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RECREATION CARRYING CAPACITY FACTS AND CONSIDERATIONS. REPORT 2--ETC(U)
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RECREATION RESEARCH PROGRAM

RRP

LEVEL II

RECREATION CARRYING CAPACITY FACTS AND CONSIDERATIONS

Report 2

BENBROOK LAKE PROJECT AREA

by

Urban Research and Development Corporation
528 North New Street
Bethlehem, Pa. 18018

MISCELLANEOUS PAPER R-80-1 JULY 1980 REPORT 2 OF A SERIES

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RECREATION CARRYING CAPACITY FACTS AND CONSIDERATIONS

Title	Date
Report 1: Barkley Lock and Dam, Lake Barkley Project Area	Jul 1980
Report 2: Benbrook Lake Project Area	Jul 1980
Report 3: Hartwell Lake Project Area	Jul 1980
Report 4: Lake Ouachita Project Area	Jul 1980
Report 5: Lake Shelbyville Project Area	Jul 1980
Report 6: McNary Lock and Dam, Lake Wallula Project Area	Jul 1980
Report 7: Milford Lake Project Area	Jul 1980
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Report 11: Surry Mountain Lake Project Area	Jul 1980

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We gratefully acknowledge the enthusiasm and excellent cooperation of the resource managers, rangers, and other Corps personnel at Benbrook Lake and the representatives from the Fort Worth District Office. Their contributions of practical experience and knowledge, along with their assistance in arranging schedules, have made this carrying capacity research effort possible.

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A project map of Benbrook Lake is enclosed in an envelope attached inside the back cover of this report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Benbrook Lake Project	Recreation	Utilization
Carrying capacity	Recreation resource planning	
Monitoring	Recreational areas	
Overcrowding	Recreational facilities	

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides selected recreation carrying capacity-related information for the Benbrook Lake Project. The information is based upon: 1) user and management surveys conducted at Benbrook Lake, and Urban Research and Development Corporation's observations and perceptions of the situations at the project's activity areas. The report provides information regarding activity situations, user characteristics, carrying capacity findings, and other findings; it then focuses on selected problem situations and their possible solutions.

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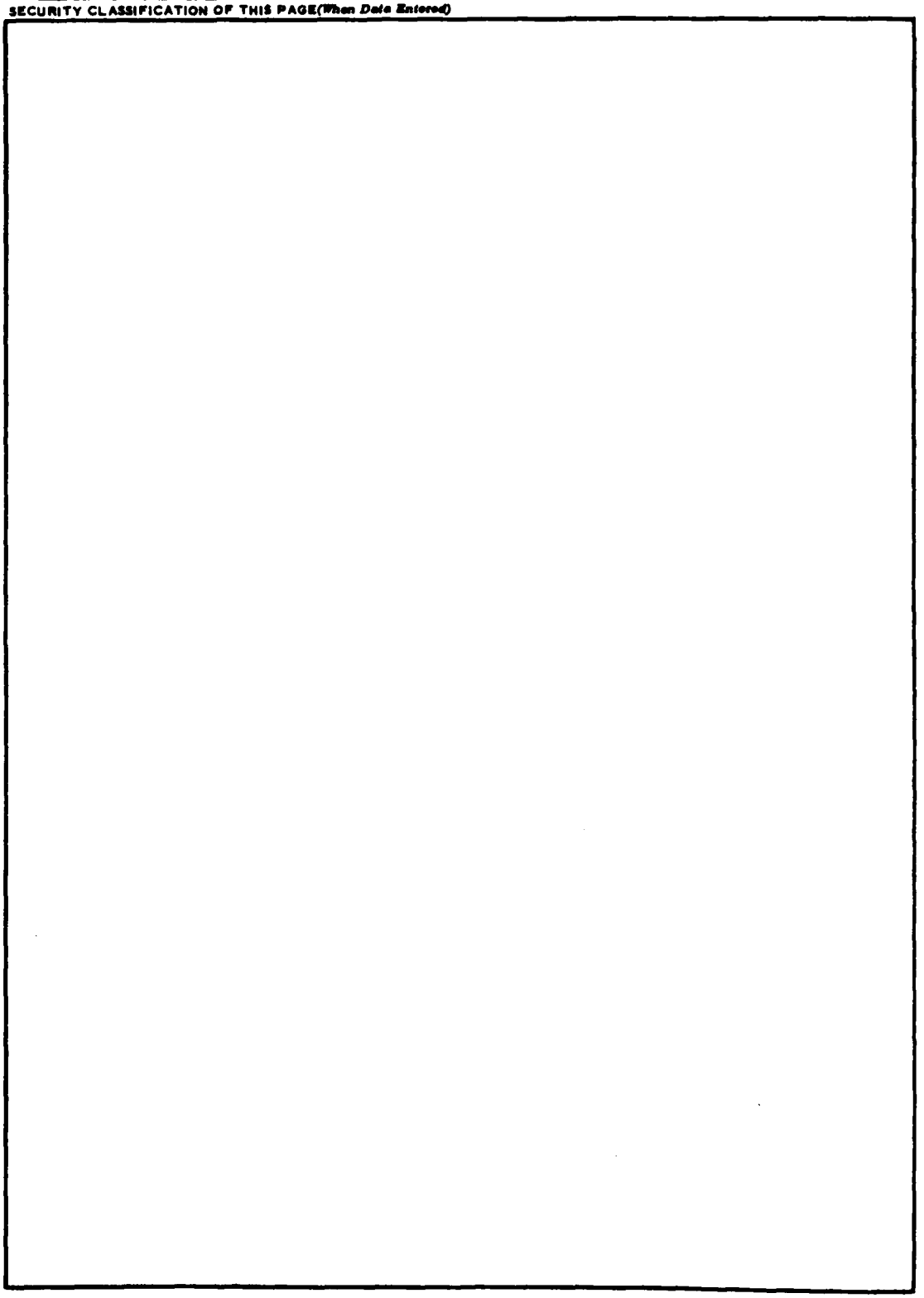

PREFACE

This report presents the findings and recommendations of the Urban Research and Development Corporation (URDC) relative to recreational carrying capacity at the Benbrook Lake Project Area. Results of site analyses and user surveys are presented as they relate to existing carrying capacity conditions on the project. The study was conducted under Contract with the U. S. Army Engineer Waterways Experiment Station (WES), Vicksburg, Mississippi, (Contract No. DACW39-78-C-0096).

Mr. Donald R. Detwiler, President of URDC, was Principal-In-Charge of this study, assisted by Mr. Martin C. Gilchrist, Executive Vice-President and Mr. David H. Humphrey, Vice-President. Mr. B. Thomas Palmer, Project Director, had the major responsibility for technical project direction; Messrs. Phillip D. Hunsberger and Paul L. Sabrosky were involved in the site analysis, conducting surveys, and the success analysis; and Mr. Timothy A. Fluck was involved in conducting surveys, survey analysis, and development of methodologies.

Mr. R. Scott Jackson, WES was the Project Monitor. Dr. Adolph Anderson, WES, was Program Manager of the Environmental Laboratory (EL) Recreation Research Program. The study was supervised by Dr. Conrad J. Kirby, Chief, Environmental Resources Division, EL, under the general supervision of Dr. John Harrison, Chief, EL.

COL John L. Cannon, CE, and COL Nelson P. Conover, CE, were Commanders and Directors of WES during this study. Technical Director was Mr. F. R. Brown.

CONTENTS

CONVERSION FACTORS, U. S. CUSTOMARY TO METRIC (SI)
UNITS OF MEASUREMENT

U. S. customary units of measurement used in this report can be converted to metric (SI) units as follows:

Multiply	By	To Obtain
acres	4046.856	square metres
Fahrenheit degrees	5/9	Celsuis degrees or Kelvins
feet	0.3048	metres
horsepower (550 foot and pounds per second)	745.6999	watts
inches	2.54	centimetres
miles per hour (U. S. statute)	1.609344	kilometres per hour
miles (U. S. statute)	1.609344	kilometres
square feet	0.09290304	square metres
yards	0.9144	metres

* To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use the following formula: $C = (5/9)(F - 32)$. To obtain Kelvin (K) readings, use $K = (5/9)(F - 32) + 273.15$.

RECREATION CARRYING CAPACITY FACTS AND CONSIDERATIONS

BENBROOK LAKE PROJECT AREA

PART 1: INTRODUCTION

This Report

Purpose

This report, prepared as the second in a series of the U. S. Army Engineer Waterways Experiment Station's (WES) Recreational Carrying Capacity Design and Management Study reports, provides selected carrying capacity-related information for the Benbrook Lake Project Area which cannot be found in the Technical Report. The information is based upon: 1) the user and management surveys conducted at Benbrook Lake, and 2) Urban Research and Development Corporation's (URDC) observations and perceptions of the situations at the project's study activity areas. Some observations and suggestions dealing with project area planning, design, and/or management are included, even though they are not specifically carrying capacity related. The report also suggests specific solutions and treatments of specific recreation activity areas.

The report first provides information regarding activity situations, user characteristics, carrying capacity findings, and other findings; it then focuses on selected problem situations and their possible solutions. Although suggestions regarding possible solutions to problems are included, this report is not intended to be a substitute for master planning or to provide answers to all project area capacity problems. Instead, this report should be viewed as a constructive, informative document which points out directions and techniques for consideration by project managers and designers in the near or distant future.

Relationship to Technical Report and Handbook

In addition to this Project Area Report and similar reports on the other ten study project areas,* the overall capacity study effort produced a Technical Report and a Capacity Handbook:

a. The Technical Report describes the overall study process, reports detailed study findings, and suggests and demonstrates methods and techniques for capacity management.

b. The Capacity Handbook is a more graphic, "how-to-do-it" type of report, designed to serve as a useful field tool for determining carrying capacity and applying techniques for capacity design and management.

This project area report is different from the Technical Report and Handbook in several ways: it includes information not found in the Technical Report and Capacity Handbook; it reports and examines user survey information by activity area and project area, rather than from the total survey population; it addresses specific problems and examines possible solutions; and it does not include the methodologies for determining and monitoring social and resource capacity. For these reasons, this report is intended to compliment the Technical Report and the Handbook, and is not intended to substitute for them.

Qualifications

The information in this report is based on the Management/Site Survey conducted on November 8-10, 1978 and the User Survey conducted on May 11-14, 1979 by Urban Research and Development Corporation (see Appendix B). The user survey information was collected over a one-weekend period, which may or may not have been representative of a typical or heavy use weekend at Benbrook. Interviews were limited at some activity areas because of such factors as lack of users and weather conditions. For these reasons and because carrying capacity analysis is dynamic rather than static, this report is not intended to provide the final answers. Rather, it is a foundation for future analysis and carrying capacity progress.

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* See definition of "Study Project Area" in Appendix A for a listing of these project areas.

Summary Project Area Description*

Benbrook Lake** is located within the Dallas/Fort Worth metropolitan area and exemplifies an urban lake situation. The lake was authorized for the purposes of flood control, water conservation, and navigation. Benbrook is one of the smaller lakes visited, having a normal recreation pool of 3498 acres.§ The lake is approximately seven miles long and its width averages 1.5 miles. Approximately 40 miles of shoreline exist at the recreation pool level and the total project area covers 11,295 acres. The land bordering the lake is typical of the Texas Prairie. In most places, the shore area slopes gradually in the water; much of the shoreline is usable and accessible. Benbrook Lake lies in a region characterized by a relatively mild climate. Summer seasons are long. Precipitation consists of 32 inches of rain and three inches of snow annually. The Texas Prairie has few trees, except for areas near water courses. North Central Texas, specifically the City of Fort Worth, is the major area from which visitors are attracted to the Lake. Visitation in 1978 was approximately 2.5 million recreation days.

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* Appendix C contains a more detailed project area description for your future use.

** See map inside back cover.

§ A table of factors for converting U. S. customary units of measurement to metric (SI) units is found on page iv.

PART 2: SURVEY FINDINGS BY ACTIVITY

BOATING/WATERSKIING

Orientation

Boating and waterskiing are very popular at Benbrook Lake which is situated adjacent to a large metropolitan area. This, coupled with many access points to the water, causes heavy use of the lake by boaters. Tree stumps in areas present a hazard, but at the same time provide an area for boat fishing.

The findings presented in the remainder of this section are based on the User Survey. This survey obtained 19 responses from boaters and 9 responses were obtained from waterskiers at Benbrook Lake.

User characteristics

Table 1 indicates the characteristics of the boaters and waterskiers surveyed at Benbrook. The most significant differences in the characteristics of these users from those of other study project areas are: 1) the participants are younger, 2) they are engaged in fewer activities other than boating and waterskiing and 3) more are within 30 minutes travel time from their homes.

Table 1

Age	Percent of Boaters/Waterskiers
<18	0
18 - 25	61*
26 - 40	29**
41 - 55	3**
56 - 65	3
>65	3

Group Size	Percent of Boaters/Waterskiers
1	7
2	18
3 - 4	50
5 - 8	18
9 - 12	7
>12	0

Travel Time to Project Area	Percent of Boaters/Waterskiers
<15 minutes	21*
15 - 30 minutes	57*
30 - 60 minutes	21
1 - 2 hours	0**
2 - 3 hours	0
3 - 5 hours	0
>5 hours	0

Visit Duration	Percent of Boaters/Waterskiers
1 - 4 hours	44
5 - 8 hours	44
1 day	7
2 days	4
3 days	0
4 days	0
5 - 7 days	0
>7 days	0

No. of Other Activities	Percent of Boaters/Waterskiers
0	21*
1	25
2	18
3	14
4	18
5	4**
6	0
>6	0

Equipment	Percent of Boaters/Waterskiers
Day Sailer	32
Canoe	5
Power Boat (>25 h.p.)	65

*Significantly higher than total survey sample.
**Significantly lower than total survey sample.

User opinions

Spacing preferences - Tables 2 and 3 indicate the spacing that the boaters and waterskiers surveyed at Benbrook and elsewhere prefer.

Table 2

Preferred Distance Responses*

Sample	Sample Size	Range	Mean	Median	Mode
All Boaters Surveyed	135	30- a	531	300	300
Benbrook Lake	18	30-1320	270	150	150
All Waterskiers Surveyed	95	30- a	520	300	300
Benbrook Lake	9	100- 225	160	150	150

*In feet; see Appendix A for definitions of terms.

a - response of "alone" or "out of sight."

Table 3

Preferred Distance Responses in Planning Range and Preference Groupings*

Sample	% in Planning Range[1] (100'-1500')	% in A[2] (100'-199')	% in B[2] (200'-450')	% in C[2] (451'-1500')
All Boaters Surveyed	79%	29%	37%	34%
Benbrook Lake	78	58	21	21
Sample	**% in Planning Range[1] (100'-1500')**	**% in A[2] (100'-199')**	**% in B[2] (200'-400')**	**% in C[2] (401'-1500')**
All Waterskiers Surveyed	91%	22%	50%	28%
Benbrook Lake	100	75	25	0

*See Appendix A for definitions of terms; see Technical Report for a full development of spacing preference information.

[1]Percentage of all preferred distance responses.

[2]Percentage of all preferred distance responses in the Planning Range.

