MISCELLANEOUS PAPER R-80-1

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
Report 8: New Hogan Lake Project Area	Jul 1980
Report 9: Shenango River Lake Project Area	Jul 1980
Report 10: Somerville Lake Project Area	Jul 1980
Report 11: Surry Mountain Lake Project Area	Jul 1980

Acknowledgements

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

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: Miscellaneous Paper R-80-1

2. GOVT ACCESSION NO.:

3. RECIPIENT'S CATALOG NUMBER:

4. TITLE (and Subtitle): RECREATION CARRYING CAPACITY FACTS AND CONSIDERATIONS; Report 9, SHENANGO RIVER LAKE PROJECT AREA

5. TYPE OF REPORT & PERIOD COVERED: Report 9 of a series

6. PERFORMING ORG. REPORT NUMBER:

7. AUTHOR(s):

8. CONTRACT OR GRANT NUMBER(s): Contract No. DACW39-78-C-0096

9. PERFORMING ORGANIZATION NAME AND ADDRESS:
Urban Research and Development Corporation
528 North New Street
Bethlehem, Pa. 18018

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: Recreation Research Program

11. CONTROLLING OFFICE NAME AND ADDRESS:
Office, Chief of Engineers, U. S. Army
Washington, D. C. 20314

12. REPORT DATE: July 1980

13. NUMBER OF PAGES: 85

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office):
U. S. Army Engineer Waterways Experiment Station
Environmental Laboratory
P. O. Box 631, Vicksburg, Miss. 39180

15. SECURITY CLASS. (of this report): Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE:

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

A project map of Shenango River 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)

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

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

This report provides selected recreation carrying capacity-related information for the Shenango River Lake Project. The information is based upon: 1) user and management surveys conducted at Shenango River Lake, and 2) Urban Research & 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 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 Shenango River 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.

PART 1: INTRODUCTION

RECREATION CARRYING CAPACITY FACTS AND CONSIDERATIONS

SHENANGO RIVER LAKE PROJECT AREA

PART 1: INTRODUCTION

This Report

Purpose

This report, prepared as the ninth 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 Shenango River Lake Project Area which is not included in the Technical Report. The information is based upon: 1) the user and management surveys conducted at Shenango River 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 February 20-21, 1979 and the User Survey conducted on July 27-30, 1979 by Urban Research & Development Corporation (URDC). (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 Shenango. 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*

The Shenango Reservoir Project** was authorized for the purposes of flood control and seasonal augmentation of low flows of the Shenango and Beaver Rivers. The lake is located in northwestern Pennsylvania and northeastern Ohio, approximately 10 miles§ northeast of Youngstown, Ohio, and 65 miles northwest of Pittsburgh, Pennsylvania. When the recreational pool is established at an elevation of 896 msl the lake surface area is 3550 acres, the lake shoreline is 44 miles long, and the project land area is 10,984 acres. The lake extends 11 miles up the arm of the Shenango River and five miles up the Pymatuning Creek. The reservoir lies in broad, flat, meandering valleys. Along the main body of the reservoir, 30 percent of the land is intermittent wood lots and border timber, with the remainder in meadows and fields. The two arms of the reservoir are bounded by wooded areas, meadows, fields, and marshes. The average summer temperature is 75 degrees F., and the average annual precipitation is 38.5 inches. Access to the project area is excellent; Federal Interstates 79, 80, and 90 provide access for visitors from the Cleveland and Pittsburgh areas, while many well-maintained local roads provide access for nearby residents. In 1978, attendance reached almost 4.8 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

Shenango River Lake is popular with power boaters, since other lakes in the area have restrictions on power. During low flow periods, there are many underwater obstructions which are well marked. The level of use is reported to be well-balanced, but an additional 100 boats would make the lake overcrowded.

The findings presented in the remainder of this section are based on the User Survey. This survey obtained 33 responses from boaters and waterskiers at Shenango River Lake.

User characteristics

Table 1 indicates the characteristics of the boaters and waterskiers surveyed at Shenango. The users at Shenango who were surveyed tended to be older than those surveyed elsewhere. Also, the users surveyed tended to be involved in more activities than boaters and waterskiers at the other study project areas.

Table 1

Boater/Waterskier Characteristics

Age	Percent of Boaters/Waterskiers
<18	0
18 - 25	16**
26 - 40	48
41 - 55	30
56 - 65	6
>65	0

Group Size	Percent of Boaters/Waterskiers
1	3
2	12
3 - 4	43
5 - 8	36
9 - 12	6
>12	0

Travel Time to Project Area	Percent of Boaters/Waterskiers
<15 minutes	18
15 - 30 minutes	24
30 - 60 minutes	34
1 - 2 hours	28
2 - 3 hours	6
3 - 5 hours	0
>5 hours	0

Visit Duration	Percent of Boaters/Waterskiers
1 - 4 hours	16
5 - 8 hours	39
1 day	3
2 days	0
3 days	6
4 days	3
5 - 7 days	21
>7 days	12

No. of Other Activities	Percent of Boaters/Waterskiers
0	3**
1	9**
2	15
3	28
4	9
5	15
6	9
>6	12

Equipment	Percent of Boaters/Waterskiers
Sailboat	0
Canoe	0
Power Boat (<25 h.p.)	9
Power Boat (>25 h.p.)	91

**Significantly lower than total survey sample.

User opinions

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

Table 2

Preferred Distance Responses*

Sample	Sample Size	Range	Mean	Median	Mode
All Boaters Surveyed	135	30- a	531	300	300
Shenango	31	30- a	864	200,225	600
All Waterskiers Surveyed	95	30- a	520	300	300
Shenango	2	70-300	185	-	-

*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%
Shenango	67	20	30	50
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%
Shenango	50	0	100	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.

Boaters surveyed at Shenango prefer greater spacing more frequently than boaters surveyed at other study project areas.

