercial and private dock owners. Applicants are required to submit detailed drawings of the planned dock's design and a drawing of their property showing placement of the dock. This drawing is used to ensure that the structures conform to the GRDA's lake rules and regulations. After it is issued, the permit is placed in a file. Once the permit is filed, retrieving pertinent information becomes difficult. The GRDA's permit system for boat docks is inadequate and may result in impaired safety and enforcement of GRDA regulations.

GRDA has identified safety issues such as: 1) docks with electricity around water; 2) inadequate dock mooring, which has permitted docks to float into the lake; and, 3) being unable to efficiently locate a dock during an emergency. In addition, for future recreation planning, GRDA needs to know who the boat dock owners are, what their

expectations are, and their pattern of use of their boat docks. Once these questions are better answered, the GRDA can develop an appropriate management tool.

Objectives of the Study

This study had five objectives: 1) define the different types of boat dock structures; 2) identify placement of boat dock facilities as a geographic location along the shore; 3) identify variables that motivate users of boat docks; 4) identify what effect the density of boat docks has on recreation; and, 5) determine what recreational activities occur on private boat docks. This study investigated the affect of each of these factors on the recreational use of boat docks.

Definitions

This study, uses the following definitions:

Acceptable Change: "emphasis on the idea that the amount of change that occurs reflects a judgment made about its appropriateness" (Stankey, McCool and Stokes, 1984, p. 35).

Boat Dock Placement: The geographical location of the boat dock in reference to the lake.

Carrying Capacity: " level of recreation use an area can withstand while providing a sustained quality of recreation" (Wagar, 1964, p. 276).

Crowding: experiential state or subjective judgment affected by situational, social and personal factors (i.e., the negative value judgment that a given

density is excessive and that it impairs an individual's satisfaction or performance) (Greafe and Drogin, 1989).

Damage: "a judgment that change which has occurred is undesirable" (Stankey, 1974, p. 84).

Displacement: any change in recreation behavior to maintain satisfaction in response to changes in the recreation environment (Becker, 1981; Schreyer, 1979b).

Dispersed Recreation: "any type of recreation that occurs on the lake or river that is initiated from outside of established recreational facilities" (M.K. Perales, personal communication, April, 1996).

Ecological Capacity: "a concern with impacts on the natural environment. Examples of ecosystem impact parameters include percent of viable ground cover, rations of various plant species, numbers of animals observed, and coliform counts" (Shelby and Heberlein, 1986, p. 19).

Limits of Acceptable Change (LAC): a management tool described as "a recognition that change is a natural inevitable consequence of recreation use" (Stankey et al., 1984, p. 34) and that inevitable impacts that occur are a result of human use. This method of management focuses on managing for desired conditions rather "than on how recreation per se should be managed" (Stankey, et al., 1984, p. 34).

Recreational Pattern: time measure defining when boat docks are used (weekend or weekday, morning or evening) and how long the use occurs.

Recreation Resource: "a judgment that a part of our environment is useful for some human purpose" (Ciriacy-Wantrup, 1963, p.395).

Social Capacity: the level of use beyond which impacts exceed levels specified by evaluative standards" (Shelby and Heberlein, 1986, p.26).

Satisfaction: The feeling or state of mind (i.e. enjoyment) which results from a recreational experience that has met or exceeded the participant's expectations regarding the specific recreation experiences. Satisfaction is a surrogate measure of experiential quality and a principal product of the recreation experience (Driver and Tocher, 1970).

User: one person on site for a recreational purpose (Caneday et al., 1996).

User day: one person participating in any recreation activity on Grand Lake in a given twenty-four-hour day (Caneday et al., 1996).

Utilities: electricity, water, bathroom, kitchen, appliances and furniture.

Limitations:

There are several limitations of this study: research approach, external validity, and reliability. The method of research was a distributed questionnaire. The reason for choosing this method was the dispersed nature of the population of the study. Some problems with the distributed questionnaire are control of the sample size, randomness of the sample, and the validity of the survey instrument. Due to time constraints the survey instrument was not pre-tested. The threats to validity and reliability are not known at this time. Questions from other lake questionaires were used in an attempt to reduce the

affect of this problem. All private boat dock permit holders were invited to participate in the study.

Delimitations:

This study examined private boat dock permit holders on Grand Lake. The lake is managed by the GRDA, which requires that all boat dock structures have a permit. A questionnaire was mailed to each permit holder. The study was delimited to determining 1) types of boat dock structures, 2) placement of those structures, 3) depth of water around the boat dock, 4) density of boat docks, 5) the recreational activities that occur on the boat docks, and 6) the pattern of that recreation. It was expected that the private boat dock owner participating in this research would be a representative sample of all boat dock owners on Grand Lake. It was further expected that participants would honestly respond to questions.

CHAPTER II

LITERATURE REVIEW

This chapter will review the literature dealing with lake studies on topics of water-related recreational use, participants' perceived sense of crowding, and dispersed recreation on lakes. In addition, a related topic included is the recreationist's decision-making process in purchasing a seasonal home and its effect on his/her recreation choices. These topics offer an overview of lake recreation studies. The studies are varied. Some studies looked at better definition of the types of recreation occurring on lakes. Others explored the water recreationist's satisfaction and sense of feeling crowded. This reviewer found two reports that included boat docks as a part of the study (Dames and Moore, 1992; McDonald, 1992).

General Lake Studies

Water recreation is very popular. Ibrahim and Cordes (1993) published information from the 1987 U.S. Bureau of Census report stating that 197 million people participate in water related recreation. That number included participation in five different activities: swimming, fishing, motor boating, canoeing, and sailing.

Five extensive studies examined lake recreation. A study by Zwick (1991) looked at recreation on all lakes and ponds in the state of Vermont. The study had a three-phase

process to generate issues concerning Vermont's lakes and ponds. Out of this process, twenty-one issues were developed as problem areas or were perceived to be potential problems for the future. The top four problems identified by the survey were: 1) milfoil spread between lakes; 2) development around lakes and ponds; 3) pollution; and, 4) excessive weed growth.

The land use component of Teleki and Herskowitz's study (1986) attempted to develop a model to predict the level of cottage use in the Muskoka-Haliburton area of Ontario province. In developing this model, Teleki and Hershowitz (1986) investigated land use as a source of impact on four areas: 1) trophic status; 2) microbiology; 3) wildlife; and, 4) fisheries of lakes. To predict the impact of cottage usage on the four areas, they studied three land use models to see which was the most accurate in predicting that impact. The three models were an averaging model, an accessibility model, and a cottager model. The output of each of these models was in the form of projections of the impact that the cottage would have. Of the three models, the averaging model was the least accurate and there was no significant difference between the accessibility model and cottager model. Based on the predicted cottage usage, researchers for each of the four areas, trophic status, microbiology, wildlife, and fisheries, would develop a model to further predict the impact that cottage use would have on the individual areas. In addition, various management scenarios could be simulated to determine environmental consequences to the lake.

Others have studied the need for monitoring future impact on lake systems. Marzolf and Wood (1993) described the need for long-term monitoring and research of the limnological system of Lake Powell. Their concern was about the potential for

contaminants from recreational activities. Marzolf and Wood (1993) additionally indicated that recreational use does affect water quality primarily from wastewater, human excreta from chemical toilets, fuel spills, and trash.

Today, in the United States, the Federal Energy Regulatory Commission is placing requirements on lakes which generate electricity. Addressing specific requirements of the federal re-licensing of the GRDA, the Grand Lake Study (Caneday et al., 1996) was conducted to develop a recreation management plan for Grand Lake. The re-licensing requirements included: 1) a lake use report; 2) maintenance standards for public recreation areas; 3) provisions of a lake patrol; 4) a management plan for lakeshore development; 5) management of fishing tournaments; and, 6) a study of recreation's impact on protected species. The Grand Lake study reviewed the recreation resource inventory and surveyed residents around the lake to gauge their concerns about the ecological condition of the lake and its recreational use. The results of the study included a three-part scenario. Each scenario had a description of: 1) a preferred environmental condition; 2) a preferred recreational experience provided; and, 3) a list of actions that if implemented would achieve the preferred future environmental condition. The plan was to provide lake management with a list of choices, not to dictate lake management.

Boat Use on Lakes

Two studies investigated boat use on lakes. A study on Lake Champlain (Vermont, 1993) collected baseline data about the type of recreation occurring on the lake. The Lake Champlain study used aerial photographs to detect areas of use. The data were used to develop a management plan. The results of the survey indicated peak usage

periods were 9:30 AM to 2:30 PM, and that only 14% of all boats were in use at any one time. This survey counted all boats on the water, whether moored or in use.

Hawthorne (1989) conducted a study on Lake Murray in Oklahoma and sought to determine the types of boating occurring on the lake and the carrying capacity of the lake for each recreational use. The study surveyed boaters regarding their attitudes and use patterns. Hawthorne's study established the size of the area needed by recreationists for boating activity on Lake Murray. This study concluded that boaters did not perceive that the lake was crowded if there were 15 acres/boat for pleasure boating and 20 acres/boat for water skiing.

Recreational Use

As seen in the previous section, there has been concern about the types of recreation occurring on lakes, as well as, concern about the amount of recreational use and the quality of that use. Water quality was the major concern expressed in several studies: Caneday et al., 1996; Downing, 1986; Euler, 1983; and, Marzolf and Wood, 1993; Euler, 1983; Zwick, 1991) studied water quality and its environmental impact as a tool to manage the development of summer cottages in the study areas. Zwick (1991) looked at users' perceived problems or concerns. This study was not confined to just recreational use, but recreational concerns were included in the survey. Objectives of Zwick's study were to ascertain use levels, trends and issues, conflicts, inadequacies in management, and protection mechanisms.

In a study of Lake Hartwell (Dames and Moore, 1992) reported that the major lake recreation activities were pleasure boating, fishing from boat, fishing from shore,

swimming, water-skiing, and picnicking. The report estimated the length of recreation time for visitors to the lake. Indices were determined by the number of activity days that an activity occurred divided by the total number of recreation days. Results indicate that visitors during the spring spent their time doing the following: 56% pleasure boating, 27% fishing from the boat, 21% fishing from the shore, 13% swimming. Multiple activities took place at the same time. Table 1 shows seasonal indices of recreational activity. Dames and Moore (1992) looked at three areas of recreational use: docks, non-docks, and condominiums. Table 2 compares the recreation for the three stratum and indicates that 75% of the total recreation originated from boat docks, 20% from non-dock sources and 5% from condominiums. In this table total hours of recreation were calculated for each day type in each stratum.

TABLE 1

SUMMARY OF ACTIVITY INDICES FOR MAJOR ACTIVITIES BY EACH SEASON DURING 1988 USING THREE STRATUM LEVELS

Activity	Spring	Summer	Fall/Winter
Pleasure boating	0.56	0.56	0.50
Fishing from boat	0.27	0.14	0.27
Fishing from shore	0.21	0.12	0.24
Swimming	0.13	0.52	0.02
Water-skiing	0.03	0.32	0.05
Picnicking	0.01	0.07	0.00
Other	0.09	0.21	0.16
Total	1.29	1.94	1.24

(Dames and Moore, 1992, p.35)

TABLE 2

ESTIMATED VISITOR HOURS OF DISPERSED USE DURING SPRING 1988 FOR THE POPULATION BY STRATUM AND DAY TYPE USING THREE STRATUM LEVELS

Stratum	Day Type	Strata Weights	Mean visitor hours	Total Hours	Percent of Hours
Dock	Weekday	205,556	0.84	171,1840	25
	Fridays	51,389	1.92	98,729	14
	Weekends	106,731	3.93	419,529	61
				690,098	75
Nondock	Weekday	65,832	1.23	80,902	44
	Fridays	16,458	1.12	18,405	10
	Weekends	34,182	2.50	85,597	46
				184,904	20
Condominium	Weekday	15,132	1.21	18,294	39
	Fridays	3,783	2.38	8,985	19
	Weekends	7,857	2.47	19,376	42
				46,655	5

(Dames and Moore, 1992, p. 37)

Dispersed Recreation

Dispersed recreation is one way to describe recreation patterns in outdoor resource settings. Dispersed recreation has been defined by the Army Corps of Engineers as "any type of recreation that occurs on the lake or river that is initiated from outside an established recreational facility" (M. K. Perales, personal communication, April, 1996). In a study on Hartwell Lake (Dames and Moore, 1992), the Army Corps of Engineers (ACOE) indicated that dispersed recreation occurring on Hartwell Lake could be divided into six different activities as follows: pleasure boating, water skiing, fishing from boat, fishing from shore, swimming, and picnicking

For Grand Lake, any recreation that occurs on the lake that originates from outside the five state parks or the three city parks would be considered dispersed recreation. Recreational use emanating from private boat docks and the eleven section lines that intersect the lake would be described as dispersed recreation.

Caneday's study indicates that power boating and fishing were two of the most frequent types of dispersed recreation occurring on Grand Lake (Caneday et al., 1996). However, the recreation patterns specific to private boat dock owners were not identified. This research will narrow its scope to only investigate the recreational uses of private boat docks owners.

The Army Corps of Engineers' (ACOE) Waterways Experiment Station has conducted several studies of dispersed recreation. Two of those studies were the Estimates of Dispersed Recreational Use at Hartwell Lake (Dames and Moore, 1992) and Hartwell Lake Dispersed-use Estimation Associated with Walk-on Access from Adjacent

Households (McDonald, 1992). Both reports looked at households with boat docks, households without boat docks, and condominiums.

In the Dames and Moore (1992) Lake Hartwell study, the ACOE interviewed a sample of members from the three classifications of households for a one-year period to estimate their dispersed recreational use of Lake Hartwell by seasons. The Lake Hartwell researchers further classified seasonal use according to weekdays, Fridays, and weekends. Dames and Moore (1992) proceeded to examine the number of hours of recreation, the type of recreational use, and when that recreation occurred (weekdays, Fridays, or weekends) for the three classifications. Their results indicated that 60% of the total visitor hours and about one-half of the recreation days occurred during the summer. While spring visitation accounted for approximately 30% of the total use, fall/winter accounted for only 14% of the total visitor hours and 22 % of the total recreation days. They found that weekend use by households with docks was greater regardless of the season. Regardless, the highest use during all three seasons was by households with docks on weekends. In this report, six recreational uses for Hartwell Lake were identified as pleasure boating, fishing from boats, fishing from shore, swimming, water-skiing, and picnicking. Although the Lake Hartwell report was concerned with three forms or stratum levels (dock, non-dock and condominium) all three are considered forms of dispersed recreation. This research will narrow the scope to investigate the recreational uses of private boat docks.

A related topic was the decision-making process in buying seasonal homes. As indicated by Steward (1994) buying a second home involved a long-term decision making process. Decision making is the general term for the study of how an individual

arrives at the resolution to some problem or task, and what the nature of that resolution will be (Steward, 1994). The factors that contribute to this decision making process are economics, psychology, and marketing.

Recreational access to Grand Lake is provided from the following sources: 5 state parks, 3830 private boat docks, 3 county and municipal facilities, and 130 commercial boat docks (marinas). Table 3 presents a list of estimated recreational usage from these four sources: state parks, county and municipal facilities, marinas, and private boat docks.

TABLE 3

USAGE ESTIMATES OF RECREATION ACCESS POINTS

Access Points	Usage estimates
State Parks	278,084 users
County and Municipal facilities	33,384 users
Marinas	939,750 user days
Private Boat docks	12,926,254 user days

(Caneday et al., 1996)

To determine usage estimates, the amenities were counted, probable use was estimated, group size was determined, frequency of use was determined, and this was multiplied by the number of days in the year it would be used. This technique was used for state, municipal, and county facilities. The estimation for private boat docks and marinas was determined by using total number of boat docks and slips in the marinas, days of use, and group size. This estimates user days. Definitions for users and user day are not that dissimilar. The term user days is employed because there is no information for how many times in the day the facilities was used.

Recreation Satisfaction

Various articles define recreation satisfaction. Many of the same components expressed in this section define why private boat dock owners recreate at Grand Lake. The discussion of recreation satisfaction is investigated from the aspect of camping satisfaction and boating satisfaction, two types of recreation satisfaction that seem to relate closely to Grand Lake. Camping was used in this section because it would relate better to going to the cabin on the lake than backpacking or bowling.

Bultena and Klessig (1969) tried to break down the components of camping that result in a satisfying experience. The authors gave four dimensions of camping that resulted in camper satisfaction. The dimensions were as follows: 1) camping is motivated by a desire to derive benefits from a specific resource base versus the mere attraction and novelty of a change in setting and living routine; 2) camping style emphasizes the primitive and simple versus comfort and convenience; 3) camping is characterized by a high level of energy and an 'activistic' orientation versus mental engagement and a passive, reflective orientation toward nature; and, 4) camping is motivated by a search for 'personal experiences' in which a man-land relationship is stressed and the camper seeks isolation in nature versus a desire for 'social experiences' in which the man-man relationship is primary.

In another article, Manning (1980) developed a relationship between density and user satisfaction. Density can increase until it is perceived as restricting one's motives or objectives, at which point the user perceives the resource as crowded. The greater the restriction the more crowded the user will feel. It was demonstrated that user's perceptions were not always the same when comparing hypothetical cases and actual

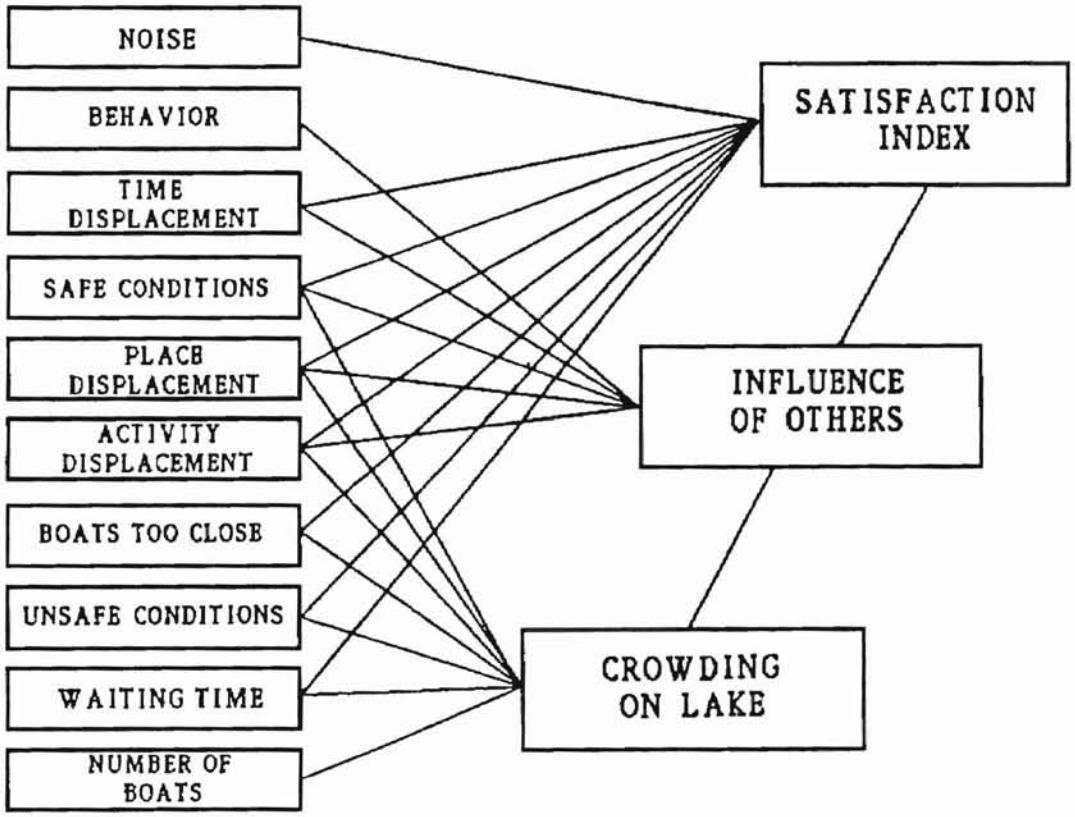
cases. Users were questioned if they would have felt crowded if they had encountered differing hypothetical numbers of other recreationists on their outing. Users were asked whether these differing numbers of other users would affect their experience. The results indicate that as the number of hypothetical users increased, the user's satisfaction decreased. But, when participants were observed on the trail, encountering other users, they indicated no decrease in satisfaction with the increased number of contacts, hence the satisfaction rating remained fairly constant.

Satisfaction is affected by a large variety of both objective and subjective factors (Graefe and Drogin, 1989). Graefe and Drogin (1989) investigated a number of factors as they related to Raystown Lake, an 8500-acre lake managed by ACOE in central Pennsylvania. The survey measured factors influencing an individual visitor's satisfaction and tried to correlate those individual factors (experiential impacts) to an overall satisfaction rating. The experiential impacts studied were the number of boats, feelings of crowding among boaters, influence of others, displacement, waiting time to get on the lake, noise, boaters' behavior, and safe boating conditions.

From this study, a model of boating satisfaction was developed to show recreational satisfaction (Figure 2). The model was made up of ten factors grouped into three conditions: satisfaction index, the influence of others, and crowding on the lake. The ten factors were noise, behavior, time displacement, safe conditions, place displacement, activity displacement, boats too close, unsafe conditions, waiting time, and number of boats. Each of the three conditions was related to a number of the factors. The "satisfaction index" was determined by noise, time displacement, safe conditions,

place displacement, activity displacement, boats too close, unsafe conditions, and waiting time. The "influence of others" consisted of behavior, time displacement, safe conditions, place displacement, and activity displacement. "Crowding" was determined by safe conditions, place displacement, activity displacement, boat too close, unsafe conditions, waiting time, and number of boats. The study results suggest that boaters were generally satisfied with their boating experiences regardless of the number of boats

Figure 1. MODEL OF BOATING SATISFACTION AT RAYSTOWN LAKE



(Drogin, Graefe and Titre, 1990)

Figure No. 1

on the lake. Boaters, however, did report moderate levels of crowding on the lake and significant numbers of boaters reported experiencing inappropriate behaviors by other visitors and concerns about boater safety, and felt displaced in some way.

The Raystown Lake study was repeated at Berlin Lake, located in eastern Ohio and managed by ACOE (Drogin, Graefe, and Titre, 1990). The objective of the Berlin Lake study was to see if the results of this study supported the results from the Raystown study. The Berlin Lake study dropped factors ("behavior" and "waiting time") and added others (too many boats, frequency of perceived contacts, experience-neutral contacts, and patrol). The Berlin Lake study (Drogin, Graefe, and Titre, 1990) results were consistent with the Raystown Lake results.

From the Berlin Lake study, revisions to the original model of boating satisfaction were made. This revised model was made up of the same three conditions, "satisfaction index," "influence of others," and "crowding on the lake" and a different set ten of factors. Each of the three conditions were related to a number of the factors. The satisfaction index was determined by the factors consisting of noise, boats too close, near accident, unsafe conditions, safe conditions, place displacement, too many boats, frequency of perceived contacts, and experience-neutral contacts. The "influence of others" consisted of safe conditions, place displacement, too many boats frequency of perceived contacts and experience-neutral contacts. "Crowding" was determined by unsafe conditions, safe conditions, place displacement, too many boats, frequency of perceived contacts, experience-neutral contacts, activity displacement, boat density (peak use) and patrol.