The preferred spacing of both boaters and waterskiers is significantly closer than in the national sample.

Reasons for pleasant/unpleasant experience - Table 4 indicates the impact that different factors had on making the boating and waterskiing experience pleasant or unpleasant for users surveyed at Benbrook Lake. These responses indicate a larger amount of unpleasant items compared with other activities (both at Benbrook as well as other projects surveyed). The items mentioned as being unpleasant in a significant number of cases were: 1) distance from other people, 2) accidents or near accidents, 3) noise, 4) people in areas they shouldn't be and 5) not enough facilities such as water, restrooms, etc. Three users indicated that they would not return (see Table 5).

Tables 6 and 7 indicate the changes in the physical condition and people's use of the area as reported by boaters and waterskiers from their previous visit.

Table 4

Reasons Making Recreation Experience Pleasant or Unpleasant--Boating/Waterskiing
Benbrook Lake

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	82	14	4
Distance from other people	61	39	-
Number of people in other visitor groups	75	14	11
Number and type of other activities occurring here	82	7	7
Scenic views	86	10	4
Noise	63	22	11
Accidents or near accidents	64	36	-
Enforcement of rules/regulations	79	17	4
Car parking facilities	89	7	4
Theft	92	4	4
Vandalism	96	4	-
Land-Based Reasons			
Amount of facilities (restrooms, water, etc.)	74	19	7
Convenience to facilities (restrooms, water, etc.)	82	11	7
Maintenance of facilities	82	11	7
Condition of trees and landscape	85	4	4
Condition of grass or soil	89	-	4
Water-Based Reasons			
Water quality	82	18	-
Formal designation of places for your activity	73	4	8
Waiting time to launch boat	89	7	-
People in areas they shouldn't be	74	22	4

*Percentages may not total 100% because of those responding "Does Not Apply."

Table 5

Number and Percent of Users That Indicated They Would Not Return to the Activity Area and Their Reasons

Area	Number and percent of users surveyed who indicated they would not return #	%	Reasons for not wanting to return
Benbrook Lake	1	4%	"Cops"
	1	4%	"Undesirables taking over"
	1	4%	"Too crowded"

Table 6

Positive and Negative Changes Noticed in the Physical Conditions of the Area - Items Mentioned by Boaters and Waterskiers

Area	Positive Changes		Negative Changes	
Lake and adjacent areas	"Fencing"	(1)	"Fences"	(1)
	"High water"	(1)	"Too many stumps"	(1)
	"More facilities"	(1)	"Low water"	(1)
	"Better maintenance"	(1)	"Restrooms dirty"	(1)
	"Buoys around stumps"	(1)	"Litter"	(1)
	"Cleared trees"	(1)		

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Table 7

Positive and Negative Changes Noticed in the People's Use of the Area - Items Mentioned by Boaters and Waterskiers

Area	Positive Changes		Negative Changes	
Lake and Adjacent Areas	"More people"	(1)	"Irresponsible younger people"	(1)
	"More enforcement"	(1)	"More cops"	(1)
	"More young people"	(1)	"More boats"	(1)
			"More people"	(1)
			"People litter"	(1)

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Acceptability of techniques - Table 8 indicates the acceptability of different techniques for solving problems to the boaters and water-skiers surveyed at Benbrook.

The acceptability of most techniques is very clear: at least 60 percent of the respondents agreed on one of the three levels of acceptability for 12 of the 17 techniques. However, even for those techniques which were acceptable to most respondents, up to 35 percent responded that these techniques were unacceptable. Thus, project managers should expect some expression of opposition to any technique which they employ.

In general, the more apparent and widespread that a problem of overcrowding or overuse is, the more likely users may accept a technique which addresses it. Thus, remedial techniques (which solve existing problems) are generally more acceptable than preventative techniques (which correct a problem before it becomes readily apparent).

The more users can understand the rationale and operation of a technique, the more likely they will accept the use of the technique. Education, therefore, would seem to be an important method of improving user acceptance of different techniques.

It also seems as though the more directly a technique impacts only the problem, and the less it operates to diminish recreational opportunities generally, the more likely users will accept the use of the technique. Thus, techniques which can be applied in the short-term or selectively to problem areas are favored (particularly if done in a crisis setting).

Techniques which call for reductions in existing opportunities to use recreational resources and facilities are strongly disfavored. User expectations of the opportunities available are critical in this determination. Consideration should be given initially to avoiding overdeveloping an area with the idea that selective cutbacks in services and facilities can be accomplished later. Users expectations will be based on the initial level, and subsequent reductions will be disfavored.

Table 8

User Acceptability of Techniques--Boating/Waterskiing
Benbrook Lake

Techniques	Levels of Acceptability		
	Percentage* of Users Responding:		
	Very Acceptable	Mildly Acceptable	Unacceptable
General Planning Techniques			
Keep major recreation areas more separated	79	4	11
Make vehicle access to areas less convenient	14	18	64
Make area's existence less obvious	7	21	64
Site Planning Techniques			
Design for greater distance between people	21	7	4
Reduce number of parking spaces	11	25	57
Management Techniques			
Procedures:			
Require prior reservations	-	11	89
Require permits	14	11	75
Charge/increase fees	18	18	64
Rules and Regulations:			
Impose more rules	7	21	64
Provide stricter enforcement of rules	39	21	35
Close areas when natural resource destruction reaches critical point	71	18	4
Close areas when they become "too full"	46	21	32
Reduce number of activities in same area	71	11	14
Keep unnecessary vehicles out	70	7	15
Services:			
Provide more and better information	71	11	4
Increase maintenance and restoration	54	14	-
Reduce facilities and services	11	-	86

*Percentages may not total 100% because of those responding "Does Not Apply."

BOAT FISHING

Orientation

Boat fishing is very popular at Benbrook Lake. Areas of the lake contain tree stumps which provide an excellent habitat for fish. These areas also provide fishermen with water surface removed from the power boaters and waterskiers.

The findings presented in the remainder of this section are based on the User Survey. This survey obtained 12 responses from boat fishermen at Benbrook.

User characteristics

Table 9 indicates the characteristics of the boat fishermen surveyed at Benbrook.

Table 9

Boat Fishing Characteristics

Age	Percent of Boat Fishermen
<18	0
18 - 25	33
26 - 40	0
41 - 55	42
56 - 65	17
>65	8

Group Size	Percent of Boat Fishermen
1	17
2	33
3 - 4	25
5 - 8	25
9 - 12	0
>12	0

Travel Time to Project Area	Percent of Boat Fishermen
<15 minutes	42
15 - 30 minutes	25
30 - 60 minutes	25
1 - 2 hours	0
2 - 3 hours	0
3 - 5 hours	8
>5 hours	0

Visit Duration	Percent of Boat Fishermen
1 - 4 hours	42
5 - 8 hours	25
1 day	8
2 days	17
3 days	0
4 days	8
5 - 7 days	0
>7 days	0

No. of Other Activities	Percent of Boat Fishermen
0	76
1	8
2	8
3	8
4	0
5	0
6	0
>6	0

Equipment	Percent of Boat Fishermen
Power Boats (<25 h.p.)	33
Power Boats (>25 h.p.)	67

User opinions

Spacing preferences - Tables 10 and 11 indicate the spacing that the boat fishermen surveyed at Benbrook and elsewhere prefer.

Table 10

Preferred Distance Responses*

Sample	Sample Size	Range	Mean	Median	Mode
All Boat Fishermen Surveyed	111	30 - 5280	555	200	100
Benbrook Lake	11	40 - 195	104	85	40-75

*In feet; See Appendix A for definitions of terms.

Table 11

Preferred Distance Responses in Planning Range and Preference Groupings*

Sample	% in Planning Range[1] (50'-1500')	% in A[2] (50'-199')	% in B[2] (200'-599')	% in C[2] (600'-1500')
All Boat Fishermen Surveyed	91%	49%	27%	24%
Benbrook Lake	78	100	0	0

*See Appendix A for definitions of terms; See Technical Report for a full development of spacing preference information.

[1]Percentage of all preferred distance responses.
[2]Percentage of all preferred distance responses in Planning Range.

The boat fishermen surveyed at Benbrook Lake prefer closer spacing more frequently than at other project areas visited.

Reasons for pleasant/unpleasant experience - Table 12 indicates the impact that different factors had on making the boat fishing experience pleasant or unpleasant for users surveyed at Benbrook Lake. Boat fishermen found their experience to be unpleasant more often than other user groups. Among those factors which users found unpleasant most frequently are: visual privacy from other people, amount of facilities (restrooms, water, etc.), people being in areas they shouldn't be, and theft. No user responded that he would not return.

Tables 13 and 14 indicate the changes in the physical condition and in people's use of the area as reported by boat fishermen from their previous visit.

Table 13

Positive and Negative Changes Noticed in the Physical Conditions of the Area - Items Mentioned by Boat Fishermen

Area	Positive Changes		Negative Changes	
Lake and Adjacent Areas	"Cleaner"	(2)	"Fences"	(1)
	"Improvements"	(4)	"No trash barrels"	(1)
			"More litter"	(2)
			"Erosion"	(1)
			"Water high & rough"	(1)

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Table 14

Positive and Negative Changes Noticed in the People's Use of the Area - Items Mentioned by Boat Fishermen

Area	Positive Changes		Negative Changes	
Lake and Adjacent Areas	"People use area more"	(1)	"Too many people"	(1)
	"People take care of area"	(1)	"Kids bad at night"	(1)
			"More sloppy people"	(1)

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Table 12

Reasons Making Recreation Experience Pleasant or Unpleasant--Boat Fishing
Benbrook Lake

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	83	17	-
Distance from other people	92	8	-
Number of people in other visitor groups	83	8	8
Number and type of other activities occurring here	92	8	-
Scenic views	100	-	-
Noise	100	-	-
Accidents or near accidents	67	17	17
Enforcement of rules/regulations	83	17	-
Car parking facilities	83	17	-
Theft	67	25	8
Vandalism	73	18	9
Land-Based Reasons			
Visual privacy from other people	64	36	-
Amount of facilities (restrooms, water, etc.)	64	36	-
Convenience to facilities (restrooms, water, etc.)	64	-	-
Maintenance of facilities	64	-	-
Condition of trees and landscape	64	-	-
Condition of grass or soil	64	-	-
Water-Based Reasons			
Water quality	100	-	-
Catching fish	83	8	8
People in areas they shouldn't be	67	33	-

*Percentages may not total 100% because of those responding "Does Not Apply."

Acceptability of techniques - Table 15 indicates the acceptability of different techniques for solving problems to the boat fishermen surveyed at Benbrook.

The acceptability of most techniques is very clear: at least 60 percent of the respondents agreed on one of the three levels of acceptability for 14 of the 17 techniques. However, even for those techniques which were acceptable to most respondents, up to 42 percent responded that these techniques were unacceptable. Thus, project managers should expect some expression of opposition to any technique which they employ.

Table 15

User Acceptability of Techniques--Boat Fishing
Benbrook Lake

Techniques	Levels of Acceptability Percentage* of Users Responding:		
	Very Acceptable	Mildly Acceptable	Unacceptable
General Planning Techniques			
Keep major recreation areas more separated	92	-	8
Make vehicle access to areas less convenient	25	-	67
Make area's existence less obvious	17	-	83
Site Planning Techniques			
Reduce number of parking spaces	-	8	75
Management Techniques			
Procedures:			
Require prior reservations	33	17	50
Require permits	42	17	42
Charge/increase fees	25	8	76
Rules and Regulations:			
Impose more rules	25	-	75
Provide stricter enforcement of rules	83	8	8
Close areas when natural resource destruction reaches critical point	83	8	8
Close areas when they become "too full"	33	17	50
Reduce number of activities in same area	83	-	17
Limit number of people in visitor groups	-	9	91
Keep unnecessary vehicles out	92	-	8
Services:			
Provide more and better information	75	17	8
Increase maintenance and restoration	75	-	8
Reduce facilities and services	8	8	75

*Percentages may not total 100% because of those responding "Does Not Apply."

BOAT LAUNCHING

Orientation

Benbrook Lake is well developed with boat ramps and parking areas. Several of these ramps are not usable at low water, which creates heavy to overcrowded conditions on the usable ramps. The location of the ramps allows boaters to get from the popular points on land to the desired points on the lake with minimum excess travel.

The findings presented in the remainder of this section are based on the User Survey. This survey obtained 10 responses from boat launchers at Benbrook (7 at Rocky Creek Park and 3 at Mustang Park).

User characteristics

Table 16 indicates the characteristics of the boat launchers surveyed at Benbrook.

Table 16

Boat Launching Characteristics

Age	Percent of Boat Launchers	Group Size	Percent of Boat Launchers
<18	0	1	0
18 - 25	50	2	50
26 - 40	30	3 - 4	50
41 - 55	10	5 - 8	0
56 - 65	10	9 - 12	0
>65	0	>12	0

Travel Time to Project Area	Percent of Boat Launchers	Visit Duration	Percent of Boat Launchers
<15 minutes	0	1 - 4 hours	20
15 - 30 minutes	30	5 - 8 hours	70
30 - 60 minutes	60	1 day	0
1 - 2 hours	0	2 days	10
2 - 3 hours	10	3 days	0
3 - 5 hours	0	4 days	0
>5 hours	0	5 - 7 days	0
		>7 days	0

No. of Other Activities	Percent of Boat Launchers
0	40
1	60
2	0
3	0
4	0
5	0
6	0
>6	0

User opinions

Launch time preferences - Boat launchers surveyed at Benbrook had an average preferred launch time of 4 minutes, which is one minute less than the average preferred launch time for the boat launchers surveyed at all of the study project areas.

Reasons for pleasant/unpleasant experience - Tables 17 and 18 indicate the impact that different factors had on making the boat launchers experience pleasant or unpleasant for users at Benbrook. In general, these users indicated they had a pleasant experience. One user responded that he would not return (see Table 19).

Tables 20 and 21 indicate the changes in the physical condition and people's use of the area as reported by boat launchers from their previous visit.

Table 17

Reasons Making Recreation Experience Pleasant or Unpleasant--Boat Launching
Rocky Creek Park

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	100	-	-
Distance from other people	100	-	-
Number of people in other visitor groups	100	-	-
Number and type of other activities occurring here	100	-	-
Scenic views	100	-	-
Noise	100	-	-
Accidents or near accidents	100	-	-
Enforcement of rules/regulations	86	14	-
Car parking facilities	100	-	-
Theft	100	-	-
Vandalism	100	-	-
Land-Based Reasons			
Amount of facilities (restrooms, water, etc.)	100	-	-
Convenience to facilities (restrooms, water, etc.)	86	14	-
Steepness of slopes	100	-	-
Maintenance of facilities	100	-	-
Condition of trees and landscape	100	-	-
Condition of grass or soil	100	-	-
Water-Based Reasons			
Water quality	100	-	-
Formal designation of places for your activity	100	-	-
Waiting time to launch boat	100	-	-
People in areas they shouldn't be	86	14	-

*Percentages may not total 100% because of those responding "Does Not Apply."