Reasons for pleasant/unpleasant experience - Table 4 indicates the impact that different factors had on making the boating/waterskiing experience pleasant or unpleasant for users at Shenango. While users found their experience to be generally pleasant, the enforcement of rules, launching times, the distance from other users, car parking facilities, and characteristics and behavior of other people were unpleasant in a significant number of cases. No factor was so unpleasant as to cause a user to indicate that he would not return.

Tables 5 and 6 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 5

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	"Cleaner"	(2)	"More algae"	(1)
	"More docks"	(3)	"Swimming area isolated"	(1)
	"Roads have better paving"	(1)		
	"Painted restroom"	(1)		

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

Table 6

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	(None mentioned)	"More boats"	(3)
		"Less responsibility"	(1)

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

Table 4

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

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	85	15	-
Distance from other people	73	18	9
Number of people in other visitor groups	91	-	9
Number and type of other activities occurring here	76	3	21
Scenic views	100	-	-
Noise	76	6	18
Accidents or near accidents	70	12	18
Enforcement of rules/regulations	61	30	9
Car parking facilities	82	18	-
Theft	82	-	18
Vandalism	76	6	18
Land-Based Reasons			
Amount of facilities (restrooms, water, etc.)	94	6	-
Convenience to facilities (restrooms, water, etc.)	82	18	-
Maintenance of facilities	97	3	-
Condition of trees and landscape	100	-	-
Condition of grass or soil	76	6	18
Water-Based Reasons			
Water quality	94	6	-
Formal designation of places for your activity	70	-	6
Waiting time to launch boat	52	24	-
People in areas they shouldn't be	73	12	15

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

Acceptability of techniques - Table 7 indicates the acceptability of different techniques for solving problems to the boaters and water-skiers surveyed at Shenango.

The acceptability of many techniques is very clear: at least 60 percent of the respondents agreed on one of the 3 levels of acceptability for 5 of the 17 techniques. But even for those techniques which most respondents found to be acceptable, up to 36 percent found them to be unacceptable. Thus, project management should expect some opposition to any technique used.

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 7

User Acceptability of Techniques--Boating/Waterskiing
Shenango River Lake

Techniques	Levels of Acceptability		
	Percentage* of Users Responding:		
	Very Acceptable	Mildly Acceptable	Unacceptable
General Planning Techniques			
Keep major recreation areas more separated	43	36	15
Make vehicle access to areas less convenient	18	36	36
Make area's existence less obvious	9	30	52
Site Planning Techniques			
Design for greater distance between people	52	27	6
Reduce number of parking spaces	18	30	46
Management Techniques			
Procedures:			
Require prior reservations	3	6	88
Require permits	15	15	67
Charge/increase fees	21	24	55
Rules and Regulations:			
Impose more rules	18	21	24
Provide stricter enforcement of rules	49	27	24
Close areas when natural resource destruction reaches critical point	58	18	18
Close areas when they become "too full"	64	18	18
Reduce number of activities in same area	27	46	27
Keep unnecessary vehicles out	70	18	9
Services:			
Provide more and better information	70	21	6
Increase maintenance and restoration	49	33	6
Reduce facilities and services	6	39	49

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

BOAT FISHING

Orientation

Shenango River Lake is a very popular fishing lake. A limited number of water access points makes overcrowding of the launch ramps a problem. Resource degradation is occurring because more and more informal roads are being created in the vicinity of the lake.

The findings presented in the remainder of this section are based on the User Survey. This survey obtained 24 responses from boat fishermen at Shenango.

User characteristics

Table 8 indicates the characteristics of the boat fishermen surveyed at Shenango. Fewer people over 55, in a group of 9 or more, travel between 30 minutes and one hour, and involved in many other activities characterize the Shenango fishermen as compared to boat fishermen surveyed elsewhere. Also, significantly more fishermen are involved in one activity besides boat fishing at Shenango as compared to elsewhere.

Table 8

Boat Fisherman Characteristics

Age	Percent of Boat Fishermen
<18	4
18 - 25	21
26 - 40	46
41 - 55	25
56 - 65	4**
>65	0

Group Size	Percent of Boat Fishermen
1	0
2	67
3 - 4	33
5 - 8	0
9 - 12	0
>12	0

Travel Time to Project Area	Percent of Boat Fishermen
<15 minutes	4
15 - 30 minutes	30
30 - 60 minutes	12**
1 - 2 hours	50
2 - 3 hours	4
3 - 5 hours	0
>5 hours	0

Visit Duration	Percent of Boat Fishermen
1 - 4 hours	25
5 - 8 hours	33
1 day	8
2 days	12
3 days	0
4 days	8
5 - 7 days	4
>7 days	8

No. of Other Activities	Percent of Boat Fishermen
0	30
1	30*
2	8**
3	4**
4	4
5	16
6	0
>6	8

Equipment	Percent of Boat Fishermen
Rowboat	0
Power Boat (<25 h.p.)	4**
Power Boat (>25 h.p.)	96

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

User opinions

Spacing preferences - Tables 9 and 10 indicate the spacing that boat fishermen surveyed at Shenango and elsewhere prefer.

Table 9

Preferred Distance Responses*

Sample	Sample Size	Range	Mean	Median	Mode
All Boat Fishermen Surveyed	111	30 - 5280	555	200	100
Shenango	25	30 - 5280	300	100	60,300

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

Table 10

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%
Shenango	93	73	27	0

*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.

Boat fishermen surveyed at Shenango prefer closer spacing than the boat fishermen surveyed at other project areas.

Reasons for pleasant/unpleasant experience - Table 11 indicates the impact that different factors had on making the boat fishing experience pleasant or unpleasant for users at Shenango. The number and type of other activities, people in areas they shouldn't be, enforcement of rules and regulations, and catching fish were the factors which most often made the experience at Shenango unpleasant. No factor was so unpleasant as to cause a user to indicate that he would not return.

Tables 12 and 13 indicate the changes in the physical condition and people's use of the area as reported by boat fishermen from their previous visit.