Some previous studies have used the more fully developed job satisfaction literature to explain recreational satisfaction (Griest, 1968; Roggenbuck, 1975; Graefe, 1977). Others have focused on multiple components of satisfaction as areas of dissatisfaction (Stankey, 1973; Bassett, Driver, & Schreyer, 1972). In a study of

recreational satisfaction with float trips on the Buffalo National River (Ditton, Graefe, & Fedler, 1981) tried to develop a better survey to measure user satisfaction. In the Buffalo National River study, the research team (Ditton et al., 1981) interviewed one member of a number of float groups. The member was asked to respond to the following five statements on a five-point Likert scale: 1) I thoroughly enjoyed the trip; 2) I cannot imagine a better trip; 3) The river trip was well worth the money I spent to take it; 4) I do not want to run any more rivers like this one; and, 5) I was disappointed with some aspect of my trip. This study was unable to determine the independent variables that affect user satisfaction.

Before examining recreation activities that occur on boat docks, a review of the definitions of recreation is necessary. One definition is " what you do to be amused or refreshed" (Bammel and Burrus-Bammel, 1982, p. 5). Another definition used is,

> "(1) The pleasureable and constructive use of leisure time,
>
> (2) Acitivity that rest one from work, often by providing a change or diversion,
>
> (3) Activities which we engage because of inner desire and not because of outer compulsion" (Jensen, 1985, p. 6).

Jensen goes on the say that, " Some common element among several definitions, distinguish the term *recreation*: (1) voluntary participation; (2) leisure time; (3) enjoyment and satisfaction; and, (4) positive results for the individual" (Jensen, 1985, p. 6). It is this statement that governed the topics of this literature review. Recreation satisfaction is a much more complex subject. As seen, studies of recreation satisfaction have changed from Griest's job satisfaction (Griest, 1968) approach to recreation satisfaction to Graefe's complex model of factors affecting boating satisfaction at

Raystown Lake and Berlin Lake studies. The conditions that affect satisfaction are made up of many factors as suggested by Figure 1. We must look at them all to understand recreation satisfaction.

Crowding

As seen with recreational satisfaction, increasing density does not always mean that the participant will feel crowded. In a paper that examines user's perceptions of crowding in a river recreation setting, Ditton, Graefe, and Fedler (1983) found that the floaters that reported feeling crowding tended to use the river during a period of heavy use. Perceptions of crowding tended to be expressed by the more experienced or frequent user. There are two ways in which increased usage of the river could change the river experience for the experienced or frequent user: an increase in population encountered over the time period or an increase in public awareness of the area.

In another paper, Gramann (1982) examined crowding from a perspective of social psychology in terms of stimulus overload and social interference. The paper developed a series of axioms, theorems and propositions to explain perceptions of crowding. In stimulus overload, the assumption is that size, density, and heterogeneity of urban populations cause the population to be exposed to high levels of psychological stress. "Crowding perceptions are greatest when the level of social stimulation exceeds that desired and the individual is unable to reduce that stimulation through adaptive strategies" (Gramann, 1982, p. 111). Individuals within the population develop coping strategies.

In social interference, an explanation of crowding is that individuals are motivated consciously or subconsciously by the desire for solitude, stress release, or social interaction. The important point in this theory is that the different goals of individuals become important predictors of crowding. "Human behavior is often goal directed, and crowding attributes occur when the number, behavior, or proximity of other persons in a setting is incompatible with an important goal and thus interferes with its attainment" (Gramann, 1982, p. 112). Gramann states a set of four axioms, three propositions, and four theorems to explain the interrelationships of psychological goals, density, and the perception of crowding. According to most of these, it is not the density of other users that causes a feeling of crowding, but the incompatibility of goals causes interference with the attainment of those goals, and at that point there is a feeling of crowding. The greater the interference, the greater the feeling of crowding.

Others have looked at crowding, Desor (1972, p.79) defined crowding as: "(1) filled with people, of things; packed; (2) packed too full; (3) close together; inconveniently lacking room." The article goes on to say that this definition has not been improved on by social psychologists. In the article, Desor (1972) uses architectural design to identify which architectural features cause a perception of crowding. Epstein (1979), after discussing the effects of crowding, suggested that subsequent behavior was governed by gender. The psychological state of the participant was manipulated and then the participant's behavior observed during crowding situations. As density increased men were more likely to become competitive with fragmented orientation, and women formed cohesive, cooperative groups.

In summation, the topics of recreational use, lake studies, and dispersed recreation were used to define the recreation occurring on lakes and to indicate the lack of studies concerning private boat docks. The lake studies (Vermont, 1993; Zwick, 1991; Teleki and Herskowitz, 1986; Caneday et. al., 1996; Marzolf and Wood, 1993; Euler, 1983; Hawthorne, 1989) were diverse in subject, but none directly addressed dispersed recreation. The Lake Hartwell study (Dame and Moore, 1995; McDonald, 1992) examined dispersed recreation directly.

Crowding and recreation satisfaction were used to develop insight into why people choose certain types of recreation and why they continue to recreate. Where crowding would seem to have an effect on recreation satisfaction, this is not always the case (Gramann, 1982; Ditton et. al., 1983; Desor, 1972; Epstein, 1979). Complicated models have been developed trying to explain what is involved in satisfaction (Graefe, 1989).

CHAPTER III

METHODOLOGY

Chapter three consists of a plan for investigating the problem. There will be a discussion of statement of the problem, procedure, hypotheses, methodology, instrumentation, sample, and statistical analysis.

Statement of the Problem

The purpose of this study was to examine the recreational uses of private boat docks on Grand Lake. Dock structures are used for the storing water craft, social functions, fishing, and swimming and occasionally people live on them. There are very few regulations concerning the use of dock facilities. Most of the regulations, which are established by GRDA (Appendix A), are concerned with the construction and the placement of dock structures. Private boat docks on Grand Lake provide the greatest number of recreational access to the lake and that is why it is important to know more about the use of those dock structures. There are two issues in the study of private boat docks: one is the management issue and the other is the recreation issue. This study focuses on the recreation issue.

Procedure

This chapter describes the methods and procedures used to determine recreational uses of private boat docks on Grand Lake. For this descriptive research project, questionnaires were sent to 3340 private boat dock permit holders on Grand Lake. Independent variables in this study are types of boat dock structures, placement of those structures, depth of water under those structures, and density of boat docks. Types of "boat dock structures" are slips only, slips with roofs, slips with roofs and solid walls, and slips with roofs that serve as a patio. The variable "placement of boat docks" is defined as being placed in open water versus being placed in non-open water. "Depth of water" is defined as water depth under the boat dock. "Density of boat docks" is concerned with how close other boat docks are to the participant's boat dock. The dependent variables are the type of recreational activities occurring on private boat docks and the recreational patterns of those activities. The following sections describe the hypotheses, methodology, instrumentation, sample and statistical analysis.

Hypotheses

Several conceptual hypotheses were developed in this study.

Type of Structure

Research Hypothesis	There is no significant difference in types of recreational uses based on type of private boat dock structures.
Research Hypothesis	There is no significant difference in recreational patterns based on type of private boat dock structures.

Placement: Open water vs. non-open water

Research Hypothesis	There is no significant difference in types of recreational uses based on placement of private boat dock structures.
Research Hypothesis	There is no significant difference in recreational patterns based on placement of private boat dock structures.

Depth of Water

Research Hypothesis	There is no significant difference in types of recreational uses based on depth of water under private boat dock structures.
Research Hypothesis	There is no significant difference in recreational patterns based on depth of water under private boat dock structures.

Density

Research Hypothesis	There is no significant difference in types of recreational uses based on density of private boat dock structures.
Research Hypothesis	There is no significant difference in recreational patterns based on density of private boat dock structures.

Methodology

Boat dock permits have to be renewed each year on January 1. The GRDA charges a yearly fee for a boat dock permit. The questionnaire was distributed to the 3340 permit holders through this billing process in January 1997. The permit holders

were invited to take part in the survey and the participants were assured that they would remain anonymous. Permission to conduct research was received from the Oklahoma State University's Institutional Review Board, IRB No. ED-97-041 (Appendix B). GRDA approval of the research is in Appendix C. A news release was sent to local newspapers in the Grand Lake area announcing the survey and inviting all private boat dock owners to participate in the research project (Appendix D).

Instrumentation

The questionnaire was developed using three other lake studies (Caneday et. al, 1996; McDonald, 1992; Dame and Moore, 1992). The questionnaire consisted of four sections: 1) demographic and general information about the respondent; 2) placement of the respondent's boat dock; 3) the type of boat dock structure; and, 4) type of recreational use. A letter with the questionnaire introduced the permit holder to the researcher and explained the purpose of the study. The introductory letter informed the participants that their participation was voluntary and that there was no penalty for non-participation (Appendix E).

Section 1 obtained demographic and general information that pertained to the owners and their property. Those questions were: 1) whether they own property on the lake; 2) how much lake frontage the participant owns; 3) the number of people in their lake family; 4) what boats they have; 5) the zip code where they live; and, 6) in what area of the lake they spend most of their time. These questions revealed whether the participants lived at the lake and the number of people in their lake family. This section also included questions about participants' perceptions of crowding and lake quality on a

Likert scale, and open ended questions regarding the respondent's feelings on the most appealing and least appealing aspects of Grand Lake.

Section 2 obtained information about the placement of the boat dock structure. Information elicited in this section included: 1) the location of the boat dock; 2) the placement of the dock (open water or non-open water) and, 3) the depth of water under the dock. Information in this section was used to determine if of open water, non-open water, and depth of water under the dock are related to the types of recreation used and the pattern of that recreational activity. This section helped define how placement will affect the type of recreation that occurs on the boat dock structure.

Section 3 obtained information about the boat dock structure and the amenities available on the boat dock. Information in this section provided a description of the structure, as to whether it had slips or walls and a roof. This section was used to define how structure type influenced the recreational pattern on the structure.

Section 4 obtained information about the recreational use of the boat dock Participants were asked to indicate the number of hours that they spent on boat dock for each lake visit and what recreational activities they participate in while on their dock. This section will be used to define how recreational activities and recreation patterns are affected by the four factors of type of boat dock structure, depth of water under the boat dock structure, placement of boat dock and boat dock density.

Statistical Analyses of Data

The sample size was 3340 boat dock permit holders. The independent variables were type of structure, placement of boat dock, depth of water under the boat dock,

density of boat docks, and. Dependent variables were types of recreation that occur on the boat docks and patterns of that recreation.

The data were analyzed using the Pearson's goodness of fit for a one-way design. There were two reasons for using the goodness of fit test: 1) dependent variables can be divided into discrete categories, and 2) observations are measured in frequencies. There are four categories of type of structure, two categories for placement of boat dock structures with five sub-categories, and three categories for density.

Four types of structures were examined: 1) slips only; 2) slips with roofs; 3) slips with a roof and solid walls; and, 4) slips with solid walls and patio on the roof. The types of structures were further divided into the amenities available on the boat dock, such as potable water, electricity, bathroom, kitchen appliances and furniture. This division resulted in 1024 different combinations to be analyzed.

The placement of boat docks was divided into three levels. They were unprotected open water, semi-protected open water, and protected water. The category was further subdivided by the depth of water under the boat dock was subdivided into 5ft. increments: 1ft. - 5ft., 6ft. - 10ft., 11ft. - 15ft., 16ft. - 20ft., and over 20ft. The density of boat docks was divided into three categories: number of boat docks within 50 ft. of the participant, number of boat docks within 100 ft. of the participant, and number of boat docks within 150 ft. of the participant. These categories were analyzed to determine if density affects the types of recreation that occur on the boat docks and the patterns of that recreation. Chi-squared (χ^2) critical values were determined with alpha of 0.05.

CHAPTER IV

RESULTS

The purpose of this study was to examine the recreational uses of private boat docks on Grand Lake. There are 3830 boat dock structures on the lake and they are used for storage of water craft, social functions, fishing, and swimming. Occasionally people also live on them. The GRDA deals with several lake management issues related to boat docks, but this study only addressed the recreation issues. The objective of the study was to measure the types of recreation and the patterns of use of that recreation.

Frequency of Responses

The questionnaire was divided into four sections: 1) demographic and general information about the participant; 2) placement of the boat dock and depth of water under the boat dock; 3) type of boat dock structure; and, 4) type of recreational use occurring on the boat dock.

Of the 3340 questionnaires sent to the permit holders, 1460 were returned, for a total response rate of 44 %. Seven of the returned questionnaires could not be used in the analysis because of damage, incomplete information or late arrival. Of those returned, 30

held more than one dock permit resulting in a total of 1490 useable questionnaire which could be utilized. The results of the questionnaire are found in Appendix F.

Section 1. This section requested demographic and general information pertaining to the boat dock owners and their property. Those questions determined: 1) whether respondents own property on the lake: 2) how much lake frontage respondents own; 3) the number of people in the respondent's lake family; 4) what type of boats respondants have; 5) the zip code of respondent's primary residence; and, 6) in what area of the lake respondents spend most of their time.

When asked if they owned property on the lake, 97.5% indicated they were property owners. Those who owned property on the lake were asked how much lake frontage they owned. There were 1341 responses to this question, the average lake frontage was 231.06 ft., the mode was 100 ft. of shore line (228 participants). When asked if they owned a boat dock, 98.2% of the respondents said 'yes'. The average size of a lake household from this sample was 3.4 individuals per household. The number of responses to this question was 1443 with a maximum household size of 360 individuals (an individual who permitted his employees to use his lake property) and a mode of 2 members in 861 households.

The 1490 boat docks contained 2826 boats or an average of 1.9 boats per dock. The question, "How many of the watercraft are kept at your boat dock?" offered the participants a list of six different types boats and also had an "other" in which there were 156 responses listed other boats. This question caused some confusion about what was defined as a motorboat. Some of the answers were 25ft. cruiser, Celebrity IO, bass boat, jet boat, cabin cruiser and others. All of these types of answers were considered to be

motorboats over 25 hp. Appendix G includes definitions of categories that were derived from the open-ended responses.

The "What is the ZIP code of your permanent address?" question had 1463 responses from a total number of 1490 resulting in a 98.19% response rate. There were 224 different zip codes represented in the survey. The top ten most frequently given zip codes are displayed in Table 4.

TABLE 4

TOP TEN MOST FREQUENTLY GIVEN ZIP CODES

Zip Code Cities	No.
Tulsa, OK	361
Grove, OK	269
Afton, OK	126
Bartlesville, OK	66
Broken Arrow, OK	33
Disney, OK	32
Miami, OK	32
Jay, OK	30
Joplin, MO	28
Wyandotte, OK	23

The responses to the question, "In which area of the lake do you spend the most time?" were much more varied than expected. This variety of responses could indicate differences between in the owners' perceptions of "area of the lake" and the researcher's view of the area. There were 656 or 44.03% 'no responses.' Respondents listed a total of 98 different descriptions of 'area of the lake.' The answers ranged from 'the cabin' to the addition name and from 'south end' to the 'north end.'

The next set of questions was designed to measure attitudes. Responses were indicated on a Likert scale with a range of responses between 1 and 5. The focus of these two questions was to determine the dock owner's perception of crowding on the lake and their perception of change in lake quality. The dock owners do not perceive the lake to be at all crowded on the weekdays, with 75.8% responding "not at all crowded" and 14.4% indicating "slightly crowded" while on holiday weekends, 27.2% perceived it as "uncomfortably crowded" and 67.2% perceived it as "extremely crowded." The owners' perceptions of lake quality was not as easy to analyze. The range of responses on a five point Likert scale were as follows: 7.0% respondents felt that lake quality over the period of years they have used the lake was considerably improved, 14.2% felt quality was slightly improved, 28.8% said lake quality remained the same, 26.2% indicated it was slightly degraded, 17.4% believed that the lake was considerably degraded, and 1.8% of the responses were "no opinion/can't tell." There were 2.4% that answered "other" and 31 'no responses.' When asked, "Do you feel crowded?" 15.3% indicated 'yes,' 81.1% responded 'no' and 3.4% did not respond.

The results from the question, "Briefly describe the most and least appealing aspect of Grand Lake?" have been categorized for ease of reporting the results. Multiple

responses per question were possible. When there were multiple responses to this question there was the researcher assigned each different response to an appropriate category. For a more detailed definition of the categories see Appendix H for "most appealing aspect of Grand Lake" and Appendix I for "least appealing aspect of Grand Lake." Table 5 reports the results in the "most appealing" categories. Based on the number of responses, 24 categories were formed. The categories included 97% of all responses. The responses help to define the participants' perceptions and attitudes toward the lake. Aesthetics is by far the most appealing aspect of Grand Lake according to the respondents (43.4%), followed by relationships with nature (19.5%) and solitude (8.9%).

TABLE 5

MOST APPEALING ASPECTS OF GRAND LAKE

List of Most Appealing Category of Grand Lake	No. Of Responses	%
Aesthetics	647	43.4
Relationships with nature	291	19.5
Ownership Waterfront	145	9.7
Solitude	132	8.9
Access to Home	97	6.5
Social contact	87	5.8
Boating	78	5.2
Relaxation	58	3.9
Dock	47	3.2

Table 6 displays the results in the "least appealing aspect of Grand Lake" categories. As with the most appealing aspects, answers caterorized for analysis. The 10 categories with the most responses are reported, but a more detailed description of the

categories is in Appendix I. The 37 categories contain about 97% of all responses. The 'no response' category had the largest number with 13% of 1988 responses. "Lake levels" was second with 12.0%; PWC (Personal Water Craft) with 10.6% was third, followed by crowded with 8.0%.

TABLE 6

LEAST APPEALING ASPECT OF GRAND LAKE

List of Least Appealing Category of Grand Lake		
Category Name	No.	%
Lake Levels	239	12.0
PWC	211	10.6
Crowded	159	8.0
Large Boats	134	6.7
Rude Recreationists	119	6.0
Water Quality	114	5.7
Boat Speeds	81	4.1
Debris in the Water	68	3.4
Run Down Docks or Property	53	2.7

Summary of Section 1

- Question 1: 98.2% response rate with 224 different Zip Codes.
- Question 2: 97.5% own property on Grand Lake.
- Question 3: Average lake frontage is 231.1 ft.
- Question 4: 98.2% own a boat dock on Grand Lake.
- Question 5: Average size of lake family is 3.4 persons per household; a total of 100 households have 2 individuals.
- Question 6: Boats kept in boat dock.

Number	Type of Boat
1166	Motorboats over 25 hp

602	Personal Water Craft
337	Pontoons
212	Motorboats under 25 hp
151	Sailboats
156	Other boats
112	Rowboats
76	Canoes

- Question 7: Area of the lake. Top 4 responses.

Number	Area of the Lake
176	South end
137	Duck Creek
129	Honey Creek
108	Elk River

- Question 9: "Please indicate with an 'x' your feelings about water related activities at Grand Lake for the time you have indicated your highest visitation in question 8".

Time Period	Not at all crowded	Slightly Crowded	Moderately Crowded	Uncomfortably crowded	Extremely Crowded	No Response
Weekdays	1125	213	73	9	3	61
Weekends	106	363	598	269	95	47
Holiday weekends	37	78	320	402	591	49

- Question 11: "Since I have lived on this lake, the quality of the lake has (check one)"

Considerably Improved	Slightly Improved	Remained the same	Slightly degraded	Considerably degraded	No Opinion\ Can't tell	Other
99	201	407	370	245	25	34

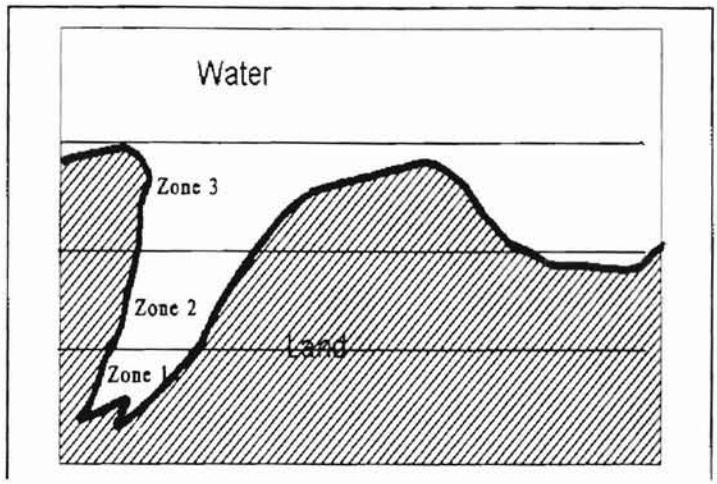
- Question 19: Most and least appealing aspect of Grand Lake.

  The two highest responses for the "most appealing aspect of Grand Lake" were aesthetics at 43.4 % and relationships with nature at 19.5 %. For the "Least appealing aspect of Grand Lake" the two highest responses were "lake levels" at 12 % and "personal water craft" at 10.6 %

Section 2 describes the placement of boat dock structures and the depth of water under the dock. In this section, the factors boat dock placement (in open water or non-open water) and depth of water under the dock are compared with the type of recreation activity and the pattern of that recreation activity. This section helps define how dock placement affects the type of recreation that occurs on boat dock structures. The results from the section are discussed in detail later in this chapter, in the Hypothesis Testing section.

Placement was determined by asking the participants to indicate the placement of their boat dock on a theoretical lake map. During the data entry, this researcher divided the map into three zones. Zone 1 represents protected water in a cove; as such, the area would be subjected to little wind and wave action. Zone 2 is a semi-protected area, the area located closer to the mouth of the cove. This area would be subjected to more wind and wave action than Zone 1. Zone 3 docks have has no protection from wind and wave action. The zones are displayed in Figure 2. Zone 1 contained 25.2% of boat docks, Zone 2 had 36% and Zone 3 had 36.8% and there were 2.2% 'no response.' For "depth of water under the boat dock" 6.5% of the docks were in 1 - 5 ft. of water, 23.6% in 6 - 10 ft., 26.2% in 11 - 15 ft., 19% in 16 - 20 ft., and 23.1% in over 20 ft. of water.

FIGURE 2; LAKE MAP



Section 3: This section of the questionnaire asked respondents to describe their boat dock structure and indicate what amenities were available on their boat dock. Information in this section provided a description of the structure, whether or not it has slips or walls and roof. This section was used to analyze whether the type of structure determined the type of recreation occurring on the structure. Four additional structure types not included in the survey were indicated by the respondents. These written responses were the flat deck, also called a swim deck (113), house dock (4), slips with swim deck (7), slips with open walls and patio (5), and rail dock (4). The flat deck, with 113 responses was 7.58% of all responses, even though it was not included in the questionnaire. Because of the number of responses an additional category was included in the study to account for this structure. Other structures (boat houses, slip with sun deck, slip with roof as a patio, and a rail dock) that were reported were a response rate of 1%.