Table 18

Reasons Making Recreation Experience Pleasant or Unpleasant--Boat Launching Mustang Park

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	100	-	-
Distance from other people	100	-	-
Number of people in other visitor groups	100	-	-
Number and type of other activities occurring here	100	-	-
Scenic views	100	-	-
Noise	100	-	-
Accidents or near accidents	66	33	-
Enforcement of rules/regulations			
Car parking facilities	100	-	-
Theft	100	-	-
Vandalism	100	-	-
Land-Based Reasons			
Amount of facilities (restrooms, water, etc.)	100	-	-
Convenience to facilities (restrooms, water, etc.)	100	-	-
Steepness of slopes	100	-	-
Maintenance of facilities	100	-	-
Condition of trees and landscape	100	-	-
Condition of grass or soil	100	-	-
Water-Based Reasons			
Water quality	100	-	-
Formal designation of places for your activity	100	-	-
Waiting time to launch boat	66	-	-
People in areas they shouldn't be	100	-	-

*Percentages may not total 100% because of those responding "Does Not Apply."

Table 19

Number and Percent of Users That Indicated They Would Not Return to the Activity Area and Their Reasons

Area	Number and percent of users surveyed who indicated they would not return #	%	Reasons for not wanting to return
Mustang Park	1	33%	"Too many trees in the lake"
Rocky Creek Park	-	-	-

Table 20

Positive and Negative Changes Noticed in the Physical Conditions of the Area - Items Mentioned by Boat Launchers

Area	Positive Changes	Negative Changes
Mustang Park	(None mentioned)	(None mentioned)
Rocky Creek Park	"New facilities" (1)	(None mentioned)

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Table 21

Positive and Negative Changes Noticed in the People's Use of the Area - Items Mentioned by Boat Launchers

Area	Positive Changes	Negative Changes
Mustang Park	(None mentioned)	(None mentioned)
Rocky Creek Park	(None mentioned)	"Kids drinking" (1)

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Acceptability of techniques - Table 22 indicates the acceptability of different techniques for solving problems to the boat launchers at Benbrook.

The acceptability of most techniques is very clear: at least 60 percent of the respondents agreed on one of the three levels of acceptability for 12 of the 19 techniques. However, even for those techniques which were acceptable to most respondents, up to 40 percent responded that these techniques were unacceptable. Thus, project managers should expect some expression of opposition to any technique which they employ.

Table 22

User Acceptability of Techniques--Boat Launching
Benbrook Lake

Techniques	Levels of Acceptability		
	Percentage* of Users Responding:		
	Very Acceptable	Mildly Acceptable	Unacceptable
General Planning Techniques			
Keep major recreation areas more separated	90	-	10
Make vehicle access to areas less convenient	-	50	50
Make area's existence less obvious	-	40	60
Site Planning Techniques			
Redesign area to accommodate fewer users	-	40	40
Design for greater distance between people	-	-	-
Reduce number of parking spaces	10	50	40
Management Techniques			
Procedures:			
Require prior reservations	-	10	90
Require permits	10	10	80
Charge/increase fees	-	20	80
Rules and Regulations:			
Impose more rules	-	10	90
Provide stricter enforcement of rules	30	10	60
Close areas when natural resource destruction reaches critical point	10	70	20
Close areas when they become "too full"	20	60	20
Reduce number of activities in same area	90	-	10
Limit number of people in visitor groups	-	20	70
Keep unnecessary vehicles out	80	10	10
Services:			
Provide more and better information	90	-	10
Increase maintenance and restoration	70	-	30
Reduce facilities and services	-	50	50

*Percentages may not total 100% because of those responding "Does Not Apply."

CAMPING

Orientation

The campgrounds at Benbrook Lake vary in the amount of development and control provided. Holiday Park (H-4) and Mustang Park (M-1 and M-2) are highly developed with water and electric hookups and a resident gate attendant. The sites in these areas are much closer together than in the other, less-developed areas. Holiday Park H-3 and Mustang Park M-3 are controlled by patrolling rangers. H-3 has designated campsites, some of which are 400' to 600' feet apart. Each of these sites is provided with a picnic table. Mustang Park M-3 is an area where camping is mixed with day use, and where some designated sites are provided.

The findings presented in the remainder of this section are based on the User Survey. This survey obtained 18 responses from campers at Benbrook (9 responses at Holiday Park and 9 at Mustang Park).

User characteristics

Table 23 indicates the characteristics of the campers surveyed at Benbrook. The most significant differences in the characteristics of the campers surveyed at Benbrook from those of other study project areas are: 1) a greater number of large groups, and 2) a greater number of campers with a 30 minute drive from home and fewer people travelling over one hour (probably due to the large populations living in close proximity to the park).

Table 23

Camper Characteristics

Age	Percent of Campers
<18	0
18 - 25	11
26 - 40	28
41 - 55	33
56 - 65	22
>65	6

Group Size	Percent of Campers
1	0
2	39
3 - 4	22
5 - 8	11
9 - 12	6
>12	22*

Travel Time to Project Area	Percent of Campers
<15 minutes	5
15 - 30 minutes	44*
30 - 60 minutes	28
1 - 2 hours	6**
2 - 3 hours	6**
3 - 5 hours	0
>5 hours	11

Visit Duration	Percent of Campers
1 - 4 hours	0
5 - 8 hours	6
1 day	11
2 days	33
3 days	16
4 days	6
5 - 7 days	6
>7 days	22

No. of Other Activities	Percent of Campers
0	28*
1	5
2	17
3	17
4	0
5	17
6	5
>6	11

Equipment	Percent of Campers
Tent	18
Tent Camper	0
Truck-Mounted Camper	0
Travel Trailer	53
Van	0
Motor Home	29

*Significantly higher than total survey sample.
**Significantly lower than total survey sample.

User opinions

Spacing preferences - Tables 24 and 25 indicate the spacing (as measured on center of each site) that campers surveyed at Benbrook and elsewhere prefer.

Table 24

Preferred Distance Responses* - Camping

Sample	Sample Size	Range	Mean	Median	Mode
All Campers Surveyed (11 projects)	511	10 - a	79	60	75
Benbrook	15	20 - 300	86	65	100
Holiday Park (H-4)	6	30 - 100	72	75-65	100
Mustang Park (M-3)	9	20 - 300	96	75	-

*in feet (as measured on center of each site); See Appendix A for definitions of terms.
a - response of "alone" or "out of sight."

Table 25

Preferred Distance Responses in Planning Range and Preference Groupings*

Sample	% in Planning Range[1] (20'-120')	% in A[2] (20'-39')	% in B[2] (40'-59')	% in C[2] (60'-79')	% in D[2] (80'-120')
All Campers Surveyed	90%	20%	28%	31%	21%
Benbrook	71	17	0	33	50
Holiday Park (H-4)	50	0	0	50	50
Mustang Park (M-3)	89	25	0	25	50

*See Appendix A for definitions of terms; See Technical Report for full development of spacing preference information.
[1]Percentage of all preferred distance responses.
[2]Percentage of all preferred distance responses within the Planning Range.

While the preferences of camping at the two areas differ from each other, campers surveyed at both areas prefer greater spacing than did the total sample.

Reasons for pleasant/unpleasant experience - Tables 26 and 27 indicate the impact that different factors had on making the camping experience pleasant or unpleasant for users at the two camping areas surveyed. The responses of the campers surveyed vary greatly from one campground to another. While users of Holiday Park (H-4) found their experience to be generally pleasant, the campers surveyed at Mustang Park (M-3) considered more of the factors asked to be unimportant to their experience.

The enforcement of rules and regulations and car parking facilities were the factors which most often made the experience at Holiday Park H-4 unpleasant. The distance from other people was the factor which most often made the experience at Mustang Park M-3 unpleasant. No factor was so unpleasant as to cause a user to respond that he would not return.

Tables 28 and 29 indicate the changes in the physical condition and the people's use of the areas as reported by the campers from their previous visit.

Table 26

Reasons Making Recreation Experience Pleasant or Unpleasant--Camping
Holiday Park (H-4)

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	88	-	12
Distance from other people	100	-	-
Number of people in other visitor groups	100	-	-
Number and type of other activities occurring here	100	-	-
Fees charged	88	12	-
Scenic views	100	-	-
Noise	100	-	-
Accidents or near accidents	88	-	12
Enforcement of rules/regulations	75	25	-
Car parking facilities	75	25	-
Theft	88	-	12
Vandalism	88	-	12
Land-Based Reasons			
Visual privacy from other people	100	-	-
Amount of facilities (restrooms, water, etc.)	88	-	-
Convenience to facilities (restrooms, water, etc.)	75	12	-
Nearness to the water body	100	-	-
Steepness of slopes	100	-	-
Maintenance of facilities	100	-	-
Condition of trees and landscape	100	-	-
Condition of grass or soil	100	-	-
Water-Based Reasons			
Water quality	71	-	-

*Percentages may not total 100% because of those responding "Does Not Apply."

Table 27

Reasons Making Recreation Experience Pleasant or Unpleasant--Camping
Mustang Park (M-3)

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	89	-	11
Distance from other people	56	22	22
Number of people in other visitor groups	44	-	56
Number and type of other activities occurring here	78	-	22
Fees charged	56	11	11
Scenic views	100	-	-
Noise	78	11	11
Accidents or near accidents	67	11	22
Enforcement of rules/regulations	100	-	-
Car parking facilities	100	-	-
Theft	56	11	11
Vandalism	67	-	11
Land-Based Reasons			
Visual privacy from other people	78	-	22
Amount of facilities (restrooms, water, etc.)	78	11	11
Convenience to facilities (restrooms, water, etc.)	78	11	11
Nearness to the water body	100	-	-
Steepness of slopes	100	-	-
Maintenance of facilities	100	-	-
Condition of trees and landscape	100	-	-
Condition of grass or soil	100	-	-
Water-Based Reasons			
Water quality	100	-	-

*Percentages may not total 100% because of those responding "Does Not Apply."

Table 28

Positive and Negative Changes Noticed in the Physical Conditions of the Area - Items Mentioned by Campers

Area	Positive Changes	Negative Changes
Holiday Park	"Fewer people" (1) "Better maintenance" (1) "Paved streets" (2) "Electricity, utilities, grills" (1)	"Posts" (1)
Mustang Park	"Better maintenance" (4) "High water" (1)	"More trash at water's edge" (1) "Shelter roofs need paint" (1)

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Table 29

Positive and Negative Changes Noticed in the People's Use of the Area - Items Mentioned by Campers

Area	Positive Changes	Negative Changes
Holiday Park	"More hippies" (1) "Less noise" (1) "Fewer wild parties" (1)	(None mentioned)
Mustang Park	"Better rangers" (2) "More campers with children" (1) "Control gates, patrol" (2) "More recreation vehicles" (1) "Better people/fewer pot parties" (1)	"Beer parties" (1) "Kids getting more rowdy" (1) "More people" (1)

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Acceptability of techniques - Table 30 indicates the acceptability of different techniques for solving problems to the campers surveyed at Benbrook.

The acceptability of most techniques is very clear: at least 60 percent of the respondents agreed on one of the three levels of acceptability for 14 of the 22 techniques. However, even for those techniques which were acceptable to most respondents, up to 47 percent responded that these techniques were unacceptable. Thus, project managers should expect some expression of opposition to any technique which they employ.

Table 30

User Acceptability of Techniques--Camping
Benbrook Lake

Techniques	Levels of Acceptability		
	Percentage* of Users Responding:		
	Very Acceptable	Mildly Acceptable	Unacceptable
General Planning Techniques			
Keep major recreation areas more separated	78	6	17
Make vehicle access to areas less convenient	11	17	61
Make area's existence less obvious	11	6	77
Site Planning Techniques			
Redesign area to accommodate fewer users	33	11	50
Design for greater distance between people	50	11	39
Reduce number of parking spaces	11	17	72
Change natural surface by hardening	0	33	67
Change natural surface by paving	41	12	47
Provide landscaped buffers	33	11	50
Management Techniques			
Procedures:			
Require prior reservations	22	17	56
Require permits	25	13	31
Charge/increase fees	22	67	11
Rules and Regulations:			
Impose more rules	6	6	83
Provide stricter enforcement of rules	39	11	44
Close areas when natural resource destruction reaches critical point	67	22	11
Close areas when they become "too full"	67	16	16
Reduce number of activities in same area	50	11	39
Limit number of people in visitor groups	17	11	67
Keep unnecessary vehicles out	61	17	22
Services:			
Provide more and better information	67	11	17
Increase maintenance and restoration	78	6	16
Reduce facilities and services	11	6	83

*Percentages may not total 100% because of those responding "Does Not Apply."

PICNICKING

Orientation

Benbrook provides a variety of areas where picnicking can take place. Some of the areas are shaded, while others are open. Picnic tables with canopies are provided. Generally, the tables are spaced far apart (200'). In several instances, the spacing even reaches 600' feet.

The findings presented in the remainder of this section are based on the User Survey. This survey obtained 10 responses from picnickers at Benbrook (6 at Holiday Park and 4 at Mustang Park).

User characteristics

Table 31 indicates the characteristics of the picnickers surveyed at Benbrook.

Table 31

Picnicker Characteristics

Age	Percent of Picnickers	Group Size	Percent of Picnickers
<18	0	1	10
18 - 25	50	2	20
26 - 40	50	3 - 4	50
41 - 55	0	5 - 8	0
56 - 65	0	9 - 12	20
>65	0	>12	0

Travel Time to Project Area	Percent of Picnickers	Visit Duration	Percent of Picnickers
<15 minutes	40	1 - 4 hours	50
15 - 30 minutes	60	5 - 8 hours	40
30 - 60 minutes	0	1 day	10
1 - 2 hours	0	2 days	0
2 - 3 hours	0	3 days	0
3 - 5 hours	0	4 days	0
>5 hours	0	5 - 7 days	0
		>7 days	0

No. of Other Activities	Percent of Picnickers
0	0
1	10
2	20
3	30
4	20
5	20
6	0
>6	0

User opinions

Spacing preferences - Tables 32 and 33 indicate the spacing that picnickers surveyed at Benbrook and elsewhere prefer.

Table 32

Preferred Distance Responses*

Sample	Sample Size	Range	Mean	Median	Mode
All Picnickers Surveyed	190	1 - a	62	50	50
Benbrook	10	10 -200	69	30-70	10-20
Holiday Park	6	10 -200	82	70-80	-
Mustang Park	4	10 -150	50	20	20

*In feet; See Appendix A for definitions of terms.
a - response of "alone" or "out of sight."

Table 33

Preferred Distance Responses in Planning Range and Preference Groupings*

Sample	% in Planning Range[1] (20'-100')	% in A[2] (20'-39')	% in B[2] (40'-59')	% in C[2] (60'-79')	% in D[2] (80'-100')
All Picnickers surveyed	93%	23%	42%	20%	15%
Benbrook	60	50	0	17	33
Holiday Park	67	25	0	25	50
Mustang Park	50	100	0	0	0

*See Appendix A for definitions of terms; See Technical Report for a full development of spacing preference information.

[1]Percentage of all preferred distance responses.
[2]Percentage of all preferred distance responses in the Planning Range.