Table 12

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	"More fish" (1)	"Removed stumps" (1)

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

Table 13

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	(None mentioned)	"Waterskiers worse" (2)

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

Table 11

Reasons Making Recreation Experience Pleasant or Unpleasant--Boat Fishing
Shenango River Lake

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons Characteristics and behavior of other people	88	12	-
Distance from other people	92	8	-
Number of people in other visitor groups	75	-	12
Number and type of other activities occurring here	46	42	12
Scenic views	100	-	-
Noise	88	4	8
Accidents or near accidents	88	-	4
Enforcement of rules/regulations	83	17	-
Car parking facilities	96	4	-
Theft	96	-	4
Vandalism	96	-	4
Land-Based Reasons Visual privacy from other people	100	-	-
Amount of facilities (restrooms, water, etc.)	88	8	4
Convenience to facilities (restrooms, water, etc.)	100	-	-
Maintenance of facilities	100	-	-
Condition of trees and landscape	100	-	-
Condition of grass or soil	96	-	4
Water-Based Reasons Water quality	100	-	-
Catching fish	71	17	12
People in areas they shouldn't be	71	29	-

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

Acceptability of techniques - Table 14 indicates the acceptability of different techniques for solving problems to the boat fishermen surveyed at Shenango.

The acceptability of most techniques is very clear: at least 60 percent of the respondents agreed on one of the 3 levels of acceptability for 14 of the 17 techniques. But even for those techniques which most respondents found to be acceptable, up to 42 percent found them to be unacceptable. Thus, project management should expect some opposition to any technique used.

Table 14

User Acceptability of Techniques--Boat Fishing
Shenango River Lake

Techniques	Levels of Acceptability		
	Percentage* of Users Responding:		
	Very Acceptable	Mildly Acceptable	Unacceptable
General Planning Techniques			
Keep major recreation areas more separated	54	4	42
Make vehicle access to areas less convenient	17	4	79
Make area's existence less obvious	25	21	54
Site Planning Techniques			
Reduce number of parking spaces	17	4	79
Management Techniques			
Procedures:			
Require prior reservations	17	8	75
Require permits	17	8	75
Charge/increase fees	12	-	88
Rules and Regulations:			
Impose more rules	25	12	63
Provide stricter enforcement of rules	50	25	25
Close areas when natural resource destruction reaches critical point	79	-	21
Close areas when they become "too full"	83	-	17
Reduce number of activities in same area	67	4	29
Limit number of people in visitor groups	12	4	84
Keep unnecessary vehicles out	21	17	62
Services:			
Provide more and better information	88	4	8
Increase maintenance and restoration	67	17	17
Reduce facilities and services	-	4	96

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

CAMPING

Orientation

Two campgrounds at Shenango Recreation Area provides 300 fee campsites which are very closely spaced. This campground receives very heavy use. A new section of 35 campsites opened during the summer of 1979. The 30 non-fee sites located at Mercer Recreation Area are filled on weekends. These sites are numbered and provide gravel pads.

The findings presented in the remainder of this section are based on the User Survey. This survey obtained 62 responses from campers at the Shenanbo campgrounds.

User characteristics

Table 15 indicates the characteristics of the campers surveyed at Shenango. Campers at Shenango are very similar to those surveyed elsewhere except they are involved in more activities other than camping and more are within 30 minutes of the home.

Table 15

Camper Characteristics

Age	Percent of Campers
<18	5
18 - 25	19
26 - 40	40
41 - 55	26
56 - 65	3
>65	7

Group Size	Percent of Campers
1	0
2	18
3 - 4	32
5 - 8	47
9 - 12	3
>12	0

Travel Time to Project Area	Percent of Campers
<15 minutes	10*
15 - 30 minutes	24*
30 - 60 minutes	34
1 - 2 hours	25
2 - 3 hours	2
3 - 5 hours	3
>5 hours	2

Visit Duration	Percent of Campers
1 - 4 hours	2
5 - 8 hours	0
1 day	0
2 days	3
3 days	21
4 days	18
5 - 7 days	30
>7 days	28

No. of Other Activities	Percent of Campers
0	0**
1	6**
2	10
3	15
4	18
5	21
6	16
>6	14

Equipment	Percent of Campers
Tent	27
Tent Camper	8
Truck Mounted Camper	12
Travel Trailer	32
Van	7
Motor Home	12
Other	2

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

User opinions

Spacing preferences - Tables 16 and 17 indicate the spacing (as measured on center of each site) that campers surveyed at Shenango and elsewhere prefer.

Table 16

Preferred Distance Responses* - Camping

Sample	Sample Size	Range	Mean	Median	Mode
All Campers Surveyed (11 projects)	511	10 - a	79	60	75
Shenango Campgrounds	57	15 - a	31	30	30

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

Table 17

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%
Shenango	95	47	31	11	11

*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.

The campers surveyed at Shenango clearly prefer closer spacing more frequently than the users surveyed at other study project areas.

Reasons for pleasant/unpleasant experience - Table 18 indicates the impact that different factors had on making the experience pleasant or unpleasant for users at Shenango. The lack of rules enforcement and the amount of facilities caused unpleasantness in a significant number of cases. One person responded that they would not return to the area (see Table 19).