To better define the type of boat dock structure participants indicated what amenities were on their boat dock. They were given choices of; drinking water,

electricity, a bathroom, kitchen appliances and furnture. The most popular amenity was electricity at 74.4% and the next choses amenities was furniture at 18.5%(Table 7). For recreation activities the respondents indicated 86% fishing, reading 34.6%, swimming 76.4%, watching wildlife 47.2%, entertainging guests 51.5% and watching TV 4.6%. Summary of dock types and amenities.(Table 8)

- Flat Deck 7.3%
- Slips only 15.7%
- Slips with a roof only 7.3%
- Slips with solid walls and roof 20.42%
- Slips with solid walls and roof used as patio 26.2 %
- Others 1 %
- Utilities

TABLE 7

AMENITIES ON BOAT DOCKS

Drinking water	Electricity	Bathroom	Kitchen Appliances	Furniture
5.4%	74.4%	1.1%	5.6%	18.5%

Section 4: This section of the survey described the recreational activities occurring on boat docks. There was only one question, which offered the participant several choices of recreation activities and an open-ended response. This section will help define the types of recreation occurring on boat docks. Results of this section will be discussed later. The participants were given the opportunity to respond with other recreation activities not listed on the questionnaire. These responses were categorized

into existing activities or into three new ones. Of the 165 responses to the "other" category, 66 were categorized as boarding, 28 maintenance, and 27 sunbathing.

TABLE 8

RECREATION ACTIVITIES ON PRIVATE BOAT DOCKS

Activity	Percent
Fishing	86.0%
Reading	34.6%
Swimming	76.4%
Watching Wildlife	47.2%
Entertaining Guest	51.5%
Watching Television	4.6%
Other	11.1%

Analyses of Data

This study examined four factors that could affect recreational activity and recreational patterns of that activity. Those factors are boat dock structure, placement of the boat dock, water depth under the dock, and boat dock density. Boat dock structure is defined by its construction: flat deck; dock with slips; dock with slips and roof; dock with slips, roof and walls; and dock with slips, roof, walls, and a patio. A Goodness of Fit analysis was conducted.

The second factor is the placement of the boat dock. There are no regulations concerning the placement of boat docks on Grand Lake, other than ones that ensure that owners will have access to the lake from their boat dock and regulate how it's connected to the shore, is to ensure that an entrance to the cove or lake cannot be blocked by another boat dock. The participants were asked to place the relative position of their boat dock on a map. The map was of a theoretical lake shore with a small cove opening onto a long open shore. The map was divided into three parts by the researcher and assigned a category of unprotected water, semi-protected water, and protected water. Definitions of categories follow: unprotected water is where the dock is readily exposed to wind and wave action; semi-protected water is where the dock is placed in a cove, but close to the mouth of the cove and is subject to some wind and wave action; and protected water is in the upper end of a cove which is subjected to little wind and wave action.

The third factor was depth of water under the boat dock. In shallow this wind and wave action could become critical, as changes in lake levels and wave action is greater in shallow water. The question was whether this affects the recreation on these boat docks.

The last factor is boat dock density. This factor will be used to determine if the number of boat docks affects recreational activity on the dock. Density is defined by: number of boat docks within 50ft., number of boat docks within 100ft., and number of boat docks within 150ft. As mentioned earlier, an increase in density does not always mean that participants will feel crowded. An important factor in determing whether there are perceptions of crowding is the difference in the goals of the participants.

The Pearson Goodness of Fit test is a non-parametric statistical test used to test the shape of the distribution, or expected and observed frequencies or the association

between two categorical variables. The Goodness of Fit test is used because the researcher is interested in counting results that fall into particular categories. The Goodness of Fit test sums the difference between the expected results and the observed

$$\chi^2 = \sum_{i=1}^{k} \frac{(X_{observed} - X_{expected})^2}{X_{expected}}$$

results squared, divided by expected results.

The first research hypothesis looked at the factor of boat dock structure. Boat dock structure is defined by its construction characteristics. The number of flat decks reported was 113. There are 235 docks with boat slips, 705 docks with slips and roof, 303 docks with slips constructed with roof and walls, and 108 structures of docks with slips, roof, walls, and a patio. The number of docks that consisted of slips with roofs seems to be out of proportion with the other structures at 48.2% just less than half of the total structures. As stated in Chapter III, in an interview, John Kirkpatrick, a lake resident, said GRDA rules regulated structure type; this was determined not to be the case. In a telephone conversation, Jennifer Weatherspoon, a GRDA accountant, said that the dock structures were set by the individual addition's covenant. Each addition around the lake dictated the type of structure that was allowed. This information does not affect the analysis but affects the shape of the distribution.

The Pearson Goodness of Fit test was administered to the time spent on boat dock and type of the boat dock structure the structure of the data is displayed in Table 9 . The resulting χ^2 value was 142.941 with a probability of <0.001. The critical value was 45.315 with 20 degrees of freedom as displayed in Table 9, thus, indicating that the χ^2

null hypothesis should be rejected. By rejecting the null hypothesis of χ^2 test, the research hypothesis would also be rejected.

TABLE 9

TIME SPENT ON BOAT DOCK BY TYPE OF BOAT DOCK
BY BOAT DOCK: PERCENTAGES

	Flat Deck (%)	Slips Only (%)	Slips w/ Roof (%)	Slips w/ Roof and walls (%)	Slips w/ Roof and walls and patio (%)
None	0.51	0.36	0.36	0.14	0.0
< ½ hr	2.10	4.19	8.10	2.10	0.36
1 - 2 hrs	1.81	4.41	15.33	4.63	1.74
2 - 4 hrs	1.81	4.41	15.04	7.74	2.39
4 - 8 hrs	.72	1.52	9.04	4.84	2.02
All day	0.07	0.07	0.94	1.16	0.87

TABLE 10

TIME SPENT ON BOAT DOCK BY BOAT DOCK TYPE: STATISTICS

Pearson Goodness of Fit Test

Recreational pattern	χ^2 Value	Critical Value for α=0.001	Degrees of Freedom	Probability values determined by SYSTAT
Type of boat dock structure	142.941	45.315	20	<0.001

Another factor that should be considered with boat dock structure is the amenities on each of the different structures. Amenities can have a limiting affect on the type of recreational activities occurring on those structures. The Pearson Goodness of Fit test was administered to boat dock type and amenities on boat dock. Amenities available on boat docks were water, electricity, bath, kitchen, and furniture. The critical value was

18.467 with 4 *df*, and α of 0.001 was the same for all five amenities. The resulting χ^2 value for water was 186.120 with a probability of <0.001. The χ^2 value for electricity was 521.815 with a probability of <0.001. The χ^2 value for bath was 51.211 with a probability of <0.001. The χ^2 value for kitchen was 146.142 with a probability of <0.001. The χ^2 value for furniture was 186.120 with a probability of <0.001. Results are summarized in Table 11. Each of the χ^2 indicates that the null hypothesis should be rejected for each of the amenities.

TABLE 11

AMENITIES ON BOAT DOCKS BY BOAT DOCK TYPE
PEARSON GOODNESS OF FIT TEST

Boat Dock Amenities	χ^2 Value	Critical Value for α=0.001	Degrees of Freedom	Probability values determine by SYSTAT
Water	35.2	18.467	4	<0.001
Electric	521.8	18.467	4	<0.001
Bath	51.2	18.467	4	<0.001
Kitchen	146.1	18.467	4	<0.001
Furniture	186.1	18.467	4	<0.001

In comparing dock type by utilities, the dominant utility is electricity found on 75.55% of all dock types (Table 12). When looking at the individual dock types, the docks with the highest percentage of electricity are the slips w/ roof, walls, and patio at 96.3%, slips w/ roof and walls at 96.04% and, slips w/roof at 85.82%. Clearly the predominant dock configuration is slips w/roof with electrical service, which applies to 605 docks or 41.33% of all docks. By comparison, 7.1% are slips w/ roof, walls, and a patio and 19.8% are slips w/roof and walls.

A closer examination of the dock utilities data reveals that 24.4% of the boat docks have no utilities, 52.5% have electricity only, 11.5% have electricity and furniture, 4.1% have electricity and kitchen, 3.1% have water and electricity: of the remainder, which consists of less than 3% of total boat docks, 5 have electricity, bath, and kitchen, 15 have water, electricity, and furniture, 6 have water, electricity, kitchen, and furniture, and only 6 have all utilities.

TABLE 12

UTILITIES BY DOCK TYPE

Dock that have these utilities	Flat Deck (%)	Slips Only (%)	Slips w/ Roof (%)	Slips w/ Roof and walls (%)	Slips w/ Roof and walls and patio (%)
Water	0.1	0.0	6.7	4.6	14.8
Electric	27.4	31.5	85.8	96.0	96.3
Bath	0.0	0.1	0.0	2.0	7.4
Kitchen	0.0	0.1	2.0	12.5	25.9
Furniture	8.9	6.4	13.1	30.7	58.3

The research hypothesis stated that boat dock structure would not have an effect on types of recreation by the owners of the boat dock.

The results of this question were subjected to the Pearson Goodness of Fit test. Since multiple activities could take place, each activity was tested individually. The critical value was 9.488 with 4 *df* an α of 0.05 was the same for all six activities. The χ^2 value for fishing was 10.63, for reading was 21.91, for swimming was 10.9, for watching wildlife was 5.86, for entertaining guests was 37.59 and for watching TV was 109.17. Each of the χ^2 values was greater than the critical value, so the null hypothesis would be rejected. Since the χ^2 null hypothesis is rejected the research hypothesis is also rejected

and there is a significant difference in recreational activities of fishing, reading, swimming, entertaining guests and watching TV based on type of private boat dock structure.

Watching wildlife was the only activity with a χ^2 value less than the critical value, so this hypothesis would not be rejected.

TABLE 13

RECREATIONAL ACTIVITY BY BOAT DOCK TYPE
PEARSON'S CHI-SQUARE TEST

Activity	χ^2 Value	Critical Value for α=0.05	Degrees of Freedom	Probability values determined by SYSTAT
Fishing	10.63	9.488	4	0.031*
Reading	21.91	9.488	4	0.001*
Swimming	10.9	9.488	4	0.028*
Watching Wildlife	5.86	9.488	4	0.210
Entertaining Guest	37.59	9.488	4	0.001*
Watching TV	109.17	9.488	4	0.001*
* = null hypothesis rejected $p < 0.05$				

The research hypothesis stated that the placement of the boat dock would not have an affect on the recreational patterns of the owners of the boat dock. A recreational pattern is a measure of how much time was spent on the boat dock.

The results of the survey were subjected to the Pearson Goodness of Fit test. The results of questions, regarding time spent on the boat dock and the placement of the boat dock were used in the Pearson Goodness of Fit test. The χ^2 value was 11.10 and the

critical value for Table 14 was 18.3070 (Shavelson, 1988) for an $\alpha = 0.05$ and 10 df (degrees of freedom)(Table 14). The observed χ^2 value is less than the critical value so the null hypothesis is not rejected. Since the χ^2 null hypothesis is not rejected, the research hypothesis is also not rejected and there is no significant difference in recreational patterns based on placement of private boat dock structure.

$$H_0 = \chi^2_{observed} < \chi^2_{critical}(\alpha, df)$$

TABLE 14

PEARSON CHI SQUARED TEST OF DOCK PLACEMENT

Recreational pattern	χ^2 Value	Critical Value for α=0.05	Degrees of Freedom	Probability values determined by SYSTAT
Placement of dock	11.10	18.3070	10	0.350

The research hypothesis that placement of the boat dock would not affect types of recreation by the owners of the boat dock, was measured by the frequency of each activity taking place on the boat dock.

The results of this question were subjected to the Pearson Goodness of Fit test. Since multiple activities could occur, each activity was tested individually. Results of the analysis can be found in Table 15.

Each of the χ^2 values was less than the critical value so the null hypothesis is not rejected. This would also mean that the research hypothesis was accepted. Since the χ^2 null hypothesis is not rejected the research hypothesis is also not rejected and there is no significant difference in recreational activities based on placement of private boat dock structure.

TABLE 15

PEARSON'S χ^2 TEST
RECREATIONAL TYPES VS PLACEMENT OF BOAT DOCKS

Recreational Activity	χ^2 Value	Critical Value for α=0.05	*df*	Probability values determined by SYSTAT
Fishing	0.208	5.99147	2	0.901
Reading	0.608	5.99147	2	0.738
Swimming	0.544	5.99147	2	0.762
Watching Wildlife	1.388	5.99147	2	0.500
Entertaining Guests	0.573	5.99147	2	0.751
Watching TV	3.828	5.99147	2	0.148

Another factor that could affect the use of boat docks is water depth. In this research, the hypothesis was that the depth of water under the boat dock would not affect recreational patterns of the owners of the boat dock. The recreational pattern was a measure of how much time was spent on the boat dock.

Looking at all the frequencies of time spent on boat docks by depth, clearly the category of 1 - 5ft. depth, (Table 17) shows the least percentage of time spent on the dock structures, only 6.39%. The other four categories have percentages ranging from 19.8% to 26.2%. Those four categories make up 93.7% of the total categories. The χ^2 value,

85.537, is greater than the critical value of 31.410, indicating that the null hypothesis should be rejected.

The results of the survey were subjected to the Pearson Goodness of Fit test. The results of the questions about time spent on the boat dock and the depth of water under the boat dock were used in the Goodness of Fit test. The χ^2 value was 85.537 at a probability of <0.001, and the critical value for Table 16 (Shavelson, 1988) was 31.4104 for $\alpha = 0.05$ and 20 *df* (degrees of freedom). The χ^2 value is greater than the critical value so the null hypothesis should be rejected (Table 16). Since the χ^2 null hypothesis is rejected the research hypothesis is also rejected and there is significant difference in recreational activities based on depth of water under private boat dock structure.

TABLE16

PEARSON'S χ^2 TEST OF WATER
DEPTH AND TIME SPENT ON BOAT DOCK

Recreational pattern	χ^2 Value	Critical Value for α=0.05	Degrees of Freedom	Probability values determined by SYSTAT
Water Depth	85.537	31.410	20	<0.001

The next hypothesis concerns the recreational activities and water depth. The results of this question were subjected to the Pearson Goodness of Fit test. Since multiple activities could take place, each activity was tested individually. The χ^2 value for each of the recreation activities is shown in Table 18.

The χ^2 values for fishing and watching wildlife were less than the critical value so the null hypothesis should not be rejected. Since the χ^2 null hypothesis is not rejected the

research hypothesis is also not rejected and there is not a significant difference in recreational activities of fishing and watching wildlife on depth of water under private boat dock structure. The other recreational activities of; reading, swimming,entertaining guests and watching TV all have χ^2 values were greater than the critical value at probabilities of <0.001 so the null hypothesis is rejected.

TABLE 17

FREQUENCIES OF TIME SPENT ON BOAT DOCKS BY WATER DEPTH.

	Depth of water under the boat dock				
	1 - 5ft.	6 - 10ft.	11 - 15ft.	16 - 20ft.	over 21ft.
None	5.8	0.3	0.3	1	0.3
< 1 hr	1.7	5.3	4.0	3.0	2.6
1 - 2 hrs	2.0	7.2	7.9	5.2	6.7
2 - 4 Hrs	1.2	7.6	8.5	6.4	7.5
4 - 8 hrs	0.5	3.3	5.5	4.3	4.8
All day	0.2	0.4	0.4	0.8	1.3
Total	6.3	24.1	26.6	19.8	23.2

TABLE 18

PEARSON'S χ^2 TEST OF RECREATIONAL ACTIVITY BY WATER DEPTH UNDER THE BOAT DOCK

Recreational Activity	χ^2 Value	Critical Value for α=0.05	Degrees of Freedom	Probability values determined by SYSTAT
Fishing	4.468	9.488	4	0.346
Reading	25.595	9.488	4	<0.001
Swimming	38.027	9.488	4	<0.001
Watching Wildlife	7.171	9.488	4	0.127
Entertaining Guests	49.637	9.488	4	<0.001
Watching TV	35.153	9.488	4	<0.001

The last factor that could affect recreational activity and the recreation pattern of that activity is boat dock density. Density is defined as the number of boat docks within 50ft., 100ft. and 150ft. This factor will be used to determine if the number of boat docks will affect recreational activity on the dock.

Before discussing the analysis, there is a need to explain data handling processes. Eight of the responses indicated that the participants' perception of distance was questionable. Responses of 10, 12, 16, 17 and 20 docks within 50ft. are not reasonable. If the maximum size of each private boat dock permit is 1100 square feet, with no other dimensions there is no way to determine the exact dimensions of a boat dock, but assuming the docks are square, the dimensions would be about 33ft. by 33ft. Using these dimensions, it was determined that only 6 docks are possible within 50ft. of participant's boat dock, 8 docks within 100ft. and 10 docks within 150ft. Using this assumption eight responses were eliminated from the 50ft. data, 4 from the 100ft. data and 13 from the 150ft. data.

The results of Pearson's Goodness of Fit test indicate different outcomes for each set of data. For density at 50ft. the χ^2 value is 62.091 for $df = 30$ and probability of >0.001 which is greater than the critical value of 43.773 (Shavelson, 1988) for $df = 30$ and $\alpha = 0.05$. This means that the null hypothesis is rejected. As the density ring is enlarged to 100ft. and 150ft., the results of the χ^2 test change. The results for 100ft. are a χ^2 value of 44.916 with $df = 35$ and $\alpha = 0.05$ at a probability of 0.0122. The χ^2 value is less than the critical value so the null hypothesis is not rejected. For 150ft. the results are similar: χ^2 value is 53.606 at a probability of 0.338 for $df = 50$ and $\alpha = 0.05$. This indicates we should not reject the null hypothesis. As shown in Table 19, as the density rings increase, the fewer the number of boat docks. As the size of the density ring increases the χ^2 value decreases and critical value increases.

TABLE 19

TIME SPENT ON BOAT DOCKS BY BOAT DOCK
DENSITY PEARSON'S χ^2 AT $\alpha = 0.05$

	χ^2 Value	Critical Value for α=0.05	Degrees of Freedom	Probability values determined by SYSTAT
Density at 50ft.	62.091	43.773	30	0.001*
Density at 100ft.	44.916	49.7657	35	0.0122*
Density at 150ft.	53.606	67.5048	50	0.338*
More than 1/5 of fitted cells are sparse (frequency < 5) Significance tests are suspect.				

In this section, the recreational activity compared to boat dock density will be the focus of analysis. Boat dock density is divided into three levels: number of boat docks within 50ft., number of boat docks within 100ft., and number of boat docks within 150ft.

Number of Boat Docks within 50ft.

Looking at the Pearson Goodness of Fit test results for all activities the χ^2 values are less than critical values from Table 20 for $\alpha = 0.05$ and $df = 6$, and the probabilities range from 0.058 for swimming to 0.705 for fishing. These indicate that the null hypothesis should not be rejected as summarized in Table 20.

TABLE 20

PEARSON'S χ^2 TEST FOR RECREATIONAL ACTIVITY VERSUS NUMBER OF BOAT DOCKS WITHIN 50FT.

Activity	χ^2 Value	Critical Value for α=0.05	Degrees of Freedom	Probability values determined by SYSTAT	Sparse Cells *
Fishing	3.796	12.592	6	0.705	x
Reading	10.628	12.592	6	0.101	x
Swimming	12.179	12.592	6	0.058	x
Watching Wildlife	8.439	12.592	6	0.208	
Entertaining Guests	4.022	12.592	6	0.674	
Watching TV	11.981	12.592	6	0.62	x
*More than one fifth of fitted cells are sparse (frequency < 5); significance tests are suspect.					

In tables No. 21 thru 24 are matrix of recreational activities of; fishing, reading, swimming and watching TV for boat dock density of 50ft. These tables were used for the

Person Goodness of Fit test. Each of One of the results of the analysis also indicated that 20% of the cells for four activities--fishing, reading, swimming and watching TV-have a frequency <5; therefore, the results are not reliable(Tables 21,22,23 &24).

TABLE 21

FISHING (ROWS) ON BOAT DOCK BY DENSITY
OF BOAT DOCK WITHIN 50FT. (COLUMNS)

	Number of boat docks							
	0	1	2	3	4	5	6	Total
No Fishing	6.3%	3.7%	3.1%	0.6%	0.1%	0.1%	0.1%	14.0%
Fishing	36.7%	21.4%	21.6%	3.9%	1.5%	3.0%	0.7%	86.0%
Total	43.1%	25.1%	24.7%	4.5%	1.6%	0.4%	0.4%	100.0%

TABLE 22

READING (ROWS) ON BOAT DOCK BY DENSITY
OF BOAT DOCK WITHIN 50FT. (COLUMNS)

	Number of boat docks							
	0	1	2	3	4	5	6	Total
No Reading	29.3%	16.7%	14.7%	3.2%	0.9%	0.2%	0.5%	65.5%
Reading	13.7%	8.5%	10.0%	1.3%	0.7%	0.2%	0.2%	34.5%
Total	43.0%	25.1%	24.6%	4.5%	1.6%	0.4%	0.7%	100.0%

TABLE 23

SWIMMING (ROWS) ON BOAT DOCK BY DENSITY
OF BOAT DOCK WITHIN 50FT. (COLUMNS)

	Number of boat docks							
	0	1	2	3	4	5	6	Total
No swimming	10.5%	5.6%	5.2%	1.5%	0.3%	0.1%	0.4%	23.7%
Swimming	32.6%	19.5%	19.4%	3.0%	1.3%	0.3%	0.3%	76.3%
Total	43.1%	25.1%	24.7%	4.5%	1.6%	0.4%	0.7%	100.0%

TABLE 24

WATCHING TV (ROWS) ON BOAT DOCK BY DENSITY
OF BOAT DOCK WITHIN 50FT. (COLUMNS)

	Number of boat docks							
	0	1	2	3	4	5	6	Total
No Watching TV	41.9%	23.5%	23.2%	4.2%	1.6%	0.4%	0.7%	95.4%
Watching TV	1.1%	1.6%	1.5%	0.3%	0.1%	0.0%	0.0%	4.6%
Total	43.0%	25.1%	24.7%	4.5%	1.6%	0.4%	0.7%	100.0%

For the other activities of "watching wildlife" and "entertaining guest" the χ^2 value is less than the critical value, indicating that the null hypothesis is not rejected. Since the χ^2 null hypothesis is not rejected the research hypothesis is also not rejected and there is not a significant difference in recreational activities of "watching wildlife" and "entertaining guests" for number of boat docks within 50ft. of a private boat dock structure.

Number of Boat Docks within 100ft.

Continuing with the Pearson Goodness of Fit test results for all activities, the χ^2 values for number of boat docks within 100ft. (Table 25) are less than the critical values for $\alpha = 0.05$ and $df = 7$ and the probabilities range from 0.027 for swimming to 0.70 for reading. These values indicate that the null hypothesis should not be rejected for recreational activities reading, watching wildlife, and entertaining guests. The null hypothsis should be rejected for the swimming activity.

TABLE 25

PEARSON'S CHI-SQUARED TEST FOR RECREATIONAL ACTIVITY VERSUS NUMBER OF BOAT DOCKS WITHIN 100FT.