Picnickers surveyed at Mustang Park prefer close spacing (Group A), while those at Holiday Park tend to prefer greater spacing (Groups C and D).

Reasons for pleasant/unpleasant experience - Tables 34 and 35 indicate the impact that different factors had on making the picnickers experience pleasant or unpleasant for users at the two areas surveyed. The responses of these areas surveyed vary only slightly from one another. Users from both areas appear to be pleased by the conditions they found at Benbrook, and no user indicated that he would not return.

Tables 36 and 37 indicate the changes in the physical condition and the people's use of the areas as reported by picnickers from their previous visit.

Table 34

Reasons Making Recreation Experience Pleasant or Unpleasant--Picnicking
Holiday Park

	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	60	20	20
Distance from other people	80	-	20
Number of people in other visitor groups	80	-	20
Number and type of other activities occurring here	100	-	-
Scenic views	100	-	-
Noise	100	-	-
Accidents or near accidents	80	20	-
Enforcement of rules/regulations	100	-	-
Car parking facilities	100	-	-
Theft	100	-	-
Vandalism	100	-	-
Land-Based Reasons			
Visual privacy from other people	60	40	-
Amount of facilities (restrooms, water, etc.)	40	60	-
Convenience to facilities (restrooms, water, etc.)	40	60	-
Nearness to the water body	100	-	-
Steepness of slopes	100	-	-
Maintenance of facilities	80	20	-
Condition of trees and landscape	100	-	-
Condition of grass or soil	100	-	-
Water-Based Reasons			
Water quality	80	-	20

*Percentages may not total 100% because of those responding "Does Not Apply."

Table 35

Reasons Making Recreation Experience Pleasant or Unpleasant--Picnicking
Mustang Park

	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	100	-	-
Distance from other people	100	-	-
Number of people in other visitor groups	70	-	25
Number and type of other activities occurring here	100	-	-
Scenic views	75	25	-
Noise	100	-	-
Accidents or near accidents	100	-	-
Enforcement of rules/regulations	75	-	25
Car parking facilities	100	-	-
Theft	75	-	25
Vandalism	75	-	25
Land-Based Reasons			
Visual privacy from other people	100	-	-
Amount of facilities (restrooms, water, etc.)	100	-	-
Convenience to facilities (restrooms, water, etc.)	100	-	-
Nearness to the water body	100	-	-
Steepness of slopes	100	-	-
Maintenance of facilities	50	-	50
Condition of trees and landscape	100	-	-
Condition of grass or soil	100	-	-
Water-Based Reasons			
Water quality	25	-	75

*Percentages may not total 100% because of those responding "Does Not Apply."

Table 36

Positive and Negative Changes Noticed in the Physical Conditions of the Area - Items Mentioned by Picnickers

Area	Positive Changes	Negative Changes
Holiday Park	"Grills" (1)	"Charge at beach" (1)
Mustang Park	(None mentioned)	"High water" (2)

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Table 37

Positive and Negative Changes Noticed in the People's Use of the Area - Items Mentioned by Picnickers

Area	Positive Changes	Negative Changes
Holiday Park	"Variety of users" (1)	"People leaving trash" (1)
Mustang Park	"Many young people" (1)	(None mentioned)

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Acceptability of techniques - Table 38 indicates the acceptability of different techniques for solving problems to the picnickers surveyed at Benbrook.

The acceptability of most techniques is very clear: at least 60 percent of the respondents agreed on one of the three levels of acceptability for 21 of the 22 techniques. However, even for those techniques which were acceptable to most respondents, up to 40 percent responded that these techniques were unacceptable. Thus, project managers should expect some expression of opposition to any technique which they employ.

Table 38

User Acceptability of Techniques--Picnicking
Benbrook Lake

Techniques	Levels of Acceptability Percentage* of Users Responding:		
	Very Acceptable	Mildly Acceptable	Unacceptable
General Planning Techniques			
Keep major recreation areas more separated	70	10	20
Make vehicle access to areas less convenient	30	-	60
Make area's existence less obvious	20	10	60
Site Planning Techniques			
Redesign area to accommodate fewer users	30	-	70
Design for greater distance between people	30	10	60
Reduce number of parking spaces	10	-	90
Change natural surface by paving	60	-	40
Provide landscaped buffers	30	10	60
Management Techniques			
Procedures:			
Require prior reservations	10	-	90
Require permits	20	-	80
Charge/increase fees	20	-	80
Rules and Regulations:			
Impose more rules	-	20	80
Provide stricter enforcement of rules	30	-	60
Close areas when natural resource destruction reaches critical point	70	20	11
Close areas when they become "too full"	20	-	80
Reduce number of activities in seam area	60	-	40
Limit number of people in visitor groups	-	10	90
Keep unnecessary vehicles out	30	20	50
Services:			
Provide more and better information	60	10	20
Increase maintenance and restoration	90	10	-
Reduce facilities and services	10	20	70

*Percentages may not total 100% because of those responding "Does Not Apply."

SHORELINE FISHING

Orientation

Shoreline fishing is very popular at Benbrook Lake. Because the shoreline lacks steep slopes and because there is good parking and other support facilities, the fishing areas are heavily used, especially the narrow rivers and streams flowing into the lake. The outlet (tailwater) of this lake is very small and has a low water flow volume, making it of little use ot the fishermen.

The findings presented in the remainder of this section are based on the User Survey. This survey obtained 26 responses from shore fishermen at Benbrook (10 at Dutch Branch, 8 at Mustang, 6 at Holiday Park, and 2 at Rocky Creek Park).

User characteristics

Table 39 indicates the characteristics of the shoreline fishermen surveyed at Benbrook.

Table 39

Shoreline Fishermen Characteristics

Age	Percent of Shoreline Fishermen	Group Size	Percent of Shoreline Fishermen
<18	0	1	42
18 - 25	4	2	27
26 - 40	38	3 - 4	27
41 - 55	42	5 - 8	4
56 - 65	8	9 - 12	4
>65	8	>12	0

Travel Time to Project Area	Percent of Shoreline Fishermen	Visit Duration	Percent of Shoreline Fishermen
<15 minutes	20	1 - 4 hours	69
15 - 30 minutes	65	5 - 8 hours	19
30 - 60 minutes	15	1 day	4
1 - 2 hours	0	2 days	4
2 - 3 hours	0	3 days	4
3 - 5 hours	0	4 days	0
>5 hours	0	5 - 7 days	0
		>7 days	0

No. of Other Activities	Percent of Shoreline Fishermen
0	77
1	11
2	4
3	0
4	0
5	0
6	4
>6	4

User opinions

Spacing preferences - Tables 40 and 41 indicate the spacing that shoreline fishermen interviewed at Benbrook and elsewhere prefer.

Table 40

Preferred Distance Responses* - Shoreline Fishermen

Sample	Sample Size	Range	Mean	Median	Mode
All shoreline fishermen surveyed	106	6 - a	76	35	50
Benbrook	24	6 - 225	56	30	30
Dutch Branch	10	6 - 100	35	24	20- 30
Holiday Park	4	20 - 150	82	60-100	60-100
Rocky Creek Park	2	30	30	30	30
Mustang Park	8	6 - 225	77	90	50- 90

*In feet; See Appendix A for definitions of terms.
a - response of "alone" or "out of sight."

Table 41

Preferred Distance Responses in Planning Range and Preference Groupings*

Sample	% in Planning Range[1] (10'-100')	% in A[2] (10'-19')	% in B[2] (20'-39')	% in C[2] (40'-59')	% in D[2] (60'-100')
All Shoreline Fishermen surveyed	83%	2%	38%	24%	18%
Benbrook	83	5	55	5	35
Dutch Branch	90	11	67	0	22
Holiday Park	75	0	33	0	67
Rocky Creek Park	100	0	100	0	0
Mustang Park	25	0	33	7	50

*See Appendix A for definitions of terms; See Technical Report for a full development of spacing preference information.
[1]Percentage of all preferred distance responses.
[2]Percentage of all preferred distance responses in the Planning Range.

While the preferences of shoreline fishermen at the four areas differ from each other, preference groups B and D are clearly the most preferred.

Reasons for pleasant/unpleasant experience - Tables 42, 43, 44, and 45 indicate the impact that different factors had on making the shoreline fishering experience pleasant or unpleasant for users at the four areas surveyed. The responses of the users usrveyed vary slightly from one another. While most respondents indicated they had a pleasant experience, the factors which most often made the experience unpleasant were: enforcement of rules and regulations characteristics and behavior of other people, car parking facilities, and accidents or near accidents. One user responded that he would not return (see Table 46).

Tables 47 and 48 indicate the changes in the physical condition and the people's use of the areas reported by shoreline fishermen from their previous visit.

Table 42

Reasons Making Recreation Experience Pleasant or Unpleasant--Shoreline Fishing
Dutch Branch Park

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	70	30	-
Distance from other people	100	-	-
Number of people in other visitor groups	100	-	-
Number and type of other activities occurring here	90	10	-
Scenic views	100	-	-
Noise	80	20	-
Accidents or near accidents	100	-	-
Enforcement of rules/regulations	100	-	-
Car parking facilities	100	-	-
Theft	100	-	-
Vandalism			
Land-Based Reasons			
Visual privacy from other people	80	-	-
Amount of facilities (restrooms, water, etc.)	60	10	10
Convenience to facilities (restrooms, water, etc.)	60	10	10
Nearness to the water body	80	-	-
Steepness of slopes	80	-	-
Maintenance of facilities	80	-	-
Condition of trees and landscape	80	-	-
Condition of grass or soil	80	-	-
Water-Based Reasons			
Water quality	100	-	-
Catching fish	80	20	-
Formal designation of places for your activity	100	-	-

*Percentages may not total 100% because of those responding "Does Not Apply."

Table 43

Reasons Making Recreation Experience Pleasant or Unpleasant--Shoreline Fishing
Holiday Park

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	67	33	-
Distance from other people	84	16	-
Number of people in other visitor groups	50	16	16
Number and type of other activities occurring here	50	33	16
Scenic views	84	-	16
Noise	-	-	-
Accidents or near accidents	67	33	-
Enforcement of rules/regulations	33	50	16
Car parking facilities	67	33	-
Theft	100	-	-
Vandalism			
Land-Based Reasons			
Visual privacy from other people	60	20	-
Amount of facilities (restrooms, water, etc.)	60	20	-
Convenience to facilities (restrooms, water, etc.)	60	20	-
Nearness to the water body	80	-	-
Steepness of slopes	80	-	-
Maintenance of facilities	75	-	-
Condition of trees and landscape	80	-	-
Condition of grass or soil	80	-	-
Water-Based Reasons			
Water quality	84	16	-
Catching fish	67	16	16
Formal designation of places for your activity	80	20	-

*Percentages may not total 100% because of those responding "Does Not Apply."

Table 44

Reasons Making Recreation Experience Pleasant or Unpleasant--Shoreline Fishing
Mustang Park

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	100	-	-
Distance from other people	100	-	-
Number of people in other visitor groups	75	-	25
Number and type of other activities occurring here	100	-	-
Scenic views	100	-	-
Noise	75	25	-
Accidents or near accidents	100	-	-
Enforcement of rules/regulations	75	25	-
Car parking facilities	100	-	-
Theft	75	25	-
Vandalism			
Land-Based Reasons			
Visual privacy from other people	100	-	-
Amount of facilities (restrooms, water, etc.)	100	-	-
Convenience to facilities (restrooms, water, etc.)	100	-	-
Nearness to the water body	100	-	-
Steepness of slopes	100	-	-
Maintenance of facilities	50	50	-
Condition of trees and landscape	100	-	-
Condition of grass or soil	100	-	-
Water-Based Reasons			
Water quality	100	-	-
Catching fish	100	-	-
Formal designation of places for your activity	25	-	-

*Percentages may not total 100% because of those responding "Does Not Apply."

Table 45

Reasons Making Recreation Experience Pleasant or Unpleasant--Shoreline Fishing
Rocky Creek Park

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	100	-	-
Distance from other people	100	-	-
Number of people in other visitor groups	50	-	50
Number and type of other activities occurring here	100	-	-
Scenic views	50	-	50
Noise	100	-	-
Accidents or near accidents	100	-	-
Enforcement of rules/regulations	100	-	-
Car parking facilities	50	50	-
Theft	100	-	-
Vandalism			
Land-Based Reasons			
Visual privacy from other people	100	-	-
Amount of facilities (restrooms, water, etc.)	100	-	-
Convenience to facilities (restrooms, water, etc.)	100	-	-
Nearness to the water body	100	-	-
Steepness of slopes	100	-	-
Maintenance of facilities	100	-	-
Condition of trees and landscape	100	-	-
Condition of grass or soil	100	-	-
Water-Based Reasons			
Water quality	50	50	-
Catching fish	100	-	-
Formal designation of places for your activity	50	-	-

*Percentages may not total 100% because of those responding "Does Not Apply."

Table 46

Number and Percent of Users That Indicated They Would Not Return to the Activity Area and Their Reasons

Area	Number and percent of users surveyed who indicated they would not return		Reasons for not wanting to return
	#	%	
Holiday Park	1	17%	"Regulations--Too regimented"

Table 47

Positive and Negative Changes Noticed in the Physical Conditions of the Area - Items Mentioned by Shoreline Fishermen

Area	Positive Changes		Negative Changes	
Dutch Branch	"Improved road"	(1)	"Fishing not as good"	(1)
	"Cabled off area"	(1)		
	"Dock"	(3)		
	"High water"	(1)		
Mustang Park	"Campsites and other facilities"	(2)	"Lake lower"	(1)
	"High water"	(3)	"Erosion"	(1)
Holiday Park	"More facilities"	(1)	"Roped off areas"	(2)
	"Cleaner"	(1)	"Posts"	(1)
Rocky Creek	(None mentioned)		"Posts and lines"	(1)
			"Sheriff"	(1)

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Table 48

Positive and Negative Changes Noticed in the People's Use of the Area - Items Mentioned by Shoreline Fishermen

Area	Positive Changes	Negative Changes
Dutch Branch	(None mentioned)	"More hippies and beer drinking" (1)
Mustang Park	"50-50 Black-White" (1) "More people" (1)	"Some people of bad taste" (1) "More people" (1)
Holiday Park	(None mentioned)	(None mentioned)
Rocky Creek	"People clean up after themselves" (1)	(None mentioned)

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Acceptability of techniques - Table 49 indicates the acceptability of different techniques for solving problems to the shoreline fishermen surveyed at Benbrook.

The acceptability of most techniques is very clear: at least 60 percent of the respondents agreed on one of the three levels of acceptability for 13 of the 22 techniques. However, even for those techniques which were acceptable to most respondents, up to 20 percent responded that these techniques were unacceptable. Thus, project managers should expect some expression of opposition to any technique which they employ.