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

Table 18

Reasons Making Recreation Experience Pleasant or Unpleasant--Camping
Shenango River Lake

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	73	7	20
Distance from other people	77	3	20
Number of people in other visitor groups	73	-	27
Number and type of other activities occurring here	70	3	27
Fees charged	72	3	25
Scenic views	93	2	5
Noise	64	13	23
Accidents or near accidents	68	7	25
Enforcement of rules/regulations	67	23	10
Car parking facilities	65	12	23
Theft	68	5	27
Vandalism	63	11	26
Land-Based Reasons			
Visual privacy from other people	73	10	17
Amount of facilities (restrooms, water, etc.)	76	21	3
Convenience to facilities (restrooms, water, etc.)	77	8	15
Nearness to the water body	69	2	27
Steepness of slopes	73	2	25
Maintenance of facilities	81	6	13
Condition of trees and landscape	95	2	3
Condition of grass or soil	76	2	22
Water-Based Reasons			
Water quality	76	5	16

*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
Shenango	1	2%	"Won't allow visitors to drive to site"

Table 20

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

Area	Positive Changes		Negative Changes	
Shenango Recreation Area	"More facilities"	(6)	"Lack of maintenance"	(3)
	"Landscaped better"	(1)	"Glass on beaches"	(1)
	"Painted restroom"	(4)	"Fewer ranger patrols"	(1)
	"More stop signs"	(3)		
	"More rangers"	(2)		
	"Better paving"	(1)		
	"Better maintenance"	(5)		

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 Campers

Area	Positive Changes		Negative Changes	
Shenango Recreation Area	"More people"	(2)	"Men in women's shower"	(2)
			"Vandalism"	(4)
			"Lack of parental disciplines"	(1)
			"Anti-visitors"	(1)
			"Traffic too fast"	(1)
			"Bikes"	(1)
			"Too many dogs"	(2)
			"Noise"	(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 to the campers surveyed at Shenango. The acceptability of these techniques is not as clear as for campers at other project areas studied. 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 used.

Table 22

User Acceptability of Techniques--Camping
Shenango River Lake

Techniques	Levels of Acceptability Percentage* of Users Responding:		
	Very Acceptable	Mildly Acceptable	Unacceptable
General Planning Techniques Keep major recreation areas more separated	47	40	13
Make vehicle access to areas less convenient	18	44	37
Make area's existence less obvious	15	32	48
Site Planning Techniques Redesign area to accommodate fewer users	22	39	39
Design for greater distance between people	51	39	10
Reduce number of parking spaces	23	31	36
Change natural surface by hardening	23	58	19
Change natural surface by paving	47	44	5
Provide landscaped buffers	57	27	16
Management Techniques Procedures: Require prior reservations	24	8	66
Require permits	37	14	47
Charge/increase fees	16	42	40
Rules and Regulations: Impose more rules	21	31	48
Provide stricter enforcement of rules	57	21	23
Close areas when natural resource destruction reaches critical point	52	42	6
Close areas when they become "too full"	68	18	14
Reduce number of activities in same area	26	48	26
Limit number of people in visitor groups	18	13	70
Keep unnecessary vehicles out	55	34	8
Services: Provide more and better information	68	26	2
Increase maintenance and restoration	47	44	5
Reduce facilities and services	11	29	58

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

HIKING

Orientation

The Seth Myers Nature Trail, located at the Shenango Recreation Area is reportedly well balanced in use. The four mile interpretive nature trail has 17 stops and has an accompanying booklet.

User information

Only two hikers were surveyed at the Seth Myers Hiking Trail. They found their experience to be pleasant. Neither responded that any factor had been unpleasant. They found the following techniques to be very acceptable: providing more and better information, keeping major activity areas more separated, and keeping unnecessary vehicles out. They found the remainder to be only mildly acceptable or unacceptable.

OFF-ROAD VEHICLE RIDING (ORV)

Orientation

Off-road vehicle riding is provided for at the Paden Farm Area. This area contains approximately 200 usable acres (400 acres total) for riding, and is well suited because of its location away from other activity areas and its former use as a sand and gravel borrow area. Although no support facilities are provided, it reportedly receives moderate to heavy use.

User information

Only one ORV rider was surveyed. He found his experience at Paden Farm to be generally pleasant, with only the enforcement of rules and car parking facilities being unpleasant. He found the following techniques to be unacceptable: making vehicle access less convenient, hardening natural surfaces, reducing facilities and services, and imposing more rules. He found the remainder of the techniques to be acceptable.

PICNICKING

Orientation

Shenango's picnic areas vary from being underused to heavily used. Most of the picnicking occurs at Mahaney Recreation Area. Picnic tables are staked to the ground to prevent theft.

The findings presented in the remainder of this section are based on the User Survey. This survey obtained 17 responses from picnickers surveyed at Shenango (13 at the Mahaney Recreation Area and 4 at Shenango Recreation Area).

User characteristics

Table 23 indicates the characteristics of the picnickers surveyed at the project. The most significant differences in the characteristics of the picnickers surveyed at Shenango from those of other study project areas are: more picnickers are over 56 years old and have over 9 people in their group. Also fewer are involved in picnicking as their only activity.

Table 23

Picnicker Characteristics

Age	Percent of Picnickers	Group Size	Percent of Picnickers
<18	6	1	0
18 - 25	12	2	6
26 - 40	47	3 - 4	18
41 - 55	18	5 - 8	35
56 - 65	18*	9 - 12	6*
>65	0	>12	35*

Travel Time to Project Area	Percent of Picnickers	Visit Duration	Percent of Picnickers
<15 minutes	0	1 - 4 hours	47
15 - 30 minutes	53	5 - 8 hours	53
30 - 60 minutes	24	1 day	0
1 - 2 hours	12	2 days	0
2 - 3 hours	12	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	18
2	29
3	24
4	12
5	18
6	0
>6	0

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

User opinions

Spacing preferences - Tables 24 and 25 indicate the spacing that picnickers surveyed at Shenango and elsewhere prefer.

Table 24

Preferred Distance Responses*

Sample	Sample Size	Range	Mean	Median	Mode
All Picnickers Surveyed	190	1 - a	62	50	50
Shenango	17	15 -200	60	35	30
Mahaney	15	20 -200	73	60	60
Shenango	4	15 - 20	18	20	20

*In feet; 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'-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%
Shenango	87	62	8	30	0
Mahaney	100	55	9	36	0
Shenango	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 Shenango prefer closer spacing more frequently than picnickers surveyed at other project areas.

Reasons for pleasant/unpleasant experience - Tables 26 and 27 indicate the impact that different factors had on making the picnicking experience pleasant or unpleasant for users at the picnic areas surveyed. Users at Mahaney found their experience to be generally pleasant. The enforcement of rules, the amount and convenience of facilities, the steepness of slopes, nearness to the water, water quality, and noise caused unpleasantness in a significant number of cases. The small survey sample at the Shenango Recreation Area limits the reliability of the information presented. One user indicated that he would not return (see Table 28).