Activity	χ^2 Value	Critical Value for α=0.05 (Shavelson)	Degrees of Freedom	Probability values determined by SYSTAT	Sparse Cells*
Fishing	4.784	14.067	7	0.686	X
Reading	4.669	14.067	7	0.700	
Swimming	15.772	14.067	7	0.027	
Watching Wildlife	6.583	14.067	7	0.474	
Entertaining Guests	12.856	14.067	7	0.076	
Watching TV	5.956	14.067	7	0.545	x
*More than one fifth of fitted cells are sparse (frequency < 5); therefore, significance tests are suspect.					

The results of the analysis as shown in Table 25 also indicated that for two activities, fishing and watching TV, 20% of the cells have a frequency of < 5 which would relate to a percentage <0.3%; therefore, these results are not reliable. The Pearson Goodness of Fit test for the "fishing" and "watching TV" activities is indiscernible, so the results are inconclusive.

Number of Boat Docks within 150ft.

Continuing with the Pearson Goodness of Fit test results for all activities the χ^2 values for number of boat docks within 150ft. are less than critical values for $\alpha = 0.05$ and $df = 7$, and the probabilities range from 0.027 for swimming to 0.70 for reading (Table 26). These values indicate that the null hypothesis should not be rejected.

The results of the analysis also indicated that for three activities fishing, reading and watching TV have, 20% of their cells have a frequency <5; therefore the results are not reliable. The χ^2 value for swimming is greater that the critical value therefore the null hypothesis should be rejected. The χ^2 values for watching wildlife and entertaining guests is less than the critical value therefore we do not reject the null hypothesis.

TABLE 26

PEARSON'S GOODNESS OF FIT TEST FOR RECREATIONAL ACTIVITY VERSUS NUMBER OF BOAT DOCKS WITHIN 150FT.

Activity	χ^2 Value	Critical Value for α=0.05 (Shavelson, 1988)	Degrees of Freedom	Probabilities values determined by SYSTAT	Sparse Cells *
Fishing	4.422	18.307	10	0.926	x
Reading	7.219	18.307	10	0.705	x
Swimming	25.730	18.307	10	0.004	
Watching Wildlife	12.933	18.307	10	0.227	
Entertaining Guests	16.935	18.307	10	0.076	
Watching TV	12.850	18.307	10	0.232	x
*More than one fifth of fitted cells are sparse (frequency < 5); significance tests are suspect.					

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Review of the Study

In this study, 3340 questionnaires were sent to 3830 private boat dock permit holders in January of 1997 during the permit billing process. By March 1997, questionnaires were still being received with some questionnaires being returned as late as July of 1997. In April, data entry began and at that point no other questionnaires were added to the data analysis. A total of 1460 questionnaires were used in the analysis and 30 respondents reported a second dock.

Summary of Research Hypotheses

This research was designed on the premise that four factors will affect recreation patterns and types of recreation occurring on the private boat docks on Grand Lake. Those factors were type of boat dock structures, placement of boat docks, depth of water under the boat docks, and the number of other boat docks in the area.

The participants were asked to define the type of boat dock structure they owned from a list of different types of boat dock structures. They also indicated the types of recreation that they participated in while on their dock and the amount of time they spent

on their dock. For placement of their boat dock they were asked to indicate the placement of their dock on a theoretical lake map. The map was divided into three zones, protected area, semi-protected area, and unprotected area. There was a question on depth of water and the participants were asked to estimate the number of other boat docks within a radius of 50ft., 100ft. and 150ft.

Conclusions

Tables 27 and 28 below summarize the results of each hypothesis tested. Looking at Table 27, results relating to hypotheses concerning type of boat dock structure and depth of water under the boat dock are very similar. Conclusions for these questions are the same and are being discussed together. The χ^2 test indicated that all the null hypotheses should be rejected except for those addressing "watching wildlife" for the "type of boat dock structure" hypothesis and "fishing" for the "depth of water" hypotheses. Rejecting the null hypothesis suggests a significant difference between the recreation activity and recreational pattern with "type of boat dock structure" and "depth of water under the boat dock." The conclusion for these questions is that there should be further study.

The hypothesis for placement of boat dock is the only hypothesis to not be rejected for all the recreation activities and recreational patterns. This result indicates that placement is not a factor in determining recreation activity and recreational pattern. On Grand Lake, placement of boat docks is not only subject to geographic conditions, but to conditions that lie far outside the scope of this research. As suggested earlier, the

decision making process for buying a summer home (Steward, 1994) is far more complex than just considering geographical terrain.

For the "boat dock density" hypothesis there are varied results for most of the recreation actitivies. For example, fishing (at all boat dock densities, 50ft., 100ft., and 100ft.) there were no results. For reading (at 50ft. and 100ft. densities), there were no results. Swimming at 50ft. densities had no results. Watching TV for 100ft. and 150ft. densities had no results. Reading at 100ft. density do not reject the null hypothsis. Two activities, watching wildlife and entertaining guests, indicate that the null hypothesis should not be rejected for each of the boat dock densities (50ft., 100ft., and 150ft.). Swimming at 100ft. and 150ft. boat dock densities did not reject the null hypothesis.

TABLE 27

RESULTS FOR HYPOTHESIS
TESTING FOR RECREATION ACTIVITIES

Activity	Hypothesis Structure Type	Hypothesis Placement	Hypothesis Depth of Water	Hypothesis Boat Dock Density	
Fishing	Reject	Do not Reject	Do not Reject	50ft.	No results*
				100ft.	No results*
				150ft.	No results*
Reading	Reject	Do not Reject	Reject	50ft.	No results*
				100ft.	Not reject
				150ft.	No results*
Swimming	Reject	Do not Reject	Reject	50ft.	No results*
				100ft.	Reject
				150ft.	Reject
Watching Wildlife	Do not Reject	Do not Reject	Do not Reject	50ft.	Not reject
				100ft.	Not reject
				150ft.	Not reject
Entertaining Guests	Reject	Do not Reject	Reject	50ft.	Not reject
				100ft.	Not reject
				150ft.	Not reject
Watching TV	Reject	Do not Reject	Reject	50ft.	Not reject
				100ft.	No results*
				150ft.	No results*

*More than one fifth of fitted cells are sparse (frequency < 5) significance test are suspect.

TABLE 28

RESULTS FOR HYPOTHESIS
TESTING FOR RECREATIONAL PATTERNS

	Hypothesis Reject or Not to Reject	
Research Hypothesis 1 B: Boat dock structure	Reject	
Research Hypothesis 2 B: Placement	Not reject	
Research Hypothesis 3 B: Depth of Water	Reject	
Research Hypothesis 4 B: Density	50ft.	Reject
	100ft.	Reject
	150ft.	Not reject

Research hypothesis for boat dock structure, water depth under boat dock, and boat dock density of 50ft. and 100ft. are rejected. The boat dock placement hypotheis is rejected along with the research hypothesis of boat dock denisty for 150ft. are rejected.

Recommendations

This study has expanded the knowledge base about the recreational activities and recreational patterns of these activities on Grand Lake. The factors that were theorized to affect recreational activities and recreational patterns were dock structures, dock placement, water depth under the dock, and boat dock density. Only the dock placement factor has shown it has no effect on recreation. Type of structure and depth of water do effect recreational activities and patterns. In addition, the water depth under the dock and type of dock structure effect the recreation activity occuring on private boat docks. The varying results for boat dock density indicate that boat dock densities need futher study. All factors need further study to better define their effect on recreation.

Areas of this study that should receive more attention are the differences between full time residents and weekend residents. About 38% of the participants in this research had permanent addresses from areas around the lake. Further studies could address the following questions: 1) Are attitudes about the lake quality different between these full time residents and the temporary weekend or holiday residents? 2) Are the types of recreation different between these two groups? 3) How much different are their recreational activities?

Using this study as a base for types of recreational activities occurring on boat docks, other studies should determine the time spent in doing those various activities. This study did not investigate the types of boating activity and time spent participating in these activities. Many participants indicated boating as an activity occurring on their boat dock. With the recent interest by the FERC about carrying capacity, further study about how much time boat dock owners use the lake is important. Along with the continued study of private boat docks there should be a study of commercial boat docks. The 180 marinas on the lake have a total of 3380 slips; the second largest access to the lake, and additional studies on how this activity is impacting the lake are needed. Possible areas to address include water quality, displacement of lake users and carrying capacity, limits of acceptable change, and displacement of dock owners.

An area of possible interest to the GRDA is the negative response that many boat dock owners gave regarding lake management. Of the 45 categories concerning the least appealing aspect of the lake (Appendix H), 20 dealt directly or indirectly with lake management. These 20 categories accounted for 60.3% of the responses. Included in this list are several that the GRDA have no or very little control over, but they help reflect

the participants view of the lake. The GRDA needs to address this negative view of their management of the lake. However, not all the attitudes regarding lake management were negative with 20.9% of all responses regarding most appealing aspects of the lake dealt with lake management issues (Appendix H). Five categories deal with lake management and these responses make up 20.9% of all responses.

Another recommendation is to develop a GIS (Geographical Information System) database for private boat docks. Several areas of lake management would benefit by the development a GIS database. One benefit would be that lake patrol would be better able to manage boat docks; the other would be that better emergence responses to water accidents. Accidents could be tracked on a map so the lake patrol could recognize problem areas. All of these problems to lake management are spatial problems. The GIS applications are for spatial problems.

Being able to locate the boat docks is a problem. Being able to put them on a map in relationship to other docks in the area would be very beneficial for management, as such a map this would speed up the location process for the inspections. It would also aid the lake patrol in finding owners of rundown boat docks and docks for which permits were not renewed. The second benefit would be to provide better emergence response to accidents that occur on the lake because one could better determine the location of an accident and which rescue organization would be appropriate to call. By determining the closest boat dock, the lake patrol will have an exact position of an accident and by knowing the boat dock location, they can advise the response unit of the best way to get to the area of the accident.

Accidents do not just happen. They are incidents that are brought about by many factors. Being able to track the location of accidents and the factors that contribute to an accident will aid management in determining the necessary regulatory procedures needed to eliminate or reduce the frequency of accidents.

This study concentrated on patterns and activities of recreation on private boat docks on Grand Lake. It investigated the influence of dock placement, depth of water, crowding and dock structure on the recreational patterns and recreation activities. Even though some of the questions in this research were inconclusive, the study has provided information revealing what boat dock owners do on their docks. The study has also indicated several topics that should be addressed further.

The number of boats that have direct access to the lake is estimated at 10,657 boats. Some of the owners and operators of the watercraft access Grand Lake from 3380 private boat docks that contain 1.9 boats per dock and 3380 slips in commercial marinas. The potential for more than ten thousand watercraft to access Grand Lake raises serious questions about the capacity of the lake. Crowding and quality of the recreation experience must become concerns for management.

Another concern for management revealed in this study is the presence of negative images that boat dock owners have of GRDA as the management agency. In addition, safety issues are concern expressed by those individuals who responded to this study.

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APPENDIX A

GRDA DOCK REGULATIONS

Approved 6/15/94 (mh)

RULES AND REGULATIONS
GOVERNING
THE USE OF SHORELANDS
AND WATERS OF THE
GRAND RIVER DAM AUTHORITY

INDEX

6. All vessels shall carry a U.S. Coast Guard-approved life preserver for each person on board. The operator of a vessel less than 27 feet in length, while underway under motorized power, shall require each passenger 12 years of age or younger to wear a U.S. Coast Guard-approved life preserver (63 O.S.A. § 4206).

7. All persons using parasails, lifting or suspending devices or on water skis, or surfboards, or similar device shall wear U.S. Coast Guard-approved life preservers.

8. No person shall sit or ride on the sides of a vessel, a covered bow or the back of any seat of a vessel, or stand in a vessel while under way at any speed greater than idle or trolling speed; provided, however, the operator of such vessel may stand if said vessel is specifically designed to be operated from a standing position.

9. Each vessel, other than a personal watercraft, shall be equipped with a paddle or set of oars, anchor, bailing device and fire extinguisher.

10. All vessels are prohibited from entering any area within 200 feet below Pensacola, Kerr and Chimney Rock Dams. Vessels are prohibited within 500 feet below said dams during periods of hydrogeneration.

11. In the nighttime, all vessels must have and use proper navigation and anchoring lights and shall limit their speed to that which is reasonable and proper under the circumstances.

12. Safety permits will be cancelled and vessels removed from the lakes upon violation or failure to comply with these Rules and Regulations.

13. No skiing is allowed above the Strang Bridge on Lake Hudson, above Twin Bridges on Grand Lake, in Elm Creek east of Grove water intake tower, above the Harbors Marina on Duck Creek or above Lakemont Shores Ramp on Drowning Creek.

These rules are for your safety; please help keep Grand Lake, Lake Hudson and the W.R. Holway Reservoir safe for everyone.

ARTICLE II
GENERAL RULES AND INFORMATION

1. Free Access. The public shall have free access to the waters of the lakes and no charges shall be made to the public for the right to engage in hunting, fishing, swimming or non-commercial boating.

2. Roads and Highways. The existing public rights-of-way to the waters or shorelands and boat ramps sponsored by the Authority shall remain open as a way of free public passage to and from the lakes.

3. Fishing and Hunting. Fishing or hunting within restricted areas will not be permitted, nor will hunting or fishing be permitted within 200 feet of the tailraces below the dams; nor will hunting or fishing, except commercial bait operators, be permitted at such other points on or about the lakes where such use will unduly

Approved 6/15/94

RULES AND REGULATIONS GOVERNING THE USE OF SHORELANDS AND WATERS OF THE GRAND RIVER DAM AUTHORITY

PREAMBLE

The law (82 O.S.A. § 861 et seq.) creating the Grand River Dam Authority prescribes the use that may be made of the properties of the Authority and authorizes the Authority to promulgate, prescribe and enforce rules and regulations for the use, for recreational and commercial purposes, of its lakes and shorelands, including the use of firearms and the inspection of all vessels of every character proposing to operate or operating on said lakes. The travel of vessels on the waters of the lakes of the Authority shall be in keeping with the following Rules and Regulations of the Authority in the interest of public health, safety and convenience in the use of the waters and the shorelands of the Authority.

ARTICLE I
LAKE SAFETY RULES

1. The Oklahoma Boating Safety Regulation Act, 63 O.S.A. § 4200 et seq., the Personal Watercraft Safety Act, 63 O.S.A. § 4220.1 et seq., and the Oklahoma Penal Code, 21 O.S.A. § 1 et seq., apply to the waters of the Authority, in addition to the Rules and Regulations set out herein. Failure to comply with these laws and Rules and Regulations may constitute a criminal offense.

2. The Oklahoma Vessel and Motor Registration Act, 63 O.S.A. § 4001 et seq., applies to the waters of the Authority and must be complied with in addition to the Rules and Regulations set out. Every vessel subject to the provisions of the Oklahoma Vessel and Motor Registration Act must have state registration and current license by no later than June 30 of the current state fiscal year.

3. All vessels kept for operation or operated upon the lakes may be inspected by the Authority's Lake Patrol for the safety of water craft and equipment. For information regarding inspections and safety permits, contact Lake Patrol Headquarters at (918) 782-9594 or (918) 256-5545. There is no charge for GRDA safety permits, which shall be placed on the port front portion of the vessel.

4. (a) Power vessels, when moving under more than idle power, shall not travel within 150 feet of wharves, docks, landings and swimming areas and shall be operated in such a manner that lives or property shall not be endangered.

(b) No person shall operate a vessel on any waters of the Authority towing a person or persons using parasails, lifting or suspending devices or on water skis, or surfboards, or similar device nor shall any person engage in water skiing, surfboarding, or similar activity at any time between sunset to sunrise or at such time visibility due to other existing conditions is obscured so as to endanger life or property (63 O.S.A. § 4212(B)).

5. No vessel shall be permitted to operate on the lakes in excess of its licensed capacity.

8. Liability. Neither the Authority nor any representative thereof assumes any responsibility for loss or damage to life or property by theft, storm, accident or otherwise, in connection with or growing out of the exercising of the privileges conferred by any permit which may be issued in accordance with these regulations.

Nothing contained in these regulations shall operate to relieve the owners of vessels from complying with, or from the obligation of complying with, the applicable laws of the United States and the State of Oklahoma.

ARTICLE III
VESSELS

1. Inspection, Registration and Certificate of Safety.

(a) All vessels operated upon the lakes may be inspected at any time by the Authority's Lake Patrol for safety equipment.

(b) All vessels and equipment used for transportation of the public for pecuniary gain or profit shall be subject to inspection during each permit year by the Authority.

(c) All vessels must be licensed under the Oklahoma Vessel and Motor Registration Act.

2. Loose and Derelict Vessels. Any loose, derelict or apparently abandoned vessel found on the lakes, or shores of the lakes, may be impounded by the Authority, and any expense in connection with its impoundment shall be the responsibility of the owner.

3. Vessel Operating Distance. Except at slow idle, no vessel shall be operated within fifty (50) feet of any other vessel that is underway.

4. Water Muffling. All vessels must be muffled pursuant to 63 O.S.A. § 4208.

5. Wake Damage. All vessel operators shall be held responsible for any damage that their wake might cause to property. No person shall operate or give permission to operate a vessel in a wake zone at a speed which is other than reasonable and prudent and which shows due regard for the existence of actual or potential hazards and obstacles, or in such a manner as to endanger the life, limb or property of any other person, or in such a manner as to create a wake. "No wake zone" means any area posted with buoys or within one hundred fifty (150) feet of any boat ramp, dock, pier or anchored or moored vessel.

6. Minimum Age. No person shall operate a vessel other than a personal watercraft (jet ski, water bike, wave runner and similar craft) on Authority waters unless they are at least 16 years of age and possess a valid automobile operators license, unless such person is under direct (on board) visual and audible supervision of a responsible adult. Personal watercraft may be operated by individuals between the ages of 12 and 14 years of age in the area of immediate visual observation by a responsible adult. No personal watercraft may be solely operated by a person below 12 years of age.

interfere with navigation or proper conduct of the business of the Authority or endanger the public.

4. Tree-cutting. The cutting of trees greater than three (3) inches in diameter on Authority lands is strictly prohibited without prior approval of the Authority.

5. Firearms. Only shotguns and proper archery equipment are allowed on Authority property, except that hunters may also use rifles and pistols on certain Authority property which is marked as a Wildlife Management Area. All hunting on any Authority property shall be conducted in accordance with Oklahoma Department of Wildlife Conservation regulations.

The discharge of any firearms or bows in, over or across the waters of the lakes is expressly prohibited except as regulated by the Oklahoma Department of Wildlife Conservation. In no event shall the use of firearms or bows be conducted in a manner which interferes with the business of the Authority's projects or endangers the public.

6. Gas and Oil Storage. The keeping or storage of gasoline and other inflammable or combustible fuels, other than fuel tanks installed in vessels, in, upon or about the lakes or shores will not be permitted unless the location and detailed storage plans therefor are first submitted to and approved by the Authority, and comply with all applicable state and federal statutes.

7. Health and Sanitation.

(a) Sanitation Rules and Regulations. All sanitary rules and regulations of the Oklahoma Public Health Code shall be complied with prior to the granting or renewal of any GRDA permit.

In the interest of public health, sanitation and safety there shall be no camping on the Authority's lands below 750 feet mean sea level on Grand Lake and 622 feet mean sea level on Lake Hudson, except in areas the Authority may designate a "Public Use Area."

Bottles, cans, garbage, rubbish, refuse, debris, wreckage, bilge water containing oil or grease or materials used in the process of cleaning the outer surfaces of vessels or any other material of any kind shall not be thrown into or released upon the lakes or deposited or dumped upon the shores of the lakes or upon any land under the jurisdiction of the Authority.

No septic tank, lateral line or lagoon shall be placed on the shorelands of the Authority. No sewage shall be disposed of in the waters or on the shorelands of the Authority. No person shall operate a vessel equipped with a marine toilet which is not a total retention system in accordance with federal regulations regarding marine toilets (63 O.S.A. § 4213(B)).

(b) Anchorages. Anchorages shall not be allowed off the shore of the lakes of the Authority in any one location for a continuous period in excess of forty-eight (48) hours. At the end of a forty-eight (48) hour period, a new anchorage may not be taken up within a distance of one (1) mile of the anchorage previously used. No buoy may be used as an anchorage without the permission of its owner.

7. Hazardous Acts. In addition to the rules of travel for operation of vessels upon the lakes, all vessels shall be operated in such a manner as will best safeguard the lives and property of others upon the lakes.

Any person conducting himself in such a manner as to endanger the health and safety of others upon the lakes or lands of the Authority, or violate any of the statutes of the State of Oklahoma, may be removed from the lakes or lands of the Authority and subject to the penalty of any applicable law.

ARTICLE IV
PERMITS REQUIRED FOR WHARVES, LANDINGS AND DOCKING FACILITIES

1. Private Use. No person, firm or corporation may construct, install, relocate or operate any wharf, dock, landing, anchorage, boat house or breakwater on the waters or shorelands of the lakes until a permit shall have been issued by the Authority.

2. Commercial Use. The construction, installation, relocation or operation of wharves, docks, landings, anchorages or boat houses for pecuniary profit or gain, directly or indirectly, on the waters of the lakes or shorelands of the Authority shall be allowed only after a permit has been issued pursuant to Article VII, Section 2, of these Rules and Regulations.

3. Permits for Private Docks. Issuance of permits for new or relocated private docks will be withheld until there has been compliance with these Rules and Regulations by the applicant and compliance with the following conditions:

(a) The submission of an application duly executed, in writing, by the applicant, upon a form prescribed and provided by the Authority.

(b) The applicant shall submit to the Authority a plat, plans or specifications, drawn to scale, showing the location of the proposed works to be constructed, the shoreline, type or method of holding or holding device, cable or metal stiff-arms and such other details as required by the Authority, and such facilities shall not be relocated without approval of the Authority.

Said cables, stiff-arms or other holding device shall be securely attached to the adjacent lands at a point above 750 feet mean sea level on Grand Lake and above 622 feet mean sea level on Lake Hudson. Said cables, stiff-arms, holding device and any walkways extending to the shorelands shall conform to these Rules and Regulations.

(c) The submission of a certificate signed by a licensed electrical contractor showing compliance with all applicable electrical codes and any corrective action taken. Thereafter, each private boat dock shall be inspected every three (3) years by a licensed electrical contractor and a certificate of the inspection and any corrective action taken, signed by the contractor, shall be furnished to the Authority.

(d) Payment in advance of the fee specified in the table of fees hereinafter set forth.

4. Payment of Fees. No permit, private or commercial, shall be issued until the appropriate fee has been paid.

5. Electrical Inspections. By January 1, 1995, all existing commercial boat docks shall be inspected by a licensed electrical contractor to insure compliance with all applicable electrical codes. A certificate of the inspection and any corrective action taken, signed by the contractor, shall be furnished to the Authority.

By July 1, 1995, all existing private boat docks shall be inspected by a licensed electrical contractor to insure compliance with all applicable electrical codes. A certificate of the inspection and any corrective action taken, signed by the contractor, shall be furnished to the Authority.