Table 49

User Acceptability of Techniques--Shoreline Fishermen
Benbrook Lake

Techniques	Levels of Acceptability Percentage* of Users Responding:		
	Very Acceptable	Mildly Acceptable	Unacceptable
General Planning Techniques			
Keep major recreation areas more separated	65	15	15
Make vehicle access to areas less convenient	23	23	50
Make area's existence less obvious	27	31	38
Site Planning Techniques			
Redesign area to accommodate fewer users	20	16	64
Design for greater distance between people	27	4	8
Reduce number of parking spaces	23	19	57
Change natural surface by paving	38	15	46
Provide landscaped buffers	38	19	42
Management Techniques			
Procedures:			
Require prior reservations	4	8	88
Require permits	4	8	88
Charge/increase fees	12	12	76
Rules and Regulations:			
Impose more rules	12	8	80
Provide stricter enforcement of rules	38	12	46
Close areas when natural resource destruction reaches critical point	64	12	20
Close areas when they become "too full"	42	15	38
Reduce number of activities in seam area	4	58	12
Limit number of people in visitor groups	4	88	8
Keep unnecessary vehicles out	77	8	15
Services:			
Provide more and better information	81	8	12
Increase maintenance and restoration	81	12	8
Reduce facilities and services	12	19	69

*Percentages may not total 100% because of those responding "Does Not Apply."

SUNBATHING AND SWIMMING

Orientation

The typically gently sloping shoreline at Benbrook provides easy access to the water for swimming. The improved sandy beach at Mustang Park M-3 provides a designated area for swimming which is protected from other activities, especially boating.

Most of the activity areas consist of large open fields, offering unlimited opportunities for sunbathers. The M-3 area of Mustang Park is particularly popular for sunbathers and has become "the place to go" among the 17-25 year old age group.

The findings presented in the remainder of this section are based on the User Survey. This survey obtained 20 responses from sunbathers at Benbrook (16 at Mustang Park M-3 and 4 a5 Holiday Park). Because it was early in the season, only 6 swimmers were surveyed at Mustang Park M-3.

User characteristics

Table 50 indicates the characteristics of the sunbathers and swimmers surveyed at Benbrook. The most significant differences in the characteristics of these users from those of other study project areas are: 1) no respondent travelled over one hour to the Park and 2) very few of these people participated in more than one or two other activities while they were at the park.

Table 50

Sunbather and Swimmer Characteristics

Age	Percent of Sunbathers/Swimmers	Group Size	Percent of Sunbathers/Swimmers
<18	15	1	4
18 - 25	62	2	35
26 - 40	23	3 - 4	35
41 - 55	0	5 - 8	15
56 - 65	0	9 - 12	4
>65	0	>12	7

Travel Time to Project Area	Percent of Sunbathers/Swimmers	Visit Duration	Percent of Sunbathers/Swimmers
<15 minutes	23	1 - 4 hours	42
15 - 30 minutes	54	5 - 8 hours	54
30 - 60 minutes	23	1 day	0
1 - 2 hours	0**	2 days	0
2 - 3 hours	0	3 days	0
3 - 5 hours	0	4 days	0
>5 hours	0	5 - 7 days	0
		>7 days	4

No. of Other Activities	Percent of Sunbathers/Swimmers
0	19*
1	23**
2	27*
3	19
4	4
5	8
6	0
>6	0

*Significantly higher than total survey sample.
**Significantly lower than total survey sample.

User opinions

Spacing preferences - Tables 51 and 52 indicate the spacing that sunbathers and swimmers surveyed at Benbrook and elsewhere prefer.

Table 51

Preferred Distance Responses*

Sample	Sample Size	Range	Mean	Median	Mode
All Sunbathers surveyed	161	3- a	30	20	15, 20
Benbrook	15	3-100	22	15	10, 15
Mustang Park (M-3)	15	3-100	22	15	10, 15
Holiday Park	-	-	-	-	-
All Swimmers surveyed	120	2-200	25	20	20
Benbrook (Mustang Park)	3	4- 30	15	10	-

*In feet; See Appendix A for definitions of terms.
a - response of "alone" or "out of sight."

Table 52

Preferred Distance Responses in Planning Range and Preference Groupings*

Sample	% in Planning Range[1](5'-50')	% in A[2] (5'-14')	% in B[2] (15'-20')	% in C[2] (21'-30')	% in D[2] (31'-50')
All Sunbathers surveyed	88%	27%	39%	20%	14%
Benbrook	87	39	40	8	8
Mustang Park	87	39	40	8	8
Holiday Park	-	-	-	-	-
Sample	**% in Planning Range[1](5'-50')**	**% in A[2] (5'-14')**	**% in B[2] (15'-24')**	**% in C[2] (25'-34')**	**% in D[2] (35'-50')**
All Swimmers surveyed	90%	25%	41%	19%	15%
Benbrook (Mustang Park)	67	50	0	50	0

*See Appendix A for definitions of terms; See Technical Report for a full development of spacing preference information.
[1]Percentage of all preferred distance responses.
[2]Percentage of all preferred distance responses in Planning Range.

The sunbathers surveyed at Benbrook prefer a somewhat closer spacing more frequently than the users surveyed at the other projects. Since the sample of swimmers was small, a true picture of preferences may not be shown.

Reasons for pleasant/unpleasant experience - Tables 53 and 54 indicate the impact that different factors had on making the sunbathing and swimming experience pleasant or unpleasant for users at the two areas surveyed. The responses of these users surveyed vary considerably from one another. Mustang Park (M-3) has a relatively high number of people indicating that enforcement of rules and regulations and accidents or near accidents were unpleasant. Also, many respondents at Mustang indicated that number of people in other visitor groups, number and type of other activities occurring in the area, and noise were not important factors in their recreational experience. Three users indicated that they would not return (see Table 55).

With only 4 responses at Holiday Park, less confidence can be placed in any conclusions drawn. Water quality was an unpleasant factor for half of the respondents. None of the 4 users surveyed indicated that they would not return.

Tables 56 and 57 indicate the changes in the physical condition and people's use of the areas as reported by swimmers and sunbathers from their previous visit.

Table 53

Reasons Making Recreation Experience Pleasant or Unpleasant--Sunbathing/Swimming
Holiday Park

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons Characteristics and behavior of other people	100	-	-
Distance from other people	100	-	-
Number of people in other visitor groups	100	-	-
Number and type of other activities occurring here	100	-	-
Scenic views	100	-	-
Noise	100	-	-
Accidents or near accidents	100	-	-
Enforcement of rules/regulations	100	-	-
Car parking facilities	100	-	-
Theft	75	25	-
Vandalism	75	25	-
Land-Based Reasons Amount of facilities (restrooms, water, etc.)	75	25	-
Convenience to facilities (restrooms, water, etc.)	75	25	-
Maintenance of facilities	100	-	-
Condition of trees and landscape	100	-	-
Condition of grass or soil	100	-	-
Water-Based Reasons Water quality	50	50	-
Formal designation of places for your activity	25	-	-

*Percentages may not total 100% because of those responding "Does Not Apply."

Table 54

Reasons Making Recreation Experience Pleasant or Unpleasant--Sunbathing/Swimming
Mustang Park (M-3)

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons Characteristics and behavior of other people	91	9	-
Distance from other people	91	4	4
Number of people in other visitor groups	50	4	41
Number and type of other activities occurring here	59	4	36
Scenic views	95	4	-
Noise	77	9	14
Accidents or near accidents	82	14	4
Enforcement of rules/regulations	59	32	9
Car parking facilities	95	4	-
Theft	91	-	9
Vandalism	91	-	9
Land-Based Reasons Amount of facilities (restrooms, water, etc.)	91	9	-
Convenience to facilities (restrooms, water, etc.)	95	4	-
Maintenance of facilities	91	4	4
Condition of trees and landscape	95	-	4
Condition of grass or soil	91	4	4
Water-Based Reasons Water quality	91	9	-
Formal designation of places for your activity	95	-	-

*Percentages may not total 100% because of those responding "Does Not Apply."

Table 55

Number and Percent of Users That Indicated They Would Not Return to the Activity Area and Their Reasons

Area	Number and percent of users surveyed who indicated they would not return #	%	Reasons for not wanting to return
Mustang Park	2	10%	"The cops"
	1	5%	"Closes too early"
Holiday Park	-	-	--

Table 56

Positive and Negative Changes Noticed in the Physical Conditions of the Area - Items Mentioned by Sunbathers and Swimmers

Area	Positive Changes		Negative Changes	
Mustang Park	"Swim buoys"	(2)	"More glass"	(1)
	"Cut off road"	(2)	"Need trash barrels"	(1)
	"Cleaner"	(2)	"Dead fish"	(1)
	"Grass mowed"	(1)	"More weeds"	(1)
	"Improved restrooms"	(1)	"No swim buoys"	(1)
	"Better beach"	(1)		
Holiday Park	(None mentioned)		"Trash"	(1)
			"Cables"	(2)
			"Less grass"	(1)
			"No sand"	(1)

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Table 57

Positive and Negative Changes Noticed in the People's Use of the Area - Items Mentioned by Sunbathers and Swimmers

Area	Positive Changes		Negative Changes	
Mustang Park	"Younger kids"	(1)	"More people"	(1)
	"More people"	(1)	"Too much activity"	(1)
	"No riff-raff"	(1)		
	"Fewer poor people"	(1)		
	"Not as many people"	(1)		
	"Fewer teens"	(1)		
	"Fewer party people"	(1)		
Holiday Park	"Cleaner"	(1)	(None mentioned)	

NOTE: The number in parenthesis (#) indicates the number of times the change was mentioned.

Acceptability of techniques - Table 58 indicates the acceptability of different techniques for solving problems to the sunbathers and swimmers surveyed at Benbrook.

The acceptability of most techniques is very clear: at least 60 percent of the respondents agreed on one of the three levels of acceptability for 13 of the 18 techniques. However, even for those techniques which were acceptable to most respondents, up to 31 percent responded that these techniques were unacceptable. Thus, project managers should expect some expression of opposition to any technique which they employ.

Table 58

User Acceptability of Techniques--Sunbathing/Swimming
Benbrook Lake

Techniques	Levels of Acceptability Percentage* of Users Responding:		
	Very Acceptable	Mildly Acceptable	Unacceptable
General Planning Techniques			
Keep major recreation areas more separated	65	8	19
Make vehicle access to areas less convenient	11	4	85
Make area's existence less obvious	19	8	62
Site Planning Techniques			
Redesign area to accommodate fewer users	12	-	88
Design for greater distance between people	38	12	35
Reduce number of parking spaces	8	-	92
Management Techniques			
Procedures:			
Require permits	-	12	88
Charge/increase fees	12	-	88
Rules and Regulations:			
Impose more rules	8	4	85
Provide stricter enforcement of rules	35	8	54
Close areas when natural resource destruction reaches critical point	65	12	23
Close areas when they become "too full"	38	8	54
Reduce number of activities in same area	31	12	54
Limit number of people in visitor groups	-	-	100
Keep unnecessary vehicles out	58	11	31
Services:			
Provide more and better information	65	8	15
Increase maintenance and restoration	84	8	-
Reduce facilities and services	15	4	81

*Percentages may not total 100% because of those responding "Does Not Apply."

PART 3: ANALYSIS OF SELECTED PROBLEMS/SITUATIONS

PART 3: ANALYSIS OF SELECTED PROBLEMS/SITUATIONS

This final section identifies and examines selected problems and situations at Benbrook Lake. The section is not intended to provide solutions to all project area problems. Nor is it a substitute for project area master planning. The solutions/techniques are intended to be only suggestions for further consideration by project area personnel, for they are most familiar with the intricacies associated with these problems.

In many cases, the project area staff is already aware of these problems or situations and is in the process of dealing with them. And in some cases, the solutions/techniques listed in Table 59 may not be practical or possible because of management, budget, or other constraints.

Table 59

Analysis of Selected Problems/Situations

Area/Subject	Problem/Situation	Possible Solutions/Techniques
Enforcement of Rules and Regulations	Because of heavy use of the water by boaters, the need for enforcing rules and regulations had increased.	• make use of State Game Warden. • provide strict & uniform enforcement of Title 36. • consider lake zoning, e.g., jet boats only near the dam, waterskiing in several designated areas, pleasure boaters kept out of these areas.
Tree Stumps in the Water	Existing tree stumps under the water surface provide protection for fish, but also create a hazard for boaters of all types.	• provide map showing areas where stumps exist. • during low water when stumps can be identified, place buoys at the edge of stump to identify the hazard at high water (some project areas use plastic milk jugs). • remove or cut off stumps during low water periods.
Unusable boat ramps at low water	Several ramps at the lake are not usable at low water.	• at low water, construction to the length of selected ramps will increase low water usability. • build a low water ramp near a high water ramp as each can be used during different water level periods. • use signs, etc. to inform users as to which ramp can be usef while low water exists.

Area/Subject	Problem/Situation	Possible Solutions/Techniques
Boat launching ramps within camping areas	Several camping areas have a boat ramp inside the controlled area of the campgrounds.	• allow only the campers to use these boat ramps as enough launching areas exist outside the controlled areas.
Boater/swimmer conflict	Boaters sometimes come too close to the shoreline of the designated beach.	• place line and buoys in the water to keep the boats out of the swimming area and/or to contain swimmers in designated areas. • place buoys in water to warn boaters as they get near swimming areas. • develop regulations which prohibit boats near swimming areas.
Boater/water-skier conflicts	Boaters, especially jet boaters, are sometimes observed speeding in an area where others are waterskiing causing a hazard to skiers.	• consider lake zoning, e.g. restrict waterskiing only in designated areas, jet boating only along the dam, and other boating activities outside these areas. • establish maximum speed limitations or maximum horsepower limitations.
Camping--electric hookups	Campers desire more electric hookups as camping equipment has become more sophisticated in recent times.	• develop more campsites or add hookups to the existing campsites. • place the hookups at less desirable sites to make them more desirable. • work with Corps officials to allow for adequate fees to cover the cost of electricity used.
Holiday Park, H-3 and H-4, Mustang, M-1 and M-2--campsite spacing	Campsites are spread out, some are 250 feet apart or more, permitting squatters to move in between filled campsites. H-3 is a lineal camping area having no real core.	• determine the carrying capacity of the area and develop accordingly. • add additional designated sites and improve delineation of campsites. • designate some central areas for open space uses--play areas, etc. • construct impact campsites where overuse is or might be a problem. • cluster campsites in several areas along the road in H-3 which can be serviced by utilities and support facilities more adequately.
Holiday Park, H-3--Campground control	Traffic from U.S. Rt. 377 through H-3 to dayuse area of H-2 and H-1 cause a lack to control traffic through the campground.	• terminate traffic along park road 1 on the southerly side of its intersection with Tiger Road, limiting access to H-3 and H-4 to one entrance.