Tables 29 and 30 indicate the changes in the physical condition and people's use of the areas as reported by picnickers from their previous visit.

Table 26

Reasons Making Recreation Experience Pleasant or Unpleasant--Picnicking
Mahaney

	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons Characteristics and behavior of other people	100	-	25
Distance from other people	75	-	25
Number of people in other visitor groups	75	-	45
Number and type of other activities occurring here	55	-	-
Scenic views	100	-	-
Noise	58	17	25
Accidents or near accidents	50	8	42
Enforcement of rules/regulations	67	25	8
Car parking facilities	92	-	8
Theft	50	-	50
Vandalism	58	-	42
Land-Based Reasons Visual privacy from other people	50	8	42
Amount of facilities (restrooms, water, etc.)	75	25	-
Convenience to facilities (restrooms, water, etc.)	75	25	-
Nearness to the water body	58	17	25
Steepness of slopes	42	17	42
Maintenance of facilities	92	8	-
Condition of trees and landscape	10	8	-
Condition of grass or soil	50	8	42
Water-Based Reasons Water quality	50	17	33

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

Table 27

Reasons Making Recreation Experience Pleasant or Unpleasant--Picnicking
Shenango Recreation Area

	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons			
Characteristics and behavior of other people	75	25	-
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	100	-	-
Accidents or near accidents	75	25	-
Enforcement of rules/regulations	100	-	-
Car parking facilities	100	-	-
Theft	100	-	-
Vandalism	100	-	-
Land-Based Reasons			
Visual privacy from other people	100	-	-
Amount of facilities (restrooms, water, etc.)	75	25	-
Convenience to facilities (restrooms, water, etc.)	100	-	-
Nearness to the water body	75	25	-
Steepness of slopes	75	25	-
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

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
Mahaney	-	-	(None mentioned)
Shenango	1	25%	"No beach"

Table 29

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

Area	Positive Changes		Negative Changes	
Mahaney Recreation Area	"Better maintenance"	(1)	"Restroom too far away"	(1)
	"More tables"	(1)	"Insufficient mowing"	(1)
	"Better parking"	(1)		
	"Docks"	(2)		
	"Lake level constant"	(1)		
Shenango Recreation Area	"More tables"	(1)	"No garbage cans"	(1)

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

Table 30

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

Area	Positive Changes	Negative Changes
Mahaney Recreation Area	(None mentioned)	"Behavior of other uses" (1)
Shenango Recreation Area	(None mentioned)	(None mentioned)

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

Acceptability of techniques - Table 31 indicates the acceptability of different techniques for solving problems to the picnickers surveyed at Shenango.

The acceptability of many techniques is very clear: at least 60 percent of the respondents agreed on one of the 3 levels of acceptability for 6 of the 22 techniques. But even for those techniques which most respondents found to be acceptable, up to 47 percent found them to be unacceptable. Thus, project management should expect some opposition to any technique used.

Table 31

User Acceptability of Techniques--Picnicking
Shenango River Lake

Techniques	Levels of Acceptability Percentage* of Users Responding: Very Acceptable	Mildly Acceptable	Unacceptable
General Planning Techniques			
Keep major recreation areas more separated	65	29	-
Make vehicle access to areas less convenient	-	47	53
Make area's existence less obvious	18	35	41
Site Planning Techniques			
Redesign area to accommodate fewer users	-	53	47
Design for greater distance between people	35	47	18
Reduce number of parking spaces	6	59	35
Change natural surface by paving	24	41	35
Provide landscaped buffers	53	18	29
Management Techniques			
Procedures:			
Require prior reservations	6	-	88
Require permits	18	6	71
Charge/increase fees	-	35	65
Rules and Regulations:			
Impose more rules	24	24	53
Provide stricter enforcement of rules	47	29	24
Close areas when natural resource destruction reaches critical point	59	29	12
Close areas when they become "too full"	29	23	47
Reduce number of activities in seam area	18	35	47
Limit number of people in visitor groups	18	6	71
Keep unnecessary vehicles out	35	29	29
Services:			
Provide more and better information	94	6	-
Increase maintenance and restoration	59	41	-
Reduce facilities and services	18	35	41

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

SHORELINE FISHING

Orientation

Shenango River Lake is a very popular fishing lake. Trout, largemouth bass, walleye, northern pike, crappie, panfish and other species are frequently caught. Fishermen desire more and better access points to the lake.

The findings presented in the remainder of this section are based on the User Survey. This survey obtained 7 responses from shoreline fishermen at the outlet.

User characteristics

Table 32 indicates the characteristics of the shoreline fishermen surveyed at Shenango. The shoreline fishermen surveyed tend to have shorter travel times and participate in significantly fewer other activities than the shoreline fishermen surveyed elsewhere.

Table 32

Shoreline Fisherman Characteristics

Age	Percent of Shoreline Fishermen
<18	29*
18 - 25	14
26 - 40	29
41 - 55	14
56 - 65	14
>65	0

Group Size	Percent of Shoreline Fishermen
1	29
2	57
3 - 4	14**
5 - 8	0
9 - 12	0
>12	0

Travel Time to Project Area	Percent of Shoreline Fishermen
<15 minutes	43*
15 - 30 minutes	19
30 - 60 minutes	43
1 - 2 hours	0**
2 - 3 hours	0
3 - 5 hours	0
>5 hours	0

Visit Duration	Percent of Shoreline Fishermen
1 - 4 hours	86
5 - 8 hours	14
1 day	0
2 days	0
3 days	0
4 days	0
5 - 7 days	0
>7 days	0

No. of Other Activities	Percent of Shoreline Fishermen
0	100*
1	0**
2	0
3	0
4	0
5	0
6	0
>6	0

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

User opinions

Spacing preferences - Tables 33 and 34 indicate the spacing that shoreline fishermen surveyed at Shenango and elsewhere prefer.