Thereafter, each commercial and private boat dock shall be inspected every three (3) years by a licensed electrical contractor and a certificate showing the inspection and any corrective action taken, signed by the contractor, shall be furnished to the Authority.

6. Plans and Construction Details. The applicant shall submit to the Authority a plat, plans or specifications, drawn to scale, showing the location of the proposed works to be constructed, the shoreline, type or method of holding or holding device, cable or metal stiff-arms and such other details as required by the Authority, and such facilities shall not be relocated without approval of the Authority.

Said cables, stiff-arms or other holding device shall be securely attached to the adjacent lands at a point above 750 feet mean sea level on Grand Lake and above 622 feet mean sea level on Lake Hudson. Said cables, stiff-arms, holding device and any walkways extending to the shorelands shall conform to these Rules and Regulations.

7. Placement and Maintenance. Piers, wharves, landings, floating boat houses, docks, breakwaters and/or barges and other floating structures of a stationary or semi-stationary nature, commercial or private, extending into the lands and waters of the Authority, including all attachments, such as stiff-arms, spars, approaches, walkways, gangplanks and/or ramps, will be limited to a total maximum length, perpendicular to the shoreline, as hereinafter defined, of:

(a) 125 feet, or

(b) One-third of the distance from the adjacent shoreline, measured across the land and water of the Authority, to the nearest opposite shoreline, whichever distance is less.

The term "shoreline" is defined and established for the purpose of these Rules and Regulations as the 750-foot mean sea level elevation on Grand Lake and the 622-foot mean sea level elevation on Lake Hudson. Provided, however, the Authority will consider differing bank angles and normal lake levels when computing the distance from an adjacent shoreline.

It is the intent of this section that all structures extending into the lands and waters of the Authority be so located as to minimize the obstruction of travel over the lands and waters of the Authority, and that they be so located, attached

and secured as to keep to a minimum that amount of encroachment necessary on the lands and waters of the Authority.

All floating structures of a stationary or semi-stationary nature, commercial or private, which are used for the housing and/or storage of vessels, shall be constructed, maintained, located, attached and secured in the manner provided, and shall be so located, attached and secured to the shoreline, that all boat stalls located in them are perpendicular to said shoreline, so that the opening to said stall, of which there will be only one opening, shall open only to the waterfront side of said structure, and shall not open parallel to the shoreline, or to the shoreline side of said structure. Provided, upon the filing of a written request, the Authority may, for good cause shown, grant an exception to this requirement. Any permit issued shall be revocable if a conflict arises between the permittee and adjacent land owners.

Existing piers, wharves, landings, floating boat houses, docks and/or barges and other floating structures of a stationary or semi-stationary nature, commercial or private, extending into the lands and waters of the Authority, including all attachments, such as stiff-arms, spars, approaches, walkways, gangplanks and/or ramps, not fully complying with this section on the effective date of these Rules and Regulations, may continue to be located on the lands and waters of the Authority subject to all other Rules and Regulations set forth, but the same shall not be expanded, enlarged or relocated except in compliance with these rules.

Metal drums or metal drums filled with plastic foam will not be acceptable for flotation of floating structures, such as docks, boat houses, houseboats and other water use facilities. Such flotation must be a permanent flotation material, for example, pontoons made of steel, aluminum and/or fiberglass, one-eighth inch thickness or greater, or plastic foam.

All docks must comply with the Authority's numbering system by displaying the identification numbers provided in the manner and location specified by the Authority.

8. Breakwaters. Breakwaters must be constructed of steel pipe or channel with foam flotation or tires with foam flotation consisting of units joined by a common set of cables and chain to insure their structural integrity; PROVIDED, that only large tires may be used, the size to be approved by the Lake Patrol. Breakwaters must be anchored in permanent locations and must have proper lighting. All breakwaters shall be inspected annually by the Lake Patrol. The owner of a breakwater shall be responsible for maintaining it until the permit has been properly assigned to a new owner. Issuance of a permit for any breakwater, private or commercial, shall be withheld until the applicant has submitted a certificate from an insurance company licensed to do business in Oklahoma, showing evidence of a Comprehensive General Liability Policy with $100,000.00 combined single limits. The term of such insurance shall be coterminous with the permit.

9. Buoy Marking. No buoy shall be placed or replaced without a permit from the Authority. All buoys placed on the lakes shall be commercially manufactured units approved by the Lake Patrol and shall have reflective tape or paint on the top side. Any buoy not maintained in its proper location by the owner shall be subject to removal by the Authority. Any buoys, lighthouses or other types

of markers placed with the permission of or installed and maintained by the Authority are primarily warning devices for the convenience of the public, and should not be relied upon solely as navigational aids. The Authority assumes no liability or responsibility for loss or damages to life or property arising out of the public's reliance upon said devices.

10. Removal and Cancellation for Failure to Comply. If, at any time, any such dock, wharf, boat house, breakwater or any other structure, private or commercial, is not constructed with generally-accepted building materials and pursuant to generally-accepted construction practices, or installed in accordance with the plans and specifications approved by the Authority, or if such works are not kept in good state of repair and in a good, safe and substantial condition, or are not inspected by a licensed electrical contractor as provided in Section 5, above, or upon failure of payment of any fee when due, the Authority, upon thirty (30) days prior notice, shall have the right to remove or cause to be removed from the Authority's waters and lands such structure and/or cancel any license or permit in the event the owner thereof fails to repair or remove the same after being notified by the Authority to repair or remove the same. Any loose or abandoned dock shall be impounded by the Authority and the owner shall be responsible for any expense incurred by the Authority thereby. The Authority will notify the Oklahoma State Department of Health and the utility company furnishing electricity of any dock reported to be in an unsafe electrical condition.

11. Location and Site to Be Returned in Good Condition. Within thirty (30) days after expiration or termination of any permit, the holder shall remove all works and facilities from the lakes and lands of the Authority and shall leave the premises in as good condition as they were before the construction of said works and facilities.

12. Authority Sole Judge. The Authority shall be the sole judge as to whether or not such structures are constructed and maintained in accordance with these Rules and Regulations, or kept and operated in a good and safe condition.

ARTICLE V
PERMITS REQUIRED FOR DIKES, EXCAVATIONS, DREDGINGS AND GRAVEL, DIRT AND ROCK HAULING

The contour, elevation or surface of any of the Authority's lands or the reservoir bed shall not be changed in any manner whatsoever by the construction of dams, dikes, jetties, channels, canals or landings until a permit has been issued by the Authority.

Any person desiring to make any improvement or change upon any of the Authority's lands shall make application to the Authority, submitting plats and drawings, construction details and specifications, setting forth the proposed work to be done, and the purpose or purposes for making such changes. Upon request of the Authority, the applicant shall also furnish a survey prepared by a licensed surveyor or engineer showing the location of the Authority's taking (property) line in the project area and shall have such line staked on the ground. Upon approval of such plans and specifications by the Authority, a temporary permit shall be issued. A permanent permit shall be issued when such construction work has been completed and approved by the Authority. The Authority reserves the right to require any such applicant to furnish a performance bond to the Authority, guaranteeing that such work will be done in accordance with the approved plans and specifications.

Any person desiring to haul dirt, gravel and/or rock from any of the Authority's lands shall make application to the Authority, submitting plats, drawings and specifications showing the proposed work to be done. Upon request of the Authority, the applicant shall also furnish a survey prepared by a licensed surveyor or engineer showing the location of the Authority's taking (property) line in the project area and shall have such line staked on the ground. Upon approval of such plans and specifications, the applicant shall pay a royalty on each load of material hauled and shall make a yearly accounting to the Authority of the amount hauled.

ARTICLE VI
SWIMMING AND BATHING BEACHES

The preparation and marking of beaches shall be in such manner as to provide reasonable safety in their use. Commercial beaches shall be provided with adequate and sanitary dressing rooms, toilets, showers and other necessary accessories for public convenience and safety; adequate lifeguards shall be provided during use of beaches.

ARTICLE VII
COMMERCIAL USE OF THE LAKES AND LANDS OF THE AUTHORITY

1. Definition. The keeping or operation of one or more vessels, surfboards, aquaplanes, skis, personal watercraft or like devices, docks, landings, anchorages, marine railways, dry docks or any concession, for pecuniary profit or gain on the water of the lakes or upon the property of the Authority, the carriage of any person, or persons, or of any goods, wares, merchandising or other freight, for a valuable consideration, whether directly or indirectly flowing to the owner, charterer, operator, agent or any other person, shall be deemed commercial use of the waters and lands of the Authority and will be allowed only after a permit has been issued.

2. Permits. Issuance of permits for new or relocated commercial docks will be withheld until there has been compliance with these Rules and Regulations by the applicant and compliance with the following conditions:

(a) The submission of an application duly executed, in writing, upon a form prescribed and provided by the Authority.

(b) The submission to the Authority of maps, plans and specifications of the proposed construction and its location. If the project involves construction other than the placement of docks or breakwaters on Authority property, the applicant shall furnish a survey prepared by a licensed surveyor or engineer showing the location of the Authority's taking (property) line in the project area and shall have such line staked on the ground.

(c) Submission to the Authority of a certificate from an insurance company licensed to do business in Oklahoma, showing evidence of a Comprehensive General Liability Policy with $100,000 combined Single Limits. The term of such insurance shall be coterminous with the permit.

(d) For all commercial boat docks, the submission of a certificate signed by a licensed electrical contractor showing compliance with all applicable electrical codes and any corrective action taken. Thereafter, each commercial boat dock shall be inspected every three (3) years by a licensed electrical contractor and a certificate of the inspection and any corrective action taken, signed by the contractor, shall be furnished to the Authority.

(e) Payment in advance of the fee specified in the table of fees hereinafter set forth.

3. Dock Installers Permit. Any person, firm or corporation operating for pecuniary gain or profit any business that, directly or indirectly, is engaged in the building and placing of piers, wharves, landings, anchorages, floating boat houses, docks, barges or other floating structures of a stationary or semi-stationary nature upon the waters of the Authority shall obtain an annual permit.

The permit holder shall not place any piers, wharves, landings, anchorages, floating boat houses, docks, barges or other floating structures of a stationary or semi-stationary nature upon the waters of the Authority until a Dock Installers permit has been issued pursuant to the following:

(a) Insurance Required. Any applicant for a Dock Installers permit shall furnish evidence of a Comprehensive General Liability Policy with $100,000.00 combined Single Limits. Such insurance shall provide for thirty (30) days notice to GRDA prior to cancellation.

(b) Renewal. A penalty of Ten Dollars ($10.00) per month for each month delay in renewal of the permit shall commence thirty (30) days after expiration of a previous permit.

The fee for an initial Dock Installers permit shall be reduced by fifty percent (50%) for any portion of a year less than six (6) months.

(c) Permit Not Transferable. No person, firm or corporation shall allow his or its name to be used by any other person, firm or corporation to do any work under his or its permit.

(d) Penalty. Any person, firm or corporation who shall violate any provision of this section may:

1. Upon the first violation during a permit year pay an administrative fee of Fifty Dollars ($50.00).

2. Upon a second violation during a permit year have his or its Dock Installers permit suspended for six (6) months.

3. Upon a third violation during a permit year have his or its Dock Installers permit revoked and said permit holder shall not be eligible for reconsideration until three (3) years shall have elapsed from and after the date of revocation.

4. Boat Operators Must Be Qualified. No vessel, while carrying passengers for hire, shall be operated or navigated except in charge of a person covered by a policy of insurance that clearly covers the scope of duties resulting from such commercial enterprise.

5. Transfer or Assignment. Transfer or assignment of permits issued hereunder (both private and commercial) shall not be made except with written consent and approval of the Authority.

6. Schedule of Fees for Commercial Permits. Expiration date for all permits shall be the 30th day of June of each year; for permits issued on or after January 1 and before April 1 of any year, only payment of one-half the amount of the annual fee will be required; for permits issued on or after April 1, but before July 1 of any year, only payment of one-fourth of the amount of the annual fee will be required.

Permits issued pursuant to these Rules and Regulations are subject to cancellation in the event the holder thereof fails or refuses to comply with these Rules and Regulations or to make payments when due.

A schedule of fees marked Appendix "A" is attached.

ARTICLE VIII
OTHER PERMITS REQUIRED

1. Railways, Fences, Retaining Walls. No private or commercial railways, fences or retaining walls shall be constructed on GRDA property without first obtaining a permit. The applicant shall submit complete and detailed maps, plans and specifications for the proposed construction and its location, including a statement of the purpose(s) for which the work is to be done. For fences and retaining walls, the applicant shall also furnish a survey prepared by a licensed surveyor or engineer showing the location of the Authority's taking (property) line in the project area and shall have such line staked on the ground.

2. Raw Water Permits.

(a) Definition. For the purpose of these Rules and Regulations, the term "domestic and household use" shall mean water that is taken, used and consumed by the permittee in and upon his premises for all usual and ordinary household uses and purposes which shall include sprinkling and watering lawns and gardens of not to exceed three (3) acres. A raw water permit shall be obtained for any appropriation of water requiring a hose or pipe extending into the lake and running off GRDA property. The term "irrigation" shall mean water that is taken, used and consumed by the permittee in and upon the premises covered by the permit for the purpose of irrigating lands, crops and vegetables growing in and upon said lands by ditches, canals, sprinkling systems and such other usual and ordinary means of irrigation.

Water rights granted under these Rules and Regulations shall not be construed as the supplying or furnishing of water for domestic purposes to the public; such permits only grant the permittee the right to take and use the water as provided by these Rules and Regulations.

(b) Permits. The taking of and using water from Grand Lake, Lake Hudson and Fort Gibson Lake shall be allowed only after a permit has been issued by the Grand River Dam Authority.

Issuance of such permits will be withheld until the applicant has complied with the following conditions:

1. The submission of an application duly executed in writing by the applicant upon a form prescribed and provided by the Authority;

2. The submission to and approval by the Authority of maps, plans and specifications of the proposed facilities and works that are to be used for the taking of water, describing the location of the point of diversion or taking, and a statement by the applicant fully setting forth the purpose(s) for which the water is to be used;

3. By July 1, 1995, the submission of a certificate signed by a licensed electrical contractor showing compliance with all applicable electrical codes for water/irrigation pump installations and any corrective action taken. Thereafter, each water/irrigation pump installation shall be inspected every three (3) years by a licensed electrical contractor and a certificate of the inspection and any corrective action taken, signed by the contractor, shall be furnished to the Authority; and

4. Payment in advance of all applicable processing fees.

(c) Irrigation Billing. Upon approval of the application for an irrigation permit, the permittee may begin irrigation.

If the permittee has provided facilities for measuring the water taken and used, he shall report the amount of water used to the Authority not later than the first day of November of each calendar year.

In the event the permittee and the Authority agree that the amount of water taken will be fixed and established by agreement between the permittee and the Authority, a determination of the amount of water used will be made not later than the first day of March of that calendar year.

In the event the permittee has used more than one acre foot of water during the calendar year, he shall pay for all water in excess of one acre foot on the basis of the fees above set forth before the end of the calendar year.

If the term of the permit is for more than one (1) year, then the permittee shall pay the required fees and charges on the first day of January for each calendar year covered by said permit.

(d) Use of Lands for Location of Facilities. The granting of such permit to take water from Grand Lake or Lake Hudson shall authorize the permittee to

locate upon the lands of the Authority the facilities necessary to take such water covered by the permit; provided, the location and manner of diversion is first approved by the Authority; however, a permit for the use of water from Fort Gibson Lake shall give the permittee no permission or right to take or use any lands for any purpose whatsoever. (The lake bed and shorelands of Fort Gibson Lake are owned by the United States of America and are under the jurisdiction and control of the United States Army Engineers, District Office, Tulsa, Oklahoma.)

(e) Subject to Laws - Regulations - Liability. Grand Lake, Lake Hudson and Fort Gibson Lake are flood control and hydro electric power projects, and it is recognized and understood that the elevation of the waters in said lakes will vary from time to time as operations for flood control and hydro electric power generation demand, and the water rights granted under these Rules and Regulations shall be subject to these conditions and all laws governing the Grand River Dam Authority (82 O.S.A. § 861 et seq.) and shall be subject to all Federal and State laws, rules and regulations governing the control storage release and use of the waters of Grand River, Grand Lake, Lake Hudson and Fort Gibson Lake.

The Authority shall never be liable in any manner whatsoever because of the quantity or quality of the water in said lakes, nor shall the Authority ever be liable for any damage that the permittee may sustain to person or property which may be occasioned by or result from the construction, maintenance and operation of the Authority's projects and the Fort Gibson Dam and Reservoir Project.

(f) Construction and Maintenance. The permittee, upon being granted a permit, shall construct and maintain all taking and diversion facilities according to plans and specifications and in a proper and safe manner that will prevent waste and loss of water and will not pollute or contaminate the lake water. All such facilities shall be subject to inspection by the Authority.

(g) Cancellation of Permit. Permits issued pursuant to these Rules and Regulations are subject to cancellation in the event the holder fails, refuses or omits to comply with any of the requirements of these Rules and Regulations, or to make payments when due. In addition, the Authority will notify the Oklahoma State Department of Health and the utility company furnishing electricity of any water or irrigation pump reported to be in an unsafe electrical condition.

Permits issued under and pursuant to these Rules and Regulations may be terminated by either party upon giving the other party thirty (30) days written notice prior to the end of any calendar year.

(h) Rights Reserved. These regulations do not cover the taking or using of water for any purpose or use other than those specifically covered by these regulations. Other regulations cover the taking and using of waters under jurisdiction of the Grand River Dam Authority for such purposes as irrigation, public use, municipal use, and for distribution and sale.

(i) Rules Subject to Change. The Authority reserves the right to change these Rules and Regulations as changing conditions may make it advisable or necessary.

All applications and inquiries regarding the use of water from the Grand Lake, Lake Hudson and Fort Gibson Lake should be addressed to:

Grand River Dam Authority
P. O. Box 409
Vinita, Oklahoma 74301

3. Land Use/Grazing Permits. The use of the lands of the Authority for such purposes as grazing and brush clearing shall be allowed only after a permit has been issued by the Grand River Dam Authority.

Issuance of such permits will be withheld until the applicant has complied with the following conditions:

1. The submission of an application duly executed in writing by the applicant upon a form prescribed by the Authority; and

2. The submission to the Authority of proof of ownership of or an interest in land immediately adjoining the Authority's land which applicant desires to use; and

3. Payment in advance of all applicable fees.

4. Sanctioned Event Permits. A sanctioned event is any organized event on the waters of the Grand River Dam Authority, including, but not limited to, regattas, motorboat or other boat races, marine parades, tournaments and exhibitions. No sanctioned event shall be held without a written permit issued by the Grand River Dam Authority at least ten (10) days prior to the event.

ARTICLE IX
ADMINISTRATION OF RULES AND REGULATIONS

1. General Manager. The General Manager of the Grand River Dam Authority is authorized to administer these Rules and Regulations and to issue all permits and licenses provided for.

2. The Board of Directors. The Board of Directors of the Grand River Dam Authority retains the right to authorize and issue any and all permits and licenses not specifically provided for in these Rules and Regulations. No fees, charges or any of these Rules and Regulations shall be changed in any manner without the approval of the Board of Directors.

3. Administrative Decisions, Review - Appeal. Any person, firm or corporation directly affected by an administrative ruling or decision made under these Rules and Regulations may petition for review or appeal of such ruling or decision by filing a written request with the Board of Directors within ten (10) days after the effective date of the ruling or decision. The request shall set out the facts and circumstances surrounding the case and shall state the type of relief sought.

ARTICLE X
NON-COMPLIANCE AND VIOLATION

Any person, firm or corporation failing to comply with these Rules and Regulations in the operation, maintenance and construction of any boat, structure or

any facility of any kind upon the waters and lands of the Authority shall be required to remove such boat, structure or facility at his own expense and without cost to the Authority. The Authority shall require the owner to reimburse it for the direct cost and overhead incurred in securing the owner's property. Upon his failure to do so, after giving thirty (30) days notice to the owner, the Authority may cancel any permit or license which has been issued in connection with said boat, structure or facility and may remove or cause it to be removed from the Authority's lands and waters.

ARTICLE XI
LAKE PATROL

1. Creation. The Authority has created a lake patrol for the purpose of enforcing these Rules and Regulations on the waters and properties of the Authority.

2. Duties of Lake Patrolmen.

(a) The members of the Authority's lake patrol are hereby declared to be the enforcement officers for the Authority for the purpose of enforcing these Rules and Regulations and for enforcing the provisions of the Grand River Dam Authority Act; said patrolmen shall have the power of peace officers in enforcing these Rules and Regulations and all violations of criminal laws occurring within the boundary of all real property owned or leased by the Authority, except in the serving and execution of civil process.

(b) The patrolmen shall, in the event of emergency, assist in the rescue of any person who may be in danger and shall assist in the saving of any property that is in danger of being lost or damaged. The patrolmen shall have the authority to stop and board any vessel at any time for the purpose of inspecting it or its equipment. They shall require the operator of any vessel operating on the waters of the lakes in any manner which is not in compliance with these Rules and Regulations, or any applicable state law, to remove said vessel from the lake until compliance has been had.

(c) The patrolmen are charged with the duty of examining and inspecting proposed locations for wharves, docks, dikes, anchorages, boat houses or any proposed structures or improvements to be made upon the lakes or the lands of the Authority, and of issuing certificates of inspection; and of causing all vessels to be registered with proper registration numbers, or permit numbers, displayed upon such vessels.

3. Cooperation. The Authority's lake patrolmen may cooperate with federal, state and local enforcement officers in the enforcement of all federal and state laws upon the waters and properties of the Authority.

ARTICLE XII
RIGHTS OF ABUTTING LANDOWNERS

No permit, private or commercial, shall issue for any of the facilities described in these Rules and Regulations which would deprive the owner of land adjacent to the shoreland or lakefront or abutting thereon of any anchorage, wharf, dock, boat dock, houseboat and landing privileges.

The Authority may designate areas closed to such use, where in its opinion such use would interfere with the health or safety of the public, or with the proper conduct of the Authority's business.

ARTICLE XIII
REPEAL

All Rules and Regulations conflicting with the provisions of these Rules and Regulations are revoked, cancelled and repealed.

ARTICLE XIV
RIGHTS RESERVED

The omission or failure to cover any use of the waters and lands of the Authority in these Rules and Regulations shall not be considered as granting the rights to make use of the same without first obtaining permission from the Authority.

The Authority further reserves the right to change these Rules and Regulations.

Approved 6/15/94

APPENDIX "A"

SCHEDULE OF FEES
(Page 1 of 2)

PRIVATE DOCKS: A floating structure 1,100 square feet or less for private use and not related to the generation of revenue. Docks over 1,100 square feet will be charged at commercial rates excluding the minimum rate.

Annual Rate: $25.00 plus $12.00 for each boat slip over one.

COMMERCIAL DOCKS: All floating structures other than private.

Annual Rate: All floating structures will pay $.045 per square foot, but not less than $40.00.