Area/Subject	Problem/Situation	Possible Solutions/Techniques
	No gate attendant for the H-3 camping area.	• establish one control gate for H-3 and H-4.
	Use of rangers as fee collectors and campground attendants.	• consider using a "MA and PA" gate attendant to help control the campground area.
Holiday Park H-1 and H-2--traffic control to the recreation area	Traffic from U.S. RT 377 to H-3 & H-4 permits traffic through H-1 and H-2, adding to the areas congestion.	• terminate traffic along Park Road 1 to the south of its intersection with Tiger Road, thus keeping the camping and day use areas separated. This will still allow for through traffic from Tiger Road to Dutch Branch Park.
		• terminate traffic along Park Road 1 to the north of its intersection with Tiger Road, thus limiting only one access to H-1 and H-2 allowing for easy control of this area.
Holiday Park H-1 & H-2, Mustang Park M-3--traffic control within the recreation area	Uncontrolled traffic in H-1 & H-2 has created intermittent roads, compacted soil, and damaged turf as a result of driving and parking in the open area.	• restrict vehicles from open areas by installing post and cables.
		• restrict vehicles from open areas by constructing both berms and ditches.
		• determine the carrying capacity of each area and construct parking lots to meet that capacity.
		• close the gate when capacity is reached.
Holiday Park H-1 and H-2--picnic table spacing	Picnic tables are spaced far apart, some as far as 600 feet apart.	• determine carrying capacity of each area and provide parking and tables accordingly.
		• remove isolated picnic tables.
		• cluster more tables in the most desirable picnic locations.
Mustang Park--traffic circulation to the recreation area	Users of M-3 (a day use and camping area) must travel through M-1 and M-2 (a camping area).	• open Road 3 into M-3 from County Road 1125 and close Road 4 between M-2 and M-3. This will provide separate unconnected circulation systems in both the M-1 and M-2 area and the M-3 area.
		• add control gate to the entrance to M-3.
		• add gate attendant to M-3 if this area becomes a campground.

Area/Subject	Problem/Situation	Possible Solutions/Techniques
Mustang Park M-3 --undesignated use.	Continuation of M-3 as both a day use area and as a campground makes control of the area difficult.	• designate area for selected uses. • make decision regarding which uses to provide on the basis of user need.
Mustang Park M-3--beach	Need for enlarging the designated beach.	• construct additional beach to the east of the existing one. • enlarge the existing parking area with respect to the carrying capacity of the beach. • construct a new beach at another location (i.e. Holiday Park H-1 or H-2).
Rocky Creek R-4--underused camping area	The camping area is remotely located from main highway and from main body of water; and it receives little air circulation and becomes very hot during the summer.	• make people aware of the area by signs, word of mouth, and referrals when other areas are full. • increase camping services provided. • evaluate closing area if use does not improve.
Rocky Creek R-1, R-2 & R-3--failure to designate use (camping or picnicking)	Users can become confused as to the use to which a picnic table has been designated (camping or picnicking).	• label designated use on the side of tables. • provide better separation of the camping and picnicking areas and use signs and/or control gates to inform users of the location of activity sites. • examine the carrying capacity of the area and develop to achieve the appropriate use level.

APPENDICES

APPENDIX A: KEY TERMS

1. Activity area - The specific area where an individual primary activity occurs (e.g., a campground, the lake, a hiking trail, a picnic area, etc.).

2. Capacity, recreational carrying - The capability of a recreational resource to provide opportunity for certain types of satisfactory recreation experiences over time without significant degradation of the resource. Inherent in this view of carrying capacity are resource (biophysical) and social (psycho-social) capacities.

3. Capacity, resource - The level of recreational use of a resource beyond which irreversible biological deterioration takes place or degradation of the physical environment makes the resource no longer suitable or attractive for that recreational use.

4. Capacity, social - The level of recreational use of a resource or area beyond which the user's expectation of the experience is not realized and he/she does not achieve a reasonable level of satisfaction.

5. Carrying capacity guidelines - The levels of use and the methods used to obtain and achieve them which are recommended in this report.

6. Factors - The characteristics and phenomena which influence carrying capacity.

7. Indicators - The phenomena which can be used to identify or measure the degree of overcrowding or overuse, and which can be used in conjunction with a monitoring system to help predict when problems of overuse and overcrowding will occur if preventive measures are not taken.

8. Management/site survey - The initial survey conducted at the study project areas where resource managers, rangers, and maintenance personnel were interviewed and a reconnaissance was made of "overused," "overcrowded," "underused," and "well-balanced" recreation areas. (See Appendix B)

9. Mean - The measure of central value defined as the sum of all observations divided by the number of observations.

10. Median - The measure of central value defined as the point on the scale of observations which is the middle observation (if there is an odd number of cases) or which is the mean of the two central observations (if there is an even number of cases).

11. Mode - The measure of central value defined as the observation with the largest frequency.

12. Monitoring - The periodic assessment of the impact that use levels have on the social capacity or resource capacity of an area.

13. Overcrowding - A condition where the user does not achieve a satisfactory recreational experience because of too many people, inadequate distances between sites, etc.

14. Overuse - A condition where (during the course of a season/year) degradation of the physical environment makes the resource no longer suitable or attractive for recreational use.

15. Planning range - The range of spacing distances for an activity which satisfies the spacing preferences of the majority of recreators participating in that activity, which at the same time accounts for other considerations (e.g., cost, safety, equity, etc.).

16. Preference distribution - The set of preference groupings for an activity which can be modified to develop the social carrying capacity of an area.

17. Preference groupings - The range of spacing distances for an activity which satisfies the similar spacing preferences of a group of recreators participating in that activity.

18. Primary activity - The major recreation activity which brought the visitor to the recreation area.

19. Project area - The land and water area of the total Corps of Engineers Project.

20. Project management - The project area staff, district personnel, and other people involved with project area management.

21. Recreation area - Corps-managed areas specifically identified for recreational use within the total Project Boundary; usually named.

22. Recreation day - A standard unit of use consisting of a visit by one individual to a recreation development or area for recreation purposes during any reasonable portion or all of a 24-hour period.

23. Recreation environment - An activity area together with its various recreation settings.

24. Recreation resource - The land and/or water areas, with associated facilities, which provide a base for outdoor recreation activities.

25. Recreation setting - The physical, development/control, activity/use relationship components of an activity area; taken as a whole, the various settings comprise a particular "recreation environment" for each activity area.

26. Recreation unit - A campsite, picnic table, boat, off-road vehicle, user group, or other unit which when spaced together with other units represents a use level or density.

27. Representative recreation setting - The most typical recreation setting for a particular activity.

28. Secondary activities - Incidental activities; activities which are supplemental to the primary activity.

29. Study activity area - An activity area at which the management/site survey and the user survey was conducted.

30. Study project area - One of the 11 project areas at which the management/site survey and the user survey were conducted. These project areas are: Barkley Lock and Dam, Benbrook Lake, Hartwell Lake, McNary Lock and Dam, Milford Lake, New Hogan Lake, Lake Ouachita, Lake Shelbyville, Shenango River Lake, Somerville Lake, and Surry Mountain Lake.

31. Title 36 - Part 327, Chapter III, of Title 36 of the Code of Federal Regulations which provides rules and regulations governing the public use of water resource development projects administered by the Army Corps of Engineers.

32. Underuse - A condition where use levels are significantly less than their potential service level.

33. User survey - The survey that provided user preference information used in developing social capacity guidelines; information was obtained from users at the study project areas by means of a questionnaire (see Appendix B).

34. Well-balanced use - A condition which exhibits just the right amount of use to satisfy users and protect the resource.

APPENDIX B: EXAMPLE SURVEY FORMS

This Appendix includes on the following pages examples of the survey forms that were used during the Management/Site Survey and the User Survey.

MANAGEMENT/SITE SURVEY

PICNICKING QUESTIONNAIRE

(Resource Manager, Head Ranger, Maintenance Foreman)

Project Area Name _____

Respondent Name _____ Title _____

Interviewer _____ Date _____

1. PICNICKING USE AREA INFORMATION (selected areas)

Recreation Area/Use Area Names	Support Facilities	Fee Charged	Acres Total Use Area	Acres Activity Area Only	Total Picnic Sites	List Primary Activities Adjacent to Area	When Started
OVERCROWDED							
OVERUSED							
UNDERUSED							
WELL-BALANCED							

2. VISITOR CHARACTERISTICS RELATED TO OVERCROWDING/OVERUSE

Recreation Area/Use Area Names (same as in #1)	# of picnicking groups on typical recreation season weekend day	Typical Length of Stay	Typical Ages	Typical Group Size	Origin of visitors[1] % U	% S	% R	Approximate # of miles most visitors travel to use area High	Average	Average Frequency of visits per year
OVERCROWDED										
OVERUSED										
UNDERUSED										
WELL-BALANCED										

NOTES: [1]U = Urban location (city), S = Suburban location, R = Rural

3. CAUSES & EFFECTS OF OVERCROWDING/OVERUSE

Pichicking

Use Area Names (same as in #1 & #2)	Actual Complaints (list in order of frequency)	Causes		Effects	
		Observed	Surmised	Observed	Surmised
OVERCROWDED					
OVERUSED					
UNDERUSED					
WELL-BALANCED					

Picnicking

4. OCCURRENCE OF OVERUSE/DEGRADATION

Use areas which experience overuse (from #1)	Off-season restoration potential: Recovers naturally	Off-season restoration potential: Requires treatment	Off-season restoration potential: Beyond off-season restoration	Approximate Dates of Recreation season (_____ to _____)	When signs of degradation first occur: Approx. date	When signs of degradation first occur: Approx. visitor groups to date	When highest degradation is reached: Approx. date	When highest degradation is reached: Approx. visitor groups to date

5. INDICATORS (SIGNS) OF OVERCROWDING

Indicators	Assign relative importance using a numerical rating on a scale of 1 (least) to 10 (most)	Comments
o Increase in the # of complaints		
o Arguments/conflicts between picnickers		
o Shorter stays		
o Fewer returnees		
o Increase in crime		
o Increase in noise		
o Picnicking, in non-picnic areas		
o Crowded support facilities		
o Increase in litter		
o Increase in resource and facility destruction		
o Occurrence of displacement/succession (changes in visitor characteristics)		
o Increase in number of accidents involving vehicles		
o Increase in use levels		

(Please list others below)

o

o

o

6. INDICATORS OF OVERUSE/DEGRADATION

Indicators	Assign relative importance using a numerical rating on a scale of 1(least) to 10 (most)	Comments
o Ground cover wearing away		
o Damaged trees and/or undergrowth		
o Absence/change in wildlife		
o Increased erosion/sedimentation		
o Little deadfall		
o Compacted soils		
o Increased litter/trash		
o Trees cut down		
o Increased runoff		
o Need for replacement of support facilities before normal life period		
o Rodent infestation		

(Please list others below)

o

o

o

o

7. FACTORS AFFECTING RESOURCE CARRYING CAPACITY

Picnicking

Factors	Assign relative importance using a numerical rating on a scale of 1 (least) to 10 (most)	Comments
o Resiliency of vegetation type		
o Resiliency of soils		
o Resiliency of wildlife		
o Degree of normal maintenance applied		
o Degree of off-season restoration applied		
o Site drainage		
o Slope/topography		
o Climate/micro-climate		
o Group size		
o Slope orientation		
o Tree cover		
o Level of development (e.g. paved roads/paths vs. unpaved roads/paths)		

(Please list others below)

o

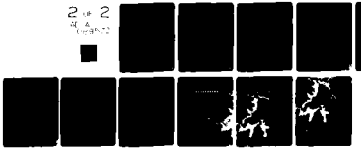
o

o

AD-A089 572 URBAN RESEARCH AND DEVELOPMENT CORP BETHLEHEM PA F/G 13/2
RECREATION CARRYING CAPACITY FACTS AND CONSIDERATIONS. REPORT 2--ETC(U)
JUL 80 DACW39-78-C0096.

UNCLASSIFIED WES-MP-R-80-1-2 NL

2 OF 2



8. FACTORS AFFECTING SOCIAL CARRYING CAPACITY

Factors	Assign relative importance using a numerical rating on a scale of 1 (least) to 10 (most)	Comments
o Similarity of visitor groups		
o Slope orientation		
o Distance from highway access		
o Proximity to the water		
o Scenic views or vistas		
o Quality/variety of natural amenities		
o Number, type, and degree of man-made intrusions or disturbances (power lines, buildings, etc.)		
o Visual screening between picnickers		
o Density/type of vegetation		
o Distance between picnic sites		
o Degree of designation		
o Level of support facilities		
o Proximity to support facilities		
o Size of picnicking area		
o Charging of fees		
o Compatibility of nearby primary activities		
o Single purpose or multi-purpose recreation area		
o Distance traveled		
o Frequency of visits		
o Origin of user (urban, suburban, rural)		
o Configuration of area		
o Degree of maintenance		
(Please list other factors)		
o		
o		

9. PRESENT/PAST CAPACITY MANAGEMENT

Picnicking

Use areas where capacity management techniques were, or are now, applied (Name)	Past (√)	Present (√)	List capacity management techniques(s) used	Describe level of effectiveness (pros/cons regarding visitor satisfaction and resource protection)	Assessment of management feasibility (pros/cons why the technique could or could not be implemented)

10. POSSIBLE CARRYING CAPACITIES

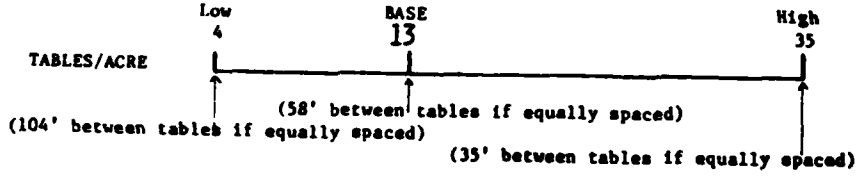
Picnicking

Use Area Names	Present capacity actual or estimated	Best guess as to what the capacity should be	Principal factors
THE MOST OVERCROWDED AREA:			
THE MOST OVERUSED AREA:			
THE MOST UNDERUSED AREA:			
THE MOST WELL-BALANCED AREA:			

B11

EXAMPLES FROM BUREAU OF OUTDOOR RECREATION CAPACITY RESEARCH:

(Use as a general guide when estimating what the capacity should be)



MANAGEMENT/SITE SURVEY

CAMPING

USE AREA ANALYSIS SHEET

(for URDC staff use)

Project Area Name _____ Field Analyst(s) _____

Recreation Area and/or Use Area _____ _____

_____ Weather _____

Code # _____ Date _____

				ANSWER COLUMN	COMMENT CODE	COMMENTS:
SITE AWARENESS	Signage (camping or name)	Between main highway and use area entrance				
		At use area entrance				
	Exposure of Site	Between main highway and use area entrance				
		At use area entrance				
SITE ACCESS	Relationship to Main Highway	Distance to area from main highway				
	Road Conditions	Road to site from main highway				
			Paved(P) or Unpaved(U)			
			Condition (E, G, P)			
			Estimated Width			
		Road within use area				
			Paved(P) or Unpaved(U)			
			Condition (E, G, P)			
			Estimated Width			
		Presence of informal roads				
SLOPES & VEGETATION	Slopes	% of area 0 - 5%				
		% of area 6 - 9%				
		% of area 10%+				
		Existence of unique land form				
	Vegetation	Density of trees				
			% dense			
			% moderate			
			% sparse			
			% little or none			
		Density of understory				
			% dense			
			% moderate			
			% sparse			
			% little or none			
	On the Use Area	Geologic, cultural, archeologic features				
		Abundance of wildlife				
		Water feature				

NATURAL AMENITIES	From the Use Area	Visibility to water features (insert) O - outstanding G - good U - undesirable	Severely obstructed		
			Moderately obstructed		
			Mildly obstructed		
			Unobstructed		
		Visibility to other natural areas (insert) O - outstanding G - good U - undesirable	Severely obstructed		
			Moderately obstructed		
			Mildly obstructed		
			Unobstructed		
		Distance to lake			
CONDITION OF NATURAL FEATURES	Vegetation & Soils	Dead or trampled vegetation			
		Evidence of taking			
		Compacted soils			
	Drainage	Wet soils/standing water			
		Erosion			
CILITIES & RVICES	Facility/ Service Distribution (S - Site D-Distributed C - Centralized)	Electric hook-ups			
		Water hook-up			
		Improved pad			
		Picnic tables			
		Cooking grill			
		Firewood			
		Drinking water (cold)			
		Hot water			
		Showers			
		Flush toilets			
		Vault toilets			
		Pit toilets			
		Dumping station			
		Shelter			
		First aid station			
		Telephone			
		Lighting (R - road, P - Parking W - Walkway, C - Comfort area			
		Recreation area or equipment			
		Convenience store			
	Condition	Excellent			
		Good			
		Need attention			
LANNING DESIGN SPECTS	Distance between campsites	Minimum			
		Maximum			
		Average			
	Distance between campsites and the facilities	Minimum			
		Maximum			
		Average			
	Space for camper unit maneuverability	Ample			
		Acceptable			
		Restrictive			
	Access Control	Controlled (gate, attendant)			
		Uncontrolled			

Camping

Car Parking	Parking space on each camp-site			
	Road parking			
Buffer between Campsites	Man-made			
	Natural vegetation			
	Planted landscape			
	None			

RELATIONSHIP OF CAMPING USE AREA TO OTHER USE AREAS

Use Area Name	Activity	Estimated direct distance from camping use area	Pedestrian accessibility to other use area: Easy	Moderate	Difficult	Visibility to other use area: Obstructed	Semi-obstructed	Unobstructed	Reasons for accessibility and/or visibility situation

ANALYST'S PERCEPTION OF ACTIVITY AREA'S CARRYING CAPACITY

List the resource/physical factors you feel most affect carrying capacity on this site

_____

_____

_____

_____

_____

Should resource/physical carrying capacity of this site be: _____ higher _____ lower _____ same

List possible techniques which might be used to increase and/or to limit capacity on this site.