Table 33

Preferred Distance Responses*

Sample	Sample Size	Range	Mean	Median	Mode
All Shoreline Fishermen Surveyed	106	6 - a	76	35	50
Shenango	5	15 - 20	16	15	15

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

Table 34

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%	20%	38%	24%	18%
Outlet	100	80	20	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.

Shoreline fishermen surveyed at Shenango prefer closer spacing more frequently than shoreline fishermen surveyed at other project areas.

Reasons for pleasant/unpleasant experience - Table 35 indicates the impact that different factors had on making shoreline fishing pleasant or unpleasant for users at the Outlet. The steepness of slopes, catching fish, location of facilities, car parking facilities, and accidents or near accidents caused unpleasantness in a significant number of cases. No factor was so unpleasant as to cause a user to indicate that he would not return. One respondent mentioned the Outlet has "more litter" than in the past. No other changes in the physical condition or people's use of this fishing area were reported by the users surveyed.

Table 35

Reasons Making Recreation Experience Pleasant or Unpleasant--Shoreline Fishing Outlet

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	71	-	-
Number and type of other activities occurring here	100	-	-
Scenic views	100	-	-
Noise	100	-	-
Accidents or near accidents	71	29	-
Enforcement of rules/regulations	86	14	-
Car parking facilities	71	29	-
Theft	100	-	-
Vandalism	100	-	-
Land-Based Reasons			
Visual privacy from other people	-	-	-
Amount of facilities (restrooms, water, etc.)	86	-	-
Convenience to facilities (restrooms, water, etc.)	57	29	-
Nearness to the water body	100	-	-
Steepness of slopes	29	71	-
Maintenance of facilities	100	-	-
Condition of trees and landscape	86	-	-
Condition of grass or soil	86	-	-
Water-Based Reasons			
Water quality	100	-	-
Catching fish	57	43	-
Formal designation of places for your activity	86	14	-

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

Acceptability of techniques - Table 36 indicates the acceptability of different techniques for solving problems to the shoreline fishermen surveyed at Shenango.

The acceptability of many techniques is very clear: at least 60 percent of the respondents agreed on one of the 3 levels of acceptability for 6 of the 21 techniques. But even for those techniques which most respondents found to be acceptable, up to 43 percent found them to be unacceptable. Thus, project management should expect some opposition to any technique used.

Table 36

User Acceptability of Techniques--Shoreline Fishermen
Shenango River Lake

Techniques	Levels of Acceptability Percentage* of Users Responding:		
	Very Acceptable	Mildly Acceptable	Unacceptable
General Planning Techniques			
Keep major recreation areas more separated	71	14	-
Make vehicle access to areas less convenient	43	-	57
Make area's existence less obvious	14	14	57
Site Planning Techniques			
Redesign area to accommodate fewer users	43	-	29
Design for greater distance between people	14	-	57
Reduce number of parking spaces	43	29	29
Change natural surface by paving	-	14	71
Provide landscaped buffers	-	-	-
Management Techniques			
Procedures:			
Require prior reservations	-	-	29
Require permits	43	14	43
Charge/increase fees	-	-	100
Rules and Regulations:			
Impose more rules	14	57	29
Provide stricter enforcement of rules	100	-	-
Close areas when natural resource destruction reaches critical point	43	43	14
Close areas when they become "too full"	86	14	-
Reduce number of activities in seam area	29	57	-
Limit number of people in visitor groups	-	29	57
Keep unnecessary vehicles out	57	29	-
Services:			
Provide more and better information	86	-	14
Increase maintenance and restoration	29	57	14
Reduce facilities and services	-	14	86

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

SUNBATHING/SWIMMING

Orientation

Sunbathing and swimming are popular activities at Shenango's recreation areas. While swimming areas are provided at the Shenango and Mahaney areas, Chestnut Run Beach (a cooperate Corps/County area) is the most highly developed swimming area at the project.

The findings presented in the remainder of this section are based on the User Survey. This survey obtained 20 responses from sunbathers and swimmers at Shenango (19 at Mahaney Recreation Area and 1 at Shenango Recreation Area).

User characteristics

Table 37 indicates the characteristics of the sunbathers and swimmers surveyed at Shenango River Lake.

Table 37

Sunbather/Swimmer Characteristics

Age	Percent of Sunbathers/Swimmers
<18	0
18 - 25	45
26 - 40	55
41 - 55	0
56 - 65	0
>65	0

Group Size	Percent of Sunbathers/Swimmers
1	10
2	75*
3 - 4	15
5 - 8	0
9 - 12	0
>12	0

Travel Time to Project Area	Percent of Sunbathers/Swimmers
<15 minutes	0
15 - 30 minutes	53
30 - 60 minutes	24
1 - 2 hours	12
2 - 3 hours	12
3 - 5 hours	0
>5 hours	0

Visit Duration	Percent of Sunbathers/Swimmers
1 - 4 hours	47
5 - 8 hours	53
1 day	0
2 days	0
3 days	0
4 days	0
5 - 7 days	0
>7 days	0

No. of Other Activities	Percent of Sunbathers/Swimmers
0	10
1	10**
2	65**
3	10
4	0
5	5
6	0
>6	0

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

User opinions

Spacing preferences - Tables 38 and 39 indicate the spacing that sunbathers and swimmers surveyed at Shenango and elsewhere prefer.

Table 38

Preferred Distance Responses*

Sample	Sample Size	Range	Mean	Median	Mode
All Sunbathers surveyed	161	3- a	30	20	15, 20
Mahaney	9	15- a	28	25	-
All Swimmers surveyed	120	2-200	25	20	20
Shenango	4	15-150	25	30	30
Mahaney	3	15- 30	25	30	30
Shenango	1	150	150	150	150

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

Table 39

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%
Mahaney	100	0	44	33	22

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%
Shenango	75	0	33	67	0
Mahaney	100	0	33	67	0
Shenango	0	0	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 Planning Range.