OTHER COMMERCIAL FACILITIES:

Ramps	$ 75.00 each per year
Marine Railways	$ 75.00 each per year
Barges & Other Commercial Crafts	$200.00 each per year
Vessel Rental Operations	$200.00 each per year

Note: The square footage shall be obtained by measuring the outside dimensions of the dock or facility.

SPECIAL: The Authority may issue licenses and permits for the construction, operation, maintenance or use of any other facility or facilities not specifically covered herein, upon application to the Authority.

In lieu of the fees set out herein for a wharf, dock, landing, anchorage or concession permit, the Authority may, at its direction as the case may arise, advertise for bids for a permit for commercial purposes for any particular wharf, dock, landing, anchorage or concession and issue a permit to the highest and best bidder.

DOCK INSTALLERS PERMIT: $250.00 per year.

COMMERCIAL SEA PLANES: Special application and permit required. Fees to be determined in each individual case.

SANCTIONED EVENT PERMIT: $50.00.

RAILWAY, FENCE, RETAINING WALL AND DREDGING PERMITS: $60.00 for original one-year permit with an additional $60.00 assessment for each renewal.

DOMESTIC RAW WATER PERMITS: $20.00 Application Fee.

Domestic Water - The use of water by a natural individual or by a single family household for household, garden or irrigation purposes, but not exceeding three (3) acres in area.

APPENDIX "A"

SCHEDULE OF FEES
(Page 2 of 2)

Irrigation Permit Fee - $20.00 Processing Fee plus Annual Usage Fee as follows:

$4.00 per acre foot per year from Grand Lake and tributaries above the Pensacola Dam, but not less than $50.00 per year.

$3.00 per acre foot per year from Lake Hudson and tributaries between Robert S. Kerr Dam and Pensacola Dam, but not less than $40.00 per year.

$2.00 per acre foot per year from Ft. Gibson Lake and tributaries between Ft. Gibson Lake and Robert S. Kerr Dam, but not less than $30.00 per year.

LAND USE/GRAZING PERMITS:

Annual fee: Minimum fee of $100.00 plus $10.00 per acre over 10 acres.

GRAVEL PERMITS:

$25.00 Processing Fee for 5 or more loads plus $1.00 per load.

APPENDIX B

INSTITUTION REVIEW BOARD PERMISSION

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 12-11-96 **IRB#: ED-97-041**

Proposal Title: RECREATIONAL ACTIVITY USES BY PRIVATE BOAT DOCK USERS ON GRAND LAKE O' THE CHEROKEES

Principal Investigator(s): Christine Cashel, Clarence T. Ruby

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING THE APPROVAL PERIOD.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Signature: _____ Date: December 12, 1996

Chair of Institutional Review Board

cc: Clarence T. Ruby

APPENDIX C

GRAND RIVER DAM AUTHORITY LETTER OF APPROVAL

GRDA

GRAND RIVER DAM AUTHORITY

An agency of the State of Oklahoma, fully supported by customer revenues instead of taxes

December 11, 1996

Dr Christine Cashel
Oklahoma State University
111 Colvin Center
Stillwater, Oklahoma 74078

SUBJECT Recreational Uses Of Private Boat Docks On Grand Lake O' Cherokees
Research Project For Clarence T Ruby, Jr

Dear Dr Cashel

Please accept this letter as written permission for Mr Ruby to distribute his survey to private boat dock permit holders on Grand Lake

If I may be of further assistance, please let me know

Sincerely,

Robert W Sullivan, Jr
Assistant General Manager

RWSJr.vjh

cc Clarence T Ruby, Jr

ADDRESS REPLY TO
X ADMINISTRATION HEADQUARTERS P O Box 409, Vinita, Oklahoma 74301-0409 (918) 256-5545
LAKE PATROL HEADQUARTERS P O Box 70, Langley, Oklahoma 74350 (918) 782-9594
HYDRO-GENERATION, Pensacola Headquarters P O Box 70, Langley, Oklahoma 74350
SALINA PUMP-STORAGE PROJECT P O Box 609, Salina, Oklahoma 74365 (918) 434-5920
KERR DAM P O Box 772, Locust Grove, Oklahoma 74352 (918) 479-5249
TRANSMISSION P O Box 1128, Pryor, Oklahoma 74362, (918) 825-0916
CUSHING P O Box 329, Cushing, Oklahoma 74023 (918) 225-1507
GRDA COAL FIRED COMPLEX, P O Box 609, Chouteau, Oklahoma 74337-0609 (918) 476-5840

APPENDIX D

NEWS RELEASE AND THE PAPER WHERE THE NEWS RELEASE WAS SENT

News release

Clarence Ruby
Oklahoma State University
(918) 622-3759

Please run sometime between Jan 1 and Jan 7.

Attention all Grand Lake Private Boat Dock Permit Holders

Please be on the lookout for a research survey that will be mailed to all private boat dock permit holders with boat dock renewals invoices. Please promptly complete the survey according to the enclosed instructions, and return it to Oklahoma State University. I am conducting a detailed survey of the permit holders to provide more information about recreational activities on boat docks at Grand Lake. This is also the research I am conducting for completing my master's degree in recreation with an emphasis in outdoor recreation and Geographical Information Systems. An adequate response rate is crucial to the scientific validity of the study. Please direct any of your questions about this research to, my thesis advisor, Dr. Chris Cashel at (405) 744-6815 or University Research Services, Oklahoma State University at (405) 744-5700.

You understand that your participation in this research is voluntary and there is no penalty for refusal to participate. If you choose to participate in the research, your responses will remain anonymous. Returning the survey will indicate your acceptance of voluntary participation.
Clarence Ruby, graduate student, Oklahoma State university.

News Papers

News Editor
Joplin Globe
117 E. 4th Street
Joplin, MO 64801

Town and Country Horizons
Neal Mc Christy Mng Editor
PO Box 126
Girard, KS 66743

Sam Powell, Outdoors Editor
Tulsa World
PO Box 1770
Tulsa, OK 74102

Gary Wells
C/O Mailbox Monthly
Rt 2 Box 27
Adair, OK 74330

News Editor
The Afton-Fairland American
PO Box 339
Fairland, OK 74343

News Editor
Grove Sun/Grand Lake Magazine
PO Box 969
Grove, OK 74344-0969

Grand Lake Times
Greg Hardin, Editor
PO Box 527
Jay, Ok 74346

News Editor
Delaware County Journal
PO Box 1050
Jay, OK 74346

New Editor
Grand Lake Waterfront
PO Box 1260
Jay, OK 74346

Rusty Fleming, Editor
Grand River Chronicle
PO Box 757
Langley, OK 74350-0757

Terry Aylward, Mng Editor
Pryor Daily Times
PO Box 308
Pryor, OK 74362

Jerry Turner, Managing Editor
Miami News Record
PO Box 940
Miami, OK 74355

APPENDIX E

PRIVATE BOAT DOCK OWNERS' QUENSTIONNAIRE

Jan. 1, 1997

Dear Boat Dock Permit Holder,

I am Clarence Ruby, a Master's candidate, working on my thesis "Recreational Uses of Private Boat Docks on Grand Lake o' Cherokees" in the School of Health, Physical Education and Leisure at Oklahoma State University (OSU).

As part of this research, I am surveying boat dock permit holders. The Grand River Dam Authority is allowing me to include my survey with boat dock permit renewals. I am asking you to help me in this research by answering the questions on the survey and returning it to me at OSU. The results of the study will provide information about recreational uses on and around boat docks on Grand Lake.

You understand that your participation in this research is voluntary and there is no penalty for refusal to participate. If you choose to participate in the research, your responses will remain anonymous. Returning the survey will indicate your acceptance of voluntary participation. For more information please contact my thesis advisor, Dr. Chris Cashel at (405) 744-6815 or University Research Services, Oklahoma State University at (405) 744-5700.

You will find the survey starting on the back of this letter. If you would complete the survey and fold it so that my return address is on outside, tape it closed and mail it to me it would greatly enhance my research. Postage is prepaid. For more information please contact me at (918) 622-3759.

Sincerely,

Clarence Ruby
Graduate Student

Christine Cashel, Ed.D.
Thesis Advisor

Survey of Recreational Activity uses of Private Boat Docks on Grand Lake o' Cherokees

This survey is being conducted as of a master's Thesis at Oklahoma State University. The results will be shared with the GRDA. Please respond to every question. Thank you!

1. What is the ZIP code of your permanent address? _____

2. Do you own property on Grand Lake? Yes ___ No. ___
No If no, skip to question 3.

3. Approximately how many feet of lake frontage do you own? _____ft.

4. Do you own a boat dock? Yes___ No___

5. How many members are in your lake household? _____

6. How many of the following watercraft are kept at your Boat dock?
___ Canoes
___ Sailboats
___ Rowboats
___ Personal watercraft
___ Motorboat under 25 HP
___ Motorboat over 25 HP
___ Pontoons
___ Other(please list)_____

7 In which area of the lake do you spend the most time? _____

8. How many days did you and other members of your household use the lake during each of the following seasons last year(1996)?

Season	No. of Days (record Code)	Code
1 Winter (Dec., Jan., Feb.)		1 none 2. 1-5 Visits 3. 6-10 Visits 4. 11-20 Visits 5. 21-30 Visits 6. over 30 Visits
2. Spring (March, April, May)		
3. Summer (June, July, August)		
4. Fall (Sept., Oct., Nov.)		

9. Please indicate with an ' x ' your feelings about water related activities at Grand Lake for the time you have indicated your highest visitation in question 8.

Time Period	Not at all crowded	Slightly Crowded	Moderately Crowded	Uncomfortably crowded	Extremely Crowded
Weekdays					
Weekends					
Holiday weekends					

10. On each of your visits to your lake property on average how much time do you spend in your boat dock?
____ Never
____ Less than hour
____ One to two hours
____ Two to four hours
____ Four to eight hours
____ All day

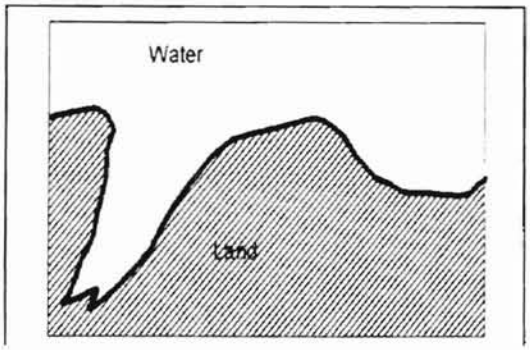
11. Since I have lived on this lake, the quality of the lake has;(check one)
____ Considerably Improved
____ Slightly Improved
____ Remained the same
____ Slightly degraded
____ Considerably degraded
____ No opinion/can't tell
____ Other: _____

12. Describe your boat dock structure (Check one that best describes your boat dock)
____ Slips only
____ Slips with a roof only
____ Slips with a roof and solid walls
____ Slip with solid walls and roof is used for a patio

13. Check all of utilities you have available in your boat dock.
____ Drinking Water (plumbing)
____ Electricity
____ Bathroom
____ Kitchen appliances
____ Furniture

14. Estimate the deepest water depth under your boat dock.
____ 1 - 5
____ 6 -10
____ 11 -15
____ 16 -20
____ 21 +

15. Boat docks are either in a cove area or closer to open water. Mark your relative position on the picture below.



16. While on your boat dock what are your recreational activities? (check all that apply)
____ Fishing
____ Reading
____ Swimming
____ Watching wildlife
____ Entertaining guest
____ Watching Television
____ Other: _____

17. How Many other boat docks are within 50 ft ____ , within 100 ft ____, within 150 ft ____.

18. Do you feel crowded? yes ____ No ____.

19. Briefly describe the most and least appealing aspects of Grand Lake?

Most appealing:	
Least appealing:	

Clarence Ruby
2110 S 103rd E. Ave
Tulsa, Okla. 74129

Clarence Ruby
103 Colvin Center
Oklahoma State University
Stillwater, Ok 74078

APPENDIX F

RESULTS FROM PRIVATE BOAT DOCK PERMIT HOLDERS QUESTIONNAIRE

1. What is the ZIP code of your permanent address? _____

Response to Question	%	No. Different Zip codes	Total Response
1463	98.17	224	1490

2. Do you own property on Grand Lake? Yes ___ No. ___

'YES'	% 'YES'	'NO'	% 'NO'	'No response'	Total Response
1423	97.47	55	3.77	37	1490

3. Approximately how many feet of lake frontage do you own? _____

Number of Responses	Minimum	Maximum	Average	Mode
1341	20ft.	10000ft.	231.06ft.	100ft.

4. Do you own a boat dock? Yes___ No___

'YES'	% 'YES'	'NO'	% 'NO'	Total Response	No Responses
1463	98.19	13	0.09	1490	14

5. How many members are in your lake household? _____

No. Of Responses	Average size of Lake family	Maximum size	No. Reporting Mode of 2 family members
1443	3.41 persons	360	100

6. How many of the following watercraft are kept at your Boat dock?
___ Canoes
___ Sailboats
___ Rowboats
___ Personal watercraft
___ Motorboat under 25 HP
___ Motorboat over 25 HP
___ Pontoons
___ Other(please list)_____

Number	%	Type of Craft
76	2.70	Canoes
151	5.37	Sailboat
112	3.98	Rowboat
602	21.41	Personal Water Craft
212	7.54	Motorboat Under 25 hp
1166	41.47	Motorboat over 25 hp
337	11.98	Pontoons
156	5.55	Other boats
2812		Total boats
1.89		Boats/dock

Other boats	
Bass Boat	6
CabinCruiser	
Celebrity IO	
Cruiser	10
Cuttycaboat	
Day Dock	
Daycruiser30	
Deckboat	4
ExpCruiser30	
Houseboat	6
Inbd/otbt165	
Inbd/out 18'	
Inflatable	4
IO 188HP 18'	

Jet Boat	
John Boat	2
Kayak	2
Minipontn4x8	
Motoryacht	
Paddle Boat	95
Runabout 20'	
Sailboards	
Sea do	4
SeaRay Ski23	
Ski boat	2
Trojan 36ft.	
Two Man	
Water Scamp	4

7. In which area of the lake do you spend the most time? _____

Area	No.
No responses	612
South end	176
Duck Creek	137
Honey Creek	129
Elk River	108
Drowning Creek	77
Monkey Island	55
Sailboat Bridge	49
Horse Creek	44
North end	42
Middle 3rd	37
Woodard Hollow	33
Cowskin Bay	31
Shangri la	31
Two Tree Island	30
Ketchum	19
Grove	18
Court House Creek	15
Wolf Creek	15
Grays Hollow	12
Ketchum Cove	12
Carey Bay	11
Dock	11
Cabin	10
Dripping Springs	10
Sweetwater	9
Aspinwall	7
Cove	7
Disney	6
Big Hollow	6
Grand	6
Rapier Hollow	6
Paradise Point	6
Neosho River	5
Bernice	5
All over	5
West	5
Three Finger	5
Patricia Island	5
Red Arrow	4
Main Body	4
Snake Is	4
Woodland Shores	4
West Bay	4
Ghost Hollow	3
Governors Island	3
Grand Lake	3
Bird Island	3
Blue Bluff	3
Elm Creek	3
Property	3
Twin Bridges	3
Zena Area	3
Grand Point	3
Hickory Ck	3
Langley	3
East	2
Check In Bay	2
Goat Island	2
Island Area	2
Ice Box Bluff	2
Grand Craft	1
Grand cove	1
Fox Hollow	1
Gran Tara	1
Hickory Cove	1
Hidden Acres	1
Johnson Hollow	1
Hickory Grove	1
Hickory Point	1
Fly Creek	1
Blue is	1
Cabin Hollow	1
Beachberry Is	1
Block cove	1
Caps Cove	1
East Bay	1
Flat Rock Cove	1
Cedar cove	1
Cherokee YC	1
Sunset Hills	1
The Coves	1
Red banks	1

Sportsman`s	1
Tiajuana	1
Water	1
West Shores	1
Tree Isle	1
Unknown	1
Port Have Co	1
Mayfield	1
North Cove	1

Lakemont Shores	1
Marina	1
Osage Hollow	1
Point Author	1
Port Carlos	1
Padley Point Cove	1
Paradise Grove	1

8. How many days did you and other members of your household use the lake during each of the following seasons last year(1996)?

Season	No. of Days (record Code)	Code
1. Winter (Dec., Jan., Feb.)		1. none 2. 1-5 Visits 3. 6-10 Visits 4. 11-20 Visits 5. 21-30 Visits 6. over 30 Visits
2. Spring (March, April, May)		
3. Summer (June, July, August)		
4. Fall (Sept., Oct., Nov.)		

No. Of Visits	Winter use (Dec-Feb)		Spring Use (Mar – May)		Summer Use (Jun - Aug)		Fall Use (Sep - Nov)	
	No.	%	No.	%	No.	%	No.	%
0	329	22.1	55	3.69	28	1.88	75	5.04
1 - 5	475	31.9	287	19.27	104	6.98	312	20.95
6 - 10	228	15.31	330	22.16	201	13.50	314	21.09
11 - 20	114	7.65	312	20.95	364	24.45	283	19.01
21 - 30	41	0.07	130	8.73	225	15.11	141	9.47
over 30	92	6.18	207	13.9	407	27.33	190	12.76
Residents	113	7.59	117	7.86	128	8.6	120	8.06
No response	110	7.39	54	3.63	35	2.35	57	3.83

9. Please indicate with an ' x ' your feelings about water related activities at Grand Lake for the time you have indicated your highest visitation in question 8.

Time Period	Not at all crowded	Slightly Crowded	Moderately Crowded	Uncomfortably crowded	Extremely Crowded
Weekdays					
Weekends					
Holiday weekends					

Time Period	Not at all crowded	Slightly Crowded	Moderately Crowded	Uncomfortably crowded	Extremely Crowded	No Response
Weekdays	1125	213	73	9	3	61
Weekends	106	363	598	269	95	47
Holiday weekends	37	78	320	402	591	49

10. On each of your visits to your lake property on average how much time do you spend in your boat dock?
____ Never
____ Less than hour
____ One to two hours
____ Two to four hours
____ Four to eight hours
____ All day

	No. Of Responses	Per Cent
Never	22	1.48 %
> 1 hr	234	15.72 %
1 to 2 hrs	406	27.27 %
2 to 4 hrs	437	29.35 %
4 to 8 hrs	256	17.19 %
All Day	43	2.89 %
No Response	91	6.11 %

11. Since I have lived on this lake, the quality of the lake has;(check one)
____ Considerably Improved
____ Slightly Improved
____ Remained the same
____ Slightly degraded
____ Considerably degraded
____ No opinion/can't tell
____ Other: _____

Considerably Improved	Slightly Improved	Remained the same	Slightly degraded	Considerably degraded	No Opinion\ Can't tell	Other
99	201	407	370	245	25	34

This question had 31 no responses.

12. Describe your boat dock structure (Check one that best describes your boat dock)
____ Slips only
____ Slips with a roof only
____ Slips with a roof and solid walls
____ Slip with solid walls and roof is used for a patio

	Number	Percent
Flat Deck	109	7.3
Slips Only	234	15.7
Slips with a roof only	705	47.4
Slips with solid walls and roof	304	20.4
Slips with solid walls and roof used as a patio	92	6.2
House dock	4	0.3
Slips with a sun deck	7	0.5
Slips with a roof as a patio	4	0.3
Rail dock	5	0.3

13. Check all of utilities you have available in your boat dock.
____ Drinking Water (plumbing)
____ Electricity
____ Bathroom
____ Kitchen appliances
____ Furniture

	Number	Per Cent
Drinking Water(plumbing)	81	5.4
Electricity	1107	74.4
Bathroom	16	1.1
Kitchen Appliances	83	5.6
Furniture	275	18.5

14. Estimate the deepest water depth under your boat dock.
____ 1 - 5
____ 6 -10
____ 11 -15
____ 16 -20
____ 21 +

Depth	1 - 5ft.	6 - 05ft.	11 - 15ft.	16-20ft.	Over 21ft.	No response
No. Of responses	96	351	390	283	344	25
%	6.5 %	23.6 %	26.2 %	19.0 %	23.1 %	1.7 %

15. Boat docks are either in a cove area or closer to open water. Mark your relative position on the picture below

	Zone 1	Zone 2	Zone 3	No Response
No. Of Responses	375	536	548	33
Per Cent	25.2%	36.0%	36.8%	2.2%

16. While on your boat dock what are your recreational activities? (check all that apply)
____ Fishing
____ Reading
____ Swimming
____ Watching wildlife
____ Entertaining guest
____ Watching Television
____ Other: _____

	Number	Per Cent
Fishing	1281	86.0
Reading	515	34.6
Swimming	1137	76.4
Watching Wildlife	702	47.2
Entertaining Guest	767	51.5
Watching Television	69	4.6
Other	165	11.1

Below is a list resulting from the Other column, there were 165 other entries made.