_____

_____

_____

CORPS OF ENGINEERS USER CAPACITY SURVEY

Notations ☐

Date _____ Day _____ OMB Clearance # 49-R0419

Time (hour) _____ Expires October 1983

Weather _____ Project Area Name _____

Interviewer _____ Recreation Area Name _____

Activity _____ Code _____ Activity Area _____ Code _____

We are conducting a survey for the Army Corps of Engineers at selected Corps recreation areas throughout the Country. Through these surveys, we will discover how visitors feel about overcrowding and overuse of these recreation areas. The Corps will use this information to help make decisions about the use and protection of its recreation areas. Would you be willing to take fifteen minutes of your time to answer some questions about your visit here?

BASIC VISITOR CHARACTERISTICS

1. In which category is your age?

17 & under	☐
18 - 25	☐
26 - 40	☐
41 - 55	☐
56 - 65	☐
66 & over	☐

2. How large is your group?

1	☐
2	☐
3- 4	☐
5- 8	☐
9-12	☐
13+	☐

3. Is this your main destination or a stopover on a trip?

Main destination	☐
Stopover on trip	☐

4. How long did it take you to travel here from your home ___(✓) or last destination ___(✓)?

Under 15 minutes	☐
15-30 minutes	☐
30 min. - 1 hour	☐
1 - 2 hours	☐
2 - 3 hours	☐
3 - 5 hours	☐
5+ hours	☐

VISITOR PARTICIPATION

5. How many times did you participate in this activity anywhere last year? (if "0", go to Question 7)

0	☐
1 - 5	☐
6 - 10	☐
11 - 20	☐
21 - 30	☐
31+	☐

6. How many times have you participated in this activity at this Lake?

a) Last year?		b) So far this year?	
0	☐	0	☐
1- 2	☐	1- 2	☐
3- 4	☐	3- 4	☐
5- 7	☐	5- 7	☐
8-10	☐	8-10	☐
11-19	☐	11-19	☐
20+	☐	20+	☐

7. How long are you staying on this visit?

1 - 4 hours	☐
5 - 8 hours	☐
1 day (overnight)	☐
2 days	☐
3 days	☐
4 days	☐
5 - 7 days	☐
8 or more days	☐

8. Have you participated in this activity at this specific location anytime before this visit?

No ☐ (go to #9) Yes ☐ Please list any changes you have noticed in the physical condition of this location or in people's use of the area.

Physical condition:	People's use of the area:
☐ Positive	☐ Positive
☐ Negative	☐ Negative

9. Would you say the number of people who are now participating in this activity are:

too many ☐ too few ☐ just the right number ☐

10. a) Would you say that the distance between you and other people is:

too far ☐ (to 10c) just right ☐ (to 10c) too close ☐

(Actual or estimated distance to be recorded by interviewer _____)

b) If other people are too close, how far away would you like them to be? ☐ Not Applicable

just a little farther ☐ twice as far ☐ three times farther ☐ more than 3 times ☐

c) What is the closest distance you would accept? _____

d) What distance would you like them to be? _____

11. a) Which of the following reasons are making your present activity at this location pleasant or unpleasant?

	Pleasant	Un-pleasant	Not Important	Does Not Apply
GENERAL REASONS				
1. Characteristics and behavior of other people	☐	☐	☐	☐
2. Distance from other people	☐	☐	☐	☐
3. Number of people in other visitor groups	☐	☐	☐	☐
4. Number and type of other activities occurring here	☐	☐	☐	☐
5. Fees charged	☐	☐	☐	☐
6. Scenic views	☐	☐	☐	☐
7. Noise	☐	☐	☐	☐
8. Accidents or near accidents	☐	☐	☐	☐
9. Enforcement of rules/regulations	☐	☐	☐	☐
10. Car parking facilities	☐	☐	☐	☐
11. Theft	☐	☐	☐	☐
12. Vandalism	☐	☐	☐	☐
Others _____	☐	☐	☐	☐
_____				
LAND-BASED REASONS				
13. Trees/natural landscape	☐	☐	☐	☐
14. Visual privacy from other people	☐	☐	☐	☐
15. Amount of facilities (restrooms, water, etc.)	☐	☐	☐	☐
16. Convenience to facilities (restrooms, water, etc.)	☐	☐	☐	☐
17. Nearness to the water body	☐	☐	☐	☐
18. Steepness of slopes	☐	☐	☐	☐
19. Maintenance of facilities	☐	☐	☐	☐
20. Condition of trees and landscape	☐	☐	☐	☐
21. Condition of grass or soil	☐	☐	☐	☐
Others _____	☐	☐	☐	☐
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐
WATER-BASED REASONS				
22. Water quality	☐	☐	☐	☐
23. Catching fish	☐	☐	☐	☐
24. Formal designation of places for your activity	☐	☐	☐	☐
25. Waiting time to launch boat	☐	☐	☐	☐
26. Waiting time to retrieve boat	☐	☐	☐	☐
27. People in areas they shouldn't be	☐	☐	☐	☐
Others _____	☐	☐	☐	☐
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐

b) Will any of the above reasons prevent you from coming here again?

No ☐ Yes ☐

If yes, which reasons (selected from reasons checked "unpleasant" above)?

_____ _____ _____

_____ _____ _____

12. If recreation areas have too many people for each to enjoy the activity or if areas become damaged by too much use, there are some solutions for reducing that overcrowding or overuse. Please indicate which of the following possible solutions you would find very acceptable, mildly acceptable, or unacceptable for reducing crowding and/or natural resource destruction in this location. (If this location is not overcrowded or overused, assume that it is for this question.)

POSSIBLE SOLUTIONS FOR OVERCROWDING OR OVERUSE	Very Acceptable	Mildly Acceptable	Unacceptable	Does Not Apply
PUBLIC AWARENESS/EASE OF ACCESS SOLUTIONS				
1. Make vehicle access to areas less convenient.	☐	☐	☐	☐
2. Make the area's existence less obvious to the general public (fewer signs and directions)	☐	☐	☐	☐
3. Provide more and better information on how to use the area	☐	☐	☐	☐
ACTIVITY RELATIONSHIPS & USE DENSITY				
4. Keep major recreation activities more separated from one another.	☐	☐	☐	☐
5. Reduce the number of different activities occurring in the same area	☐	☐	☐	☐
6. Design for greater distance between people	☐	☐	☐	☐
7. Limit the number of people in each group	☐	☐	☐	☐
8. Change natural surfaces by hardening them to withstand more use.	☐	☐	☐	☐
9. Increase maintenance and restoration to allow more use	☐	☐	☐	☐
PLANNING & DESIGN SOLUTIONS				
10. Reduce the type and number of facilities and services provided	☐	☐	☐	☐
11. Keep unnecessary vehicles out of areas	☐	☐	☐	☐
12. Reduce number of parking spaces to limit number of users	☐	☐	☐	☐
13. Provide landscaped buffers between visitor groups to increase privacy	☐	☐	☐	☐
14. Redesign area to accommodate fewer users	☐	☐	☐	☐
RULES & REGULATIONS SOLUTIONS				
15. Have stricter enforcement of regulations	☐	☐	☐	☐
16. Impose more rules and regulations	☐	☐	☐	☐
17. Require prior reservations to use areas.	☐	☐	☐	☐
18. Require permits to use areas	☐	☐	☐	☐
19. Close down areas when natural resource destruction reaches critical point	☐	☐	☐	☐
20. Charge fees or increase fees now charged	☐	☐	☐	☐
21. Close gates when areas get "too full"	☐	☐	☐	☐
OTHERS				
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐
_____	☐	☐	☐	☐

13. Please answer the following questions about your other recreation activities on this visit.

	a) What are your other recreation activities on this visit?	b) Are they within walking distance or driving distance from this location? (use launching location for boat activities) (1) Walking distance	(2) Driving distance	c) What is your main recreation activity on this visit?
1. Camping	☐	☐	☐	☐
2. Boating	☐	☐	☐	☐
3. Waterskiing	☐	☐	☐	☐
4. Swimming	☐	☐	☐	☐
5. Sunbathing	☐	☐	☐	☐
6. Picnicking	☐	☐	☐	☐
7. Shoreline fishing	☐	☐	☐	☐
8. Boat fishing	☐	☐	☐	☐
9. Hiking	☐	☐	☐	☐
10. Horseback riding	☐	☐	☐	☐
11. Off-road vehicle riding	☐	☐	☐	☐
12. _____	☐	☐	☐	☐
13. _____	☐	☐	☐	☐
14. _____	☐	☐	☐	☐
15. _____	☐	☐	☐	☐
16. None	☐	☐	☐	☐

RECREATION EQUIPMENT RECORD

Camping

- Tent ☐
- Tent camper ☐
- Truck-mounted camper ☐
- Travel trailer ☐
- Van ☐
- Motor home ☐
- _____ ☐
- _____ ☐

Boat Activities

- Day sailer ☐
- Sailer (cabin) ☐
- Canoe ☐
- Row boat ☐
- Power boat (less than 25 hp) ☐
- Power boat (25+ hp) ☐
- Houseboat or cruiser ☐
- _____ ☐
- _____ ☐

Off-Road Vehicle Riding

- Trail bike ☐
- Motorcycle ☐
- ATV ☐
- Dune buggy ☐
- 4-wheel drive ☐
- _____ ☐
- _____ ☐

COMMENTS:

REPLACEMENT QUESTIONS TO ASK DURING BOAT LAUNCHING INTERVIEWS

(Write answers and comments directly on the User Survey Interview Sheet)

10. a) Would you say that the time it takes you to launch your boat at this ramp is:

too long ☐ long, but tolerable ☐ just right ☐

(Approximately how long does it take to launch your boat at this ramp? Actual or estimated time to be recorded by interviewer _____)

b) How long would you prefer it to take:

just a little faster ☐ twice as fast ☐ three times faster ☐ more than three times faster ☐

c) What could be done to expedite boat launching at this ramp:

_____

_____

_____

APPENDIX C: PROJECT AREA DESCRIPTION

Benbrook

Location

Benbrook Dam (Fort Worth District) is located on the Clear Fork of the Trinity River, 15 miles upstream of its confluence with the West Fork of the Trinity River. It is about 10 miles southwest of Fort Worth, Texas, and about 44 miles west of Dallas, Texas.

Authorization and purpose

The Benbrook Dam and Lake Project was authorized under the Flood Control Act of 1944 for the purpose of flood control, water conservation, and navigation.

Project area size and features

The drainage area above the dam covers an area of over 429 square miles. At the normal recreation elevation, the lake has a surface area of 3498 acres and a shoreline of approximately 37 miles. The lake is approximately seven miles long and its width averages 1-1/2 miles. The maximum depth of the lake is 70 feet at the damsite.

Land area of the project at the lake's normal recreational level is about 4903 acres. Of this total area, approximately 3900 acres are managed by the Corps, 278 by the City of Benbrook, and 720 by the City of Fort Worth.

In most places the shore area slopes gradually into the water, resulting in much of the shoreline being usable or accessible. Campers, picnickers, and fishermen may gain lake access from approximately 20 improved boat ramps, as well as many less improved approaches to the water.

The nearly 20 full-time and part-time Corps employees assigned to the project area include a Reservoir Manager, Head Ranger, Maintenance Foreman, several patrolling rangers, and clerical and maintenance personnel. Gate attendance and many maintenance services, such as trash pick-up and vehicle maintenance, are carried out on a contract basis.

Topography

The land bordering the project is typical of the Grand Prairie region. The uplands are characterized by gently rolling hills interspersed with more rugged slopes and small bluffs.

Climate

Benbrook Lake lies in a region characterized by a relatively mild climate. Summer seasons are long, while the winter seasons are short and comparatively mild. Normal temperatures range from the upper 90 degrees F. (with extremes to 110 degrees F.) in summer to the lower 30 degrees F. (with extremes to below 0 degrees F.) during the winter months. The mean annual temperature is 64 degrees F. Precipitation consists of 32 inches of rain and three inches of snow annually. Prevailing winds come from the south at 12 mph in the summer and at 13 mph in winter. The days are sunny 68 percent of the time throughout the year, and 77 percent of the time in the summer.

Soils and vegetation

Soils commonly found at the project include loam, loamy fine sand, clay loam, stony clay, and clay.

The Texas Prairie has few trees, except for areas near water courses. Live oak, mulberry, and hawthorns grow to relatively low heights. Because there is a minimum of backwater and flatland on the lake's periphery, there is no established shoreline vegetation except where streams enter the lake.

Fish and wildlife

Predominant native fish species include channel, flathead, yellow, and blue catfish, white crappie, largemouth and white bass, and sunfish. Species introduced to the lake are the Florida and hybrid striped bass. Carp and other roughfish also presently exist in the lake.

Wildlife on lands surrounding the lake include the bobwhite quail, mourning dove, mallard, pintail, and shoveller ducks, osprey, coot, snipe, snow and Canada geese, egret, blue heron, fox squirrel, cottontail and jack rabbit, racoon, red and gray fox, coyote, bobcat, armadillo, and white-tailed deer.