Reasons for pleasant/unpleasant experience - Table 40 indicates the impact that different factors had on making the experience pleasant or unpleasant for users at Mahaney. All but three of the factors which were unpleasant were unpleasant to at least ten percent of the users surveyed. The swimmer surveyed at the Shenango Recreation Area found no factor to be unpleasant.

Tables 41 and 42 indicate the changes in the physical condition and people's use of the areas as reported by sunbathers and swimmers from their previous visit.

Table 41

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

Area	Positive Changes	Negative Changes
Mahaney	"Painted restrooms" (1)	"Parking" (3)
	"Cleaner" (1)	"Bees" (1)
		"Restrictions" (1)
Shenango	(None mentioned)	(None mentioned)

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

Table 42

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

Area	Positive Changes	Negative Changes
Mahaney	(None mentioned)	"Boats" (3)
		"Traffic" (1)
Shenango	(None mentioned)	(None mentioned)

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

Table 40

Reasons Making Recreation Experience Pleasant or Unpleasant--Sunbathing/Swimming
Mahaney

Reasons	Percentage* of Users Responding:		
	Pleasant	Unpleasant	Not Important
General Reasons Characteristics and behavior of other people	89	-	11
Distance from other people	89	-	11
Number of people in other visitor groups	78	-	22
Number and type of other activities occurring here	83	6	11
Scenic views	100	-	-
Noise	83	6	11
Accidents or near accidents	78	11	11
Enforcement of rules/regulations	61	39	-
Car parking facilities	61	33	6
Theft	78	17	6
Vandalism	78	17	6
Land-Based Reasons Amount of facilities (restrooms, water, etc.)	50	50	-
Convenience to facilities (restrooms, water, etc.)	33	61	6
Maintenance of facilities	83	6	11
Condition of trees and landscape	89	11	-
Condition of grass or soil	61	22	17
Water-Based Reasons Water quality	44	56	-
Formal designation of places for your activity	47	-	20
People in areas they shouldn't be	83	-	7

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

Acceptability of techniques - Table 43 indicates the acceptability of different techniques for solving problems to the sunbathers and swimmers surveyed at Shenango.

The acceptability of many techniques is very clear: at least 60 percent of the respondents agreed on one of the 3 levels of acceptability for 7 of the 18 techniques. But even for those techniques which most respondents found to be acceptable, up to 45 percent found them to be unacceptable. Thus, project management should expect some opposition to any technique used.

Table 43

User Acceptability of Techniques--Sunbathing/Swimming
Shenango River Lake

Techniques	Levels of Acceptability		
	Percentage* of Users Responding:		
	Very Acceptable	Mildly Acceptable	Unacceptable
General Planning Techniques			
Keep major recreation areas more separated	50	20	25
Make vehicle access to areas less convenient	20	50	30
Make area's existence less obvious	5	60	35
Site Planning Techniques			
Redesign area to accommodate fewer users	10	50	40
Design for greater distance between people	35	60	5
Reduce number of parking spaces	-	25	75
Management Techniques			
Procedures:			
Require permits	10	5	85
Charge/increase fees	-	50	50
Rules and Regulations:			
Impose more rules	30	25	45
Provide stricter enforcement of rules	10	35	55
Close areas when natural resource destruction reaches critical point	55	25	20
Close areas when they become "too full"	35	25	40
Reduce number of activities in same area	30	35	35
Limit number of people in visitor groups	20	-	80
Keep unnecessary vehicles out	40	15	45
Services:			
Provide more and better information	65	30	5
Increase maintenance and restoration	45	45	-
Reduce facilities and services	-	40	60

*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 Shenango River 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 44 may not be practical or possible because of management, budget, or other constraints.

Table 44

Analysis of Selected Problems/Situations

Area/Subject	Problem/Situation	Possible Solutions/Techniques
Shenango Recreation Area--camping	Overuse--especially the campsites near the water.	o rehabilitate water-side sites with impact sites. o put in more gravel at all sites & provide hardened areas for a boat trailer and second vehicle. o relocate sites which continue experiencing problems.
	Overcrowding--campsites located too close to each other.	o eliminate sites which are too close to others; these are generally found at turns in the road. o where more than 2 sites are too close, they might be redeveloped as a group site.
	Overuse--people have worn paths along desire lines, particularly at bathroom and shower buildings.	o harden paths. o constrain traffic to hardened paths.
Duck Lake--camping	Overcrowding--the lack of natural cover as a visual screen in this area makes it highly susceptable to overcrowding problems.	o plant trees and large shrubs between sites to reduce the potential for overcrowding and user conflicts.

Area/Subject	Problem/Situation	Possible Solutions/Techniques
Mahaney--picnicking	Underuse--the upper portion of this picnic area is underused.	• provide more grills & better access to water (e.g. paths to shoreline, install steps on hill near boat trailer lot), add more tables near ramp area. • provide more & better signs on highways to inform people of the areas' existence. • provide picnic tables in end-to-end arrangements for groups and families. • provide more and better facilities to attract picnickers.
Shenango Recreation Area--Boat launching	Overcrowding--the limited area at the ramp and lack of a preparation lane foster overcrowding conditions.	• install a preparation lane on entry road. • add a paved area adjacent to exit lane to facilitate backing onto ramp. • provide someone at the ramp to direct traffic during peak use periods, such as holiday weekends. • upgrade existing roads that dead-end into the lake for small boat launching; this may help reduce conjection at the more formal ramps.
Mahaney--Boat Launching area	Overuse--boaters and swimmers have worn a path leading to the bathroom up the hill next to the boat trailer ramp.	• harden worn paths.
Shoreline Erosion	Shoreline erosion in some places is severe.	• continue to stabilize erosion prone areas. • explore new methods for solving and preventing shoreline erosion. • identify areas prone to shoreline erosion and avoid developing recreation sites.
Lake surface	Numerous obstructions in the water during low flow periods.	• continue to mark and identify new obstructions. • provide maps and other information to make boaters aware of these hazards. • place warning buoys near popular swimming areas.