Boarding	66
Maintenance	28
Sunbathing	27
Relaxing	8
Feeding Wildlife	4
Cooking	4
People Watching	3
Many Others	3
Eating	3
Drinking	3
Listening to Music	1
Living actively	1
Watching boats	1
Watching kids	1
Outdoors	1
Scuba diving	1
Photography	1
Stargazing	1
Boat storage	1
Music	1
Fireworks	1
Nature	1
Hitting golf	1

17. How Many other boat docks are within 50 ft ____ , within 100 ft ____, within 150 ft ____.

	Within 50ft.	With 100ft.	Within 150ft.
No other boats docks	641	602	680
Owners reporting docks	848	887	809
Average No. boat docks	1.85	2.35	3.58
Mode other than zero/No.	2 / 367	2 / 353	1 / 202

18. Do you feel crowded? yes ____ No ____.

'YES'	% 'YES'	'NO'	% 'NO'	'no response'	% 'no response'
228	15.28	1213	81.13	51	4.42

19. Briefly describe the most and least appealing aspects of Grand Lake?

Most appealing:	
Least appealing:	

List of Most Appealing Category of Grand Lake	No of Responses	%
Aesthetics	639	43.8
Relationships with nature	289	15.2
No Responses	140	7.3
Solitude	131	6.9
Ownership Waterfront	141	7.4
Access to Home	96	5.0
Social contact	88	4.6
Boating	78	4.1
Relaxation	58	3.0
Dock	46	2.4
Water Sports	35	1.8
Escape personal and social pressures	31	1.6
Service Facilities	29	1.5
Recreation	27	1.4
Not a Corps Lake	26	1.4
Security	16	0.8
Reflection on personal values	13	0.7

Family togetherness	8	0.4
Privacy	6	0.3
Exercise	2	0.1
GRDA	1	0.1

Least Appealing Category of Grand Lake	No. Of Response	%
No Response	259	17.7
Lake Levels	239	12.0
PWC	211	10.6
Crowded	159	8.0
Large Boats	134	6.7
Rude Recreationists	119	6.0
Water Quality	114	5.7
Boat Speeds	81	4.1
Debris in the Water	68	3.4
Run Down Docks or Property	53	2.7
Noise Pollution	47	2.4
Pollution	46	2.3
Numbers of Boats	44	2.2
Pollution from Chicken Industry	41	2.1
Trash(litter)	40	2.0
Lake Patrol(Lack of enforcement)	38	1.9
Flood Control	35	1.8
Lack Access to lake	34	1.7
None	25	1.3
Lake Management	19	1.0
Drinking	17	0.9
Fishing Tournaments	15	0.8
Heavy Development	15	0.8

APPENDIX G

RESPONSES TO THE OPEN ENDED QUESTION OTHER BOATS

	OTHER BOATS	
	Minipontn4x8	1
	Motoryacht	1
Motorboat over 25 hp	Jet Boat	1
Motorboat over 25 hp	inbd/out 18'	1
Motorboat over 25 hp	IO 188HP 18'	1
Motorboat over 25 hp	Trojan 36ft.	1
Inflatable	Two Man	1
PWC	SeaRay Ski23	1
Motorboat over 25 hp	runabout 20'	1
	Sailboards	1
Motorboat over 25 hp	Inbd/otbt165	1
	Day Dock	1
	Daycruiser30	1
	Cuttycaboat	1
Motorboat over 25 hp	CabinCruiser	1
	Celebrity IO	1
	ExpCruiser30	1
Canoe	Kayak	2
	Ski boat	2
Rowboat	John Boat	2
PWC	Sea do	4
Inflatable	Inflatable	4
	Deckboat	4
	Water Scamp	4
	Houseboat	6
Motorboat over 25 hp	Bass Boat	6
Motorboat over 25 hp	Cruiser	10
	Paddle Boat	95
		156

APPENDIX H

DEFINITION OF CATEGORIES FOR MOST APPEALING ASPECTS OF GRAND LAKE

List of Most Appealing Categories of Grand Lake

1. Family togetherness
2. Social contact
3. Meeting/observing new people
4. Relationships with nature
5. Reflection on personal values
6. Escape personal and social pressures
7. Aesthetics
8. Solitude
9. Relaxation
10. Exercise
11. Achievement/Challenge
12. Physical rest
13. Lack of Privacy
14. Ownership Waterfront
15. Not a Corps Lake
16. Dock
17. Security
18. Access to Home
19. Boating
20. Recreation
21. GRDA
22. Water Sports
23. Service Facilities
24. Fishing

Most Category	Definition	
Access to Home		97
	Convenient location to Tulsa	
	Location	
	CONVENIENT TO MAIN ROADS	
	closeness fr/Tulsa (sic)	
	proximity to permanent address,	
	Good get away – and fairly close to home.	
	EASY TO GET ON LAKE	
	travel distance from home and facilities	
	Living close to water -- Having my own Dock	
	AVAILABILITY TO USE AT ANY TIME	
	distance from home	
	Proximity to Tulsa	
	close to Grove	
	Location, Living close enough to enjoy the lake without driving a long way	
	Access	
	close to Miami but yet away from town far enough to feel as if it is a true getaway.	
	accessibility, clean.	
	CLOSE TO DRIVE FOR WEEK-END GETAWAY	
	good access roads	
Aesthetics	Water	647
	Beautiful, Uncrowded and Relaxing (sic)	
	PEACEFUL and BEAUTIFEL SURROUNDING - (sic)	
	People, the beauty of the lake, nice deepwater	
	Good fishing, where we are not so	

	crowded, good Lake patrol, pelicans	
	LARGE LAKE	
	SIZE	
	the clearness of the water usually	
	Outdoors, area	
	beautiful	
	Size of Lake	
	NATURAL BEAUTY	
	The view while on the lake	
	View	
Boating	boating experience	78
	GOOD SAILING LAKE	
	Boating,	
	boating	
	Enjoying boating during the week	
	Boating	
	good sailing	
	BOAT	
	COMPETITIVE SAILING PROGRAM	
	FREEDOM TO BOAT ALL OVER LAKE, VERY FEW RESTRICTIONS	
	Varied boating opportunities and scenery	
Dock	BOAT DOCK OWNERSHIP	47
	Being Able to Have Your Own Dock -	
	BOAT DOCKS,	
	Waterfront property with dock.	
	ability to have a private dock	
	owning Boat and Dock	
	Availability to waterfront property and Docks	
	boat docks	
	Private dock close to house (cabin)	
	access to own dock	
	HAVING DOCKS ON WATER	
	Being Able to Walk to Your Boat	

	Dock.	
Escape personal and social pressure	getting away from city life	31
	a great place to live	
	hypmotising, soothing, calming, de-stressing (sic)	
	calming effect. Pleasant surroundings and close to Miami but yet away from town far enough to feel as if it is a true getaway.	
	Enjoying the water and being outside	
	GOOD GETAWAY	
	The are we live in ('The Coves') (sic)	
	MAKES A NICE GETAWAY FROM EVERY DAY PROBLEMS and ACTIVITIES	
	Relaxing get-away	
	get away	
	Friendly place to get away	
Family Togetherness	NICE FOR FAMILY - (sic)	8
	Family outings	
	BRINGS OUR FAMILY TOGETHER	
	good fishing - Family outings	
	Good place for Family Recreation	
Fishing	GREAT Fishing,	
	Good fishing, where we are not so crowded	
	Fishing	
	Fishing, now that their is a 10" limit on crappie	
	Good fishing,	
GRDA	That the Lake is run by GRDA and not the Corp of Eng. (sic)	1
None	Nothing	
	None	
	None	
Not Crops lake	No Corp of Engineers	25

	No "Green Zone" like Army Corp's Lakes (sic)	
	Little Apparent control of CORPS OF ENGINEERS	
	not controlled by ACOE but, by GRDA	
	LAKE ACCESS BY GRDA VERSUS CORPS of ENGINEERS	
	Separation FROM CIVIL ENGINEER'S. (sic)	
	COOPERATION OF GRDA (VRS CORPS OF ENGRS.) (sic)	
	It isn't a Corp. Of Eng Lake - Clean water	
	The lake is GRDA and not Corp. of Eng.	
	*Compared To A Corp. Of Eng Lake - a 2" Grand is a 10" - (sic)	
	Not Being Control by Corp of Engineers and State Lake! (sic)	
Privacy	Privacy - natural wooded lake setting	6
	PRIVACY	
Recreation	Sports, and Recreation	27
	Activities	
	RecReation (sic)	
	It's location and opportunities for enjoyment	
	Recreation For Kids	
	RECREATION and WATER QUALITY	
	Fishing and Rec! (sic)	
Reflection of personal Values	Location and Tranquility	13
	The Lake is still relatively undeveloped and uncrowded (sic)	
	GREAT PLACE TO RELAX WITH FAMILY and FRIENDS	
	Leisurely entertaining - personal enjoyment of surroundings	
	Peacefulness much of the time	

	Just a Nice Place To Live and Play (sic)	
	Peaceful Living on the Lake (sic)	
	THE ATMOSPHERE	
	I like being around the water.	
	freedom to enjoy all activities on the lake.	
	Close to GOD and Nature	
	Best kept secret	
	Life Style - Relaxing	
Relationship with Nature	Wildlife,	291
	pelicans	
	being with nature	
	PELICANS and WILDLIFE	
	WILDLIFE WATCHING	
	birds etc (sic)	
	beauty of nature	
Relaxation	Quite and Relaxing	58
	View and peacefulness - esp. in winter (sic)	
	RELAXING	
	Relaxation	
	Good place to relax	
	RELAXING ATMOSPHERE	
	FREEDOM TO RELAX AND DO WHATEVER.	
	Restful atmosphere	
	Relaxation	
	relaxing atmosphere	
	Relaxing view	
Security	Lake Patrol	16
	GOOD LAKE PATROL	
	PATROLLED REG BY GRDA (sic)	
	Some Security. (sic)	
	safe atmosphere	
	Lake safety(patrols)	
	Well patrolled	

	Knowing GRDA Will come if you call for help. (sic)	
	safety	
Service Facilities	Access to facilities	29
	LAKE BUSINESSES and WATER QUALITY	
	RESORTS / CLUBS	
	Arrowhead Yacht Club	
	Lake Access to Restaurants	
	yacht Clubs	
	activities, food restaurants clear water (sic)	
	facilities on the water	
	RESTAURANTS, ENTERTAINMENT	
	Beauty, variety of activities, location to other places - such as Branson, Tulsa etc.... (sic)	
	Facilities and Services on Water.	
	ENTERTAINMENT, RESTAURANTS	
	variety of activities,	
	MARINAS (sic)	
Social Contacts	SOCIALIZING, NICE FACILITIES	87
	People	
	LAID BACK ATTITUDE OF USERS	
	people	
	ACTIVITY and SOCIAL ATMOSPHERE	
	SOCIAL ACTIVITIES	
	BUTIFUL - PEOPLE (sic)	
	going to visit other people on the lake by boat	
	ENTERTAINING	
	Friendly People	
	friendly boaters,	
Solitude	Beautiful, Uncrowded and Relaxing (sic)	132

CRUISING ON THE WATER / QUIETNESS AND BEAUTY OF THE LAKE

Solitude, Beauty

Beauty -- Solitude

Quiteness During week

not overcrowded (sic)

not crowded

Peace and Quiet

QUIET

Solitude.

tranquility Peaceful surroundings(sic).

Weekdays w/ no crowds

BEAUTY, QUIET, PEACEFUL, PRIVATE

Quietness during week

Spring and Fall and Summer

Quiet Week days

Our area is fairly quiet and uncrowded.

Tranquility and beautiful scenery, especially spring and fall

A great place to play and relax

Quietness, Peacefulness, Beauty

The isolation of our property

TRANQUILITY - PEACE - (sic)

our area of the lake is not crowded.

somewhat quiet atmosphere

Solitude, beauty.

Seclusion

Quietness in the off season

Solitude in Winter

Quiet weekdays

Great during the week.

NICE, QUIET, ACCESS

Solitude during week

MONDAYS

Winter and Weekdays tranquility

	Peace and quiet,	
	quietness in our area	
	Serenity	
	Quiet days -- Birds both land and water	
	We are in a remote cove	
	quiet	
	Sunday evening when others have gone home.	
	IN OUR AREA IT IS STILL PRETTY QUIET	
Water Sports	Lots of Water	35
	Water activities	
	Water Recreation	
	water sports.	
	Swimming	
	WATER SPORTS	
	waters	
	Good Water Sports and Boating	
	lots of water for skiing, swimming	
Waterfront Ownership	EXTENDED SHORELINE	145
	Waterfront property	
	OWN PROPERTY TO WATER LINE	
	Owning waterfront lots	
	ABILITY TO OWN PROPERTY	
	Lake front living	
	SHORELINE	
	ownership to water	
	LAKE ACCESS - LIVING NEAR WATER	
	Own H2O frontage and controll (sic)	
	People, Being Able to Walk to Your Boat Dock.	

APPENDIX I

DEFINITION OF CATEGORIES FOR LEAST APPEALING ASPECTS OF GRAND LAKE

List of Least Appealing Category of Grand Lake

Category Name	No.	%
No Response	259	17.74
Lake Levels	239	12.03
PWC	211	10.62
Crowded	159	8.00
Large Boats	134	6.74
Rude Recreationists	119	5.99
Water Quality	114	5.74
Boat Speeds	81	4.08
Debris in the Water	68	3.42
Run Down Docks or Property	53	2.67
Noise Pollution	47	2.37
Pollution	46	2.32
Numbers of Boats	44	2.21
Pollution from Chicken Industry	41	2.06
Trash (litter)	40	2.01
Lake Patrol (Lack of enforcement)	38	1.91
Flood Control	35	1.76
Access to lake	34	1.71
None	25	1.26
Lake Management	19	0.96
Drinking	17	0.86
Fishing Tournaments	15	0.75
Heavy Development	15	0.75
Service Facilities (lack)	14	0.70
Windy Weather	12	0.60
Poor Fishing	12	0.60
Lack of Zoning	11	0.55
Nuisance Insects or Wildlife	10	0.50
Shore Erosion	10	0.50
Boat Wakes	8	0.40
Fishing Regulations	6	0.30
Lake Patrol (Over enforcement)	6	0.30
Taxes	6	0.30
Permits	5	0.25
?	4	0.20
Survey	4	0.20
Cost of Living	4	0.20
Winter Winds	3	0.15
Neighbors	3	0.15
Going Home	3	0.15
Lack of Security	3	0.15
Property Maintenance	3	0.15
No Comment	2	0.10
Lack of Wildlife Habitat	2	0.10
Too Many Docks	1	0.05
Large Marinas	0	0.00
	1985	104.60

List of Least Appealing Categories
of Grand Lake

Flood Control
Lake levels
Numbers of boats
None
Large Boats
Heavy Development
Lacking of Zoning
Crowded
Lake Patrol (Over enforcement)
Lake Patrol (Lack of enforcement)
Rude Recreationists
Winter Winds
Lack of Wildlife Habitat
Trash (litter)
Poor Fishing
Large Marinas
Boat Wakes
Boat Speeds
Run Down Docks or Property
Personal water craft (PWC) Drivers
Debris in the Water
Access to lake
Going Home
Drinking
Water Quality
Shore Erosion
Permits
Lake Management
Nuisance Insects or Wildlife
Taxes
Fishing Regulations
Lack of Security
Cost of living
Noise Pollution
Service Facilities (lack)
Windy Weather
Too Many Docks

Least Appealing Aspect of Grand Lake Categories

Least Category	Least Appealing	No. Of Responses
?	? (sic)	4
Access to Lake	LACK OF DEVELOPMENT / POOR SERVICES / HIGH TAXES INADEQUATE ROADS / LITTLE OR NO LAW ENFORCEMENT (sic)	34
	DELAWARE COUNTY ROADS	
	ROAD IS BAD	
	TOO FAR FROM O.C. (sic)	
	ACCESS ROADS TO LAKE HOUSE.	
	DISTANCE FROM OUR PERMANENT HOME - KANSAS CITY	
	Distance from nearest town (25 to 30 min)	
	Too far from Home (sic)	
	TOO FAR FROM MY PERM. ADD. and FISHING NOT AS IT USED TO BE (sic)	
	Access Roads	
	distance from home	
	the long drive to get there (sic)	
	Distance from my Home in Texas. (sic)	
Boat Speeds	fast boats to close to docks - (sic)	81
	EXCESSIVE BOAT SPEED. ALCOHOL (sic)	
	Visitors in the cove, speed too fast and lake patrol are never around anymore.	
	Boat Speeds and Safety (sic)	
	FAST BOAT - BASS FISHERMAN (sic)	
	SPEED LIMIT IN COVE, TOO MANY BOATERS ON WEEKENDS, LAKE LEVEL TOO LOW, NEEDS TO BE KEPT HIGHER (sic)	
	JET SKIS / EXCESS SPEEDERS NEAR DOCK	
	Fast boats - Dangerous Drivers - Personal Water Crafts (sic)	
	Drunks, speeders, Daredevils, rule breakers, Nosey neighbors (sic)	
	WAVE RUNNERS - High Speed of ALL BOATS.	
	Speeding, high-powered boats, personal watercrafts	

	(as operater) (Need speed limits in crowded areas (e.g. Duck Creek), strict enforcement of operations of PWC's. (sic)	
Boat Wakes	big wakes	8
	BIG BOAT WAKES	
	Boat waves (sic)	
	Rough water from Boats	
	wake caused by boat traffic	
	Wave disturbance caused by boat wakes	
	Big Boats - Size of WAVES and NOISE	
Cost of Living	- cost of having lake property keeps increasing (sic)	4
	Cost of use of water and Docks. (sic)	
	Hgh prices (sic)	
	Utility rates - Town crowded (Grove)	
Crowded	WEEKEND CROWDS	159
	Over crowding and run down properties on the lake.	
	Sometimes overcrowded.	
	TO CROWDED AND TO MANY LARGE BOATS CREATING EXTREMELY ROUGH WATER CONDITIONS ON VERY CALM DAYS, IMPOSSIBLE CONDITIONS ON WINDY DAYS. (sic)	
	OVERCROWDED AT TIMES	
	to many weekenders (sic)	
	over crowding and polution (sic)	
	HOLIDAYS - WAVE RUNNERS - CARELESS BOATERS	
	CROWDS	
	Visit week ends	
	over population	
	LOOTERS and CROWDED MARINAS	
	Weekend warriors	
	BUSY CROWDED WEEK-ENDS	
Debris in Water	the trash that washes up	68
	DEBRIS ON THE LAKE SHORE.	
	logs and trees floating during high levels	
	Trash in water, or left on beaches, people driving	

	boats to close to docks. (sic)	
	DEBRIS THAT ARE NOT REMOVED ON GRDA PROPERTY.	
	Logs Floating Down (sic)	
	Drift Wood	
	floating debris.	
	Floating Debris at times (sic)	
	Trash in Water	
	TRASH AFTER HIGH WATER	
	The logs after heavy rains -- real problems	
Drinking	drunks, dope while the GRDA turns their heads.	17
	Cruisers out of Control driven by a bunch of drunks.	
	Alcohol	
	Drunk Boat Drivers no respect for other people on lake (sic)	
	DRUNKS DRIVING BOATS.	
	drinking	
	Large boat waves cause erosion, Drunk drivers (boats) (sic)	
Fishing Regulations	JUG lines and TROT lines should not be allowed. Boating hazard!! Sport fishing should only be allowed by "POLE IN HAND" method. Commercial fishing methods (JUG and TROT Lines) should not be allowed on Grand Lake. (sic)	6
	Trout lines,	
	trout lines every where (sic)	
	LACK OF CONCERN FOR CONSERVATION * * THEY HOLD OVER A HUNDRED BASS TOURNAMENTS A YEAR HERE . - THE BASS FISH KILL IS 30% OR BETTER - MOST FISHERMAN COME FULLY SUPPLIED AND BUY NOTHING FROM THE LOCALS TO HELP THE ECONOMY - SPOON BILL TAKE MANY YEARS TO MATURE AND YET PEOPLE ARE ALLOWED TO CATCH THREE A DAY -- THEIR NUMBERS CAN'T SUSTAIN THIS ABUSE IN MY OPINION. -	
	Fish limit and size	
	I want to say that I don't understand why people over the age of 65, that have owned property on	

	Grand Lake and paid taxes over 20 years have to buy a DOKLA non-resident fishing license to fish off of there (sic) own dock. I think $28.50 for a non-residence senior citizen fishing license is terrible and something should be done. (sic)	
Fishing Tournaments	BASS Tournaments I have owned and Lived on the same prop. On Grand for 16 years.	15
	BASS TOURNAMENTS, NIGHT BASS TOURNAMENTS RUDE BASS FISHERMAN,	
	Fishing Tournments, (sic)	
	the Bass Boat (Fishing tournaments) - they run "fast" and you better be out of their way at sundown (or when its time for them to weigh-in) (sic)	
	HEAVY and FREQUENT BASS TOURNAMENTS (sic)	
	Too Many Bass Tournaments (sic)	
	BLACK BASS TOURNAMENTS (TOO MANY)	
	WEEK-END BASS TOURNAMENTS	
Flood Control	LAKE FLOODS	35
	Spring Floods	
	Neosho River floods	
	Justability of the Lake Level I think Flood Control Could be Improved - Better Anticipation of Lake Level and if a Flood on High Water Threatens - React to it sooner - (sic)	
	OCCASIONAL FLOODS	
	FLOODING CONDITIONS, DIRTY WATER, FLOATING DEBRIS	
	FLOODS and ALL THE TRASH THAT COMES WITH THEM DOWN THE RIVERS.	
	flooding AND DEBRIS LEFT ALONG SHORELINES ALSO LARGE BOATS THAT FEEL THEY ARE THE ONLY ONES ON THE WATER ESPECIALLY DURING HOLDIAY WEEKENDS. (sic)	
Going Home	Having to Leave and go home (sic)	3
	Leaving to Go to Permanent Rediscence (sic)	
	it makes it hard to go back to work on Monday	
Heavy Development	Overdeveloped -- Too many people -- Too many large boats	15

	to many houses/cabins (sic)	
	COMMERCIALIZING of LAKe by developers and CHAMBER of COMMERCE (sic)	
	The commercialization	
	Recent Growth	
	Developement taking many of good fishing areas. (sic)	
	CONTINUING COMMERCIALIZATION	
	Commercialism and overpopulated overall v (sic)	
	Our development	
	OVER DEVELOPED, CROWDED	
	Too much development (houses) leading to overcrowding on lake. Grove is starting to have a traffic problem. Too much traffic -- like Branson	
	Over Developed (Been on South Monkey Island since 1960) Jet Skis and Larger Boats	
	Too many commercial properties and large boats It was perfect when we came here 15 years ago. (sic)	
	Being overbuilt	
	large boat traffic, soil erosion, heavy development, lack of zoning	
Lack of Security	do Not feel as safe in the lake area as use to - more break in etc. (sic)	3
	Too many residents, run-down housing in some areas and CRIME (burglary)	
	I have been Burglarized and Vandalized and the Local Law enforcement agency (OTTAWA County Sheriff) are unable to catch the person (s). (sic)	
Lack of Wildlife Habitat	PUMP THE WATER TOO LOW - DESTROYS FISHING TOO MANY BIRDS, EGRETS, ETC, EAT ALL THE FISH . FISHING HAS BEEN POOR THE PAST 2-3 YRS OR REALY LONGER THAT. I'M SELLING MY PLACE BECAUSE OF ABOVE (sic)	2
	LACK OF SHORELINE FISH HABITAT	
Lack of Zoning	lack of zoning	11
	OLD, DANGEROUS DOCKS and Shabby looking TRAILER HOMES (NEED MORE RESTRICTONS)	
	ABSENCE OF HOUSE ZONING LAWS.	