Population areas
served and accessibility

Visitors to Benbrook Lake come mainly from north central Texas, specifically the City of Fort Worth and its environs. The 1970 population estimate for the day-use market area (within a 25-mile radius of the project) is about 712,300.

U. S. Highway 377, extending west-southwest from Fort Worth, passes within 1/2 mile of the dam and crosses the Clear Fork of the Trinity River within the reservoir area. Interstate Highway 20 extends east-west approximately four miles to the north of the dam. Several county roads leading from these highways provide access to the lake area.

Recreation areas

The Corps of Engineers currently manages four developed recreational areas encompassing 1898 acres. Some of the activities and facilities offered at these areas include: picnic areas, campsites, boating, waterskiing, swimming, hiking and horseback riding trails, shore fishing, boat fishing, recreation open space, a model airplane field, and marina slips.

The Cities of Fort Worth and Benbrook offer the following on leased areas: horseback riding, a sailing center, marina, golf course, competitive sports fields, and beach and picnic areas. Both the Corps-operated and the city-operated areas have support facilities which include picnic shelters, comfort stations, boat launching ramps, sanitary dumping stations, and electric and water hook-ups at the campgrounds.

Visitation

June was the month of highest visitation to Benbrook Lake in 1978, with 515,900 recreation days. During 1978, 2,515,000 recreation days were reported.

In accordance with letter from DAEN-RDC, DAEN-ASI dated 22 July 1977, Subject: Facsimile Catalog Cards for Laboratory Technical Publications, a facsimile catalog card in Library of Congress MARC format is reproduced below.

Urban Research & Development Corporation.
Recreation carrying capacity facts and considerations; Report 2: Benbrook Lake Project Area / by Urban Research and *Development Corporation, Bethlehem, Pa.* Vicksburg, Miss. : U. S. Waterways Experiment Station ; Springfield, Va. : available from National Technical Information Service, 1980.
iv, 89, [25] p. : ill. ; 27 cm. (Miscellaneous paper - U. S. Army Engineer Waterways Experiment Station ; R-80-1, Report 2)
Prepared for Office, Chief of Engineers, U. S. Army, Washington, D. C., under Contract No. DACW39-78-C-0096.
Project map of Benbrook Lake in pocket at end of report.

1. Benbrook Lake Project. 2. Carrying capacity. 3. Monitoring. 4. Overcrowding. 5. Recreation. 6. Recreation resource planning. 7. Recreational areas. 8. Recreational facilities. 9. Utilization. I. United States. Army. Corps of Engineers. II. Series: United States. Waterways Experiment Station, Vicksburg, Miss. Miscellaneous paper ; R-80-1, Report 2.
TA7.W34m no. R-80-1 Report 2

Benbr

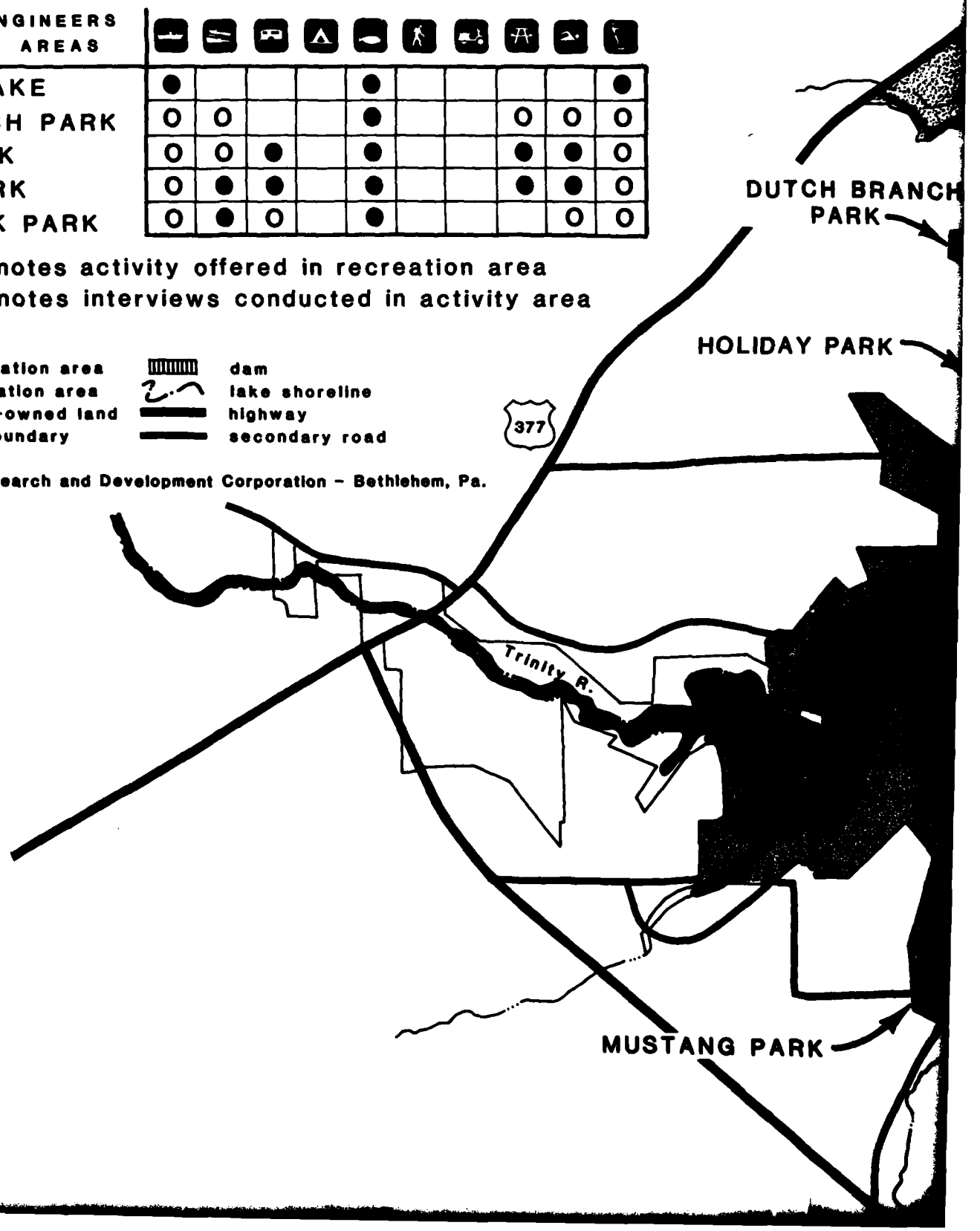
CORPS OF ENGINEERS RECREATION AREAS										
BENBROOK LAKE	●				●					●
DUTCH BRANCH PARK	O	O			●			O	O	O
HOLIDAY PARK	O	O	●		●			●	●	O
MUSTANG PARK	O	●	●		●			●	●	O
ROCKY CREEK PARK	O	●	O		●				O	O

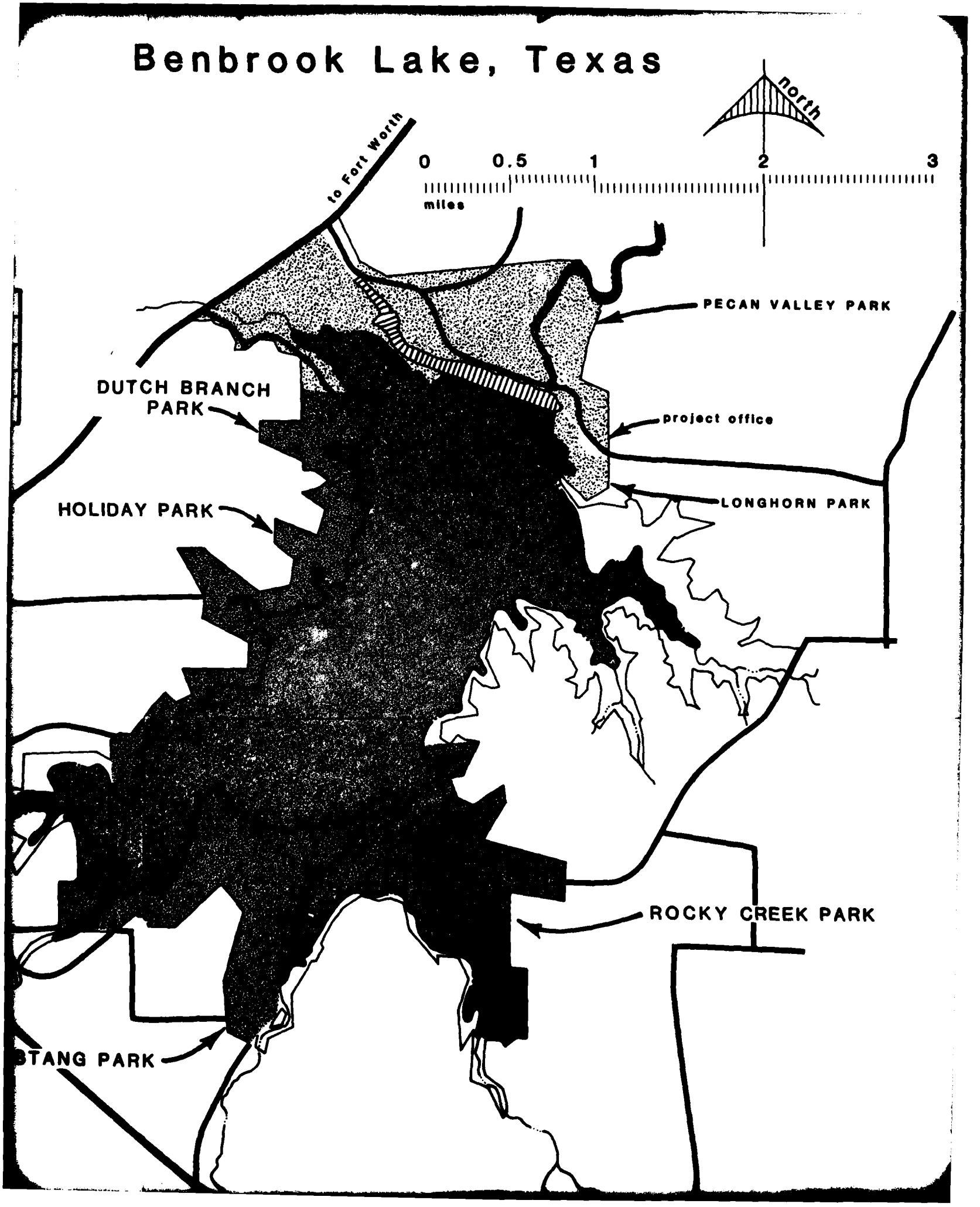
O denotes activity offered in recreation area

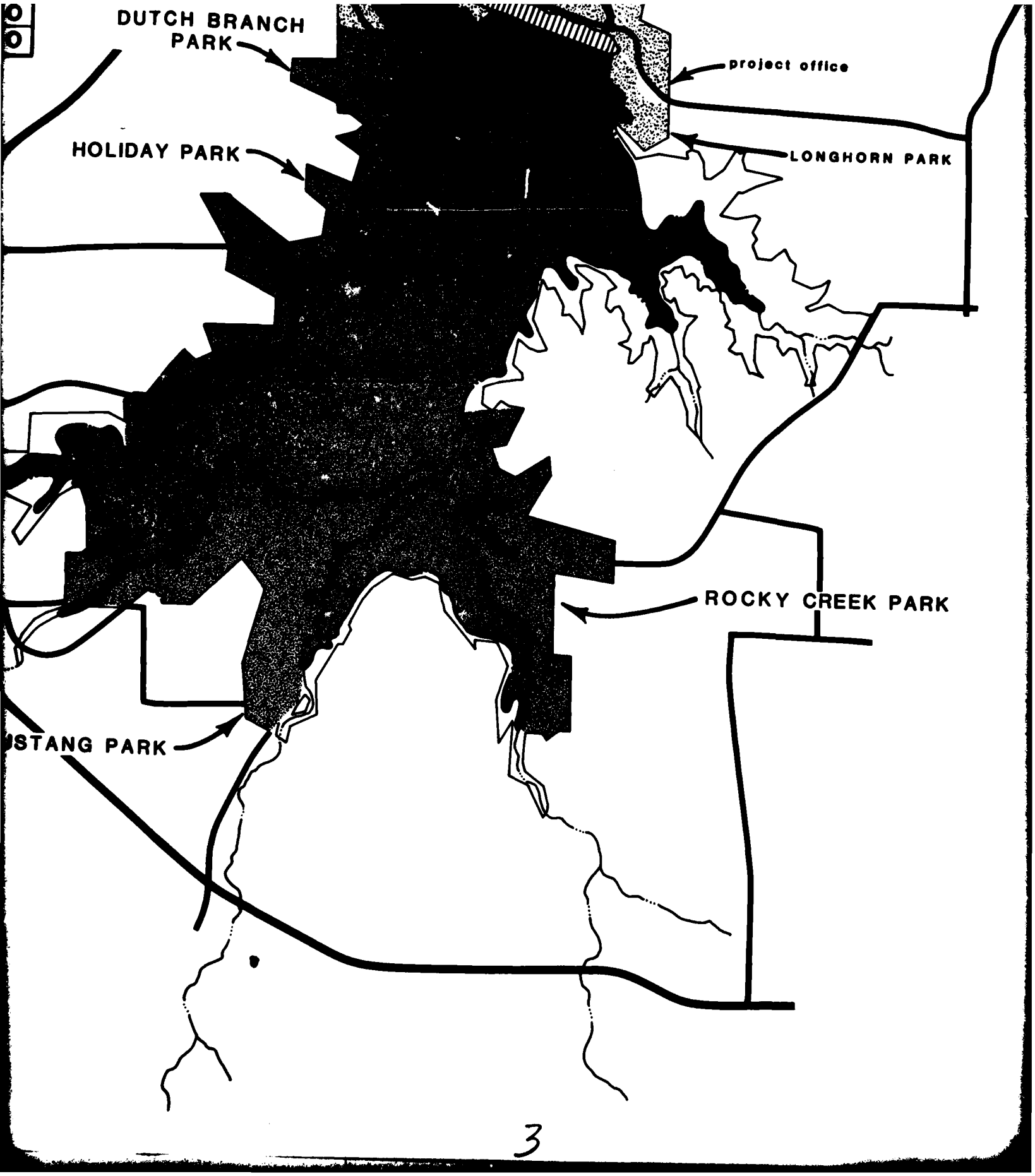
● denotes interviews conducted in activity area

Corps recreation area
other recreation area
government-owned land
municipal boundary
dam
lake shoreline
highway
secondary road

prepared by Urban Research and Development Corporation – Bethlehem, Pa.




Benbrook Lake, Texas
north
0
0.5
1
2
3
miles
to Fort Worth
PECAN VALLEY PARK
DUTCH BRANCH PARK
project office
HOLIDAY PARK
LONGHORN PARK
ROCKY CREEK PARK
STANG PARK


DUTCH BRANCH PARK
project office
HOLIDAY PARK
LONGHORN PARK
ROCKY CREEK PARK
STANG PARK