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

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					

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

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

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

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)

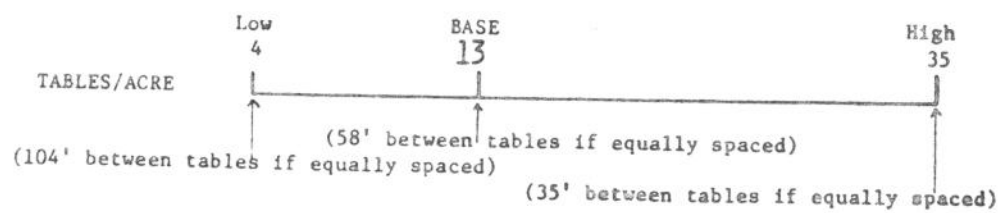
10. POSSIBLE CARRYING CAPACITIES

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:			

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 AWARE-NESS	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	Relation-ship 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, archeo-logic 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 & ERVICES	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 ESIGN SPECTS	Distance between campsites	Minimum			
		Maximum			
		Average			
	Distance between campsites and the facilities	Minimum			
		Maximum			
		Average			
	Space for camper unit maneuverability	Ample			
		Acceptable			
		Restrictive			
	Control	Controlled (gate, attendant)			
		Uncontrolled			

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 rea ame	Activity	Estimated direct distance from camping use area	Pedestrian accessibility to other use area			Visibility to other use area			Reasons for accessibility and/or visibility situation
			Easy	Mod-erate	Diffi-cult	Ob-structed	Semi-ob-structed	Unob-structed	

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-RO419

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

Shenango

Location

The Shenango Reservoir Project (Pittsburgh District) is located in the northwestern part of Pennsylvania and in adjoining northeastern Ohio. It is contained in the Shenango River Valley between Sharpsville and Greenville, Pennsylvania, and in the tributary stream valley of Pymatuning Creek, between the Shenango River and Kinsman, Ohio. The dam is located about 33 miles above the mouth of the Shenango River.

Authorization and purpose

The Shenango River Lake Project was authorized by the Flood Control Act of 28 June 1938, for the purposes of flood control of the Shenango, Beaver, and Ohio Rivers, and seasonal augmentation of low flows of the Shenango and Beaver Rivers.

Project area size and features

At the normal recreational lake elevation of 896 feet msl, the lake has a surface area of 3550 acres and the project land area is 10,984 acres. Shenango's watershed area comprises 431 square miles, beginning just below the Pymatuning Dam, which is located farther up the Shenango River.

The lake extends 11 miles up the arm of the Shenango River and 5 miles up the Pymatuning Creek. The 44-mile shoreline consists of many small coves and inlets.

Topography

The shoreline upstream of Orangeville on Pymatuning Creek and upstream of the Big Bend area on the Shenango River consists of gently rolling hills with slopes of usually less than 15 percent.

Climate

The average monthly temperature ranges from 75 degrees F. during July to about 29 degrees F. during January. The average precipitation over the drainage area is 38.5 inches. Prevailing winds over the basin are usually from the southwest.

Soils and vegetation

Adjacent to the main body of the reservoir, the vegetation consists of approximately 70 percent meadows and fields and 30 percent intermittent wood lots and border timber. Along the two arms of the reservoir, wooded areas make up about one half of the vegetation, with the remainder being cultivated fields, meadows, and a few marshes.

Fish and wildlife

Numerous species of fish and wildlife abound at Shenango Lake. The lakebed is irregular and undulating, and composed of various types of rock, gravel, and soil formations which provide an excellent environment for the northern, walleye, and muskellunge pike, largemouth bass, bullhead, catfish, suckers, bluegill, sunfish, and crappie.

The lands surrounding the reservoir contain a variety of wildlife such as white-tailed deer, gray fox, cottontail rabbit, gray and fox squirrel, pheasant, ruffed grouse, woodcock, bobwhite quail, mourning dove, and wild turkey. These species are the principal upland game resources. The reservoir is situated on an important flyway for ducks and geese migrating north and south. Secluded natural resting, feeding, and nesting areas are available.

Population areas served and accessibility

Youngstown, Ohio is located about 10 miles southwest of the damsite, and Pittsburgh, Pennsylvania is approximately 65 miles to the southeast. In 1970, the population of the metropolitan Youngstown area was over 536,000, and the Pittsburgh metropolitan area had over 2,401,200 persons. Pittsburgh and Cleveland, Ohio are both less than two hours driving time from the project, and numerous other smaller cities and towns lie within one hour driving time zone.

Access to the project is excellent via the surrounding federal and state highways. Interstate Highways 79, 80, and 90 transport many recreators from the Cleveland and Pittsburgh areas, while many local roads provide direct access to the Lake.

Recreation areas

Of the total 10,987 acres of land, the Corps of Engineers manages 8695 acres, the Borough of Clark manages an 18-acre park, Costar Marina manages 15 acres, and the Shenango Valley Y.M.C.A. manages a 43-acre general recreation area. The Pennsylvania Game Commission, in conjunction with the Corps, manages 2213 acres of land for wildlife management.

The Corps of Engineers currently has three developed recreation areas which total approximately 400 acres. The Mahaney Area has day use facilities for boating, fishing, picnicking, and sightseeing. The Shenango Recreation Area has camping in addition to these day use facilities. The Mercer Area offers primitive camping. Seventeen other areas have been selected for future general recreation development.

Visitation

In 1978, approximately 1,758,200 recreation days were recorded at the Shenango Reservoir. The month of highest visitation was July, with 445,900 recreation days.

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 9: Shenango River 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, 69, [25] p. : ill. ; 27 cm. (Miscellaneous paper - U. S. Army Engineer Waterways Experiment Station ; R-80-1, Report 9)
Prepared for Office, Chief of Engineers, U. S. Army, Washington, D. C., under Contract No. DACW39-78-C-0096.
Project map of Shenango River Lake in pocket at end of report.

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