	TO MANY "LIVE ON " BOAT DOCKS" W/O SHORELINE TOILET FACILITIES . ALSO - TO MANY UNMAINTAINED DOCKS and "LIVE ON" FACILITIES. (sic)	
	Some of the older non regulated Areas of Houses. (sic)	
	Lack of building Codes and restrictions	
	no controls of Building (sic)	
	no building restrictions for homes and docks	
	LACK of aoning Restrictions through the past years (sic)	
Lake Levels	LARGE CHANGES OF WATER LEVEL.	239
	dirty water and low level	
	when they lower the water level	
	3. Lower Water level proposed for 1997 of 744'. (sic)	
	Water level do not encourage Fishing (sic)	
	Water levels seem to vary greatly - Dock underwater or practically setting on dry ground	
	Using the lake level as a yo-yo (sic)	
	Changes in water levels	
	Lake level leaves our dock on mud most of year (as of 1996-97) (sic)	
	unnecessarily low water levels determined by politicians, (sic)	
	Level Fluctuating so Logs and Debris settle on Shore (sic)	
	Lake level lowered - We extended our ramp and had a sea anchor attached and now we can't drive up to our dock, when we used to have a minimum of 5' in front of it. (sic)	
	HIGH WATER/DIRTY WATER AND DRIFT	
	WATER FLUCTUATION DUE TO WATERCRAFT NOT OBSERVING SPEED LIMITS IN COVES, AND FLUCTUATION DUE TO CONTROL OF LAKE LEVELS.	
	Fluctuating water levels - Rudeness of many boaters concerning other's safety. (sic)	
	FERC Mandated fluctuation of water level	
	water levels fluxuate and the long drive to get there	

	(sic)	
	water level – Speed of Crafts in Coves. (sic)	
	LAKE LEVAL IS TOO INCONSISTANT IN SPRING and SUMMER. (sic)	
	VARIATION OF WATER LEVEL and KEEPING WATER LEVEL BELOW NORMAL, due TO THE BITCHING and GRIPING OF PEOPLE IN MIAMI WHO LIVE IN A FLOOD PLAIN. (sic)	
Lake Management	People Trying to Run the Lake from a distance instead of Lake people (sic)	19
	NO PROPER CARE IN PLACING OF DOCKS GRDA POLITS SEEMES TO RULE and ARE NOT CONSISTANT (sic)	
	The cove that my dock in, is filling in and GRDA won't let me have it dug out. I barely have water to get out. This isn't right!!! (sic)	
	Too many permits and water-dock - tags - ect. Restrictions – Have Idle too long in certain areas get to marinas. (sic)	
	GRDA	
	boaters who have no respect for NO WAKE BOUYS. The concenses of Grda officials that property owners should pay for patrol salaries. What about all the individual boat owners who use the lake from other areas. They are usually the ones who have no respect for property damage and No Wake Zones. (sic)	
	1) Variable water levels; 2) Not all dock owners pay fees 3) Rules not uniformly enforced (sic)	
	Lake fluctulation GRDA let neighbor extend their dock over our property line. (sic)	
	GRAD DOESN'T MAINTAIN THE LAKE (sic)	
	1) Inadequate management of ("policing") of skiers and personal watercraft violating dock areas. (sic)	
	POOR CONTROL OF PLACEMENT and NUMBER OF BOAT DOCKS BY LOT/HOME OWNERS. NO CONTROL OF SHAPE, SIZE and COLOR OF BOAT DOCKS	
	Yacht clubs are allowed to put in eye blocking Boats slips. People invest a fortune for a home with a view, and we have no say on that view being ruined. I feel we are as important to the as they are.	

	We also maintain the lake. Can anything be done? (sic)	
	GRDA'S Patrol Aircraft -- Total Waste of Money	
	Over regulation -- No wake	
	Gov't intervention trying to curb economic development	
	This all goes on with GDRA consent. There is to much money and politics which is going to ruin the lake. I think GRDA should pay us for trying to keep our docks afloat on Duck Creek. Signed. Disgusted. (sic)	
	GOVERNMENTAL INTERVENTION - TOO MANY RULES	
	LOW WATER LEVELS -- POLITICAL INFLUENCE	
	too many shore line structures	
Lake Patrol (Lack enforcement)	NOT ENOUGH LAKE PATORLMAN (sic)	38
	Lack of GRDA Patrol - . The concenses of Grda officials that property owners should pay for patrol salaries.	
	Lack of Enforcement of Lake Rules Regulation – Traffic Control in hot spots on weekends and holidays. (sic)	
	Performance GRDA patrol, don't keep their word (sic)	
	GRDA PATROL SHOULD ISSUE MORE TICKETS TO RECKLESS BASS BOATS, JET SKIS, AND CIGAR BOATS.	
	Sewage and industrial waste constantly getting into the lake and no and no attempt enforce the regulatons (laws) against that. (sic)	
	lack of speed enforcement at night	
	LACK OF HIGHLY TRAINED LAKE PATROL MOST LAKE PATROL MEMBERS HAVE NEVER HAD EITHER USCG OR POWER SQUADRON BOATING COARSES. i HAVE HEARD (BUT HAVE NOT CONFIRMED) THAT MOST HAVE NOT HAD RED CROSS TRAINING. (sic)	
	GRDA doesn't listen and doesn't enforce. We plan	

	to sell soon because of all this.	
	No consideration for water regulations plus no stringent enforcement of them.	
	1) Inadequate management of ("policing") of skiers and personal watercraft violating dock areas.	
	3) The GRDA Not Enforcing the Rules 4) No Agency Backing Up Grda. (sic)	
	LACK OF CONTROL OVER PERSONAL WATERCRAFT	
	I wish GRDA would tighten the rules on offenders.	
	Excessive P.W. activity, Lake Patrol not effective for assisting distress calls, Marine Radio not monitored. (sic)	
	1 2) Rules and regulations for issuing dock permits are no longer enforced by G.R.D.A.	
	Holiday weekends and the lack of water patrol to maintain safety on the lake.	
	LAKE PATROL IS NON EXISTENT EXCEPT DRIPPING SPRINGS COVE.	
	GRDA never patrols. (sic)	
	Lack of Law enforcement and lodgic (sic) approach to same! After 4pm NO LAKE PATROL!	
	2) Not enough patrolman to cover lake for violators	
Lake Patrol (over enforcement)	Being pestered By Lake patrol (sic)	6
	Local Patrolman (Vaughn)	
	RUDE PATROLMEN.	
Large Boats	large boats and I don't mined jet ski's or large boats, it's the people who use them without respect for anyone else.	134
	LARGE BOAT WAKES ON MAIN LAKE	
	HUGE 50ft. BOATS THAT DISREGARD SMALL BOATS	
	25' -40' cruisers making huge wakes	
	Speeding "cigarette boats"	
	FAR TOO MANY VERY LARGE BOATS	
	Huge boat owners have absolutely no respect for smaller boats We've been swamped by larger boats many times (sic)	

	The huge yachts. (sic)	
	Large Boats in Horse Creek and the shallow area's are not marked	
Large Marinas	GRDA LETTING THE YACHT CLUBS RUN THE LAKE TOO MANY BOATDOCKS (sic)	11
	The increasing port (large) traffic	
	COMM. BOAT DOCK THAT ARE BUILT THEN A LARGE PART OF A WATERWAY, CREEK OR MAIN LAKE. (sic)	
	Can't use 2,052 Sqft. dock do to large Boats from Ugly John Marina, Harbor Marina, Arrowhead North Marina, Arrowhead South Marina, Cherokee Yacht Club Marina. Throwing wakes on dock -- Too rough even on a quiet day to go on the dock "Need no wake in Duck Creek."	
	too many commercial docks	
	large commercial dock construction - there are no controls to prohibit unsightly dock construction along the shore line and 300' into any water area.	
	1) Marina keep adding slips	
	Cherokee yacht Club DOCKS intrude too far into Duck Creek - Now Arrowhead Yacht Club Doing the same. (sic)	
	Seems the commercial aspect has taken over in Duck Creek with the approval of the GRDA Duck Creek, at least from the Cherokee- Arrowhead Yacht Club on North should be subjected to a "No Wake" restriction. (sic)	
	GETTING TO BE CROWDED WITH LARGE BOATS	
	Some of the boats are ocean Vessels to Big for Small Boats (sic)	
Maintenance	Mowing our lawn	3
	Work of ownership, crowds on weekends and holidays	
	Maintenance	
Neighbors	Neighbors	3
	My Neighbor	
	Nosey neighbors (sic)	
No Comment	No Comment.	2

Noise Pollution	Increasing jet ski traffic and noise	47
	PWD and NOISE (sic)	
	Loud noise of some boats. (sic)	
	LARGE LOUD BOATS and PERSONAL WATERCRAFT	
	LOUD BOAT NOISE	
	too loud jet boats. - (sic)	
	jet ski noise.	
	High Speed and Noisy Go Fast Boats (Dangerous) (sic)	
	NOISE ON HOLIDAY WEEKENDS	
	Speed and noise of boats	
	Loud boats Jet skis	
	Too many noisey boats and Jet skies, etc. (sic)	
	INCREASING NOISE LEVEL	
None	None	25
	Everything is Great on Grand Lake (sic)	
	No complaints	
	Can't Be there all the time (sic)	
	Nothing negative	
	I do not have any least appealing aspects.	
	no problems	
	fact I'm not there full time	
	- WE LOVE IT	
	? (sic)	
	I can think of none. We look forward to going to Grand lake, and enjoy our visits.	
Nuisance insect or Wildlife	too many protected birds and limits seagulls and coots. (sic)	11
	LOOSE DOGS	
	Ducks messing up docks	
	Destructin of Docks by Beavers, and Mud in Lake (sic)	
	4) Deer -- and their ticks at the coves!!	
	MOSQUITOS, TICKS.	
	Ticks	
	WATeR TURKeys, (sic)	

	Fighting all the bugs and insects	
	Cormorants eating the fish	
Number of Boats	To many Boats in Narrow Channels - (sic)	44
	Number of boats and speed and careless manner in which they operated. (sic)	
	Heavy boat traffic and wave runners	
	Too much boat traffic w/ too much speed (sic)	
	Very Crowded During Summer, Too Many Big Boats	
	To (sic) many boats -	
PWC	JET SKIS,	211
	SKI – DOO's should be Regulated I am convinced if the water patrol doesn't regulate these water type motorcycles, we shall have numerous accidents on the lake. I have seen some terrible incidents with these apparatuses. I have seen them go between a boat and skier, through fishing boats I believe a strict regulation or schooling should be imposed. (sic)	
	JeT Skis and BOATS NOT FOLLOWING DISTANCE and SPEEDs(sic)	
	two many on-person ski jet boats (sic)	
	the # of personal watercraft (sic)	
	2. Young Kid on wave runners need to be taught safety - also parents should supervise them all the time they are in the water (sic)	
	Waverunners, especially with inexperienced operators; waverunners and boats following too closely when pulling a skier; boats that travel 60+ mph	
	Too many personal Watercraft (sic)	
	Waverunner, Jet ski	
	IGNORANCE AND ARROGANCE OF PWC OPERATORS	
Permits	Too many permits and water-dock - tags - ect. Restrictions - Have Idle too long in certain areas get to marinas. (sic)	5
	I am charged the SAME Amount for my small dock AS Grand River Dam Authority charges for all the large docks, MINE should be $15.00 Medium	

	should be $25.00 Large should be more. (sic)	
	Paying for Dock Permits	
	2) Not all dock owners pay fees 3) Rules not uniformly enforced (sic)	
	fishing permits are too expensive (sic)	
Pollution	2. Large boats dumping sewage—How many dump stations are available? Are they convenient? 5. Illegal septic systems contaminating the water. Who controls this ?	46
	POLUTION (sic)	
	Contamination of the water.	
	Thereat of septic contamination from low lying homes	
	Increasing Pollution from Honey Creek Drainage Area	
	POLLUTION FROM SOUTHWEST CITY -	
	Comment: the water pollution on Elk river has steadily increased every year over the last 4 yrs.	
	WATER QUALITY IS BAD I SEE SOAP BUBBLES IN THE WATER AND FOAM (SOAPSUDS) ALONG THE BANK . I THINK THAT THE CITY OF AFTON OR OTHER ENTITY IS NOT CONTROLLING THEIR WASTE WATER PROPERLY. - I HAVE JOINED A WATER QUALITY WATCH TO SEE IF ANYTHING CAN BE DONE.	
	Degradation of water quality from polutants	
	Contamination	
	Lift Station's ARE A JOKE. No Sewage Actuly Regulated on house boats, Sewage if This is not MORE Strikly Regulated we Aren't going to have NATURE, CLEAN WATER OR GOOD Fishing (It will All be gone Forever) (sic)	
	City Sewers ssytems on tributarys to Grand Lake, Poltry Plants spraying their waist on the fields on tributarys to grand Lake killing fish and Plouting the stream and Grand Lake. I hate to think what this lake "Grand Lake" will look like in 50 yrs for my Grand Kids (sic)	
Pollution from Chicken Plants	Smell of chicken processing plant	41

	Bad smell from chicken farm disposal at certain times on lake.	
	Pollution from Siemmons Poultry Plant (sic)	
	2) CHICKEN PROCESSING EFFLUENT DRAINING INTO LAKE	
	Threat of sewage pollution and chicken processing smell	
	pollution, (chicken stuff)	
	Pollution from chicken growers	
	Have Chicken House so close to the Lake. They are putting more and more of them in the area around the Lake and I'm real concern of the polution the can cause. (sic)	
	Water Quality Chicken Plant discharge (sic)	
	Contaming lake by chicken plant in Missouri (sic)	
	poultry / swine plant pollution by corporate industry particularly it's tributaries (sic)	
	SIMMONS WATER CONTAMINATION (sic)	
	WATER QUALITY (EFFLUENT FROM CHICKEN PLANTS) (sic)	
	Spills from chicken plants and sewage spills	
	water is impure from Chicken houses (sic)	
	Pollution From Simmons and HUDSON CHICKEN PLANTS In HONEY CREEK and ELK RIVER (sic)	
Poor Fishing	fishing is not as good as used to be	12
	Poor fishing	
	CROPPY FISHING HAS BEN VERY, VERY POOR FOR THE PAST 12 TO 13 YEARS. (sic)	
	Crappie Population Down	
	we no longer see large schools of shad we used to see and fishing is poorer. It is being monitored so we are told (sic)	
	PUMP THE WATER TOO LOW - DESTROYS FISHING TOO MANY BIRDS, EGRETS, ETC, EAT ALL THE FISH . FISHING HAS BEEN POOR THE PAST 2-3 YRS OR REALY LONGER THAT. I'M SELLING MY PLACE BECAUSE OF ABOVE (sic)	

Rude Recreationist	Discourteous boat drivers while we're fishing	119
	Quality of boating operators	
	3) Irresponsible boaters and jet skis. (sic)	
	unsafe, disrespectful boat operators (sic)	
	People	
	Fishermen	
	Sailing,	
	Water skiing	
	THE LACK OF THEIR OEPRATORS TO HAVE ANY RESPECT OR COURTESY FOR ANYTHING OR ANYBODY. (THE SAME APPLYS TO 90% OF TOURNAMENT BASS FISHERMEN) (sic)	
	people who do not observe safety Rules (sic)	
	Bass Tournaments which have participants who are discourteous. Jet shi drivers fail to operate away from docks, land or fishing boats (should be removed). What ever happened to the law that required boats to be a certain length (12ft.) with engines. (sic)	
	trouble makers (sic)	
	Other people's disregard for us on fishing docks.	
	Personnal water craft and many thoughtless people who operate them. Also, large boat operators who "plow" at lower speeds making wake vaves that tear up docks and equipment.	
	JET SKIS AND RUDE BOATERS (SOME BASS FISHERMAN) ARE THE WORST (sic)	
	BOATERS DISREGARD FOR DAMAGE THEIR BOAT WAKES CREATE.	
	BASS TOURNAMENTS and OTHER BOAT IDIOTS WHO DO NOT UNDERSTAND LAKE RULES	
	Boats driving too close to private docks making wakes	
	UNCOURTEOUS PEOPLE ON PERSONAL WATERCRAFT	
	BOATERS ETIQUETTE	
	People	
	the rud bass fishermen who don't know how to	

	drive (sic)	
	disregaurd for private property and improper use of water vehicles (sic)	
	Ignorant inconsiderate boaters	
Run Down Dock or Property	Lots of old delapeted docks –trashy docks should not be permitted (sic)	53
	Property that is not maintain etc. (sic)	
	some of the trashy docks arround it. (sic)	
	Deterating dock and property on water front (sic)	
	Some docks not kept up, let rundown	
	Ugly Run down Boat Docks (sic)	
	Run down boat docks	
	upkeep of house, yard and shoreline	
	enforce proper upkeep of docks	
	The older more run-down docks where people actually lived on the water. Check in Bay for example. Actually don't like the appearance of metal roof covered docks! (sic)	
	The rundown cabins and trash	
	Old Docks, people living in them dumping raw sewage into lake/old docks in disrepair, rotting in water	
	Damaged and partially sunken Docks Need to be cleaned up (sic)	
	trash, junky yards	
Service Facilities (lack)	Not enough restaurants to go to by boat.	14
	LACK OF DEVELOPMENT / POOR SERVICES	
	NO BEACHES	
	no city or rural water service.	
	Not close enough to a metropolitan area	
	THE LACK OF HOTELS, RESURANTS, A GOOD PHONE SYSTEM. (sic)	
	Needs more restaurants Accessible by H2O (sic)	
	LACK OF CITY WATER and NATURAL GAS	
	ACCESS TO SHOPPING	
	Lakc of continuing growth of support business on the lake (resturants, etc.) (sic)	

	Lack of fueling areas around lake	
	(WIFE) "MALL WITHDRAWAL" NO SHOPS/RESTAURANTS LIKE TULSA	
Shore Erosion	BEACH ERROSION (sic)	10
	RARE / BANKS because of water level (sic)	
	No sandy shoreline	
	In the 23 years that we have lived here, we have lost 20' of shore line. This is due to large boats going to fast during high water. Last year we added a retaining wall to stop this. It also destroys the natural beauty of the lake. (the wall - that is) In narrow channels like Duck Creek and other arms of the lake, a boat leaving this kind of a wake would be confiscated in Florida by the Coast Guard.	
	soil erosion	
	lake level lowered w/ no consideration to damage to docks and the ugly shore line that stands above the lowered level of the lake, and the hazards caused by shallow water over structures (sic)	
	3) Due to long periods of high lake levels i.e., 750 ft most lake shore habitat ie. willow trees have been eliminated by excess washing action or by being under water for extended periods of time. (sic)	
	Rocky Beaches	
Survey	The only outcome I can see from this survey is data which will ultimately be used by GRDA, Corps of Engineers, etc to impose taxes or more importantly controls. Since such controls are most often simply devices to extend Government dominance over areas they have no business meddling with, I can not support your survey. You should consider potential consequence. (sic)	4
	incompontent lake surveyors trying to prevent lake growth (sic)	
	Unnecessary Control I don't understand the purpose of these questions and what question or issue you can develop or answer! (sic)	
	NON INFORMED INDIVIDUALS WHO DO NOT USE THE LAKE, WHO ATTEMPT TO MAKE LAKE POLICY RECOMMENDATIONS	
Taxes	Pay high taxes with no fire or police protection from Delaware Co. on our side of the lake --	6

	HIGH TAXES INADEQUATE ROADS / LITTLE OR NO LAW ENFORCEMENT (sic)	
	The Taxes	
	#1. Property Taxes!	
	The State of Okla and GRDA are both money brubbers, Higher Taxes I waited 14 years and drove to Joplin and other places to work so I could retire here, I've been retired 2 years now, and things have change so much I'm moving on(sic)	
Trash (litter)	Litter on Roads (sic)	40
	Styrofoam Trash	
	Trash left by humans. Homeowners have to Clean up After the Public. (sic)	
	Too many Boat docks -- litter from people -- PWC hazardous	
	lots of trash from the Marina and the big boats also oil on top of the water the water is dirty not clear or as clean as it was years ago. (sic)	
	Overpopulation (people and big boats) / litter	
	TRASH LEFT BY WEEKEND VISITORS	
	trash, junky yards	
	Trash accumulation from high water	
	Litter on Roadway	
	Need to publicize and advertise trash collection areas around the lake (sic)	
	All the Garbage blown into Cove's (sic)	
Water Quality	Dirty water and debris.	114
	Water Quality	
	Dirty and Smellie water at times. (sic)	
	dirty water	
	The area on Elk River the farthest east (about 2 miles east of 10 Bridge. (sic)	
	muddy water	
	Water Quality:	
	polution (sic)	
	Sewer draining in lake	
	murky water a great deal of the time	
	DIRTY WATER THAT COMES WITH IT	

	cleanliness of water	
	Quality of Water on Elk River I wish we could get the Health department to take samples of the water -Sometimes the CATFISH WE CATCH. We Are Afraid to eat Because they Have Some Kind of Growth on Stomach. I think we need Some Real Help For Our Water. Maybe Your work will help. (sic)	
	Water quality degrading	
	WE ARE IN A COVE THAT BOATERS FLOCK TO THEY ARE NASTY LOUD. POLLUTE THE WATER IS UNSAFE TO USE. (sic)	
	Murky water for swimming	
	1) Water clarity	
	Water is dirtier!	
	WATER - WE DO NOT SWIM IN THE LAKE	
	Flooding and dirty water from upper lakes / contamination.	
	I think we should address these issues soon as the quality of the lake is quickly deteriorating.	
	Water Is Apalling Plus Algae (sic)	
	Water quality -- we have owned property here for 25 yrs. Water used to be clear most of the time -- now it is murky -green (algae) Not nearly as clean as it once was!	
Windy Weather	VERY HOT IN SUMMER.	12
	Rough Water	
	Wind	
	OCCASIONLY ROUGH DUE TO WIND (sic)	
	wind	
	ROUGHNESS OF WATER SOMETIMES	
	N W Wind can be pretty rough in cove	
	Strong winds and Rough Water. (sic)	
	"Rough" water during Holidays (sic)	
	Winter "cold weather"	
	When it freezes over	
	North west Cold wind	

Most Appealing Aspect of Grand Lake Categories

List of Most Appealing Category of Grand Lake		
Category	No. of Responses	%
Aesthetics	647	43.423
Relationships with nature	291	19.530
No Responses	123	8.255
Solitude	132	8.859
Ownership Waterfront	145	9.732
Access to Home	97	6.510
Social contact	87	5.839
Boating	78	5.235
Relaxation	58	3.893
Dock	47	3.154
Water Sports	35	2.349
Escape personal and social pressures	31	2.081
Service Facilities	29	1.946
Recreation	27	1.812
Not a Corps Lake	25	1.678
Security	16	1.074
Reflection on personal values	13	0.872
Family togetherness	8	0.537
Privacy	6	0.403
Exercise	2	0.134
GRDA	1	0.067
Physical rest	0	
Meeting/observing new people	0	
Achievement/Challenge	0	

VITA

Clarence Towner Ruby, Jr.

Candidate for the Degree of

Master of Science

Thesis: RECREATIONAL USES OF PRIVATE BOAT DOCKS ON GRAND LAKE O'THE CHEROKEES

Major Field: Health, Physical Education and Leisure

Biographical:

Personal Data: Born in Talequah, Oklahoma, On January 26, 1943, the son of Florence and Clarence T Ruby, Sr. Married to Suzanne E. Ruby, two children.

Education: Graduated from Muskogee Central High School, Muskogee, Oklahoma, in May 1962; received Bachelor of Science Degree in Mathematics and Business Administration from Northeastern State University, Tahlequah, Oklahoma in May 1971. Completed the requirements for the Master of Science with a major in Health, Physical Education and Leisure at Oklahoma State University in May 1998.

Experience: Oklahoma State University, School of Health, Physical Education and Leisure, Stillwater, Oklahoma, Graduate Research Assistant, 1994-1996; US Forest Service, Dillon Ranger District, Silverthrone, Colorado, Information Specialist (Visitor Information), Summer 1994; Oklahoma State University, OSU Vending, Stillwater, Oklahoma, Route Attendant, 1993-1994; AMOCO Production Co., Tulsa, Oklahoma, Sr. Computer Analyst, Drilling & Production Analytics & Computing Applications, 1983-1993; Computer Analyst, Fracturing and Rock Mechanics, 1983-1993; Associate Computer Analyst, 1978-1979; Assistant Computer Analyst, Well Completions and Operations, 1975-1978; Sr. Research Technologist, 1975-1975; Research Technologist(sg) 1971-1975, Research Technologist, 1968-1971. Programming languages used: Fortran, PL/1, Basic, C, Windows III and OS/2.